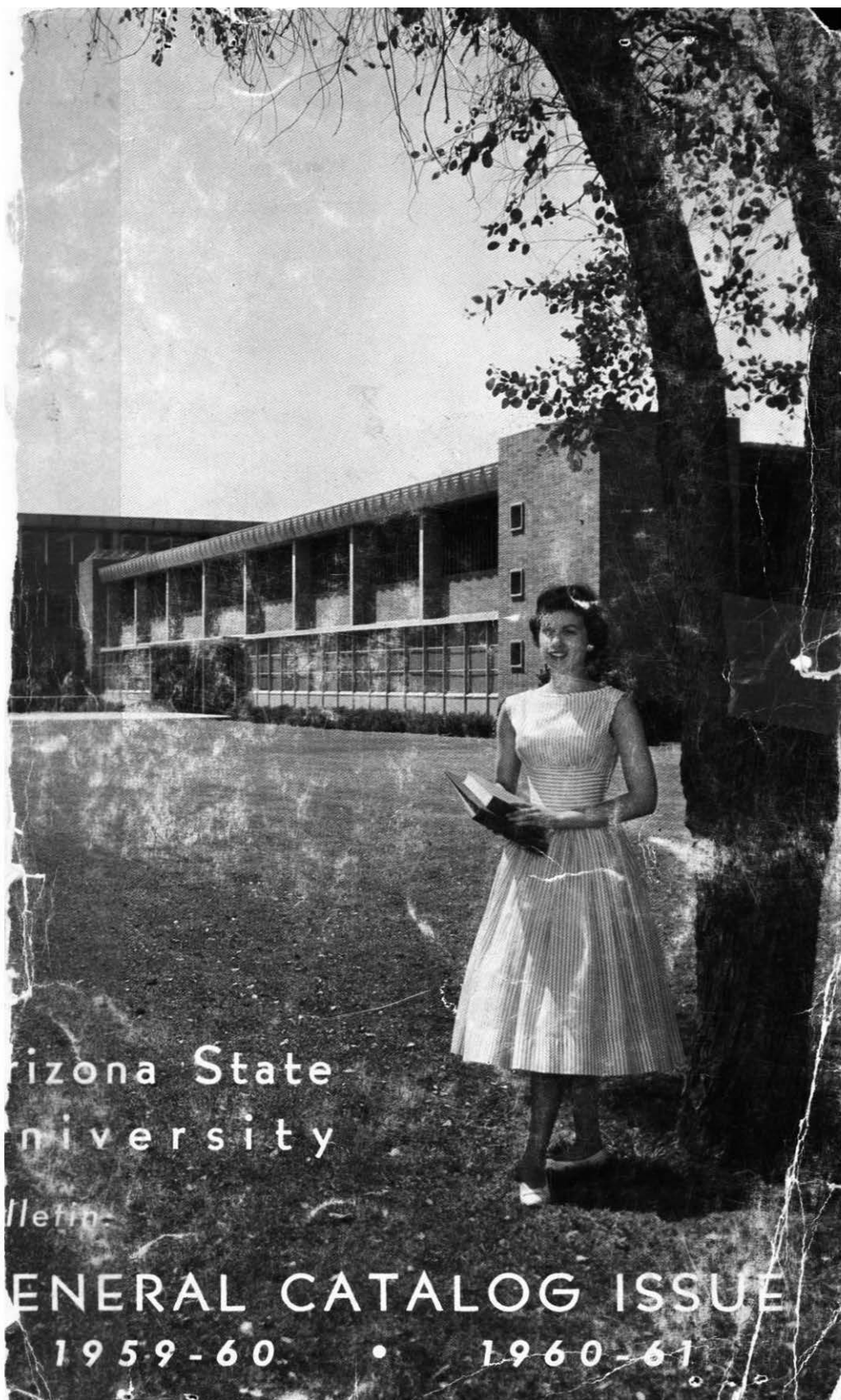




Arizona State
University

Bulletin

GENERAL CATALOG ISSUE

1959-60

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1960-61

BULLETIN

GENERAL CATALOG

1959-60

1960-61

Arizona State University

Grady Gammage, Ed.D., LL.D.
President of the University

Harold D. Richardson, Ph.D.
Academic Vice President

Gilbert L. Cady, B.A. in Ed.
Vice President for Business Affairs



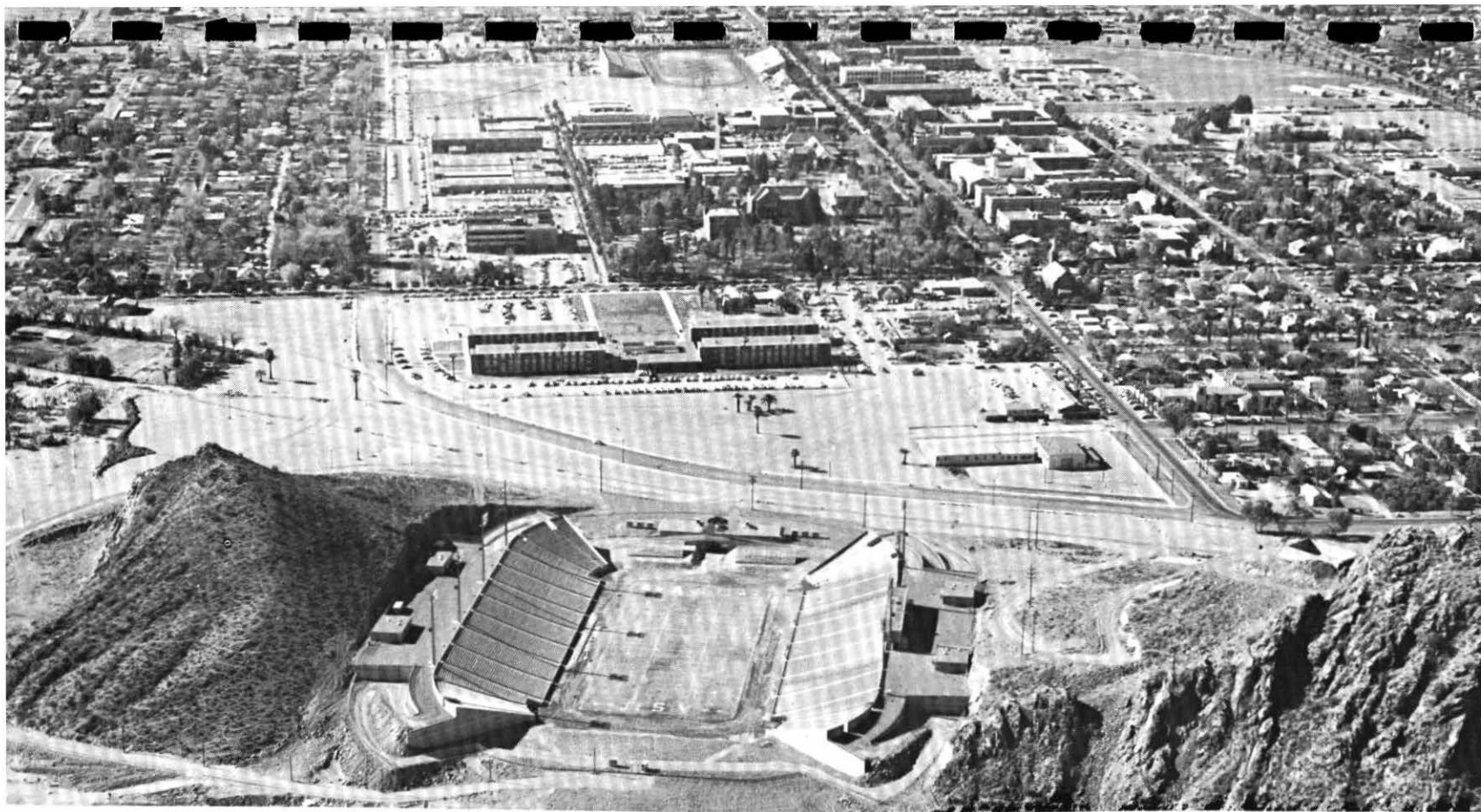
Vol. LXXIV
May, 1959

No. 2
Tempe, Arizona

Published four times a year during the months of January, March, May and July, and entered as second class matter November 30, 1931 in the Post Office at Tempe, Arizona, under the Act of August 24, 1912.



Book-laden students between classes compare notes in front of Matthews Library. The easy informality of southwestern college living is complemented by the dignity preserved in the architecture of campus buildings.



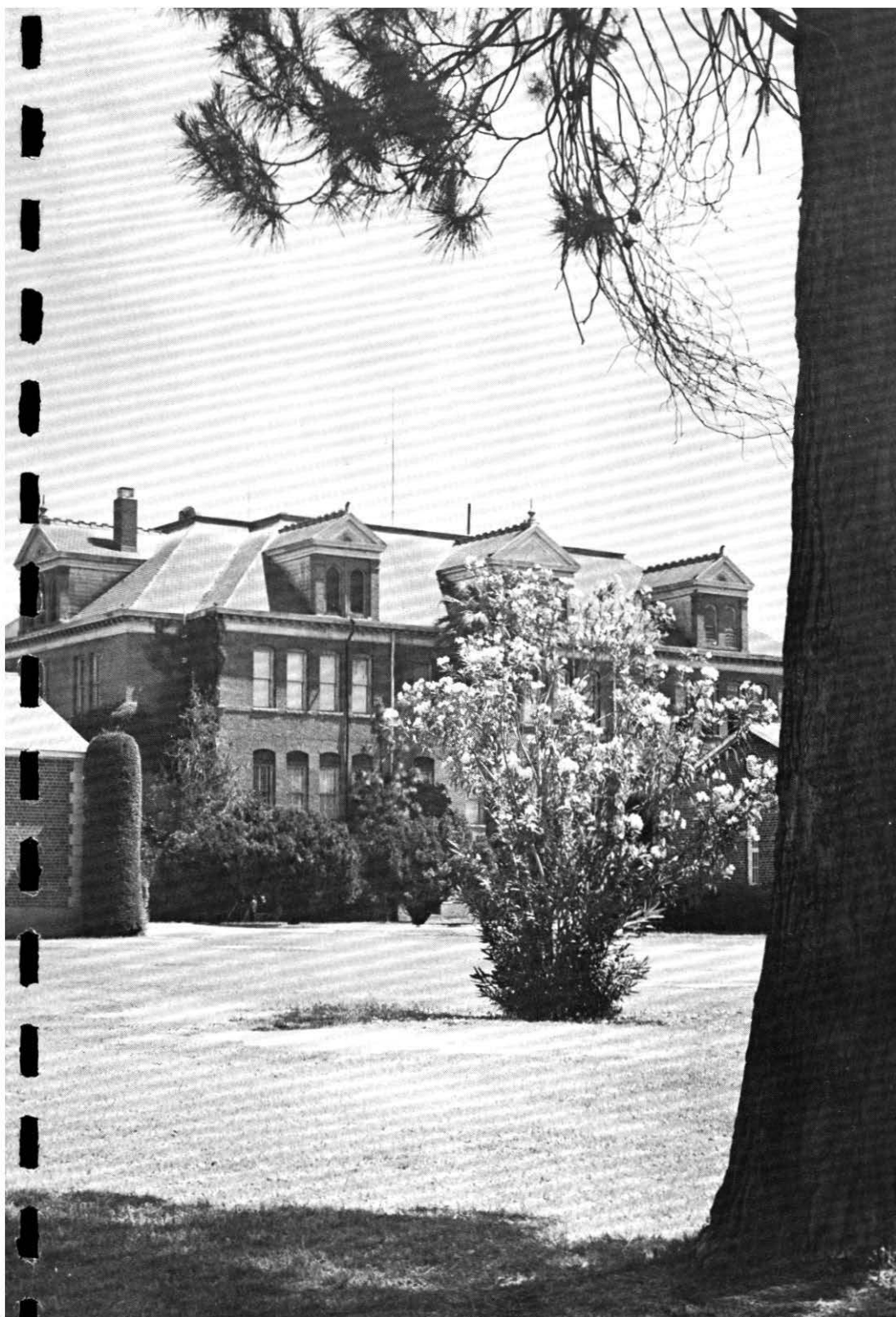
Dramatic aerial photo from the north shows the ASU campus—over 220 acres and more than 60 buildings. Mid-campus is located slightly above and to the right of center. In the foreground is the new Sun Devil Stadium, opened in 1958, seating over 30,000 spectators. Directly above it is the new women's residence hall, Palo Verde.



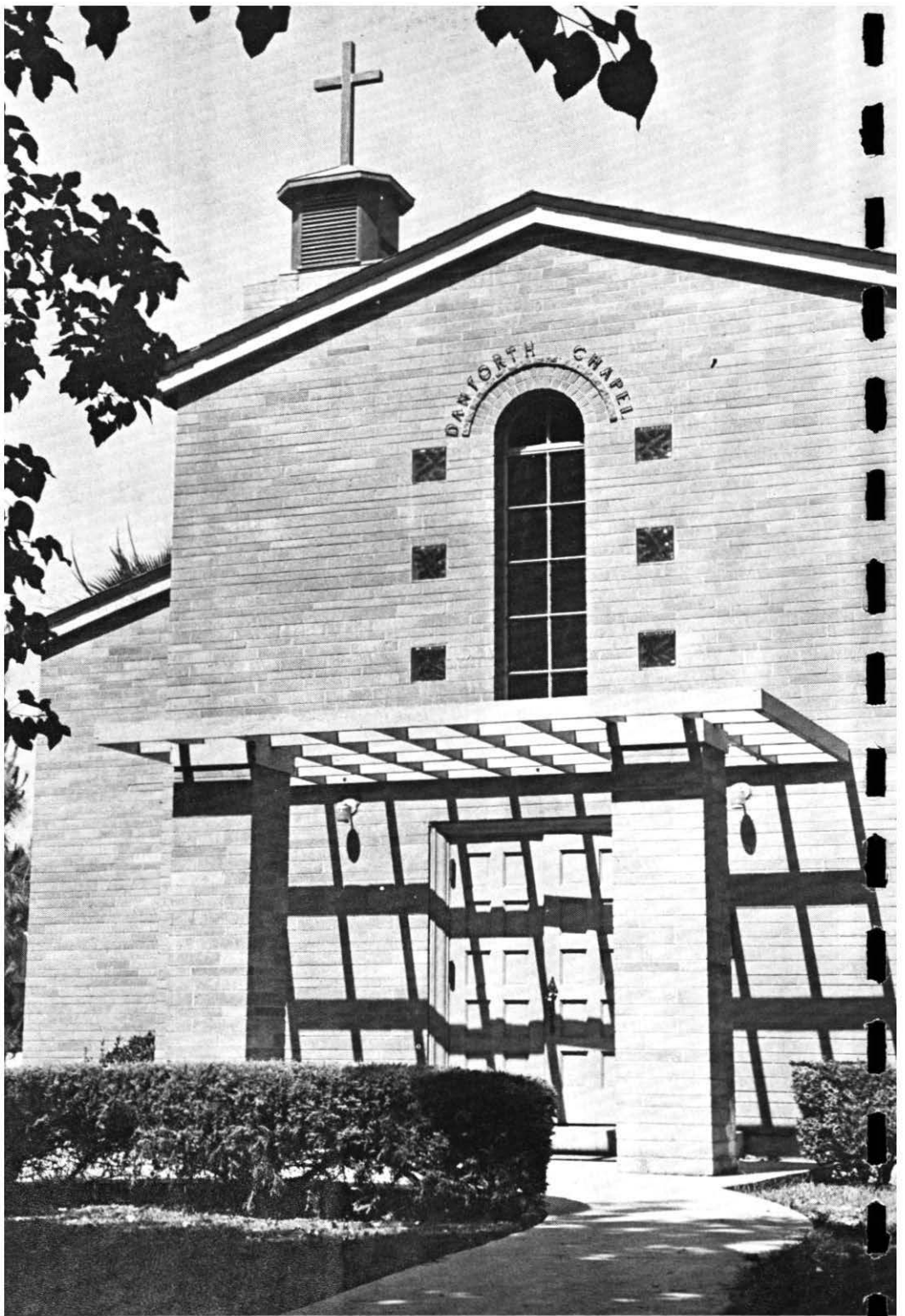
The Administration Building houses key administrative offices and is headquarters for the many complex operations necessary to a university of this size. The offices of the President, Vice-Presidents, Registrar and Director of Admissions, and other administrative officers are located here.

Center of social, cultural, and student affairs on campus, the Memorial Union provides a ballroom, banquet rooms, and many recreational facilities. The central cafeteria, snack bars, bookstore, and Associated Students' offices are also in this ultra-modern structure.





Old Main, completed in 1894, was an architectural showpiece in Arizona for years. Recently completely remodeled inside, the building now provides valuable classroom and office space for the College of Education.



In the heart of the campus and in the heart of the students, Danforth Chapel is open at all times for meditation to all students regardless of race, creed, or color.



One of the most striking components of the new Life Sciences Center is the rounded, wedge-shaped lecture amphitheater. This building features an ecological patio laboratory which will contain many varieties of desert plant and animal life under natural desert conditions for purposes of research and study.

The Business Administration Building splendidly typifies the dramatic architecture of new buildings on the ASU campus. Wing-end blocks contain service equipment, leaving the long glass-walled expanse for classrooms, offices, and lecture theaters.





Iron gates and decorative pillars, part of yesterday's campus, still contribute a graceful frame for the classical columns of the Arts Building.

Home Economics majors become familiar with this building, which features modern classroom, well-equipped laboratory kitchens, and up-to-date homemaking appliances.



GENERAL CATALOG

1959-60

1960-61

Arizona State
University

Requests for detailed information should be addressed
as follows:

Registrar and Director of Admissions
Arizona State University
Tempe, Arizona

Arizona State University reserves the right to change
without notice any of the materials—information, require-
ments, regulations—published in this bulletin. The catalog
is not to be regarded as a contract.

CALENDAR 1959-60-61

1959

JULY

S	M	T	W	T	F	S
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AUGUST

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DECEMBER

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1961

JANUARY

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University Calendar

1959-60 1960-61

Fall Semester

	1959-60	1960-61
Faculty Planning Conference.....	Sept. 4, 5 F. & Sa. to noon	Sept. 2, 3, F. & Sa. to noon
Residence Halls and Dining Hall Open	Sept. 7, M	Sept. 5, M.
First Freshman Assembly.....	Sept. 8, Tu. 7:45 a.m.	Sept. 6, Tu. 7:45 a.m.
Orientation and Guidance for Freshmen	Sept. 8, 9, 10, 11, 12, Tu., W., Th., F. and Sa.	Sept. 6, 7, 8, 9, 10 Tu., W., Th., F. and Sa.
(All Freshmen are expected to be in attendance on these days for the special orientation programs and aptitude tests.)		
Sophomores, Juniors, Seniors, and Graduates Receive Curriculum Ad- visement-Registration Materials	Sept. 10, Th.	Sept. 8, Th.
Sophomores, Juniors, Seniors, and Graduates Complete Registration.....	Sept. 11, F. to Noon Sa., Sept. 12	Sept. 9, F. to Noon Sa., Sept. 10.
Freshman Students will Complete Registration and Pay Fees.....	Sept. 14, M.	Sept. 12, M.
Instruction Begins.....	Sept. 15, Tu.	Sept. 13, Tu.
Last Day of Registration for Credit.....	Sept. 21, M. 4:00 p.m.	Sept. 19, M. 4:00 p.m.
Mid-Semester Scholarship Reports Due.....	Nov. 5, Th., 4:00 p.m.	Nov. 3, Th., 4:00 p.m.
Veterans' Day, No Classes.....	Nov. 11, W.	Nov. 11, F.
Candidates for Bachelor's Degrees Must File Application for Graduation by.....	Nov. 16, M.	Nov. 15, Tu.
Thanksgiving Recess.....	Nov. 25, W., 10:30 p.m. to Nov. 30, M., 7:40 a.m.	Nov. 23, W., 10:30 p.m. to Nov. 28, M. 7:40 a.m.
Christmas Vacation.....	Dec. 19, Sa., 12:00 Noon to Jan. 4, M., 7:40 a.m.	Dec. 17, Sa. 12:00 Noon to Jan. 3, Tu., 7:40 a.m.
Final Examinations.....	Jan. 14, 15, 16, 18, 19, 20 Th., F., Sa., M., Tu., W.	Jan. 12, 13, 14, 16, 17, 18, Th., F., Sa., M., Tu., W.
First Semester Grade Reports Due.....	Jan. 22, F., 4:00 p.m.	Jan. 20, F., 4:00 p.m.

Spring Semester

Residence Halls Open to New Students	Jan. 24, Su.	Jan. 22, Su.
New Freshmen and Transfer Students take Aptitude Examinations.....	Jan. 25, M.	Jan. 23, M.
Registration Days..... (All students will complete registration and pay fees.)	Jan. 28, 29 Th., F.	Jan. 26, 27, Th., F.
Instruction Begins Second Semester.....	Feb. 1, M.	Jan. 30, M.
Last Day of Registration for Credit.....	Feb. 8, M.	Feb. 6, M.
Washington's Birthday, No Classes.....	Feb. 22, M.	Feb. 22, W.
Mid-Semester Scholarship Reports Due	Mar. 18, F. 4:00 p.m.	Mar. 17, F. 4:00 p.m.
Easter Vacation.....	April 9, Sa. Noon to April 19, Tu., 7:40 a.m.	Mar. 30, Th., 10:30 p.m. to April 10, M., 7:40 a.m.
Scholarship Reports Due for all Students Completing Requirements for Degrees.....	May 23, M., Noon	May 22, M., Noon
Commencement Rehearsal..... (Sun Devil Stadium)	May 27, F., 8:00 a.m.	May 26, F., 8:00 a.m.
Honors Assembly.....	May 27, F., 10:40 a.m.	May 26, F., 10:40 a.m.
R.O.T.C. Honors Ceremony and Parade	May 27, F., 8:00 p.m.	May 26, F., 8:00 p.m.
Baccalaureate Service.....	May 29, Su. 8:00 p.m.	May 28, Su., 8:00 p.m.
Commencement Exercises.....	May 31, Tu., 8:00 p.m.	May 30, T., 8:00 p.m.
Final Examinations.....	May 27, 31, June 1, 2, 3, F., Tu., W., Th., F.	May 26, 29, 31, June 1, 2, F., M., W., Th., F.
Residence Halls Closed.....	June 4, S., 12:00 Noon	June 3, Sa., 12:00 Noon
Second Semester Grade Reports Due.....	June 7, Tu., Noon	June 6, Tu., Noon

Summer Session

First Summer Session Begins, Registration	June 13, M.	June 12, M.
First Summer Session Ends.....	July 16, Sa.	July 15, Sa.
Second Summer Session Begins, Registration	July 18, M.	July 17, M.
Second Summer Session Ends.....	Aug. 20, Sa.	Aug. 19, Sa.

ARIZONA STATE UNIVERSITY

COLLEGE OF LIBERAL ARTS

Division of Behavioral and Social Sciences: Departments of History; Political Science; Psychology and Philosophy; Sociology and Anthropology; Bureau of Government Research.

Division of Health, Physical Education, and Recreation: Departments of Air Science; Intercollegiate Athletics; Health, Physical Education, and Recreation; Military Science and Tactics.

Division of Home Economics: Department of Home Economics.

Division of Fine Arts: Departments of Art; Music.

Division of Language and Literature: Departments of English; Foreign Languages; Humanities; Mass Communications; Speech and Drama.

Division of Life Sciences: Departments of Botany; Zoology; Poisonous Animals Research Laboratory.

Division of Physical Sciences: Departments of Chemistry; General Physical Sciences; Geography; Geology; Mathematics; Physics and Astronomy.

School of Nursing

COLLEGE OF EDUCATION

Department of Education

Bureau of Educational Research and Services

COLLEGE OF BUSINESS ADMINISTRATION

Departments of Accounting; Economics; General Business Administration; Management, Marketing; Office Administration and Business Education.

Bureau of Business Services

COLLEGE OF APPLIED ARTS AND SCIENCES

Division of Agriculture

School of Architecture

School of Engineering

Division of Industrial Education

Research Center

GRADUATE COLLEGE

SUMMER SESSION

EXTENSION DIVISION

Board of Regents of The Universities and State College of Arizona

Ex-Officio

PAUL FANNIN, B.A.....	Governor of Arizona
W. W. DICK, B.A. in Ed., M.A. in Ed.....	State Superintendent of Public Instruction

Appointed

	TERM EXPIRES
ALEX G. JACOME, B.S., President.....	January, 1961
WILLIAM R. MATHEWS, A.B., Secretary.....	January, 1961
LYNN M. LANEY, B.S., J.D., Treasurer.....	January, 1963
SAM H. MORRIS, J.D., LL.D.....	January, 1963
JOHN G. BABBITT, B.S.....	January, 1965
ELWOOD W. BRADFORD, B.S.....	January, 1965
VIVIAN L. BOYSEN, B.A., M.A.....	January, 1967
O. D. MILLER, A.B.....	January, 1967

JAMES BYRON MCCORMICK, LL.B., LL.M., S.J.D., LL.D.....	Adviser to the Board
MYRON R. HOLBERT, A.B., M.A.....	Budget Officer for Board
ALVRED B. NETTLETON, M.S., C.P.A.....	General Examiner for Board

The University Staff

Administration

- GRADY GAMMAGE (1933)*.....President of the University
B.A., M.A., LL.D., University of Arizona; Ed.D., New York University; Litt.D., Southwest Christian Seminary
- HAROLD D. RICHARDSON (1940).....Academic Vice President;
Chairman, Division of Instruction;
Professor of Education
Ph.B., Ph.M., University of Wisconsin; Ph.D., Northwestern University
- GILBERT L. CADY (1934).....Vice President for Business Affairs;
Chairman, Division of Business Management
B.A. in Ed., Arizona State University
- IRVING W. STOUT (1953).....Dean, Graduate College;
Professor of Education
B.Ed., Platteville State Teachers College; M.A., Ed.D., Northwestern University
- ARNOLD TILDEN (1937).....Dean, College of Liberal Arts;
Professor of History
B.A., M.A., DePauw University; Ph.D., University of Southern California
- G. D. McGRATH (1950).....Dean, College of Education;
Professor of Education
A.B., Findlay College; M.A., University of Michigan; Ph.D., University of Colorado
- GLENN D. OVERMAN (1956).....Dean, College of Business Administration; Professor of Business Administration
B.S., Central State College; M.S., Oklahoma State University; D.B.A., Indiana University
- LEE P. THOMPSON (1955).....Dean, College of Applied Arts and Sciences; Director, School of Engineering;
Professor of Engineering
B.A., Indiana University; M.S., Ph.D., Agricultural and Mechanical College of Texas; Registered Professional Engineer in Texas and Arizona
- JAMES W. ELMORE (1949).....Director, School of Architecture;
Professor of Architecture
A.B., University of Nebraska; M.S. in Arch., Columbia University; Registered Professional Architect in Arizona and New York
- LORETTA A. HANNER (1957).....Director, School of Nursing;
Associate Professor of Nursing
R.N., Michael Reese Hospital School of Nursing; P.H.M., B.S., University of Minnesota; M.S., Cornell University
- ROY C. RICE (1946).....Director of Summer Session, Extension and Correspondence; Professor of Education
B.S., New Mexico University; M.S., Massachusetts State College; Ph.D., University of Texas
- W. P. SHOFSTALL (1950).....Dean of Students; Chairman, Division of Student Affairs; Director, Student Activities
B.S. in Ed., Northeast Missouri State Teachers College; M.A., Ph.D., University of Missouri
- CATHERINE G. NICHOLS (1952).....Associate Dean of Students
A.B., M.A., University of Kentucky; Ed.D., Teachers College, Columbia University
- JOSEPH E. SPRING (1954).....Chief, News Bureau
A.B., Illinois Wesleyan University; M.A., Ph.D., University of Denver
- ##HAROLD W. BATCHELOR (1943).....Head Librarian;
Professor of Library Science
B.A., University of Oregon; B.S. in L.S., M.S., University of Illinois
- ALFRED THOMAS, JR. (1939).....Registrar and Director of Admissions
B.A. in Ed., M.A. in Ed., Arizona State University

*Year of first appointment to the faculty.

##On Leave, July 1, 1959 - January 1, 1960

- ROBERT F. MENKE (1947).....Director of Placement Center;
Professor of Education
B.S., Oshkosh State College; M.A., Ph.D., Northwestern University
- TILMAN T. CRANCE (1941).....Comptroller
B.A. in Ed., M.A. in Ed., Arizona State University; C.P.A., Arizona
- GEORGE A. BOYD (1955).....Coordinator of Research
A.B., M.A., Austin College; M.S., University of Iowa
- EDWARD J. DEMSON (1958).....Acting Director of Special Services;
Lecturer in General Business
A.B., L.L.B., Ohio State University
- JAMES W. CREASMAN (1947).....Alumni Secretary
A.B. in Ed., Arizona State University
- CLYDE B. SMITH (1952).....Director, Department of Intercollegiate
Athletics; Head, Division of Health, Physical
Education and Recreation; Associate Professor
of Physical Education
A.B., Geneva College; M.S. in Ed., Indiana University
- EDWARD M. HICKCOX (1958).....Director of Housing
B.S., New Mexico Agricultural and Mechanical College;
B.A., Arizona State University

Instruction*

- GAMMAGE, GRADY (1933).....President of the University
B.A., M.A., L.L.D., University of Arizona; Ed.D., New York
University; Litt.D., Southwest Christian Seminary
- ABBOTT, JOHN C. (1956).....Assistant Professor of Education
B.S., M.S. in Ed., Ed.D., Indiana University
- ABRAHAM, WILLARD (1953).....Professor of Education
B.S., Illinois Institute of Technology; M.Ed., Chicago Teachers College;
Ph.D., Northwestern University
- ADAMS, WALLACE E. (1958).....Assistant Professor of European
History
B.S., M.A., University of Oregon
- ALBRIGHT, ROBERT W. (1957).....Associate Professor of Speech;
Chairman, Department of Speech and Drama
B.A., University of Washington; M.A., Ph.D., Stanford University
- ALISKY, MARVIN HOWARD (1957).....Associate Professor of Mass
Communications; Chairman, Department of
Mass Communications
B.A., M.J., Ph.D., University of Texas
- ALLEN, THEODORE, JR. (1959).....Associate Professor of Engineering
B.S.M.E., M.S.M.E., Agricultural and Mechanical College of Texas;
Registered Professional Engineer in Texas
- ANDERSON, MARGERY M. (1949).....Assistant Professor of Education
B.A., Yankton College; M.A., University of Chicago
- ARNER, DOUGLAS G. (1959).....Associate Professor of Philosophy
B.S., Creighton University; M.A., Ph.D., University of Michigan
- ARONSON, JOHN N. (1959).....Assistant Professor of Chemistry
B.A., The Rice Institute; M.S., University of Wisconsin
- ASAI, RICHARD I. (1959).....Assistant Professor of Chemistry
B.S., Oregon State College
- ASHE, ROBERT W. (1955).....Professor of Education
A.B., M.A., Arizona State University;
Ed.D., University of Southern California
- AUSTIN, GLENN (1950).....Professor of Education
B.A., M.A., University of Kansas; Ph.D., Ohio State University
- AUTENREITH, BERTHA (1946).....Associate Professor of Music
B.M., New England Conservatory; M.M., University of Michigan

*Includes 1959-60 appointments made prior to publication of the biennial catalog.

- AX, LELAND S. (1959).....Associate Professor of Engineering
B.S.E.E., B.S.R.E., Tri-State College; M.S., Kansas State College
- BAKER, ROBERT L. (1956).....Associate Professor of Education
B.S., M.A., Ph.D., University of Nebraska
- BAKER, VIRGIL R. (1955).....Associate Professor of Geology
B.S., M.S., University of Nebraska; Ph.D., University of Utah
- BALL, RACHEL STUTSMAN (1947).....Professor of Psychology
A.B., University of Missouri; Ph.D., University of Chicago
- BARDRICK, RICHARD A. (1956).....Assistant Professor of Psychology
A.B., Ph.D., University of California, Los Angeles
- BARGER, JAMES D. Professor of Medical Technology;
Pathologist—Good Samaritan Hospital
A.B., B.S., University of North Dakota; M.D., University of
Pennsylvania; M.S. (Pathology), University of Minnesota
- BARKLEY, BESS J. (1933).....Associate Professor of Music
B.A., University of Arizona
- BARKSON, JOSEPH A. (1958).....Professor of Engineering
B.S.E.E., University of Michigan; M.S., Ph.D., University of Illinois;
Registered Professional Engineer in Ohio
- BARNES, JOHN B. (1957).....Associate Professor of Education;
Director of Bureau of Education
Research and Services
B.A., M.A., University of Denver; Ed.D., University of Wyoming
- BAROODY, WILSON GEORGE (1957).....Instructor in English
B.A., Grand Canyon College; M.A., University of Arizona
- BARRETT, THOMAS W. (1950).....Professor of Agronomy
B.S., Brigham Young University; M.S., Ph.D., Cornell University
- ##BATCHELOR, HAROLD W. (1943).....Professor of Library Science;
Head Librarian
B.A., University of Oregon; B.S. in L.S., M.S. in L.S.,
University of Illinois
- BATEMAN, GEORGE M. (1927).....Professor of Chemistry;
Head, Division of Physical Sciences
B.S., Utah State University; M.S., Ph.D., Cornell University
- BEAKLEY, GEORGE C. (1956).....Professor of Engineering
B.S.M.E., Texas Technological College; M.S.M.E., University of Texas;
Ph.D., Oklahoma State University; Registered Professional Engineer
in Texas, Oklahoma and Arizona
- BEAL, RICHARD S., JR. (1958).....Assistant Professor of Entomology
B.S., University of Arizona; Ph.D., University of California, Berkeley
- BEALS, ARTHUR R. (1951).....Assistant Professor of Accounting
B.A. in Ed., M.A. in Ed., Arizona State University; C.P.A., Arizona
- BEAMER, WILLIAM E., CAPTAIN (1956).....Assistant Professor of
Military Science and Tactics
B.S., Virginia Polytechnic Institute
- **BECKER, ELERY R. (1958).....Professor of Parasitology
A.B. University of Colorado; D.Sc. in Hygiene, Johns Hopkins University
- BECKER, WALTER G. (1955).....Associate Professor of Finance
A.B., M.A., Loyola University, Chicago; Ph.D., State University of
Iowa
- BELL, RICHARD H. (1952).....Assistant Professor of Education;
Director of Radio-TV Bureau
B.A., Miami University; M.A., Teachers College, Columbia University
- BELOK, MICHAEL V. (1959).....Assistant Professor of Education
B.S., Indiana University; M.A., Arizona State University;
Ph.D., University of Southern California
- BENDER, GORDON L. (1953).....Professor of Zoology
B.S., Iowa State College; M.S., University of Wisconsin;
Ph.D., University of Illinois

##On Leave, July 1, 1959 - January 1, 1960

**Part Time

- BENEDICT, JOEL A. (1946).....Professor of Education;
Director of Audio-Visual Bureau
B.A., M.A., Arizona State University; Ed.D., Stanford University
- BERTKE, ELDRIDGE M. (1958).....Assistant Professor of Zoology
B.S., M.S., Ph.D., University of Wisconsin
- BIGLER, HELEN FRANCES (1959).....Assistant Professor of Nursing
R.N., St. Mary's Hospital School of Nursing;
B.S., M.P.N., University of Washington
- BINGHAM, DAVID A. (1957).....Assistant Professor of Political Science;
Director, Bureau of Government Research
B.A., Concord College; M.A., Ph.D., State University of Iowa
- BLYTHE, HARRY D. (1958).....Associate Professor of Finance
B.S., M.S., Columbia University
- BOARD, CORNELIUS Z. (1955).....Instructor in Industrial Education
B.S., M.A. in Ed., Arizona State University
- BOGUE, JAMES WALTER (1956).....Instructor in English
A.B., Holy Cross College; M.A., Teachers College, Columbia
University; M.S. in L.S., Columbia University
- BORGO, PHILIP E. (1959).....Instructor in Engineering
B.S.C.E., University of Cincinnati
- BOWERS, CHARLES O. (1948).....Assistant Professor of Music
B.S. in Ed., Southeast Missouri State College; M.M., Eastman
School of Music
- BOWMAN, RUSSELL KEITH (1956).....Professor of Romance Languages;
Chairman, Department of Foreign Languages
A.B., A.M., Ph.D., Columbia University
- BOYD, GERTRUDE A. (1958).....Associate Professor of Education
A.B., M.S., Florida State University; Ed.D., Colorado State College
- BRADLEY, JOHN A. (1956).....Assistant Professor of Engineering
B.S.M.E., Professional M.E. Degree, Rose Polytechnic Institute;
Registered Mechanical Engineer in Arizona
- BRANSTETTER, ELLAMAE (1957).....Associate Professor of Nursing
R.N., Jewish Hospital School of Nursing; B.S., P.H.N., St. Louis
University; M.P.H., University of Minnesota
- BRATCH, AUSTIN S. (1946).....Professor of Marketing
B.A., Trinity University; M.A., M.B.A. (Statistics), University of
Texas; M.B.A. (Marketing), University of Chicago
- BRITTON, MERVIN W. (1957).....Instructor in Music
B.S. in Mus.Ed., University of Illinois
- BROWN, DUANE (1951).....Professor of Chemistry
B.S., Brigham Young University; Ph.D., Cornell University
- BRYANT, ALEXANDER W., COLONEL (1958).....Professor of Air Science;
Chairman, Department of Air Science
B.S., Virginia Military Institute
- BRYANT, FRED O. (1950).....Assistant Professor of Physical
Education
B.S., Springfield College; M.S., University of Illinois;
Ed.D., Arizona State University
- BRYANT, JERRY H. (1958).....Instructor in English
B.A., M.A., University of California, Los Angeles
- BUKER, ALDEN P. (1955).....Assistant Professor of Humanities
A.B., A.M., Harvard University; Ph.D., Boston University
- BULLOCK, ARNOLD H. (1941).....Professor of Music
B.M., Yale University; M.A. in Ed., Arizona State University
- BURDETTE, WALTER E. (1956).....Professor of Industrial Education
Head, Division of Industrial Education
B.S., M.S., Kansas State Teachers College; Ed.D., University of Missouri
- BURGOYNE, EDWARD E. (1951).....Professor of Chemistry
B.S., Utah State University; M.S., Ph.D., University of Wisconsin

- BURK, KARL W. (1949).....Assistant Professor of Industrial
B.A. in Ed., M.A. in Ed., Arizona State University; Education
Ed.D., Bradley University
- BURKHARD, SAMUEL (1921).....Professor Emeritus of Education
B.A., Goshen College; M.A., Columbia University; Retired
Ph.D., New York University
- BURTON, ARLEIGH R. (1941).....Professor of Accounting;
Chairman, Department of Accounting
A.B., M.A., Emporia State Teachers College; Ph.D., University of
Nebraska; C.P.A., Arizona
- BYERS, FRANK R. (1947).....Professor of Drama;
Director of Drama Workshop
B.A., M.A., University of Cincinnati
- BYERS, NELLIE B. (1934).....Associate Professor of Education
B.A., University of Cincinnati; M.A., Ohio State University
- CAMPBELL, LOGAN E. (1957).....Assistant Professor of Architecture
B. of Arch., Catholic University of America; M. of Arch., University
of Oklahoma; Registered Professional Architect in Arizona
- CAMPBELL, WILLIAM R. (1959).....Associate Professor of Management
B.S. in Bus., M.B.A., Ohio State University
- CAMUNEZ, ARTHUR D., MAJOR (1959).....Assistant Professor of
Military Science and Tactics
- CARON, ALEXIS A. (1955).....Assistant Professor of French
B.A., University of Massachusetts; M.A., Ph.D., University of
Minnesota
- CARR, ALICE ROSE (1955).....Associate Professor of Mathematics
Education
A.B., St. Mary's College; M.A., Ohio University
- CASTILLO, SENON ARTHUR (1951).....Instructor in Physical Education;
Track Coach
B.A. in Ed., Arizona State University
- CAUTHORN, ROBERT CARTER (1959).....Assistant Professor of
Economics
B.S., Georgia Institute of Technology; M. of Public Affairs,
Princeton University
- CAVALLIERE, WILLIAM A. (1947).....Assistant Professor of Industrial
Education
A.B. in Ed., M.A. in Ed., Arizona State University
- CHAUSOW, EUGENE (1956).....Assistant Professor of Music
B.A. in Ed., M.A. in Ed., Arizona State University
- CLOTHIER, RONALD R. (1955).....Assistant Professor of Zoology
A.B., Fresno State College; M.A., Montana State University;
Ph.D., University of New Mexico
- COBB, PHIL R. (1957).....Associate Professor of Engineering
B.S.M.E., M.S.M.E., Texas Agricultural and Mechanical College;
Ph.D., Stanford University; Registered Profession Engineer in Arizona
- COFFIN, HARRY C. (1958).....Assistant Professor of Geography
B.A., San Diego State College; M.A., University of California, Berkeley
- COHN, JAMES E. (1959).....Assistant Professor of Mathematics
B.S., United States Naval Academy
- ##CONLIN, DAVID A. (1948).....Professor of English Education
A.B., Syracuse University; Ph.D., Yale University
- COOKE, FRANKLIN O. (1956).....Associate Professor of English
A.B., Princeton University; A.M., Colorado College;
Ph.D., University of Colorado
- #COONROD, ROBERT W. (1954).....Associate Professor of European
History; Chairman, Department of History
B.S. in Ed., Southwest Missouri State College; M.A., Ph.D.,
Stanford University

##On Leave, Second Semester, 1959-60

#On Leave, 1959-60

- COPPOCK, HAROLD W. (1957).....Associate Professor of Psychology
A.B., Antioch College; Ph.D., Indiana University
- CRON, ROBERT E., JR. (1957).....Associate Professor of Engineering
B.S., U. S. Military Academy; B.S.C.E., M.S.C.E., Carnegie Institute
of Technology; Registered Professional Engineer in Tennessee, New
Mexico, and Arizona
- CROSLAND, GEORGE N. (1959).....Instructor in English
B.A., M.A., University of California, Los Angeles
- CROUCH, BEULAH (1958).....Instructor in Education
B.A. in Ed., M.A. in Ed., Arizona State University
- CROWLEY, CLYDE A. (1956).....Professor of Chemistry and
Engineering; Chairman, Department of Chemistry
B.S.E.E., Chicago Technical College; M.S., Ph.D., Loyola University,
Chicago; Registered Professional Engineer in Arizona, Illinois,
Pennsylvania and Missouri
- DAMMANN, ARTHUR E. (1955).....Assistant Professor of Zoology;
Assistant Director of Poisonous Animals
Research Laboratory
B.S., Arizona State University; M.S., University of Michigan
- DANNENFELDT, KARL H. (1956).....Professor of History; Head, Division
of Behavioral and Social Sciences
A.B., Valparaiso University; M.A., Indiana University; Ph.D.,
University of Chicago
- DAVIS, KEITH (1958).....Professor of Management; Chairman,
Department of Management
B.B.A., M.B.A., University of Texas; Ph.D., Ohio State University
- DAVIS, SANDFORD S. (1953).....Associate Professor of Education
A.B., B.S., Central Missouri State College; A.M., University of
Missouri; Ed.D., University of Colorado
- DAWKINS, LOLA B. (1959).....Assistant Professor of Office
Administration
B.B.A., Texas Western College; M.B.A., University of Texas
- DECOSTER, DON THEODORE (1959).....Assistant Professor of Accounting
B.B.A., West Texas State College; M.B.A., University of Texas
- DEEVER, R. MERWIN (1959).....Assistant Professor of Education
A.B., Southwestern College; Ed.M., University of Oklahoma
- DEJONG, JOHN ARLO (1959).....Instructor in History
B.A., Central College; M.A., State University of Iowa
- DEMAREST, HAROLD R. (1957).....Associate Professor of Business
Administration; Director of Hotel Administration
B.S., United States Naval Academy; M.S.E., Harvard University;
M.S., Florida State University
- DEMPSEY, LAURENCE FRANCIS (1959).....Assistant Professor of
Chemistry
B.A., Pennsylvania State College; Ph.D., University of Illinois
- DENGLER, MAX A. (1958).....Professor of Engineering
Diplom Ingenieur, Institute of Technology, Graz, Austria;
Dr. Techn., Institute of Technology, Vienna
- ##DICKINSON, ARTHUR L. (1952).....Assistant Professor of Physical
Education; Trainer, Intercollegiate Athletics
B.A., Iowa State Teachers College; M.S., Indiana University
- DITSWORTH, RICHARD LEE (1959).....Associate Professor of
Engineering
B.S., M.S., Iowa State College; Ph.D., Michigan State University
- DOLPHIN, VERNON M. (1954).....Assistant Professor of Philosophy
B.A., M.A., University of Minnesota
- DOUTHIT, J. C. (1950).....Assistant Professor of Engineering
B.E.E., University of Arkansas; M.A. in Ed., Arizona State
University; Registered Professional Engineer in Arizona

##On Leave, Second Semester, 1959-60

- DOWLING, FRED (1959).....Assistant Professor of Education
B.A., M.A., Ed.D., University of Wisconsin
- DOWLING, JEROME M. (1959).....Assistant Professor of Physics
B.S., M.S., Ph.D., Illinois Institute of Technology
- DOYLE, ROY P. (1959).....Associate Professor of Education;
Principal, I. D. Payne, Training School
B.A., Arizona State University; M.A., Ed.D., Columbia University
- DRESSKELL, MILES A. (1945).....Professor of Music
B.M., Northwestern University; B.A., San Jose State College;
M.A., Teachers College, Columbia University
- DRESSKELL, NADINE (1946).....Associate Professor of Music
B.S., Bowling Green State University; M.A., Teachers College,
Columbia University
- DUDLEY, GUILFORD A. (1956).....Assistant Professor of History
A.B., Harvard University; M.A., Ph.D., University of California,
Los Angeles
- DUSTMAN, JACK ROBERT (1959).....Instructor in Management
B.S., Arizona State University
- DYRESON, DELMAR A. (1958).....Instructor in Mathematics
B.S., Texas College of Arts and Industries; M.S., Texas
Agricultural and Mechanical College
- ELLIS, JOHN C. (1957).....Assistant Professor of English
B.A., M.A., University of Oregon
- ELLSWORTH, LOLA (1938).....Associate Professor of Home Economics
B.S., Brigham Young University; M.A., Teachers College,
Columbia University
- ELMORE, JAMES W. (1949).....Professor of Architecture; Director,
School of Architecture
A.B., University of Nebraska; M.S. in Arch., Columbia University;
Registered Professional Architect in Arizona and New York
- ERNO, RICHARD B. (1957).....Assistant Professor of English
A.B., Michigan State University; M.A., University of Denver
- ESCUDERO, MARY J. (1948).....Associate Professor of Spanish
A.B., San Diego State College; M.A., Claremont College; Diplome,
University of Paris-Institute de Phonetique; Ph.D., Cornell University
- **ESSIG, MARY (1947).....Assistant Professor of Home Economics
B.S. in Ed., University of Missouri; M.A. in Ed., Colorado State
University
- ETHINGTON, RAYMOND L. (1958).....Assistant Professor of Geology
B.S., M.S., Iowa State College; Ph.D., State University of Iowa
- FAILING, FRANCES (1956).....Assistant Professor of Art
B.S., Western Reserve University; M.A., Columbia University
- FAIRBANKS, CHARLES L. (1958).....Instructor in Physical Education;
Assistant Football Coach
B.S., Michigan State University
- FARRIS, MARTIN (1957).....Associate Professor of Economics
B.A., M.A., Montana State University; Ph.D., Ohio State University
- FERRELL, PALMORE A., LT. COLONEL (1957).....Professor of Military
Science and Tactics;
Chairman, Department of Military Science and Tactics
B.S., Virginia Polytechnic Institute
- FIELDING, JANE P. (1957).....Instructor in Education
B.S., Western Reserve University; M.S., University of Wisconsin
- FIESER, MAX E. (1958).....Assistant Professor of Economics
B.A., University of Wichita; M.A., University of Oregon
- FINK, RAYMOND R. (1958).....Associate Professor of Art
B.A.E., School of Art Institute of Chicago; M.S.A.E., Institute of
Design, Illinois Institute of Technology
- FINLEY, LUTHER E. (1950).....Assistant Professor of Industrial
Education
B.S., M.A. in Ed., Arizona State University; Ed.D., Bradley
University; Licensed Land Surveyor in Arizona

••Part Time

- FISHER, MARVIN MARK (1958).....Assistant Professor of English
A.B., A.M., Wayne University; Ph.D., University of Minnesota
- FITZGERALD, DONALD G. (1958).....Instructor in Physics
B.A., Coe College
- FLETCHER, GRANT (1956).....Professor of Music
B.Mus., Illinois Wesleyan University; M.M., University of Michigan;
Ph.D., Eastman School of Music
- FOSTER, JOHN C. JR. (1959).....Instructor in Engineering
B.S.E.E., University of Colorado
- FRENCH, HELEN AIKEN (1949).....Assistant Professor of Education
B.S. in Ed., Geneva College; M.A. in Ed., University of Pittsburgh
- FREUND, JOHN E. (1957).....Professor of Mathematics
B.A., M.A., University of California, Los Angeles;
Ph.D., University of Pittsburgh
- FRY, HAROLD (1958).....Associate Professor of Engineering
B.S., Colorado State University; M.E., University of Wyoming;
M.S., University of Colorado; Registered Professional Engineer in
Colorado
- FUCHS, JACOB (1952).....Professor of Chemistry
B.A., New York University; M.S., Ph.D., University of Illinois
- FULLERTON, BILLIE J. (1958).....Assistant Professor of Education
B.S. in Ed., Northwestern State College; Ed.M., Ed.D., University
of Oklahoma
- GAFFNEY, PHILIP D. (1957).....Assistant Professor of Education
B.S., Northern Illinois University; M.A., Ph.D., State University
of Iowa
- GALASYN, VALENTINE DAVID (1959).....Assistant Professor of
Chemistry
B.S., Teachers College of Connecticut; M.S., Ph.D., University of Illinois
- GAMBRELL, CARROLL B., JR. (1959).....Professor of Engineering
B.S.E., Clemson Agricultural and Mechanical College; M.S.E.,
University of Florida; Ph.D., Purdue University; Registered
Professional Engineer in Texas
- GEORGE, CLAY E. (1958).....Assistant Professor of Psychology;
Director of Reading Clinic
B.S., Arizona State University; M.A., University of Arizona
- GILLANDERS, DOROTHY F. (1937).....Professor of Physical Education
B.S., Oregon State College; M.A., Teachers College, Columbia
University; Ed.D., University of Southern California
- GISOLO, MARGARET (1954).....Assistant Professor of Physical Education
B.S., Indiana State Teachers College; M.A., New York University
- GOO, BENJAMIN (1955).....Assistant Professor of Art
B.F.A., State University of Iowa; M.F.A., Cranbrook Academy of Art
- GOODWIN, JOHN B. (1948).....Assistant Professor of Industrial
Education
B.A., Arizona State University; M.S., Oregon State College
- GOSSICK, BEN R. (1957).....Professor of Physics
B.A., Pomona College; M.A., Columbia University;
M.S., Ph.D., Purdue University
- GRAHAM, MARY ELIZABETH (1955).....Assistant Professor of Physical
Education
B.S. in Ed., University of Arizona; M.A. in Ed., Arizona State University
- GRENFELL, NICHOLAS.....Assistant Professor of Medical Technology;
Resident in Pathology—Good Samaritan Hospital
A.B., Stanford University; M.D., University of Tennessee
- GRIER, MARVIN (1957).....Instructor in Physical Education;
Supervisor of Swimming Pool
B.S., Wisconsin State College; M.A., New York University
- GRIFFITH, LEROY H. (1958).....Assistant Professor of Education
B.S. in Ed., M.S. in Ed., Drake University; Ph.D., State University
of Iowa

- GRIMES, JOHN O. (1928).....Professor Emeritus of Psychology—
Retired
B.S. in Ed., Ohio University; M.A., Ph.D., University of Michigan
- GROBE, EDWIN P. (1957).....Assistant Professor of French and German
A.B., Wm. Jewell College; M.A., Ph.D., Indiana University
- GUENDLING, JOANNE G. (1958).....Assistant Professor of Nursing
B.S., St. Mary's College; M.S., Indiana University;
R.N., St. Mary's College School of Nursing
- GURNEE, HERBERT (1943).....Professor of Psychology
A.B., M.A., Wesleyan University; Ph.D., Harvard University
- GUTENBERG, ARTHUR W. (1951).....Assistant Professor of
Management
B.A.S., B.S., M.B.A., University of California, Berkeley;
Ph.D., Stanford University; Registered Mechanical Engineer in Arizona
- HAIGH, GERARD V. (1958).....Associate Professor of Psychology
B.S.S., City College of New York; Ph.D., University of Chicago
- HALE, JOHN DOUGLAS (1956).....Assistant Professor of Art
B.F.A., M.F.A., University of Southern California; Ph.D., Ohio
State University
- HANNER, LORETTA A. (1957).....Associate Professor of Nursing;
Director, School of Nursing
R.N., Michael Reese Hospital School of Nursing; P.H.N., B.S.,
University of Minnesota; M.S., Cornell University
- HANSON, HUGH (1948).....Associate Professor of Zoology;
Chairman, Department of Zoology
B.S. in Ed., Kansas State Teachers College; M.S., Ph.D.,
University of Illinois
- HARELSON, HARRY B. (1935).....Professor of Music
B.Pub.Sch.Mus., M.M., Columbia School of Music
- HARNER, MICHAEL JAMES (1958).....Assistant Professor of
Anthropology
B.A., University of California, Berkeley
- HARPER, EDWARD Y. (1959).....Instructor in Engineering
B.S., Stanford University
- HARTER, TOM J. (1941).....Professor of Art
B.A. in Ed., Arizona State University; M.F.A., University of Oregon
- HARWARD, NAOMI (1956).....Assistant Professor of Sociology
B.A., Northwestern University; B.D., Garrett Biblical Institute;
M.A. (Rel.Ed.), M.A. (Social Welfare), University of Chicago
- HASKIN, M. LOUISE (1958).....Assistant Professor of Art Education
B.S., State Teachers College; M.A., Teachers College, Columbia
University
- HAWLEY, JOHN B. (1957).....Instructor in Engineering
B.S., Colorado School of Mines
- #HEADINGTON, ROBERT C. (1953).....Professor of Real Estate
A.B., Kenyon College; M.S., Ph.D., Ohio State University
- HEIMANN, ROBERT A. (1952).....Professor of Education;
Director, Guidance Service; Counselor Trainer
B.S., Wisconsin State College; M.S., Ph.D., University of Wisconsin
- HENDERSON, CAROL JEAN (1958).....Assistant Professor of Nursing
R.N., St. Luke's Hospital School of Nursing; B.S., Youngstown
University; M.S., University of California, Los Angeles
- HENSHAW, MARJORIE B. (1953).....Assistant Professor of English
B.A. in Ed., M.A. in Ed., Arizona State University
- HERMAN, GEORGE RICHARD (1956).....Instructor in English
B.S., M.A., University of Kansas
- HERRICK, THOMAS R. (1954).....Assistant Professor of Political
Science
A.B., University of Chicago

- HILDEBRAND, PAUL G., CAPTAIN (1957).....Assistant Professor of Air
B.A., University of Philippines Science
- HILKERT, E. J. (1933).....Professor of Business Administration;
Dean Emeritus, College of Business Administration
B.S. in Bus.Adm., M.A., University of Southern California;
LL.B., University of Notre Dame; C.P.A., Arizona and California
- HILL, LOUIS A., JR. (1958).....Assistant Professor of Engineering
B.A., B.S.C.E., M.S.C.E., Oklahoma State University; Registered
Professional Engineer in Oklahoma
- HINES, HAROLD C. (1952).....Associate Professor of Music; Director
of Band
B.S. in Mus.Ed., M.S. in Mus.Ed., University of Illinois
- HINK, HEINZ R. (1958).....Assistant Professor of Political Science
LL.B., University of Berlin; M.A., Ph.D., University of Washington
- HOOK, RALPH C., JR. (1958).....Professor of Marketing;
Director of Bureau of Business Services;
Acting Chairman, Department of
General Business Administration
A.B., M.A., University of Missouri; Ph.D., University of Texas
- HOOVER, HELENE M. (1957).....Assistant Professor of Home Economics
B.S., M.A., Louisiana State University
- HOOVER, KENNETH H. (1956).....Associate Professor of Education
B.S., M.A., Louisiana State University; Ed.D., University of Washington
- HOPKINS, ERNEST J. (1949).....Professor Emeritus of Journalism—
Retired
B.A., University of Southern California
- HOPKINS, JEAN (1959).....Assistant Professor of Art
A.B., University of California, Berkeley; M.A. in Ed., Arizona
State University
- HOROWITZ, DAVID L. (1956).....Instructor in English
B.A., Arizona State University; M.A., University of California, Berkeley
- HUBBARD, PAUL G. (1950).....Professor of History;
Acting Chairman, Department of History
A.B., Wabash College; M.A., Ph.D., University of Illinois
- HUBER, PAUL (1954).....Assistant Professor of Speech
A.B., Muskingum College; B.D., Emory University; M.A., Ph.D.,
University of Michigan
- JACKS, MARY L. (1955).....Assistant Professor of Office
Administration
B.A. in Ed., M.A. in Ed., Arizona State University
- JACOBSON, ARTHUR (1956).....Assistant Professor of Art
B.S., M.S., University of Wisconsin
- JARVIS, THOMAS B. Assistant Professor of Medical Technology
Resident in Pathology—Good Samaritan Hospital
B.S., M.D., University of Utah
- JEFFREY, CLARENCE RAY (1957).....Assistant Professor of Sociology
A.B., Ph.D., Indiana University
- JELINEK, JAMES J. (1953).....Professor of Education
B.S., University of Illinois; M.A., Northwestern University;
Ed.D., Indiana University
- JELLEY, HERBERT M. (1957).....Assistant Professor of Office
Administration
B.S., University of Minnesota; Ed.M., Ed.D., University of Cincinnati
- JENCKES, KENYON S., M/SGT. (1956).....Instructor in Military
Science and Tactics
- JOHNSON, JAMES E. (1957).....Instructor in English
B.S., Northern State Teachers College; M.A., University of Minnesota
- JOHNSON, ROSEMARY (1959).....Assistant Professor of Nursing
R.N., Milwaukee County General Hospital; B.S., M.P.H.,
University of Minnesota

- JOHNSON, ROY M. (1955).....Associate Professor of Microbiology
A.B., M.S., University of Chicago; Ph.D., University of New Mexico
- JUST, HUDSON (1959).....Professor of Psychology;
Chairman, Department of Psychology and Philosophy
A.B., University of Redlands; M.A., University of California,
Los Angeles; Ph.D., Yale University
- JUDD, B. IRA (1937).....Professor of Agronomy
B.Sc., M.Sc., Utah State University; Ph.D., University of Nebraska
- KAGY, VIRGINIA L. (1947).....Associate Professor of Home Economics;
Director of Nursing School
B.A., Drake University; M.S., Iowa State College; Ph.D., Johns
Hopkins University
- KAJIKAWA, WILLIAM M. (1937).....Assistant Professor of Physical
Education
B.A. in Ed., M.A. in Ed., Arizona State University
- KAUFMAN, LUCILE B. (1950).....Assistant Professor of Engineering
B.S.M.E., M.S., University of Colorado; Registered Mechanical
Engineer in Arizona and Illinois
- KEATING, PATRICIA B. (1948).....Assistant Professor of Music
B.M., University of Illinois; M.M., Northwestern University
- KEENAN, RUTH (1953).....Assistant Professor of English
B.A., M.A., Montana State University
- KEITH, MARLOW (1946).....Assistant Professor of Industrial
Education
B.A., M.A. in Ed., Arizona State University
- KELLY, FRANCIS (1957).....Assistant Professor of Management
B.B.A., M.B.A., University of Michigan
- KEMP, PAUL C. (1958).....Instructor in Physical Education;
Freshman Football Coach
B.S., M.A., State University of Iowa
- KENT, GEORGE.....Assistant Professor of Medical Technology;
Associate Pathologist—St. Joseph's Hospital
A.B., Dartmouth College; M.D., University of Colorado
- KERSTEN, ROBERT D. (1957).....Associate Professor of Engineering
B.S., M.S., Oklahoma State University; Registered Professional
Engineer in Oklahoma and Arizona
- KEVANE, CLEMENT J. (1956).....Associate Professor of Physics
B.S., Ph.D., Iowa State College
- KIESOW, MILTON A. (1957).....Assistant Professor of Education
B.S., University of Wisconsin; M.A., Ph.D., University of Nebraska
- KIGIN, DENIS J. (1958).....Assistant Professor of Industrial Education
B.S., State Teachers College, Mankato; M.S., Stout State College
- KING, ALFRED S. (1958).....Associate Professor of Engineering
B.S.M.E., Michigan State University; M.S.T.E., Purdue University
- KLANN, MARGARET (1945).....Associate Professor of Physical
Education
B.S., University of Illinois; M.A. in Ed., Colorado State College
of Education
- KLEPPER, DIANE J. (1958).....Instructor in Physical Education
B.A., University of Kansas; M.A., Teachers College, Columbia
University
- KLOSTER, PAULA REBECCA (1931).....Professor of Art; Curator,
Collection of Art
B.S. in Ed., University of North Dakota; M.A., Stanford University
- ##KRENKEL, JOHN H. (1947).....Professor of History
B.S. in Ed., University of Illinois; M.A., Claremont Graduate School;
Ph.D., University of Illinois
- KRUEGER, HARRY CALVERT (1957).....Associate Professor of
Accounting
B.S. in B.A., University of Wichita; M.A., University of North
Dakota; C.F.A., Missouri, Arizona, Kansas, and North Dakota

##On Leave, Second Semester, 1959-60

- KUNKEL, JOHN H. (1959).....Instructor in Sociology
A.B., Pomona College, M.A., University of Michigan
- KUSH, FRANK (1957).....Assistant Professor of Physical Education;
Head Football Coach
B.A., Michigan State University
- LAKE, ROBERT L. (1958).....Instructor in Mathematics
B.S.Chem.E., South Dakota School of Mines and Technology
- LAMBORN, AMY LOUISE (1957).....Assistant Professor of Home
Economics
B.S., M.A., Iowa State College
- LAMBRIGHT, ROBERT W. (1958).....Assistant Professor of Marketing;
Assistant to Director, Bureau of Business Services
B.A. in B.A., M.B.A., University of Washington
- LAMM, ROBERT C. (1959).....Associate Professor of Humanities
and Music
B.M., University of Louisville; M.M., University of Arizona;
Ph.D., Indiana University
- LANDINI, RICHARD G. (1959).....Instructor in English
A.B., M.A., University of Miami
- LAVIK, RUDOLF H. (1933).....Professor of Physical Education
B.A., Concordia College; B.P.E., Springfield College;
M.A., University of Southern California
- LAVIN, MARY VIRGINIA (1948).....Assistant Professor of Speech
B.A., University of Oregon; M.A., University of Washington
- LAW, MARJORIE W. (1957).....Instructor in Physical Education
B.A. in Ed., M.A. in Ed., Arizona State University
- LEATHERS, CHESTER RAY (1957).....Assistant Professor of Botany
B.S., Eastern Illinois State College; M.S., Ph.D., University of
Michigan
- LEWIS, MAURICE S. (1954).....Associate Professor of Education
B.S. in Ed., M.S. in Ed., Drake University; Ed.D., Colorado
State College of Education
- LIKOS, JOSEPH J. Assistant Professor of Medical Technology;
Associate Pathologist—Good Samaritan Hospital
M.D., St. Louis University
- LINDSTROM, FREDERICK B. (1953).....Associate Professor of Sociology
A.B., M.A., Ph.D., University of Chicago
- LISKOVEC, RICHARD F. (1958).....Assistant Professor of Mathematics
B.S., M.A., Kent State University
- LITTRELL, JOSEPH J. (1958).....Associate Professor of Industrial
Education
A.B., Nebraska State Teachers College; M.A., University of
Minnesota; Ed.D., University of Missouri
- LIVERMORE, PAUL E. (1958).....Assistant Professor of Mathematics
B.S., M.A., Arizona State University
- LOIR, SONIA (1959).....Assistant Professor of Nursing
R.N., Long Island College Hospital; B.S., M.A., New York University
- LOMBARDI, EUGENE P. (1957).....Assistant Professor of Music
B.M.Ed., Westminster College; M.A., Columbia University
- LOPER, JAMES L. (1958).....Instructor in Mass Communications;
Assistant Director, Radio-TV Bureau
B.A., Arizona State University; M.A., University of Denver
- LOWE, HOWARD D. (1959).....Associate Professor of Accounting
B.S., M.S., Brigham Young University; D.B.A., Indiana University
- LOWE, JOHN W. (1956).....Assistant Professor of Economics
B.S., Arizona State University; M.S., University of Wisconsin;
Ph.D., University of Florida
- LOWENSTEIN, LLOYD L. (1957).....Professor of Mathematics;
Chairman, Department of Mathematics
A.B., Ph.D., Cornell University

- LOWENSTEIN, MILTON D. (1959).....Assistant Professor of Architecture
B.A., M.A., Columbia University
- LOWES, WILLIAM J., M/SGT. (1958).....Instructor in Military
Science and Tactics
- LURNOW, PAUL F., JR. (1958).....Assistant Professor of Spanish
B.A., M.A., University of Washington; Ph.D., University of
New Mexico
- LUXEMBURGER, JOHN J., JR., CAPTAIN (1958).....Assistant Professor
of Military Science and Tactics
B.S., LaSalle College
- LYLE, MARY G. (1959).....Assistant Professor of English
B.A., State University of Iowa; M.A., University of South Dakota
- LYON, ROBERT B. (1938).....Associate Professor of Mathematics
B.S., B.M., University of Illinois; M.S., University of Idaho
- MACFARLANE, JULIA LIVINGSTON (1959).....Assistant Professor of
Nursing
R.N., Fitkin Memorial Hospital School of Nursing; B.S., M.A.,
New York University
- MANHEIM, HENRY L. (1958).....Assistant Professor of Sociology
A.B., University of California, Los Angeles; M.A., Ph.D., University
of Southern California
- MANN, FRANK D. Associate Professor of Medical Technology;
Associate Pathologist—St. Joseph's Hospital
B.A., M.S., M.D., Ph.D., University of Minnesota
- MANNING, DUANE (1951).....Professor of Education
B.S., M.A., Ball State Teachers College; Ed.D., Indiana University
- MARKHAM, FRANCIS E. (1958).....Assistant Professor of Physical
Education; Freshman Basketball Coach
B.S. in Ed., Kansas State Teachers College; M.S. in P.E., University
of Washington
- MARTINEZ, JOHN R. (1957).....Assistant Professor of History
B.A., Brigham Young University; M.A., Ph.D., University of
California, Berkeley
- MARTINEZ, QUINO E. (1957).....Associate Professor of Spanish
B.S., New Mexico Western College; M.A., George Peabody College;
Ph.D., University of North Carolina
- MATULA, ARTHUR (1958).....Assistant Professor of Journalism
B.A., Agricultural and Mechanical College of Texas;
M.A., Stanford University
- #McCLEARY, JAMES A. (1947).....Professor of Botany
B.A., Asbury College; M.S., Ohio University; Ph.D., University of
Michigan
- MCGRATH, G. D. (1950).....Professor of Education; Dean,
College of Education
A.B., Findlay College; M.A., University of Michigan; Ph.D.,
University of Colorado
- McINTIRE, E. BERNELL (1959).....Instructor in German
A.B., M.A., Brigham Young University
- MCLEOD, DOROTHY L. (1957).....Assistant Professor of Nursing
R.N., St. Joseph's Hospital School of Nursing; B.S., St. Louis
University; M.S., Teachers College, Columbia University
- McSPARRIN, BRUCE D., JR. (1959).....Associate Professor of
Management
B.B.A., University of Oklahoma; M.B.A., D.B.A., Indiana University
- MEADOR, BRUCE S. (1959).....Assistant Professor of Education
B.A., M.E., University of Texas
- MEINERS, ROGER K. (1959).....Instructor in English
B.A., Wheaton College; M.A., University of Denver
- MEISTER, ARNOLD G. (1957).....Professor of Physics
B.S., Central Y.M.C.A. College; Ph.D., Illinois Institute of Technology

#On Leave, 1959-60

- MENKE, ROBERT F. (1947).....Professor of Education; Director of
Placement Center
B.S., Oshkosh State College; M.A. in Ed., Ph.D., Northwestern
University
- MERRITT, CHARLES H. (1946).....Professor of Engineering
B.A., M.A., Arizona State University; Registered Professional
Engineer in Arizona
- MEYER, NEAL L., CAPTAIN (1958).....Assistant Professor of Air
Science
B.S., University of Nebraska
- MIKULEKY, BEN, M/SGT. (1957).....Instructor in Military Science
and Tactics
- MILLER, GEORGE GUY (1959).....Assistant Professor of Management
B.B.A., Texas College of Arts and Industries; M.B.A., University
of Texas
- MILLER, IRWIN (1958).....Associate Professor of Mathematics
B.A., Alfred University; M.S., Purdue University; Ph.D., Virginia
Polytechnic Institute
- MILLER, PAUL T. (1947).....Professor of Geology; Chairman,
Department of Geology
B.A., Simpson College; M.S., Ph.D., State University of Iowa
- MILLER, VICTOR J. (1958).....Professor of Horticulture
B.S., M.S., Ph.D., University of Illinois
- MILLS, DONALD F. (1957).....Assistant Professor of Education
B.A. in Ed., Northern Idaho College of Education; M. of Ed.,
Ph.D., University of Washington
- MOFFIT, INEZ (1953).....Assistant Professor of Library Science
B.A., Iowa State Teachers College; B.L.S., University of
Minnesota; M.A., University of Denver
- MONAGHAN, THOMAS J., CAPTAIN (1958).....Assistant Professor of
Air Science
B.S., Pennsylvania State University
- MONTAGUE, GENE B. (1957).....Assistant Professor of English
B.A., Central Washington College of Education; M.A., Ph.D.,
University of Texas
- MOODY, E. GRANT (1951).....Associate Professor of Animal Husbandry
B.S., University of Arizona; M.S., Kansas State College;
Ph.D., Purdue University
- MOOMAW, HOLLIS R., MAJOR (1957).....Assistant Professor of Air
Science
B.A., M.A., Arizona State University
- MORTENSEN, MARTIN (1932).....Associate Professor of General Science
A.B., Brigham Young University; A.M., University of Arizona
- MOUNT, DICK (1948).....Associate Professor of Office Administration
and Business Education
B.A., Simpson College; M.S. in Ed., Drake University
- MUNCH, THEODORE WILLIAM (1959).....Associate Professor of Science
Education
B.S. in Ed., B.S. in Bacteriology, Ohio State University; M.A. in Ed.,
Colorado State College; Ed.D., Stanford University
- MURPHY, NINA L. (1924).....Professor of Physical Education
B.S. in Ed., University of Arizona; M.A., University of Southern
California
- MURRA, WILBUR F. (1958).....Assistant Professor of Education
B.S., M.A., University of Minnesota; M.A. in Teaching, Harvard
University; Ph.D., University of Minnesota
- MYERS, LOUIS M. (1937).....Professor of English; Head, Division of
Language and Literature
B.S., St. Stephens College; M.A., Columbia University; Ph.D.,
University of California, Berkeley
- MYERS, RICHARD E. (1959).....Instructor in Mathematics
B.S., United States Naval Academy

- NEAL, WILLIAM R. (1959).....Instructor in Mathematics
B.S., M.A., Arizona State University
- NEBEKER, HELEN ELIZABETH (1958).....Instructor in Freshman English
B.A., M.A., Arizona State University
- NELSON, PHILIP F. (1958).....Assistant Professor of Music
A.B., Grinnell College; A.M., Ph.D., University of North Carolina
- NIELANDER, WILLIAM A. (1958).....Professor of Marketing, Chairman,
Department of Marketing
B.S., University of Pittsburgh; M.S., Ph.D., Columbia University
- NUTT, MERLE C. (1956).....Associate Professor of Engineering
B.S.Chem.E., Illinois Institute of Technology; M.A., State University
of Iowa; LL.D., Illinois Wesleyan University; Registered Professional
Engineer in Arizona
- O'BRIEN, CARMEN (1959).....Assistant Professor of Education
B.A. in Ed., M.A. in Ed., Arizona State University
- OPPITZ, ROBERT JAMES (1959).....Assistant Professor of Finance
A.B., McKendree College; M.A., Washington University
- OSBORN, GRANT M. (1957).....Professor of Insurance
B.S., Brigham Young University; M.B.A., Stanford University;
Ph.D., University of Pennsylvania
- OSENBURG, FREDERIC C. (1946).....Associate Professor of English
A.B., M.A., University of Michigan; Ph.D., University of Illinois
- OVERMAN, GLENN D. (1956).....Professor of Business Administration;
Dean, College of Business Administration
B.S., Central State College; M.S., Oklahoma State University;
D.B.A., Indiana University
- PADALIS, PRANAS (1959).....Associate Professor of Economics
M.A., Dr. Rer. Pol., University of Vytautas the Great
- PALLEY, JULIAN (1959).....Instructor in Spanish
B.A., Mexico City College; M.A., University of Arizona;
Ph.D., University of New Mexico
- PANAS, GEORGE W., CAPTAIN (1959).....Assistant Professor of
Air Science
B.A., Arizona State University
- PARKER, ERNEST L. (1950).....Professor of Animal Husbandry
B.S., M.S., University of Halle; Ph.D., University of Leipzig.
- PARKER, L. MAYLAND (1955).....Assistant Professor of Farm
Management
B.S., Brigham Young University; M.S., University of Utah;
Ph.D., Cornell University
- PATTERSON, ROBERT A. (1957).....Assistant Professor of Zoology
B.S., University of Michigan; M.S., Ph.D., Ohio State University
- PAYNE, IRA DAWSON (1911).....Professor Emeritus of Education
Retired
B.A., M.A., Stanford University; LL.D., Arizona State University
- PEABODY, STANLEY J. (1952).....Assistant Professor of Industrial
Education
B.S., M.A. in Ed., Arizona State University
- PEARSON, JAMES W. (1959).....Instructor in Office Administration
and General Business Administration
B.S. in Bus., M.B.A., Indiana University
- PECK, GEORGE B. (1958).....Assistant Professor of Mathematics
B.S., Arizona State University; M.S., University of Illinois
- PERRIL, LESTER S. (1957).....Professor of Sociology; Chairman,
Department of Sociology and Anthropology
B.A., Ohio Wesleyan University; M.A., Ohio State University;
Ph.D., University of North Carolina
- PHILLIPS, WILLIAM WEILAND (1958).....Assistant Professor of History
Ph.B., M.A., University of North Dakota; Ph.D., University
of Missouri
- PIAN, RICHARD H. J. (1959).....Professor of Engineering
B.S.C.E., Kung Shan University (China); M.S.E., Ph.D., Cornell
University; Registered Professional Engineer in Michigan

- PILLSBURY, KENT (1957)**.....Assistant Professor of Education
A.B., University of California, Santa Barbara; M.A., University of Oregon; Ed.D., Teachers College, Columbia University
- PITTMAN, ANNE (1952)**.....Associate Professor of Physical Education
B.S. in P.Ed., University of Texas; M.A., New York University
- PLUMMER, RAMONA F. (1957)**.....Instructor in Physical Education
B.S., M.A., University of Alabama
- PODLICH, WILLIAM F., JR. (1949)**.....Professor of Education;
Director of Student Teaching
B.S., Maryland State Teachers College, Towson; M.A., Teachers College, Columbia University; Ph.D., State University of Iowa.
- PORTMANN, WALTER O. (1959)**.....Associate Professor of Mathematics
B.S. in Ed., Kent State University; M.S., Ph.D., Case Institute of Technology
- PORTNOFF, COLLICE H. (1945)**.....Professor of English; Chairman,
Department of English
A.B., M.A., University of California, Berkeley; Ph.D., Stanford University; F.A.A.R., M.A., American Academy in Rome
- PREBYL, FRANCIS J. (1957)**.....Instructor in Marketing
B.B.A., University of Minnesota; M.S., University of Oregon
- PRICE, KENTON E. (1957)**.....Assistant Professor of Mathematics
B.S., United States Naval Academy
- QUAID, HAZEL HARVEY (1942)**.....Associate Professor of Music
A.B., Arizona State University; M.A., Northwestern University
- QUIRK, DANIEL (1959)**.....Instructor in English
B.A., Arizona State University
- RALSTON, MACK A. (1956)**.....Associate Professor of Education
B.S., M.S., Indiana State Teachers College; Ed.D., Indiana University
- RANNELLS, JESSIE M. (1939)**.....Professor of Home Economics;
Head, Division of Home Economics
B.S., Iowa State College; M.S., Cornell University; Ph.D., University of Wisconsin
- RASMUSSEN, ROBERT D. (1949)**.....Assistant Professor of Animal
Husbandry
B.S., Iowa State College; M.S., Washington State College
- RAST, JAMES F., CAPTAIN (1958)**.....Assistant Professor of Military
Science and Tactics
B.S., Davidson College
- RATLIFF, JOHN D. (1954)**.....Associate Professor of English
B.A. in Ed., Arizona State University; M.A., Claremont Graduate School; Ph.D., Stanford University
- RAWLS, WILLIAM S. (1949)**.....Associate Professor of Physics
B.S., Murray State Teachers College; M.S., Tulane University; Ph.D., Iowa State College
- RAY, WILLIAM D. (1957)**.....Assistant Professor of Mathematics
B.S., M.S., Alabama Polytechnic Institute
- REISER, CASTLE O. (1958)**.....Professor of Engineering
B.S., Colorado Agricultural and Mechanical College; Petr.Eng., Colorado School of Mines; Ph.D., University of Wisconsin; Registered Professional Engineer in Idaho and Washington
- RENNER, GEORGE T. (1951)**.....Associate Professor of Geography;
Chairman, Department of Geography
B.A., Stanford University; M.A., Ed.D., Columbia University
- RICE, ROSS R. (1950)**.....Associate Professor of Political Science
Chairman, Department of Political Science
M.A., Ph.D., University of Chicago
- RICE, ROY C. (1946)**.....Professor of Education; Director of
Summer Session, Extension and Correspondence
B.S., New Mexico University; M.S., Massachusetts State College; Ph.D., University of Texas
- RICE, WARREN (1958)**.....Professor of Engineering
B.S., M.S., Ph.D., Agricultural and Mechanical College of Texas; Registered Professional Engineer in Texas

- RICHARDSON, GRANT L. (1953)**.....Professor of Agronomy
B.S., M.S., University of Arizona; Ph.D., Oregon State College
- RICHARDSON, H. D. (1940)**.....Professor of Education;
Academic Vice President; Chairman, Division of Instruction
Ph.B., Ph.M., University of Wisconsin; Ph.D., Northwestern University
- RICHISON, JACK "J" (1959)**.....Assistant Professor of Accounting
A.B., San Jose State College; M.S., University of Illinois
- RICKEL, HARRY P. (1948)**.....Associate Professor of Music
B.M., M.M., University of Arizona
- RIDER, WENDELL J. (1953)**.....Professor of Music; Chairman,
Department of Music
B.S., Iowa State Teachers College; M.M., Eastman School of Music;
Ph. D., State University of Iowa.
- RIESE, RUSSELL L. (1957)**.....Professor of Engineering;
Chairman, Electrical Engineering
B.S.E.E., University of Washington; M.S., Ph.D., Oklahoma
State University; Registered Professional Engineer in New Mexico
- RIGGINS, L. F. (1956)**.....Assistant Professor of Agricultural
Mechanics
B.S. in Ed., Arizona State College at Flagstaff; M.A. in Ed., Arizona
State University
- ROBERTS, BYRON D. (1957)**.....Associate Professor of Mathematics
B.A., M.A., Indiana University; Ph.D., State University of Iowa
- ROBINS, ROLAND K. (1957)**.....Associate Professor of Chemistry
B.A., M.A., Brigham Young University; Ph.D., Oregon State College
- ROBINSON, DANIEL O. (1950)**.....Professor of Agronomy;
Head, Division of Agriculture
A.B., Brigham Young University; M.S., University of Arizona;
Ph.D., Ohio State University
- ROESSEL, ROBERT A., JR. (1959)**.....Instructor in Education
B.A., M.A., Washington University
- ROMANO, ALBERT (1959)**.....Assistant Professor of Mathematics
B.A., Brooklyn College; M.A., Washington University
- ROSENTHAL, MAURICE**.....Professor of Medical Technology;
Pathologist—Memorial Hospital
M.D., Medical College of Virginia
- ROSS, KENTON EUGENE (1958)**.....Assistant Professor of Office
Administration
B.S., M.S., Oklahoma State University
- ROSS, STANLEY H. (1957)**.....Assistant Professor of Geography
B.A., M.A., University of Colorado
- ROVER, R. CRAIG (1952)**.....Associate Professor of Education
B.A., Upsala College; M.A., St. Lawrence University;
Ph.D., Cornell University
- RUFF, PAUL FULTON (1958)**.....Associate Professor of Engineering
B.S.C.E., M.S.C.E., Case Institute of Technology; Registered
Professional Engineer and Land Surveyor in Ohio
- RUSSELL, FRED DONALD (1958)**.....Instructor in Engineering
B.S., M.S., California Institute of Technology
- RYAN, MARJORIE (1957)**.....Assistant Professor of English
A.B., A.M., University of Michigan; Ph.D., University of Minnesota
- SANDERS, BEVIE T. (1957)**.....Associate Professor of Accounting
B.B.A., North Texas State College; M.S., Agricultural and
Mechanical College of Texas; Ph.D., University of Texas;
C.P.A., Texas
- SANDLIN, ROBERT E. (1959)**.....Assistant Professor of Speech
A.B., San Diego State College; M.A., Wayne State University
- SAVAGE, NEVIN W. (1959)**.....Associate Professor of Mathematics
B.S., M.A., Pennsylvania State University; Ph.D., University of
California, Los Angeles

- SCHARF, GEORGE.....Assistant Professor of Medical Technology
Associate Pathologist—Memorial Hospital
B.A., M.S., M.D., University of California
- SCHATTKER, RUDOLPH W. (1958).....Assistant Professor of Accounting
B.S., M.S., University of Illinois; C.P.A., Illinois
- SCHAUMBURG, DONALD (1953).....Associate Professor of Art
B.A. in Art Ed., California College of Arts and Crafts;
M.F.A., Claremont Graduate School
- SCHILLING, DOROTHY C. (1932).....Professor of Humanities and
English; Chairman, Department of Humanities
A.B., M.A., Ph.D., Stanford University
- SCHMIDT, MILDRED E. (1956).....Assistant Professor of Home
Economics
B.A., Nebraska State Teachers College; M.S., Kansas State College
- SCHROEDER, CLIFFORD M. (1956).....Assistant Professor of Physics
B.S., State College of Washington; M.A., Ph.D., Ohio State University
- SCHUTZ, RICHARD E. (1957).....Assistant Professor of Education;
Director, Testing Service
B.A., M.A., University of California, Los Angeles; Ph.D., Columbia
University
- SCOUJAR, DAVID B. (1952).....Professor of Music
B.A., Texas Christian University; B.M., Lawrence College;
M.A., Columbia University
- SHAW, LEE (1955).....Assistant Professor of English Education
B.S., M.A. in Ed., Arizona State University
- SKINNER, H. CLAY (1938).....Professor of Psychology
B.S., Ohio University; M.A., Ohio State University; Ph.D., New
York University
- SMITH, CLYDE B. (1952).....Associate Professor of Physical
Education; Director of Intercollegiate Athletics;
Head, Division of Health, Physical Education
and Recreation
A.B., Geneva College; M.S., Indiana University
- SMITH, LEHI T. (1959).....Assistant Professor of Mathematics
B.S., M.A., Arizona State University
- SMITH, MARION W. (1952).....Assistant Professor of Voice
B.S. in Mus.Ed., Capital University; M.M., American
Conservatory of Music
- SMITH, PAUL R., MAJOR (1956).....Assistant Professor of Military
Science and Tactics
- SMITH, SYDNEY RUSSELL (1947).....Professor of Psychology;
Director, Psychology Clinics
A.B., M.A., Ph.D., University of California, Berkeley
- SNODGRASS, RICHARD (1959).....Instructor in English
B.A., M.A., Arizona State University
- SNYDER, ERNEST E., JR. (1958).....Associate Professor of Science
Education; Chairman, Department of
General Physical Sciences
A.B., M.A., Colorado State College; Ed.D., New York University
- SPRAGUE, CHESTER L. (1958).....Instructor in Architecture
B. of Arch., University of Minnesota; M. of Arch., Massachusetts
Institute of Technology
- STAATS, ARTHUR W. (1955).....Associate Professor of Psychology
A.B., M.A., Ph.D., University of California, Los Angeles
- STAATS, CAROLYN KAIDEN (1957).....Assistant Professor of Sociology
and Psychology
A.B., M.A., Ph.D., University of California, Los Angeles
- STAFFORD, ALFRED B. (1958).....Professor of Engineering
B.S.E.E., Carnegie Institute of Technology; M.A., University of
Pittsburgh; Ph.D., University of Chicago; Registered Professional
Engineer in Colorado

- STAFFORD, KENNETH (1957)**.....Assistant Professor of Education
B.A., M.Ed., Ph.D., University of Oklahoma
- STAHNKE, HERBERT L. (1941)**.....Professor of Zoology; Head, Division
of Life Sciences; Director, Poisonous Animals
Research Laboratory
S.B., University of Chicago; M.A., University of Arizona;
Ph.D., Iowa State College
- STALZER, FRANK S. (1955)**.....Assistant Professor of Music
B.M.Ed., University of Kansas; M.M., Eastman School of Music
- STAPLEY, LOREL A.**.....Professor of Medical Technology;
Pathologist—St. Joseph's Hospital
B.S., M.D., Northwestern University
- STEIN, PETER K. (1959)**.....Associate Professor of Engineering
S.B. (Bus. Adm.), S.B.M.E., M.S., Massachusetts Institute of
Technology; Registered Professional Engineer in Arizona
- STEPHENS, SHELBY M. (1957)**.....Associate Professor of Home
Economics
B.S., North Texas State College; M.S., Iowa State College;
Ed.D., Cornell University
- STEVEYSON, NORRIS J. (1932)**.....Associate Professor of Physical
Education
B.A. in Ed., Arizona State University; M.S. in Ed., University of
Southern California
- STEWART, KENNETH M. (1947)**.....Professor of Anthropology
A.B., M.A., Ph.D., University of California, Berkeley
- STITES, WILLIAM H. (1954)**.....Associate Professor of Speech
B.A., Louisiana Polytechnic Institute; M.A., Ph.D., University
of Denver
- STOUT, IRVING W. (1953)**.....Professor of Education; Dean,
Graduate College
B.Ed., Platteville State Teachers College; M.A., Ed.D.,
Northwestern University
- STUDER, RAYMOND GAULT, JR. (1958)**.....Instructor in Architecture
B. of Arch., University of Texas
- STUMPF, ANGELA MARGARET (1959)**.....Assistant Professor of Nursing
R.N., St. Mary's Hospital School of Nursing; B.S., Marquette
University
- SUMMERS, GEORGE WILLIAM (1959)**.....Assistant Professor of
General Business Administration
B.S., United States Naval Academy; B.A., M.A., University of Colorado
- SUTTON, GEORGE E. (1959)**.....Professor of Engineering
B.S.M.E., West Virginia University; M.S.E., University of Florida;
Ph.D., Michigan State University; Registered Professional Engineer
in Arizona and Florida
- TAIT, ARTHUR THOMAS (1959)**.....Associate Professor of Finance
B.S.B.A., M.B.A., University of Denver
- TAMBURO, RICHARD P. (1958)**.....Instructor in Physical Education;
Assistant Football Coach
B.S., Michigan State University
- TATE, DONALD J. (1958)**.....Professor of Office Administration and
Business Education; Chairman, Department of
Office Administration and Business Education
B.S., Kansas State Teachers College; M.A., Ed.D., New York
University
- TAYLOR, LOUIS (1949)**.....Assistant Professor of English
B.S. in Ed., M.A., Ohio State University
- TAYSOM, ELVIN D. (1953)**.....Assistant Professor of Animal
Husbandry
B.S., University of Idaho; M.S., Utah State University
- THOMPSON, LEE P. (1955)**.....Professor of Engineering; Dean,
College of Applied Arts and Sciences;
Director, School of Engineering
B.A., Indiana University; M.S., Ph.D., Agricultural and
Mechanical College of Texas; Registered Professional
Engineer in Texas and Arizona

- THOMPSON, WILMA M. (1959).....Instructor in Mathematics
A.B., New Mexico Highlands University; M.S., University of Wyoming
- THOMSON, RONALD G. (1947).....Professor of Health and Physical
Education; Chairman, Department of Health,
Physical Education and Recreation
B.S., Springfield College; M.A. in Ed., Arizona State University;
Ed.D., University of Southern California
- TILDEN, ARNOLD (1937).....Professor of History; Dean, College of
Liberal Arts
A.B., A.M., DePauw University; Ph.D., University of Southern
California
- TULLEY, GEORGE F. (1958).....Assistant Professor of Education
B.A., M.A., Ed.D., University of Denver
- TURNER, KATHARINE C. (1946).....Professor of English
B.Ed., Illinois State Normal University; M.A., Ph.D., University
of Michigan
- VAN PETTEN, DONALD R. (1942).....Professor of Political Science
A.B. in Ed., Arizona State University; M.S. in Ed., University
of Southern California; Ph.D., Stanford University
- VERGIS, JOHN P. (1954).....Associate Professor of Education
B.S., M.A., New York University; Ed.D., University of
Southern California
- VON DER HEYDT, ALFRED (1950).....Associate Professor of German
Diploma, University of Frankfurt-on-the-Main; M.A., Yale
University; Ph.D., Cornell University
- #VOTICHENKO, T. ALEXANDER (1956).....Assistant Professor of
Philosophy
A.B., Princeton University; M.A., Columbia University
- WADDELL, JOHN H. (1957).....Associate Professor of Art Education
B.F.A., M.F.A., B.A.E., M.A.E., School of the Art Institute of Chicago
- WAGER, ALAN T. (1949).....Professor of Physics; Chairman,
Department of Physics and Astronomy
B.S., Hobart College; M.A., Cornell University; Ph.D., University
of Chicago
- WALLACE, CHARLES EDWARD (1958).....Associate Professor of
Engineering
B.S., Lewis and Clark College; M.S., Oregon State College;
Ph.D., Stanford University
- WALLING, JOSEPH F. (1959).....Assistant Professor of Chemistry
A.B., Washington State College; Ph.D., University of Washington
- WATKINS, LOWELL A. (1956).....Assistant Professor of Office
Administration
B.Ed., Illinois State Normal University; M.B.A., University of Denver
- WEBSTER, JAMES E., CAPTAIN (1957).....Assistant Professor of
Air Science
B.S., Arizona State University
- WEGNER, ARTNOLL L. (1957).....Professor of Physical Education
B.S., Wisconsin State College; M.S., University of Wisconsin;
P.E.D., Indiana University
- WEISS, HAROLD (1958).....Assistant Professor of General Business
Administration
B.B.A., City College of New York; B.E.E., New York University;
M.E.E., Syracuse University
- WEISS, THOMAS M. (1956).....Associate Professor of Education
B.A., M.A., Ph.D., Michigan State University
- WELSH, RICHARD K. (1959).....Assistant Professor of English
B.A., DePauw University
- WEXLER, CHARLES (1930).....Professor of Mathematics
A.B., Harvard College; A.M., Ph.D., Harvard University

#On Leave, 1959-60

- WHITEHURST, HARRY B. (1959).....Associate Professor of Chemistry
B.A., M.A., Ph.D., The Rice Institute
- WILCOX, JOYCE H. (1957).....Instructor in Chemistry
B.S., M.S., University of Wichita
- WILCOX, SIDNEY W. (1955).....Assistant Professor of Technical
Communications
B.A., Bethany-Peniel College; M.A., University of Oklahoma
- WILLIAMS, O. O. Professor of Medical Technology;
Consultant in Medical Technology, St. Joseph's Hospital
B.S., M.D., Vanderbilt University
- WILLSON, LORETTA (1947).....Assistant Professor of Speech
B.A., University of South Dakota; M.A., Northwestern University
- WILSON, IRMA (1922).....Professor of Spanish
A.B., Montana State University; A.M., Teachers College,
Columbia University; Ph.D., Columbia University
- WINKLES, ROBERT B. (1958).....Instructor in Physical Education;
Varsity Baseball Coach
Ph.B., Illinois Wesleyan University; M.S., University of Colorado
- WIRTZ, DOROTHY (1959).....Assistant Professor of French
B.A., State University of Iowa; M.A., Ph.D., University of Wisconsin
- WOCHNER, RAYMOND E. (1952).....Professor of Education
B.S., York College; M.A., University of Nebraska;
Ph.D., University of Wyoming
- WOOD, HARRY (1954).....Professor of Art; Chairman, Department
of Art
B.A., M.A., University of Wisconsin; M.A., Ph.D., Ohio State University
- WOOLDRIDGE, CHARLES B. (1959).....Associate Professor of Engineering
A.B., B.S.C.E., University of Kentucky; M.S., Ph.D., Purdue University
- WOOTEN, WILLIAM W. (1959).....Instructor in History
B.A., University of Chicago; M.A., State University of Iowa
- WULK, NED W. (1957).....Assistant Professor of Physical Education;
Basketball Coach
B.S., LaCrosse State College; M.Ed., Xavier University
- WUNCH, WILLIAM STUART (1957).....Associate Professor of
Mathematics
B.S.E. (Math), B.S.E. (Aero), M.S.E., University of Michigan;
Ae.E., California Institute of Technology; Ph.D., Stanford University
- YALE, FRANCIS G. (1952).....Assistant Professor of Physical Science
A.B., M.A., Colorado State College of Education; Ed.D., Teachers
College, Columbia University
- YEAGER, HERMAN VINCENT (1959).....Associate Professor of Education
A.B., San Jose State College; M.A., Stanford University
- YEATER, JAMES W. (1958).....Instructor in Speech and Drama
B.A., Baker University; M.A., University of Washington;
Ph.D., University of Illinois
- YOUNG, G. P. (1947).....Associate Professor of Psychology
B.A., Colorado State College; M.A., University of Colorado;
Ph.D., Yale University
- YUEN, GEORGE U. (1957).....Assistant Professor of Chemistry
B.S., Arizona State University; Ph.D., University of Utah
- ZACHER, ROBERT V. (1946).....Associate Professor of Advertising
B.S. in C.&B.A., M.S. in C.&B.A., University of Alabama
- ZASLOW, BERTRAM (1956).....Associate Professor of Chemistry
B.A., Cornell University; M.S., University of Minnesota;
Ph.D., Iowa State College
- ZEITLIN, HARRY (1959).....Assistant Professor of Education
B.S.S., City College of New York; M.A., Ph.D., Teachers College,
Columbia University
- ZIMMER, CARL R. (1959).....Assistant Professor of Engineering
B.E.E., Cornell University; M.E.E., Ph.D., Syracuse University
- ZIMMERMAN, J. E. (1946).....Associate Professor of English
A.B., M.A., Baylor University
- ZUCHOWSKI, JOHN M. (1958).....Assistant Professor of Health and
Physical Education
B.S., Northwest State College; M.A., Professional Diploma, Teachers
College, Columbia University

Visiting Professors and Lecturers

- BENDHEIM, OTTO L.....Lecturer in Psychology
M.D., University of Michigan; Diplomate in Neurology and Psychiatry
- BUZZARD, ROBERT G.....Visiting Professor of Geography
Diploma, Illinois State Normal University; S.B., S.M., University
of Chicago; A.M., University of Illinois; Ph.D., Clark University
- CATTELL, JAKUES.....Lecturer in Publishing;
Editor and Publisher, American
Men of Science; Directory of American Scholars
- DAVIS, LEW.....Lecturer in Art
- DUNSHEE, LAURA.....Lecturer in Nursing; Executive Director,
Visiting Nurse Service, Inc.
R.N., Toledo Hospital School of Nursing, Ohio; B.S., University
of Michigan School of Nursing
- GABRIELSON, ROSAMOND.....Lecturer in Nursing; Director of
Nursing, Good Samaritan Hospital
R.N., Hotel Dieu School of Nursing; El Paso, Texas; B.S.,
Arizona State University
- GREEN, JOHN R.....Lecturer in Biology
B.S., College of Puget Sound; M.B., M.D., Northwestern University
- LORENZEN, CLAYTON.....Lecturer in Nursing; Executive Director,
Samuel Gompers Memorial Rehabilitation Center
B.A., Sioux Falls College; M.A., University of South Dakota
- PASTORE, EDWARD W.....Lecturer in Physical Education;
Director, Personnel and Training Service—
Boys' Clubs of America
B.A., Dartmouth College; M.A., Yale University
- PEPLOW, EDWARD H., JR.....Lecturer in Art and Mass Communications
A.B., Princeton University
- PITTMAN, MARY.....Lecturer in Nursing; Director of Nursing,
Arizona State Hospital
R.N., Theda Clarke Memorial Hospital, Neenah, Wisconsin;
B.S., Arizona State University
- PRIETO, ROSELYN Y.....Lecturer in Nursing; Director of Nursing,
Crippled Children's Hospital
R.N., Hospital of the Holy Family, New York
- RICE, MARGARET JANE.....Lecturer in Speech
A.B., M.A., University of Kansas
- SURRETT, HERBERT.....Lecturer in Mass Communications
B.A., Arizona State University
- SWARTHOUT, GLENDON.....Lecturer in English
A.B., A.M., University of Michigan; Ph.D., Michigan State University
- WALL, ANNA S.....Lecturer in Russian
B.S., University of Idaho
- WILSON, MARY.....Lecturer in Nursing; Director, Public
Health Nursing, Maricopa County Health Department
R.N., Henrotin Hospital, Chicago; B.S., Loyola University, Chicago

Training School

DOYLE, ROY P. (1959)	Associate Professor of Education; Principal, I. D. Payne Training School B.A., Arizona State University; M.A., Ed.D., Columbia University
ASHBY, NANCIE (1948)	Lunchroom Supervisor
BOETTO, LAUREL B. (1956)	Third Grade A.B. in Ed., M.A. in Ed., Arizona State University
BRYAN, RUTH D. (1956)	Seventh Grade B.Ed., M.S., Southern Illinois University
CHRISTINE, RAY ORR (1958)	Fifth Grade A.B., A.M., Colorado State College of Education
COOK, IRMA (1958)	Second Grade B.S. in Ed., M.S. in Ed., Oswego State Teachers College
HALL, LOLA (1958)	Kindergarten B.S. in Ed., Black Hills Teachers College; M.S. in Ed., Northern State Teachers College
KIRKPATRICK, JANE (1958)	School Nurse R.N., St. Mary's Hospital, Tucson
LAW, MARJORIE W. (1957)	Physical Education B.A. in Ed., M.A. in Ed., Arizona State University
MOORE, HOPE C. (1956)	Shop and Physical Education B.A., M.A., Arizona State University
MORRIS, MARY SCOTT (1947)	Art A.B., Western Kentucky State College; M.A., Northwestern University
OLMSTEAD, CAMERON (1956)	First Grade B.A. in Ed., M.A. in Ed., Arizona State University
ROBINSON, DOROTHY F. (1927)	Librarian B.A., M.A., University of Southern California
SEARIGHT, ROLAND (1954)	Music B.A., Grinnell College; M.A., The Eastman School of Music of the University of Rochester
SMITH, GLADYS ARLENE (1954)	Fourth Grade B.S. in Ed., Fort Hayes Kansas State College; M.S. in Ed., University of Kansas
STANSELL, WILLIAM E. (1956)	Sixth Grade B.S., Milwaukee State Teachers College; M.E., Wisconsin State College at Superior
WEAR, GEORGE R. (1953)	Eighth Grade B.A., Arizona State University

Matthews Library

BATCHELOR, HAROLD W. (1943)	Head Librarian; Professor of Library Science B.A., University of Oregon; B.S. in L.S., M.S., University of Illinois
ACKLIN, PAULINE (1955)	Catalog Librarian B.A., B.S. in L.S., Texas State College for Women
ARKO, MARY L. (1958)	Catalog Librarian B.S. in L.S., University of Minnesota
ARNHOLD, KATHRYN (1947)	Loan Service Manager B.A. in Ed., Arizona State University
BEECHER, MARY E. (1958)	Assistant in Cataloging and Curriculum Laboratory B.A., Iowa State Teachers College; M.A., State University of Iowa
CORY, LUELLA (1948)	Reference and Catalog Librarian A.B., University of Kansas; B.L.S., University of Illinois
GAFFORD, FRANK H., JR. (1959)	Catalog Librarian B.A., North Texas State College

HOWE, CHARLES EDWARD (1951).....	Special Collections Librarian
B.D., Bexley Hall, Kenyon College	
MAXWELL, RUTH (1952).....	Catalog Librarian
B.A., Arizona State University	
MCGUIRE, WALTER J. (1958).....	Chief Reference Librarian
B.S., M.A., University of Minnesota	
MORGAN, FLORENCE B. (1950).....	Catalog Librarian
B.A., University of Colorado; B.S. in L.S., University of Illinois;	
M.S., Columbia University	
PHILLIPS, RUTH F. (1948).....	Catalog Librarian
B.A., Cornell College; Certificate in L.S., University of Wisconsin	
RAWSON, RUTH P. (1958).....	Reference Librarian
and Assistant Librarian, Curriculum Laboratory	
B.S., University of Colorado; Certificate in L.S., University of	
Minnesota	
RUSSELL, ISABEL (1953).....	Administrative Assistant to Librarian
A.B., Butler University	
RUSSELL, JESSIE C. (1954).....	Manager, Curriculum Laboratory
A.B., M.S., Butler University	
SIEDENTOPF, MARIE (1953).....	Acquisitions Librarian
B.A., University of Montana; Library Certificate, Riverside	
Library School	
SWINCHER, BARBARA (1958).....	Assistant Acquisitions Librarian
A.B. in Ed., Ball State Teachers College; M.A. in L.S.,	
University of Illinois	
ZOOK, RUTH M. (1957).....	Assistant in Acquisitions
B.A., M.A., Wheaton College	

Assistants in Administration

ADAMS, BEATRICE.....	Secretary, Associate Dean of Students;
	Housemother, Adelphi Cooperative No. 1
ARMSTRONG, RODNEY M., B.S.....	Placement Interviewer, Placement
	Center
ASHLEY, ALETHA.....	Secretary to the Academic Vice President
**AXEL, BENJAMIN J., M.D.....	College Physician
BAADE, ZOE.....	Housemother, Adelphi Cooperative No. 5
BAAS, BARBARA.....	Secretary to Vice President in Charge of
	Business Affairs
BAILEY, DOROTHY.....	Secretary, Student Health Service
BEATY, BETTY JEAN.....	Secretary to Dean, College of Applied Arts
	and Sciences
BELL, ELLEN M.....	Assistant Director, Memorial Union
BELTZ, VICTOR R.....	Veterans Adviser, Business Office
BOHLEN, GERE.....	Clinical Secretary, Department of Psychology
BOLEN, MARTHA J.....	Secretary to the Comptroller
BRISCOE, DIANE.....	Stenographer, Military Science and Tactics
BROWN, LAUREL H.....	Secretary, Division of Teacher Education
BROWNING, RUTH C.....	Stenographer, Division of Agriculture
BUNTE, MARY L., M.A. in Ed.....	Secretary to the President
BURKE, SARAH, B.S.....	Office Assistant, Radio-TV Bureau
BUSH, CATHERINE, B.A.....	Secretary, Registrar's Office
BUSTAMANTE, TONY, B.A.....	Manager, Bookstore
CARON, JOSEPH R.....	Associate Head Resident, Irish Hall
CARROLL, M. C. K. "Chris".....	Secretary to Graduate Manager
CASSITY, GALEN H., M.A.....	Assistant Registrar
CLARK, MARIANNA B., B.A.....	Secretary, Department of English

COLEMAN, LEE W.	Assistant, Information Service
COLEMAN, SHARON	Secretary, Department of Health, Physical Education and Recreation
COLLINS, HUTOKA	Secretary, Purchasing and Stores
COLTON, DOROTHY N., B.S.	Secretary, Audio Visual Bureau
CONNOLLY, GRACE T.	Secretary to Dean, College of Education
COOK, RUTH L., B.A.	Head Resident, Hayden Hall
COPPLE, BARBARA A.	Secretary to Dean, Graduate College
CROUCH, CHARLES, M.A.	Coordinator-Counselor, Student Affairs
DILWORTH, BARBARA	Secretary, School of Nursing
**DOBBS, LAURA	Office Assistant, Alumni Office
DOTTS, DONALD V., B.A.	Alumni Editor, Alumni Office
DRURY, LORENE M.	Head Resident, M. O. Best Hall "A"
DRYER, LYNN E., B.S.	Chief Engineer, Radio-TV Bureau; Lecturer in Mass Communications
DUBLIN, ARLENE F.	Mimeograph Supervisor
EARLE, LOIS PORTER, A.B.	Section Head, Payroll, Business Office
EATON, META JEAN	Secretary, School of Architecture
ELLINSON, JOHN R., B.A.	Director, Physical Plant
FEMINO, EVELYN L.	Secretary, Placement Center
FIX, RACHEL E.	Film Librarian, Audio Visual Bureau
FORSYTHE, LULU	Housemother, Adelphia Cooperate No. 4
GARNATZ, NORMAN	Accountant, Associated Students
GERSHINOW, BESSIE	Secretary, Division of Language and Literature
GILL, FRANCES M.	Admissions Secretary, Registrar's Office
GILLIAM, FRANCIS O.	Recorder and Section Head, Registrar's Office
GODWIN, WANDA B.	Secretary to Director of Summer Session, Extension and Correspondence
GOTTHARD, WARREN F., M.A.	Assistant Director of Placement
GREEN, MAVIS A., B.A.	Head, Accounts Payable, Business Office
GREGORY, BEATRICE E.	Head Resident, South Hall
HANNEY, IRENE M.	Head Resident, Wilson Hall
HIGGINS, NANCY	Secretary, School of Engineering
HODGDON, ROSA P., A.A.	Secretary, Division of Life Sciences
HOWLAND, PHYLLIS	Secretary to Dean, College of Business Administration
HUNTER, ELMER R., B.S.	Assistant Comptroller
JONES, LORRAINE	Secretary, Department of Music
KELOW, BARBARA	Secretary, Bookstore
KILBOURNE, RUTH, M.A.	Assistant to Associate Dean of Students
KOLBERG, ANN J.	Assistant Director of Admissions, Registrar's Office
KRENKEL, MARGARET A.	Credentials Secretary, Registrar's Office
KRUEGER, EDITH W.	Secretary, I. D. Payne Training School
LAUGHEAD, CHARLYN GAY, B.S.	Secretary, Bureau of Business Services
LEFFEL, JUNE, B.S.	Psychometrist, Testing Bureau; Assistant, Associate Dean of Students
LEWIS, P. CHARLOTTE, M.A.	Head Resident, Gammage Hall
LORD, RALPH C.	Military Property Custodian
MACHTOLFF, GLADYS J.	Secretary, Department of Mathematics

MARX, EUGENE.....	Head Cashier, Business Office
MAY, SIBYL S.....	Clerk, News Bureau
McALEXANDER, DAYLE.....	Housemother, Adelphi Cooperate No. 3
McFARLAND, ELAINE, M.N., C.P.H.N.....	Director, Student Health Service
McKEMY, MARGE.....	Secretary, Scholarship Committee
MEASON, ANNA FRANCES.....	Head Resident, East Hall
MOORE, JUANITA.....	Secretary, Department of Chemistry
MORRELL, GEORGE W., B.A.....	Purchasing Agent, Purchasing and Stores
MUNRO, CLARE W.....	Manager, Business Office
NELSON, GEORGIA Y., B.A.....	Assistant to Director, Memorial Union
NORTON, DONNA.....	Secretary, Memorial Union
OAKLEY, ALVAH S., JR.....	Coordinator, Land Acquisition
OWENS, ROSS A., M.A. in Ed.....	Associate Director of Admissions, Registrar's Office
PARKER, CLARA.....	Head Resident, M. O. Best Hall "B"
PETERSON, MARY F.....	Secretary, Air Science
PHILLIPS, ELSIE W.....	Head Resident, McClintock Hall
PHILLIPS, JUNE.....	Secretary, Division of Industrial Education
RALSTON, MARJORIE.....	Secretary, U.S.O.E. Project, College of Education
RAYMOND, CHARLES J., B.S.....	Assistant Purchasing Agent, Purchasing and Stores
REESE, MARY.....	Stenographer, Bureau of Education Research and Services
RHOTON, DREW.....	Housemother, Adelphia Cooperate No. 2; Cashier, Bookstore
**RICHTER, M. R., M.D.....	Physician, Intercollegiate Athletics
RISPOLI, FRANK, B.A.....	Graduate Manager
RITTENHOUSE, HAZEL.....	Secretary, Alumni Office
ROGERS, KATHRYN.....	Secretary, Department of Physics and Astronomy
ROSE, C. KIMBALL, B.A.....	Assistant to Dean of Students
SCHEIER, MARTHA LOIS.....	Stenographer, Physical Plant
SCHIESZER, JOAN.....	Secretary, Ticket Manager
SCHMIDT, HERMAN A., M.A.....	Assistant Dean of Students; Director of Intramurals
**SCHRAMEL, JOHN E., M.D.....	College Psychiatrist
SCOTT, FRANCES MERY.....	Secretary, Coordinator of Research
SCOULAR, CECILIA, M.A.....	Director, Memorial Union
SHLYK, DOROTHY.....	Secretary, Division of Student Affairs
SHUMAN, IRVEN GAYLE, B.S.....	Director, Campus Security
SHUMWAY, DOROTHY H.....	Head Resident, North Hall
SIMS, JOSEPH J.....	Warehouse Manager, Purchasing and Stores
SMITH, ELIZABETH ANNE, B.S.....	Secretary, Division of Behavioral and Social Sciences
SUTHERLAND, RUTH B.....	Secretary, Division of Physical Sciences
TAIT, MARY H.....	Cashier, Housing
TROXELL, ROBERT E.....	Assistant Director of Housing
VAUGHN, RENE K.....	Administrative Assistant, Palo Verde Hall
WALSH, MARGARET MARY, M.A.....	Head Resident, West Hall

**Part Time

Arizona State University

Organization

Arizona State University is an integral part of the system of higher education maintained by the State of Arizona. It is governed by a Board of Regents appointed by the Governor of the State and is supported by legislative appropriations.

The University is organized into five colleges, an extension division, and a summer session.

1. The College of Liberal Arts includes the School of Nursing, and offers courses in the arts and sciences leading to the degrees of Bachelor of Arts, Bachelor of Science and Bachelor of Science in Nursing.

2. The College of Education offers courses in kindergarten-primary, elementary, secondary, and special education leading to the degree of Bachelor of Arts in Education.

3. The College of Business Administration offers courses in the various fields of business leading to the degree of Bachelor of Science.

4. The College of Applied Arts and Sciences offers courses in agriculture, architecture, engineering and industrial education, leading to the degrees of Bachelor of Architecture, Bachelor of Science, and Bachelor of Science in Engineering.

5. The Graduate College administers programs of work offered in the four colleges leading to the degrees of Master of Arts, Master of Science, Master of Science in Engineering, Master of Arts in Education, Master of Fine Arts, Master of Public Administration, Education Specialist, and Doctor of Education.

6. The Extension Division administers programs of undergraduate and graduate courses in residence centers in Phoenix and other Arizona communities. Courses are also available by correspondence.

7. The Summer Session provides an extensive undergraduate and graduate course offering from each of the colleges during two five-week summer terms.

History

Centuries before the white man came to Arizona, an Indian culture of significance had been established in Central Arizona. Just a short distance from the present site of Arizona State University and actually on the campus are remains of a civilization dating back to the eighth century. Here the Ho-Ho-Kam tribe tilled the desert soil bringing life-giving moisture to that soil from the clear waters of the nearby Salt River by an intricate system of brush dams and laboriously constructed canals.

The first white man known to have visited this region must have marveled at the pattern of life the Indians had left behind, for by the time Fray Marcos de Niza came up from Mexico in 1539, the tribe of Ho-Ho-Kam had vanished, no one knows where. De Niza was soon followed by the colorful but ill-starred expedition of Coronado. Others came, passed on. The desert land was too forbidding for even the most hardy. The Valley of the Sun slumbered.

Almost three centuries passed before courageous, adventure-some white men established permanent homes along the streams and in the mountains of this fabulous land. By 1863, sufficient numbers had gathered within the borders of the region to form the Territory of Arizona. President Lincoln appointed the first territorial governor, John N. Goodwin, who raised the American flag over the Territory, December 29, 1863.

Education in the frontier land progressed slowly until 1885, when on March 12, the Thirteenth Legislative Assembly made provision for the establishment at Tempe of a Normal School. The Normal began classes on February 8, 1886. Thirty-one students met in a single room under the supervision of Hiram Bradford Farmer. The Normal School, forerunner of the present Arizona State University, was the first institution of higher learning to be opened in the State.

The University has had a variety of names starting with Arizona Territorial Normal School and proceeding to Arizona Normal School, The Normal School of Arizona, The Tempe Normal School of Arizona, and the State Normal School of Tempe, Arizona. In 1925, through the activities of the Alumni Association the Seventh State Legislature approved a bill providing that the Tempe Normal School become Tempe State Teachers College and establishing a four-year college curriculum. The Ninth Legislature changed the name of the College to read Arizona State Teachers College at Tempe and authorized the College to grant the degree of Bachelor of Arts in Education. In March, 1937, the Thirteenth Legislature authorized the College to grant the advanced degree of Master of Arts in Education, which degree was conferred the first time on May 31, 1938.

A complete revision of the system of governing the state institutions of higher learning took place on March 9, 1945, when the legislature established a Board of Regents of the University and State Colleges of Arizona, and changed the name of the College to Arizona State College at Tempe. By vote of the people on November 4, 1958, the name was again changed to what will likely be its permanent name—Arizona State University. The Board has broad powers. It has authorized new curriculums and courses, and during the past thirteen years, has authorized awarding the Bachelor of Arts and the Bachelor of Science degrees, May 21, 1946; the degree of Doctor of Education, May 25, 1954; the degree of Education Specialist, December 17, 1954; the degrees of Master of Arts and Master of Science, May 24, 1956; the degree of Bache-

lor of Science in Engineering on July 2, 1956; the degrees of Bachelor of Science in Nursing and Master of Science in Engineering on February 24, 1957 and most recently the degrees of Bachelor of Architecture; Master of Fine Arts, and Master of Public Administration on March 9, 1959.

On May 16, 1953, the Board of Regents approved a limited reorganization of the College and established a College of Arts and Sciences, a School of Education, and Departments of Agriculture, Business Administration, and Industrial Arts and Technology.

Following a study of the state's higher educational program, conducted by the United States Office of Education, the Board, on November 20, 1954, approved the recommendations of the survey committee and authorized the establishment of four colleges: a College of Liberal Arts, a College of Education, a College of Business Administration, and a College of Applied Arts and Sciences. On April 7, 1956, a School of Nursing was approved, and on April 18, 1958 the name of the Graduate Division was changed to the Graduate College. On March 9, 1959, the Division of Engineering was changed to the School of Engineering, and the Division of Architecture was changed to the School of Architecture.

Thus, the University has had a gradual, positive evolution from the limited curriculum of a normal school to a strong multipurpose University. From the original single-building campus, there has grown a campus containing 66 buildings on 314 acres and the original attendance of 31 has expanded to 10,000 for the academic year of 1958-59.

Purposes

Arizona State University aims to serve the people of Arizona by providing an over-all educational program appropriately reflecting the community interests of the people of the State as a whole as well as the needs and desires of individual students who enroll. Present institutional objectives which define the educational program of the University are the result of the evolution of the institution over a period of over seventy years.

The general purpose of the University is to provide means by which all who pass through its doors may become better citizens of the state, the nation, and the world, through increased competence, improved moral and ethical standards, and expanded cultural horizons.

Attainment of this general purpose is made possible through specific programs of academic and other activities which are designed:

- (1) To provide a basic program of general education.
- (2) To provide programs of work in the arts and sciences at the undergraduate level which broaden and extend the basic program of general education and provide the beginning speciali-

zation necessary for advanced graduate and professional education.

(3) To provide programs for the selection and preparation of teachers and administrators for the elementary and secondary schools of Arizona.

(4) To provide programs of graduate and professional work in the fields of the arts and sciences, education, business and engineering.

(5) To provide the atmosphere and facilities for research by both faculty and students. Research is regarded as the hub of graduate study, thereby, helping to fulfill the obligation of any university in the seeking and recording of new knowledge.

(6) To provide programs of pre-professional training in accepted professional fields.

(7) To provide a rich and balanced program of out-of-class activities through the residence halls, student government, professional and special interest groups, organizations, fraternities, and sororities, that provide abundant opportunity for the development of wholesome individual personalities, refined social living, training in leadership and effective citizenship.

(8) To provide a program of help, guidance, and personal counseling that reaches all students.

(9) To provide a program of cultural and educational leadership and service in the community and the State as a whole. These professional and community services are provided through special evening courses, resident credit centers, correspondence courses, summer sessions, educational conferences, dramatic performances, musical concerts, speech clinic services, published bulletins, radio and T-V programs, placement services, alumni organizations, school visitation, speaker and consultant services.

Academic Recognition

The Arizona State University has been accredited by the North Central Association of Colleges and Secondary Schools since 1931. The professional programs in Education are accredited by the National Council for Accreditation of Teacher Education and the program in chemistry is accredited by the American Chemical Society. Students transferring from this University to other colleges and universities are given the same recognition with respect to transfer of credits, graduate study, and other privileges as are enjoyed by other universities and colleges of the country.

The University and its Colleges have institutional membership in the Association of American Colleges, the American Council on Education, the Western College Association, the American Association of University Women, the Western Interstate Commission for Higher Education, the American Association of Colleges for Teacher Education, the National Commission

on Accrediting (not an accrediting agency), the National Association of Business Teacher Education, the Associated University Bureaus of Business and Economic Research, the Society of Industrial and Applied Mathematics, the Council on Social Work Education, the Council of Member Agencies for the Baccalaureate and Higher Degree Programs of the National League for Nursing, the Western Council for Higher Education in Nursing, and associate membership in the Association of Collegiate Schools of Architecture.

University Setting

Environment

Location. Arizona State University is located in the City of Tempe in the heart of the Salt River Valley and nine miles east of metropolitan Phoenix, the state capital, and one of the fastest growing areas in the nation. Tempe is located on the Southern Pacific Railroad's main line and connections with the Santa Fe Railway are available at Phoenix. Four transcontinental highway systems run by the University grounds, affording easy access to all parts of the country. One of the nation's outstanding airports is located halfway between Phoenix and Tempe and provides frequent services via Trans World Airlines, American Airlines, Frontier Airlines, and Bonanza Airlines. The airway's network extends in all directions and there are at least 40 transcontinental flights daily. There is regular metropolitan bus service between Tempe and Phoenix and other adjacent communities.

Climate. The great adventure of this country has always been the act of heading West. That holds good today. Only in the West can the classic American combination of frontier informality and a civilization in the making still be found. In Arizona—above all, the district around Tempe—there is the additional blessing of the nation's most perfect climate. Here in the Valley of the Sun, prosperity can be found in a land suited to its enjoyment. Cloudless skies and bright, constant sunshine permit much of the University activity to be conducted outdoors. There is virtually no snow, rain is seldom, and high winds are infrequent.

Historical and Scenic Features. Within easy reach are found such exciting landmarks as Apache Trail, Canyon Lake, Roosevelt and Coolidge Dams, Hieroglyphic Canyon and the Casa Grande Ruins National Monument. Somewhat distant are the internationally famous Grand Canyon of the Colorado, one of the Seven Wonders of the World, and scenic Oak Creek Canyon, famed western beauty spot.

The Navajo, Apache and Hopi Indian Reservations are near enough for occasional visits and smaller tribal groups—the Pimas, Maricopas and Yaquis—live but a few miles from the campus. At the Heard Museum in Phoenix and in the original excavations at Pueblo Grande, five minutes from the campus, the superb art of

the ancient basket-weavers and Sun-worshipping Ho-Ho-Kam, may be studied.

Majestic mountains fringe the horizon—Camelback, Four Peaks, South Mountain, and the Superstitions, being the most prominent. Papago Park, a natural scenic attraction retaining much of the original desert flora, lies just north of the campus. This beauty spot and its 1200-acre park is an ideal center for hiking, horseback riding, picnicking and painting.

Grounds

The 220 acres comprising the campus proper, arranged in a most attractive setting with broad, shady lawns and dotted by a profusion of orange, olive, fig, and palm trees, present a veritable oasis in this desert land. Interestingly arranged hedges and a variety of shrubs combine with gaily blooming flowers to give an inviting vista of restful color.

More than 60 buildings comprise the main campus. Consistent with a master plan adopted several years ago, all recently completed buildings and those now under construction are finished in light buff brick, a perfect complement to the vivid natural colors of the Southwest. When practical, the same light buff color is used in the modernization of older structures, bringing to the campus scene a warm unity of color. Classrooms and laboratories are designed with large window areas to take full advantage of the winter sunshine abundant in this area and are decorated in soft, pleasant pastels.

The prospective student must see the tropical fruit and nut trees surrounding the buildings, marvel at the desert's rare coloration, visit the fabulous mountains nearby, and bask in the warm, comfortable climate to really appreciate the campus. It's a friendly, democratic campus, where students from every state in the Union and many foreign countries seek a source of power and happiness—the gold of knowledge for a richer, fuller life.

University Farm. The model farm of 360 acres is located six miles southeast of the campus. It is used for experimental and practical work in various phases of agriculture.

University Buildings

Administration

Administration Building. The administrative offices of the University are in the north wing of this imposing structure. In it are located the President's Office, Office of the Academic Vice President, Office of the Vice President for Business Affairs, Dean of the Graduate College, the Registrar's Office, the Business Office, the Division of Student Affairs, the Alumni Office, the Coordinator of Research Activities, the News Bureau, and other administrative sections. It is especially noted for a magnificent entrance-mural in fresco done by Jean Charlot.

University Libraries

Matthews Library. This modern, fire-proof, air-conditioned building provides outstanding facilities, and a growing collection of materials to meet the needs of undergraduate and graduate students and the faculty. Recently remodeled and enlarged at a cost of more than a half-million dollars, the functional plant and the beautiful decor contribute to make the Library a most attractive, comfortable, and efficient place for intensive study or for casual reading. It is indeed the "great heart" of the institution. Arranged for semi-subject specialization, there are reading rooms for Education, Humanities, Science and Technology, and the Social Sciences. In addition to these special reading rooms, there are General Reference Rooms and a Browsing Room for recreational reading. A well equipped Music Room, a gift of Mrs. Mary Redewill, late wife of music patron Eugene Redewill, permits students to listen through individual devices, to the finest in classical recordings and F.M. radio programs. There are one hundred and forty individual study carrells available in the stacks. The significant Collection of American Art is hung in the Library's gallery and reading room.

Training School Library. In addition to the general library, there is a children's library in the Training School. This collection contains more than 5,000 carefully selected juvenile books covering all types of literature. The book collection is supplemented by a file of pamphlets, pictures, and other materials; by a selection of outstanding juvenile periodicals; and by a textbook collection for the enrichment of directed teaching as well as for the children's use. Students in elementary education find the Library valuable.

Curriculum Laboratory. The Curriculum Laboratory, housed in Matthews Library, is a functional part of the teacher-education program of the University. It is designed to serve teachers in training and Arizona teachers in-service by maintaining extensive collections of teaching materials and curricula.

Audio-Visual Center. The Audio-Visual Center is a service agency for the instructional program of the University and for the schools of Arizona. The Center is located on College Avenue between 6th and 7th Streets.

The Audio-Visual Library, valued at more than two hundred and ten thousand dollars, is the largest library of films in the state of Arizona. The films are cooperatively owned by the seventy-seven member schools, by Arizona State University, and by a number of government agencies and industries which deposit films in the Audio-Visual Library. These films are available on a rental or free-loan basis to any responsible organization or school in Arizona.

A library of educational tape recordings is being developed. Schools wishing to acquire these tape programs may send their tapes to the Audio-Visual Library and have any program which the library has recorded on their own tape.

A Graphic Arts Section produces charts and graphs for instructional purposes.

The Audio-Visual Center maintains all projection and sound equipment on campus. The Center provides equipment operation instruction for faculty and students and provides projection service for special events and large group meetings.

Modern electronic film inspection equipment is used for film maintenance.

The Photographic Service produces various types of photographic instructional materials for faculty and students. These include slides, filmstrips, sound or silent motion pictures, multi-lith negatives, Polaroid slides and photocopies.

The Photographic Service also provides news and activity pictures for the Sahuaro, State Press, News Bureau and Radio-TV Bureau.

A Portrait Studio is available for exclusive service to students and faculty.

Radio-Television Bureau. Radio-Television Bureau is an agency of the Division of Special Services charged with presenting material about the University on the broadcasting media.

Radio Facilities: The Bureau operates a professionally equipped broadcasting unit located in the Engineering Center. Three studios, master control room, and sub-control room are used for recording and direct program originations. A portion of the facilities are used by KASN, the campus carrier current radio station for teaching radio skills. More than 100 program units per week originate on tape from these studios for broadcast over commercial stations by the Arizona State Radio Network. In addition, the facilities are used in the preparation of recordings for individuals and organizations connected with the University.

Television Facilities: The Engineering Center also contains a television studio, control room, and film room used by the Bureau for the training of students in the television skills, and in the origination of University television programs broadcast over commercial stations in the area.

Both the radio and television facilities are used to extend the University resources to the people of the State.

The Bureau also has offices and production facilities in the Engineering Center including: a record library, newsroom, film and editing rooms, and KASN headquarters.

The Arizona State University Collection of American Art. The Collection of American Art, including over a hundred original paintings in oil, water color, and tempera, numerous works of sculpture, a division of ceramics and an extensive print collection, is on permanent display in Matthews Library. This Collection presents a panorama of American art that is constantly being increased and now lists 200 catalogued works valued at nearly \$500,000. It has earned its place as one of the most significant

contributions to the cultural life of the state of Arizona and has gained recognition as one of the outstanding collections in the Southwest.

Oliver B. James (1896-1955), distinguished citizen in service to his country and to the State of Arizona, was the original donor and founder of the Arizona State University Collection of American Art. The worth of his generous gift has since attracted many fine contributions in valuable acquisitions, and this noteworthy Collection has superb works by Gilbert Stuart, Sully, West, Audubon, Morse, Eakins, Ryder, Homer, and many other American old masters of the 18th and 19th centuries, as well as representative works by great modern artists such as O'Keefe, Hartley, Marin, Speicher, Rattner, Shahn, Tamayo, Tanquy, Roszak, Lipchitz, Calder, Rebay, Gertrud and Otto Natzler, and many others.

The Lewis and Lenore Ruskin Collection. In 1958 the nucleus of a collection of Renaissance and 17th Century painting valued at a quarter million dollars was presented to Arizona State University by Lewis and Lenore Ruskin of Scottsdale, Arizona. Three Flemish, two Dutch, and two Italian masterpieces are included. Hanging temporarily in the Regents Room in the Administration Building, these paintings are already becoming a shrine for students, artists, and tourists. Most famous of the group is a Nativity by Ambrosius Benson, the Flemish artist whose work is so rare that only eleven other examples exist.

Classroom and Laboratory

Arts Building. This is a recently modernized, fire-proof building of concrete construction faced with brick. It houses the departments of Art, Music, and Social Studies.

Business Administration Building. This is one of the most modern and functional classroom and office structures in the Southwest. It comprises the south wing of the building which houses the administrative offices.

Engineering Center. The Engineering Center is one of the newest structures in the classroom building program. The Center, a series of integrated unit-wings, occupies nearly one full block including parking areas. The building includes shops, experimental shop laboratories, a three-story wing for classrooms and offices, and the Arizona State University Computer Center, housing one of the largest electronic data-processing systems installed on any college or university campus in the world.

English Building. Classrooms and offices for English and speech are housed in this attractively remodeled structure.

Home Economics Building. A splendid, completely equipped structure which houses the Home Economics Department has been constructed at the north edge of the campus adjacent to the Arts Building and in close proximity to the Home Management

House and Nursery School. This structure provides the latest facilities for technical courses in homemaking.

Home Management House and Nursery School. A fine building in which students majoring in Home Economics live for a part of a year. A modern nursery school is also housed in this building. *Life Sciences Center.* This new classroom and laboratory building contains 188 rooms, ranging from laboratories and lecture halls to graduate research facilities. A unique feature is an ecological laboratory where desert life is kept as close as possible to natural surroundings. Courses in botany, zoology, biology, microbiology and entomology are taught in this building. The Center also includes the internationally recognized Poisonous Animals Research Laboratory.

Lyceum Building. The Lyceum Building has been converted recently to provide office space for the Psychology Department. In addition, the building is devoted to the Research and Testing Service, the Guidance and Counseling Center, the Reading Clinic, and the Psychological Clinic.

Old Main. The early traditions of the University cluster about Old Main with its three stories of ivy-covered brick. Erected in 1894, the building has been completely remodeled inside, and new entrance ways have been installed. It is devoted to classrooms and offices for academic work and houses the College of Education.

Physical Sciences Building. This new instructional facility will eventually cover a full city block. The building has four floors which provide space for chemistry and physics classrooms, laboratories, research facilities, and a spacious lecture hall, in addition to many general-purpose classrooms.

Science Building. The Science Building provides facilities for the departments of Agriculture, Geology and Geography, as well as a research laboratory for the U.S. Geodetic Survey.

Training School. The Training School occupies three buildings on a ten acre site on the west central portion of the campus. This modern laboratory school is an accredited elementary school as well as a research center for the College of Education.

Physical Education and Recreation

Men's Physical Education Building. The Men's Physical Education Building was completed and opened in 1952. It is of the latest type construction, contains ample gymnasium space, classrooms, offices and many other features which make it outstanding. The basketball area will ultimately provide seating for 6,000 spectators. The classrooms and offices of the Department of Military Science and Tactics are located in this building.

B. B. Moeur Activity Building. This is the instructional center for women's physical education. The building was named in honor of the late Governor Moeur.

Goodwin Stadium. The stadium was named after the late Garfield A. Goodwin, an early graduate of the Territorial Normal School, and a member of the Board of Education for many years. This stadium, with a seating capacity of more than 9,000, is used as a center for the field and track events and other outdoor activities.

Sun Devil Stadium. The new stadium, dedicated during the 1958-59 football season, seats 30,000 spectators. It is located between two beautiful buttes on the north end of the campus, overlooking Tempe and the Salt River. With ample parking space and fine press facilities, the stadium is an outstanding addition to the University's athletic facilities. There is provision for eventual expansion to 78,000 seats.

Swimming Pool. The swimming pool is one of the newest facilities to be added to the Physical Education departments at Arizona State University. The pool is located just east of the Men's Physical Education Building. It is of heavy concrete construction and is equipped with the most modern high-volume water filtering and purification system. Dressing facilities for men and women are adjacent, and spacious concrete deck areas surround the pool.

Residence Halls

Adelphi Housing. Local chapters of five national fraternities are located on this fifteen acre site three blocks southeast of the campus. Each unit houses thirty students and contains a living-dining room and kitchen.

Carrie J. Matthews Hall. This hall for women was named after Carrie J. Matthews, the wife of former president Arthur J. Matthews. It is temporarily being used as an office building for the College of Liberal Arts.

North Hall. This women's hall is located on the north side of the residence hall quadrangle.

South Hall. South Hall accommodates women. It is located on the south side of the residence hall quadrangle.

West Hall. This fine, large residence hall for women is located on the west side of the residence hall quadrangle.

Dixie Dees Gammage Hall. This is a modern structure for women. The hall was named in honor of Dixie Dees Gammage.

James H. McClintock "A" Hall. McClintock "A" was the first half of this apartment-type residence hall to be constructed. Attractively up-to-date, this hall provides accommodations for ninety-six women.

James H. McClintock "B" Hall. The newest section of McClintock Hall, "B" provides accommodations for 128 women. The hall features a central patio, living room, kitchen, and sunbathing area.

George W. Wilson Hall. Completed in 1956, Wilson Hall provides a fine measure of tasteful modernity with a home-like atmosphere for 148 women. It is located directly west of Danforth Chapel in mid-campus.

Palo Verde Hall. Newest of the women's residence halls, Palo Verde was completed during the 1957-58 school year. It accommodates 600 women, and features the most modern facilities for on-campus living. The hall is located at the north end of the campus and offers a separate cafeteria and ample parking facilities.

East Hall. This residence hall for men is located at the center of the campus.

Irish Hall. This is a three-wing unit located just west of Goodwin Stadium, and houses 153 men.

M. O. Best Hall. Two hundred men are housed in this completely modern, two-wing unit opened for the first time in 1956. The units face a park area and are located west of Irish Hall.

Sahuaro Hall. Opened during the 1957-58 school year, this most modern of the men's residence halls accommodates 450 men. It is located three blocks southeast of the main campus and features a self-contained cafeteria unit.

Charles Trumbull Hayden Hall. A men's residence hall accommodating 146 students has been constructed on the south edge of the campus, facing federal highways. It is modern in construction and contains many conveniences and facilities for pleasant living.

Charles A. Haigler Hall. This dormitory provides accommodations for eighty men and is located underneath the east section of Goodwin Stadium.

Student Services

Memorial Union. The center of student life on campus is the magnificent new Memorial Union Building, located on the southeast corner of the main campus intersection and near to classrooms, residence halls, and all activity centers. A large part of the financing which made the Union possible came through contributions from faculty, alumni, students, and friends of the University. Formally opened and dedicated in the spring of 1956, the Union provides space and the most modern facilities for recreational, cultural, and social activities of the students and faculty.

On the ground floor of the Memorial Union are located the spacious University Cafeteria, the snack-room, known as the "Devils' Den," the efficient, self-service University Bookstore, the campus post-office, and a comfortable lounge. Recreation rooms providing space for table tennis, billiards, bowling, and hobbies and crafts are located in the basement. On the second floor is the luxurious main ballroom opening onto the Starlight Terrace, as

well as a student lounge, several banquet rooms, committee rooms, a well equipped soda bar adjacent to the ballroom, offices of the Associated Students of Arizona State University, and complete editorial facilities of student publications, including the office of Sahuaro, the University yearbook, and the editorial and advertising office and news room of the State Press.

The Memorial Union is, in fact, more than just another building on campus. Every element in its design was chosen to reflect the social, cultural, and recreational life at Arizona State, and to enrich all students generally and each student individually. Thus, this imposing structure brilliantly fosters the real campus spirit with a constantly growing program of activities and events supervised and administered by a competent director of the Union, working with the Cultural Affairs Committee, the Social Committee, and the Committee on Traditions. The Memorial Union Program, as it is called, is alert to the needs of students and is receptive to their requests and suggestions. In the short space of time since it has been opened, the Memorial Union, with its luxurious furnishings, its striking decor, and its colorful offices and recreational rooms has become literally, a "Building-in-motion," and a beautiful, living tribute expressed in its dedication: "To Students, Faculty, and Alumni who served in defense of our country."

Student Health Center. An expanded and reconstructed University Health Center was opened for service in mid-1953. This building, located in a quiet section on the east side of the campus, provides most adequate facilities to care for the health needs of University students.

Danforth Meditation Chapel. A chapel for devotions by individuals and small groups made possible by a gift of \$5,000.00 by William Danforth supplemented by gifts from numerous students, faculty, and friends of the University.

Maintenance

Maintenance Building. This new building located just north of the Men's Physical Education Building is the center for the receiving, storage, and disbursement of all supplies and equipment. The switchboard and the mimeograph office are located here.

Heating Plant. The plant is located centrally just south of the dining hall. It furnishes steam heat and hot water to all University buildings.

Entrance Information

Admission

General Requirements

Age. All applicants for admission to Arizona State University must be at least 16 years of age.

Character. All new students are required to furnish satisfactory evidence of good character as evidenced by a certificate of graduation or of honorable dismissal from the school last attended.

Health. Prior to registration every new student or former student who has been absent from Arizona State University for a year or more must furnish the Student Health Service with a recently completed (within six months) Student Health Record Physical Examination form signed by a practicing physician and surgeon—preferably the family physician. Registration is not valid unless confirmed by the physician's report certifying to the student's good health or to such disability as need not affect the student's work in Arizona State University.

Aptitude Test. All entering lower-division students are required to take the aptitude tests given each fall during Freshman Week and at other specified times, and all entering students are required to take such other tests as may be recommended by the appropriate dean or required by the testing service of Arizona State University.

Arizona State University reserves the right to deny admission or cancel registration of an individual whose attendance at Arizona State University, in the opinion of the appropriate administrative officer and the President, would not be mutually beneficial to himself and to the institution.

Admission to Arizona State University

The first phase of admission is admission to the institution. The second phase is admission to freshman standing in a curriculum of a particular college, school, division, or department within the institution.

Application For Admission. Inquiry regarding application for admission should be directed to the Registrar and Director of Admissions. To make formal application for admission, a student should submit a completed application blank to the Admissions Office, and should have his high school registrar or principal forward to the Admissions Office a transcript of his high school record. Out-of-state applicants may file a preliminary report any time during the second semester of their senior year, with provision to file a supplementary report following graduation.

Graduates from an Approved Secondary School

All applicants for admission to the institution must have graduated with satisfactory scholarship from an accredited secondary school and must have completed a 4-year secondary-school course or the equivalent with a minimum of sixteen units in acceptable subjects. The definition of a unit is that used by the North Central Association of Colleges and Universities.

Scholarship Requirements

Regular Admission. Students must offer an acceptable program of secondary school subjects and must have ranked in the upper three-quarters of their graduating class.

Provisional Admission. Students offering an acceptable program of subjects but ranking in the lower one-fourth of their high school graduating class may apply for provisional admission. Such applicants will be granted provisional admission at the discretion of the institution to which they apply only after pre-admission counseling and testing in which they give evidence of ability to carry college work successfully.

Non-resident Admission. Applicants for admission from accredited secondary schools will be considered for admission if the transcript shows that the applicant has been graduated and has completed an acceptable program of secondary school subjects (as recommended below) and has ranked at least in the upper two-thirds, preferably the upper one-half, of his graduating class. College Entrance Examination Board scores (Scholastic Aptitude Test) of at least 350 on the Verbal section and 400 on the Mathematical section are an acceptable substitute for rank in the graduating class.

Advanced Placement. Students who have taken college level courses in secondary schools and have taken the Advanced Placement Examination will be considered for advanced placement and for the granting of college credit to count towards degree requirements.

Recommended Secondary School Subject Units

English	4	(from Group I)
or English 3 and one foreign lang- uage	2	5 (from Groups I and II)
Mathematics	2	(from Group III)
American History & Social Studies	2	(from Group IV)
Laboratory Science	2	(from Group V)
Electives or	6	(from Groups I through VI)
depending upon English option	5	
	16	16

Additional Subject Units Recommended

The recommended pattern of subjects is that which on the basis of experience can reasonably be expected to provide satisfactory preparation for college when these subjects have been completed with better than average grades. *Academically talented students are strongly urged to take additional courses from*

Groups I through V beyond those recommended above.

Classification of Acceptable Secondary School Subjects

- Group I. English: only courses with major emphasis upon grammar, composition and literary analysis.
- Group II. Foreign Language: a classical or modern foreign language. Less than one unit is not accepted. Two units or more are strongly recommended.
- Group III. Mathematics: one unit of algebra and one unit of mathematics other than arithmetic, business mathematics or general mathematics.
- Group IV. Social Studies: history, civics, economics, sociology, geography, and government (including United States and Arizona constitution).
- Group V. Laboratory Science: only courses in biology, chemistry, and physics, in which at least one regular laboratory period is scheduled each week.
- Group VI. Art, agriculture, bookkeeping, general science, home economics, arithmetic, business arithmetic, general mathematics, journalism, industrial arts, music, drama and speech, secretarial training, and other subjects commonly offered for credit by secondary schools.

Admission to Freshman Standing

The recommended program of secondary school subject units meets the requirements for admission to freshman standing in the Colleges of Liberal Arts, Education, Business Administration, and Applied Arts and Sciences except in the Schools of Engineering and Architecture.

In the School of Engineering $3\frac{1}{2}$ units are required in mathematics. Included must be: advanced algebra, geometry, and trigonometry. Calculus is recommended. The two units of required laboratory science are 1 in chemistry and 1 in physics.

In the School of Architecture, mathematics must include algebra, advanced algebra and geometry for a total of $2\frac{1}{2}$ units; laboratory sciences must include 1 unit of physics and 1 unit of chemistry; additional units recommended include geometry, trigonometry, art and drawing.

Provisions for Admission of Secondary School Graduates Who Have Not Completed the Recommended Subject Units

1. To provide for a period of transition to the new admission requirements, students applying for admission for the academic years 1959-60 or 1960-61, may be admitted provided they offer 10 units chosen from Groups I through V and 5 elective units chosen from Groups I through VI. Other exceptions may be made only with the approval of the Admissions Committee.

2. Applicants who lack no more than two units of the recommended program may be admitted with deficiencies. Credit for college courses applied to deficiencies is not applicable to degree requirements.

Approved Arizona High Schools

The high schools of the state are classified in four divisions—North Central Association high schools, Class A high schools, Class B high schools, and private schools acceptable to the University of Arizona and Arizona State University. Graduates of these schools are accepted without examination under the foregoing provisions governing admission.

NORTH CENTRAL ASSOCIATION HIGH SCHOOLS

Agua Fria Union (Avondale)	Nogales Junior-Senior
Ajo	North Phoenix
Amphitheater (Tucson)	Peoria
Antelope Valley Union (Wellton)	Phoenix Union
Benson Union	Prescott
Bisbee	Pueblo (Tucson)
Buckeye Union	Ray
Camelback (Phoenix)	Round Valley (Eagar)
Carl Hayden (Phoenix)	Safford
Casa Grande Union	St. Johns
Catalina (Tucson)	San Manuel
Central (Phoenix)	Santa Cruz Valley Union (Eloy)
Chandler	Scottsdale
Clifton	Snowflake
Coolidge	South Mountain (Phoenix)
Douglas Senior	Sunnyside (Tucson)
Duncan	Sunnyslope (Glendale)
Flagstaff	Superior
Florence Union	Tempe Union
Flowing Wells (Tucson)	Thatcher
Gilbert	Tolleson Union
Glendale Union	Tombstone Union
Globe	Tucson Senior
Hayden	Washington (Glendale)
Holbrook Senior	West Phoenix
Marana	Wickenburg
Mesa	Willcox
Miami	Williams
Mohave County Union (Kingman)	Winslow
Morenci	Yuma Union

CLASS A HIGH SCHOOLS

Bagdad	Patagonia Union
Bowie	Payson
Camp Verde	Phoenix Christian
Fort Thomas Union	Pima
Gila Bend	St. David
Grand Canyon	Sanders
McNary	Seligman
Mingus Union (Clarkdale)	Valley Union (Elfrida)
Northern Yuma County Union (Parker)	Window Rock (Fort Defiance)

CLASS B HIGH SCHOOLS

Ash Fork	St. Joseph's Academy (Tucson)
Brophy College Preparatory (Phoenix)	St. Mary's (Phoenix)
Fredonia	St. Michael's
Ganado Mission	Salome
Maricopa	Salpoint (Tucson)
Page	San Simon
Phoenix Indian	Theodore Roosevelt (Fort Apache)
St. Joseph's Academy (Prescott)	Xavier (Phoenix)

PRIVATE SCHOOLS

Judson School (Phoenix)	Southern Arizona School
Orme School on Quarter	for Boys (Tucson)
Circle V Bar Ranch (Mayer)	Verde Valley School (Sedona)

Admission with Advanced Standing

Application for Admission. Inquiry regarding application for admission should be directed to the Registrar and Director of Admissions. To make formal application for admission, a student should submit a completed application blank to the Admissions office.

Transcripts. Before any student may register for work in the regular sessions of Arizona State University, and be admitted to advanced standing and classification, his transcripts of high school and previous college work must be on file in the Office of the Registrar and Director of Admissions. Students should request the high school principal and each college registrar to mail their transcripts directly to the Registrar and Director of Admissions. Transcripts should be in the hands of the Registrar and Director of Admissions at least thirty days in advance of the registration date. Transfer students whose transcripts are not received by this date may experience difficulty in planning course programs with curriculum advisers. Transcripts are not required at the time of registration of those taking work in the summer session, in extension, or by correspondence.

All transcripts or credentials submitted from other institutions become the property of Arizona State University. Neither the originals nor copies will be released from the files. When duplicates are required students should obtain new transcripts from the issuing institution. At the discretion of the administration of Arizona State University admissions, credentials and transcripts will be destroyed.

Transfer of Credit. Credentials presented for admission may be rejected in whole or in part and examinations required in any or all of the subjects offered. Applicants who have failed to maintain a satisfactory scholarship record acceptable to the University will not be admitted. Admission will not be granted to students whose credentials from other institutions are not on file, nor to students who, for any reason, are ineligible to continue in the institutions from which they desire to transfer.

Students from approved institutions of higher education ordinarily will be given credit, hour for hour, for work done in these institutions insofar as it applies to the requirements of the curriculum pursued at Arizona State University. The number of units in barely passing grades credited to students admitted to advanced standing may not exceed 20 per cent of the total number of units completed. This applies to records in separate institutions when the transfer has attended more than one. Grades and scholastic honor points earned at other colleges and universities are not recorded on the student's permanent record.

Students who have registered in other colleges and universities may not disregard their records in such institutions in order to make application for admission solely on the basis of their high school records.

Failure to report previous college attendance at the time of registration is sufficient cause for cancellation of the student's enrollment, of any credits earned, or both.

Before consideration for admission will be given to transfer students who have been disqualified in another college, an official transcript showing evidence of good standing and that the disqualification has been removed and that the student is eligible to return to the institution where the action was taken is on file in the office of the Registrar and Director of Admissions of Arizona State University.

Students who have been disqualified in another college because of scholarship, conduct or any other reason will not be admitted to Arizona State without the approval of the University Admissions and Standards Committee.

Credits from Junior Colleges. Credits transferred from an accredited junior college will be accepted up to a maximum allowed by the University for the first 2 years in the corresponding University curriculum.

Junior colleges in Arizona accredited by Arizona State University under the above provisions include Phoenix College, at Phoenix, and Eastern Arizona Junior College, at Thatcher.

Junior-college students planning to transfer to Arizona State University at the end of their first or second year should plan their junior-college courses to meet the requirements of the curriculum selected. Loss of time often results from failure to do this. Junior college transfer students will be permitted to follow the degree requirements specified in the Arizona State University catalog in effect at the time they began their junior college work providing their college attendance has been continuous. Courses transferred from junior colleges will not be accepted as upper division credit at Arizona State University.

Credits from Tempe Religious Conference. Courses offered by the Tempe Religious Conference, Tempe, and approved for transfer are accepted for general elective credits by Arizona State University.

Credit for Military Service. For active service terminated under honorable conditions in the Army, Navy, Marine Corps, Air Force, or Coast Guard for a period of at least six months and less than a year, the University allows two units of military science, for one year or more of active service, four units of military science, and for a commission earned in the service, twelve upper-division units of military science.

Veterans must submit their records of service in the Armed Forces (photostatic copy of discharge and/or separation notice) with a notarized *Application for Evaluation* to the Admissions Office as a part of their admissions credentials. Advanced standing credit will be granted on the basis of these records only if application is made at the time of admission to Arizona State University.

Special Information for Veterans:

Arizona State University is fully accredited by the Veterans Administration. Veterans will follow the procedures outlined above under the heading, "Admission to College." In addition, veterans will observe the following special procedures:

1. Veterans not previously in training under the G.I. Bill will obtain from the Veterans' Administration, Regional Office, Phoenix, Arizona, a Certificate of Eligibility and Entitlement to attend Arizona State University.
2. Veterans previously in training under the G.I. Bill will obtain from the Regional Office nearest the institution which he last attended a supplemental Certificate of Eligibility and Entitlement.
3. Veterans will deliver these certificates to the Veterans' Accounts Officer at the University in person at the time of registration.

4. Veterans must be in continual attendance in training after July 25, 1951. Changes of course and/or place of training must be applied for while the veteran is in actual attendance in a college or university. Failure to comply with either of the above may result in the forfeiture of remaining entitlement by the Veterans Administration.

5. Veterans desiring to enter R.O.T.C. so as to qualify for a commission in the Army or Air Force should contact the Professor of Military Science and Tactics or Professor of Air Science prior to registration. Veterans receiving commissions through the Army R.O.T.C. programs are required to serve only six months active duty and a total of four years in the Reserves following date of commission. Veterans receiving commissions through the Air Force ROTC Program should contact the Professor of Air Science for service commitments.

Admission of Special Students—Unclassified

Persons 21 years of age or over who wish to enroll for six semester hours or less per semester of undergraduate course work may register as special students unclassified. Such special students are not required to file transcripts or a residence classification form. These students must however file a special student admission application form. Persons registering under the special provisions are not candidates for any degree but may elect to take such courses as they are prepared to take with profit.

Admission of Foreign Students

Foreign students seeking admission to Arizona State University in addition to meeting the requirements for regular admission either as a freshman or as a transfer with advanced standing credit must have the American Consul office in the vicinity in their home country forward to the Admissions Office at Arizona State University a certified statement that the student's English reading, speaking, and comprehension ability is such that the student can reasonably be expected to succeed in a university program here. Foreign students must also provide a personal data sheet in duplicate in addition to the application for admission. Foreign students are urged to be certain that their passport and visas are in order before coming to the United States.

Arizona State University has very limited scholarship resources for foreign students. In most instances, financial assistance will not be available. Before a foreign student leaves his home country he should have a certificate of admission from Arizona State University and a United States Department of Justice Immigration and Naturalization Service Form I-20 from Arizona State University. Arizona State University cannot provide on-campus employment to aliens because a state law provides that non-citizens cannot be on the Arizona State payroll.

All foreign students are required by Arizona State University to have insurance coverage against illness and accident before being permitted to register. The insurance must be maintained throughout the student's enrollment in the University. The cost of this insurance must be provided by the student. Group insurance with a recognized American insurance company is available through the Registrar's Office. Information and application forms are supplied with admission material. Comparable insurance with a reputable American insurance company is acceptable. Canadian students may be insured by recognized Canadian insurance agents.

Re-Admission to the University

Any former student, graduate or undergraduate, who has not been in attendance at Arizona State University for one or more regular semesters must obtain an application for re-admission from the records section of the Office of Registrar and Director of Admissions. This application should be submitted at least one month prior to the beginning of the semester the student plans to re-enter. Official transcripts of any additional work taken elsewhere must be sent from the Office of the Registrar at the institution where such credit was earned direct to the Office of the Registrar and Director of Admissions at Arizona State University.

Admission to Summer Session

Excepting those who plan to complete the degree requirements in summer sessions only, students will be admitted to the summer session without presentation of transcripts.

Registration

Registration Dates. Students should register on the registration dates announced in the University calendar. New students cannot complete the required aptitude and health examinations and finish registration in one day. Students registering late will be charged a late registration fee. Residence halls will be open to students on the dates scheduled in the University calendar.

Prerequisites to Registration. Before registering in the regular sessions, all students seeking admission must file transcripts of high school or college work, or both, and take the aptitude and health examinations required under the heading, "Admission to Arizona State University." In addition, students must meet special requirements given hereafter. Undergraduate students file applications for admission and transcripts in the Office of the Registrar and Director of Admissions. Graduate students file theirs in the office of the Director of Graduate Study.

Classification of Students. Freshmen are those students who at the beginning of the academic year have less than 30 semester hours of credit; sophomores, those with 30 or more semester

hours, but less than 60; juniors, those with 60 or more, but less than 90; seniors, those with 90 or more; graduate students, those holding a bachelor's degree from Arizona State University, or any other recognized institution. Students retain their class designation during the academic year. No changes in classification are made between the semesters of the academic year.

Curriculum Advisers. Before entering the University a student should study the curriculums outlined in order to determine the curriculum best suited to his interests and needs. Before registering, each student must select, tentatively at least, a curriculum. The designated curriculum adviser will counsel with the student regarding his proposed curriculum, his choice of courses, and approve both. He advises him as needed throughout his stay in the University.

Course Loads. Students carrying twelve or more semester hours of work are classified as full-time students for University classification purposes. *Students attending the university under the benefits of Public Laws 346 or 16 must be registered for a minimum of 12 semester hours for G.I. benefit and subsistence purposes. Students attending under the Korean G.I. Bill of Rights must be registered for a minimum of 14 semester hours to be classified as a full-time student for G.I. benefit and subsistence purposes. Male students to qualify as full time college students for Selective Service classification purposes must be registered for and complete, each semester, one eighth of the number of semester hours required for a degree. Thus, male students subject to the draft must be registered for and complete sixteen semester hours each semester.* Students may not be registered at any other college or university or in a Residence Center when in regular attendance here unless approval has been granted by the Admissions and Standards Committee. The maximum load for which a student may register is 17½ semester hours, except for students enrolled in engineering programs. The maximum load for engineering students is 19 semester hours. Students who wish to register for more than these maximums must petition the standards committee of the college in which they are registered. Freshmen and lower division transfer students attending Arizona State University for the first time will not be permitted to carry an overload. Students having a low scholarship record may be required to carry a light load. Students carrying a full-time school job will be asked to carry a light load unless their previous records in scholarship and on aptitude tests are high. During the semester in which a student is registered for student teaching, the load should not exceed 16 semester hours.

Planning the Schedule. The schedule of classes covers both morning and afternoon hours, Monday, Tuesday, Wednesday, Thursday, and Friday, and morning hours only on Saturday. Full-time students are expected to devote both mornings and afternoons to their program of studies. They should not plan to take classes

mornings only, or afternoons only, or less than five days per week.

Course Restrictions. Freshmen may not register for courses numbered "200" and above unless they have met the designated prerequisites. Honors freshmen may register for "200" courses on approval of the instructor.

Auditors. Persons wishing to audit courses will register in the regular manner and pay the regular fees. Audited courses carry no credit. Courses audited count toward the student's load. Students once registered for "audit" are not permitted to change to "credit" (and vice versa) after the close of the drop-add period.

Comprehensive Examinations. The purpose of the Comprehensive Examination is to permit the student an opportunity to establish credit in a field in which he has had adequate preparation or experience, but in which he has not received academic credit. To provide a procedure by which this may be accomplished, the following rules are applicable:

Comprehensive examinations may not be taken in any course for which the student has received admission or transfer credit from any educational institution. Admission and transfer credit are established through the Admissions Office.

Comprehensive examinations may not be taken in the elementary level of a field in which the student has received credit for advanced work. This includes the prohibition of comprehensives in courses required as prerequisites for a course in which the student has received credit.

Students desiring credit by comprehensive examination should indicate their desire to take such examinations during their first two semesters in residence at Arizona State University. No comprehensive examinations will be given to students who have accumulated 100 or more semester hours of credit.

A student may establish a maximum of 16 semester hours of credit by comprehensive examinations and/or correspondence courses.

Only full-time matriculated students regularly enrolled in the academic year, (not including summer sessions) may petition to establish credit by examination.

Applications will be accepted only for courses listed in the current university catalog, *and only for courses in which a comprehensive examination is regarded as a satisfactory measure of accomplishment.*

The fee for such examinations shall be \$7.50 per semester hour of credit. An examination may cover only one course. For example, English 101 and 102 are two courses requiring separate examinations. No examination will be prepared until the fee is paid.

An application blank may be secured from the office of the Dean of the College in which the course is offered. The student will fill out the application giving the number, title, and the number of semester hours of credit for the course in which an examination is desired, and a statement showing his training and preparation for the course. The completed application shall carry the recommendation of the Head of the Division or Chairman of the Department in which the course is offered. The application is filed with the Dean of the College in which the course is offered, and his *approval to take the examination must be granted.*

Ordinarily, an application will be approved for only one course at a time. If a student applies for examinations in sequence of two closely related courses, such as English 101 and 102, permission may be granted to take the second examination upon successful completion of the first.

The number of hours of credit granted shall be the hours specified for the course in the current catalog.

All examinations shall be of a comprehensive type. They shall be prepared and graded by the instructor of the course and the Head of the Division or Chairman of the Department and filed in the Records office.

Examinations will be administered through the office of the Dean of the College in which the course is offered.

Letter grades of A,B,C,D, and E will be used in grading examinations. If the grade is A,B or C, a grade of CR. will be entered on the student's permanent record. If the grade on the examination is D or E no entry will be made on his permanent record. Entries on the permanent record of credit by examination shall be so indicated. The student will be notified of the result of the examination. The student will not be given a second opportunity to establish credit by examination for the same course.

NOTE: Of the total fee, \$1.00 is to be retained by the University. The remainder is to be divided equally between the Head of the Division or Chairman of the Department and the instructor for services rendered in preparing and grading the examination. Payments are made by the Business Office upon authorization by the Dean of the College in which the course is offered.

Late Registration. Late registration fees are charged beginning the day class instruction begins. Registration for the first semester is closed Monday of the second week of classes. Registration for the second semester is closed Thursday of the second week of classes.

Incomplete Registration Registration is not complete until all fees have been paid and all required examinations have been taken. Failure to satisfy any of the admission or registration requirements is sufficient cause for dropping a student from all classes.

Changes in Registration. Programs should be carefully planned under the guidance of the curriculum adviser so that changes in registration will not be necessary. After a student has completed his registration, changes may be made only through the Registrar's Office by means of a Drop-Add card. Changes may be made as late as Monday of the second week of the first semester. Changes may be made as late as Thursday of the second week of the second semester.

Dropping Courses After the Close of Registration. The courses for which a student is registered at the close of the late registration period constitutes his official registration and semester load. A student who officially withdraws from a course during the first six weeks of a semester receives the mark of W. After the first six weeks a student may not drop courses from his official semester load. To drop a course during the first six weeks of the semester the student will obtain from the Office of the Registrar and Director of Admissions an Authorization for Dropping Course Form and complete it.

Withdrawal from the University. Students who find it necessary to withdraw from the University should withdraw officially by obtaining and completing an official withdrawal card from the Office of the Registrar and Director of Admissions.

Until a student withdraws officially, he is registered in all courses and he will receive E grades in all subjects at the end of the semester unless he withdraws officially from the University. Students who withdraw officially will receive a mark of W or grade of E at the time of withdrawal depending upon the quality of the work at the time of the official withdrawal. If a student is unable personally to withdraw officially as prescribed above because of illness or other reasons, he should notify the Registrar and Director of Admissions in writing without delay and request that he be officially withdrawn from the University.

Retention

Dropping Course at Instructor's Request. A faculty member will drop a student from his class with a mark of W or grade of E whenever, because of absence or other reason, he thinks the work of the student is such as to justify it. (See Attendance, page 65.)

Disqualification. All students classified as *freshmen* who have a cumulative grade point index of less than 1.25 at the end of the academic year are disqualified. All students classified as *sophomores* who have a cumulative grade point index of less than 1.50 at the end of the academic year are disqualified. All students classified as *juniors* who have a cumulative grade point index of less than 1.75 at the end of the academic year are disqualified. Any student who fails to meet the cumulative scholarship index required for graduation and who after completing 15 additional semester hours has not met this requirement is disqualified. Stu-

dents who are disqualified are not eligible to attend summer sessions. This regulation is effective for all students enrolled 1st semester 1959-60 and thereafter.

Reinstatement. A student who has been disqualified may file an application for reinstatement with the Dean of the College in which he was registered. A student who is disqualified is not permitted to file an application for reinstatement for either of the succeeding summer terms. After a review of his case by the Dean of the College and upon recommendation by the Standards Committee of the College in which the student was registered, he may be reinstated on probation. A disqualified student has the right to be heard by the respective Standards Committee.

Scholarship Probation. Students who have been reinstated by action of the Admission and Standards Committee are on scholarship probation during the semester following reinstatement.

University Regulations

Conduct of Students

Standards. It is the policy of the University to give students the largest degree of liberty consistent with good work and orderly conduct. Students of a state supported University have an important responsibility to the citizens who help pay for their education, and to each other; and their conduct, both on and off the campus, should reflect this responsibility. Specifically, each student is expected:

1. To conduct himself in such a manner as to uphold, not detract from, the good name of the University and fellow students by conforming to the law and accepting the moral and social practices of the community, state, and nation.
2. To abide by University rules and regulations.
3. To respect property, public and private, and to meet his financial obligations in relations with fellow students, others and the University.
4. To show active concern for the physical safety of self and others.
5. To demonstrate consideration and respect for the rights and personal privileges of other human beings regardless of such factors as race, nationality, religion or color.

Among the circumstances which indicate possible dismissal from the University, if the student is found guilty, are whenever a student:

1. Deliberately endangers or seriously threatens the life or physical safety of others or self.
2. Leads or participates actively in destructive mob action.
3. Has serious or repeated difficulties with law enforcement authorities.
4. Commits sexual immorality.
5. Refuses to cooperate in efforts made to help him adjust to college responsibilities, or persists in conduct which, though perhaps less flagrant violations than items 1 through 4, eventually would serve to discredit the University and/or fellow students.

These standards apply to all students as long as they are enrolled in the University, both on and off the campus, and the University assumes that the act of registering as a student implies full acceptance of these standards of conduct. Failure to conform to these standards may be considered sufficient cause for dismissal from the University. The authority of the University is exercised over all students individually and over all student groups or organizations bearing the name of the University, or representing or purporting to represent the University, in any

student enterprises to the extent necessary to safeguard the good name and well-being of the University.

Any proposed enterprises by students or organizations bearing the name of the University, or representing or purporting to represent the University, must receive the official sanction of the University before announcements are made of such enterprises.

The possession, serving or use of intoxicants of any kind whatsoever is prohibited on the campus, at all social functions held under the auspices of university-sponsored organizations or groups, wherever held, or at any other event in which university students participate where such possession, serving or use may reflect on the good name and reputation of the University.

Appropriate dress is expected of students on the campus and in all campus buildings. In accordance with Associated Women Students' regulations, women students are expected to wear street clothes such as sweaters and skirts, dresses, or suits, unless they are going to or from a sports activity. For further details on dress in the Memorial Union and women's residence halls see "Co-ed Cues."

Attendance

The University has no uniform system of cuts. The loss incurred by a student for absences depends upon the nature and the amount of work missed, of which the instructor is the sole judge. The instructor will recommend that a student be dropped from class whenever, in his opinion, the student's continuation in the course seems unprofitable to the student or detrimental to the class, and will send a memorandum to the Registrar and Director of Admissions who will initiate the "Authorization for Dropping Course" form. All *veteran students* are to be reported to the Office of the Registrar and Director of Admissions when absent for three or more consecutive class periods or when the instructor considers the total number of absences excessive, whether consecutive or not.

No excuses for absence from class are granted either by the administration or by instructors. This applies to any absence occasioned by a student leaving early for, or returning late from, a scheduled vacation period as announced in the University calendar. The student alone assumes full responsibility for all absences. Instructors will permit student to make up tests and other work missed when the absence was due to causes beyond the control of the student or on account of activities assigned by the University. The instructor is the judge of the validity of reasons given by the students for absence. Students absent from classes because of a confining illness in the infirmary, may request a statement from the Director of the Student Health Service which will give the dates the student was confined as a patient. Students absent from classes because of a confining illness at home, may request a similar statement from the Dean of Students or Associate Dean of Students.

Fees, Deposits, and Expenses

Changes in Fees. The Board of Regents reserves the right to change fees and charges from time to time without notice when necessary.

Extending Credit. The University cannot extend credit, therefore, students must have on hand when registering sufficient funds to pay for registration, incidental fees, books, and board and room for one month.

Definitions. *Regular fees* are those paid by all students. *Special fees* are those paid by certain students only, and under the conditions indicated. *Deposits* are made to cover certain contingencies. All or part of the deposit may be returned depending upon the charges incurred by the student.

General Summary

Summary of minimum annual expenses:

General University fees	\$182.00
Laboratory and incidental fees	20.00 (approx.)
Books and supplies	75.00 (approx.)

Total minimum cost to Arizona resident residing off campus	\$277.00
Room and Board	550.00 ¹ (approx.)

Total minimum costs to Arizona resident residing on campus	\$827.00
Non-resident tuition	450.00

Total minimum cost to out-of-state resident residing on campus	\$1,277.00

All students should add to this list incidental personal expenses as needed plus special fees and deposits.

¹Rates vary depending on the dormitory in which a student resides and on the basis elected for meals in the University cafeteria. Above figures based on a five day meal ticket.

Regular Fees

These fees are paid each semester by all students with the exception of those registering for Extension and Correspondence courses.

General University Fee.....	\$91.00
(Covers registration for more than six (6) semester hours)	

This includes fees covering registration, student activities, student union, recreation, library, college series, stadium, alumni association and health service. (Please note Special Fees and Deposits are in addition to these fees.)

Registration Fee.....\$7.50 per semester hour
(Registration for six (6) semester hours or less)

Special Fees

Special fees are paid by certain students under the conditions given below:

Non-resident Tuition Fee (per semester).....\$225.00

All students classified as non-residents, who register for twelve (12) or more semester hours pay the full non-resident tuition fee, except graduate students who have been awarded graduate fellowships or teaching assistantships.

Students classified as non-residents who register for less than twelve (12) semester hours, but more than six (6) semester hours, are required to pay a non-resident tuition fee of \$18.75 per semester hour. Those students registering for six (6) or less semester hours pay no tuition.

A student to be considered a legal resident of Arizona for the purpose of registering at the Arizona State University must present evidence as follows:

(1) **If under 21 years of age**—that the supporting parent (or guardian having legal custody) has been a legal resident of the State of Arizona for at least 1 year next preceding registration.

In the event that a legal resident of Arizona is appointed as the guardian of a non-resident minor, such minor does not become a resident until the expiration of 1 year from the time of appointment and then only upon a proper showing that such appointment was not made to avoid the non-resident fee.

(2) **If over 21 years of age**—that legal residence in the state has been established for at least 1 year next preceding registration, and that he is eligible to become a registered voter. (Sec. 3 of Art. 7, Constitution of Arizona, provides, "For the purpose of voting, no person shall be deemed to have gained or lost a residence . . . while a student at any institution of learning . . . Sec. 6, Art. 7 provides, "No soldier, sailor or marine . . . shall be deemed a resident of this State in consequence of his being stationed at any military or naval place within this state.")

(3) **If an alien who has taken out first naturalization papers**—that residence has been maintained in the state for at least 1 year previous to registration, and that he has filed with the United States Immigration and Naturalization Service an application for such citizenship or a declaration of intention to make such application when eligible.

The student must have the question of his legal residence passed upon previous to registration and payment of fees. The responsibility of registration under proper residence is placed upon the student. If there is any possible question as to the legal residence, the student is responsible for obtaining a blank from the Registrar's Office; filling it out completely; taking it to a notary public in the Business Office, and making a sworn statement concerning the facts given, and returning the blank to the Registrar's Office. Any student found to have made a false or misleading statement as to his residence shall be subject to dismissal from the University.

In all cases where the records indicate that the student's home is outside of Arizona, the non-resident fee shall be assessed. Claims for refund may, however, be filed at any time within 30 days.

Non-resident graduate students also pay the tuition fee.

Private Lessons—Music Majors.....\$40.00

In addition to the usual University registration fees, music majors will pay a flat rate of \$40.00, per semester, which covers all private instruction required in the major teaching fields and in fields of specialization. All non-majors will pay the fees for private instruction listed below.

For two half-hour lessons per week in piano, voice, violin, violoncello, band and orchestral instruments, the fee is \$40.00 per semester. For one half-hour lesson per week the fee is \$27.00 per semester.

Class Lessons—Music\$9.00 or \$12.50

The fee for two (2) one-hour piano lessons a week is \$12.50 per semester. For two (2) class lessons of one (1) hour each in all other music classes, the fee is \$9.00 per semester.

¹The attention of students who have not attained the age of 22 years and whose parents do not live in the state of Arizona is directed to the fact that presence in the state of Arizona for a period of more than 1 year immediately preceding the opening day of the semester during which it is proposed to attend the Arizona State University does not, of itself, entitle the student to classification as a resident.

Rentals—Musical Instruments

The rental for school-owned solo instruments is \$2.50 a semester. Students using University-owned instruments are held financially responsible for damage done them from the time received until returned and inspected at the close of the semester.

Rental on the Hammond organ is \$5.00 per semester, for one hour daily practice. Rental on practice pianos is \$5.00 per semester, for one hour daily practice; \$7.50 per semester, for two hours daily practice.

School of Nursing Transportation Fee (per sem.).....\$10.00

To provide transportation to hospitals and other health facilities for observation and clinical training. Paid by all students each semester of registration in the School of Nursing.

School of Nursing Examination Fee.....\$8.00

To cover cost of National Qualifying Examination in Nursing.

Transcript Fee

There is no charge for the first transcript. For each additional transcript there is a fee of \$1.00. Requests for transcripts should be in the hands of the Registrar and Director of Admissions one week in advance of the time needed.

Senior Check-Out

Each senior is entitled to one official check-out, at the time application for graduation is filed, without charge, under the curriculum designated in his application for graduation. A fee of \$1.00 will be charged for any additional check-outs.

Absentia Fee\$7.50

Students who are granted permission to receive their degree in absentia pay this fee.

Auditor's Fees

Those taking courses for record purposes register and pay the regular fees.

Laboratory Fees.....See course descriptions

With few exceptions such fees are not returnable.

Master's Degree Qualifying Examination Fee.....\$3.50**Master's Thesis Binding Fee.....\$5.00****Education Specialist Report Binding Fee.....\$10.00****Doctoral Dissertation Binding Fee.....\$10.00****Doctoral Dissertation Fee.....\$50.00**

This fee is paid by doctoral candidates who have been admitted to candidacy for the Doctor of Education degree.

Doctoral Dissertation Micro-Film Fee.....\$10.00**Doctoral Qualifying Examination Fee.....\$7.50****Education Specialist Qualifying Examination Fee.....\$7.50****Education Specialist Report Fee.....\$25.00****Special Examination Fee.....\$1.00**

When, because of absence, or for any reason, it becomes necessary for a student to request a special examination in any course, a fee of \$1.00 may be required for this special privilege.

Comprehensive Examination Fee.....\$7.50 per semester hour

Paid by all students seeking to establish credit by examination.

Test Fees—Vocational\$0.50

A nominal fee is charged to pay the cost of test materials only.

Graduation Fees\$5.00

A graduation fee in the amount of \$5.00 applies if paid on or before the dates specified in the section of the catalog headed **Graduation Requirements**. After that date, the fee is \$10.00. If a student is granted permission to receive a degree in absentia, he shall pay an additional fee of \$7.50.

Cap and Gown Rental Fee.....\$2.75 to \$7.50

Bachelor's cap and gown for baccalaureate and commencement exercises, \$2.75. Master's cap, gown, and hood, \$8.90. Education Specialist cap, gown, and hood, \$7.50. Doctor's cap, gown, and hood, \$7.50. These are approximate amounts and subject to change.

Fee for Dropping Course\$0.50

Charged following last day of registration.

Late Fees

Late Registration\$5.00

All students registering on the date specified for the beginning of classes, or thereafter, pay this fee.

Late Aptitude Tests.....\$2.00

Paid by students taking the aptitude tests on the date specified for the beginning of classes or thereafter.

Late Physical Examination.....\$1.00 to \$3.00

Charged beginning at noon of the last day scheduled for registration.

Late X-ray Actual Cost

Charged all students who fail to take the X-ray on the date specified by the University.

Deposits

Deposits are required of those students wishing certain privileges or services. The deposits are returnable less any charges which may have been incurred during the term of the service being rendered.

Science Breakage Deposits

In the following courses students are required to purchase a \$4.00 deposit card. When their breakage exceeds this amount, they will be required to purchase additional deposit cards.

CH 100, 111, 113, 114, 115, 121, 225, 231, 300, 327, 331, 332, 341, 421g, 431g, 435g, 441g, 442g, 448g, 452g, 455g, 525, 526, 527, 531, 543.

Women's Gymnasium Deposit (per semester).....\$5.00

This deposit will be required of all freshmen women students. This deposit will be refunded if the towels, leotard and lock are returned in good condition.

Military Uniform Deposit (returnable).....\$25.00

Room Reservation Deposit\$10.00

Reservations for rooms are obtained by filing an application and the \$10.00 deposit with the Housing Office. Deposits are refundable upon withdrawal, less any damages or other charges assessed.

General Expenses

Board and Room

The Memorial Union Dining Hall offers meals on a 5-day or 7-day meal ticket basis with as many additional portions as the student desires served at no extra cost. Individual meals are also available on an a la carte basis at regular prices. The meal ticket costs per semester are \$165.00 for 5-day or \$225.00 for 7-day meal tickets. This breaks down to a daily cost of \$2.00 for three meals.

Rooms are available in college residence halls at rates listed below:

Men's Residence Halls	Semester Rate	School Year
Irish, B Unit	96.00	192.00
East and Haigler	98.00	196.00
Irish, A & C Units	104.00	208.00
Hayden	115.00	230.00
Best	120.00	240.00
Sahuaro (including 5-day meal ticket)	292.00	584.00

Women's Residence Halls	Semester Rate	School Year
North, South and West	104.00	208.00
Gammage	112.00	224.00
McClintock-A	115.00	230.00
McClintock-B and Wilson	130.00	260.00
Palo Verde (including 5-day meal ticket)	292.00	584.00

No refund of any part of a current period's rent will be made unless a move is requested by the University.

Payment and Refund of Fees

Payment of Fees

The payment of fees cannot be deferred. By regulation of the Board of Regents based on a ruling of the Attorney General, registration and other university fees are payable on the day of registration.

Method of Payment

Checks, drafts, and post office or express money orders should be made payable to the Arizona State University.

Refunds

Activities and Other Fees Including Laboratory

Students withdrawing from school or dropping classes will receive a refund based on a percentage of the total semester fees paid, in accordance with the following schedule:

1 thru 14 days	80%
15 thru 21 days	60%
22 thru 28 days	40%
29 thru 35 days	20%
After 36th day	None

The days referred to are calendar days, beginning with the first day college classes begin.

Exception: In case an applied music course is dropped, because of actual illness, or other emergency beyond the control of the student, not more than half of the semester fee paid may be refunded.

Forfeiture of Refunds

All refunds and deposits due students for any reason whatsoever will be forfeited unless called for on or before June 30 of the college year in which they are due. Should June 30 fall on Sunday or on a day when the Business Office is closed, the refund will be made on the next business day.

Grading System

Scholarship Grades. Scholarship grades on the student's report card and on his permanent record card are indicated by the letters and explanations given below:

A, Highest.	D, Lowest passing.
B, Above average.	Y, Credit.
C, Average	E, Failure.

The following marks designate the situations concerning the student's academic program:

W, Withdrew

X, Audit

I, Incomplete, given and removed as specified below

The Mark of Incomplete. A mark of I, is given only when a student is unable to complete a course because of illness or other conditions beyond the control of the student. Negligence or indifference are never accepted as reasons for giving an I. It is the sole responsibility of each student receiving a mark of incomplete

to contact the instructor or Dean of the College in cases where the instructor is no longer available, and complete the course not later than the middle of the following semester. If an I is not removed by the middle of the following semester, the grade of E will be reported and entered on the student's permanent record unless an extension of time is granted by the Dean of the College in which the course was offered. Incompletes received in summer session courses must be removed by December 31 next following unless an extension of time is granted by the Dean of the College in which the course was offered.

Grade of E. Students receiving grades of E must repeat the course in the regular class if they desire credit. Both the E and the new grade remain as a part of the student's permanent record.

Mark of W. The mark of W is given under the following condition: Withdrawal from a course during the first six weeks of the semester. The mark of W may be given under the following conditions: (1) Official withdrawal from the University after the first six weeks of the semester if the quality of work at the time of withdrawal justifies it, (2) When dropped from class at the request of the instructor.

Repetition of Course. Students may repeat a course in which a low grade has been received. In such cases students must secure an Approval Form from the Registrar and Director of Admissions and have it signed by the instructor and curriculum adviser. These forms must be submitted with other registration materials when completing registration.

When a course is repeated, the original grade remains on the student's record and is included in his cumulative scholarship index. Semester hours of credit are counted only once for the course but the honor points are included on the scholarship index both times the course is taken.

Change of Grade. A grade once reported to the Registrar's Office may be changed only upon the authorization of the faculty member issuing the original grade and the approval of the Dean of the College concerned.

A change of grade is made by filing an Authorization of Change of Grade Form with the Registrar's Office. The reason for the change of grade shall be entered on the form and signed by the faculty member and by the Dean of the appropriate college.

Grade Points. For the purpose of computing the scholarship index, grade points are assigned to each of the grades as follows: A, 4 points for each semester hour; B, 3 points; C, 2 points; D, 1 point; and E, 0 points.

Scholarship Index. The scholarship index is obtained by dividing the total number of grade points earned by the number of semester hours in the student's course load. Courses in which marks of W (withdrew), I (incomplete), Y (credit) and X (audit) are given are not included in determining the number of semester hours in the course load.

Reports to Students. Each student receives a Deficient Scholarship Report at the mid-semester for courses in which his grades are D or E. At the close of each semester, he receives a report showing his standing in each course taken.

Reports to Parents. A duplicate of the report cards of all unmarried students under twenty-one showing their standing in each class is mailed to the parent at the close of each semester. Report cards of other students are mailed to their home address unless the Office of the Registrar and Director of Admissions is notified prior to final examination week.

Reports to High Schools. A copy of the semester grade report of each student is sent to the high school from which he graduated.

Air Science

General. The Arizona State University offers courses in basic and advanced Air Force military training. The Basic Course is designed to develop an understanding of the Air Force, its organization, problems, and techniques. The purpose of the Advanced Course is to train selected prospective graduates in a balanced course of officer training, both theoretical and practical, which will qualify them to perform the duties of a commissioned officer of the United States Air Force. Students who successfully complete the Advanced Course receive a commission as Second Lieutenant in the Air Force Reserve.

Requirements for Admission. All physically fit male students, who are citizens of the United States, entering the University as freshmen or sophomores and carrying more than 6 semester hours of work, are required to complete two years of basic ROTC training. However, a student will not be enrolled initially or be allowed to re-enroll in the AFROTC after a period of nonparticipation in AFROTC training, if his age is such that he will be unable to complete all requirements for appointment as a Reserve of the Air Force prior to reaching his 28th birthday. The two years of basic ROTC training are a prerequisite for graduation unless the student is properly exempt. The Advanced Course is available as an elective to men who have completed the Basic Course. On the basis of previous honorable active service in the Air Force, Army, Navy, Marine Corps, or Coast Guard, a student may request from the chairman of the department a waiver of the Basic Course, or any portion thereof, as a requirement for entrance into the Advanced Course. Veterans entering at freshman or sophomore level who desire a commission through AFROTC will be required to take, in phase with non-veteran contemporaries, the portion of the basic program which remains. The Advanced Course, when elected by the student, becomes a prerequisite for graduation unless, for good reason, the requirement is waived by competent authority. Students electing the Advanced Course must be physically fit for military duty and within the age limit set forth above.

Exemptions. Exemptions from AFROTC training will be granted to only the *following*: (a) aliens; (b) those certified as physically unfit by the university physician; (c) those presenting evidence of at least one year of military service; (d) those transferring sufficient credit for military training from an accredited institution; (e) those disqualified by age; (A student will be disqualified if his age is such that he will be unable to complete the Advanced Course and the requirements for a degree prior to reaching his 28th birthday.) (f) those students who transfer with junior or senior standing from institutions not offering or requiring ROTC Training; (g) those offering other reasons acceptable to the Admissions and Standards Committee. Students requesting exemption will present the evidence to the Registrar on which they claim exemption at the time of registration.

Attendance and Credits. Basic students spend 2 hours in class and 2 hours in drill each week, and receive 1.5 semester hours of credit. Advanced students spend 4 hours in class and 2 hours in drill each week, and receive 3 semester hours of credit. Regular attendance in class and drill is required. Advanced students are required to attend one summer training unit for approximately 4 weeks, normally at the end of the first year of the Advanced Course. The military training requirement does not excuse students from any of the physical education requirements.

All Air Sciences. A Military Ball is scheduled annually to provide Military Social Training.

Pay and Deferments. Advanced students receive pay for subsistence at the rate of \$.90 per day while attending the two year course. The total pay for subsistence will not exceed 637 days less those days while in attendance at a Summer Training Unit. In addition to the subsistence allowance, the student will receive pay at the rate of \$78.00 per month during attendance at the summer encampment. Travel pay, uniforms, housing and dining facilities are provided at camp without cost to the student. Draft deferments for Freshmen, Sophomores, Juniors and Seniors are available to those qualified students who desire to take or who are taking the Advanced Course.

Uniforms and Texts. Each student registering for ROTC will make a deposit of \$25.00 in the Business Office. He will present the receipt to the Military Property Custodian as the basis for issue of prescribed uniforms, text books, and other materials. The full deposit, less any deductions to defray cost of any items lost or damaged through neglect, is refunded at the end of each semester.

Military Science and Tactics

General. Arizona State University offers Basic and Advanced Courses in General Military Science in the senior division of the Army Reserve Officers' Training Corps. The purpose of these courses is to train college students for positions of leadership in the Army in time of national emergency, and to strengthen their educational foundation for intelligent citizenship. Instruction is given, in both Basic and Advanced Courses, in subjects common to all branches of the Army. Advanced Course enrollees may volunteer for Army Flight Training which will provide qualified ground and flight instruction leading to a CAA license. The successful completion of the two-year Advanced Course program satisfies military education requirements for commission as a second lieutenant in any one of the various branches of the Army Reserve. Students designated as Distinguished Military Graduates are eligible for selection for a Commission in the Regular Army.

Requirements for Admission. All physically fit male students, who are citizens of the United States, and under 23 years of age, entering the University as freshmen or sophomores and carrying more than 6 semester hours of work, are required to complete successfully the two years of basic ROTC training. This requirement is a prerequisite for graduation unless the student is properly exempt. Students without previous active service in the armed forces will not be admitted initially to the Basic Course after reaching their twenty-third birthday. Veterans who have completed one year or more of continuous active service must not have reached age 25 at time of initial enrollment in the Basic Course. No student will be accepted for initial enrollment in the Advanced Course if he has reached age 27.

Students having completed three years of junior ROTC training and veterans having completed not less than six months, nor more than twelve months, of active service, may be exempt from the first year of the Basic Course, provided such previous training or service was completed within five years of date of initial enrollment in the ROTC at this University, and provided they receive the approval of the Professor of Military Science and Tactics. Students receiving credit under the above provisions will be enrolled in their initial Military Science courses when they attain equivalent academic classification.

Students having completed the Army ROTC Basic Course and veterans having completed one year or more of continuous active service in the armed forces may, with the consent of the chairman of the department, enroll in the Advanced Course, provided such previous training or service was completed within five years of date of application for enrollment in the Advanced Course.

Exemptions. Exemptions from the ROTC requirement will be granted only to: (a) aliens; (b) those certified as physically unfit by the university physician; (c) those disqualified by age; (d)

those presenting evidence of at least one year of continuous active service in the armed forces; (e) those transferring sufficient credit for ROTC training from an accredited institution; (f) those entering the University with junior or senior standing; (g) those offering other reasons acceptable to the Admissions and Standards Committee.

Students requesting exemptions must present the evidence upon which request is based to the Registrar at the time of registration.

Attendance and Credits. Basic Course students spend 2 hours in class and 2 hours at drill each week and receive 1.5 semester hours of credit. Advanced Course students spend 4 hours in class and 2 hours at drill each week and receive 3 semester hours of credit. Regular attendance in class and drill is required. Absences for reasons which were under the control of the student are reflected in semester grades.

Advanced Course students are required to attend one summer camp for approximately six weeks, normally at the end of the first year of the Advanced Course.

The ROTC requirement does not satisfy any of the physical education requirements.

All Military Sciences. A Military Ball is scheduled annually to provide Military Social Training.

Pay and Deferments. Advanced Course students receive a subsistence allowance of approximately \$27.00 per month except for the period of summer camp; travel pay to and from summer camp; and pay of approximately \$78.00 per month and subsistence while at camp. For each unauthorized absence of an Advanced Course student from an hour of ROTC instruction, an amount equivalent to 2 days commutation of subsistence will be deducted from his next payment of commutation.

Deferment from induction is granted on a competitive basis to those Basic Course students who apply for and are conditionally selected for Advanced Course training. Advanced Course students, regularly enrolled and meeting the criteria of their Local Selective Service Board, receive deferments from induction and, therefore, must be transferred out of Ready Reserve and National Guard Units upon entry into the Advanced Course.

Uniform and Texts. Each student registering for ROTC training is required to make a deposit of \$25.00 in the Business Office. He will present the receipt to the Military Property Custodian as the basis for issue of prescribed uniforms, text books and other materials. The full deposit, less deductions to defray cost of any items lost or damaged through neglect, is refunded at the end of each semester.

General Education

Requirements. Completion of a pattern of general education courses is required of all students who are candidates for a bachelor's degree in any curriculum. The general program of courses is given below. Since requirements under this program vary somewhat from one curriculum to another, the student should select from indicated courses only after consultation with his adviser. Students from approved institutions of higher education ordinarily will be given credit, hour for hour, for work done in those institutions in so far as it is equivalent in content to courses in this program.

Objectives. The purposes of general education at Arizona State University are expressed in the following objectives, adopted by the faculty in 1954.

1. To develop the individual's awareness of, and esteem for, the privileges and responsibilities of citizenship in a democratic society, and to motivate effective participation in endeavors for the common good.
2. To so improve the individual's ability to think, that he will reach valid conclusions and build a system of critically examined values by which to guide his life.
3. To so improve the individual's ability in the basic arts of communication, that he will express himself effectively, and read and listen with understanding and discernment.
4. To introduce the individual to the major problems of philosophy, and to develop a discriminating appreciation of art, music, and literature, and encourage a satisfying avocational interest in these fields.
5. To develop sufficient understanding of the biological and physical sciences, and of mathematics, so that the individual will comprehend the roles they play in our civilization and appreciate the scientific approach to many problems of human experience.
6. To develop the individual's understanding of human society, and of his cultural heritage, and to motivate application of this understanding to the social issues of the time.
7. To help the individual achieve sufficient understanding of himself, to maintain physical and mental health, and to develop his abilities for his own and the common good.

Program. Courses which are accepted as meeting general education requirements are indicated in the program below. A total of 40 semester hours is required for graduation in any curriculum, with minimums in each field as specified. So far as possible, a student should meet the general education requirements in his first two years of college work. In certain curriculums it will be necessary to spread the requirements through the four years; some

courses at the 300 and 400 levels are provided for such students. Juniors and seniors should not take a freshman course in general education except where there is no alternative.

I. Communications.

For all curriculums leading to a bachelor's degree, a minimum of 6 semester hours.

EN 101, 102 First Year English-3,3 is required of all students; except that students who have had four years of English in high school may be excused from one or both of these courses upon such evidence of exceptional proficiency as the Department of English may require.

The following courses may be used as general education electives: SE 200 Elements of Speech-2, SE 300 Principles and Methods of Discussion-2, EN 211 Advanced Composition-3, ES 400 Technical Communications-3, or one year of a foreign language at the elementary or intermediate level.

II. Humanities.

For all curriculums leading to a bachelor's degree, a minimum of 8 semester hours.

Option I

HU 101, 102 Ideas and Values in the Humanities-4,4 or HU 201, 202 The Humanities in the Western World-4,4.

Option II

HU 301, 302 The Humanities in Modern America-3,3 and one course from those listed in Option III.

Option III

Eight semester hours from the following courses, with at least three of the subject fields represented. This option is intended for students who wish to distribute humanities through four years.

First year courses: AC 100 Introduction to Architecture-2; AH 102 Introduction to Art-2; EN 103 Introduction to Literature-3; FL 100 Introduction to Foreign Languages-2; MU 105 Music in Living-2, MU 107 Introduction to Music-2; PI 101 Introduction to Philosophy-3.

Second year courses: AH 211 Western Art to the Renaissance-3, AH 212 Renaissance Art-3; EN 201 World Literature—The Classical and Medieval Periods-3, EN 202 World Literature—The Renaissance and Modern Periods-3, EN 204 Literature of Today-3; PE 280 History and Philosophy of Dance-2; PI 328 Contemporary Philosophy-3.

Third and Fourth years: AC 311 Architectural Philosophies-3; AH 313 Contemporary Art-3, AH 321 American Art-3; EN 341, 342 American Literature-3,3, EN 355 History of the Drama-3; FR 321, 322 Survey of French Literature-3,3; GR 321, 322 Survey of German Literature-3,3; SP 321, 322 Survey

of Spanish Literature-3,3; MU 355 Survey of American Music-2, MU 356 Survey of the Musical Theater-2; PI 301 Philosophies of the Western World-3.

III. Behavioral and Social Sciences.

For all curriculums leading to a bachelor's degree, a minimum of 8 semester hours, with at least two subject fields represented.

First and second years: AN 111 Elementary Anthropology-3; EC 201, 202 Principles of Economics-3,3; GB 101 Introduction to Business-3; HI 101, 102 Survey of Western Civilization-3,3, HI 103, 104 History of the United States-3,3; PS 101 Modern Politics and Government-3, PS 102 American Government-3; PY 100 Elementary Psychology-3; SO 101 Sociology-3, SO 313 Modern Social Problems-3; SS 101, 102 Introduction to the Social Sciences-3,3.

Third and fourth years: HI 301, 302 Ancient Orient and the Classical World-3,3, HI 305 European Civilization-6, HI 303, 304 American Cultural History-3,3; ES 320 Man and Machine-2; PS 310 Federal Constitution and Government-2, PS 311 Arizona Constitution and Government-1, PS 331 Western Political Thought-3.

IV. Sciences and Mathematics

For all curriculums leading to a bachelor's degree, a minimum of 8 semester hours, with at least two groups represented.

Group 1. Physical Sciences.

CH 100 Essentials of Chemistry-5, CH 111 College Chemistry-5, or CH 113 General Chemistry-4, CH 114 General Chemistry-4 or CH 115 General Chemistry and Qualitative Analysis-5; GE 111 Elements of Geography-4, GE 411 Principles of Physical Geography-3; GL 111 General Geology-4, GL 113 Physical Geology-4, GL 114 Historical Geology-4; PL 110 Physical Universe-4, PL 410 History of the Physical Sciences-3; PH 101 Introduction to Physics-4, PH 111 General Physics-4 or PH 131 Physics-3, PH 121 Descriptive Astronomy-2, PH 112 General Physics-4 or PH 211, 212 Physics-4, 3.

Group 2. Life Sciences.

BI 100 The Living World-4; BO 100 General Botany-4; ZO 100 General Zoology-4.

Group 3. Mathematics.

MA 205 Mathematics for General Education-4, MA 116 Intermediate Algebra-3, MA 117 College Algebra-3, MA 118 Trigonometry-3, MA 119 Algebra and Trigonometry-4, MA 120, 121 Analytic Geometry and Calculus-4,4, MA 226 Introduction to Modern Statistics-3.

V. Physical Education and Health.

PE 101, 102 Freshman Physical Education- $\frac{1}{2}$, $\frac{1}{2}$ is required of all students. The following courses may be used as general education electives: HE 100 Healthful Living-2; PY 114 Mental Hygiene-2; SO 321 Marriage and the Family-3; HE 360 School-Community Health-3; and any physical education activity courses up to two semester hours.

VI. General Education Electives.

To complete the total requirements of 40 semester hours, the student shall select from the courses listed in any of the areas above, except that the courses selected may not be in his major field or field of specialization. These courses should be chosen with the approval of the adviser, to correct evident inadequacies in the general education background of the student.

Graduation Requirements

The University grants the following degrees: Bachelor of Arts, Bachelor of Science, Bachelor of Architecture, Bachelor of Science in Engineering, Bachelor of Science in Nursing, Bachelor of Arts in Education, Master of Arts, Master of Science, Master of Arts in Education, Master of Science in Engineering, Master of Fine Arts, Master of Public Administration, Education Specialist, and Doctor of Education. To obtain a second bachelor's degree, the student must do an additional 30 hours of work or more and meet all of the requirements of the particular degree.

Requirements for the Bachelor's Degrees

The Unit of Credit. The semester-hour is the unit of credit. It represents one fifty-minute class exercise per week per semester with two hours of outside preparation or the equivalent in laboratory work.

Credit Requirements. A minimum total of 126 semester hours is required for graduation with a bachelor's degree. Forty per cent. of the semester hours required for graduation must be in upper division courses numbered 300 or 400.

Curriculum and Course Requirements. Alternate courses may not be substituted for required generalization courses under a particular curriculum, nor may any such courses be waived without approval of the respective College Standards Committee or for honors students, without the approval of the adviser. Alternate courses may not be substituted for required courses, in the major, minor or field of specialization under a particular curriculum, nor may any such courses be waived without the approval of the curriculum adviser in the department in which such major, minor or field of specialization is offered.

Meeting New Course Requirements. Students who continue their college work without interruption may graduate under the curriculum and course requirements as stated in the catalog for the year the student first registered.

When enrollment is not continuous, the student will be required to meet the curriculum requirements and regulations for graduation as stated in the catalog for the year the student registers for final continuous residence prior to graduation. Any exceptions must be recommended by the student's adviser and approved by the appropriate college Standards Committee.

Military and Air Sciences. All male students entering the University as freshmen or sophomores, unless properly exempt, are required to complete two years of basic military or air science. Male students who elect advanced military or air science, unless properly exempt, shall complete that course as a prerequisite for graduation.

Physical Education. All students who are under 25 years of age at the date of entrance and who are classified as freshmen are required to register for PE 101-102, and to continue registration therein until they have completed one semester hour of credit in physical education. Exemption from this requirement may be made only because of physical disability or health factors by the University physician. Students enrolled for six semester hours or less need not register for physical education during their first two semesters of residence, but must complete one semester hour for credit prior to graduation.

Scholarship Requirements. In order that a student may be eligible for graduation, his cumulative scholarship index must be 2.00 or better for all work taken while a student at this University. This regulation applies to all students entering Arizona State University in September, 1959 and after. Students who entered Arizona State University from September, 1957 to September, 1959 will be permitted to graduate with a 1.80 cumulative index providing they have been in continuous attendance.

Graduation With Distinction. Students who have a cumulative scholarship index of between 3.00 and 3.49 graduate "With Distinction." Students who have a cumulative scholarship index of between 3.50 and 4.00 graduate "With High Distinction." Students to qualify for graduation with honors must have completed at least 60 semester hours in residence at Arizona State University. However if a transfer student's scholarship for work completed at the previous college or university was of the same high standing as is required for graduation with distinction at Arizona State University then the distinction will be based on a minimum of 30 semester hours of residence. Arizona State University does not transfer honor points for work completed at other colleges and universities. The cumulative scholarship index is based only upon the quality of work done at Arizona State University.

Graduation With Honors. Students in the Honors Program of the College of Liberal Arts who have a cumulative scholarship index between 3.20 and 3.50 and are approved for scholarly achievement by the Honors Council will graduate "magna cum laude." Those in the index range of 3.50 to 4.00, on approval of the Honors Council, will graduate "summa cum laude."

Residence Requirements. A minimum of one year residence as a regular student is required of every candidate for the bachelor's degree, and the final 12 semester hours immediately preceding graduation must be taken in residence. For purpose of record, a year in residence is defined as 30 semester hours of credit earned in on-campus courses offered by regular members of the teaching staff. The phrase, *in residence*, means in regular classes held on the campus or at an established residence center. It has no reference to living in residence halls or in Tempe. Credit earned in correspondence courses cannot be used to meet residence requirements. The 12 semester hours of final residence may be taken during a semester of the regular academic year or during the summer terms. Exception to the residence regulation may be made by the Admissions and Standards Committee. Petitions for an exception must be made in writing and addressed to the Registrar and Director of Admissions.

Application for Graduation and Teaching Certificates. Students who plan to complete requirements for graduation at the end of either summer term or the first semester should pay the Application for Graduation fee and file their application for graduation with the Registrar and Director of Admissions before registering for their final term or semester. Those planning to complete degree requirements during the first semester must file an Application for Graduation prior to April first of the preceeding academic year. Those planning to complete requirements for graduation in May should pay the Application for Graduation fee and file their applications for graduation with the Registrar and Director of Admissions before November 15. A \$5.00 late fee is charged students planning to graduate in May who do not file the application for graduation by the November 15th deadline. The filing of late applications for May commencement extends from November 16 to the last day of late registration for second semester. Students cannot change their application from one degree to another after the beginning of the final semester's work.

Application blanks are obtained in the Office of the Registrar and Director of Admissions. Candidates who fail to pay the Application for Graduation fee and file applications at the times specified are required to pay the late fee, and may be scheduled for graduation at a later date. Upon filing an application for graduation, a final check on graduation requirements is made by the Office of the Registrar and Director of Admissions. A check sheet showing the remaining requirements for graduation under the curriculum designated in the application is furnished the student as a guide to his final semester's registration.

Applications for teaching certificates should be obtained at the Office of the Registrar and Director of Admissions at the time of filing Applications for Graduation. Applications should be filed promptly after taking the oath of allegiance.

Graduation Fees. A graduation fee in the amount of \$5.00 applies if paid on or before the dates specified in the preceding paragraphs. After that date, the fee is \$10.00. If a student is granted permission to receive a degree in absentia, he shall pay an additional fee of \$7.50.

Attendance at Commencement Exercises. Candidates for degrees are required to be present at the commencement exercises in the prescribed academic costume. Exceptions to this rule will be made only in extreme cases, and upon petition to the Registrar. The \$7.50 absentia fee is to be submitted at the time the petition is filed. If the petition is not accepted, the fee will then be refunded.

Financial Clearance. Before a student may participate in the commencement exercises or receive his diploma, he must obtain financial clearance at the Business Office. Financial clearance indicates that the regular fees, library, dining hall, and all other fees have been paid.

Requirements for the Master's Degree and the Doctor's Degree

See the section of the catalog headed "The Graduate College."

University Services

University Guidance Program

Excellent instruction is one of the chief responsibilities of a progressive university. Instruction is excellent to the extent that it fits the abilities, interests, and personality traits of the students. The purpose of the guidance and counseling program of the University is to help teachers and students discover and develop those traits possessed by each student in order that he may carry out such a program of education, both in class and out, as will best fit his individual needs, and will inspire him to complete it with genuine satisfaction, and with the highest degree of achievement possible.

Orientation. An orientation program, under the supervision of the Associate Dean of Students in the Division of Student Affairs, is provided for new students at the beginning of the fall term. It includes placement testing, health examinations, social events, introduction of student and administrative officers, explanations by individuals and groups of university services, curricula, and the guidance program. Throughout the year students are aided in adjustment to university life through group programs, individual counseling, work, organizations and clubs, student government, residence hall programs, faculty assistance, and special emphasis in courses.

The Counseling and Testing Program. A student's success in college is to a large degree dependent on his ability to adjust to the total university environment—personally, socially, and emotionally. The Division of Student Affairs, through work with individuals and with groups is established to assist in these areas. Personal counseling is directed by the Associate Dean of Students. Personal counseling of women is carried on by the Associate Dean of Students and her staff, and of men by the Dean of Students and his staff. In some cases problems of students are referred to other faculty members or to the agency or service best qualified to help. Likewise, the counseling often begins with the faculty or agency and is referred to the Deans for assistance.

The University Testing Service in the Lyceum Building administers and scores group tests for orientation and guidance purposes, provides a research service for the University, and scores examinations administered by the academic departments. Tests are also administered to individuals by the Research and Testing Service, the Guidance and Counseling Center, The Reading Clinic, and the Psychological Clinic in connection with individual counseling.

Choosing a Curriculum. During Freshman Week a number of programs are held to assist students in deciding wisely upon a curriculum. Students who are uncertain as to the curriculum they

desire to follow may register for a first year program of basic studies. This program may be changed at any time the student definitely decides upon a curriculum and major or field of specialization. At this time, each student will be assigned an adviser and have conferences with him concerning his proposed choice of curriculum. Choosing a curriculum is an exceedingly important decision for a student. This choice may be postponed until later in his freshman year, but not later than the beginning of the sophomore year. Ultimately, his happiness and success in college depend, in part, upon a selection suited to his abilities, interest, and personality.

The Psychological and Reading Clinics. The Psychological and Reading Clinic Services are part of the program of the Department of Psychology. The clinics have a two-fold purpose: (1) that of providing a laboratory situation in the training of advanced students in the diagnosis and remediation of reading problems, intelligence and aptitude testing, vocational advisement, and problems of adjustment, and (2) of making its services available to the university student, the Training School, and to the public schools, and agencies that need such services to the extent that is practicable. A nominal fee for services will be charged.

The Guidance Center. The Guidance Center of the College of Education has two main functions: (a) to provide laboratory experiences for graduate students in guidance and counseling and to provide them with supervised experiences in using tests and conducting counseling interviews; (b) to provide a counseling service for university students, Training School students, high school students upon referral by their high school counselors, and other members of the community who request vocational and educational guidance.

Curriculum Advisers. When the student has chosen a curriculum and a major or field of specialization, he will then be assigned a permanent adviser whose function is to assist the student in the selection of courses. The student remains under the same adviser as long as he continues under his original curriculum and major or field of specialization. Should the student change his curriculum and major or field of specialization, a new adviser in that field will be appointed. Students are urged to take the initiative in seeking counsel regarding the adequacy of their programs of studies.

Honors Advisers. In each department within the College of Liberal Arts there is an honors adviser to help those whose proven ability and stated intention is such that they will do outstanding work.

Housing

Residence Halls for Women. There are eight halls occupied by women students. These are: Gammage Hall, McClintock "A", McClintock "B", North Hall, South Hall, West Hall, Wilson Hall, and Palo Verde Hall. Gammage Hall is a residence hall for freshmen women, the quadrangle halls — North Hall, South Hall, and West Hall are also primarily freshmen halls. McClintock "A" is for upperclass women, and McClintock "B" is an honor hall with special requirements for residency. Palo Verde and Wilson are general halls.

Residence Halls for Men. There are seven halls ordinarily occupied by men: East, Hayden, Irish, M. O. Best "A" and "B", Haigler, and Sahuaro Halls.

Apartments. Twenty temporary facilities are available for faculty members. Other facilities are available from time to time. For information on these, consult the Housing Office.

Reservations. Accompanying the notification from the Registrar and Director of Admissions that admission has been granted, is an application form for reservation of residence hall space. This should be filled out immediately and mailed to *Housing Office*, together with a deposit of \$10.00 for residence halls. Students are placed on reservation lists according to date of receipt of deposit.

Preferences of residence halls may be stated at the time of making reservations. Assignments to halls are made by the Housing Clerk in line with policies established in the Division of Student Affairs. Assignments to the honor hall are made through the office of the Associate Dean of Students. Room assignments are made by the Head Residents under the supervision of the Dean of Students in the men's halls and the Associate Dean of Students in the women's halls.

Residence in halls, sorority or fraternity houses is restricted to students registered for 12 or more units of regular work. Any exception must be approved by the Associate Dean of Students or the Dean of Students. The University reserves the right to change the residence of any student or to deny or cancel residence accommodations of any students in cases where such action is deemed desirable.

Occupancy. Housing accommodations are available for occupancy one day preceding Freshman Week. Students are expected to vacate accommodations by noon Saturday of the last week of school. Students are admitted to the assigned housing accommodations only upon presentation of the proper assignment card to the head resident or apartment supervisor.

Hall Facilities. All student rooms are provided with electric light, steam heat, and are furnished with a study table, a dressing table or chest, and chairs. In some halls, sleeping porches are used the year round; others have suites which include sleeping quarters. There is a laundry room in each residence hall furnished with ironing boards.

Residence Regulations. No single university influence may contribute more to the development of the personality and character of a student than that of residence hall life. The halls are so equipped and managed as to secure the maximum values at a minimum cost. No cooking of any kind is permitted in students' rooms. Electrical appliances such as irons, TV sets, percolators, grills are to be used only in lounges, kitchens, and utility rooms. *Vocal or instrumental music may not be practiced in any of the halls.* Arrangements for such practice may be made through the Music Department. If radios are used, they must be adjusted so as not to interfere with the rights of others. No pets are permitted in the halls. Nominal dues are collected in each hall by the respective Hall Councils. This fee may not be refunded.

Residence Regulations for Women Students. Young women may be absent from the halls overnight only with the written consent of their parents, which must be on file with the Associate Dean of Students and the head resident at the time of departure. On these occasions residents sign out, indicating where they may be reached in case of emergency. Other regulations for women students appear in Associated Women Students' Handbook, "Co-ed Cues."

Personal Equipment. The following list of equipment is the minimum which students should bring with them when entering a hall: blankets and comforts for a single bed, one bedspread, dresser scarf, bathrobe, soft-soled slippers, and washable laundry bag. All should be clearly marked with the name of the student. *The University provides and launders sheets and pillow slips.* Personal property is not covered by college insurance.

Regulations Concerning Guests. Guests may be accommodated in residence halls when space is available under the following conditions: (a) that the permission of the head resident has been secured; (b) that guests do not accept invitations from residents for the first four nights of the week or during examination time unless absolutely necessary; (c) that guests do not ask for accommodations for more than a three-day period. Visiting student groups may be accommodated if space is available, when previous arrangements are made in the Housing Office. A nominal rental fee is charged for these accommodations.

Care of Halls and Apartments. The University attempts to furnish comfortable and attractive living conditions for students. Students are expected to cooperate by keeping them so. Should any damage, beyond the usual wear, occur to the decorations and furniture of a room, the cost of redecoration or repair will be charged to the occupants of the room.

Housing Regulations for Undergraduate Women Students Under 23 Years of Age. Undergraduate women students under 23 years of age are required to live in the University residence halls and are expected to carry an academic load of at least 12 semester

hours. Exceptions are made for those women who live with their parents, guardians, or close relatives, or who work in a private home for their room and board.

In the event that all women's residence halls are filled, upper class students may obtain permission to arrange for off-campus housing which meets with their parents' approval by filling out the appropriate forms in advance in the office of the Associate Dean of Students. Such off-campus housing is not officially under University inspection or supervision; therefore, the University can not assume responsibility for students living off-campus. However, the University reserves the right to move students whose conduct or quarters are found to be undesirable.

Graduate students and women over 23 may live in the residence halls if space is available, providing they conform to all regulations of the residence units in which they live.

Married women may live in the residence halls only with special permission of the Associate Dean of Students. Students in women's residence halls must report changes in marital status immediately.

Health Service

Student Health Service. This service is maintained for the purpose of constant supervision over the health of students. It is administered under the Division of Student Affairs. A Dispensary and Infirmary are staffed by physicians and registered nurses. The Student Health Service is located on Normal Avenue. Prior to registration, every new student or former student who has been absent from Arizona State University for a year or more must furnish the Student Health Service with a recently completed (within six months) Student Health Record Physical Examination form signed by a practicing physician and surgeon—preferably the family physician. Students are urged to have all immunizations brought up to date, and all remediable defects, such as in eyes, ears, teeth, tonsils, etc., corrected in advance of matriculation to prevent possible loss of time from studies. The Student Health Service makes recommendations concerning activities of students in which health may be a factor. Restricted class schedules or physical activity programs, based on the findings of the physical examination are recommended. See the item headed "Health" under the section on Admission to the University for further details on the physical examination.

Dispensary and Infirmary Treatment. Dispensary services are available during regularly posted hours and at any hour for emergencies to all regularly registered students. No illness will be cared for in the residence halls, nor will any prescription be made for a student not reporting in person to the Health Service. Bed-side care will be given in the Infirmary for one week per semester without charge. A very nominal charge is made after that time,

should further care be needed. Students who do not have meal tickets at one of the University dining halls will pay for meals served while in the Infirmary. There is no limitation on number of clinic visits. Contagious illness will be cared for in the Infirmary whenever possible, but diseases requiring long periods of isolation must be treated either at home or in a local hospital at the student's expense.

Illness or Injury Must Be Reported. Any illness or injury must be reported to the Student Health Service without delay. A campus resident is required to report illness immediately to the head resident of his or her hall. Failure to do so may result in one being asked to leave the hall. Health reports are sent to the family physician upon request of the student. Parents will be notified at once of any serious illness or need for hospitalization; however, they are not routinely notified of all admissions to the Infirmary.

Financial Responsibilities. With the payment of the General University Fee each semester, all regularly registered students are entitled to student health service care according to established policies. Students may be referred to consultant specialists when the University physicians consider it advisable, but such fees must be borne by the student. When hospitalization attention is considered necessary, the University assumes no financial responsibility. Parents are consulted in advance of hospitalization if at all possible. A fee of \$4.00 a day is charged for Infirmary care after one week.

Placement Center

The Placement Center is maintained to assist undergraduates, graduates, and alumni in obtaining employment according to their training, ability, and experience. It is the purpose of the Center to serve the State, region, and nation by providing adequately trained personnel for business, industry, government and education. Although the Placement Center does not guarantee placement, every effort is made to aid students and those in the field who desire placement assistance. Candidates may enroll by filling out the appropriate blanks. Upon enrolling, candidates receive full information and instructions relative to securing employment. Complete records are kept on permanent file in the Placement Center. *Yearly renewal keeps credentials in active file.*

Student Placement. The Placement Center aids students attending the University in securing part-time employment, both on and off the campus, which tends to supplement their income and educational goals. All students who are interested in on or off campus placement should register with this office.

Approximately ninety outstanding high school seniors, who have need of financial assistance, are awarded a job opportunity under our Selected Student Placement Program. This award provides student employment on a part-time basis, with earnings usually between \$200.00 and \$500.00 per academic year.

Teacher Placement. The Placement Center assists graduating students and alumni in obtaining teaching positions. It seeks, at the same time, to serve the best interests of the superintendents and school trustees of the State who desire to secure teachers adapted to the needs of their particular school.

Commercial Placement. The Placement Center also serves graduating students and alumni who are interested in commercial, industrial, and governmental placement. Effort is made to place students in their chosen fields, and at the same time, aid employers to obtain properly trained personnel.

All correspondence should be addressed to the appropriate division in the Placement Center.

Alumni Association

Membership. The Alumni Association was organized under the leadership of President E. L. Stormont, in June, 1894. Keeping pace with the tremendous growth of the University, the association employed a full-time executive secretary in September, 1947, and has embarked on a broad program of activities with a permanent staff now expanded to three members and a distinguished board of officers and directors. There are about 15,000 graduates including the class of 1958. All students become active members when they pay their graduation fee. All students who have attended the University at least one semester are listed as associate members.

Memorial Student Union Campaign. The Alumni Association sponsored a fund drive to raise \$350,000 in public contributions toward a \$1,300,000 Memorial Student Union Building for the University. Total proceeds from the campaign were \$439,322.06. This building was dedicated in February, 1956, and Charles A. Stauffer, '01, was General Chairman of the campaign.

Endowment Fund. Under the leadership of the late Clarence M. Paddock, '03, and Leona M. Haulot, '02, the Association raised an endowment fund of \$10,000.00 for the assistance of worthy students. The fund has now increased to more than \$30,000.00, and more than 500 students have received aid from the fund. Loans are made only to juniors, seniors or graduate students.

Alumni Housing. To meet the need of housing returning veterans and their families, the Alumni Association has financed a \$40,000 emergency housing development on campus.

Alumni Magazine. The Association's official magazine, the *Statesman*, is published quarterly for all active members. Present circulation is 14,500.

Alumni Induction Ceremony. This ceremony is held annually during the Commencement Ceremony. Members of the graduation class are inducted by the President in an impressive ceremony and receive alumni membership cards.

Alumni Register. The Alumni Association maintains a card file of the names, addresses and occupations of all active members of the Association. This is a difficult task because names and addresses are constantly changing. Alumni and friends can be of real service by sending a post card to the Alumni Secretary giving changes in names and addresses.

Officers of the Alumni Association 1958-59

Marvin Palmer, '38, President.....	Casa Grande
C. William Laing, '38 and '42 MA, First Vice President....	Phoenix
Wayne E. Legg, '52, Second Vice President.....	Mesa
James Garrett, '47, Third Vice President.....	Coolidge
Helen (Cooley) Hackleman, '40, Secretary.....	Tempe
George W. Morrell, '41, Treasurer.....	Tempe
Robert Lamparter, '50, Director.....	Phoenix
John Katsenes, '51, Director.....	Phoenix
Kenneth Clark, '26 and '28, Director.....	Tempe
William G. Barnes, '52, Director.....	Tempe
James S. Carter, '35, Director.....	Phoenix
Hascall Henshaw, '41 and '49 MA, Director.....	Tempe
John R. Sandige, '14, Trust Officer.....	Phoenix
Sidney B. Moeur, '14, Legal Advisor	Phoenix
James W. Creasman, '35, Executive Secretary.....	Tempe

Financial Assistance and Awards

Scholarships and Fellowships

Arizona State University Scholarships

The Board of Regents of the Universities and State College of Arizona has created a number of scholarships which are awarded annually by Arizona State to new and currently enrolled students who meet the qualifications established by the Regents. The financial need of applicants will be one of the factors considered in selecting recipients of many Arizona State University at Tempe Scholarships. These scholarships, limited in number, include the following:

Academic Scholarships. These scholarships are available to students who give promise of high scholastic achievement. They provide for the remission of regular registration and class fees and, in the case of out-of-state students, non-resident tuition.

Reservation Indian Scholarships. Two four-year scholarships are awarded annually to Arizona Reservation Indians who have demonstrated ability in the fields of scholarship and leadership. These scholarships cover regular registration and class fees for four years.

Art Scholarships. Two scholarships, covering regular registration and class fees and in the case of out-of-state recipients, non-resident tuition, are awarded by Arizona State each year through National Scholastic Art Awards to high school seniors who win this honor at the national competition held annually following forty-one regional exhibitions, to which students submit their portfolios. Application forms may be obtained by writing (not later than January of the year of graduation from high school) to National Scholastic Art Awards, 33 West 42nd Street, New York 36, New York. These scholarships are renewable annually for four years on the basis of continued achievement.

Foreign Student Scholarships. Graduate and undergraduate scholarships are available to qualified students from foreign countries who have previous satisfactory scholastic records and show promise of achievement in promoting good international relations. These scholarships cover regular registration and class fees and non-resident tuition. The ability to read and speak the English language is required.

Activity Scholarships. These scholarships are available to new and currently enrolled students who give promise of satisfactory scholastic achievement, of outstanding success for skills or talent in the institution's program of approved activities, and of develop-

ing desirable qualities of character and leadership. Freshmen must have graduated in the upper two-thirds of their high school classes in order to be considered for these scholarships. The scholarships listed immediately below make up the category, "activity scholarships." Although the promise of superior performance in extra-curricular activities is one of the factors considered in awarding these scholarships, the recipients must, nevertheless, have met the fundamental requirement of academic ability.

Athletic Scholarships. These scholarships provide for the remission of regular registration and class fees and, in the case of out-of-state students, non-resident tuition. In addition, recipients of these scholarships may qualify for room and board awards under the Sun Angel Scholarship Fund listed elsewhere in this section.

Band Scholarships. These scholarships provide for the remission of regular registration and class fees and, in the case of out-of-state students, non-resident tuition. A limited number of them also provide for the remission of fees for private music lessons. In addition, recipients of these scholarships may qualify under the Phoenix Junior Chamber of Commerce Band Scholarship Fund or the Sun Angel Scholarship Fund for awards to help defray the cost of room and board.

Choral Scholarships. These scholarships provide for the remission of regular registration and class fees and, in the case of out-of-state students, non-resident tuition.

Orchestra Scholarships. These scholarships provide for the remission of regular registration and class fees and, in the case of out-of-state students, non-resident tuition. In addition, they may provide for the remission of fees for private music lessons.

Voice and Piano Scholarships. These scholarships provide for the remission of fees for private music lessons. Two of them may also remit the non-resident tuition fee.

Women's Physical Education Scholarships. These scholarships provide for the remission of regular registration and class fees.

All the Arizona State University Scholarships listed above may be renewed annually upon re-application by the student and approval by the Scholarship Committee.

Sponsored Scholarships

The scholarships listed below have been created by sources other than the Board of Regents but are offered through the University.

Lee Ackerman Engineering Scholarship. This \$200.00 scholarship is awarded annually to an incoming freshman who plans to major in engineering. Scholastic aptitude, active and constructive citizenship, financial need, extra-class activities and the potential to become an outstanding engineer are considered in awarding this scholarship.

Advertising Club Scholarship. The Phoenix Advertising Club awards a \$100.00 scholarship annually to an outstanding junior or senior student majoring in advertising. Selection is made on the basis of demonstrated ability, promise of future success in the field, and the need of financial assistance in completing the student's education.

Harold A. Alpert Art Scholarship. A \$100.00 scholarship is awarded annually by Harold H. Alpert to an outstanding junior or senior art major. Selection will be made by the faculty of the Art Department on the basis of demonstrated ability and need for financial assistance.

Elenore Altman Scholarship. One scholarship is given each year by the Arizona Federation of Music Clubs to an A.S.U. student majoring in piano. The scholarship defrays all fees for one year's study of piano.

Altrusa Home Economics Scholarship. The Chandler-Mesa-Tempe branch of Altrusa International presents yearly a \$100.00 scholarship to an outstanding high school graduate from Chandler, Mesa or Tempe enrolling in home economics at Arizona State. Selection is made on the basis of need, scholarship, character, and leadership.

American Institute For Foreign Trade Scholarship. The American Institute for Foreign Trade awards annually a tuition-free scholarship to a male graduate of Arizona State University for a full year at the American Institute for Foreign Trade. In making the award, the following qualifications will be given consideration: (a) quality of scholarship throughout the undergraduate years, (b) personality and character, (c) genuine interest in living and serving abroad, (d) professional background, (e) business experience, and (f) financial need. Preference is given to men who are from 25 to 32 years of age.

American Institute of Architects Scholarships. The Central Arizona Chapter, American Institute of Architects, offers two scholarships of \$200.00 each annually to students in architecture. The scholarships are awarded to the fourth and fifth year students who have demonstrated greatest ability and promise in their work of previous year.

Arizona Association of Independent Insurance Agents Scholarship. This scholarship is available to a junior or senior student majoring in insurance at Arizona State University. This annual scholarship is for \$200.00, payable \$100.00 per semester. Applicant must be a resident of Arizona and enrolled in the College of Business Administration.

Arizona Bankers Association Scholarship. This is an annual award of \$500.00 to an Arizona student in the College of Business Administration. The basis of the award is scholastic achievement, campus and/or community activities and future promise. This award is restricted to senior or graduate students only.

Arizona Congress of Parents and Teachers Scholarships. Scholarships of \$100.00 are awarded by the Arizona Congress of Parents and Teachers to graduates of Arizona high schools planning to enter Arizona State in the teacher training program. Primary consideration in awarding these scholarships are promise of a successful teaching career, above average scholarship and financial need.

Arizona Dairy Technology Society Scholarship. The Arizona Dairy Technology Society annually awards a \$225.00 scholarship to an outstanding Arizona State University full-time junior or senior student enrolled in the Division of Agriculture with a primary interest in dairying. The award is based on interest in the field of dairy manufacturing, scholarship, leadership, character, and financial need. Preference will be given to residents of Arizona.

Arizona Education Association Scholarships. The Arizona Education Association annually makes available two scholarships of \$350.00 each to junior or senior Arizona State education students. Recipients must be legal residents of Arizona. To be considered in the selection are professional attitude and leadership, character, financial need, and general worthiness.

Arizona State University Foundation Scholarships. The Arizona State University Foundation provides a Scholarship Fund for a limited number of Arizona residents. Outstanding students in any field of interest may apply for these scholarships, which are available in varying amounts, dependent on need.

Associated Women Students Scholarship. This \$150.00 scholarship is awarded by the Associated Women Students of Arizona State to an Arizona high school senior girl, outstanding in scholarship, personality, and extra-curricular activities.

M. O. Best Memorial Foundation Scholarships. The M. O. Best Memorial Foundation makes available annually six scholarships of \$500.00 each for worthy students of Arizona universities and college who are majoring, or registered to major, in horticulture or its related fields. Applicants must be residents of Arizona.

Blue Key Scholarships. The Arizona State University Chapter of Blue Key awards several scholarships to male graduates of Arizona high schools. These scholarships are for \$200.00 annually and are made on the basis of scholarship, character, participation in extra-curricular activities and need. The scholarships may be renewed for the sophomore year.

Borden Agricultural Scholarship. An annual scholarship of \$300.00 is provided by the Borden Company Foundation, Incorporated, to the senior student in agriculture who has achieved the

highest average grade of all similarly eligible students in all college work preceding their senior year. To be eligible, the student must have included in his curriculum at least two dairy courses in the period of his studies prior to the beginning of the scholarship.

British Marshall Scholarship. In gratitude for Marshall Plan Aid, the British Government annually offers 12 scholarships at British universities to graduates of U. S. colleges and universities. Arizona State students are eligible to apply in their senior year. Selection is made on the basis of distinction of intellect and character. The scholarships are valued at from 550 to 800 pounds a year.

Adlyn Clark Foreign Student Fund. Mrs. Adlyn Clark provides a special fund for emergency use for foreign students. These awards vary in amount, dependent on need. Request for financial aid from this fund must be made to the Chairman of the Scholarship Committee at Arizona State University.

Construction Industry Scholarships. A number of scholarships have been provided in construction from annual funds maintained by Associated General Contractors, Building and Engineering Chapters; Phoenix Association of Home Builders; and individual firms in the construction industry. These are awarded on the basis of ability and need.

Carmen Corliss Memorial Scholarship. The Arizona Federation of Garden Clubs makes available annually a \$150.00 scholarship to a junior or senior whose major field of interest is horticulture.

Creighton Scholarship. The Creighton Teachers annually offer a \$125.00 scholarship to a graduate of the Creighton Schools in Phoenix who is preparing for the teaching profession at Arizona State. The recipient must be a junior or senior and will be selected on the basis of professional attitude and leadership, character, financial need, and general worthiness.

Danforth Graduate Fellowships. Approximately 50 fellowships for study at accredited graduate schools in the U. S. are awarded yearly by the Danforth Foundation to young men preparing for careers in college teaching. Senior men at Arizona State may apply for these fellowships, which carry maximum annual grants of \$1800 for single fellows and \$2400 for married fellows, with an additional stipend for children. The Foundation is looking for men with outstanding academic ability, personalities congenial to the classroom, and integrity and character, including serious inquiry within the Christian tradition.

Dumos Club Agriculture Scholarship. The Dumos Club offers a \$300.00 scholarship to an incoming male freshman at Arizona State who will major in agriculture with an interest in farming. The recipient must be a resident of Maricopa County, Arizona. Primary basis for selection is financial need.

Eastern Star Scholarship. The Grand Chapter of the Order of Eastern Star of Arizona awards annually a \$200.00 scholarship to

a graduate of an Arizona high school. The Scholarship is awarded to a junior or senior in college. The recipient must be a member herself, or the daughter of a member, of a regularly chartered chapter of the order of Eastern Star in Arizona. In selecting the recipient, character, leadership and scholarship will be given primary consideration.

David Epstein Agricultural Scholarship. This award provides \$100.00 annually for a student in the Division of Agriculture. Basis for the award is academic standing with need a primary consideration. This scholarship is not restricted to residents of Arizona.

Florists Telegraph Delivery Association Scholarship. This \$150.00 annual scholarship is made possible by Unit 10-G of Arizona. and is available to graduating high school seniors who plan a career in nursing. Recipient of this award must be a resident of Arizona and must enroll in the School of Nursing.

Fulbright Scholarships. These are awards made by the U. S. Government for graduate study in 31 foreign countries. Arizona State seniors are eligible to apply. The awards cover the cost of transportation, tuition, books, and maintenance for one academic year's study abroad. Selection is made on the basis of applicant's personal qualifications, academic record, value of the proposed graduate study or research, and suitability for placement in an institution of higher learning abroad. Most, but not all, of the awards require that applicants speak the language of the country for which they apply.

General Electric Computer Department Honor Program in Engineering. The Computer Department of the General Electric Company's Industrial Electronics Division provides funds to assist several outstanding junior or senior computer engineering students at Arizona State. The awards may vary in amount but will include the cost of the recipient's tuition and laboratory equipment. Recipients should agree to work for the G.E. Computer Department during the summer of their junior year and will be paid standard co-op rates. Applicants should be planning to do graduate work in computer engineering.

General Electric Fellowships. Thirty-four fellowships for pre-doctoral study at the graduate school of the recipient's choice are offered by the General Electric Educational and Charitable Fund. Arizona State seniors who need financial assistance and who have shown that they could, with advantage, continue their education are eligible to apply. Fellowships are offered in the physical sciences, engineering, industrial management, arts and sciences, law, and business. Stipends vary from a single fellow's minimum grant of \$1750 to a minimum grant for a married fellow with dependent children of \$2500. In addition, the fellowships cover tuition and fees.

Kemper Goodwin Scholarship. Kemper Goodwin, Tempe architect, has established this \$800.00 scholarship to be awarded each year to a graduate of Tempe Union High School. Financial need will be the primary consideration in selecting the recipient, although the ability to do at least average college work will be required. The scholarship will be disbursed to the recipient at \$100.00 a semester for four years.

Willard LeBlonde Groene Piano Scholarship. This scholarship, covering a year's expenses at Arizona State, with the exception of room and board, is offered by Willard LeBlonde Groene to a student majoring in piano. Selection of the recipient of this renewable scholarship is based on general scholastic ability and musical talent.

E. L. Grose, National Life Insurance Company of Vermont Scholarship. Mr. E. L. Grose, C.L.U., Phoenix insurance executive makes available annually a \$250.00 scholarship to be awarded to a resident of Arizona who will major in life insurance. The scholastic record of the applicants will be the basis of selection, with need a secondary consideration. The scholarship is renewable.

Arthur Emery Harvey Scholarship in Applied Music. A scholarship in applied piano is given yearly by Hazel Harvey Quaid to the freshman ranking highest in piano sight-reading, repertoire and general musicianship. Examinations are given during Freshman Week.

Heath Scholarship. This is an annual award given by the Heath Bench Advertising firm and covers registration and class fees. The award is not restricted to any specific field and will be given on the basis of academic standing and financial need.

Hiram Club Scholarship. The Hiram Club No. 1 of Phoenix annually makes available a \$50.00 scholarship for a junior or senior student enrolled in the kindergarten-primary curriculum. Qualifications for this scholarship, which is for the second semester of the academic year, are financial need and the potential of becoming an outstanding teacher.

Interfraternity Council Merit Scholarship. This scholarship is available to any fraternity student in his sophomore year. The scholarship will pay \$100.00 per semester to the recipient. The number of awards will be dependent on the funds available.

Irish Hall Scholarship. The residents of Irish Hall, men's residence hall, present this annual \$140.00 scholarship preferably to an upperclassman who has resided in the hall at least one semester. Selection is based on financial need.

W. K. Kellogg Foundation Scholarship. Students in the last or clinical year (within one year of active service) of the medical technology course may be awarded scholarships after they have completed at least 10 weeks of the work of this year. The scholarships are valued at about \$75.00.

Kiwanis Scholarships. Scholarships provided by the Kiwanis Clubs of the greater Phoenix area are available in varying amounts to Arizona residents who are scholastically in the upper half of their classes, are deemed worthy of assistance, and show proof of need of financial assistance to gain a college education.

Alfred Knight Scholarship Endowment Fund. This fund provides for several scholarships annually to outstanding graduates of Arizona high schools who have indicated a desire to continue their education in pure or applied mathematics and the sciences. Recipients will be selected primarily on the basis of scholarship, character and future promise. The amount of the award will be dependent on the financial need of the student as well as scholarship.

Dr. A. L. Krohn Scholarship. Dr. A. L. Krohn annually offers a \$250.00 scholarship to an incoming Arizona State freshman whose field of interest is literature. Financial need is a primary consideration in selecting the recipient.

Laing-Garrett Architectural Scholarship. A \$250.00 scholarship is awarded annually by Laing-Garrett Construction Company Specialties, Inc. to an architectural student demonstrating excellence in design.

Los Conquistadores Scholarships. The Los Conquistadores Club at Arizona State gives each year a scholarship of \$200.00 to a worthy Spanish-speaking high school graduate of Arizona. The scholarship is paid in \$50.00 amounts at the beginning of each semester for four semesters. The award is made on the basis of need, scholarship, character, and promise of future success.

Maricopa County Society of Osteopathic Physicians and Surgeons Scholarship in Nursing. A \$136.00 scholarship is presented annually by the Maricopa County Society of Osteopathic Physicians and Surgeons to a graduating Arizona high school senior in the upper one-third of her class who plans to major in nursing. Selection is made on this basis of character, personality, leadership, high ability and promise, and need.

Music Camp Scholarships. These scholarships, providing one academic year's applied music lesson fees (not to exceed \$40.00 a semester) are awarded annually by the University to gifted members of the Music Camp—one each in voice, piano, and instrument. Applicants are selected on the basis of auditions given at the University.

National Secretaries Association International, Valley of the Sun Chapter, Scholarship Award. A \$100.00 scholarship is provided by the National Secretaries Association International, Valley of the Sun Chapter, to a second, third, or fourth-year woman student studying for the secretarial profession at Arizona State. Scholastic attainment, citizenship, and need will be considered in making the selection. The recipient of this award must be a resident of Arizona.

Noontimers Business and Professional Women's Club. This is an annual award of \$100.00 for a girl graduate of an Arizona high school interested and enrolling in some phase of Business Administration at Arizona State University. The scholarship is payable at \$50.00 per semester.

Phelps Dodge Scholarships. The Phelps Dodge Corporation annually provides \$4,000.00 in scholarship funds to Arizona State University. A \$1,000 scholarship is awarded annually to a graduating high school senior of Arizona. This scholarship is renewable annually, depending on continued scholastic qualifications of the recipient. One thousand dollars is awarded annually to a sophomore, junior, and senior. Awards are made on the basis of high scholarship, high ability and promise, personality, character and leadership. Applicants are required to take the test given at Arizona State University and must be interviewed.

Phoenix Junior Chamber of Commerce Band Scholarship Fund. The Sun Devil Band performs annually at the Phoenix Junior Chamber of Commerce World Championship Rodeo, and in return the J.C.'s contribute \$2,000.00 to the Band's scholarship fund each year. Cash awards, to defray part of the cost of room and board, are made from this fund to A.S.U. Band scholarship recipients who qualify.

Phoenix Sales Executive Club Fellowship. A fellowship of \$300.00 is provided annually by the Phoenix Sales Executive Club of Phoenix, Arizona, to a student in the field of Marketing (Sales). This fellowship is to be awarded on the basis of need, interest in selling, leadership, character, scholarship and fitness to do sales research.

Phoenix Symphony Orchestra Guild Scholarships. Two scholarships are provided annually by the Phoenix Symphony Orchestra Guild and Arizona State University at Tempe to full-time students registered under a four-year music curriculum. These scholarships provide for a cash stipend of \$200.00, payable in \$50.00 amounts at the beginning and middle of each semester, and carry the remission of all regular registration and class fees, and the out-of-state tuition fee. Aptitude and proficiency in music as shown by performance on a musical instrument, promise of further growth and development in musicianship, and good character will receive primary consideration in making the awards. Recipients shall audition for membership in the Phoenix Symphony Orchestra.

Phoenix Symphony Orchestra Guild Graduate Scholarships. One or more scholarships of \$500.00 are provided annually by the Phoenix Symphony Orchestra Guild to graduate assistants in music at the Arizona State University at Tempe. The scholarship is payable in \$125.00 amounts at the beginning and middle of each semester. Recipients shall audition for membership in the Phoenix Symphony Orchestra.

Planning Associates Architectural Scholarship. A \$250.00 scholarship is awarded annually by Planning Associates to an architectural student demonstrating excellence in design.

Justine Ward Riseling Memorial Scholarship. The Salt River Valley Branch of the Association for Childhood Education International offers, in memory of Justine Riseling, who was a teacher in the Phoenix School system, a scholarship of \$50.00 annually to a second semester junior or senior student enrolled under the Kindergarten-Primary or Elementary Curriculum. In making this award, scholarship, character, leadership, and financial need will be given primary consideration.

A. B. Robbs Trust Company Merit Scholarships. These non-renewable scholarships are available to seniors graduating from Arizona high schools who are interested in pursuing study in the specific fields of Business Administration and Real Estate. One thousand dollars is awarded annually on the basis of high scholarship, demonstrated financial need, character and promise, as follows: (1) A maximum of \$150.00 annually to a student with high scholastic standing and no financial need; (2) a maximum of \$500.00 annually to a student with high scholastic ability and great financial need.

Rhodes Scholarships. These are competitive scholarships for which Arizona State junior and senior men are eligible to apply. The scholarships are for study at Oxford University, England, and carry a stipend of 600 pounds a year. They may be held for three years. Qualities considered in making selection are: (1) literary and scholastic ability and attainments, (2) qualities of manhood, truthfulness, courage, devotion to duty, sympathy, kindliness, unselfishness and fellowship, (3) exhibition of moral force of character and of instincts to lead and to take an interest in his fellows, (4) physical vigor, as shown by fondness for and success in sports.

St. Augustine's Episcopal Church Scholarship. This award is for \$200.00 annually to an Arizona State University student who is a member in good standing of the Episcopal Church. Basis for consideration is given to the applicant's scholastic ability, which must be at least average, and financial need.

Scottish Rite Fellowships. Applicants must have an A.B. or B.S. from an accredited college or university and at least a "B" average scholastically. This award is for \$1,800.00 annually for study at George Washington University in Washington, D.C. This fellowship may be applied for by a graduate of Arizona State University. The purpose is to educate students for leadership in government, federal, state or local. Final selection to be made by the Arizona Consistories Educational Committee.

Standard Oil Company of California Scholarship. This scholarship of \$400.00 is awarded annually on a competitive basis to an Arizona high school graduate. The selection will be based upon high scholarship, demonstrated financial need, character, and

promise. Applicants for the Standard Oil Company Scholarship, which is unrestricted as to field of study, will be tested and interviewed at the University. The scholarship is not renewable.

Sun Angel Foundation Scholarship Fund. The Sun Angel Foundation, an organization of civic and business leaders dedicated to assist in the growth of Arizona State University, each year contributes scholarship funds to the University. In selecting the recipients of scholarships provided by this fund, priority will be given by the A.S.U. Scholarship Committee to students who: (A) want a college education; (B) have the scholastic aptitude to profit from a college education; (C) preferably have demonstrated ability in one or more recognized extra-class activities; (D) have been active and constructive citizens; (E) lack the financial resources to cover all or any part of tuition, fees, books, room and board. The Foundation has designated that these funds shall be used to provide:

- (A) **Engineering Scholarships.** Five (5) for freshmen. \$200.00 each.
- (B) **Agriculture Scholarship.** One (1) for a freshman. \$300.00.
- (C) **Activity Scholarships.** Provide funds to help defray room and board costs for a limited number of A.S.U. Activity Scholarship recipients, the amount of the award to be determined by financial need.
- (D) **Other Scholarships.** Scholarships covering all or any part of tuition, fees, books, room and board, the amount of the award depending entirely on the extent of financial need. Application for one of these scholarships may be made by any student who feels he meets *all five* of the criteria of selection listed above. These awards are not limited to holders of Arizona State University Scholarships. The number of awards provided, however, is limited by the amount of funds available.

Tempe Kiwanis Club Scholarship. A scholarship of \$150.00 is awarded annually by the Tempe Kiwanis Club to a handicapped Arizona student. Preference will be given to a local student and need will be given primary consideration. Other qualifications include: ability, scholarship, and character.

Root Tilden Law Scholarships. National competition for these 20 fellowships, valued at \$6,900 each, is open to senior men at Arizona State who wish to study at the New York University School of Law. Candidates will be chosen on the basis of high scholarship, active extra-curricular participation and potential capacity for unselfish public leadership.

L. N. Treadaway and Associates Accounting Fellowship. L. N. Treadaway and Associates, Certified Public Accountants, offer a fellowship of \$400.00 annually to a junior or senior student majoring in Business Administration with a field of specialization in

accounting. Applicants must be residents of Arizona. In making the award, scholarship, leadership, character, interest in the field of accounting, and those personality traits which are believed desirable in the field of accounting will be given primary consideration.

Valley National Bank Scholarships. The Valley National Bank offers annually 16 scholarships at \$250.00 each, payable \$125.00 per semester. Applicants may be registered in any field, must be enrolled for a full course of study, and must be residents of Arizona. Selection will be made on the basis of scholarship, character, personality, leadership, and financial need. These scholarships will usually be awarded four to each class, (freshman, sophomore, junior and senior) but are renewable provided the recipient maintains the required standards.

Valley of the Sun Kiwanis Club Agriculture Scholarships. The Valley of the Sun Kiwanis Club, Phoenix, as one of its service projects, sponsors an Agriculture Scholarship Fund from which scholarships are provided annually to students at Arizona State University who are registered under the four-year agriculture curriculum. These scholarships provide for a cash stipend of \$300.00 payable \$150.00 each semester. Recipients must be residents of Arizona and be full-time students registered under the four-year agriculture curriculum. In making the awards, the primary factors to be considered will include: scholarship, ability and promise, personality, character, leadership, and financial need.

Vesta Club Scholarship. The Vesta Club gives each year a scholarship of \$800.00 to a worthy Spanish-speaking high school graduate of Arizona. This scholarship will be used to help defray the student's school expenses for four years, and will be given at the rate of \$100.00 each regular school semester. The recipient will be given the choice of attending the Arizona State University, Arizona State College at Flagstaff or the University of Arizona. This award is made on the basis of character, need, scholarship, and promise of future success.

John A. Whitsoe Memorial Scholarship Foundation. The John A. Whitsoe Memorial Scholarship Foundation of the Church of Jesus Christ of Latter-day Saints provides a \$500.00 graduate scholarship, a \$200.00 junior scholarship and a \$200.00 freshman scholarship to active members in good standing of chapters of Delta Phi, returned missionaries honorary fraternity. Scholarship and character will be the basis for selection.

Woodrow Wilson Fellowships. Faculty members at Arizona State are each eligible to nominate candidates for the Woodrow Wilson Fellowships, of which 200 are given annually. The fellowships are designed to attract to the college teaching profession young men and women who possess the highest qualities of intellect, character and personality. The minimum stipend is \$1,250 plus tuition for single fellows. Married fellows will receive special consideration.

Applications and Additional Information. Application forms and additional information about any scholarship offered at Arizona State University may be obtained by writing to the Scholarship Committee, Arizona State University, Tempe, Arizona. Arizona high school students may also obtain application forms from their principal, Dean or Counselor. All applications must be received by the A.S.U. Scholarship Committee no later than March 1.

Loan Funds

Included in the financial aids available to students at Arizona State are small short-term loans for necessary emergency expenses. Funds for this purpose are administered by the University and include the *John W. Allen Loan Fund*, the *Marshall Charitable Foundation Student Aid Fund*, the *Tempe Rotary Loan Fund*, the *Rosenzweig Student Loan Fund*, *Apfel-Carson-Wilson Memorial Fund*, and the *President's Student Aid Fund*. No interest, but a small service fee, is charged for loans from these funds. The John W. Allen Loan Fund is restricted to worthy athletes and the Rosenzweig Student Loan Fund to worthy prospective teachers. The other loan funds listed above are unrestricted.

Some long-term loan funds, carrying interest charges, are administered by the University and are available to students who meet certain qualifications. The *Alumni Loan Fund* is available to juniors and seniors for necessary college expenses. Loans from this fund are repayable after graduation with interest at 4%. The *Dixon Fagerberg Revolving Fund* provides loans to junior and senior women to be repaid with 4% interest within two years after graduation. The *W. K. Kellogg Foundation Loan Fund* is available for loans to medical technology students in the clinical or pre-clinical years of their course. The interest rate will not exceed 2½%. The *Marshall Foundation Revolving Fund* provides loans to Arizona residents who have attended Arizona State and wish to obtain medical education but are unable to finance such education through any other source. These loans are to be repaid by the student within a period of ten years, with no interest charged during the period of study and internship.

National Defense Education Act of 1958. To be eligible for a loan under the *National Defense Education Act of 1958*, a student must (a) be in need of the amount of the loan to pursue a course of study at Arizona State; (b) be capable of maintaining good standing in such course; and (c) have been accepted for enrollment as a full-time student, or, if already attending be in good standing and in full-time attendance as an undergraduate or graduate student.

No student may be loaned over \$1,000 in any year or over \$5,000 in the aggregate.

Repayment begins one year after a borrower ceases to pursue a full-time course of study in an institution of higher education,

and ends eleven years thereafter. The interest rate is three per cent (3%) on the unpaid balance beginning with the date on which repayment of the loan is to begin.

Up to one-half of any loan (plus interest) is canceled for service as a full-time teacher in a public elementary or secondary school in a state, at the rate of ten per cent (10%) of the amount of the loan (which is unpaid at the time the teaching service begins) plus interest for each complete academic year of such service.

Many organizations outside the University maintain and administer loan funds for which Arizona State students may qualify. Included among these organizations are the *Arizona Federation of Women's Clubs*, the *Charles Trumbell Hayden Chapter of the Daughters of the American Revolution*, the *DeMund Foundation*, the *Independent Order of Odd Fellows*, the *Freedra Marks Loan Fund Committee*, the *Methodist Church*, the *Phoenix Panhellenic Association*, the *P. E. O. Sisterhood*, the *Phoenix Rotary Club* and the *Phoenix Optimist Club*.

Applications. Applications and other information about loan funds may be obtained from the Division of Student Affairs. Students are urged not to drop out of school for financial reasons without first consulting with this office.

Honors and Awards

Academic Vice President's Award. A decoration is presented to the Army Company Commander and the Air Force ROTC Squadron Commander winning the Company and Squadron drill competition.

Air National Guard Award. A trophy is presented by the Arizona Assistant Adjutant General for Air National Guard to the outstanding Air Force ROTC Cadet who has been accepted for Flight Training, has excelled in the Civil Aeronautics examination, has received a private flying license, has been recommended by his flight training instructor, has displayed the highest academic proficiency in his AFROTC courses, and who is a resident of Arizona.

Air Force Association Medal. A decoration is awarded by the Air Force Association to the outstanding junior cadet of the advanced Air Force ROTC.

Alpha Beta Alpha Award. A book is given to the outstanding senior student of the year in Library Science.

Alpha Pi Epsilon Secretarial Award. An award given in the Business Administration Department to the outstanding student of the year in secretarial courses.

American Association of University Women Awards, Arizona State Division. A national and a state membership in A.A.U.W. is awarded to two outstanding graduating senior women.

American Association of University Women Awards, Tempe Branch. The Tempe Branch of the American Association of University Women usually grants a tuitional award to an ASU freshman woman who has a record of high scholastic achievement.

American Institute of Architects Awards. Two awards totaling \$25.00 are made annually by the Central Arizona Chapter, American Institute of Architects, to the students achieving the highest standard in third and fourth year architectural design.

American Legion Medal. A medal is awarded by William A. Bloys Post Number 2, American Legion, to the two cadets of the second year Basic Course, Army and Air Force ROTC, displaying the highest academic proficiency and capacity for military leadership in their respective departments.

Arizona National Guard Award. A trophy is awarded to the outstanding ROTC cadet who is a member of the Arizona National Guard.

Arizona Society of Certified Public Accountants' Award. Made to a senior graduating with the B.S. degree with a field of specialization in accounting. Based on scholarship and contributions to business.

Arizona State University Streamer. A decoration is presented by the Military Science and Tactics and Air Science Departments to the guidon of the best drilled Company, Army ROTC, and guidon of the best drilled Squadron, Air Force ROTC.

Armed Forces Communication and Electronic Association Award. A medal awarded to the outstanding senior AFROTC cadet majoring in electrical or electronic engineering.

Art Purchase Prizes and Awards. Cash purchase prizes totaling \$400.00 are awarded at the annual Art Exhibition for students and alumni of the Arizona State University Art Department in connection with the campus Art Festival. Prizes are offered in four classifications: oil painting, watercolor, ceramics and sculpture, and graphic and commercial arts. Both regular session and summer session students and alumni are eligible to exhibit. Fifteen faculty citations are awarded to worthy art works in addition to those winning cash prizes. Citation winners receive autographed copies of the illustrated catalog of the Arizona State University Collection of American Art. All awards and citations are officially listed on the records of individuals registered with the Arizona State University Placement Center.

Associated Men Students' Academic Achievement Award. This award is presented each year to the male student graduating with the highest cumulative index.

Associated Men Students' Award. An award presented by the A.M.S. Council to a senior member of the Associated Men Students in recognition of outstanding service to the University.

Associated Women Students' Recognition Award. The A.W.S. Recognition Award is presented each year to a graduating senior woman who is considered the outstanding woman in her class. She is judged on the basis of leadership, personality, scholarship, and service to the University. Recommendations are received from administrators, faculty, and student organizations.

Association for Childhood Education Award. A silver trophy to a kindergarten-primary junior or senior girl outstanding in scholarship and service.

Association of the United States Army Medal. A medal is presented to the member of the second year advanced course, Army ROTC exhibiting the greatest technical proficiency and highest capacity for leadership.

Bandsman's Award. A decoration is presented by the Division of Special Services, Arizona State University, to the outstanding member of the combined Army-Air Force ROTC Band.

M. O. Best B Hall Award. M. O. Best B Hall bestows the Antypas Award upon its outstanding resident each semester. The award is named in honor of John Antypas, first president of the hall, who did much to organize the hall council and establish the traditions of the dormitory. In making the award, service to the hall, scholarship, and citizenship are taken into consideration. The name of each recipient is engraved on a plaque which is displayed in the M. O. Best B lobby.

Beta Chi Award. An award is given to the graduating senior chosen for her good scholarship, her contribution to the Home Economics Club, to the Home Economics Department, and to the University, and her promise of future development.

Burke Award. An award of \$25.00 is given by Attorney and Mrs. William Burke to a graduating senior in the Home Economics Department who is outstanding in the field of Nursery School education.

Chemical Rubber Publishing Company Award in Chemistry and Physics. The Chemical Rubber Publishing Company annually awards a copy of their Handbook of Chemistry and Physics to the freshman student in general chemistry and to the beginning physics major with the most outstanding performance during the first semester.

Chicago Tribune ROTC Awards. A gold and silver medal is awarded by the Chicago Tribune Publishing Company to two Air Force ROTC Cadets of the Advanced Course who have demonstrated military achievement, scholastic attainment and character during the Fall and Spring semesters.

Chi Omega Social Science Award. The Chi Omega Social Science Award of twenty-five dollars is given to the outstanding woman student in the field of Social Sciences. It is judged on scholarship and general ability in that field. The recipient is chosen by the

Head, Division of Behavioral and Social Sciences and a committee of professors of Social Sciences.

Charles Christopher Memorial Award. This award, a replica of the trophy given posthumously to Charles Christopher, is given annually by the William H. Patterson BPOE of W. Lodge No. 477, Phoenix to the freshman judged most outstanding in athletic ability, scholarship, and general desirable personal qualities.

Commandants' Award. A decoration is presented by the Departments of Military Science and Tactics and Air Science to the members of the Army or Air Force Rifle Team compiling the highest average score during competitive firing.

Consolidated Vultee Aircraft Corporation Award. A model aircraft is awarded by the Consolidated Vultee Aircraft Corporation to the outstanding junior advanced Air Force ROTC cadet electing to pursue flight training upon graduation.

Thomas J. Croaff Award. An award of \$50.00 is given annually by Mrs. Carolyn B. Croaff in memory of her husband, Judge Thomas J. Croaff, to an undergraduate student for a research paper on juvenile delinquency or community problems.

Dean of the College of Liberal Arts Award. A decoration is presented by the Dean of the College of Liberal Arts to the two cadet commanders, Army and Air Force, winning the annual platoon-flight drill competition within their respective departments.

Delta Sigma Pi Scholarship Key. To encourage high scholarship, Delta Sigma Pi presents annually the Delta Sigma Pi Scholarship Key to the graduating senior who ranks highest in scholarship for the entire course in Business Administration.

Freshman Art Award. An award given to a freshman majoring in art. Selection determined on basis of scholarship, as well as art accomplishments and promise as an artist.

Bob Gehres Award. An award given each year by Blue Key to the most valuable baseball player in honor of Bob Gehres, an outstanding A.S.U. pitcher, who died in 1950.

Governor's Medal. A decoration is presented by the Governor of the State of Arizona to the respective cadet commanders of the Army and Air Force Corps of Cadets.

Graduating Honors. The honor, "With Distinction," is given to those whose index of scholarship, for all work taken at the University, is from 3.00 to 3.49 points. "With High Distinction" is given those whose index is from 3.50 to 4.00.

Hayden Hall Award. An award to a resident of Hayden Hall for outstanding achievement in service to the hall, scholarship, and service to the University.

Hillel Honor Awards. The Hillel Honor Awards are given to students of the Jewish faith, who by their devotion to service, and consecration to duty have made Hillel a worthwhile student organization.

Home Economics Senior Award. An award is given to the senior home economics major selected by the staff because of outstanding accomplishments and promise of future contribution to the field.

Home Economics Sophomore Award. An award is given to the sophomore home economics major having the highest cumulative scholastic record during her first three semesters of college.

Illuminating Engineering Society Prizes. Awards totaling \$50.00 are made each year by the Illuminating Engineering Society, Arizona Section, to students submitting winning designs in an architectural design competition emphasizing lighting.

Interfraternity Council Scholarship Award. Each semester the Interfraternity Council awards scholarship trophies to: (a) the fraternity with the highest scholarship for its total membership, (b) the fraternity with the highest scholarship for its brothers, (c) the fraternity with the highest scholarship for its pledges, and (d) the fraternity showing the most improvement over the previous semester's performance (combined actives and pledges).

Interhall Council Awards. The Interhall Council awards the scholarship trophy to the men's residence hall for the highest grade index for the first semester of each year. The Interhall Council also awards an intramural trophy to the outstanding hall in intramural activities.

Jahn-Tyler Award. An award presented annually to a student doing outstanding work in journalism.

Kappa Delta Pi Award. An award of twenty-five dollars by Kappa Delta Pi is made to the student having the highest cumulative index for all courses taken in the freshman and sophomore years at Tempe. The minimum number of hours is sixty.

Kappa Delta Pi Pin. This award goes to a graduating senior who attains the highest cumulative index for the junior and senior years under the conditions prescribed for Kappa Delta Pi Award.

Kappa Kappa Psi Award. Beta Omicron Chapter of Kappa Kappa Psi presents an award to the most outstanding senior of the University Band.

La Liga Panamericana Award. An award given to a graduating senior for all around service to the club, and for high proficiency in oral Spanish.

Letter "A" Awards. A "Letter A" is awarded by the Athletic Department, Arizona State University, to the lettermen of the Army ROTC and Air Force ROTC Rifle Team.

McGrew Printing Journalism Award. An award to an outstanding journalism student.

Mask and Sandal Award. A book is awarded each year by Mask and Sandal for all-around service to the Drama Workshop.

Moeur Award. This award of \$50.00 is given by Sidney B. and Annie Laurie Lassator Moeur, both graduates of the class of 1914, to the graduate of any four-year curriculum who attains the highest standing in academic work during the four years immediately preceding graduation.

Ralph H. Morris Instrumental Music Award. An award of \$100.00 is given by Mary Scott Morris, in memory of her father Ralph H. Morris, to a junior student of exceptional talent in instrumental music.

Music Department Award. An award is presented by the Music Department, Arizona State University, to the outstanding second year basic member of the combined Army-Air Force ROTC Band.

John Henry Newman Award. Membership in National Honor Society for Newman Club members who give outstanding leadership in local club, province, and national organization; and so honor club patron-Cardinal Newman.

Newman Club Service Award. An award to a graduating senior woman who by religious good example and four years of faithful service has enhanced the spiritual goals of the Newman Club.

Panhellenic Scholarship Cup. A Panhellenic Scholarship Cup is awarded each year by the Phoenix Panhellenic Association to that sorority which has the highest scholastic average. Any sorority receiving the award for three consecutive years retains the cup permanently.

Panhellenic Scholarship Plaque. A Panhellenic Scholarship Plaque is awarded each year by the Panhellenic Council to the sorority having the highest scholastic average.

P.E.O. Award. Chapter X, Tempe, of P.E.O. awards \$25.00 to a woman student of high ideals and outstanding service. Selection is based on integrity, intelligence, and aptitude.

Pershing Rifle Meritorious Award. An award presented by the Cadet Honorary Colonel to the Pershing Rifleman who has consistently contributed most to the furtherance of Pershing Rifle Co. D, 10th Reg. during the academic year.

Phi Eta Sigma Award. This award is given to the male student who attains the highest cumulative index for all courses taken in the freshman and sophomore years at Tempe.

Pi Kappa Delta Awards. Awards are made annually by this national honorary forensic fraternity to students who achieve forensic proficiency.

Pi Omega Pi Award. Alpha Iota Chapter of Pi Omega Pi presents an award to the graduating senior selected as the most outstanding prospective commercial teacher.

Pleiades Freshman Award is presented at the close of each year to the most outstanding woman in the freshman class.

The Pleiades Plaque. Awarded by Pleiades to the women's half having the highest collective undergraduate scholarship index. The group winning it three times in succession retains the plaque.

President's Award. A decoration is presented by the President of the University to the two outstanding cadets of the second year advanced course of their respective Cadet Corps.

Psi Chi Award. An award is annually presented to a member of Psi Chi with outstanding scholastic achievement and service.

Charles William Rawlins Memorial Award. Tau Kappa Epsilon Fraternity presents a trophy to the outstanding intramural man within fraternities. This is in tribute to the late Bill Rawlins, a fine fraternity man and a fine athlete.

Religious Activities Awards. Two awards of \$5.00 each are presented each year by the Student Religious Council to the man student and the woman student giving outstanding service in religious activities for the year. These awards are determined on the basis of (1) service to local university group and general church program, (2) service to total campus religious program, (3) personal religious living, and (4) other evidences of leadership.

Republic Aviation Award. A model F-84 Thunderjet is awarded by the Republic Aviation Corporation to the First Year Advanced Air Force ROTC Cadet who makes the most effective public presentation on an Air Power Theme.

Will H. Robinson Award. An award of \$25.00, in honor of Will H. Robinson, is given annually to a freshman. The award is based on high scholarship for the first semester considering the number of hours the student gives to self-support.

Rosenzweig Trophy. This trophy is given annually by I. Rosenzweig & Sons to an outstanding letterman having the highest total point rating on athletic ability, general aptitude index, and scholarship index.

ROTC Award. An award presented by the Departments of Military Science and Tactics and Air Science to the Army and Air Force ROTC Cadet making the greatest personal contribution to the Army and Air Force ROTC program at Arizona State University.

Sons of American Revolution Award. An award to the two cadets of the second year basic course, Army and Air Force ROTC, having the highest academic and military class standing and having rendered outstanding service to their respective departments and the University. Recommended by the PMST and PAS, chosen by the Arizona Society.

Student National Education Association Award. An award given by the Arizona State University, Tempe Chapter of Student National Education Association, to the graduating senior who shows greatest promise of leadership in the teaching profession.

Superior Cadet Ribbon Award. A Department of the Army award to one Army ROTC student, in each academic class, chosen by a board of officers, from the students in the upper fourth of his class in ROTC and academic standing. The award consists of a ribbon, certificate and lapel device.

Tau Beta Sigma Award. Sigma Chapter of Tau Beta Sigma presents an award to the most outstanding freshman of the University Band.

Tempe Daily News Journalism Award. An award is presented to a student doing outstanding journalism work.

Theta Chi Epsilon Award. This award is given annually to a senior student for excellence in scholarship and art achievement.

Veterans of Foreign Wars Medal. A medal is presented by Bob Finch Post Number 3632, Veterans of Foreign Wars, to the two cadets of the first year basic course, Army and Air Force ROTC, exhibiting the highest academic proficiency and potentiality for military leadership in their respective departments.

Weaver and Drover Prize for Architectural Design. An annual prize of \$200.00 is awarded to the student or students submitting winning designs in the prize competition.

West Hall Award. An award to a resident of West Hall for outstanding achievement in scholarship, and service to the hall and to the University for four years.

Women's Physical Education Award. An award given by the women's division of the Physical Education Department to a senior major for achievement in physical education.

Student Affairs

Student Government

Associated Students. Every student of the University is automatically a member of the Associated Students. The Board of Regents, the President, and the faculty challenge every student to accept his individual responsibility for stimulating and regulating student activities and customs, and for promoting the intellectual, moral, and social welfare of all students in a truly democratic manner. These objectives are attained by encouraging all students to participate in the government of the University.

Student government at ASU is unique, being patterned after our national and state governments, with three separate branches—legislative, executive, and judicial—which check and balance each other. Besides providing for the efficient functioning of Associated Students, our student government provides opportunity for developing responsible citizens.

The Student Senate passes the laws governing ASASU, its boards, and agencies. The Executive Council, with eleven members, five of whom are appointed, carries out those laws. The Student Court composed of five Justices, passes on the constitutionality of laws and interprets the constitution.

Under authority delegated them by the President of the University, AWS sets and enforces social standards and regulations regarding campus dress, coordinates women's student government through residence hall councils and the off-campus women's organization, establishes hours for women students, and formulates and administers policies deemed essential to promote a desirable group living experience.

The Memorial Student Union. The headquarters for all Associated Student Activities are in the Union Building. Here many student activities take place. This is indeed the instructional building for the out-of-class educational program.

The Student Activities Program. The university calendar includes many and varied programs and functions held on the campus and elsewhere. These include athletic events; social events including dances, dinners, banquets, teas; entertainment and lecture series; music and other cultural gatherings. Both men's and women's residence halls play an important part in carrying out the activity program with the advice of carefully selected personnel officers and faculty members.

Student Organizations

Program. A wholesome, integrated program for the university student is provided through student organizations. According to the individual interest and available time, any student may choose those activities which meet his desire for congenial companionship, his need for group security, his need for recognition, his need for creative effort, his need for growth—physically and socially—or supplement his classroom work in the many activities which are an extension of classroom programs.

Official Approval. Official approval of organizations may be withdrawn at any time the organization fails to comply with rules and regulations of Associated Students. At least once each year organizations are requested to submit the names of officers and other basic information. All approved organizations must have a copy of their constitution on file in the Office of Student Affairs. Organizations which do not meet these minimum requirements are removed from the official list which appears annually in the university catalog. Mail boxes are provided for all officially approved organizations in the Memorial Union Building.

Scholastic Requirements. In order to be eligible for admission to membership in any student organization, a student must have a scholarship index of 2.00 or better in all courses carried for the semester immediately preceding. Any member of such an organization whose semester report shows a scholarship index of less than 2.00 may be suspended from active work in the organization for one semester.

Honorary Groups

For Men

Alpha Delta Sigma (National advertising honorary fraternity)

Arnold Air Society (National honorary Air Force fraternity for advanced cadets.)

Blue Key (National honorary service)

Delta Sigma Pi International Business Fraternity, Gamma Omega Chapter (Business and professional fraternity)

Kappa Kappa Psi (National band fraternity)

National Honorary Society of Pershing Rifles (National professional honorary for R.O.T.C. cadets)

Pi Sigma Epsilon (National professional fraternity in marketing sales management and selling)

For Women

Alpha Lambda Delta (National scholastic honorary for freshman women)

Alpha Pi Epsilon (National secretarial honor organization)

Angel Flight (Honorary AFROTC Cadet officers for women)

Gamma Alpha Chi (National professional advertising fraternity for women)

Pleiades (Honorary service organization)
Racquet Club (Tennis)
Spurs (Honorary service organization)
Tau Beta Sigma (National band sorority)
Women's "A" Club (Honorary association in sports)

For Both Men and Women

Alpha Beta Alpha (National library science fraternity)
Alpha Mu Gamma (Foreign language)
Beta Beta Beta (Biology)
Gamma Theta Upsilon (National honorary professional geographic fraternity)
Joint Council of Engineers Societies
Orchesis (Dance honorary)
Pi Delta Epsilon (National journalism honorary)
Pi Kappa Delta—Arizona Beta (forensic fraternity)
Pi Omega Pi (National commerce honor society)

Special Interest Groups

For Men

Arizona State Men's Glee Club
Judo Club
Men's Interhall Council
National Foreign Language Council
Phi Epsilon Kappa (Men's Physical Education Fraternity)

For Women

International Association for Childhood Education
Kaydettes (Sponsors for the Army Reserve Officers Training Corps)
Naiads (Swim Club)
Par Busters (Women's golf)
Phrateres International (National Off-Campus Women's Group)
Physical Education Majors and Minors—P.E.M.M.
Pom Pon Girls
Women's Athletic Association—W.A.A.

For Both Men and Women

Accounting Club
American Chemical Society, Student Affiliate
American Institute of Architects, Student Chapter
American Institute of Electrical Engineers
American Institute of Industrial Engineers
Amerind Club (American Indians)
Arizona State Student Marketing Club
ASU Fencing Club
Choral Union (Concert Choir)
Devils and Dames (Square dance)
Foreign Students Club
German Verein
Industrial Arts Club of ASU
Institute of the Aeronautical Sciences

Institute of Radio Engineers
International Relations Club
Le Cercle Francais (French Club)
Liga Panamericana (Promotes friendly relations among those interested in things Spanish)
Los Conquistadores (Promotes the welfare of the Spanish-speaking students)
National Student Education Association
Philosophy Club
Russian Circle
Society for the Advancement of Management
Student Society of Mechanical Engineers
Sun Devil Band
Sun Devil Rodeo Association
Young Republicans of Arizona State
Undergraduate Mathematics Club
Young Republicans of Arizona State

Religious Groups

Religious Council. Composed of representative students from all denominations. Promotes religious programs, and fosters religious living.

For Men

Delta Phi Honorary Fraternity (L.D.S. returned missionaries)
Lambda Delta Sigma - Phi Omega Chapter (L.D.S.)

For Women

Lambda Delta Sigma - Phi Alpha Chapter (L.D.S.)

For Both Men and Women

Baha'i World Faith Club
Baptist Student Union
Baptist Young People Union
Campus Crusade for Christ (non-denominational)
Canterbury Club (Episcopalian)
Christian Science Organization
Congregational Fellowship
Hillel Foundation (Jewish)
Independent Baptist Student Group
Lutheran Student Association
Martin Luther Society
Newman Club (Roman Catholic)
Wesley Foundation (Methodist)
Westminster Fellowship (Presbyterian)

Sororities and Fraternities

Panhellenic Council. The Panhellenic Council is composed of representatives of each sorority with the Associate Dean of Students and/or a representative from her office as sponsors. Sponsors are members ex-officio.

Junior Pannellenic Council. The Junior Panhellenic is composed of representatives from the pledge class of each sorority.

Sororities. The following Greek letter societies carry on the traditional objectives of each group:

Alpha Delta Pi (national)
Alpha Epsilon Delta (local)
Alpha Phi (national)
Alpha Sigma Alpha (national)
Chi Omega (national)
Delta Gamma (national)
Gamma Phi Beta (national)
Kappa Alpha Theta (national)
Kappa Delta (national)
Kappa Kappa Gamma (national)
Sigma Sigma Sigma (national)

Interfraternity Council. Composed of two elected representatives from each member fraternity and the faculty adviser. The Interfraternity Council is the liaison between individual fraternities and the Associated Students and University administration.

Fraternities. The following Greek letter societies carry on the traditional objectives of each group.

Alpha Epsilon Pi (national)
Alpha Gamma Rho (national)
Alpha Tau Omega (national)
Delta Chi (national)
Delta Sigma Phi (national)
Kappa Alpha Psi (national)
Lambda Chi Alpha (national)
Phi Delta Theta (national)
Phi Kappa (Colony of Phi Kappa Theta National)
Phi Kappa Tau (colony)
Phi Sigma Kappa (national)
Pi Kappa Alpha (national)
Sigma Chi Sigma (local)
Sigma Nu (national)
Sigma Phi Epsilon (national)
Sigma Pi (national)
Tau Kappa Epsilon (national)
Theta Chi (national)

Special Group Activities

Musical Activities

Opportunities are offered to all university students to become members of the performing organizations maintained by the Music Department. College credit is given for regular work in the Symphony Orchestra, Bands, Choral Union, Concert Choir, Opera Workshop, Men's Glee Club, and in special instrumental and vocal ensembles. Participation in any of the above groups without credit is also permissible. Students in these organizations give local concerts, radio and TV performances and state-wide tours.

Intercollegiate Athletics—Men

The University is a member of the Border Conference, and is represented in such sports as football, basketball, track and field, baseball, tennis, golf, wrestling, swimming, and rodeo. The purpose of the program of intercollegiate athletics at Arizona State University is to provide the following important educational experiences all of which the faculty and the institution believe are fundamental to the American way of life: (a) To train students in legitimate methods of good sportsmanship, in competition, and in the will to win. (b) To aid in character development which includes cooperation and teamwork, leadership qualities, group loyalty, clean living and right thinking. (c) To contribute to the development of institutional morale, loyalty, and school spirit. (d) To supply wholesome recreation for the participants and other students. (e) To serve as a laboratory for the professional courses of those interested in physical education and coaching as a career.

Intercollegiate Athletics—Women

All intercollegiate athletics for women are sponsored by the Women's Athletic Association with membership on teams open to all college women. This type of competition includes sports-days with other colleges in the State. Telegraphic, sectional, national meets, and tournaments in tennis, golf, badminton, and archery are conducted. Competition is in only those sports activities offered in regular instructional class periods.

Intramurals—Men

The Associated Men Students sponsor a well-rounded intramural sports program. The program is designed to serve the needs of all the men students at Arizona State University. The sports are geared to individual and team competition.

Intramural sports have met a necessary challenge in the area of school life since their inauguration in the school program. The yearly program includes many diversified activities with both individual and team sports covering a wide range of needs.

Included in the seventeen sports are: tennis, volleyball, horseshoes, basketball, track and field, cross-country, tag football, golf and bowling.

Intramurals—Women

The program of intramurals for women is sponsored by the Women's Athletic Association and includes both the restricted student and the physically normal student. The program for both groups include only those sport and dance activities offered in instructional class periods. The activities are open to all women in the University and are broad enough in scope to meet the interest of all women students.

Recreational Facilities

In addition to the recreational facilities provided in the dormitories and the Memorial Union Building, there are two modern heated swimming pools, a large modern gymnasium which has an annex, ten tennis courts, a number of playing fields, and limited athletic and recreational equipment for student use.

Speech and Dramatics

Forensics. The University offers an extensive program of intramural and intercollegiate forensics, including debate, extemporaneous speaking, oratory, impromptu speaking, discussion and radio speaking. This activity provides one of the few ways in which the students and the school can establish prestige in academic competition. Each year rival speakers from many of the nation's major colleges and universities are met. The school is affiliated with three forensic leagues—The Arizona Speech League, which sponsors an annual tournament among six colleges in the State; the Western Association of Teachers of Speech, which sponsors a fall tournament for all western states; and the Pi Kappa Delta League, which holds a biannual national tournament, as well as tournaments in the western region. Students become eligible for membership in Pi Kappa Delta, national honorary speech fraternity, by a stipulated degree of proficiency in forensics.

Dramatics. The work in dramatics is designed to accomplish the following objectives: (1) To develop talent through participation in plays, recitals, and production. (2) To fulfill the social and therapeutic functions of dramatics in cases of defective personality. (3) To improve audience standards of entertainment. Active participation in dramatics may lead to an invitation to membership in Mask and Sandal, the local dramatics club, or Alpha Psi Omega, national dramatic fraternity.

Radio and Television

Station KASN. The Radio-TV Bureau maintains a carrier current station for the training of students in radio station operation. KASN is run by and for the University students. Students may

work on such jobs as writing, programming, continuity, and traffic. KASN provides students enrolled in Mass Communication classes with a working laboratory completely equipped with the finest professional radio facilities.

Television Programs. As part of its off-campus educational program, the University prepares and produces regular educational television series. These programs are produced by the Radio-Television Bureau in the television facilities of the Engineering Center, and micro-waved to the transmitters of local commercial TV stations. Students majoring in Radio-Television, and others interested in participating on an extra-curricular basis, assist in the production of these programs. Courses in radio and television production are closely related to the production of these television programs as well as to the operation of station KASN. Student participation in the television programs includes art work, properties, dramatic performances, writing, directing, and other details involved in presentation of television programs.

Student Publications

The State Press. Under the combined auspices of the Administration, the Department of Mass Communications, and the Associated Students, there is published twice weekly throughout the year a university-owned, student-operated newspaper, the *State Press*. It is distributed to students on campus, student subscriptions being included in the activity fee. Staff work on the *State Press* serves as professional training for students enrolled in journalism courses, and lends weight to student applications for jobs on metropolitan daily newspapers, commercial weekly newspapers, and various other work in the mass media industry. In general charge of this and other student publications is the Board of Student Publications, equally representing the faculty, the administration, and the Associated Students, with a journalism faculty member as chairman. The Board selects student editors, who in turn select their own staffs and exercise the editorial responsibility within broad standards established by the Board. Financial and budgetary matters are under the control of the Associated Students.

Sahuaro. The University yearbook, *Sahuaro*, is student-edited and published under the auspices of a faculty appointed supervisor. The supervisor and the outgoing staff select incoming editors. Art and photography students, future teachers planning to supervise high school publications, and others interested in a major student activity find *Sahuaro* work especially rewarding.

College of Liberal Arts

Purpose

The College of Liberal Arts aims to give the student an opportunity to secure a well-rounded liberal education. Life in a changing world calls for a broad training and an appreciative understanding of the varied elements in our own and other cultures. Today the peoples of various nationalities, languages, religions, and vocational interests intermingle in a human society increasingly interdependent and bound together by improved means of communication, transportation, trade, and governmental cooperation. Peaceful and effective living in such a world requires flexibility in personal equipment and ability to make quick and intelligent adjustments in the social as well as the physical environment.

The liberally educated person will have facility with his own, and preferably one or more other languages; he will possess an understanding of himself and a broad knowledge of his physical, social, moral, and spiritual environment; he will be able to deal effectively with the problems of his day in the light of the most reliable and tested knowledge of his time; he will have an appreciative understanding of the fine arts and find enjoyment in them; he will be able to live and act in the home, the local community, the nation, and the international community as an informed, responsible, and understanding human being.

The degree requirements are so arranged as to acquaint the student with the main fields of human knowledge and, at the same time, to bring to light his special aptitudes and interests. Although emphasizing breadth of training, the curriculums permit such a degree of specialization as to prepare the student for work in a professional school, for graduate study, or for the duties of a vocation. Within the limits of the curriculum chosen, the student may elect to take a part of his work among the course offerings of the Colleges of Education, Business Administration, and Applied Arts and Sciences.

Organization

The College of Liberal Arts is divided as follows:

DIVISION OF BEHAVIORAL AND SOCIAL SCIENCES

- Department of History
- Department of Political Science
- Bureau of Government Research
- Department of Psychology and Philosophy
- Department of Sociology and Anthropology

DIVISION OF FINE ARTS

Department of Art
Department of Music

DIVISION OF HEALTH, PHYSICAL EDUCATION, AND RECREATION

Department of Air Science
Department of Health, Physical Education, and Recreation
Department of Intercollegiate Athletics
Department of Military Science and Tactics

DIVISION OF HOME ECONOMICS

Department of Home Economics

DIVISION OF LANGUAGE AND LITERATURE

Department of English
Department of Foreign Languages
Department of Humanities
Department of Mass Communications
Department of Speech and Drama

DIVISION OF LIFE SCIENCES

Department of Botany
Department of Zoology
Poisonous Animals Research Laboratory

DIVISION OF PHYSICAL SCIENCES

Department of Chemistry
Department of General Physical Sciences
Department of Geography
Department of Geology
Department of Mathematics
Department of Physics and Astronomy

SCHOOL OF NURSING

Degrees

Bachelor of Arts and Bachelor of Science Degrees

The College of Liberal Arts offers three bachelor's degrees: the Bachelor of Arts, the Bachelor of Science, and the Bachelor of Science in Nursing. The first two are similar in that both require 126 semester hours of credit for graduation and call for a considerable distribution of studies; yet they also permit of specialization. Indeed, they require sufficient stress in major fields to insure some degree of mastery in particular fields. In general, the distinction between the curriculums offered for these two degrees lies in the fact that for the Bachelor of Arts degree, emphasis is placed on a broader, humanistic program, whereas for

the Bachelor of Science, greater emphasis is placed on a special scientific field.

The School of Nursing offers the degree of Bachelor of Science in Nursing. This is a four-year program requiring 126 semester hours of credit for graduation. It is the intent of this program not only to permit the student to receive her bachelor's degree in a collegiate program of nursing which includes a broad background in general education, but also to provide the learning experiences which will help the student develop the professional nursing skills necessary to function in any branch of nursing.

Master's Degrees

A graduate program consisting of a minimum of 30 semester hours of approved work in a special field of study leads to masters degrees in the following fields:

Degree	Fields of Specialization
Master of Arts	Art
	English
	French
	German
	History
	Mathematics
	Political Science
	Psychology
	Sociology
	Spanish
Master of Fine Arts	
Master of Public Administration	
Master of Science	Biological Science
	Chemistry
	Home Economics
	Physical Education
	Physics

For specific reference to these programs, see page 196 of this catalog.

Honors Program

Purpose of the Program

The Honors Program is designed for students of exceptional ability who are interested in scholarly attainment. Through this program, it is hoped to encourage the student to develop an awareness of the inter-relatedness of all knowledge and experience, and to make him more concerned with basic values—intellectual, aesthetic, social, and ethical. Wide reading, thorough scholarship, and independent creative work are emphasized throughout the program.

Admission to the Program

Students may be admitted to the Honors Program on the basis of their previous academic record, specialized tests, and a conference with an examining committee of the Honors Council.

Description of the Program

Students admitted to the Honors Program will spend a considerable portion of their time in the serious study of the general field of their major and will also do some work in related fields and in General Education. The work includes: (1) general reading and discussion covering the entire major field, with emphasis on those areas not covered by formal courses, plus such work in related fields as may seem desirable; (2) specialized and intensive work in some phase of the major field selected by the student in consultation with his Honors adviser and approved by the department of his major. The student's thesis, or creative project, will be within this field of specialized work.

The program has the same general requirements for graduation as exist within the regular degree programs in the College of Liberal Arts. In order to stimulate the student to do outstanding work, the adviser, operating under the rules established by the Honors Council, may substitute work on a higher level than that stipulated in the General Education or major requirements but always within the same field. A student in the Honors Program, with the rank of sophomore or above, may, on permission of his adviser and the Chairman of the Honors Council, enroll in any undergraduate course in the College. Seniors may enroll in graduate courses with the consent of the Dean of the Graduate College.

When enrolled in the Liberal Arts Honors Program, the full-time student, with the consent of his adviser and the instructor involved, may attend without credit, any class in the College of Liberal Arts.

Graduation Requirements

For graduation With Honors, the student must pass two essay examinations, one in his major and one in general areas. In addition, he must present to the Honors Council an acceptable honors project consisting of a thesis, or an equivalent creative project. This thesis, or creative project, must be defended in an oral examination before an examining committee of the Honors Council. A cumulative grade index of 3.20 is required for graduation With Honors.

Advisory Committee

An advisory committee consisting of one representative each from the Humanities, the Behavioral and Social Sciences, and the Natural Sciences shall be responsible for the student's program. The adviser shall be the member on this committee from the general area which he represents and shall be chairman of the advisory committee.

Bachelor of Arts Degree Curriculum

The curriculum for the degree of Bachelor of Arts is designed to give the student a broad, general background in the principal fields of human knowledge and a reasonable amount of specialized training in a selected area. It is divided into three parts:

General Education Requirements

The general education program consists of 40 semester hours of approved courses, of which 12 semester hours must be in upper division work (courses numbered 300 and above).

Communications	6 sem. hrs.
Humanities	8 sem. hrs.
Behavioral and Social Sciences.....	8 sem. hrs.
Sciences and Mathematics.....	8 sem. hrs.
Physical Education and Health.....	1 sem. hr.
General Education Electives.....	9 sem. hrs.

All courses in general education will be selected by the adviser in consultation with the student from among those approved courses listed on page 76 of the catalog.

Major Requirements

A major shall consist of 45 semester hours of credit. Not more than 30 semester hours may be in a single subject field and at least 15 must be in one or more different but related subject fields. The content of the major is determined by the adviser in consultation with the student under the rules and regulations of the department concerned. At least 18 semester hours must be in upper division courses.

The majors in the following list which are marked with an asterisk (*) require a four-year sequence of courses. A student who elects them after the first semester of his college career must therefore expect to spend more than four years in attaining the bachelor's degree. Majors not marked with an asterisk can be completed in three years or less, and may therefore be elected at the beginning of the sophomore year with no loss of time.

Division	Major
Behavioral and Social Sciences	Anthropology*
	Economics
	History
	Philosophy
	Political Science
	Psychology
	Sociology
	Social Welfare
Fine Arts	Fine Arts
	Music

Health, Physical Education, and Recreation	Health Education Physical Education Recreation
Home Economics	Clothing, Textiles, and Related Arts Family Life and Child Development *Foods and Nutrition General Home Economics
Language and Literature	Dramatics English *French *German Journalism Radio-Television *Spanish Speech
Life Sciences	Biology
Physical Sciences	Chemistry Geography Geology Mathematics Physics
Inter-Divisional	General Studies

Additional Degree Requirements

1. Knowledge in a foreign language equivalent to the level obtained through 16 hours of instruction on the college level. This requirement may be fulfilled in whole or in part through language instruction in secondary schools or by other means. If acquired in secondary school, two years of instruction in foreign language will be considered the equivalent of one year of instruction on the college level. A student who desires to fulfill the entire requirement through language study in secondary schools or in other non-collegiate institutions must pass a proficiency examination given by Arizona State University in satisfaction of the total requirement.
2. All candidates for graduation in the Bachelor of Arts degree curriculum are required to present at least 50 hours of upper division courses.
3. A cumulative scholarship index of 2.00 is required for graduation and no credit will be granted toward fulfilling major requirements in any upper division course in the student's major unless the grade in that course is at least a C.
4. All students, except those who receive a grade of B or better in EN 102, or who were exempt from that course, shall, before the end of their sophomore year, take and pass a

Written English Proficiency Examination. Failure to take this examination at the proper time or failure to pass it will make them ineligible to take upper division courses. This ineligibility will continue until such time as they pass a subsequent examination.

5. At least 60 hours, *not including the major*, must be taken in the following areas:

All courses in Anthropology, Art History, Biology, Botany, Drama, Economics, Educational Psychology, English, Entomology, Foreign Languages, History, Humanities, Mathematics, Microbiology, Philosophy, Physics, Political Science, Psychology, Social Foundations (Education), Sociology, and Zoology.

In the following areas, all courses *except* those specifically listed may be counted toward the fulfillment of this requirement: Chemistry, all courses except CH 300; Geography, all courses except GE 142 and 341; Geology, all courses except GL 215, 319, and 360; Health Education, all courses except HE 370, 371, 461, and 470; Home Economics, all courses except HO 123, 131, 142, 321, 333, 341, 343, 422, 423, 424, 431, 452, 454, and 480; Journalism, all courses except JO 211, 212, 311, 313, 315, 320, and 413; Music, all courses except those in Music Performance and MU 211, 212, 311, 312, 461, 465, and 480; Speech, all courses except SE 315 and 316.

In the following departments, only those courses listed may be taken for credit for the fulfillment of this requirement: Architecture 100, 311, 312, 413, and 414; Physical Education, PE 280, 385, and 386.

Curriculum Outline

The following is a suggested outline to indicate to the adviser and student one way in which the general education, major, and elective requirements may be worked into the first year of study.

FIRST YEAR			
First Semester		Second Semester	
	Hours		Hours
EN 101 First Year English.....	3	EN 102 First Year English.....	3
AS 101 Basic Air Science or		AS 102 Basic Air Science or	
MS 101 Basic Military Science.....	1.5	MS 102 Basic Military Science.....	1.5
PE 101 Freshman Physical Educ.....	.5	PE 102 Freshman Physical Educ.....	.5
Foreign Language.....	4	Foreign Language.....	4
Electives to fulfill major and		Electives to fulfill major and	
general education requirements 6 to 8		general education requirements 6 to 8	

Pre-Major Curriculum

Many students are not ready to choose a major at the time they enter college. Successful completion of the first-year course pattern suggested in the preceding paragraph will qualify such students to enter upon any of the three-year majors at the beginning of the sophomore year with no loss of time. Since they have not yet chosen a major, they must, of course, substitute additional general education requirements or free electives for the "major requirements" mentioned in the last entry under each semester.

Bachelor of Science Degree Curriculum

The curriculum for the degree of Bachelor of Science is designed to give the student a broad general background in the principal fields of human knowledge and an opportunity to specialize in one specific selected area of scientific endeavor. It is divided into three parts:

General Education Requirements

The general education program consists of 40 semester hours of approved courses, of which 12 semester hours must be in upper division work (courses numbered 300 and above).

Communications	6 sem. hrs.
Humanities	8 sem. hrs.
Behavioral and Social Sciences.....	8 sem. hrs.
Sciences and Mathematics.....	8 sem. hrs.
Physical Education and Health.....	1 sem. hr.
General Education Electives.....	9 sem. hrs.

All courses in general education will be selected by the adviser in consultation with the student from among those approved courses listed on page 76 of the catalog. In category IV, *Sciences and Mathematics*, the student must take at least one course in the Physical Sciences, one course in the Life Sciences, and one course in Mathematics. One of these courses must be a laboratory science. The additional work in this category is a required part of the general education electives.

Major Requirements

A major shall consist of from 45 to 55 semester hours of credit. The content of the major is determined by the adviser in consultation with the student under the rules and regulations of the department concerned. At least 40 per cent of the major must be in upper division courses.

The majors in the following list marked with an asterisk (*) require a four-year sequence of courses. A student who elects them after the first semester of his college career must therefore expect to spend more than four years in attaining the bachelor's degree. Majors not marked with an asterisk can be completed in three years or less, and may therefore be elected at the beginning of the sophomore year with no loss of time.

Division	Major
Behavioral and Social Sciences	Anthropology
	Economics
	History
	Political Science
	Psychology
	Sociology
	Social Welfare

Fine Arts	Applied Arts
Health, Physical Education, and Recreation	Boys' Club Administration Physical Education Recreation
Home Economics	Clothing, Textiles, and Related Arts Family Life and Child Development *Foods and Nutrition General Home Economics
Life Sciences	Botany Entomology Biology Microbiology *Physiological Zoology Wildlife Biology Zoology
Physical Sciences	*Chemistry Geography Geology Mathematics Physical Sciences Physics
Inter-Divisional	General Studies

Additional Degree Requirements

1. All candidates for graduation in the Bachelor of Science degree curriculum are required to present at least 50 hours of upper division courses.
2. A cumulative scholarship index of 2.00 is required for graduation and no credit will be granted toward fulfilling major requirements in any upper division course in the student's major unless the grade in that course is at least a C.
3. All students, except those who receive a grade of B or better in EN 102, or who were exempt from that course, shall, before the end of their sophomore year, take and pass a Written English Proficiency Examination. Failure to take this examination at the proper time or failure to pass it will make them ineligible to take upper division courses. This ineligibility will continue until such time as they pass a subsequent examination.
4. At least 60 hours, *not including the major*, must be taken in the following areas:

All courses in Anthropology, Art History, Biology, Botany, Drama, Economics, Educational Psychology, English, Entomology, Foreign Languages, History, Humanities, Mathe-

matics, Microbiology, Philosophy, Physics, Political Science, Psychology, Social Foundations (Education), Sociology, and Zoology.

In the following areas, all courses *except* those specifically listed may be counted toward the fulfillment of this requirement: Chemistry, all courses except CH 300; Geography, all courses except GE 142 and 341; Geology, all courses except GL 215, 319, and 360; Health Education, all courses except HE 370, 371, 461, and 470; Home Economics, all courses except HO 123, 131, 142, 321, 333, 341, 343, 422, 423, 424, 431, 452, 454, and 480; Journalism, all courses except JO 211, 212, 311, 313, 315, 320, and 413; Music, all courses except those in Music Performance and MU 211, 212, 311, 312, 461, 465, and 480; Speech, all courses except SE 315 and 316.

In the following departments, only those courses listed may be taken for credit for the fulfillment of this requirement: Architecture 100, 311, 312, 413, and 414; Physical Education, PE 280, 385, and 386.

Curriculum Outline

The following is a suggested outline to indicate to the adviser and student one way in which the general education, major, and elective requirements may be worked into the first year of study.

FIRST YEAR			
First Semester	Hours	Second Semester	Hours
EN 101 First Year English.....	3	EN 102 First Year English.....	3
AS 101 Basic Air Science or		AS 102 Basic Air Science or	
MS 101 Basic Military Science.....	1.5	MS 102 Basic Military Science.....	1.5
PE 101 Freshman Physical Educ.....	.5	PE 102 Freshman Physical Educ.....	.5
Electives to fulfill major and		Electives to fulfill major and	
general education requirements 6 to 8		general education requirements 6 to 8	
Other electives to complete		Other electives to complete	
15 to 17 hours.		15 to 17 hours.	

Pre-Major Curriculum

Many students are not ready to choose a major at the time they enter college. Successful completion of the first-year course pattern suggested in the preceding paragraph will qualify such students to enter upon any of the three-year majors at the beginning of the sophomore year with no loss of time. Since they have not yet chosen a major, they must, of course, substitute additional general education requirements or free electives for the "major requirements" mentioned in the last entry under each semester.

Special Programs

Foreign Service Training Program

Training for the Foreign Service is designed to prepare the student for Department of State examinations for the position of Foreign Service Officer. Requirements for this examination include no specific courses, but a sequence of recommended courses has been prepared based upon a careful study of prior examinations. A copy of these recommended courses may be obtained from the Foreign Service Training Program adviser. Because of the highly competitive nature of this examination and the relatively small number of vacancies, it has been found that unless students have a scholarship index of 3.50, they are not likely to qualify with a sufficiently high score to have much chance of appointment.

For specific requirements for the Foreign Service Examinations, the interested student should consult with the Foreign Service Training Program adviser. Copies of recent examinations may be had by writing to the Department of State, Washington, D.C.

In selecting a major, the student interested in the Foreign Service would do well to major in political science, history, or economics. However, a major in Spanish, French, or German, supplemented by minors in both political science and history, would be acceptable.

Latin-American Area Studies

Arizona State University, in the hope of strengthening the State's position in Hispanic-American affairs, offers a program of studies designed to be of cultural and vocational value. Governmental departments and agencies, as well as innumerable private organizations, are constantly in need of persons trained in Latin-American affairs.

The program is intended primarily to acquaint American students with the culture and development of Latin America. The course of studies stresses a broad knowledge of Spanish, Latin-American literature, history, economics, geography, government, architecture, music, and art.

It is recommended that the student select a major in one of the social sciences, with minor areas in Spanish and geography, selected from within the curriculum leading to the degree of Bachelor of Arts. If desired, the Inter-Divisional major may be selected.

Medical Technology

This curriculum is designed to prepare students for a career in medical technology. The program consists of a three-year period of resident study at the University and one year of practical

hospital internship. Students who have completed 94 semester hours at Arizona State University with a scholarship index of 2.00 or above, and have satisfied the general education requirements of the College of Liberal Arts for the degree of Bachelor of Science, may obtain the degree after completing a full year's work (not less than 32 semester hours) with an average grade of C or above in an approved hospital offering an accredited program in medical technology, providing, before entering the hospital, the student secures a statement in writing from the Dean of the College of Liberal Arts, giving senior-in-absentia privileges. The student, at the end of his year in the hospital medical technology program, must have completed a total of 126 semester hours of college credit.

Students who begin their internship in June or July will not find it possible to complete the 12 month's program in time to graduate the following May. Students may not participate in the commencement exercises until all requirements for the degree have been completed. Students should consult the medical technology curriculum adviser and the Dean of the College of Liberal Arts to be certain that all arrangements, including those for graduation, are clearly understood. Following completion of the hospital program, the student shall request that a transcript of credits and a statement recommending that the degree be granted be forwarded from the hospital school to the Registrar, Arizona State University.

Required courses: CH 113, 115, 225, 231 (or 331, 332), 464, 465; PH 111, 112 (or 101); MA 116, 118; ZO 100, 271, 360; MI 201, 202, 445. Recommended electives: ZO 396, 470, 472; MI 410. These courses also meet the general education group requirements in science and mathematics for the B. S. degree. During the fourth year, the following courses, or their equivalent, must be completed at the hospital: ME 411, 412. These courses are completed during the senior year as a unit, and may not be taken separately.

Pre-Dental, Pre-Medical, and Pre-Osteopathy

While schools of medicine, osteopathy, and dentistry indicate in their catalog that students may occasionally be admitted with only two or three years of pre-medical training, the competition for admittance is so great that few students can hope for admission unless they have completed the work for their bachelor's degree with a scholarship index of at least 3.00.

The requirements for entrance into schools of medicine, dentistry, and osteopathy are very similar. The following analysis of admission requirements to medical schools, prepared by the Association of American Medical Colleges, is *apropos*. "Medical schools differ in the specific subjects they require of their applicants. All medical schools require some college work in chemistry, biology, and with one exception, physics. More work is specified in chemistry than any other single subject. Courses in both general

and, with one exception, organic chemistry are required by all of the medical schools; quantitative analysis is specified by roughly half, and qualitative analysis and physical chemistry are specified by less than a quarter of the schools. Half of the medical schools require that the total number of semester hours spent in these chemistry courses be 16 or more, while the comparable figure for both biology and physics is 8 semester hours. Required courses in biology, other than general biology and zoology, include comparative anatomy and embryology, specified by approximately a quarter of the schools; and anatomy, genetics, micro-technique, etc., listed by only one or two schools. Nineteen of the medical schools require one or more courses in mathematics. English is a general requirement of almost all of the schools, and about half of them specify some knowledge of a foreign language. Only 18 of the medical schools require any work in the social sciences, although most of the medical schools believe such work helps to round out the liberal arts background of applicants. The total semester hours of required courses in all fields varies from 27 specified by Cornell to 84 hours for Alabama."

Approximately seventy-five per cent of the professional schools of the United States require less than forty semester hours in science and mathematics. While additional work in these fields may be taken, the professional schools generally suggest that the prospective student secure a broad, general education, postponing his professional training until he enrolls in a professional school. They generally recommend study in English, the social sciences, psychology, and other subjects of interest to the student.

At the present time, many more students qualify for entrance into the professional schools than can be admitted. It is advised that those who plan medical careers select their major and electives in such a way as to prepare for a possible alternate career in the event that they are not able to secure immediate admission to the school of their choice. Students may major in almost any field in the Arts and Sciences curriculums, but majors in chemistry, biology, psychology, medical technology, and physiological zoology are most common.

The student should consult the pre-medical adviser and discuss with him the program of studies necessary to qualify for admission to the professional schools in which the student may desire to register. The student will major in a specific field and the pre-medical adviser will refer him to the adviser in his field. It is wise, however, for the student to keep in touch with the pre-medical adviser, regardless of his major field of study, in order to keep abreast of any changes in admission requirements in the professional schools in which he is interested.

A few medical schools admit students upon completion of three years of college work. Under the guidance of the pre-medical adviser, work may be taken without reference to the requirements

of a degree, and the only degree obtained will be that in medicine at the end of three additional years at medical school.

Students who have completed 94 semester hours at Arizona State University with a scholarship index of 2.00 or above in all hours attempted, and have satisfied the general education and major requirements of the College of Liberal Arts for the degree of Bachelor of Arts or Bachelor of Science, may obtain the degree after completing a full year's work in an accredited school of medicine with an average grade of "C" or above, providing, before entering the school of medicine, the student secures a statement in writing from the Dean of the College of Liberal Arts giving senior-in-absentia privileges. In order to receive the degree in this manner, the student must, at the end of his first year in medical school, have completed a total of 126 semester hours of college credit and present a signed testimonial from the Dean of the Medical School to the Registrar at Arizona State University, which shall include a statement of courses taken, grades achieved, and a recommendation that the degree be granted.

Pre-Law

The requirements for admission to law schools vary from a minimum of three years of pre-legal college work to a four-year program leading to a bachelor's degree. The pre-law student should obtain a copy of the catalog of the law school that he plans to attend and plan his course of study under the guidance of his adviser.

The Association of American Law Schools has indicated that pre-law education should provide the student with: (a) ability in the comprehension and expression of words; (b) the critical understanding of human institutions and values with which the law deals; (c) creative power in thinking. The Association does not recommend any particular courses or sequence of courses for pre-legal training.

The leading law schools prefer that their students shall have completed four years of college work before entrance. Students planning to enter a law school requiring a bachelor's degree for entrance may register within any of the major fields in the Arts and Sciences curriculums, or in the Business Administration curriculum, paying due regard to the recommendations in the preceding paragraph. The student should check carefully in the catalog of the law school which he hopes to attend in order to determine the entrance requirements of that school.

A few law schools admit students upon completion of three years of college work. Under the guidance of the pre-law adviser, work may be taken without reference to the requirements of a degree, and the only degree obtained will be that in law at the end of three additional years at law school.

Students who have completed 94 semester hours at Arizona State University with a scholarship index of 2.00 or above in all

hours attempted, and have satisfied the general education and major requirements of the College of Liberal Arts for the degree of Bachelor of Arts or Bachelor of Science, may obtain the degree after completing a full year's work in an accredited school of law with an average grade of "C" or above, providing, before entering the school of law, the student secures a statement in writing from the Dean of the College of Liberal Arts giving senior-in-absentia privileges. In order to receive the degree in this manner, the student must, at the end of his first year in law school, have completed a total of 126 semester hours of college credit and present a signed testimonial from the Dean of the Law School to the Registrar at Arizona State University, which shall include a statement of courses taken, grades achieved, and a recommendation that the degree be granted.

Students planning a pre-law program which provides for a bachelor's degree should select a major field of specialization not later than the beginning of his sophomore year. The pre-law adviser will refer him to the adviser in the specific field chosen to see that he meets the requirements for the bachelor's degree at Arizona State University.

Pre-Ministerial

Students preparing to enter a Theological Seminary for advanced training leading to a degree in theology, should secure the catalog of the institution which they hope to enter and be guided by its recommendations during their preliminary training. Although no required course of preliminary training is offered at Arizona State University, it is suggested that the student follow the curriculum leading to the degree of Bachelor of Arts with a major in one of the social sciences (including history, sociology, and economics) and minors in English literature and psychology.

Pre-Occupational, Pre-Physical Therapy

Upon completion of the bachelor's degree within either of these programs, a student is qualified to enroll in the one year certificate program offered in approved schools of occupational or physical therapy. Customarily, an internship of from nine to eighteen months is required beyond the certificate year to complete the student's training.

Students desiring to specialize in one of these fields should major in physical education with a pre-occupational or pre-physical therapy emphasis. The student's adviser in the Department of Health, Physical Education, and Recreation will indicate the courses essential in the student's preparation to qualify for admission to the professional school.

Pre-Optometry

The general requirements for entrance to most schools of optometry include a total of sixty (60) hours, grouped as follows: English Composition, 6 hours; Chemistry, 8-9 hours; Biological Sciences, 8 hours; Psychology, 3-6 hours; the remaining hours

being chosen from the social sciences and humanities. It is strongly urged that a prospective optometry student obtain a catalog from the school he plans to enter, and that he follow their specific courses. The following courses taught at Arizona State University will meet the entrance requirements of most schools of optometry: EN 101, 102; MA 117, 118, 120; CH 113, 115; PY 100, 131; PE 101, 102; PH 111, 112; ZO 100; SE 200; 12 hours of social sciences and humanities electives.

Pre-Pharmacy

The requirements for admission to a college of pharmacy are limited to one year of pre-pharmacy training. The pre-pharmacy student should obtain a copy of the catalog of the college of pharmacy that he plans to attend and work out his course of study under the guidance of his adviser. The following program will meet the entrance requirements of most schools of pharmacy. The student should have an average of 2.50 or better in this work.

First Semester	Hours	Second Semester	Hours
EN 101 First Year English.....	3	EN 102 First Year English.....	3
CH 113 General Chemistry.....	4	CH 115 General Chemistry and	
ZO 100 General Zoology.....	4	Qualitative Analysis.....	5
MA 117 College Algebra.....	3	BO 100 General Botany.....	4
MS 101 Basic Military Science or		MA 118 Trigonometry.....	3
AS 101 Basic Air Science.....	1.5	MS 102 Basic Military Science or	
PE 101 Freshman Physical		AS 102 Basic Air Science.....	1.5
Education	0.5	PE 102 Freshman Physical	
		Education	0.5
	16		17

Pre-Social Work

Most graduate schools of social work require a bachelor's degree with a well rounded background in the social sciences and humanities.

The program for social welfare majors has been developed with a 3-fold purpose: (1) to prepare students who wish to go on to graduate schools of social work, (2) to qualify students for a limited number of social work positions open to persons without a graduate training, and (3) to give future citizens a general understanding of the field of social welfare.

Because of the 3-fold purpose of the social welfare program and because of the individual differences in entrance requirements of the various graduate schools of social work, students who plan to go on for graduate training are urged to discuss their plans with their adviser and make certain that they will meet the requirements of the specific school they wish to attend.

Public Service Training Program

It is anticipated that persons applying for positions in the public service in non-technical fields will have a broad cultural education with an adequate knowledge of political science, psychology, history, English, sociology, and economics. Non-technical Civil Service examinations stress the breadth of knowledge of a liberally educated person, his ability to reason clearly, his ability to quickly and accurately grasp and understand detail, and his rapidity and accuracy of judgment. While no program of courses

is endorsed by the Federal Civil Service Commission, a study of the examinations given indicate that course work in the fields listed above could be profitably taken as preparation for a career in the public service. The student should remember that high grades and outstanding accomplishments during his educational preparation are highly desirable indications of probable ability and are important factors in a Civil Service examination.

Students on the undergraduate level preparing for public service should enroll in the curriculum leading to the Bachelor of Arts or to the Bachelor of Science degree, and major in political science with emphasis in public administration. Graduate students enrolling in the public administration program should apply under the curriculum leading to a Master of Public Administration degree.

A listing of recommended courses for the program may be obtained from the Public Service Training Program adviser.

In cooperation with state and local governmental units, a Bureau of Government Research in this and related programs is maintained in the Department of Political Science.

School of Nursing

Bachelor of Science in Nursing Curriculum

Students wishing to graduate with the degree of Bachelor of Science in Nursing will follow a four-year program. Graduates of the program will be eligible to take the examination for licensure as registered nurse in the state of Arizona.

In September, 1957, Arizona State University first offered to qualified high school graduates a basic four-year collegiate program leading to the degree of Bachelor of Science in Nursing. The basic collegiate nursing program is under the direct supervision of Arizona State University during the entire four-year period. In this program the student nurse will proceed from a base of general education so that he or she will have a rich academic background which contributes to an understanding of the role of the nurse in contemporary society. The purpose of the program is to prepare the student for a beginning position in any field of nursing. The graduate, with successful experience, will be qualified to pursue study on the master's level leading to positions in administration, teaching, supervision and research.

To provide the best clinical experience in all fields of nursing, the School of Nursing utilizes Good Samaritan Hospital, Arizona State Hospital, Maricopa County Health Department, Visiting Nurse Service, Inc., and other hospitals and health centers in the Phoenix area.

It is recommended that the high school program of the students wishing to register in nursing should include at least four units of English, two units of history and government, one unit of algebra, two units of science (chemistry, physics, biology) and two units of Latin and/or foreign language.

The nursing program consists of the completion of the program of general education of Arizona State University and the major in nursing. In general, the following suggested outline will indicate to the adviser and student one way in which the general education and major requirements may be worked into the first year of study.

FIRST YEAR			
First Semester	Hours	Second Semester	Hours
EN 101 First Year English_____	3	EN 102 First Year English_____	3
PE 101 Freshman Physical Educ.____	0.5	PE 102 Freshman Physical Educ.____	0.5
General education and major requirements to complete 15 to 17 hours		General education and major requirements to complete 15 to 17 hours	

Prior to enrolling in the clinical nursing specialty areas, each nursing student must (a) receive approval from the office of the Director of the School of Nursing and (b) secure from his or her adviser an approved course of study for the remaining work. Generally, students with an aptitude for nursing, desirable personal qualifications, sound physical and mental health, and students with a 2.00 scholarship index (C average) or higher will receive approval.

A student must maintain a cumulative index of 2.00 and achieve a minimum grade of C in all nursing courses in order to remain in the nursing major.

The fees for attendance at Arizona State for nursing students are the same as for other students, with the addition of fees for transportation and special tests. Uniforms, uniform shoes, a watch with a second hand, bandage scissors, and fountain pen must be provided by the student. Bandage scissors may be purchased at the College Bookstore.

For information regarding scholarships and loans, see Financial Assistance and Awards, page 91. Information about other loan funds for student nurses may be obtained from the Director of the School of Nursing.

Registered Nurse Program

In this program, the student will proceed from a base of general education so that he or she will have a rich academic background which contributes to an understanding of the role of the nurse in contemporary society.

The purpose of the program is to prepare the student for a beginning position in any field of nursing. The graduate, with successful experience, will be qualified to pursue study on the master's level leading to positions in administration, teaching, supervision and research.

To provide the best clinical experience in all fields of nursing, the School of Nursing utilizes Good Samaritan Hospital, Arizona State Hospital, Maricopa County Health Department, Visiting Nurse Service, Inc., and other hospitals and health centers in the Phoenix area.

The content of professional nursing courses includes recent developments in the special fields of health teaching and nursing management.

General Education Requirements

The general education program consists of 40 semester hours of approved courses, of which 12 semester hours must be in upper division work (courses numbered 300 and above).

Communications	6 sem. hrs.
Humanities	8 sem. hrs.
Behavioral and Social Sciences	8 sem. hrs.
Physical Education and Health.....	1 sem. hr.
Sciences and Mathematics.....	8 sem. hrs.
General Education Electives	9 sem. hrs.

All courses in general education will be selected by the adviser in consultation with the student from among those approved courses listed on page 76 of the catalog.

Professional Education.....67 sem. hrs.

Credit from diploma program in nursing....46 sem. hrs.

Professional courses.....21 sem. hrs.

Limited electives.....18 sem. hrs.

Eighteen hours of electives must be selected in consultation with the student's adviser.

The student may be allowed a maximum of 46 credits toward the Bachelor of Science in Nursing for a basic program in an approved hospital school of nursing which has included a psychiatric nursing affiliation and which has resulted in registration that is currently active or inactive in one of the states or territories of the United States. These credits will be withheld until the student has satisfactorily completed 30 credits of work, 15 of which have been earned in residence at Arizona State University, and has removed high school deficiencies and strengthened any area of clinical weakness.

A minimum of 80 semester hours must be earned either at Arizona State University or by transfer from an accredited college or university to fulfill requirements for the nursing program. In all cases the last 30 hours prior to completing requirements for graduation must be completed at Arizona State.

In addition to the general college aptitude tests, it is required that the student take the Graduate Nurse Qualifying Examination. The results of this test will be used to help guide the student and plan her program. A fee is charged for this examination.

The fees for attendance at Arizona State for nursing students are the same as for other students, with the addition of fees for transportation and special tests. The student must provide an appropriate uniform for clinical experience in health department and hospital settings.

A student must maintain a cumulative index of 2.00 and achieve a minimum grade of C in all nursing courses in order to remain in the nursing major.

College of Education

Purpose

The purpose of the College of Education is to promote interest in the teaching profession and to prepare students to carry on effective work as teachers and administrators in the public schools and in institutions of higher education. To accomplish this end, the aim is to acquaint the student with human nature, educational subject matter, methods of teaching and administration, and methods of social reconstruction commensurate with democratic social theory.

It is the belief of those concerned with teacher education that those who work with the children in our schools should be educated as well as trained. To this end a wide array of cultural and general educational background is provided. There is no conflict in the approach to develop a person who lives wholesomely and happily as well as one who realizes his greatest potentialities, both professionally and in other phases of living. The College is dedicated to these purposes as well as to a program of training leading to the degrees and certificates listed below.

Organization

The courses of instruction offered by the College of Education are organized into groups so that a well-related sequence is established for important subject fields. These subject fields make for better organization in selecting courses to meet requirements for the various teacher education curriculums. This also provides a balanced program with virtually complete coverage in the field of education and with a wide array of specialization possibilities. The groups offered include: Kindergarten-Primary Education; Elementary Education; Secondary Education; Higher Education; Adult Education; Guidance and Counseling; School Administration and Supervision; Special Education; Audio-Visual Education; Social Foundations; Research and Surveys; Educational Psychology; Basic Courses in Education; and Library Science.

Degrees

Bachelor of Arts in Education Degree

The Bachelor of Arts in Education Degree is awarded after successful completion of a four year curriculum in teacher education. A minimum of 126 semester hours of work is required for each of the curriculums. A balanced program of activities for this degree provides work in well recognized basic areas.

Master of Arts in Education Degree

A graduate program consisting of a minimum of 30 semester hours of properly arranged work leads to the degree of Master of Arts in Education. Students who complete any of the teacher education curriculums at Arizona State University, may arrange for a program of studies leading to the degree of Master of Arts in Education. This degree is also available to graduates of other recognized institutions of higher learning by meeting the prescribed requirements. For specific reference to this program, see page 197 of this catalog.

Education Specialist Degree

The degree, Education Specialist, is awarded for satisfactory completion of the Specialist Program of graduate studies. For specific reference to this degree, see page 200 of this catalog.

Doctor of Education Degree

The degree, Doctor of Education, is awarded for satisfactory completion of the Doctoral Program of graduate studies. For specific reference to this degree, see page 200 of this catalog.

Certification

Arizona Certification

The State Board of Education issues the following types of certificates, preparation for which may be obtained at the Arizona State University: (1) Kindergarten-Primary; (2) Elementary; (3) Pre-Secondary; (4) Secondary; (5) Administrative; (6) Administrative Supervisory; (7) Special in Home Economics; (8) Vocational in Home Economics; (9) School Librarian; (10) School Counselor and Guidance Worker. For complete details concerning certification, students should refer to the Rules and Regulations published by the State Board of Education, or consult with the Director of Teacher Education. As new certificates are approved by the State Board of Education, the College will attempt to offer preparation to meet fully their requirements.

The four-year Kindergarten-Primary and Elementary Teacher Education curriculums lead directly to the corresponding Arizona teaching certificates. The Pre-Secondary certificate (good for four years) may be obtained by completing the four-year Secondary Teacher Education Curriculum, and an additional six semester hours of graduate credit. The five-year Secondary Teacher Education Curriculum leading to the Master of Arts in Education degree encompasses all of the requirements for the full secondary certificate.

For conditions or requirements of other certificates, consult the Rules and Regulations published by the State Board of Education.

In some instances, transfer students or others not enrolled in a teacher education curriculum may meet certification requirements through education courses not listed in teacher education curriculums. In each case, a teacher education adviser should be consulted before the course is selected. Information regarding certification requirements may be obtained from the State Superintendent of Public Instruction.

Admission Directed Teaching

Before admission, all candidates for directed teaching must meet the following requirements: (1) Junior or senior standing; (2) A cumulative scholarship index of 2.00 or better; (3) Credit in all the required courses of the first two years of a teacher-education curriculum being followed; (4) Credit in Fundamentals of Teaching, Construction Activities, Plays and Games for the Kindergarten-Primary School, Kindergarten-Primary Curriculum, Science in the Elementary School, and Reading and Language Arts for those in Kindergarten-Primary Curriculum; Credit in Fundamentals of Teaching, Language Arts, and Elementary Curriculum for those in Elementary Curriculum. (Curriculum may be taken concurrently with directed teaching); Credit in Fundamentals of Teaching, and Methods of Teaching and Evaluating in Secondary Schools for those in Secondary Curriculum. (Methods of Teaching and Evaluating may be taken concurrently with directed teaching.)

Modification of course sequences may be made for irregular and transfer students by the Director of Teacher Education; An X-ray taken within 60 days prior to assignment indicating that the student is free from tuberculosis is also required. In all cases, the student must have demonstrated competence in the course work in his field of specialization.

Requirements

Ordinarily, students who are candidates for the bachelor's degree and elementary certification teach in the cooperating schools for one-half day for one semester either for the first or second half of the third or fourth year. Students who are preparing for secondary certification teach for one-quarter day for one full semester in either the first or second half of the fourth year. Students whose programs permit them to devote their full time to directed teaching spend all day in the cooperating schools and receive one semester hour of credit per week of successful directed teaching. Regularly scheduled conferences at the College are held during the directed teaching period. The student's load is limited to sixteen semester hours during the semester in which he is teaching. Student teachers are not permitted to take part in activities that interfere with their directed teaching, conferences, or other activities related to teaching in the cooperating school.

Students must count full time or part time employment as part of their load while they are doing directed teaching. Each five hours of employment per week will be considered equivalent to a load of one semester hour in calculating the total 16 semester hour load permitted during the semester in which the student is teaching. It is recommended that students plan not to be employed during the directed teaching period.

Training Schools Available

The University has available many fine schools or school systems for the training of student teachers. Others will be added as the program expands. Among those utilized at present are the following: The Training School on campus, Alhambra Elementary Schools, Balsz Elementary Schools, Chandler Schools, Creighton Elementary Schools, Gilbert Elementary Schools, Glendale Elementary Schools and High Schools, Kyrene Elementary School, Madison Elementary Schools, Mesa Schools, Osborn Elementary Schools, Phoenix Elementary Schools, and High Schools, Roosevelt Elementary Schools, Scottsdale Schools, Tempe Elementary Schools and High School, and others. Students are assigned to schools other than those listed above only on approval of special requests.

Each of these schools presents its own particular type of organization and problems so that the student may receive training in any type of work desired from the kindergarten through the high school. All of these are regular public schools; therefore, students obtain their training under actual classroom conditions of the public school. Each student teacher is under direct guidance of a cooperating teacher and the Director of Teacher Education.

Waiver

Students who have been employed as regular teachers in public, parochial, or Indian schools, may apply to the Director of Teacher Education, College of Education, for waiver of the Directed Teaching requirement. Waiver of Directed Teaching in the required grade level is granted by the Director of Teacher Education. Waiver of this requirement in no way changes the total number of semester hours required for graduation or for establishing residence.

Regular teaching experience in the required grade level of two years' duration within the past five years will be considered sufficient to waive the total directed teaching requirement.

Regular teaching experience in the required grade level of one year's duration within the past five years will be considered sufficient to waive one-half the directed teaching requirement.

Regular teaching experience of two or more years' duration prior to the past five years will be considered sufficient to waive one-half the directed teaching requirement.

Additional Directed Teaching as Elective

Qualified undergraduate students whose programs will permit and who are enrolled in a teacher education curriculum may, with the approval of their adviser, the Director of Teacher Education and the Standards Committee of the College of Education, register in Directed Teaching for additional elective semester hours of credit above the number of semester hours required by their teacher education curriculum. Advisers and the Standards Committee will approve application for this privilege only when it is apparent that additional experience in Directed Teaching would be more beneficial to the student than the equivalent number of semester hours of other elective course work.

Bachelor of Arts in Education Degree Curriculums

Kindergarten-Primary Curriculum

The Kindergarten-Primary Curriculum offers specialized training for students who wish to teach young children. The courses are designed to give the student a better understanding of young children and of their total personality development during the first years of their school adjustment. Special emphasis is given to the growth and development of the child and how he learns. There is a wide demand every year for teachers who complete the Kindergarten-Primary Curriculum.

This curriculum leads to the degree of Bachelor of Arts in Education and to certification for teaching in the kindergarten and grades one, two, and three.

Major and Minor Teaching Fields. A major or minor teaching field is not required of students pursuing the Kindergarten-Primary Curriculum.

Suggested Pattern. A program of 126 approved semester hours is required. This is divided as follows:

General Education 40 semester hours

Includes state certification requirements for School-Community Health and United States and Arizona Constitutions.

Communications 6 sem. hrs.

Humanities 8 sem. hrs.

Behavioral and Social Sciences 8 sem. hrs.

Sciences and Mathematics.....8 sem. hrs.

Physical Education and Health 1 sem. hr.

General Education Electives 9 sem. hrs.

For specific courses for each of the above groups, consult topic on General Education for all curriculums, on page 76 of the catalog.

Professional Training 58 semester hours

Includes departmental methods courses. The following are required:

- BE 111 Exploration of the Education Profession
- BE 222 Foundations of Education
- 1-MU 211 Kindergarten and Primary Music Methods
- EE 211 Children's Literature
- KP 211 Techniques in Story Telling
- 1-MU 212 Kindergarten and Primary Music Methods
- KP 322 Construction Activities
- BE 333 Fundamentals of Teaching
- KP 344 Plays and Games for the Kindergarten-Primary School
- 1-PL 320 Science for the Elementary School
- KP 323 Construction Activities
- KP 355 Reading and Language Arts in the Kindergarten-Primary Grades
- KP 366 Kindergarten-Primary Curriculum and Teaching Problems
- EP 411 Educational Measurements and Evaluation
- KP 417 Directed Teaching in the Kindergarten-Primary School
- AV 411 Audio-Visual Aids in Education
- KP 428 Problems of Teachers in the Kindergarten-Primary School
- Military or Air Science (for men).....6 sem. hrs.
- Electives 22 or 28 sem. hrs.

Advisers in this curriculum have check sheets with recommended courses for each year of work. The check sheets also possess recommendations for electives. Students should consult advisers in this curriculum in order to insure the best possible program of training. Although a major is not required, it may be desirable to take additional work in selected subject fields. Electives may be used toward specialization in a field.

Professional Semester. Students in the Kindergarten-Primary Curriculum, whose program will permit, may register for KP 428, 3 hours; KP 417, 10 hours; and EP 411 or KP 428, 3 hours during the same semester. By registering for these courses and no others, students may enjoy a more flexible schedule of classes and a richer student teaching experience.

Special Requirements and Electives. Many electives are available to enrich the students' program. These should be selected in consultation with the student's adviser.

Students interested in young children but not in certification may elect any of the kindergarten-primary courses.

Students holding a bachelor's degree may work for the kindergarten-primary certificate on the graduate level. These courses are listed in the Graduate Bulletin.

Elementary Curriculum

This curriculum prepares students for service in the elementary school. No major or minor teaching fields are required. It is advisable that the student take some work in the various departments of the college so as to have a broad knowledge covering many fields. Opportunities for employment as teachers are greatest in the elementary fields.

This curriculum leads to the degree of Bachelor of Arts in Education and to certification for teaching in the elementary school, grades one to nine inclusive.

Suggested Pattern. A program of 126 approved semester hours is required. This is divided as follows:

General Education 40 semester hours

Includes state certification requirements for School-Community Health and United States and Arizona Constitutions.

Communications 6 sem. hrs.

Humanities 8 sem. hrs.

Behavioral and Social Sciences.....8 sem. hrs.

Sciences and Mathematics 8 sem. hrs.

Physical Education and Health 1 sem. hr.

General Education Electives 9 sem. hrs.

For specific courses for each of the above groups, consult topic on General Education for all curriculums on page 76 of the catalog.

Professional Training.....55 semester hours

Includes departmental methods courses. The following are required:

BE 111 Exploration of the Education Profession

BE 222 Foundations of Education

EE 211 Children's Literature

1-AE 301 Public School Art

EE 322 Language Arts

1-MA 305 Arithmetic in the Elementary School

1-MU 311 or 312 Classroom Music in the Low

Elementary Grades

BE 333 Fundamentals of Teaching

EE 333 Language Arts

1-PL 320 Science for the Elementary School

1-PE 366 Playground Leadership

EE 344 Elementary Curriculum

EE 345 Social Studies in the Elementary School

SF 433 Philosophy of Education

EE 478 Directed Teaching in the Elementary School

EP 411 Educational Measurement and Evaluation

AV 411 Audio-Visual Aids in Education

Military or Air Science (for men).....6 semester hours

Electives.....25 or 31 semester hours

Advisers in this curriculum have check sheets with recommended courses for each year of work. The check sheets also possess recommendations for electives. Students should consult advisers in this curriculum in order to insure the best possible program of training. Although a major is not required, it may be desirable to take additional work in selected subject fields. Electives may be used toward specialization in a field.

Professional Semester. Students in the elementary curriculum, whose program will permit, may register for special sections of EE 489, 3 hours; EE 478, 10 hours; and EP 411 or EE 489, 3 hours during the same semester. This permits a richer student teaching experience through teaching all day in a selected school for ten weeks.

Secondary Curriculum

This curriculum prepares students for service in the secondary school. Majors and minors are completed in the teaching fields desired. The curriculum has considerable flexibility for those who wish to pursue specialized work in addition to the regular expectations for teaching. This curriculum leads to the degree of Bachelor of Arts in Education and to the certification for teaching in the secondary school.

Suggested Pattern. A program of 126 approved semester hours is required. This is divided as follows:

General Education 40 semester hours

Includes state certification requirements for School-Community Health and United States and Arizona Constitutions.

Communications 6 sem. hrs.

Humanities 8 sem. hrs.

Behavioral and Social Sciences 8 sem. hrs.

Sciences and Mathematics 8 sem. hrs.

Physical Education and Health 1 sem.hr.

General Education Electives 9 sem. hrs.

For specific courses for each of the above groups, consult topic on General Education for all curriculums on page 76 of the catalog.

Major Teaching Field 45 semester hours

Minor Teaching Field 15 semester hours

Professional Training 22 semester hours

The following are required:

BE 111 Exploration of the Education Profession

BE 222 Foundations of Education

BE 333 Fundamentals of Teaching

SE 311 Methods of Teaching and Evaluating in the
Secondary School

SE 433 Directed Teaching in the Secondary School

SE 444 Principles and Curricula of Secondary Schools

Military or Air Science (for men).....6 semester hours

Electives (as needed to fill out 126 semester hours).

Advisers in this curriculum have check sheets with recommended courses for each year of work. The check sheets also possess recommendations for electives. Students should consult advisers in this curriculum in order to insure the best possible program of training.

It can be seen that it is necessary to utilize general education hours to build a minor and to some extent a major. This is explained in the following paragraph under *Major and Minor Teaching Fields*.

Major and Minor Teaching Fields. Students under the secondary curriculum are required to complete a major and a minor teaching field.

A major teaching field shall consist of 45 semester hours of work, 24 semester hours of which shall be in courses in a subject field from one department, and the remainder of which shall consist of courses from the same or related fields. A minimum of 18 semester hours in the major teaching field should be upper division courses. Wherever practicable, general education courses which are appropriate should be used to meet the requirements of a major teaching field. Courses included in the general education requirements or options, if taken, may be applied toward meeting the semester hour requirements of a major teaching field if such courses are specified as required courses for the major teaching field, or if approved by the adviser as satisfying major teaching field requirements. Under the secondary curriculum, 1-PS 311, Constitutional Government may be used in meeting the social sciences requirement in general education.

A minor teaching field shall consist of 15 semester hours in a subject field from one department or division. In order to meet the various graduation requirements under the secondary curriculum, it is usually necessary to use general education courses to build the minor teaching field to the extent of 8 semester hours.

In selecting major and minor teaching fields, students should keep in mind the requirements of the North Central Association, the Arizona State Board of Education, and the combinations usually assigned beginning teachers in Arizona high schools. Information concerning these matters can be obtained at the office of the Director of Teacher Education.

Major Teaching Fields Available

Art	German
Biological Sciences	Speech and Dramatics
Business	Spanish
Chemistry	Home Economics
English	Industrial Arts
French	Mathematics
Geography	Choral Music
Geology	Double Music Major

Instrumental Music
Health Education
Physical Education

Physics
History
Political Science

Minor Teaching Fields Available

In addition to minors in the above fields, the following minors are available:

Journalism
Speech
Dramatics

Library Science
Music

Other minors can be developed with the approval of the Division Head under which the minor is developed or the Dean of the College of Education.

Considerable attention should be given to the selection of teaching combinations. In many instances, teachers must assume positions which call for a major and one or two minors. Although there is no definite pattern concerning teaching combinations, it should be profitable to consider the more prevalent ones. Information regarding these may be obtained from the student's adviser or the Director of Placement.

Professional Education. In addition to the courses listed under other requirements, all students registered under the secondary curriculum are required to take 22 semester hours of work in education. The following must be included: BE 111, 222, 333; SE 311, 433, and 444.

Recommended Electives and Specialization. Students are urged to plan electives in conjunction with suggestions from their advisers.

Certification for Teaching in Arizona. Completing the requirements for the degree of Bachelor of Arts in Education under the Secondary Curriculum does not meet the requirements for a certificate to teach in Arizona high schools. Students who graduate under this curriculum must have in addition to the degree of Bachelor of Arts in Education, *at least six semester hours of graduate work to qualify for a Pre-Secondary Teaching Certificate.*

An exception to this exists for those who complete the Vocational in Home Economics.

Major and Minor Teaching Fields

Following are detailed suggestions for preparing to teach in each of the respective major and minor fields. In each case it is advisable to complete a major teaching field of 45 semester hours in the first four years. Candidates for the master's degree planning to teach in the secondary schools may complete an additional 15 semester hours of graduate credit in the fifth year. In each case the student should consult his adviser in the planning of his course program.

The Teaching of Art

The student of Art Education will develop the necessary skill in art teaching and at least one strong field of specialization. He will acquire a broad understanding of the whole field in relationship to contemporary society and its education. He will understand the purposes, theories, philosophy, and methods necessary to implement this knowledge. The understanding of art as basic to the development of the human being in all fields of human endeavor is emphasized.

Major Teaching Field in Art. This major will consist of 45 semester hours work of which 18 hours shall be in upper division. Each student will be advised as to the appropriate courses for him.

Minor Teaching Field in Art. This field consists of 15 hours. These should be planned in consultation with the adviser.

The Teaching of Biology

Major Teaching Field in the Biological Sciences. Entering freshmen who show an inadequate high school background in general biology must take BI 100. Majors must take 45 hours in the Division of Life Sciences plus supporting courses in physics, chemistry, and mathematics as indicated on the curriculum check sheet for biology. Those electing the physical sciences as a minor may use the supporting courses as part of the 15 semester hours minimum. Check sheets can be obtained through the adviser or the Divisional Office.

Minor Teaching Field in the Biological Sciences. The minimum requirement is 15 semester hours which must include 1-BO 100, 101; 1-ZO 100, 101; 1-BI 340. 1-BI 100 and 1-ZO 102 may not be used. Optional courses should be selected only with the approval of the minor adviser.

The Teaching of Business

Major Teaching Field in Business. 3-GB 101, 141, 233, 305, 321; 3-FI 325; 3-MG 301; 3-MK 251; 3-OA 102, 143, 211, 312, 344; 3-BE 480g. At least 6 hours from the following: 3-OA 101, 113, 114, 201, 232, 351; 3-AC 181, 201; 3-MG 311; 3-MK 301; 3-EC 321; 3-FI 301; or other approved courses. Approved electives to complete degree requirements.

Minor teaching fields are offered in secretarial and general business.

Minor Teaching Field, Secretarial. Fifteen hours from the following: 3-AC 101; 3-OA 102, 114, 143, 211, 212, 331; 3-EC 311; or other approved courses.

Minor Teaching Field in General Business. Fifteen hours from the following: 3-AC 101, 181; 3-OA 102, 143; 3-GB 305; 3-MG 301, 311; 3-EC 202; or other approved courses.

The Teaching of English, Speech, Dramatics and Journalism

This department offers major teaching fields in English and in speech and dramatics as outlined below. To complete either of these, 45 semester hours in the field must be completed in the first four years. Candidates for the master's degree planning to teach English, speech, or dramatics in secondary schools should complete additional courses in these subjects during the fifth year.

Major Teaching Field in English. First year, 1-EN 101, 102, and 151. Second year, 1-EN 211, 221, 222; and 3 hours of electives. Third year, 1-EN 312, 313, 341, and 6 hours of English electives, 3 of which should be upper division. Fourth year, 1-EN 471, 480, and sufficient hours of upper division English electives. (1-HI 251 and 252 may be offered as lower division electives to meet the English major requirement.)

Major Teaching Field in Speech and Dramatics. First year, 1-SE 120; 1-DR 111. Second year, 1-SE 211, 241, 312; 1-DR 112. Third year, 1-SE 313; 1-DR 213; 1-EN 313. Fourth year, 1-SE 421, 424; 1-EN 312; plus additional hours during the four years selected from the following courses: 1-EN 421, 422, 441, 453, 454; 1-PY 362, and any other courses in speech.

Minor Teaching Field in English. 1-SE 200 or 211; 1-EN 151, 221 and 222; 6 hours of upper division English.

Minor Teaching Field in Journalism. 1-EN 211; 1-JO 110, 211, 212, 313.

Minor Teaching Field in Speech. 1-SE 120, 211, 312, and six hours of upper division speech.

Minor Teaching Field in Dramatics. 1-DR 111, 112, 213, 315, 320.

The Teaching of Foreign Languages

Major Teaching Field in French. A major teaching field in French consists of 45 semester hours of work, of which 18 hours shall be in upper division courses in French. These hours must be completed in the first four years. The following courses are required: 1-FR 201, 202, 311, 312, 321, 322; 1-FL 480; and 1-EN 221 or one of the following: 1-HI 322, 324, 421, 422. Enough additional hours during the four years to meet the requirement may be selected from the following courses or from other courses in French: 1-GR 101-102, 201-202; 1-LA 101-102, 201-202; 1-RU 101-102, 201-202; 1-SP 101-102, 201-202.

Major Teaching Field in German. A major teaching field in German consists of 45 semester hours of work, of which 18 hours shall be in upper division courses in German. These hours must be completed in the first four years. The following courses are required: 1-GR 201, 202, 311, 312, 321, 322; 1-FL 480, and 1-EN 221, or 201, or 103, or one of the following: 1-HI 321, 322, 324, 422. Enough additional hours during the four years to meet the requirement

may be selected from the following courses, or from other courses in German: 1-SP 101-102, 201-202; 1-FR 101-102, 201-202; 1-LA 101-102, 201-202; 1-RU 101-102, 201-202.

Major Teaching Field in Spanish. A major teaching field in Spanish consists of 45 semester hours of work, of which 18 hours shall be in upper division courses in Spanish. These hours must be completed in the first four years. The following courses are required: 1-SP 201, 202, 313, 314, 321, 322, 427; and 1-EN 221 or one of the following: 1-HI 241, 242, 341, 422. Enough additional hours during the four years to meet the requirement may be selected from the following courses or from other courses in Spanish: 1-FR 101-102, 201-202; 1-GR 101-102, 201-202; 1-LA 101-102, 201-202; 1-RU 101-102, 201-202.

Minor Teaching Field in Spanish. The minor of 15 hours will consist of 1-SP 201-202 and 7 more hours work in the field.

Minor Teaching Field in French. The minor of 15 hours will consist of 1-FR 201-202 and 7 more hours work in the field.

Minor Teaching Field in German. The minor of 15 hours will consist of 1-GR 201-202 and 7 more hours work in the field.

The Teaching of Home Economics

Major Teaching Field in Home Economics. A major in Home Economics shall consist of 45 semester hours of credit. At least 40 of these must be in the Home Economics field and must include 1-HO 112, 124, 141, 142, 222, 223, 232, 234, 321, 331, 333, 334, 343, 431, and 5 hours of electives in home economics or related fields to be selected by the student with the approval of her adviser. At least 18 hours must be in the upper division level. The above requirements for graduation and vocational certification may be met in four years by careful selection of electives.

Minor Teaching Field in Home Economics. This field requires 15 semester hours. 1-HO 123, 143 are recommended. The remaining courses may be chosen with the approval of the departmental adviser.

The Teaching of Industrial Arts

Major Teaching Field in Industrial Arts. For students planning to teach in the secondary schools, 45 semester hours of industrial arts courses are required as follows: 4-IA 103, 104, 121, 135, 161, 210, 261, 322, 323, and 4-TM 274. Nine hours of professional industrial arts courses are required including 4-IA 342 and 480. Nine hours are to be elected, with the approval of the adviser, from a field of specialization.

Minor Teaching Field in Industrial Arts. Fifteen semester hours of work are required as follows: 4-IA 103, 121, 261, 322, and 342.

Library Science

Under the secondary curriculum, students who desire to prepare for high-school librarianship may choose a minor teaching

field in library science. The undergraduate program of professional education for high school librarians should also include a systematic survey of the various fields of knowledge, concentration in one or more subject fields taught in Arizona High Schools, background courses of special value in library science, study of professional principles and methods common to school libraries.

Students who have completed a minor teaching field in library science at the undergraduate level may select library science as a field of specialization at the graduate level.

Minor Teaching Field in Library Science. The minor in library science consists of 15 semester hours. The courses are LS 223, 441, 442, 461, 471, and 481.

Graduate Field of Specialization in Librarianship. Thirty hours of Library Science selected from 400g and 500 courses upon approval of the adviser.

The Teaching of Music

Under the secondary curriculum, students may choose a major teaching field in choral music, instrumental music, or choral and instrumental music.

A minimum level of musical literacy is presumed for all students wishing to major in music. Placement tests in theory, piano and a major performing medium are required of all freshmen and transfer students planning to major in music. Advanced standing may be secured through these tests. If minimum requirements cannot be met, the student may meet these requirements by assignment to classes below the music major college credit level.

All students majoring in music are required to attend 25 approved recitals as set up by the faculty during the school year as partial fulfillment of the course requirements in their major performing field.

Major Teaching Field in Choral Music. The courses listed below are required: 1-MU 121, 122, 222, 241, 242, 431, 465, and 341 or 342; 1-MP 109, 339; 16 hours in major performing medium (or proficiency equivalent), 4 hours piano (or proficiency equivalent), 10 hours ensemble.

Major Teaching Field in Instrumental Music. The courses listed below are required: 1-MU 121, 122, 221, 241, 242, 427, 433, 461, 465; 1-MP 109, 340; 16 hours in major performing medium (or proficiency equivalent); 4 hours piano (or proficiency equivalent); 4 hours class instruments; 6 hours ensemble.

Double Music Majors. Only students with a good background in both instrumental and vocal will be accepted as candidates for the double major. The required courses include all those listed above as required for both choral and instrumental majors, and, therefore, cannot be completed in eight regular semesters.

Minor Teaching Field in Music. For a minor in music, the student should consult the music department adviser for courses best designed to develop competence.

The Teaching of Health and Physical Education

Major Teaching Field in Health Education. This teaching field consists of 45 semester hours. At least 18 of the 45 hours must be in upper division courses. Required courses: 1-HE 370, 371, 461, 481; 1-PE 160; 1-MI 201; 2-BE 444; 2-AV 411; 1-ZO 102; 1-AN 411; and 1-PY 367. The remaining courses shall be chosen by the student in consultation with his adviser.

Minor Teaching Field in Health Education. Fifteen hours are required, including 6 hours of upper division courses. Required courses: 1-HE 370, 371, 461. The remaining semester hours shall be chosen by the student in consultation with his adviser.

Major Teaching Field in Physical Education. This teaching field requires 45 semester hours. At least 18 of the 45 hours must be in the upper division courses. Required courses: 1-PE 150, 151, 161, 250, 251, 360, 367, 368, 371; 1-ZO 102. Also, each student must have satisfied departmental requirements for First Aid, and Water Safety prior to the completion of the junior year. Additional courses required for men: 1-PE 364, 365, 385, 386, 462, plus two hours of selected activity courses. Additional courses required of women: 1-PE 262, 280, 361, 385, or 386. The remaining semester hours must be in physical education or related courses, and shall be selected by the student in consultation with his adviser.

Minor Teaching Field in Physical Education. Required of men: 1-PE 368, 371; 6 hours to be selected from 1-PE 150, 151, 250, and 251; and 2 hours to be selected from 1-PE 364, 365. The remaining hours shall be selected by the student in consultation with his adviser. Required of women: 1-PE 360, 367, 368, 371; plus 3 hours to be selected from 1-PE 150, 151, 250, 251.

The Teaching of Physical Sciences and Mathematics

Students planning to teach chemistry, mathematics or physics should take basic courses in biology, chemistry, mathematics and physics.. Over-specialization at the undergraduate level is to be avoided. The student should carefully select his electives so that he may complete the undergraduate requirements for a masters degree in the subject that he plans to teach. The master's degree is required by an increasing number of secondary schools, and by all Junior Colleges. The Division of Physical Sciences offers teaching majors in chemistry, geography, geology, mathematics and physics. At least one upper division course in the major teaching field must be taken by the student during each semester of the senior year.

Major Teaching Field in Chemistry. Undergraduate courses required: 1-MA 117, 118 or 119; 1-PH 111, 112; 1-CH 111 or 113, 115 225, or 227, 331 and 332 (or 231, 464, 465), 341 or 441, 442), and 351.

1-MA 120, 121, 212 are recommended in case a student plans to complete a master's degree with a major in chemistry teaching. Those interested in teaching chemistry should complete a minor in mathematics, physics or biology.

Major Teaching Field in Geography. Students planning to teach geography, conservation, social sciences, and related subjects should select this field. Undergraduate courses required: 1-GE 111, 131, 151, 221, 222, 223, 321; 1-GL 113. Optional courses will be selected from geography and related fields with adviser's approval. Recommended courses for graduates: 1-GE 421, 422, 424, 433.

Major Teaching Field in Geology. Undergraduate courses required: 1-GL 111 or 113 and 114, 321, 322, 335, 336; 1-CH 113, 114. The remaining courses to be approved by the student's adviser.

Major Teaching Field in Mathematics. Undergraduate courses required: 1-MA 120, 121, and 212, and a minimum of 18 semester hours of mathematics beyond 1-MA 212, not counting 1-MA 226 and 305. These and additional courses in mathematics and related field, to make a total of 45 hours, are to be selected by the student in conference with his adviser and approved by the Chairman of the department.

Major Teaching Field in Physics. Undergraduate courses required: 1-CH 111 or 113, 115; 1-PH 111, 112, or equivalent; 1-MA 120, 121, 212, and 16 additional hours in physics courses, or equivalent, chosen with the advice and approval of the adviser.

Minor teaching fields are offered in geography, geology, chemistry and physics. Each student desiring a science teaching minor shall begin planning with his science adviser not later than the beginning of his third year. Any courses required for the major will not be accepted as meeting the requirements for the minor teaching field. Transfer students must complete at least one course in their minor teaching field at this University.

Minor Teaching Field in Chemistry. 1-CH 111 or 113, 115, and 8 additional hours chosen under the guidance of the adviser.

Minor Teaching Field in Geography. 1-GE 111, 131, 142 and 8 additional hours selected under the guidance of the adviser.

Minor Teaching Field in Geology. 1-GL 111 or 113, 114, 321, 322.

Minor Teaching Field in Mathematics. A minor in mathematics consists of 15 hours in mathematics, including a year in calculus.

Minor Teaching Field in Physics. 1-PH 111, 112, and 8 additional hours in physics to be chosen under the guidance of the adviser.

The Teaching of Social Sciences

Students planning to teach social sciences should complete basic courses in history, economics, sociology, and political science. Major and minor teaching fields are offered in history and political science.

Major Teaching Field in History.

1. At least 15 semester hours chosen from among the following:
 - a. History courses numbered 100-299
 - b. With the consent of the adviser, courses numbered 100-299 in fields related to history.
2. At least 18 semester hours chosen from among the following:
 - a. History courses numbered 300-499
 - b. With the consent of the adviser, courses numbered 300-499 in fields related to history.
3. Within the 45 semester hours total, required courses as determined by the Department of History.

Major Teaching Field in Political Science. This field is for those who plan to teach courses in government, civics, or social problems. Thirty semester hours in political science are required. In addition, 15 hours must be taken in courses related to political science. All courses must be selected in consultation with the political science adviser, including required courses as determined by the Department of Political Science. Political science majors do not take any of the following courses: PL 101, 310, 311.

Minor Teaching Field in History

1. Nine semester hours of history courses numbered 100-299.
2. Six semester hours of history courses numbered 300-499.
3. Within the semester hours listed above, course as required by the Department of History.
as by the Department of History.

Minor Teaching Field in Political Science. Fifteen semester hours in political science are required, including specific courses as determined by the Department of Political Science. All courses must be selected in consultation with the political science adviser. Political science minors do not take any of the following courses: PS 101, 310, 311.

Special Programs

Special Programs of Teacher Preparation

Two fields of specialization are available on the undergraduate level in connection with any of the undergraduate curriculums. These are available as a sequence of courses to be taken in addition to the regular requirements of the undergraduate curriculum.

Teaching the Hearing-Handicapped Child

Students pursuing the kindergarten-primary or elementary program may, in the junior year, with the approval of the adviser, elect to take a special sequence preparatory to the teaching of

hearing-handicapped children in regular or special classroom situations. These students shall be required to complete satisfactorily the basic four-year kindergarten-primary or elementary program. Specific requirements for this minor may be obtained from your adviser or from the adviser in Special Education.

Students pursuing a major teaching field in secondary education may also include this field of Special Education. Such students shall be required to complete satisfactorily the basic four-year secondary major. The special courses follow:

SP 311	Orientation to Education of Exceptional Children	3 sem. hrs.
1-SE 425g	Audiology	3 sem. hrs.
1-SE 421g	Speech Correction	3 sem. hrs.
1-SE 424g	Phonetics	2 sem. hrs.
SP 455g	Education of the Hearing- Handicapped	3 sem. hrs.
1-SE 426g	Audiometry	3 sem. hrs.
1-SE 427g	Clinical Practice in Audiology and Audiometry	3 sem. hrs.
*EE 478	Directed Teaching in the Elementary School	5 sem. hrs.
or		
SE 433	Directed Teaching in the Secondary School (3)	
or		
KP 417	Directed Teaching in the Kindergarten-Primary School (5)	
SP 456	Education of the Hearing- Handicapped	3 sem. hrs.

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*Half in a program with hard-of-hearing children; half in a "regular" school situation.

Teaching Indian Children

Students pursuing the kindergarten-primary or elementary program may, in the junior year, with the approval of the adviser, elect to take a special sequence preparatory to the teaching of Indian children. This is appropriate for those who will have only a few Indian children in a classroom, or for those who will have a classroom composed only of Indian children. These students shall be required to complete satisfactorily the basic four-year kindergarten-primary or elementary program.

Students pursuing a major teaching field in secondary education may also take this special training for teaching Indian children. Such students shall be required to complete satisfactorily the basic four-year secondary major.

EE 335	Methods and Materials for Teaching Indian Children.....	3 sem. hrs.
EE 355	Curriculum and Practices for Indian Education	3 sem. hrs.
EE 490g	Problems of Teachers of Indian Children	3 sem. hrs.
*EE 478	Directed Teaching in the Elementary School.....	5 sem. hrs.
	or	
SE 433	Directed Teaching in the Secondary School (3)	
	or	
KP 417	Directed Teaching in the Kindergarten-Primary School (5)	
1-AN 221	Indians of the Southwest	3 sem. hrs.
1-AN 421g	The American Indian	3 sem. hrs.

*Half in a program with Indian children; half in a "regular" school situation.

College of Business Administration

Purpose

The primary purpose of the College of Business Administration is to prepare students for positions of responsibility in the business community. The undergraduate and graduate degree curricula are designed to provide (1) a basic background of general education helpful to informed, thinking citizens in a democracy, (2) a mastery of basic business tools and skills and an understanding of business procedures, and (3) a specialized and professional knowledge of a selected field of business.

In addition to the regular degree curricula, other programs of study in the College of Business Administration are designed to meet special needs. Preparation for the teaching of business subjects in the secondary schools is offered in cooperation with the College of Education. A special secretarial program is offered for students who wish to prepare for office positions but who do not plan to spend four years in college. Evening and extension courses are conducted for qualified persons who are regularly employed and who would otherwise be unable to enroll in college courses. Short courses and institutes on a non-credit basis are organized in cooperation with various business groups for the furtherance of in-service training of employed personnel.

Organization

The courses of instruction offered by the College of Business Administration are organized into groups in order that a related sequence may be established for the various subject fields. These subject fields include Accounting, Advertising, Economics, Finance, General Business Administration, Insurance, Management, Marketing, Office Administration, Real Estate, and Business Education.

For administrative purposes these fields are organized into the following departments:

- Accounting
- Economics
- General Business Administration
- Management
- Marketing
- Office Administration and Business Education

In addition to the regular instructional program, the College of Business Administration operates a Bureau of Business Services which gathers and publishes business and economic data per-

taining to the surrounding community. The Bureau serves as a laboratory for students in the College of Business Administration who wish to secure practical experience in business research and analysis.

Degrees

Bachelor of Science Degree

The College of Business Administration awards the Bachelor of Science Degree upon successful completion of a four-year curriculum of 126 semester hours as prescribed on the following pages. Students may select one of the following ten fields of specialization:

1. Accounting	6. Insurance
2. Advertising	7. Management
3. Economics	8. Marketing and Selling
4. Finance	9. Office Administration
5. General Business Administration	10. Real Estate

Students who wish to qualify to teach business subjects in high school should major in business education. Under this program, the student enrolls in the College of Education but specializes in business courses for his major teaching field. This curriculum leads to the Bachelor of Arts in Education Degree and certification for teaching business subjects in the Arizona secondary schools. The courses required in business for this curriculum are listed under the secondary curriculum section of the College of Education (Page 149).

Master of Science Degree

The College of Business Administration awards the Master of Science Degree upon successful completion of a graduate curriculum consisting of a minimum of 30 semester hours. Under the Master of Science Degree program the student may choose a curriculum in either Accounting, Economics, or Business Administration.

Bachelor of Science Degree Curriculum in Business Administration

Students seeking a Bachelor of Science Degree in the College of Business Administration must satisfactorily complete a curriculum of 126 semester hours as indicated below.

I. General Education and Other Required Courses.....	51 sem. hrs.
II. Business Administration Core Curriculum.....	30 sem. hrs.
III. Field of Specialization	24 sem. hrs.
IV. Electives	21 sem. hrs.

Total 126 sem. hrs.

General Education

For courses permitted under categories 1 to 6, see General Education requirements (Page 76).

Communications	6 sem. hrs.
Humanities	8 sem. hrs.
Behavioral and Social Sciences.....	8 sem. hrs.

All students in the College of Business must take both EC 201 and 202, Principles of Economics.

Sciences and Mathematics.....	8 sem. hrs.
Physical Education and Health.....	1 sem. hr.
General Education Electives.....	9 sem. hrs.

The student shall select 7 hours from any of the General Education courses listed on page 76 which are outside his major field or field of specialization. Two of the elective hours must be completed in communications (Item I).

Other Required Courses.....	11 sem. hrs.

Non-business courses which provide breadth and cultural background must be selected in consultation with the student's adviser. Additional general education courses or similar courses are recommended. Military or Air Science, required of all freshmen and sophomore men, may be included in this group requirement.

Total General Education and Other Required Courses outside the College of Business Administration.....	51 sem. hrs.

Business Administration Core Curriculum

In order to obtain an understanding of fundamentals of business operation, and to develop a broad business background, every student seeking a Bachelor of Science degree in the College of Business Administration must complete the following courses:

GB 101 Introduction to Business.....	3
AC 101 Elementary Accounting.....	4
AC 102 Elementary Accounting.....	4
GB 233 Business Communication.....	3
MK 251 Principles of Marketing.....	3
GB 305 Business Law.....	3
GB 321 Business Statistics.....	4
FI 325 Business Finance.....	3
MG 301 Principles of Management.....	3

Total.....30 sem. hrs.

Note: Proficiency in the use of basic skills in communication and mathematics is essential for students planning to prepare themselves for careers in business. Freshmen who do not demonstrate an adequate facility with business mathematics and in the use of calculating machines and typewriters must acquire these basic skills prior to being admitted to the professional courses in business administration (those numbered 300 and above).

Field of Specialization Requirements

A field of specialization consists of a pattern of 24 semester hours in related courses falling primarily within a given subject field. Fields of specialization are available in Accounting, Advertising, Economics, Finance, General Business Administration, Insurance, Management, Marketing and Selling, Office Administration and Real Estate.

Accounting. Accounting is a fast-growing professional field. The demand for accountants exceeds the supply and will continue growing for many years. This field of specialization includes the essential academic training for: (1) those wishing to prepare themselves for professional careers in public accounting and (2) those wishing to prepare themselves to operate their own businesses, or to accept positions as controllers, heads of accounting divisions, cost accountants, or traveling auditors, or to serve in any of the numerous positions offered in federal, state, and local governments.

A field of specialization in accounting shall consist of a minimum of 24 semester hours. The following 20 hours must be included:

AC 221 Mathematics of Accounting.....	2
AC 201 Intermediate Accounting.....	3
AC 202 Intermediate Accounting.....	3
AC 331 Cost Accounting.....	3
AC 383 Advanced Accounting.....	3
AC 451 Federal and State Income Tax.....	3
AC 481 Auditing Theory and Practice.....	3

To complete the field of specialization the student, with the approval of his adviser, shall select 4 hours or more from the group below:

AC 409 Governmental and Institutional Accounting.....	3
AC 415 Financial Statement Analysis.....	3
AC 441 Budgetary Control.....	2
AC 442 Controllership	2
AC 444 Machine Accounting Procedures.....	2
AC 452 Federal and State Income Tax.....	3
GB 301 Mechanized Data Processing.....	3
GB 302 Electronic Data Processing and Programming....	3
GB 306 Business Law.....	3
GB 401 Business Systems Analysis.....	3
GB 402 Data Processor Programming.....	3
GB 431 Business Report Writing.....	2

Note: All accounting students should take 1-MA 117, College Algebra, as a part of the General Education requirements in Sciences and Mathematics.

The following courses in related fields are suggested as electives for the student specializing in the field of accounting: EC 331; FI 305, 441; IN 251, 321, 331; 1-EN 211; 1-SE 311.

Advertising. Use of the mass communications media for conveying ideas and information to customers, employees, stockholders, and the general public is an essential part of modern business operation. This field of specialization offers students an opportunity to prepare for careers in advertising, public relations, and related activities dealing with mass communications. Employment opportunities include positions with advertising agencies, retail stores, manufacturing firms, newspapers, and broadcasting stations.

A field of specialization in advertising shall consist of a minimum of 24 semester hours. The following 13 hours must be included:

AD 275 Advertising Principles.....	3
AD 311 Advertising Campaigns.....	2
AD 312 Advertising Campaigns.....	2
MK 201 Principles of Selling.....	3
MK 483 Marketing Research	3

To complete the field of specialization the student, in consultation with his adviser, shall select 11 hours or more from the group below:

AD 322 Retail Promotion and Display.....	2
AD 371 Radio and Television Advertising.....	3
AD 453 Advertising Campaign Problems.....	2
AD 461 Advertising Management.....	3
1-JO 110 Mass Communications.....	3
MK 321 Principles of Retailing.....	3
MK 401 Public Relations.....	2
MK 460 Marketing Policies.....	3

For further background in related fields, the following courses are suggested as electives: MK 334, 335, 411, 412; GB 431; 1-AR 111, 181, 182, 191; 1-EN 211; 1-JO 211, 313; 1-PY 232, 367; 1-RT 230, 332, 431; 1-SO 101.

Economics. The study of economics affords an opportunity for the student to acquire a general knowledge of the operation of business and economic systems. This knowledge provides a sound basis for successful business ownership and control. Specialized courses are included to develop ability in the use of the tools of economic theory and analysis. Such tools are essential for graduates who wish to qualify for government or business positions requiring formal training in economics.

The field of specialization in economics shall consist of a minimum of 24 semester hours. The following 12 hours must be included:

FI 301 Money and Banking.....	3
EC 401 Intermediate Price Analysis.....	3
EC 402 Economics of Income and Employment.....	3
EC 441 History of Economic Thought.....	3

In addition the student shall select a minimum of 12 semester hours from the group below to complete the field of specialization:

EC 321 Labor Economics.....	3
EC 331 Comparative Economic Systems.....	3
EC 336 International Economics.....	2
EC 341 Public Finance.....	3
EC 412 Business Cycles.....	2
EC 451 Economics of Public Utilities.....	3
EC 453 Government and Business.....	3
EC 461 Current Economic Problems.....	3
FI 441 Investments	3
GB 422 Statistical Analysis.....	3
MK 471 Price Policies.....	2

The following courses in related fields are suggested as electives: 1-GE 131; 1-GL 461; 1-HI 131; 1-SO 101.

Finance. Courses in finance are designed to provide students with an understanding of the financial operations of business enterprises, as well as knowledge of the fields of commercial banking, investments, and mercantile and retail credits. This field of specialization prepares students for careers in (1) commercial banks and related financial institutions, (2) investment banking and investment management, and (3) financial management, including careers as treasurers, controllers, credit managers, and financial administrators in business enterprises.

A field of specialization in finance shall consist of a minimum of 24 semester hours. The following 15 hours must be included:

FI 301 Money and Banking.....	3
FI 305 Credits and Collections.....	3
FI 441 Investments	3
FI 451 Bank Organization and Management.....	3
FI 461 Cases in Business Finance.....	3

To complete the field of specialization the student, in consultation with his adviser, shall select 9 hours or more from the group below:

AC 201 Intermediate Accounting.....	3
AC 202 Intermediate Accounting.....	3
AC 415 Financial Statement Analysis.....	3
AC 451 Federal and State Income Tax.....	3
EC 336 International Economics.....	2
EC 341 Public Finance.....	3
EC 402 Economics of Income and Employment.....	3
EC 412 Business Cycles.....	2
GB 306 Business Law.....	3
IN 251 Principles of Insurance.....	3
MG 463 Business Policies.....	3
RE 251 Real Estate Principles.....	3
FE 331 Real Estate Finance.....	2

Recommended for students planning careers in investment banking and financial management: AC 415; EC 412; IN 251; MG 463.

Recommended for students planning careers in commercial banking and related financial institutions: AC 415; EC 341; FI 441; IN 251; MG 463.

General Business Administration. This field offers the opportunity for a broad survey of all phases of business operation. It is particularly suitable for (1) those students who are planning to operate their own businesses and seek a broad business background, (2) those who are preparing for jobs in large organizations with training programs in which specialization is taught after employment, (3) those who desire a general business background at the undergraduate level prior to taking more specialized graduate work.

The objective of the curriculum in General Business Administration is to provide breadth of preparation rather than specialization. Sufficient flexibility is provided, however, to permit students to emphasize such professional fields as transportation, hotel administration, statistics, or electronic data processing.

A minimum of 24 semester hours in economics and business administration is required with a maximum of 9 hours in one subject field. Four senior courses (numbered 400 or above) must be included. Fifteen of the 24 hours must be selected from the following list of courses:

AC 415 Financial Statement Analysis.....	3
AD 275 Advertising Principles.....	3
EC 321 Labor Economics.....	3
EC 453 Government and Business.....	3
FI 305 Credits and Collections.....	3
GB 306 Business Law.....	3
GB 341 Transportation	3
GB 431 Business Report Writing.....	2
GB 451 Business Research Methods.....	3
IN 251 Principles of Insurance.....	3
MG 311 Personnel Administration.....	3
MG 451 Human Relations in Business.....	3
MG 463 Business Policies.....	3
MK 201 Principles of Selling.....	3
MK 401 Public Relations.....	2
MK 460 Marketing Policies.....	3
OA 351 Principles of Office Management.....	3
RE 251 Real Estate Principles.....	3

Insurance. Academic preparation for professional work in insurance sales, insurance adjustment, and insurance management is offered through this program. A field of specialization in insurance shall consist of a minimum of 24 semester hours. The following 11 hours must be included:

IN 251 Principles of Insurance.....	3
IN 321 Life Insurance.....	3
IN 331 Property Insurance Principles and Coverages.....	3
IN 451 Social Insurance.....	2

To complete the field of specialization, 13 or more hours from the following:

IN 432 Property Insurance.....	3
IN 425 Current Problems in Insurance.....	2
FI 301 Money and Banking.....	3
FI 441 Investments	3
GB 306 Business Law.....	3
MK 201 Principles of Selling.....	3
MK 411 Sales Management.....	3
RE 251 Real Estate Principles.....	3

Suggested electives: AC 415; AD 275; GB 431; 1-SE 311.

Management. The management function includes the planning, organizing, motivating, and controlling of business operations. It deals with both human elements and material or physical factors. Through selection of courses, as outlined below, the student may place his major emphasis upon personnel management, production management, or the broad aspects of management philosophy and practice. A field of specialization in management shall consist of a minimum of 24 semester hours. The following 18 hours must included:

MG 311 Personnel Administration.....	3
MG 331 Industrial Management.....	3
EC 321 Labor Economics.....	3
MG 335 Methods and Motion Study.....	3
MG 451 Human Relations in Business.....	3
MG 463 Business Policies.....	3

The remainder of the required courses shall be selected by the student in consultation with his adviser as follows:

Those students planning careers in industrial relations or personnel management shall select at least 6 semester hours from:

MG 338 Industrial Safety.....	2
MG 413 Job Evaluation.....	2
MG 423 Industrial Relations and Collective Bargaining.....	3
OA 351 Principles of Office Management.....	3
1-PY 333 Techniques of Selection in Industry.....	3
GB 451 Business Research Methods.....	3

Those students planning careers in industrial and production management shall select at least 6 semester hours from:

MG 432 Production Control.....	2
MG 433 Statistical Quality Control.....	2
MG 491 Operations Research.....	3
MK 355 Purchasing	3
AC 331 Cost Accounting.....	3
4-ME 251 Mechanical and Industrial Processes.....	2
GB 301 Mechanized Data Processing.....	3

Those students seeking preparation in the broad aspects of management philosophy and practice shall select at least 6 semester hours from:

MG 422 Employee Training and Supervision.....	2
MG 423 Industrial Relations and Collective Bargaining.....	3
MG 432 Production Control.....	2
EC 453 Government and Business.....	3
MK 401 Public Relations.....	2
GB 401 Business Systems Analysis.....	3

Suggested electives, in addition to other courses from the groups above, include: AC 415, 441, 442; EC 331, 402; GB 302, 341, 402; OA 452; 4-IE 461; 4-ME 252; 1-PY 362, 367; 1-SO 361; 1-SE 311; 1-PI 211.

Marketing and Selling. The continuing expansion of production and the increase in the variety of goods and services available will require additional personnel in all phases of marketing activity. Opportunities for careers in a number of related areas are open to students who specialize in some phase of distribution. Through proper selection of courses, a student may place emphasis upon preparation for a career in (1) selling and sales management, (2) retail merchandising and management, (3) purchasing and industrial procurement, or (4) foreign trade, or he may choose to obtain a broad background in the field of preparation for a career with a large marketing organization which provides its own specialized training program.

A field of specialization in marketing and selling shall consist of a minimum of 24 semester hours. The following 17 hours must be included:

MK 201 Principles of Selling.....	3
MK 321 Principles of Retailing.....	3
MK 460 Marketing Policies.....	3
MK 471 Price Policies.....	2
MK 483 Marketing Research.....	3
AD 275 Advertising Principles.....	3

To complete the field of specialization the student in consultation with his adviser, shall select 7 hours or more from courses listed below. The various groupings are merely suggestive and do not preclude the student's choosing courses from more than one group or working out with his adviser the most satisfactory combination of courses for his particular career goal.

Recommended for students planning careers in selling and sales management:

MK 411 Sales Management.....	3
MK 412 Sales Promotion Policies.....	2
MK 332 Wholesaling	2
GB 341 Transportation	3

Recommended for students planning careers in retail buying, merchandising, and store management:

MK 423g Retail Buying and Stock Control.....	2
MK 424g Retail Store Management.....	3
AD 322 Retail Promotion and Display.....	2
GB 341 Transportation	3

Recommended for students planning careers in purchasing and industrial procurement:

MK 355 Purchasing	3
MK 334 Industrial Marketing.....	2
MG 331 Industrial Management.....	3
GB 341 Transportation	3

Note: Students interested primarily in purchasing may elect to substitute MK 355, Purchasing, for MK 321, Principles of Retailing; and MK 334, Industrial Marketing, for AD 275, Advertising Principles, in the 17 hours of required courses.

Recommended for students planning careers in foreign trade:

MK 335 International Trade.....	2
EC 336 International Economics.....	2
1-GE 131 Economic Geography.....	3

Note: Students interested primarily in foreign trade may elect to substitute MK 335, International Trade, for MK 321, Principles of Retailing, in the required course group. Courses in the language and geography of foreign areas in which the student expects to be employed should be included among the general elective courses.

Suggested electives, in addition to other courses from the above groups, include: AC 415; AD 461; FI 305; GB 306, 431; MG 311; 1-PY 232; 1-SE 311; 1-SO 101.

Office Administration. The course work in this field is designed to prepare students for either secretarial positions or managerial positions in business offices. Through the selection of courses, as outlined below, the student may place his major emphasis upon either of these fields.

A field of specialization in office administration shall consist of a minimum of 24 semester hours. The following 11 hours must be included:

OA 102 Intermediate Typewriting.....	2
OA 232 Records Systems and Filing.....	2
OA 344 Office Appliances.....	2
OA 351 Principles of Office Management.....	3
GB 431 Business Report Writing.....	2

To complete the field of specialization the student, in consultation with his adviser, shall select 13 or more hours from courses listed in the groups below:

Recommended for those students planning secretarial careers:

OA 113 Elementary Gregg Shorthand.....	3
OA 114 Intermediate Gregg Shorthand.....	3
OA 201 Advanced Typewriting.....	2
OA 211 Beginning Transcription.....	3
OA 312 Advanced Transcription.....	3
OA 331 Secretarial Procedures.....	3

Recommended for those students planning supervisory or administrative careers in offices:

OA 452 Office Systems and Procedures.....	3
AC 201 Intermediate Accounting.....	3
AC 202 Intermediate Accounting.....	3
MG 311 Personnel Administration.....	3
MG 422 Employee Training and Supervision.....	2
MG 463 Business Policies.....	3

The following courses in related fields are suggested as electives: AC 181; FI 305; MK 201; 1-EN 211; 1-PY 232, 362; 1-SE 311. *Real Estate*. Courses in real estate are designed to acquaint students with the basic information, knowledge, and practices pertaining to real property and the real estate business. This field of specialization is the academic foundation for careers in various aspects of real estate work: sales, acquisition and development, taxation, management of property, title searching and legal work, appraisal, and finance.

A field of specialization in real estate shall consist of a minimum of 24 semester hours. The following 11 hours must be included:

RE 251 Real Estate Principles.....	3
RE 302 Real Estate Management.....	3
RE 331 Real Estate Finance.....	2
RE 411 Real Estate Law.....	3

To complete the field of specialization the student, in consultation with his adviser, shall select 13 hours or more from the following:

RE 441 Real Estate Land Development.....	3
RE 461 Real Estate Problems.....	3
RE 401 Real Estate Appraisal.....	2
AC 451 Federal and State Income Tax.....	3
AD 275 Advertising Principles.....	3
FI 441 Investments	3
GB 306 Business Law.....	3
IN 251 Principles of Insurance.....	3
MK 201 Principles of Selling.....	3

The following courses in related fields are suggested for inclusion among the student's electives: 1-HO 223; 4-AC 432; 1-PS 111; 1-SO 101; 1-PY 232; 1-SE 311.

Elective Courses

Sufficient elective courses are to be selected by the student to complete the total of 126 semester hours required for graduation.

FOUR-YEAR CURRICULUM OUTLINE

The following is a suggested outline to indicate to the student how the general education, Business Administration core curriculum, and field of specialization courses may be arranged as a four-year program of study. For details in developing his individual program the student is urged to consult his curriculum adviser frequently.

FIRST YEAR

First Semester	Hours	Second Semester	Hours
1-EN 101 First Year English.....	3	1-EN 102 First Year English.....	3
GB 101 Introduction to Bus.....	3	Behavioral and Social Science.....	3
Mathematics or Science.....	3 or 4	1-PE 102 Freshman Physical Ed.....	0.5
Behavioral and Social Science.....	3	1-AS 102 Basic Air Science or	
1-PE 101 Freshman Phys. Ed.....	0.5	1-MS 102 Basic Military	
1-AS 101 Basic Air Science or		Science.....	1.5
1-MS 101 Basic Military		Mathematics or Science.....	3 or 4
Science.....	1.5	Electives.....	4
Elective.....	2 - 3		
	15 to 16		15 to 16

SECOND YEAR

First Semester	Hours	Second Semester	Hours
AC 101 Elementary Accounting.....	4	AC 102 Elementary Accounting.....	4
EC 201 Principles of Econ.....	3	EC 202 Principles of Econ.....	3
Behavioral and Social Science.....	3	*MK 251 Principles of Marketing.....	3
Mathematics or Science.....	3 - 4	*GB 233 Bus. Communication.....	3
1-AS 201 Basic Air Science or		1-AS 202 Basic Air Science or	
1-MS 201 Basic Military		1-MS 202 Basic Military Science.....	1.5
Science.....	1.5	Elective.....	2 - 3
Elective.....	2		
	16.5 to 17.5		16.5 to 17.5

THIRD YEAR

First Semester	Hours	Second Semester	Hours
*GB 305 Business Law.....	3	MG 301 Principles of Management.....	3
*GB 321 Business Statistics.....	4	FI 325 Business Finance.....	3
Communications.....	2 - 3	Field of Specialization and	
Field of Specialization and		Electives.....	10
Electives.....	2 - 3		
Misc. General Education.....	3 - 5		
	16		16

FOURTH YEAR

First Semester	Hours	Second Semester	Hours
Field of Spec. and Electives.....	16	Field of Spec. and Electives.....	16

*May be taken either semester.

Note: In the field of specialization in accounting, students will enroll in AC101 and AC102 during the first year, postponing history or science until later in their program. In some other fields of specialization students should schedule beginning courses in their field during the sophomore year, postponing one of the general education courses until later. The student should consult his adviser for details of the course sequence in the field of specialization.

GENERAL REGULATIONS

Each student enrolling in the College of Business Administration will be assigned an adviser upon the basis of the subject-matter field in which he is primarily interested. The student should follow the sequence of courses suggested in the four-year curriculum outline and the recommendations of his adviser in completing the prescribed background and tool courses in preparation for the subsequent professional program.

The third and fourth years constitute the professional program of the undergraduate curriculum. For admission to the professional program the student must (1) have attained junior standing, (2) have completed all Business Administration core-curriculum courses numbered below 300, (3) have completed at least 32 semester hours in general education and related background courses, including Principles of Economics (EC 201, 202), and have demonstrated his proficiency in business mathematics, and in use of calculating machines and typewriters.

A student must earn a minimum of 30 semester hours of credit, including 24 in professional business courses (numbered 300 or above), after admission to the professional program in order to be eligible for the Bachelor of Science Degree in the College of Business Administration. Only those regular undergraduate students who have been admitted to the professional program will be permitted to enroll in 400 level courses (other than the courses in economics).

In order that a student may be eligible for graduation, his cumulative scholarship index must be 2.00 or better for all work taken while a student at this University. A minimum of 40 per cent of the semester hours required for graduation must be represented by courses numbered 300 and 400.

To be accepted for credit as part of the professional program in Business Administration, all courses transferred from other institutions must carry prerequisites similar to those of the courses which they are replacing at Arizona State University.

Any exceptions to the core curriculum and field of specialization requirements of the College of Business Administration must be approved by the Standards Committee.

PRE-LAW CURRICULUM

Pre-law students may pursue a program of study in the College of Business Administration as well as in the College of Liberal Arts. A thorough understanding of the principles and practices of business will prove valuable in the practice of law. Accounting is especially valuable since it provides an understanding of the meaning and interpretation of balance sheets and income statements. It is a part of the "language of the lawyer." Courses in economics, insurance, statistics, taxation, business and public finance, and labor relations are also recommended for any student planning to enter the legal profession.

The admission requirements of colleges of law differ considerably. The student should communicate with the dean of the law school he hopes to attend and plan his program to meet the requirements of that school. Many law schools require a baccalaureate degree for admission whereas others permit admission upon completion of three years of college work. Arizona State University cannot accept responsibility for the admission to law school of students following any pre-law program. A four-year and a three-year curriculum are offered for students wishing to complete their pre-law in one of the various fields of business. The four-year program affords a better business preparation for a career in law.

Four-Year Curriculum

Students who plan to take a bachelor's degree prior to entering law school may follow any of the standard curricula in the College of Business Administration. Regular advisers in each field will assist the student in selecting both required and elective courses which will be of particular value in the study of law.

Three-Year Curriculum

A student may select a three-year program in the College of Business Administration, and if after completing 98 semester hours, he is admitted to an accredited law school, 28 semester hours completed in law school may be counted toward meeting the requirements for a Bachelor of Science Degree at Arizona State University. Since the 28 semester hours of the first year of law school are accepted as electives for the Bachelor of Science Degree in business administration, this program permits no other electives during the first three years.

The student who wishes to enter law school upon the completion of 98 hours and to use credits earned in law school to qualify for the Bachelor of Science Degree must complete all general education requirements, all core requirements of the College of Business Administration, and a field of specialization as indicated below:

General Education (See page 76)	51 hours
College of Business Administration	
Core Curriculum (See page 160)	30 hours
Field of specialization in accounting, economics, or finance as listed below:	
Accounting	Economics
AC 201 Inter. Accounting.....3	FI 301 Money and Banking.....3
AC 202 Inter. Accounting.....3	EC 402 Econ. of I. and E.....3
AC 383 Adv. Accounting.....3	EC 321 Labor Econ.....3
AC 415 Fin. St. Analysis.....3	EC 441 Hist. of Econ. Tht.....3
AC 451 Income Tax.....3	EC 453 Gov't. and Business.....3
AC 452 Income Tax.....3	FI 441 Investments 3
Finance	
FI 301 Money and Banking.....3	
FI 441 Investments 3	
AC 201 Inter. Accounting.....3	

AC 415 Fin. St. Analysis.....	3
AC 451 Income Tax.....	3
GB 306 Business Law.....	3

A grade point ratio of 2.00 or above is required in both the course work taken at Arizona State University and in the school of law.

Students who pursue this program must obtain a statement in writing from the Dean of the College of Business Administration giving senior-in-absentia privileges before entering the law school. At the end of his first year in law school, the student must have completed a total of 126 hours of college credit in pre-law and law combined. He must then present a signed testimonial from the dean of the law school to the Registrar at Arizona State University, which shall include a statement of courses taken, grades achieved, and a recommendation that the degree of Bachelor of Science be granted by this University.

A student following the three-year pre-law curriculum should consult the pre-law adviser in the College of Business Administration upon his first enrollment at Arizona State University.

SPECIAL SECRETARIAL PROGRAM

A special program is offered for those who do not plan to complete a four-year degree program but who wish to qualify for office positions in one or two years of study. Students who complete the curriculum outlined below and meet departmental proficiency standards will receive a certificate of proficiency. The 64-hour program may be completed in less than two years by enrollment in summer sessions.

A student who has had previous instruction in typewriting and shorthand may be permitted to enter advanced courses. Additional business subjects may be included to meet the student's needs.

A student who decides later to complete a degree program may count the courses earned in the special secretarial program as regular credit toward the degree, but must complete all requirements as outlined in a degree curriculum.

FIRST YEAR

First Semester		Second Semester	
	Hours		Hours
1-EN 101 First Year English.....	3	1-EN 102 First Year English.....	3
OA 101 Beginning Typewriting.....	2	OA 102 Intermediate Typewriting.....	2
OA 113 Elementary Gregg Shorthand.....	3	OA 114 Intermediate Gregg Shorthand.....	3
GB 101 Introduction to Business.....	3	1-PY 100 Elementary Psychology.....	3
GB 141 Mathematics of Business.....	2	OA 143 Business Machines.....	2
Freshman Phys. Ed.....	0.5	Freshman Phys. Ed.....	0.5
Elective	2	Elective	2
	15.5		15.5

SECOND YEAR

First Semester		Second Semester	
	Hours		Hours
AC 101 Elementary Accounting.....	4	AC 181 Payroll and Miscellaneous Taxes.....	2
OA 211 Beginning Transcription.....	3	OA 312 Advanced Transcription.....	3
1-SE 200 Elements of Speech.....	2	OA 344 Office Appliances.....	2
GB 233 Business Communication.....	3	OA 331 Secretarial Procedures.....	3
OA 232 Records Systems & Filing.....	2	Electives	6
Elective	3		
	16.5		16.5

College of Applied Arts and Sciences

Purpose

The purpose of the College of Applied Arts and Sciences is to provide a university education of such fundamental background and scope that a student may achieve competency in one of the fields offered by the Schools of Architecture and Engineering, and the Divisions of Agriculture and Industrial Education. The Research Center provides an opportunity for the students to augment their theoretical knowledge with research experience. Every effort is made to carry on a well rounded, well integrated program which will not only give the student proficiency in his professional field but also will develop character, judgment, ideals, breadth of view, general culture, and physical well-being.

Organization

The College of Applied Arts and Sciences is divided into the following:

- Division of Agriculture
- School of Architecture
- School of Engineering
- Division of Industrial Education
- Research Center

Bachelor's Degrees Degrees

The completion of a four-year curriculum in agriculture, construction, and industrial education leads to the degree of Bachelor of Science. The completion of a four-year curriculum in engineering leads to the degree of Bachelor of Science in Engineering. The completion of a five-year curriculum in architecture leads to the degree of Bachelor of Architecture. In agriculture, a minimum of 126 semester hours of credit is required for graduation; in construction, 130 semester hours; in engineering, 134 semester hours; in industrial education, a minimum of 126 semester hours; and in architecture, a minimum of 169 semester hours.

Master of Science in Engineering Degree

The Master of Science in Engineering degree is awarded upon successful completion of prescribed graduate level course work and research endeavor. The student's program of study is administered under an adviser with the approval of the Dean.

General Education

Higher education should provide the student not only with competency in his chosen subject field, but also with experiences which facilitate the student's growth in ability to perceive significant relationships, to make intelligent value judgments, to express himself with ease, clarity, and good taste, and to develop the qualities of character and personality requisite for a successful career. For these reasons the student's curriculum will include study in communications, the humanities, the social sciences, the sciences, and physical education. The order in which the selected courses of study are taken is not prescribed, although in certain degree programs specific courses may be recommended. In all cases, prerequisites must be followed.

The General Education requirements under each of the curriculums offered in the College of Applied Arts and Sciences include the following:

Communications	6 sem. hrs.
Behavioral and Social Sciences.....	8 sem. hrs.
Humanities	8 sem. hrs.
Sciences and Mathematics.....	8 sem. hrs.
Physical Education and Health.....	1 sem hr.
General Education Electives.....	9 sem. hrs.

Note: All courses should be chosen with the approval of the student's adviser. See page 76 for a listing of the general education courses.

Division of Agriculture

Purpose

The primary purpose of this Division is to prepare students for the production and management phases of agriculture. The curriculum and courses offered are planned to meet the needs of the following students: (1) Those who are interested in preparing for Farm and Ranch Management and who wish to obtain a degree of Bachelor of Science with emphasis on some particular phase of livestock or crop production; (2) Those preparing for a career in some phase of agricultural production and who wish to obtain a degree of Bachelor of Science with a field of specialization in Plant Industry or Animal Industry; (3) Those not planning to graduate but desiring to take one or more years of college preparation for some agricultural vocation; (4) Those who wish to take certain electives in agriculture while pursuing another curriculum; (5) Those who desire pre-forestry or pre-veterinary training, or preparatory courses for agricultural education.

Organization

Courses of instruction in the Division of Agriculture are offered in three general areas with subdivisions as follows:

1. Agricultural Economics and Management
2. Plant Industry
 - Agronomy
 - Horticulture
 - Agricultural Mechanics
3. Animal Industry
 - Animal Husbandry
 - Dairy Husbandry
 - Poultry Husbandry

Advisers from the special interest fields will offer students counsel and assistance in program planning.

Bachelor of Science Degree Curriculum in Agriculture

The completion of the four-year agriculture curriculum leads to the Bachelor of Science degree. A total of 126 semester hours of credit is required for graduation including the general education and field of specialization requirements. In completing general education requirements in the sciences, students in agriculture should select 1-CH 111 or 115; 1-BO 100; and 1-ZO 100; to satisfy prerequisites for agriculture courses.

Field of Specialization Requirements

In addition to the academic requirements outlined, students are required to demonstrate ability in the practical phases of production and husbandry related to their field of specialization. Students without adequate farm background can gain experience in farm practices at the University Training Farm or on any farm that meets the approval of the adviser. The practical experience program is initiated at the University Training Farm at the beginning of the sophomore year. During the junior and senior years this experience will be planned to meet individual student needs and will be carried out under the supervision of the student's adviser. Upon application for graduation, the student's adviser will indicate satisfactory completion of this requirement.

Agricultural Economics and Management. This field of specialization is designed to prepare students to enter the business of farming and ranching as operators or managers of productive agricultural enterprises. Within this field students may specialize in the management of crop production or livestock production enterprises. The field includes three important requirements: (1)

Training in agricultural economics and management; (2) Training in the applied sciences or agricultural production; (3) Practical experience in production and management.

To meet the requirements of a field of specialization in Agricultural Economics and Management, the following courses are required: AG 130 or HO 180; AG 232, 234; AH 150 or DH 170 or PH 190; AE 100; AM 122, 126 and AG 246. In addition, students are required to complete 24 hours in Agricultural Economics and Management and at least 15 semester hours in some phase of Animal Industry or 15 hours in some phase of Plant Industry.

Plant Industry. This field of specialization is designed for students desiring practical as well as technical training in the various phases of plant industry. It prepares students for positions as field representatives for commercial fertilizer and insecticide companies, for machinery companies, nurseries and related businesses. It also provides valuable training for students preparing for positions as field foremen on farms and ranches or as agronomists and horticulturists with U.S. government or state agencies.

Undergraduate students may major in either agronomy or horticulture. Students desiring to continue work toward an advanced degree should select additional science courses beyond the minimum requirements for the degree. This will provide a broader foundation for advanced study.

To meet the requirements of this field of specialization, the following courses are required: AG 130 or HO 180; AG 232; AH 150 or DH 170 or PH 190; AE 100; 1-CH 231 and 1-BI 340 or 1-MI 201; and 1-BO 360.

Animal Industry. This field of specialization is designed to develop within the student a sound understanding while learning the practical application of the principles of livestock husbandry. The student learns to select, breed, feed, and manage livestock in an efficient and economical manner. The animal industry curriculum, while developing leadership, provides valuable training for the student preparing for ownership or for the position of herdsman of a beef, dairy, poultry, sheep, or swine enterprise. It prepares students for positions as field representatives for breed organizations, meat and milk processing plants, feed manufacturers and distributors, hatcheries and other business associated with the industry. It also prepares students for work with Federal, State and local governmental agencies. Students who desire further training toward an advanced degree should consult their adviser, and choose elective courses that will adequately prepare them for advanced study.

To meet the requirements of this field of specialization, the following courses are required: AG 130 or HO 180; AG 232; AH 150 or DH 170 or PH 190; AE 100; 1-CH 231, and 1-BI 340. In addition, students are required to complete 24 hours in some phase of animal industry and at least 15 hours of supporting work in a related field.

Special Programs

Agriculture Education

The first two years of the curriculum preparing students to teach vocational agriculture in the high school is offered as a special program. Students should consult their adviser and select their courses to meet the requirements of the college from which they plan to obtain their agriculture education degree.

Pre-Veterinary and Pre-Forestry

The requirements for the first two years of courses in forestry and veterinary work vary considerably in the different colleges offering these programs. The student is advised to obtain a copy of the catalog from the school he plans to attend and select his program accordingly. The following course of study will meet most of the requirements if the student carefully selects electives to meet the requirements of the college that he plans to attend.

Pre-Veterinary

FIRST YEAR			
First Semester	Hours	Second Semester	Hours
1-EN 101 First Year English.....	3	1-EN 102 First Year English.....	3
1-ZO 100 General Zoology.....	4	1-BO 100 General Botany.....	4
1-CH 113 General Chemistry.....	4	1-CH 115 Gen. Chem. and Qual. Analysis.....	5
1-MA 117 College Algebra.....	3	1-MA 118 Trigonometry.....	3
1-PE 101 Freshman Phys. Ed.....	0.5	1-PE 102 Freshman Phys. Ed.....	0.5
1-MS 101 Basic Military Science or 1-AS 101 Basic Air Science.....	1.5	1-MS 102 Basic Military Science or 1-AS 102 Basic Air Science.....	1.5
	16		17

SECOND YEAR			
First Semester	Hours	Second Semester	Hours
1-PH 111 General Physics.....	4	1-PH 112 General Physics.....	4
1-CH 331 General Organic Chemistry.....	4	1-CH 332 General Organic Chemistry.....	5
1-PE Activity.....	0.5	1-PE Activity.....	0.5
1-MS 201 Basic Military Science or 1-AS 201 Basic Air Science.....	1.5	1-MS 202 Basic Military Science or 1-AS 202 Basic Air Science.....	1.5
Electives.....	7	Electives.....	6
	17		16

Pre-Forestry

FIRST YEAR			
First Semester	Hours	Second Semester	Hours
1-EN 101 First Year English.....	3	1-EN 102 First Year English.....	3
1-BO 100 General Botany.....	4	1-CH 231 Elem. Organ. Chem.....	4
1-MA 117 College Algebra.....	3	1-MA 118 Trigonometry.....	3
1-CH 111 College Chemistry.....	4	1-ZO 100 General Zoology.....	4
1-PE 101 Freshman Phys. Ed.....	0.5	1-PE 102 Freshman Phys. Ed.....	0.5
1-MS 101 Basic Military Science or 1-AS 101 Basic Air Science.....	1.5	1-MS 102 Basic Military Science or 1-AS 102 Basic Air Science.....	1.5
	16		16

SECOND YEAR			
First Semester	Hours	Second Semester	Hours
IA 103 General Drafting.....	2	CE 241 Surveying.....	3
1-BO 360 Plant Physiology.....	4	1-BO 280 Gen. Plant Pathology.....	4
AG 232 Plant Anatomy.....	4	AG 246 Conservation of Ag. Resources.....	3
1-BO 250 Plant Anatomy.....	4	1-ET 200 General Entomology.....	4
1-PE Activity.....	0.5	1-PE Activity.....	0.5
1-MS 201 Basic Military Science or 1-AS 201 Basic Air Science.....	1.5	1-MS 202 Basic Military Science or 1-AS 202 Basic Air Science.....	1.5
	16		16

School of Architecture

Purpose

The School of Architecture offers degree programs and special courses with the purpose of providing liberal, technical and professional preparation for careers concerned with creation of the buildings and related facilities of a functional and satisfying environment.

Organization

The courses of instruction are organized as follows:

Architecture—5-year curriculum leading to the degree of Bachelor of Architecture.

Construction—4-year curriculum leading to the degree of Bachelor of Science.

Admission

Students who wish to be admitted to full freshman standing in the School of Architecture should present certain secondary school units in addition to the minimum University requirements shown on page 51.

Mathematics must include algebra, advanced algebra and geometry for a total of 2½ units.

Laboratory sciences must include one unit of physics and one unit of chemistry.

Other units should include geometry, trigonometry, art and drawing.

Students presenting other or fewer credits may be required to take additional preparatory work without degree credit.

Bachelor of Architecture Degree Curriculum

Purpose

The profession of architecture has the obligation of providing comprehensive leadership in the shaping of man's physical environment.

The architect must have a working mastery of all aspects of our complex technology. He must have mature intuition and understanding of the character and significance of today's world. And he must have the talent, partly native and partly developed, to apply this working knowledge and understanding to the creation of architecture that will enrich men's lives.

It is the purpose of the program in architecture to provide graduates with:

- a thorough and intimate comprehension of the nature of architecture
- an awareness of the high purpose and responsibility of the architect
- the competence necessary to acquire professional registration
- the high ideals necessary for responsible functioning as an individual and as an architect in our society

History and Status

Since 1949, programs have permitted the student to major in architecture in meeting requirements for the four-year Bachelor of Science degree—the five-year degree program became operative in 1957. It is designed to meet requirements for accrediting by the National Architectural Accrediting Board and to provide educational qualification for registration under Arizona law as administered by the State Board of Technical Registration in conformity with the recommendations of the National Council of Architectural Registration Boards. The School is an associate member of the Association of Collegiate Schools of Architecture. An advisory committee of six architects practicing locally and in neighboring states gives counsel in shaping policies of the School. The Central Arizona Chapter of the American Institute of Architects lends support in many ways including award of scholarships and sponsorship of the Student Chapter of the American Institute of Architects.

Curriculum

The curriculum provides for the student's development in each of three areas:

Courses in *Architectural Techniques* provide *knowledge* of the technical bases of architecture, including: drawing and delineation; materials and methods of construction; principles of community planning; structural, mechanical and electrical systems; business, legal and professional procedures.

Courses in *Architectural Philosophies* provide *understanding* of architecture as both a consequence and a determinant of man's character—past, present and future.

Courses in *Architectural Design* provide for *integration* of *knowledge* and *understanding* in the shaping of our physical environment.

The curriculum is arranged to accommodate students with varying backgrounds and interests through choice of electives. For example, before the beginning of his second year, the student may choose a sequence of courses in mathematics and structures totaling either 26 or 31 semester hours as indicated in the curriculum outline. Decisions regarding the individual student's program will be reached by the student and his faculty adviser.

CURRICULUM IN ARCHITECTURE

FIRST YEAR

First Semester	Hours	Second Semester	Hours
1-EN 101 First Year English.....	3	1-EN 102 First Year English.....	3
1-MA 119 Algebra & Trigonometry.....	4	1-MA 120 Analyt. Geom. and Cal.....	4
1-HI 101 Survey of Western Civil.....	3	1-HI 102 Survey of Western Civil.....	3
1-AS 101 Basic Air Science or 1-MS 101 Basic Military Science.....	1.5	1-AS 102 Basic Air Science or 1-MS 102 Basic Military Science.....	1.5
1-PE 101 Freshman Physical Ed.....	0.5	1-PE 102 Freshman Physical Educ.....	0.5
AC 100 Intro. to Arch.....	2	AC 101 Theory of Architecture.....	2
AC 150 Architectural Drawing.....	3	AC 155 Architectural Drawing.....	3
	17		17

SECOND YEAR

First Semester	Hours	Second Semester	Hours
1-PH 111 General Physics.....	4	1-PH 112 General Physics.....	4
1-GE 111 Elements of Geography.....	4	1-AN 111 Anthropology.....	3
Elective (Humanities).....	2	Elective (Humanities).....	3
1-AS 201 Basic Air Science or 1-MS 201 Basic Military Science.....	1.5	1-AS 202 Basic Air Science or 1-MS 202 Basic Military Science.....	1.5
AC 223 Design.....	3	AC 224 Design.....	3
AC 261 *Statics.....	3	AC 262 *Mechanics of Materials.....	3
	17.5		17.5

THIRD YEAR

First Semester	Hours	Second Semester	Hours
AC 311 Architectural Philosophies.....	3	AC 312 Architectural Philosophies.....	3
AC 325 Architectural Design.....	4	AC 326 Architectural Design.....	4
AC 351 Materials and Techniques.....	3	AC 352 Materials and Techniques.....	3
AC 363 *Structural Systems.....	3	AC 364 *Structural Systems.....	3
AC 371 Mechanical and Electrical Systems.....	3	AC 372 Mechanical and Electrical Systems.....	3
Elective (Humanities).....	3	Elective.....	3
	19		19

FOURTH YEAR

First Semester	Hours	Second Semester	Hours
AC 413 Architectural Philosophies.....	3	AC 414 Architectural Philosophies.....	3
AC 427 Architectural Design.....	5	AC 428 Architectural Design.....	5
AC 431 Materials and Techniques.....	2	AC 432 Community Planning.....	2
AC 465 *Structural Systems.....	3	AC 466 *Structural Systems.....	3
Elective.....	4	Elective.....	4
	17		17

SUMMER FOLLOWING THIRD OR FOURTH YEAR

First Summer Session	Second Summer Session
AC 435 Architectural Workshop (Required).....	AC 436 Architectural Workshop (Optional as elective).....
6	(6)

FIFTH YEAR

First Semester	Hours	Second Semester	Hours
AC 415 Architectural Philosophies Seminar.....	2	AC 493 Thesis.....	12
AC 429 Architectural Design.....	5		
AC 492 Thesis Research.....	2		
AC 456 Technical Problems Seminar.....	2		
AC 482 Professional Practice.....	3		
	14		12

Courses marked * may be omitted and the following sequence in mathematics and structures substituted:

1-MA 121 Analytic Geometry and Calculus.....	4
1-MA 212 Analytic Geometry and Calculus.....	4
ES 211 Engineering Mechanics.....	3
ES 321 Mechanics of Solids.....	3
CE 321 Design of Steel Structures.....	3
CE 322 Design of Concrete Structures.....	3
AC 467 Structural Systems.....	3

This choice will make use of five elective hours.

Bachelor of Science Degree Curriculum in Construction

Purpose

The construction industry is one of the largest in the country in terms of money expended and employment provided.

Among those engaged, directly or indirectly, are owners, executives and key personnel of firms and agencies engaged in construction, or in production and distribution of construction materials and equipment, or in labor relations. A wide variety of capabilities is demanded of all these individuals.

It is the purpose of the curriculum in construction to afford the means by which qualified students may devote four years to preparation for careers in the diverse field of construction.

History and Status

For many years, programs have permitted the student to major in building construction in meeting requirements for the four-year Bachelor of Science Degree. The four-year Bachelor of Science degree in construction as described herein became an operative program in 1957. An Advisory Committee of twelve representatives of various segments of the construction industry gives counsel in shaping curriculum and policies. Various associations and firms in the State support the program with funds, scholarships and awards as well as with both summer and permanent employment opportunities.

Curriculum

The curriculum provides for the student's progressive development in each of three areas:

Technical courses, offered in the School of Architecture, provide knowledge of the special materials, techniques, systems and procedures related to construction.

Business courses, offered in the College of Business Administration, provide knowledge of general business processes.

General education courses furnish the broad base for developing understanding of the modern world and the relation of construction to it.

CURRICULUM IN CONSTRUCTION

FIRST YEAR

First Semester	Hours	Second Semester	Hours
1-EN 101 First Year English.....	3	1-EN 102 First Year English.....	3
1-MA 117 College Algebra.....	3	1-MA 118 Trigonometry.....	3
1-HI 101 Survey of Western Civil..	3	1-HI 102 Survey of Western Civil..	3
1-AS 101 Basic Air Science or 1-MS 101 Basic Military Science....	1.5	1-AS 102 Basic Air Science or 1-MS 102 Basic Military Science....	1.5
1-PE 101 Freshman Physical Educ....	0.5	1-PE 102 Freshman Physical Educ....	0.5
CO 157 Construction Drawing....	3	ME 102 Engineering Problem Analysis	2
CO 191 Construction Materials and Techniques.....	3	CO 192 Construction Materials and Techniques.....	3
	17		16

SECOND YEAR

First Semester	Hours	Second Semester	Hours
1-PH 111 General Physics.....	4	1-PH 112 General Physics.....	4
Elective (Humanities).....	4	Elective (Humanities).....	4
3-GB 101 Introduction to Business	3	3-EC 201 Principles of Economics..	3
1-AS 201 Basic Air Science or 1-		1-AS 202 Basic Air Science or 1-	
MS 201 Basic Military Science....	1.5	MS 202 Basic Military Science....	1.5
AC 261 Statics	3	AC 262 Mechanics of Materials....	3
CE 241 Surveying	3	3-MG 301 Principles of	
		Management	3
	18.5		18.5

THIRD YEAR

First Semester	Hours	Second Semester	Hours
3-AC 101 Elementary Accounting....	4	3-MG 311 Personnel Administration	3
3-GB 305 Business Law.....	3	3-GB 306 Business Law.....	3
AC 363 Structural Systems.....	3	AC 364 Structural Systems.....	3
CO 383 Construction Estimating..	3	CO 384 Construction Estimating..	3
Elective	4	Elective	5
	17		17

FOURTH YEAR

First Semester	Hours	Second Semester	Hours
CO 495 Construction Operations....	3	CO 496 Construction Operations _	3
CO 391 Construction Equipment....	3	CO 490 Pre-Plans and Methods....	3
CO 387 Construction Estimating -	3	AC 481 Design and Construction	
Elective or Foreign Lang....	4	Processes	3
Elective	3	Elective or Foreign Lang....	4
		Elective	3
	16		16

Suggested Electives:

3-EC 202 Principles of Economics..	3
3-AC 331 Cost Accounting	3
3-MG 422 Employee Training and	
Supervision	3
3-GB 233 Business Communication	3
3-FI 325 Business Finance.....	3
3-MK 401 Public Relations.....	2
3-IN 251 Principles of Insurance..	3
3-RE 251 Real Estate Principles...	3
1-SE 200 Elements of Speech.....	2

1-PY 100 Elementary Psychology....	3
1-GE 111 Elements of Geography....	4
1-GL 113 Physical Geology.....	4
AC 100 Introduction to Archl....	2
AC 371 Mechanical and Electrical	
Systems	3
AC 372 Mechanical and Electrical	
Systems	3
CE 342 Surveying	3

School of Engineering

Purpose

The Engineering Program seeks the attainment by each graduate of certain broad objectives, and it is designed to make effective a philosophy of education for careers in science, engineering, and industry for leadership in the second half of the twentieth century.

The curriculums and courses offered are designed to meet the needs of the following students: (1) Those who wish to obtain a Bachelor of Science in Engineering Degree and who plan careers in fields where science, mathematics, and analytical methods are

of special value; (2) Those who wish to do graduate work in engineering; (3) Those who wish one or two years of training in mathematics, science, and engineering in preparation for a technical program; (4) Those who desire pre-engineering for the purpose of deciding which engineering field to undertake or those who desire to transfer to another college or university; (5) Those who wish to take certain electives in these fields while pursuing another curriculum in the University.

Admission

Students who wish to be admitted to full freshmen standing in the School of Engineering should present certain secondary school units in addition to the minimum University requirements shown on page 51. A total of $3\frac{1}{2}$ units are required in mathematics. Included must be: advanced algebra, geometry, and trigonometry. Calculus is recommended. The laboratory sciences chosen must include at least one unit in physics and one unit in chemistry.

Students who may have deficiencies in subject matter preparation may be required to complete additional university credit course-work which may not be applied toward an engineering degree.

Well prepared students can usually complete the plan of study leading to the degree of Bachelor of Science in Engineering in any of the engineering curricula in four years. Many students, however, may find it advantageous or necessary to devote more than four years to the undergraduate engineering programs of study by pursuing at one time, in any semester, fewer studies than are regularly prescribed. In cases of inadequate secondary preparation, poor health, or financial necessity requiring much time for outside work, the undergraduate course should be extended to five years or longer. A student who so desires may devote five years to his undergraduate work and include additional instruction in the humanities, the social sciences, the physical sciences or mathematics.

Organization

Fields of specialization have been developed around an engineering science core. Therefore, instructional patterns are basically variations of a single curriculum and the student is allowed considerable latitude in developing an instructional pattern to fit his particular interests. Several of these fields of specialization are the well known and older branches of engineering. Others are newer areas of engineering and may be considered as variations of the recognized engineering fields. For convenience, all of the fields of specialization offered by the School of Engineering are shown in the following list:

Chemical Engineering
 Civil Engineering
 Electrical Engineering
 Computers
 Electronics
 Power
 Engineering Science
 Industrial Engineering
 Mechanical Engineering
 Nuclear

Bachelor of Science in Engineering Degree Curriculum

The satisfactory completion of a four-year curriculum of a minimum of 134 semester hours, including general education, an engineering core curriculum, and both required and elective courses of study in a field of specialization, leads to the degree of Bachelor of Science in Engineering.

The principle fields of specialization in the engineering curriculum are devoted to the basic sciences, mathematics, the fundamentals of engineering science, and their application to the solution of engineering problems. These courses are not training courses for any of the mechanical or manipulative skills, but rather, are planned to provide preparation for development, design, research, graduate work, and, with certain electives, for operation, production testing, maintenance and management.

In any field of specialization the degree requirements consist of the engineering core, the general education requirements, and the courses in a field of specialization. In addition to these 134 semester hours, 6 semester hours are required in AFROTC or ROTC for all male students, unless exempt.

For assistance and counsel in planning a program, each student will be assigned an adviser from the instructional staff in his special interest field.

ENGINEERING CORE COURSES

1-CH 113 General Chemistry.....	4
1-CH 114 General Chemistry.....	4
1-MA 120 Analytic Geometry and Calculus.....	4
1-MA 121 Analytic Geometry and Calculus.....	4
1-MA 212 Calculus	4
1-MA 220 Differential Equations.....	3
1-PH 131 Physics	3
1-PH 211 Physics	4
1-PH 212 Physics	3
ME 102 Engineering Problem Analysis.....	2
ME 113 Engineering Graphics.....	3
ES 211 Engineering Mechanics.....	3

EE 305 Electrical Circuits and Electronics.....	4
or EE 301 Electrical Networks.....	4
ES 312 Engineering Mechanics.....	3
ES 321 Mechanics of Solids.....	3
ES 350 Theory of Material Properties.....	2
ES 371 Fluid Mechanics.....	3
ES 381 Thermodynamics	3
or 1-CH 442 Physical Chemistry.....	4
ES 400 Technical Communications.....	3
ES 470 Engineering Measurements.....	3
or EE 302 Electrical Networks.....	3

The program of study in the first year precedes, and is common to, all fields of specialization. It gives the student time to become adjusted, and to choose the field of specialization for which he is best adapted. Counseling is provided in order that the student may be aided in making his choice. To a considerable extent, the course requirements of the second year are common to all fields of specialization.

Prior to enrolling in courses at the 300 level, each engineering student must: (1) receive approval from the office of the Dean of Engineering to continue in engineering; (2) secure from his adviser an approved course of study for his remaining work. Generally, students with a 2.00 scholarship index (C average), or higher will receive approval.

As an aid to student program planning, a freshman program of study is shown below.

FIRST YEAR ENGINEERING

(Common to all engineering programs)

First Semester		Hours	Second Semester		Hours
1-CH 113 General Chemistry.....	4		1-CH 114 General Chemistry.....	4	
1-EN 101 First Year English.....	3		1-EN 102 First Year English.....	3	
1-MA 120 Analytic Geometry and Calculus	4		1-MA 121 Analytic Geometry and Calculus	4	
ME 102 Engineering Problem Analysis	2		ME 113 Engineering Graphics.....	3	
Humanities Elective	2		1-PH 131 Physics	3	
1-AS 101 Basic Air Science or 1-MS 101 Basic Military Science....	1.5		1-AS 102 Basic Air Science or 1-MS 102 Basic Military Science....	1.5	
1-PE 101 Freshman Physical Educ.	0.5		1-PE 102 Freshman Physical Educ.	0.5	
		17			19

All engineering students will complete the general education and engineering core courses shown above. In addition to these subjects, there are approximately 46 hours of required and elective courses which are necessary to complete the degree requirements in each field of specialization. For convenience, these are listed below, and changes may be made only with the consent of the Dean.

Each program of study includes several hours of technical electives. With the consent of the student's faculty adviser, selection of elective courses may be made from 300 level courses or above in such fields as engineering, mathematics, business administration, the physical sciences, or foreign languages.

CHEMICAL ENGINEERING

The work of the chemical engineer is concerned with the design, construction, and operation of equipment and plans, research, and processes whereby materials undergo a chemical and physical change. Chemistry, physics, and mathematics are the underlying sciences of chemical engineering, and economics is the guide in practice.

KE 211 Process Calculations.....	3
1-CH 331 General Organic Chemistry.....	4
1-CH 332 General Organic Chemistry.....	4
KE 331 Energy, Mass and Momentum Transfer.....	3
1-CH 441 General Physical Chemistry.....	4
1-CH 442 General Physical Chemistry.....	4
KE 432 Chemical Engineering Operations.....	4
KE 441 Chemical Processes.....	3
KE 442 Chemical Processes.....	3
1-CH 421 Instrumental Analysis.....	3
KE 451 Chemical Engineering Laboratory.....	2
KE 452 Chemical Engineering Laboratory.....	2
Technical Electives.....	6

CIVIL ENGINEERING

Civil engineering as a profession embraces the following: surveying; water supply; sewerage; the planning, design, and construction of buildings; bridges, reservoirs, canals, and foundations; planning, design, construction, and maintenance of roads and highways; administration of city business; and technical service of various kinds for industries.

CE 241 Surveying	3
1-GL 347 Engineering Geology.....	3
CE 321 Design of Steel Structures.....	3
CE 322 Design of Concrete Structures.....	3
CE 311 Materials of Engineering.....	3
CE 423 Design of Steel Structures.....	3
CE 424 Design of Concrete Structures.....	3
CE 451 Soil Mechanics.....	3
or CE 452 Soil Mechanics.....	3
CE 461 Water Supply.....	3
CE 462 Sewerage and Sewage Disposal.....	3
CE 472 Highway Engineering.....	3
CE 480 Hydraulic Engineering.....	3
Technical Electives.....	10

ELECTRICAL ENGINEERING

Practically all modern scientific developments are either essentially electrical in character or depend on electronic equipment and technique. The field is very broad since it enters into every form of industry and service where power is utilized, intelligence is transmitted, and control is exercised over physical, chemical, or mechanical operations.

Engineers are involved in the technological aspects of such areas as design, application, construction, control, and automation. Computers are a basis for increasing man's ability to use tools and augmenting his ability to do mental work. Computers are not substitutes for engineers; but rather they help correlate and organize scientific information, and therefore introduce a larger number of permutations and possibilities for the engineer to apply.

(Design of Computers)

EE 202 Electrical Science.....	4
EE 321 Electron Devices.....	3
EE 322 Electronic Engineering.....	4
EE 362 Electrical Machinery.....	4
GE 316 Digital Computer Programming.....	3
1-MA 425 Numerical Analysis.....	3
EE 401 Electrical Networks.....	4
GE 430 Switching Networks.....	3
GE 411 Analog Computers.....	3
GE 431 Digital Computers.....	3
GE 432 Digital Computers.....	3
Technical Electives.....	9

(Applications of Computers)

EE 202 Electrical Science.....	4
EE 321 Electron Devices.....	3
EE 322 Electronic Engineering.....	4
GE 316 Digital Computer Programming.....	3
1-MA 362 Mathematical Methods for Engineering and Physics.....	3
GE 430 Switching Networks.....	3
GE 416 Digital Computer Programming.....	3
1-MA 325 Numerical Analysis.....	3
1-MA 437 Statistical Methods for Engineering and Physical Sciences.....	3
ES 483 Heat Transfer.....	3
EE 480 Feedback Control Systems.....	4
GE 411 Analog Computers.....	3
Technical Electives.....	7

(Electronics)

EE 202 Electrical Science.....	4
EE 321 Electron Devices.....	3
1-MA 362 Mathematical Methods for Engineering and Physics.....	3
IE 311 Engineering Economy.....	2
EE 322 Electronic Engineering.....	4
EE 362 Electrical Machinery.....	4
EE 401 Electrical Networks.....	4
EE 421 Electronic Engineering.....	4
EE 422 Electrical & Electronic Measurements.....	3
EE 441 Electromagnetic Waves.....	3
Technical Electives.....	12

(Power)

EE 202 Electrical Science.....	4
EE 321 Electron Devices.....	3
1-MA 362 Mathematical Methods for Engineering and Physics.....	3
EE 322 Electronic Engineering.....	4
EE 362 Electrical Machinery.....	4
IE 311 Engineering Economy.....	2
EE 471 Electrical Power Systems.....	3
EE 421 Electronic Engineering.....	4
EE 461 Electrical Machinery.....	4
EE 462 Motor Applications and Control.....	3
Technical Electives.....	12

ENGINEERING SCIENCE

Engineering science is designed to produce a new kind of graduate who knows the basic sciences and the important engineering sciences, and understands how to apply them to a rather broad but fundamental field of engineering activity. It leads to analytical engineering, to development, research, and to graduate work in many areas. Laboratory work will emphasize measurements and instrumentation, experimental techniques, and engineering equipment. The graduate of this curriculum will be expected to be able to avail himself of the facts of basic science and engineering science in the solution of engineering problems—using mathematics and the research method as tools.

EE 202 Electrical Science.....	4
EE 321 Electron Devices.....	3
EE 322 Electronic Engineering.....	4
ES 351 Metallurgy	3
1-MA 362 Mathematical Methods for Engineering and Physics.....	3
ES 422 Mechanics of Solids.....	2
ES 471 Engineering Research & Development.....	3
ES 472 Engineering Research & Development.....	3
ES 483 Heat Transfer.....	3
ES 421 Vibrations	3
Technical Electives.....	15

INDUSTRIAL ENGINEERING

Industry is in need of men who have a technical background which gives them an understanding of the nature of technological forces and who have, in addition, a knowledge of the details of organizing and operating an enterprise, and who are cognizant of the human elements involved.

Industrial engineering includes a study of basic engineering subjects, the principles of organizing and operating an industrial enterprise, and the principles of efficient methods of production and of handling personnel.

ME 251 Mech. & Industrial Processes.....	2
3-AC 332 Accounting for Engineers.....	4
ME 341 Analysis and Design.....	3
IE 321 Methods and Motion Study.....	3
IE 311 Engineering Economy.....	2
3-MG 301 Principles of Management.....	3
GE 401 Computing Techniques.....	3
IE 461 Factory Planning.....	3
1-MA 437 Statistical Methods for Engineering and Physical Sciences.....	3
IE 411 Production Engineering.....	3
IE 431 Engineering Administration.....	3
IE 471 Statistical Quality Control.....	3
Technical Electives.....	11

MECHANICAL ENGINEERING

Mechanical engineers are used for such a variety of work that the curriculum is broad and fundamental. The work of mechanical engineers falls under design, construction, erection, operation, inspection, production, maintenance, research sales, and administration.

Energy from the atomic nucleus will revolutionize man's concepts of power and energy utilization within the foreseeable future. Applications of nuclear reaction products will expand to all branches of engineering and technology. The need for engineers specifically trained to cope with the problems of nuclear engineering, nuclear processes and their applications to industry and living is now large and will increase. Well informed specialists in the field believe that the rate of advancement of nuclear applications is wholly dependent on the number of well qualified engineers available.

Missile and space technology have recently become an integral part of the industrial and technological scene, and the field of aeronautical engineering has had its boundaries expanded to unlimited space. Where earlier curriculums emphasized airframe and aircraft power plant design, today's engineers are, in addition, concerned with supersonic speeds, guidance systems, recent developments in propulsion, celestial navigation, manned and un-manned space flight.

(Mechanical)

ME 251 Mechanical and Industrial Processes.....	2
IE 311 Engineering Economy.....	2
ES 351 Metallurgy	3
EE 362 Electrical Machinery.....	4
1-MA 362 Mathematical Methods for Engineering and Physics.....	3
or	
MA 437 Statistical Methods for Engineering and Physical Sciences.....	3

ME 382 Thermodynamics of Mechanical Systems....	3
ME 341 Analysis and Design.....	3
ME 442 Analysis and Design.....	3
ES 483 Heat Transfer.....	3
ES 421 Vibrations	3
GE 401 Computing Techniques.....	3
ME 462 Mechanical Engineering Laboratory.....	3
Technical Electives.....	11
(Nuclear)	
ME 251 Mechanical and Industrial Processes.....	2
ES 351 Metallurgy	3
EE 311 Industrial Electronics.....	3
1-MA 362 Mathematical Methods for Engineering and Physics.....	3
ME 341 Analysis and Design.....	3
ME 382 Thermodynamics of Mechanical Systems....	3
1-PH 464 Applied Nuclear Physics.....	3
NE 421 Nucleonics Laboratory.....	2
ES 483 Heat Transfer.....	3
NE 411 Reactor Theory.....	3
NE 431 Nuclear Engineering.....	3
NE 472 Nuclear Engineering Laboratory.....	3
Technical Electives.....	12

Mechanical engineering students interested in an emphasis in aeronautics, space flight, or astronautics may select the following courses: CE 431; EE 302, 480; ES 322, 422, 483; 1-MA 362; ME 412, 421, 422, 443, 453, 463, and 471.

Division of Industrial Education

Purpose

The Division of Industrial Education serves several major functions. Important among these functions is the offering of technical and professional courses for those planning to become teachers of industrial arts education in the elementary, and secondary schools.

For in-service teachers of Industrial Arts Education a comprehensive graduate course offering, leading to the Master of Arts degree, is available.

A parallel function of the division is the offering of four-year degree curriculums with opportunity for field specialization in one of the following: aeronautics, technical design, electronics, general industrial, and mechanics. Additionally, the Division offers service courses in the form of shop and laboratory courses for specializations in the construction curriculum which is offered by the Division of Architecture.

Students who do not wish to pursue a four-year degree program, but who desire to secure specialized preparation at the university level in industrial activities, may choose a two-year curriculum from one of the several field specializations noted above.

Organization

The courses of instruction offered by the Division are organized under the following subject fields: industrial arts education, aeronautics, construction, technical design, electronics, and mechanics.

While many division courses are designated as Industrial Arts courses, they are in certain instances also elective to students of the various field specializations of the four-year non-teaching curriculums. Conversely, the Industrial Arts students to some extent, build their concentrations of technical work in courses of the above listed fields of specialization.

Industrial Arts Education

The total pattern of course work required of the prospective secondary school industrial arts teacher is as follows:

General Education.....	40 hours
Professional Education.....	22 hours
Major teaching field.....	45 hours
Minor teaching field.....	15 hours
Air or Military Science.....	6 hours

For the specific requirements of general and professional education, consult the catalog section of the College of Education.

Major Teaching Field

The major teaching field in industrial arts requires 45 hours of which 27 hours are required shop courses, 9 hours are elected in a field of specialization, and 9 hours are required in professional industrial arts courses.

The required shop core is as follows:

IA 103—General Drafting.....	2 hours
IA 104—Drafting and Design.....	2 hours
IA 210—Electricity	3 hours
TM 274—Basic Automotives.....	3 hours
IA 261—General Metals.....	4 hours
IA 121—Woods	3 hours
IA 322—Machine Woods.....	3 hours
IA 135—Basic Graphic Arts.....	3 hours
IA 161—General Shop.....	2 hours
IA 323—Shop Maintenance.....	2 hours

—
27 hours

The industrial arts professional course requirement of 9 hours is outlined below:

IA 342—Selection and Organization of Subject Matter	3 hours
IA 480—Methods of Teaching Industrial Arts.....	3 hours
IA Elective	3 hours
	—
	9 hours

Nine hours are to be elected, with approval of the adviser, from a field of specialization.

Minor Teaching Field

Fifteen semester hours of work are required including:

IA 103—General Drafting	2 hours
IA 121—Woods	3 hours
IA 261—General Metals.....	4 hours
IA 322—Machine Woods.....	3 hours
IA 342—Selection and Organization of Subject Matter	3 hours
	—
	15 hours

Bachelor of Science Degree Curriculum

Technical (non-teaching) curriculums are four-year degree programs with a significant portion of the college work being completed in an area of technical specialization. These areas include aeronautics, technical design, electronics, general industrial, and mechanics. Specialization in one of these areas is designed to afford the student an excellent preparation in the techniques, skills and processes essential to entering industrial, technical and commercial occupations.

All four-year technical curriculums of this Division require the satisfactory completion of a minimum of 126 hours, divided into five requirements as follows:

I General Education.....	40 hours
II Air or Military Science.....	6 hours
III Technical Core Courses.....	12 hours
IV Field of Specialization—(Courses required and elected).....	50 to 56 hours
V Supporting Field.....	12 to 18 hours

A minimum of 20 semester hours taken in the major field of specialization must be in upper division courses.

All technical curriculums require the following courses:

*1-MA 116 Intermediate Algebra or 117 College Algebra.....	3
*1-MA 118 Trigonometry.....	3
IA 109 Calculations.....	2
1-PH 111 General Physics.....	4
1-PH 112 General Physics.....	4

*1-CH 111 or 113 Elem. Chemistry.....	4
3-GB 305 Business Law.....	3
3-GB 101 Intro. to Modern Business.....	3
ES 400 Technical Writing.....	3

 29

Of these 29 hours the starred 13 hours are general education requirements; the remaining 16 hours comprise the technical core courses (Item III above).

Beyond the above core, the specific requirements of each of the fields of specialization are set forth in the following section.

Field of Specialization Requirements

A field of specialization consists both of required and elective courses within the selected field of emphasis.

Aeronautics. Attempt is made to develop insight and understanding of aeronautics through a combination of theory and practice. Technical aspects of meteorology, radio, navigation, aerodynamics and aircraft mechanics are studied, as well as the proper use of navigational aids, weather aids, and training facilities provided by the government.

Required Courses: TA 180, 183, 186, 287, 380, 381, 384, 388;
IA 103, 210; TM 161, 164, 169; TE 210, 310, 318.

Electives: IA 121, 486, 487, 488; TM 173.

Supporting Field: Suitable courses chosen with the approval of an adviser.

Electronics. This field of specialization provides theoretical, practical and technical knowledge of electronics and allied fields. It prepares for employment in commercial broadcasting and television station operation, maintenance, and repair; radar and other military applications of electronics; industrial applications of electronics as well as commercial activities associated with the field.

Required Courses: TE 200, 213, 310, 311, 315, 316, 317, 412, 414, 417; 1-MA 120.

Technical Electives: Select 16 hours from the following:
TE 210, 318, 319, 320, 410, 415, 418, 419; ME 112; 1-MA 121, 212.

Note: A minimum of 5 hours of the 16 selected must be upper division courses.

Supporting Field: TM 161, 164; IA 103; ME 102, 251; 1-MA 220, or suitable courses chosen with the approval of an adviser.

General Industrial. Curriculum provides experiences designed to permit a degree of specialization, but with emphasis upon broad preparation in industrial areas. Designed to meet the needs of those desiring to become inspectors, managers, salesmen, supervisors, shop owners or associated employment goals.

Required Courses: TM 161, 164, 169; IA 103, 121, 210, 227, 322.

Elective Courses: Select a minimum of 15 semester hours from one of the five special emphases. A minimum of 20 additional hours must be selected from courses offered by the division with approval of adviser.

Emphasis on Aeronautics: TA 180, 183, 186, 287, 380, 381, 384, 388, 488; TE 210.

Emphasis on Technical Design: ME 111, 112; TD 101, 302, 303, 305, 350, 402, 406, 407, 408.

Emphasis on Construction: CO 191, 193, 494, 495; AC 150, 261.

Emphasis on Electronics: TE 210, 213, 310, 311, 315, 316, 317, 412, 414, 417.

Emphasis on Mechanics: TM 162, 164, 169, 173, 274, 364, 369, 371, 376, 377, 461, 462, 467, 469, 478; TD 101; TE 319.

Mechanics. Designed to meet the needs of students desiring to enter employment in technical and related positions in metals and allied industries including the several phases of automotives.

Required Courses: TM 161, 162, 164, 169, 173, 274, 364, 369.

Required Courses: TM 161, 162, 164, 169, 173, 274, 364, 369, 371, 376, 377, 461, 462, 467, 469, 478; IA 103.

Electives: IA 210, 365, 442, 444.

Supporting Field: TE 200, 319; TD 101; IA 323; ME 112, or suitable courses chosen with the approval of the adviser.

Technical Design. Program includes: drafting techniques, scientific and mathematical background for design; advanced work in electro-mechanical design for production and construction. Graduates are prepared to work as "supporting technical personnel for engineering."

Required Courses: ME 111, 112; TD 101, 302, 303, 305, 350, 402, 406, 407, 408.

Electives: ME 102, 251, 320; ES 351; CE 241; AC 261, 262; TE 200, 213.

Supporting Field: 1-MA 120, 121; 1-PH 131, 211.

Special Students and Two-Year Technical Curriculums

Students not desiring to pursue a four-year degree program, but who wish to secure specialized preparation at the college level in industrial activities may do so. Special students are those who are not enrolled in any curriculum leading to a degree but who desire instruction in subjects of special interest to themselves. Moreover, a student may choose one of the two-year curriculums from a field of specialization. Specific courses included in the student program must have the approval of adviser.

SUGGESTED FIRST YEAR PROGRAM — AERONAUTICS

First Semester		Hours	Second Semester		Hours
1-EN 101	First Year English	3	1-EN 102	First Year English	3
1-MA 116	Intermediate Algebra	3	1-MA 118	Trigonometry	3
or 1-MA 117	College Algebra	3	TM 164	Sheet Metal	3
IA 103	General Drafting or		TA 180	Aircraft Covering	2
ME 111	Engineering Drawing	2	TA 183	Theory of Flight	3
TM 169	Oxy-Acetylene Welding	3	1-PE 102	Freshman Physical Ed.	0.5
IA 109	Calculations	2	1-AS 102	Basic Air Science or 1-	
TA 186	Aircraft Woodwork	2	MS 102	Basic Military Science	1.5
1-PE 101	Freshman Physical Ed.	0.5			
1-AS 101	Basic Air Science or 1-				
MA 101	Basic Military Science	1.5			
		17			16

SUGGESTED FIRST YEAR PROGRAM — ELECTRONICS

First Semester		Hours	Second Semester		Hours
1-EN 101	First Year English	3	1-EN 102	First Year English	3
1-MA 116	Intermediate Algebra	3	1-MA 118	Trigonometry	3
or 1-MA 117	College Algebra	3	IA 109	Calculations	2
Humanities Elective		2	TM 164	Sheet Metal	3
IA 103	General Drafting or		1-HI 102	Survey of Western Civl.	
ME 111	Engineering Drawing	2	or 1-HI 104	History of the U. S.	3
1-HI 101	Survey of Western Civl. or 1-HI 103 History of the U. S.	3	1-PE 102	Freshman Physical Ed.	0.5
1-PE 101	Freshman Physical Ed.	0.5	1-AS 102	Basic Air Science or 1-	
1-AS 101	Basic Air Science or 1-		MS 102	Basic Military Science	1.5
MS 101	Basic Military Science	1.5			
		15			16

SUGGESTED FIRST YEAR PROGRAM — MECHANICS

First Semester		Hours	Second Semester		Hours
1-EN 101	First Year English	3	1-EN 102	First Year English	3
1-MA 116	Intermediate Algebra	3	1-MA 118	Trigonometry	3
or 1-MA 117	College Algebra	3	1-HI 102	Survey of Western Civl.	
1-HI 101	Survey of Western Civl. or 1-HI 103 History of the U. S.	3	or 1-HI 104	History of the U. S.	3
IA 103	General Drafting or		TM 162	Machine Shop	3
ME 111	Engineering Drawing	2	TM 164	Sheet Metal	3
TM 161	Machine Shop	3	1-PE 102	Freshman Physical Ed.	0.5
1-PE 101	Freshman Physical Ed.	0.5	1-AS 102	Basic Air Science or 1-	
1-AS 101	Basic Air Science or 1-		MS 102	Basic Military Science	1.5
MS 101	Basic Military Science	1.5			
		16			17

SUGGESTED FIRST YEAR PROGRAM—TECHNICAL DESIGN

First Semester		Hours	Second Semester		Hours
1-EN 101	First Year English	3	1-EN 102	First Year English	3
1-MA 117	College Algebra	3	1-MA 118	Trigonometry	3
1-CH 113	General Chemistry	4	2-GB 101	Introduction to Modern Business	3
TD 101	Production Engineering Lang.	2	ME 102	Engineering Problem Analysis	2
ME 111	Engineering Drawing	2	ME 112	Descriptive Geometry	2
1-PE 101	Freshman Physical Ed.	0.5	1-PE 102	Freshman Physical Ed.	0.5
1-AS 101	Basic Air Science or 1-		1-AS 102	Basic Air Science or 1-	
MS 101	Basic Military Science	1.5	MS 102	Basic Military Science	1.5
		16			15

The Teaching of Industrial Arts

Major Teaching Field in Industrial Arts. For students planning to teach in the secondary schools, 45 semester hours of industrial arts courses are required, as follows:

IA 103, 104, 121, 135, 161, 210, 261, 322, 323, and TM 274. Nine hours of professional Industrial Arts courses are required including IA 342 and 480. Nine hours are to be elected, with the approval of the adviser, from a field of specialization.

Minor Teaching Field in Industrial Arts. Fifteen semester hours of work are required as follows: IA 103, 121, 261, 322, and 342.

Graduate College

Programs for Graduate Study are offered at Arizona State University by the various colleges through the Graduate College under the direction of the Dean of the Graduate College and the Graduate Council. The Graduate Council is responsible for the development and formulations of general policies and for the approval of procedures essential to the organization and administration of the graduate programs. The Dean of the Graduate College is directly responsible for the administration of its policies and programs.

Purpose

The graduate program has for its primary purpose the offering of advanced training to competent students in those fields in which the University has adequate staff and facilities. Programs will be added from time to time when it seems feasible.

Degree Programs Offered

At present the following degree programs are offered:

1. Master of Arts:
 - Art
 - English
 - French
 - German
 - History
 - Mathematics
 - Political Science
 - Psychology
 - Sociology
 - Spanish
2. Master of Science:
 - Accounting
 - Biological Science
 - Business Administration
 - Chemistry
 - Economics
 - Home Economics
 - Physical Education
 - Physics
3. Master of Arts in Education
4. Master of Fine Arts
5. Master of Public Administration
6. Master of Science in Engineering
7. Education Specialist
8. Doctor of Education

Admission to the Graduate College

A student who has received the bachelor's degree from an approved college or university, may be admitted to the Graduate College upon filing with the Dean of the Graduate College an application for admission.

A graduate student who is not a candidate for a higher degree is not required to select a field of specialization but may, with the approval of the Dean of the Graduate College, select work for his special purpose from the courses for which he has the requisite preparation. Should such a student subsequently desire to become a candidate for a degree, only that part of the work already done will be accepted, which in the judgment of the adviser or advisory committee, properly belongs to the approved program. The students will be required to complete whatever work is necessary for fulfilling the requirements for the degree. In no case, however, will more than six semester hours of graduate work completed before admission to the degree program be accepted toward a master's degree.

Master's Degree Program

Admission to the Master's Degree Program. Students who seek admission to the Master's Degree Program shall file with the Dean of the Graduate College an application for admission and transcripts of all college work completed. The field of specialization selected shall be designated on the application. Forms are available in the Graduate Office.

The applicant must have an acceptable undergraduate record. Those who do not have an acceptable record will be able to qualify by taking the aptitude test of the Graduate Record Examination.

Since graduate work in a field presupposes adequate training in this field at the undergraduate level, applicants are required to meet departmental or college requirements in this respect. (See Graduate Bulletin for these requirements.)

Program of Study for the Master's Degree

Master's degrees will be conferred upon those who complete successfully a program of advanced study and research in a special field.

Credit Requirements. A minimum of thirty semester hours of course work, including a thesis, if required. A minimum of twenty semester hours must be taken in the major field. Ten semester hours may complete the program in a supporting field. (In foreign languages the division may be eighteen hours in the major field and twelve hours in a second language.)

Advisers. An adviser is appointed by the Dean of the Graduate College upon recommendation of the Department Head or Dean

of the College in which the student plans to study. Two committee members to serve with the adviser are appointed by the Dean of the Graduate College upon recommendation of the adviser. The adviser shall direct the student's thesis study and the committee shall serve as an advisory committee and as an examining committee.

Residence Requirements. Two semesters of residence involving completion of a minimum of twenty semester hours of graduate credit are required. One ten-week summer session is equivalent to a semester residence.

Language Requirements. Optional with department or division. (See Graduate Bulletin.)

Thesis. Optional with department or division. (See Graduate Bulletin.)

Final Examinations. A final examination, either written or oral or both, is required.

Graduate Credit for Seniors. A senior student regularly enrolled in his last semester of work at Arizona State University, who is within 12 semester hours of completing the requirements for a bachelor's degree, may register for a sufficient number of additional hours of approved courses carrying graduate credit to complete his semester or term program. Official graduate credit may be had for this work subject to the following regulations:

1. The courses must be taken during the last semester of of the senior year of the student's undergraduate work.
2. The courses must be approved by his undergraduate adviser, the professor teaching the course(s), and the Dean of the Graduate College at the time of registration. The necessary forms are available in the Graduate Office. If any change is to be made, it must be made during the *Drop-Add Period*. The Drop-Add Card must be approved by the Dean of the Graduate College.
3. Only 400g-level courses may be taken unless the student has a grade index of 2.50 or above. If his index is 2.50 or above, he will be permitted to take a 500-level course in a field which he has had over 24 semester hours of undergraduate work and the necessary prerequisites.
4. Any student whose undergraduate grade index is below 2.50 is limited to six hours of 400g-level courses. In no case, however, may a student whose index is below 2.50 carry a total load of more than 12 semester hours of undergraduate and graduate work.

Transfer of Credits. Six semester hours of graduate credit taken in other institutions may be transferred for credit toward a master's degree. Such courses must have been taken in a fully accredited college or university which offers graduate study and must be acceptable toward graduate degrees in that institution.

The courses to be acceptable must fit into the planned program of studies at Arizona State. Only courses with an A or B grade are acceptable by transfer.

Extension Courses. Up to ten semester hours of credit toward a master's degree may be earned in extension courses offered by Arizona State University. Students who take graduate extension courses with a view to meeting degree requirements should apply for admission to the Master's Degree Program. It should be remembered that not more than six semester hours of graduate credit, completed before admission to the degree program, will be accepted toward a master's degree, and that a minimum of twenty semester hours must be completed on campus.

Maximum Time Limits. A program leading to a master's degree must be completed within a span of six years. Any exception to this rule must have the approval of the Graduate Council. A petition requesting an extension of time must explain the extenuating circumstances causing the delay. The Council is in no way obligated to extend the time, but may do so if circumstances justify it.

Course Load. A graduate student studying full time is allowed to enroll for sixteen semester hours a semester and six semester hours each summer term. Students working full time and full-time teachers are limited to six semester hours a semester.

Scholarship Requirements. Excellence in performance is expected of students doing graduate work. A student who does not appear to be doing satisfactory work may be required to withdraw from the degree program.

An average grade of B or better for all graduate work is required for graduation with a master's degree. However, no more than six semester hours of a C grade may be accepted toward degree requirements. The grade of D is not accepted in meeting master degree requirements. A thesis carries credit but no grade is given.

Graduate course work other than thesis reported "incomplete" must be completed within one year of the official ending of the course. Thesis will be open for credit for a period of two years following the official ending of the semester in which the student registered for the course.

Graduate Credit Courses. Courses carrying graduate credit are numbered 400g, 500, 600, and 700. The 400g-level courses are open to seniors and graduates. The 500-level courses are open to graduate students, and qualified seniors at Arizona State University. The 600-level courses generally are reserved for the Education Specialist Degree Program and other specialized professional programs. The 700-level courses are reserved primarily for the Doctor's Degree Program.

Graduate Bulletins. Refer to the Graduate Bulletin for a listing and a detailed description of the Graduate Programs at Arizona State University. Copies of the Graduate Bulletin and forms may be obtained in the Office of the Dean of the Graduate College.

Education Specialist Degree

The Education Specialist Degree Program is designed to develop specialization in an area of education. (For areas see Graduate Bulletin.) The program requires a minimum of thirty semester hours of planned graduate work beyond the master's degree, plus a scholarly paper in a field of specialization. This degree is terminal and is not intended as an intermediate step toward the doctorate in education.

Admission to the Degree Program. Admission to the program must be cleared before the course work outlined in the total pattern is begun. Course work completed prior to admission to the program cannot be used to build the minimum pattern of the required thirty hours. In order to be eligible to apply for this degree, the applicant must:

1. Hold a master's degree with twenty or more semester hours of graduate work in education and/or psychology.
2. Have an adequate background in the areas involved in his specialization plan.
3. Have an acceptable undergraduate and graduate scholastic average.
4. Have had two years of successful teaching experience.

An Admissions Committee, selected by the Graduate Council, will consider those applicants who have:

1. Filed an application.
2. Filed a transcript of all undergraduate and graduate work.
3. Prepared and filed a summary of educational experience.
4. Taken the qualifying examination.

Graduation Requirements. In order to be eligible for graduation with the Ed.S. degree the following requirements must be met:

1. Complete within five years a thirty-semester hour approved program with no grade below "B."
2. Complete an approved scholarly paper on some phase of the selected specialization. Four typewritten copies of this paper must be filed with the Dean of the Graduate College two months before graduation after acceptance by the Committee and Dean of the College of Education.
3. Pass a written and oral comprehensive examination over the work of specialization.

Doctor of Education Degree

The Doctor of Education Degree Program is designed to provide professional training and experience for a variety of workers in the broad field of education. The structure provides flexibility to meet individual needs and interests. The principal groups to be served by this program are as follows: (1) those seeking to increase professional competence as school administrators; (2) those seeking advanced training in other recognized professional education pursuits.

Admission to the Doctoral Program. Students who seek admission to the Doctoral Program must assume the responsibility for the following:

1. Filing an application for admission.
2. Filing transcripts of all college work completed.
3. Submitting to a qualifying examination. (Students who seek admission to the Doctoral Program must submit to a qualifying examination. Ordinarily, this will include the Graduate Record examination. This examination is administered four times yearly. Application must be filed in the Office of the Dean of the Graduate College at least three weeks in advance. Fee, \$7.50.)
4. Filing letters of recommendation.

Applications, transcripts, and examination results will be evaluated by the Doctoral Committee on Admissions. This committee will be guided by the complete profile of each individual student and may consider the following criteria in determining his eligibility for the program.

1. A bachelor's degree in an accredited institution and a satisfactory undergraduate record.
2. Satisfactory scholarship in any graduate work completed at Arizona State University or elsewhere.
3. Completed a satisfactory undergraduate program in education and psychology courses.
4. Adequate background in general and professional education.
5. Scholastic aptitude and ability to the successful pursuit of a program of doctoral work in professional education.
6. Letters or statements filed for consideration from persons in a position to judge readiness for doctoral work.

Upon being admitted to the Doctoral Program on the basis of the above criteria, a doctoral advisory committee will be appointed, the chairman of which will be the student's adviser. The student should consult his adviser, plan a doctoral program of studies approved by his advisory committee and the Dean of the School of Education, and file that program in triplicate in the Office of the Dean of the Graduate College. This program should be planned and filed before the end of the first semester or summer session in residence.

Program of Study for Doctor of Education Degree. The degree of Doctor of Education is conferred on the basis of a high degree of attainment in the constructive study of an educational problem and for demonstrated ability to pursue independent research in study for a prescribed period of time, nor as a certificate of the satisfactory completion of course requirements.

Experience shows that for students to meet the standards set, at least three years of study beyond the bachelor's degree are necessary. The amount of time a student needs to spend in resi-

dence depends to a large degree on his individual program of studies.

Transfer of credits from other recognized institutions is permissible. The amount and kind depends largely upon the objectives agreed upon between student and adviser. Regardless of how many may be accepted by transfer, a sufficient number of credits must be taken at Arizona State University to assure competency in the field the candidate selects. Minimum residence requirements must also be met.

In addition to course work, an acceptable disseration is required. The dissertation carries no semester hours of credit.

All course work taken beyond the point of admission to the Doctoral Program must be completed, except by petition to and approval by the Graduate Council, within a period of seven consecutive years.

Upon making application for the final examination for the doctor's degree, the candidate must submit evidence of at least **two years' experience** either in teaching or other educational services.

Summer Session

Terms. The summer session consists of a one-week pre-session, two terms of five weeks each, and a post-session of three weeks.

Air Cooling. Most of the buildings are cooled by refrigeration systems. The other buildings are cooled by evaporative coolers.

Forenoon Classes. Most classes meet in the forenoon, leaving the afternoons open for study, reference reading, laboratory work, conferences with faculty members, or recreation.

Credit. Students are permitted to earn a maximum of six semester hours of credit each five-week session. Four semester hours is the maximum credit which may be earned in the three-week post session. In three ten-week summer sessions, the residence requirement of the University can be met. By attending summer sessions, students can graduate in three years or less.

Admission to the Summer Session. In general, applicants for admission are expected to present evidence of graduation from an approved four-year high school, or evidence of good standing in an accredited college. Mature students, over 21 years of age, are admitted without the above qualifications, but with the understanding that all admission requirements must be satisfied before they can become candidates for the bachelor's degree.

Graduate Study. The summer session offers an excellent opportunity for those who have already acquired a bachelor's degree to do graduate work for personal edification or to work for advanced degrees.

Fees and Expenses. The summer school fee is \$10.00 per semester hour. Textbooks and supplies may be purchased at the University book store on the campus. Board and room for the summer are furnished on campus at the prevailing rates.

Bulletin. A preliminary announcement of the offerings will be mailed to the teachers in the State early in the year. Requests for the Summer Bulletin or other information should be addressed to the Director of Summer Session.

Extension Division

Many people who desire to continue their studies while actively engaged in their business or professional activities find it impossible to attend the regular sessions of the University. In response to this demand, the Extension Division has been established and offers two special types of service: extension courses offered at residence centers and correspondence courses. By these two methods, some regular college courses are made available to these people at a moderate cost.

Residence Center Classes

Residence centers will be organized where there is sufficient demand, when approved instructors are available, and when library or laboratory facilities are adequate to provide university-level instruction. A Residence Center and offering must be approved by the Director of Extension. Two types of programs are carried on at the Residence Centers: (1) recognized and accepted university credit courses that serve to meet degree requirements at the undergraduate and graduate levels, and (2) informal educational experiences for personal pleasure, general cultural advancement, refresher training courses, and the acquisition of new interests, without reference to university-level standards or credit. Courses taken in Residence Centers are counted as residence credit toward bachelor's degree requirements.

The fee for all extension courses is \$10.00 per semester hour, and is payable at the time of registration. For further information concerning residence center courses, write the Director of Extension.

Correspondence Courses

Through the use of the mails, the privileges of the university campus and service of the teaching faculty are extended to the student whose daily occupation prevents enrollment in the regular sessions.

Persons desiring to enroll for correspondence courses will write to the Correspondence Division for an enrollment blank and a copy of the Bulletin which gives a list of the courses offered. When this enrollment blank, properly filled out and accompanied by remittance to cover the fee, is received, the first lesson assignments will be mailed to the student.

The fee for correspondence courses is \$7.50 per semester hour of credit carried. Credit earned in correspondence courses may be applied toward the bachelor's degree; however, not more than 16 semester hours of correspondence and/or comprehensive work

will be accepted for credit toward the degree. Correspondence courses are not accepted for credit toward the advanced degrees.

Students who fail a course on campus, or at a residence center, are not permitted to take the same course by Correspondence.

No student doing work in residence may register for a course by correspondence without obtaining approval of the Admissions and Standards Committee. All inquiries concerning correspondence courses should be addressed to the Correspondence Division.

Courses of Instruction

Descriptions of all courses offered by the University during the regular academic year are found in the section which follows. Courses offered as "summer only" courses are not included in this section. For convenience instructional departments and divisions are arranged in alphabetical order.

Classification of Courses

The course numbering system has been designed to facilitate sorting and tabulating by machine methods.

Each College has a single digit code number as follows:

- 1.—College of Liberal Arts
- 2.—College of Education
- 3.—College of Business Administration
- 4.—College of Applied Arts and Sciences

Within each of the instructional departments or divisions, courses are grouped by "subject fields." Each subject field carries a two-letter code, e.g. AR for Art.

A complete list of Code Letters, Subject Fields, and Departments or Divisions in which the courses are offered follows:

Code Letters	Subject Field	Department
AC	Accounting	Business Administration
AC	Architecture	Architecture
AD	Advertising	Business Administration
AE	Adult Education	Education
AE	Agricultural Economics	Agriculture
AE	Art Education	Art
AG	Agronomy	Agriculture
AH	Animal Husbandry	Agriculture
AH	Art History	Art
AM	Agricultural Mechanics	Agriculture
AN	Anthropology	Sociology and Anthropology
AR	Art	Art
AS	Air Science	Air Science
AV	Audio-Visual Education	Education
BE	Basic Courses in Education	Education
BE	Business Education	Business Administration
BI	Biology	Zoology
BO	Botany	Botany
CE	Civil Engineering	Engineering
CH	Chemistry	Chemistry
CO	Construction	Architecture
DH	Dairy Husbandry	Agriculture
DR	Drama	Speech and Drama

Code Letters	Subject Field	Department
EC	Economics	Business Administration
EE	Electrical Engineering	Engineering
EE	Elementary Education	Education
EN	English	English
EP	Educational Psychology	Psychology and Philosophy
ES	Engineering Science	Engineering
ET	Entomology	Zoology
FI	Finance	Business Administration
FL	Foreign Languages	Foreign Languages
FR	French	Foreign Languages
GB	General Business Administration	Business Administration
GC	Guidance and Counseling	Education
GE	Computer Engineering	Engineering
GE	Geography	Geography
GK	Greek	Foreign Languages
GL	Geology	Geology
GR	German	Foreign Languages
HE	Health Education	Health, Physical Education, and Recreation
HE	Higher Education	Education
HI	History	History
HO	Home Economics	Home Economics
HO	Horticulture	Agriculture
HU	Humanities	Humanities
IA	Industrial Arts	Industrial Education
IE	Industrial Engineering	Engineering
IN	Insurance	Business Administration
JO	Journalism	Mass Communications
KE	Chemical Engineering	Engineering
KP	Kindergarten-Primary Education	Education
LA	Latin	Foreign Languages
LS	Library Science	Education
MA	Mathematics	Mathematics
ME	Mechanical Engineering	Engineering
ME	Medical Technology	Zoology
MG	Management	Business Administration
MK	Marketing	Business Administration
MI	Microbiology	Zoology
MP	Music Performance	Music
MS	Military Science	Military Science and Tactics
MU	Music	Music
NE	Nuclear Engineering	Engineering
NU	Nursing	Nursing
OA	Office Administration	Business Administration
PE	Physical Education	Health, Physical Education, and Recreation

Code Letters	Subject Field	Department
PH	Physics	Physics and Astronomy
PH	Poultry Husbandry	Agriculture
PI	Philosophy	Psychology and Philosophy
PL	General Physical Science	General Physical Sciences
PS	Political Science	Political Science
PY	Psychology	Psychology and Philosophy
RE	Real Estate	Business Administration
RE	Recreation	Health, Physical Education, and Recreation
RS	Research and Surveys	Education
RT	Radio-Television	Mass Communications
RU	Russian	Foreign Languages
SA	School Administration and Supervision	Education
SE	Secondary Education	Education
SE	Speech	Speech and Drama
SF	Social Foundations	Education
SO	Sociology	Sociology and Anthropology
SP	Spanish	Foreign Languages
SP	Special Education	Education
SS	Social Sciences	Sociology and Anthropology
TA	Aeronautics	Industrial Education
TD	Technical Design	Industrial Education
TE	Electronics	Industrial Education
TM	Mechanics	Industrial Education
ZO	Zoology	Zoology

The actual course number is made up of three digits, the first of which indicates the "level" of the course by years, the second may indicate a sub-field of studies, and the third, alone or in conjunction with the second, indicates the sequence of the course in the subject field.

Courses numbered:

- 100-199 are freshman level courses and are designed primarily for freshmen.
- 200-299 are sophomore level courses and are designed primarily for sophomores. They are open to freshmen only if they have had the designated prerequisites.
- 300-399 are junior level courses and are designed primarily for juniors.
- 400-499 are senior level courses and are designed primarily for seniors. Some courses at this level may be taken for graduate credit. Courses approved for graduate credit are designated by "g" following the number.
- 500-599 are graduate level courses for graduate credit only. They may be taken by eligible seniors only on

senior permit with the approval of the Dean of the Graduate College.

600-699 are graduate level courses for graduate students pursuing a specialist degree program or a specialized professional program.

700-799 are graduate level courses primarily for graduate students pursuing a doctor's degree program.

Independent Study

The course number 499 has been reserved for Independent Study courses in each of the instructional departments or divisions of the colleges at the undergraduate level. Independent Study courses are honor courses and may be taken only by outstanding senior students who have completed at least one semester in residence. To be eligible for an Independent Study course a student must have a cumulative scholarship index of 3.00 or better in his major or field of specialization.

An Independent Study course is designed to provide an opportunity for the superior senior student to do an original study or investigation in his major or field of specialization on an individual basis with a minimum of supervision or direction. An Independent Study course is not to be regarded as a substitute for a catalog course, nor as a means for taking a catalog course on an individual basis. Courses listed in the catalog may not be taken as Independent Study courses.

Application for Independent Study courses must be made well in advance of regular registration period with the student's adviser. The application must be signed by the adviser, and approved by the instructor under whom the student will work, and by the chairman of the department or head of the division in which the course is taken. A course fee may be required.

Honors Courses

The courses listed below are reserved for students in the Honors Program of the College of Liberal Arts. Honors Programs are offered in the following majors: English, History, Philosophy, Political Science, Psychology, and Sociology.

298 *Honors*. Individual study in the Honors Program of the College of Liberal Arts. May be offered by any department offering an Honors major. Prerequisite: Approval of student's adviser, instructor, and Chairman of the Honors Council. May be repeated for credit. Credit, 2-4 hours.

493 *Honor Thesis*. A thesis, or an equivalent creative project, required of all seniors in the Honors Program. Prerequisite: Approval of adviser, instructor, and Chairman of the Honors Council. Credit, 3 hours.

- 497 *Colloquium*. Small group study of a subject of contemporary importance or a basic document of continuing significance. Designed to stimulate serious thought rather than to impart information for its own sake. Consists of wide reading, discussion and a term paper. Prerequisite: Senior standing and approval of instructor. The colloquia are designed for students *not* majoring in the division offering them. Credit, 2 hours.
- 498 *Honors*. Individual study for upper-division students in the Honors Program of the College of Liberal Arts. May be offered by any department offering an Honors major. Prerequisite: Approval of student's adviser, instructor, and Chairman of the Honors Council. May be repeated for credit. Credit, 2-4 hours.

Special Graduate Courses

- 500 *Research Methods*. Acquaints the student with the essential steps in the scientific method and with the techniques and skills used in research. Required for most masters degrees. Prerequisite: Admission to a Masters Degree Program. Credit, 3 hours.
- 590 *Reading and Conference*. Independent reading and study conferences with assigned professors. Prerequisite: Admission to a Graduate Degree Program. Credit, 2 or 3 hours.
- 591 *Seminar*. A course organized for a group of graduate students for advanced study and research under the direction of one or more staff members of the department offering the seminar. Given by departments at regular intervals. Prerequisite: Admission to a Master's Degree Program. Credit, 2 or 3 hours.
- 592 *Research*. A careful investigation of a problem under the direction of an adviser. This course may not be used as research for a thesis. Prerequisite: Admission to the Master's Degree Program and approval of the Dean of the College in which the course is offered. Credit, 2 or 3 hours.
- 593 *Thesis*. An organized written presentation of results of study, investigation, and research. Prerequisite: Admission to a Master's Degree Program. Credit, 6 hours.
- 700 *Research Methods*. Credit, 4 hours. For doctorate students only.
- 790 *Reading and Conference*. Credit, 4 hours. For doctorate students only.
- 791 *Seminar*. Credit, 4 hours. For doctorate students only.
- 792 *Research*. Credit, 4 hours. For doctorate students only.
- 799 *Dissertation*. Ordinarily designed to require two semesters of intensive application to a problem in education. A scholarly piece of work is required. No semester hours credit. For doctorate students only.

Limitations on Special Courses. Not more than fifteen semester hours in courses 590, 592, and 593 will be accepted for the master's degree.

Prerequisites

A student registering for a course must meet the prerequisites listed for it or otherwise satisfy the instructor that he has had the equivalent preparation.

Starred Courses

In curriculum outlines, certain courses have a star placed in front of them. This indicates that the course is given both the first and second semesters of that year. The desire is to have one-half of the students take the course the first semester, and the other half the second semester.

Withdrawal of Courses

The University does not offer each year all of the courses listed in the catalog. The Schedule of Classes should be consulted for those courses offered each semester and during the summer terms.

Agriculture

DANIEL O. ROBINSON, Head, Division of Agriculture

Agricultural Economics

AE 100 *Agricultural Economics.* Economics as applied to agricultural problems. Credit, 3 hours.

206 *Farm and Ranch Management.* Accounting and business principles of farm and ranch management. Two lectures, 3 hours laboratory. Credit, 3 hours.

306 *Farm Management.* Management principles; economic theory and analysis in agricultural production and marketing. Prerequisite: AE 206. Three lectures or equivalent in field work. Credit, 3 hours.

308 *Agricultural Finance.* Acquisition of capital, use of credit, legal aspects of finance and management working capital. Credit, 3 hours.

402g *Land Economics and Utilization.* Land evaluation and appraisal, economic classification, use and development. Prerequisite: Nine hours credit in Agricultural Economics or the equivalent. Credit, 3 hours.

406 *Farm and Ranch Organization.* Influence of physical, cultural, and economic resource environments on farming regions, and individual farm and ranch organization; budgeting techniques; field trips. Prerequisites: AE 306 and AH 252 or AG 234. Three lectures, 3 hours laboratory. Credit, 4 hours.

412g *Agricultural Policy*. Government and public interest in agriculture, agricultural price policies and programs. Prerequisite: Nine hours credit in Agricultural Economics or equivalent. Three lectures or equivalent in field work. Credit, 3 hours.

414g *Farm Cooperatives*. Organization, operation and management of agricultural cooperatives. Prerequisite: Nine hours credit in Agricultural Economics or equivalent. Credit, 3 hours.

Agricultural Mechanics

AM 122 *Agricultural Mechanics*. Mechanical skills important to agriculture. Fee, \$4.00. One lecture, 3 hours laboratory. Credit, 2 hours.

126 *Farm Machinery*. Field operation of tillage and cultivating implements, planting, fertilizing, and harvesting machinery. One lecture, 3 hours laboratory. Credit, 2 hours.

227 *Agriculture Mechanics*. Design, construction, and repairing of farm equipment. Fee, \$4.00. One lecture, 3 hours laboratory. Credit, 2 hours.

326 *Farm Tractors*. Operation, servicing, and repairing of gasoline and diesel-powered tractors. Fee, \$4.00. One lecture, 3 hours laboratory. Credit, 2 hours.

328 *Farm Structures and Equipment*. Functional requirements of farm buildings, building materials, and constructional methods. Fee, \$4.00. One lecture, 3 hours laboratory. Credit, 2 hours.

428g *Welding for Shop Teachers*. Welding applicable to the farm shop, safety precautions, identification of metals by spark tests, chemical and microscopic analysis. Fee, \$5.00. One lecture, 6 hours laboratory. Credit, 3 hours.

Agronomy

AG 130 *Crop Production*. Principles of field crop production. Two lectures, 3 hours laboratory. Credit, 3 hours.

232 *Soils*. Properties of soils and their relation to crop production. Prerequisite: CH 111 or equivalent. Fee, \$3.00. Three lectures or equivalent. Credit, 3 hours.

234 *Irrigation Principles and Practices*. Water measurement and conveyance application and conservation of irrigation water. Prerequisite: AG 232. Three lectures or equivalent in field work. Credit, 3 hours.

236 *Crop Production Practices*. Supervised farm experience in field crop production and harvesting. Prerequisites: AG 130. One discussion period, 6 hours laboratory. Credit, 3 hours.

237 *Crop Production Practices*. Continuation of AG 236. Credit, 3 hours.

246 *Conservation of Agricultural Resources*. Developing an understanding of the relationships of agricultural resources. Three lectures or equivalent in field work. Credit, 3 hours.

330 *Soil Fertility*. Use of fertilizers, crop rotations, and water in the management of soils. Prerequisite: AG 232. Fee, \$4.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

332 *Commercial Fertilizers*. Composition, properties, availability and economic use of commercial fertilizers and related materials. Prerequisite: AG 232. Three lectures or equivalent. Credit, 3 hours.

338 *Range Management*. Improvement and utilization of range land. Prerequisites: AH 150; 1-BO 100. Fee, \$3.00. Three lectures or equivalent in field work. Credit, 3 hours.

340 *Weeds and Weed Control*. Identification of weeds and methods of control. Prerequisite: 1-BO 100. Two lectures, 3 hours laboratory. Credit, 3 hours.

342 *Grain Crops*. Production, harvesting, and utilization of grain crops. Two lectures, 3 hours laboratory. Credit, 3 hours.

344 *Alfalfa and Forage Production*. Production and storage of forage crops; pasture management and the place of forage crops in rotations and soil conservation. Three lectures or equivalent in field work. Credit, 3 hours.

345 *Cotton Production*. Production, harvesting, and utilization of cotton and its by-products. Prerequisite: 1-BO 100. Two lectures, 3 hours laboratory. Credit, 3 hours.

436 *Soil Conservation*. Soil conservation and its application to farm situations. Prerequisite: AG 232. Three lectures or equivalent in field work. Credit, 3 hours.

441 *Plant Breeding*. Principles and methods used in improving farm crops. Prerequisites: 1-BO 100; 1-BI 340. Three lectures or equivalent in field work. Credit, 3 hours.

447 *Crop Production and Management*. Crop production factors and their application to farm management. Farm plans are prepared for crop production enterprises. Prerequisite: AG 234. Three lectures or equivalent in field work. Credit, 3 hours.

450g *Soil Chemistry*. Chemical and mineralogical properties of soil colloids; weathering, ion exchange, soil solution reactions, and problems of acid and alkaline soils. Prerequisites: AG 232; 1-CH 225. Fee, \$5.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

452g *Soil Physics*. Physical condition of soils; water relationships, aeration, structure, and affects of tillage. Prerequisite: AG 234. Three lectures, 3 hours laboratory. Credit, 4 hours.

495g *Recent Advances in Agronomy*. Current literature and recent developments in agronomy. Prerequisite: Twenty hours in agronomy or plant science. Two lectures and discussion. Credit, 2 hours.

Animal Husbandry

AH 150 *Animal Husbandry*. Livestock production, management and judging. Prerequisite to other animal husbandry courses. Two lectures, 3 hours laboratory. Credit, 3 hours.

151 *Breeds of Livestock*. History, development and characteristics of breeds of farm animals. Credit, 2 hours.

252 *Animal Feeding*. Feeds and feeding methods, digestion, and balancing rations. Prerequisites: 1-CH 111 or 113 and AH 150. Three lectures or equivalent in field work. Credit, 3 hours.

253 *Livestock Production Practices*. Supervised farm experience in animal feeding, breeding, fitting for show, and records. Prerequisite: AH 150. One discussion period, 6 hours laboratory. Credit, 2 hours.

254 *Livestock Production Practices*. Continuation of AH 253. Credit, 2 hours.

260 *Meats*. Slaughtering and cutting carcasses of cattle, sheep, and swine. Uses of by-products, methods of handling meats, and factors affecting quality. Fee, \$4.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

350 *Livestock Judging*. Breed characteristics and comparative judging. Prerequisites: AH 150, 151. Two lectures, 3 hours laboratory or equivalent in field work. Credit, 3 hours.

359 *Swine Production*. Production, breeding, feeding, and management of swine. Prerequisites: AH 150, 252. Two lectures or equivalent in field work. Credit, 2 hours.

360 *Beef Production*. Production, breeding, feeding and management of beef cattle. Prerequisites: AH 150, 252. Two lectures or equivalent in field work. Credit, 2 hours.

361 *Sheep Production*. Production, breeding, feeding, and management of sheep. Prerequisites: AH 150, 252. Two lectures or equivalent in field work. Credit, 2 hours.

362 *Horse Production*. Production, feeding, management and selection of horses. Prerequisite: AH 150. Two lectures or equivalent in field work. Credit, 2 hours.

451 *Advanced Livestock Judging*. An advanced course in judging livestock. Prerequisite: AH 350. Fee, \$3.00. One lecture, 3 hours laboratory. Credit, 2 hours.

453g *Animal Nutrition*. Use of proteins, carbohydrates, fats, minerals, and vitamins by farm animals. Prerequisites: 1-CH 231 and AH 252 or 1-CH 464. Three lectures or equivalent in field work. Credit, 3 hours.

456 *Animal Breeding*. Genetics applied to animal breeding. Prerequisites: 1-BI 340; 1-ZO 100. Three lectures or equivalent in field work. Credit, 3 hours.

457 *Veterinary Science*. Form and functioning of body systems of farm animals. Prerequisites: AH 150 or DH 170 or PH 190; 1-ZO 100. Fee, \$3.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

458 *Livestock Diseases and Sanitation*. Sanitation and management in disease control. Prerequisites: AH 457; 1-ZO 100. Three lectures or equivalent in field work. Credit, 3 hours.

464 *Livestock Production and Management*. Methods of production, livestock enterprises, economics, budgeting, finance, loss prevention, and marketing. Prerequisite: AH 252. Three lectures or equivalent in field work. Credit, 3 hours.

495g *Recent Advances in Animal Science*. Current developments and literature in animal science and management. Prerequisites: Twenty hours in animal science or equivalent. Two hours lecture and discussion. Credit, 2 hours.

Dairy Husbandry

DH 170 *Principles of Dairy Husbandry*. Feeding, management, selection and herd improvement, artificial insemination, diseases, milking, and dairy equipment. Two lectures, 3 hours laboratory. Credit, 3 hours.

271 *Dairy Production Practices*. Supervised farm experience, attainment of proficiency in skills associated with a dairy enterprise. Prerequisite: DH 170. One discussion period, 6 hours laboratory. Credit, 2 hours.

274 *Milk and Milk Products*. Composition, properties, bacteriology, and nutritional value of dairy products. Fee, \$3.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

370 *Dairy Cattle Selection and Breeding*. Pedigrees of outstanding individuals and families; performance records, judging and classification. Prerequisite: DH 170. Two lectures, 3 hours laboratory. Credit, 3 hours.

373 *Animal Reproduction and Artificial Breeding*. Structure and function of the genital system in natural and artificial breeding of farm animals. Prerequisite: 1-ZO 110. Fee, \$3.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

378 *Market Milk*. Producing, assembling, processing, and marketing milk. Sanitation, quality control, legal standards, pricing, and milk plant operation. Prerequisites: DH 170; 1-MI 201. Three lectures or equivalent in field work. Credit, 3 hours.

474 *Dairy Production and Management*. An integration of the principles of feeding, breeding, and management in dairy operation. Prerequisites: DH 170, 271; AH 252. Three lectures. Credit, 3 hours.

Horticulture

HO 180 *Principles of Horticulture*. Fundamentals of fruit, vegetable, and flower production, and home landscaping. Two lectures, 3 hours laboratory. Credit, 3 hours.

281 *Plant Propagation*. Principles and skills in propagation of plants, using seeds, cuttings, and grafting. Prerequisites: 1-BO 100; one course in horticulture. Two lectures, 3 hours laboratory. Credit, 3 hours.

282 *Lawns and Greens*. Selection, establishment, and maintenance of turf grasses for lawn, park, and sports areas. One lecture, 3 hours laboratory. Credit, 2 hours.

284 *Ornamental Plants*. Characteristics and growth requirements of annuals, perennials, bulbs, shrubs, and trees used for landscaping. One lecture, 3 hours laboratory. Credit, 2 hours.

289 *Horticultural Production Practices*. Practical experience in horticultural production problems. Prerequisite: HO 180. Six hours laboratory. Credit, 2 hours.

380 *Landscaping*. Beautification of homes and public areas by lawns and ornamental plants. Prerequisite: HO 284. Two lectures, 3 hours laboratory. Credit, 3 hours.

385 *Tree-Fruit Production*. Production of citrus and deciduous tree fruits. Propagation, pruning, fertilizing, irrigating, pest-control and harvesting. Prerequisite: 1-BO 100. Two lectures, 3 hours laboratory. Credit, 3 hours.

386 *Small Fruits*. Production of grapes, brambles, and strawberries. Planting, pruning, irrigating, pest control, fertilizing, and harvesting. Prerequisite: HO 385. One lecture, 3 hours laboratory. Credit, 2 hours.

387 *Vegetable Crops*. Production of vegetable crops; variety selection, cultural practices, pest control and harvesting. Two lectures, 3 hours laboratory. Credit, 3 hours.

487 *Vegetable Crops*. Physiology of vegetable crops as influenced by cultural practices and environmental factors. Prerequisites: HO 387; 1-BO 360. Credit, 3 hours.

488 *Handling of Fruits and Vegetables*. Methods of harvesting, packaging, and storing fruits and vegetables. Prerequisites: 1-BO 100; HO 180 or 385. Two lectures, 3 hours laboratory. Credit, 3 hours.

Poultry Husbandry

PH 190 *Poultry Husbandry*. Poultry management, and application to local and regional conditions. Three lectures or equivalent in field work. Credit, 3 hours.

291 *Selection and Culling of Poultry*. Selecting poultry for production. Practice in culling flocks. Prerequisite: PH 190. One lecture, 3 hours laboratory or equivalent in field work. Credit, 2 hours.

292 *Poultry Production Practices*. Supervised farm experience in poultry feeding, handling eggs, poultry raising for meat production, sanitation practices, and disease prevention. Prerequisite: PH 190. Six hours laboratory. Credit, 2 hours.

391 *Poultry Production and Management*. Economics of production factors; marketing of poultry products; profit calculations. Prerequisite: PH 190. Three lectures or equivalent in field work. Credit, 3 hours.

392 *Poultry Breeding and Hatching*. Principles and practices. Prerequisite: PH 190. Two lectures, 3 hours laboratory. Credit, 3 hours.

393 *Poultry Diseases and Sanitation*. Health problems of poultry. Description and classification of poultry diseases, their diagnosis, control and prevention. Prerequisite: PH 190. One lecture, 3 hours laboratory. Credit, 2 hours.

495g *Recent Advances in Poultry Science*. Current literature and recent developments in poultry science and management. Prerequisite: Twenty hours in animal science or equivalent. Two hours lecture and discussion. Credit, 2 hours.

Air Science

COL. ALEXANDER W. BRYANT, Chairman, Department of Air Science

Air Science

AS 101 *Basic Air Science (First Year)*. A general survey of air power designed to provide the student with an understanding of the elements and potentials of air power to include: Fundamentals of air power; military air power of the world; military research and development; air vehicle industries; airlines and airways; general aviation; elements of an aircraft; and aerodynamics. Two lectures, 2 hours leadership laboratory a week. Credit, 1.5 hours.

102 *Basic Air Science (First Year)*. A general survey of air power to include: Control and navigation; propulsion systems; space vehicles; military instruments of national security; and professional opportunities in the United States Air Force. Two lectures, 2 hours leadership laboratory a week. Credit, 1.5 hours.

201 *Basic Air Science (Second Year)*. A general survey of the roots and development of aerial warfare emphasizing the principles of war, concepts of employment of forces, and the impact of the changing weapons systems. Treatment of aerial warfare is undertaken to include targets and weapons. Prerequisites: AS 101 and 102 or equivalent. Two lectures, 2 hours leadership laboratory a week. Credit, 1.5 hours.

202 *Basic Air Science (Second Year)*. Treatment of aerial warfare is continued including aircraft and missiles, bases and facilities, and operations. Prerequisite: AS 201. Two lectures, 2 hours leadership laboratory a week. Credit, 1.5 hours.

301 *Advanced Air Science (First Year)*. Knowledge and skills required of a junior officer in the Air Force. This includes staff organization and functions, communicating, instructing, and techniques of problem solving. Prerequisite: Basic Air Science or equivalent. Four lectures, 2 hours leadership laboratory a week. Credit, 3 hours.

302 *Advanced Air Science (First Year)*. A development of basic psychology of leadership, the military justice system, and application of problem solving techniques and leadership theory to simulated and real Air Force problems. Preparation for Summer Training Units. Four lectures, 2 hours leadership laboratory a week. Credit, 3 hours.

311 *Advanced Air Science (Second Year)*. A study of weather and navigational aspects of airmanship, such as temperature, pressure, air masses, precipitation, weather charts, navigational charts and dead reckoning navigation. International relations is devoted to the study of major factors underlying international tensions—balance of power concepts, the United Nations and regional security organizations; and the rise of the super-powers—the United States and the U.S.S.R. Flying training for accepted volunteers in CAA approved schools. Prerequisite: AS 302. Four lectures, 2 hours leadership laboratory a week. Credit, 3 hours.

312 *Advanced Air Science (Second Year)*. Devoted to a study of the concepts of the military aspects of political geography: maps and charts; factors of power; and the geographic influence upon political problems with a geopolitical analysis of the strategic areas. Flying training for accepted volunteers in CAA approved schools. Prerequisite: AS 311. Four lectures, 2 hours leadership laboratory a week. Credit, 3 hours.

All Air Sciences. A Military Ball is scheduled annually to provide military social training.

Architecture

JAMES W. ELMORE, Director, School of Architecture

Architecture

AC 100 *Introduction to Architecture*. Development of understanding of our physical environment through a study of the forms, functions and determinants of today's architecture, its continuity with the past and its relation to everyday life. A brief examination of architecture as a profession is included. Credit, 2 hours.

101 *Theory of Architecture*. Theories of structure, aesthetics, and social expression. Prerequisite: AC 100. Credit, 2 hours.

150 *Architectural Drawing*. Fundamentals of drawing, descriptive geometry, projections, shades and shadows, perspective, sketching and delineation. Emphasis on design applications. Two lectures, 4 hours studio. Credit, 3 hours.

155 *Architectural Drawing*. Continuation of AC 150. Two lectures, 4 hours studio. Credit, 3 hours.

223 *Design*. Explores sources of design inspiration and principles fundamental to all the visual arts. Individual student design studies are developed in studio and workshop experimentation with color, surface and form in a variety of materials and techniques. Nine hours studio. Credit, 3 hours. (Same as 1-AR 141.)

224 *Design*. Continuation of AC 223 with individual student projects having increased orientation toward architecture, industrial design, painting, sculpture, crafts, and other visual arts. Nine hours studio. Credit, 3 hours. (Same as 1-AR 142.)

241 *Delineation*. Techniques for design studies and presentations. Elective. Prerequisite: AC 223. Six hours criticized work in studio. Credit, 3 hours.

261 *Statics*. Basic structural concepts. Force systems, moments, centroids and moment of inertia. Prerequisite: 1-MA 118 or 119. Credit, 3 hours.

262 *Mechanics of Materials*. Hooke's Law. Analysis of axial, shearing and bending stresses. Deflections. Columns. Credit, 3 hours.

300 *Domestic Architecture*. History, design, construction, financing, and ownership of houses; legal and ethical functions and responsibilities of parties to the residential construction process. For other than architectural students. Credit, 2 hours.

311, 312 *Architectural Philosophies*. Derivation of valid architectural criteria and standards through analysis of structural, aesthetic and social characteristics of significant buildings. Credit, 3 hours, each semester.

325, 326 *Architectural Design*. Synthesis of attained technical and philosophical resources in the solution of architectural design problems selected to develop facility in creative processes. Prerequisite: AC 224. Four afternoons a week. Credit, 4 hours, each semester.

351, 352 *Materials and Techniques*. Nature of materials and techniques of their use in architectural design and construction and in design and production of objects associated with architecture. Working drawings and specifications; codes and other regulations; supervision of construction. Two lectures, 4 hours studio. Credit, 3 hours each semester.

363, 364 *Structural Systems*. Computations for members of structural systems in wood, steel and concrete. Prerequisite: AC 262. Credit, 3 hours each semester.

371, 372 *Mechanical and Electrical Systems*. Water supply and drainage; heating, ventilating and air conditioning; acoustics; electrical systems; lighting; refrigeration; building communications systems. Credit, 3 hours each semester.

413, 414 *Architectural Philosophies*. Application of derived criteria and standards to understanding of architecture as satisfaction of the cultural and practical needs of a people, place and time as revealed by historical documentation. Credit, 3 hours each semester.

415 *Architectural Philosophies Seminar*. Development of a personal philosophy and supporting faith in the perfectability of architecture through a critical appraisal of contemporary work. Credit, 2 hours.

427, 428 *Architectural Design*. Application of expanding resources in the solution of architectural design problems selected to demand increasing individual creativity. Prerequisite: AC 326. Four afternoons a week. Credit, 5 hours each semester.

429 *Architectural Design*. Extension of prerequisite course AC 428. Four afternoons a week. Credit, 5 hours.

431 *Materials and Techniques*. Landscape and related materials and techniques essential to the integration of indoor and outdoor spaces in architecture. Credit, 2 hours.

432 *Community Planning*. Principles, problems and techniques of planning as related to neighborhoods, communities, regions and other large segments of our total environment. Prerequisite: AC 431. Credit, 2 hours.

435 *Architectural Workshop*. A concentrated study of practical and theoretical aspects of architecture carried on in a full time workshop and required of all students during the summer following completion of AC 326 or AC 428. Required. Credit, 6 hours.

436 *Architectural Workshop*. Continuation of AC 435. Elective. Prerequisite: AC 435. Second Summer Session. Credit, 6 hours.

456 *Technical Problems Seminar*. Written, graphic and oral reports of investigation into specific materials or techniques as selected by students with approval of instructor. Prerequisite: AC 352. Credit, 2 hours.

465, 466 *Structural Systems*. Structural design of buildings using wood, metals, concrete and pre-stressed concrete. Methods of framing; wind and earthquake forces; special systems. Prerequisite: AC 364. Credit, 3 hours each semester.

467 *Structural Systems*. Structural design of buildings using wood, metals, concrete and pre-stressed concrete. Methods of framing; wind and earthquake forces; special systems. Prerequisites: CE 321, 322. Credit, 3 hours.

481 *Design and Construction Processes*. Functions, problems and joint operating processes of the architect, structural engineer, mechanical engineer, electrical engineer, contractor and others who are individually and collectively involved in the creation of buildings. For other than architectural students. Prerequisite: Senior standing. Two lectures, 4 hours studio. Credit, 3 hours.

482 *Professional Practice*. Legal, ethical, business and management procedures involved in architectural practice and in the construction industry. Prerequisite: AC 352. Credit, 3 hours.

492 *Thesis Research*. Selection of thesis subject. Development of program and preparatory research. Prerequisite: AC 428. Credit, 2 hours.

493 *Thesis*. A final problem demonstrating maturity achieved in the entire curriculum. Written, oral and graphic presentation to the faculty in architecture. Prerequisite: Completion of all other degree requirements. Credit, 12 hours.

Construction

CO 157 *Construction Drawing*. Elements of architectural and topographic drafting. Preparation and interpretation of working drawings. Two lectures, 4 hours studio. Credit, 3 hours.

191, 192 *Construction Materials and Techniques*. Characteristics of materials and methods of their use in construction. Credit, 3 hours each semester.

383, 384 *Construction Estimating*. Methods of estimating costs in building construction; quantity surveys; unit prices; bidding procedures. Prerequisite: CO 192. Credit, 3 hours each semester.

387, 388 *Construction Estimating*. Methods of estimating costs in engineering construction; quantity surveys; unit prices; bidding procedures. Prerequisite: CO 384. Credit, 3 hours each semester.

391, 392 *Construction Equipment*. Ownership, maintenance and use of equipment used in building and engineering construction. Prerequisite: CO 192. Credit, 3 hours.

490 *Pre-Plans and Methods*. Procedures of planning and organization employed prior to actual commencement of construction operations. Prerequisite: CO 387. Credit, 3 hours.

495, 496 *Construction Operations*. Legal, ethical, business and management procedures; processes and organization necessary to efficient conduct of construction operations; scheduling of work; ordering, storage and handling of materials and equipment; labor relations; coordination, superintendence and on the job management. Prerequisite: CO 384. Credit, 3 hours.

Art

HARRY WOOD, Chairman, Department of Art

Art

AR 111 *Drawing and Perspective*. Techniques of drawing and sketching as applied to the realistic and expressive representation of objects, landscapes, buildings, animals, etc. Four hours a week. Credit, 2 hours.

114 *Life Drawing*. Development of skill and expressiveness in drawing the basic form, construction, and action of the human figure from live models. Fee, \$5.00. Six hours a week. Credit, 3 hours.

121 *Beginning Painting*. Emphasis upon composition, color and technical mastery of painting media. Prerequisites for art majors: AR 111, 142. Six hours a week. Credit, 3 hours.

122 *Water Color*. Painting in gouache and transparent water color. Emphasis on techniques, composition, and color. Prerequisites for art majors: AR 111, 142. Six hours laboratory. Credit, 3 hours.

123 *Advanced Painting.* Advanced problems in oil painting. Prerequisite: AR 121. Six hours a week. Credit, 3 hours.

131 *Sculpture.* Modeling, casting, mold making and building armatures; carving in wood or plastic. Prerequisites for art majors: AR 114, 141. Six hours a week. Fee, \$4.00. Credit, 3 hours.

132 *Sculpture.* A continuation of AR 131 with an introduction to welded sculpture, portrait modeling, and other processes. Prerequisite: AR 131. Six hours a week. Fee, \$4.00. Credit, 3 hours.

141 *Basic Design.* Explores sources of design inspiration and principles fundamental to all the visual arts. Individual student design studies are developed in studio and workshop experimentation with color, surface, and form in a variety of materials and techniques. Six hours studio. Credit, 3 hours. (Same as 4-AC 223.)

142 *Basic Design.* Continuation of AR 141 with individual student projects having orientation toward architecture, industrial design, painting, sculpture, crafts, and other visual arts. Six hours studio. Credit, 3 hours. (Same as 4-AC 224.)

143 *Interior Design.* Design, rendering, and model construction of floor plans, elevations, and interior sketches. Prerequisites: AR 111, 142. Fee, \$2.00. Six hours a week. Credit, 3 hours.

161 *Ceramics.* A laboratory course introducing the student to the nature of clay and glazes, hand-forming methods, throwing on the wheel, decorative processes, glaze application, and firing. Prerequisite for art majors: AR 141. Fee, \$5.00. Four hours a week. Credit, 2 hours.

162 *Ceramics.* A continuation of AR 161 with increased emphasis on wheel throwing. Development of individual style. Prerequisite: AR 161. Fee, \$5.00. Four hours a week. Credit, 2 hours.

171 *Crafts.* A laboratory course in modern design using materials such as metal, wood, leather, and textiles. Field studies, block printing, lapidary work, weaving, silk screen, and bookbinding are also explored. Prerequisite: AR 141 or 142 for art majors. Fee, \$10.00. Wood, metals, copper enamel, and textile paint furnished. Six hours a week. Credit, 3 hours.

181 *Lettering.* Construction, spacing, and arrangement of Roman and Gothic letters. Analysis of italics, script, and miscellaneous letter forms. Four hours a week. Credit, 2 hours.

182 *Commercial Art.* Practical problems in six major graphic media used in advertising. Recommended also for journalism and business administration majors. Prerequisite: AR 181. Fee, \$2.00. Six hours a week. Credit, 3 hours.

184 *Fashion Design.* Initial course in designing and constructing fashions. A survey of manufacturers, retailers, designers and illustrators. Prerequisites for art majors: AR 114, 141. Six hours a week. Credit, 3 hours.

185 *Fashion Illustration*. Introduction to fashion illustration. Emphasis upon sketching and rendering. Prerequisites: AR 114, 142. Six hours a week. Credit, 3 hours.

191 *Photographic Art*. An introduction to photography as an art medium. Fee, \$10.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

211 *Advanced Drawing*. Emphasis on composition and exploration of drawing media. Prerequisite: AR 111. Fee, \$3.00. Four hours a week. Credit, 2 hours.

214 *Life Drawing*. A continuation of AR 114, with increased emphasis on figure composition. Prerequisite: AR 114. Fee, \$5.00. Six hours a week. Credit, 3 hours.

222 *Advanced Water Color*. More advanced problems in picture construction. Prerequisite: AR 122. Six hours a week. Credit, 3 hours.

223 *Advanced Painting Problems*. Problems for those with a serious interest in easel painting or murals as a career or hobby. Prerequisite: AR 123. Six hours laboratory, 1 hour research. Credit, 3 hours.

231 *Advanced Sculpture*. Experimenting with various materials and working from model. Prerequisite: AR 131. Fee, \$5.00. Six hours a week. Credit, 3 hours.

241 *Space Design*. Creative design with emphasis on volume and space relationships. Construction in a variety of materials. Continuing use of hand tools and machine tools. Prerequisite: AR 141. Fee, \$5.00. Six hours laboratory. Credit, 3 hours.

261 *Ceramics*. Continuation of AR 162 with increased emphasis on decoration and glazing of wheel-thrown ware. Prerequisite: AR 162. Fee, \$5.00. Six hours a week. Credit, 3 hours.

271 *Advanced Crafts*. Correlation of function with medium and design. Problems in weaving, bookbinding, and costume jewelry. Individual problems. Prerequisite: AR 171. Fee, \$3.00. Six hours a week. Credit, 3 hours.

281 *Advanced Lettering*. Emphasis on arrangements and spacing. Prerequisite: AR 181. Four hours a week. Credit, 2 hours.

284 *Advanced Fashion Design*. Designing clothes with relation to price ranges and materials. Style forecasting. Prerequisite: AR 184. Six hours a week. Credit, 3 hours.

285 *Advanced Fashion Illustration*. Illustrating clothes and accessory merchandise for newspaper, magazine, and catalog advertising. Prerequisite: AR 185. Six hours a week. Credit, 3 hours.

291 *Darkroom Theory and Technique*. The theory of the action of light upon photographic materials. Print finishing for display or reproduction. Prerequisite: AR 191 or equivalent. Fee, \$10.00. One lecture, 6 hours laboratory. Credit, 3 hours.

314 *Advanced Life Drawing*. Emphasis on form and anatomical structure of figure and head. Various mediums and techniques. Prerequisite: AR 114. Fee, \$5.00. Six hours a week. Credit, 3 hours.

322 *Advanced Water Color*. Prerequisite: AR 222. Six hours laboratory. Credit, 3 hours.

331 *Advanced Sculpture*. Continuation of AR 231. Prerequisite: AR 231. Fee, \$5.00. Six hours a week. Credit, 3 hours.

343 *Stage Craft*. Design and construction of scenery, costumes, and lighting for use in live theater, puppet theater, and television. Open to art majors and art education majors. Fee, \$3.00. Four hours a week. Credit, 2 hours.

344 *Advanced Interior Design*. Coordinated planning in decorating interiors. Emphasis upon modern ways of achieving space. renderings in color and perspective, and scale models. Prerequisite: AR 143 or equivalent. Fee, \$2.00. Six hours a week. Credit, 3 hours.

351 *Graphic Arts Processes*. Introduction to modern print-making processes in woodcut, etching, and lithography. Prerequisites: AR 111, 114, 142. Fee, \$3.00. Six hours laboratory a week. Credit, 3 hours.

361 *Advanced Ceramics*. Students specialize in more advanced production methods, glaze formula interpretation, some experimental work in clays and glazes. Prerequisites: AR 141, 161. Fee, \$5.00. Six hours a week. Credit, 3 hours.

371 *Advanced Crafts*. Students specialize in a particular craft medium or technique. Prerequisite: AR 271. Fee, \$3.00. Six hours a week. Credit, 3 hours.

372 *Contemporary Jewelry Design*. Theory of three-dimensional design as adapted to contemporary jewelry. Prerequisites: AR 141, 142. Fee, \$2.00. Four hours a week. Credit, 2 hours.

381 *Advanced Lettering*. Recommended only to those having a special interest in lettering. Prerequisite: AR 281. Four hours a week. Credit, 2 hours.

382 *Advanced Commercial Art*. The student specializes in areas in which he is most interested. Prerequisites: AR 181, 182. Six hours a week. Credit, 3 hours.

384 *Advanced Fashion Design*. Students may specialize in designing clothes for special types, for the junior miss, or for children. Prerequisite: AR 284. Six hours a week. Credit, 3 hours.

391 *Advanced Photography*. Course in the manipulation and interpretation of light in all its studio and darkroom aspects. Prerequisite: AR 191. Fee, \$10.00. One lecture, 6 hours laboratory. Credit, 3 hours.

414g *Advanced Life Drawing*. Continuation of AR 314 with anatomical research, one hour additional each week. Group criticism.

Prerequisites: AR 114, 314. Fee, \$3.00. Six hours laboratory, 1 hour outside preparation. Credit, 3 hours.

421g *Painting Mediums and Techniques*. A laboratory course to acquaint the student with materials in all varieties of painting. Experimental problems in oil, lacquer, pastel, encaustic, acetate, paints, mosaic, and others. Fee, \$2.50. Four hours a week. Credit, 2 hours.

423g *Portrait and Figure Painting*. Painting from model in oil, gouache, tempera or water color. Prerequisites: AR 123, 314. Fee, \$4.00. Four hours a week. Credit, 2 hours.

425g *Figure Painting*. Prerequisite: AR 423. Fee, \$4.00. Four hours a week. Credit, 2 hours.

432g *Advanced Sculpture*. For those with serious interest in the art of sculpture. Prerequisite: AR 231. Fee, \$5.00. Six hours laboratory a week. Credit, 3 hours.

443g *Advanced Interior Design*. Continuation of AR 314. Prerequisites: AR 143, 344. Fee, \$5.00. Six hours a week. Credit, 3 hours.

451g *Graphic Arts Processes*. Advanced printmaking processes in etching and lithography. Prerequisite: AR 351. Fee, \$3.00. Six hours a week. Credit, 3 hours.

452g *Graphic Arts Processes*. Advanced printmaking processes in wood cut and the serigraph. Prerequisite: AR 451. Fee, \$3.00. Six hours laboratory. Credit, 3 hours.

461g *Advanced Ceramics*. Studio problems adapted to meet individual needs. Curriculum problems, procedures, and techniques for teachers. Advanced research for the individual potter. Prerequisite: AR 361 or equivalent. Fee, \$5.00. Six hours a week. Credit, 3 hours.

471g *Native Crafts*. Research and practice in preparation and use of native materials in basket weaving, weaving, silversmithing, and gem-setting. Fee, \$10.00. Six hours a week. Credit, 3 hours.

472 *Theory and Practice of Metal Design*. Development of lost-wax design from ancient civilizations to the present, including its application to jewelry and small sculpture in metals. Prerequisite: AR 372. Fee, \$3.00. One lecture, 3 hours laboratory. Credit, 2 hours.

482g *Advanced Commercial Art*. Planning and preparation of samples of work for presentation to prospective employers. Prerequisite: AR 382. Six hours a week. Credit, 3 hours.

521 *Studio Problems and Techniques*. Advanced study in the fields of painting, sculpture, design, graphics, and ceramics. May be repeated for credit. Six hours a week. Credit, 3 hours.

580 *Creative Terminal Project*. Must be done in one of the five major areas of concentration in the MFA degree program. Must

be approved by the student's committee before undertaken, and before completion, the student must submit a complete report. A public exhibition approved by the committee must precede the final examination. Selected materials from the exhibit may be retained by the University on indefinite loan. Credit, 10 or 15 hours.

Special Graduate Courses, AR 500, 590, 591, 592, 593. See page 210.

Art Education

AE 301, 302 *Public School Art*. Emphasis on self-understanding through the use of art, concurrent with the study of the art-work of children of all ages from early childhood to mid-adolescence. Fee, \$2.00. Four hours a week. Credit, 2 hours each semester.

311 *Art Supervision in the Elementary School*. Exploration of theory, materials, organization, methods, and curriculum for the elementary art specialist or consultant; the Art Supervisor's responsibility in human relations and communications. Credit, 2 hours.

411g *Art for Elementary Teachers*. The integration of creative laboratory activities with curriculum planning, including observation at the Training School. Fee, \$3.00. One lecture, 4 hours laboratory. Credit, 3 hours.

420g *Crafts for the Elementary School Teacher*. Practical laboratory experiences stressing inexpensive and salvage materials that children can use. Combinations of materials and specific knowledges in mosaic, paper mache, clay, wood, wire, etc. Fee, \$5.00. One lecture, 3 hours laboratory. Credit, 2 hours.

480g *Methods of Teaching Art on the Secondary Level*. Methods of instruction, theory organization and presentation of appropriate content in art. Prerequisite: 2-SE 311 or concurrent registration. Credit, 3 hours.

511 *History and Theory of the Teaching of Art*. The teaching of art from Plato to Kepes. Emphasis placed upon the history of the great insights into the nature of creative expression. Prerequisites: AE 201 and 2-BE 222, or their equivalent. Credit, 3 hours.

Art History

AH 102 *Introduction to Art*. Development of understanding and enjoyment of art and its relationship to everyday life through the study of painting, sculpture, architecture, and design. Some laboratory experience. Credit, 2 hours

115 *History of Fashions*. Research and study of historic costume. Consideration will be given to the adaptation of past styles in dress in designing present day fashions. Credit, 2 hours.

211 *Western Art to the Renaissance*. A survey of western art to the Renaissance. Credit, 3 hours.

212 *Renaissance Art*. Continuation of AH 211. A survey of the art of the Renaissance in Italy and Northern Europe. Credit, 3 hours.

313 *Contemporary Art*. Philosophy and trends in twentieth-century art. Credit, 3 hours.

321 *American Art*. The cultural unfolding of America as reflected in the significant trends in American painting, sculpture, and architecture. Credit, 3 hours.

413g *Primitive Art*. Relation of early art forms from prehistoric and neolithic to Oceanic, African, and pre-Columbian to contemporary art expression. Credit, 3 hours.

414g *Oriental Art*. A survey of the art of China, India, Japan, the Near East and Polynesia, and the relating of their arts to contemporary art expression. Credit, 3 hours.

415g *Southwestern Indian Art*. A survey of the unique arts and crafts of the Southwestern American Indians from pre-historic times as related to their historical background and social customs. Credit, 3 hours.

416g *Mexican Art*. A survey of Mexican Art from Aztec and Mayan through the great contemporary schools. Course taught in English but projects may be submitted in Spanish. Credit, 3 hours.

441g *Aesthetics*. A course in the mature appreciation and understanding of the arts emphasizing the relationships of art, music, philosophy, and literature. Intended to integrate and give meaning to studio skills for majors in art or music, and to teachers and all who wish to increase understanding of modern arts. Credit, 2 hours.

442g *Aesthetics*. Continuation of AH 441. Credit 2 hours.

Botany

_____, Chairman, Department of Botany

Botany

BO 100 *General Botany*. Brief survey of lower plant life. More detailed study of flowering plants. Fee, \$4.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

170 *The Flora of Arizona*. The identification of Arizona plants, and methods of collecting, preserving, and mounting. Prerequisite: BO 100 or BI 100. Fee, \$3.00. One lecture, 6 hours laboratory or field trip, one weekend trip. Credit, 3 hours.

250 *Plant Anatomy*. A detailed study of flowering plants, relating structure and function in the case of stems, leaves, roots, flowers, fruits, and seeds. Prerequisite: BO 100. Fee, \$4.00. Two lectures, 6 hours laboratory. Credit, 4 hours.

280 *General Plant Pathology*. The principles and agents of disease, including field observations and methods of control. Prerequisite: BO 100. Fee, \$5.00. Two lectures, 6 hours laboratory. Credit, 4 hours.

360 *Plant Physiology*. An investigation of plant growth, nutrition, food synthesis, respiration and reproduction. Prerequisites: BO 100; CH 231. Fee, \$5.00. Two lectures, 6 hours laboratory. Credit, 4 hours.

420g *Plant Ecology*. Plant associations in relation to the major environment factors. Prerequisite: BO 170 or permission of the instructor. Fee, \$4.00. Three lectures, 3 hours laboratory or field trip, one week-end field trip. Credit, 4 hours.

440g *Morphology and Classification of the Thallophytes*. Morphology, taxonomy, and economic importance of the algae and fungi. Prerequisite: BO 100. Fee, \$2.00. One lecture, 3 hours laboratory including field trips. Credit, 2 hours.

447g *Morphology and Classification of the Bryophytes and Pteridophytes*. Morphology, taxonomy, and economic importance of the mosses, ferns and other vascular plants exclusive of the Angiosperms and Gymnosperms. Prerequisite: BO 100. Fee, \$2.00. One lecture, 3 hour laboratory including field trips. Credit, 2 hours.

450 g *Plant Microtechnique*. Methods of handling plant materials for cytological and anatomical examination. Prerequisite: BO 100. Fee, \$5.00. One lecture, 6 hours laboratory. Credit, 3 hours.

460g *Physiology of Growth and Reproduction*. Interaction of environmental, metabolic and hormonal factors in vegetative and reproductive phases of plant behavior. Prerequisites: BO 360 and CH 231. Fee, \$5.00. Two lectures, 4 hours laboratory. Credit, 3 hours.

471g *Grasses and Composites*. Principles underlying the classification and naming of plants. Laboratory emphasis on grasses and composites. Prerequisite: BO 170 or approval of the instructor. Fee, \$4.00. One lecture, 6 hours laboratory, including one weekend field trip. Credit, 3 hours.

472g *Cacti and Succulents of Arizona*. Identification of the principle desert cacti and succulents in the area. Prerequisite: BO 100 or equivalent. Fee, \$3.00. One lecture and 3 hours field work, or 6 hours field work. Credit, 2 hours.

473g *Taxonomy of the Higher Fungi*. Principles of collecting, preserving and identifying ascomycetous and basidiomycetous fungi. Consideration of the economic importance and recognition of the edible and poisonous mushrooms. Prerequisite: BO 440 or approval of the instructor. Fee, \$4.00. Two lectures, 6 hours laboratory, including field trips. Credit, 4 hours.

525 *Economic Botany*. Man's dependence upon and economic interest in plants throughout the world. Prerequisite: Approval of instructor. Credit, 3 hours.

Business Administration

GLENN D. OVERMAN, Dean, College of Business Administration

A. R. BURTON, Chairman, Department of Accounting

Chairman, Department of Economics

RALPH C. HOOK, JR., Acting Chairman, Department of

General Business Administration

KEITH DAVIS, Chairman, Department of Management

WILLIAM A. NIELANDER, Chairman, Department of Marketing

DONALD J. TATE, Chairman, Department of

Office Administration and Business Education

Accounting

AC 101 *Elementary Accounting*. Introduction to the theory and practice of accounting applicable to the accounting cycle. Includes journals and ledgers, transactional documents, departmental procedures, and the voucher system. Three lectures, 2 hours laboratory. Credit, 4 hours.

102 *Elementary Accounting*. A continuation of AC 101. Accounting theory and practice applicable to partnerships, corporations, cash, receivables, inventories, fixed assets, liabilities, and manufacturing accounts. Three lectures, 2 hours laboratory. Credit, 4 hours.

181 *Payroll and Miscellaneous Taxes*. Payroll records and reports required by federal and state regulation. Prerequisite: AC 102. Credit, 2 hours.

201 *Intermediate Accounting*. Accounting theory and practice applicable to corporate net worth accounts, investments, reserves, and income. Prerequisite: AC 102. Two lectures, 2 hours laboratory. Credit, 3 hours.

202 *Intermediate Accounting*. Accounting theory and practice applicable to current assets, fixed assets, liabilities, and sources and applications of funds. Prerequisite: AC 102. Two lectures, 2 hours laboratory. Credit, 3 hours.

221 *Mathematics of Accounting*. Review of simple interest, bank discount, cash and trade discount. The elementary principles of compound interest and annuities, and other business calculations. Prerequisite: 1-MA 117 or equivalent. Credit, 2 hours.

322 *Mathematics of Finance*. Compound interest and annuities, bond valuation, amortization, and income tax problems. Prerequisite: AC 221. Credit, 2 hours.

331 *Cost Accounting*. Specialized accounting procedures applicable to job order and process cost manufacturing operations. Prerequisite: AC 201. Credit, 3 hours.

332 *Accounting for Engineers*. Industrial accounting. Includes job, process, standard, and estimated costs. Enrollment restricted to students in the College of Applied Arts and Sciences. Credit, 4 hours.

383 *Advanced Accounting*. Accounting methods and procedures applicable to partnerships, joint ventures, installment sales, and consignments. Prerequisite: AC 202. Two lectures, 2 hours laboratory. Credit, 3 hours.

409g *Governmental and Institutional Accounting*. Specialized accounting methods and procedures applicable to federal, state, and municipal governmental units, and religious, charitable and non-profit organizations. Prerequisite: AC 201, 202. Credit, 3 hours.

415g *Financial Statement Analysis*. Analytical methods applied to financial statements for the guidance of management. Prerequisite: AC 102. Credit, 3 hours.

432g *Advanced Cost Accounting*. Extension of cost accounting methods and procedures to standard, estimated, and distribution cost systems. Prerequisite: AC 331. Credit, 3 hours.

441g *Budgetary Control*. Installation and administration of a budgetary control system, analysis of results obtained, and the use and interpretation of such results by management. Prerequisites: AC 201, 202, and 331. Credit, 2 hours.

442g *Controllershship*. An analysis of the functions of the controller and the organization of his department. Consideration is given to the responsibilities of the controller as a part of the administrative group and to the scope of the problems with which he deals. Prerequisites: AC 201, 202, 331. Credit, 2 hours.

444 *Machine Accounting Procedures*. The operation, potentialities, and economic application of electronic data processing machines to accounting systems. Prerequisite AC 102. Credit, 2 hours.

447g *Accounting Systems*. Adaptation and installation of an accounting system to meet the particular needs of any given business operation. Prerequisites: AC 201, 202, and 331. Credit, 2 hours.

451 *Federal and State Income Tax*. Laws and regulations; preparation of tax returns; income tax procedures. Prerequisites: AC 201, 202. Credit, 3 hours.

452 *Federal and State Income Tax*. A continuation of AC 451. An introduction to estate taxes, gift taxes, miscellaneous taxes, and refund claims. Prerequisite: AC 451. Credit, 3 hours.

472g *Consolidations and Mergers*. Theory and practice applicable to the consolidation of parent and subsidiary financial statements and the merging of corporate interests. Prerequisite: AC 383. Credit, 2 hours.

481g *Auditing Theory and Practice*. Auditing standards, procedures, programs, working papers, internal control, and the ethical and legal responsibilities of the certified public accountant. Prerequisite: AC 202. Credit, 3 hours.

482g *Auditing Theory and Practice*. Continuation of AC 481. Practical application of auditing standards and practices to an audit case with practice in the writing of an audit report. Prerequisite: AC 481. Credit, 3 hours.

501 *Managerial Accounting*. A graduate survey in accounting designed to give graduate students a basic understanding of the principles and functions of the subject, including methods of determining income, valuation theory, accounting for owners' equities, accounting for corporation securities, analysis and interpretation of accounting reports, and the relationship of accounting to economics. Prerequisite: AC 102. Credit, 2 hours.

505 *Law in Professional Accounting*. Law applicable to the various forms of business organizations and the transactions conducted by these business entities. Prerequisite: GB 305. Credit, 2 hours.

521 *Advanced Income Tax Procedures*. Interpretation of federal income tax laws; rules and regulations applicable to partnerships, corporations, reorganizations, fiduciaries, and gifts. Attention given to court decisions and internal revenue procedures. Prerequisite: AC 452. Credit, 2 hours.

522 *Advanced Income Tax Procedures*. Interpretation of federal income tax laws; rules and regulations applicable to individuals, partnerships, corporations, reorganizations, fiduciaries, and gifts. Attention given to research procedure applicable to particular tax situations. Prerequisite: AC 452. Credit, 2 hours.

551 *Advanced Accounting Theory*. Critical analysis of the generally accepted accounting theories and principles. Credit, 2 hours.

552 *Problems in Income Determination*. Analysis of problems in the calculation and disclosure of the periodic income of business enterprises. Credit, 2 hours.

560 *C.P.A. Problems*. Complex accounting problems related to accounting theory and auditing, typical of those given in American Institute examinations. Credit, 2 hours.

561 *C.P.A. Problems*. Complex accounting problems related to the cost and governmental accounting fields, typical of those given in American Institute examinations. Credit, 2 hours.

562 *C.P.A. Problems*. Complex accounting problems related to consolidations, mergers, branches, liquidations, and partnerships, typical of those given in American Institute examinations. Credit, 2 hours.

Special Graduate Courses. AC 590, 591, 592, 593. See page 210.

Advertising

AD 275 *Advertising Principles*. Advertising as a communications tool in marketing and business management. Consideration of creative methods, survey of media, measurements of effectiveness, and coordination with other aspects of the sales and promotional program. Prerequisite: MK 251 or 1-JO 110. Credit, 3 hours. (Same as 1-JO 275.)

311 *Advertising Campaigns*. Planning and preparation of advertising for the printed media, including newspapers, magazines and direct mail; practice in layout and copy writing; study of typography, printing and photoengraving. Prerequisite: AD 275. Credit, 2 hours.

312 *Advertising Campaigns*. Analysis and selection of printed media; scheduling of advertisements; development and execution of the complete advertising campaign. Prerequisite: AD 275. Credit, 2 hours.

322 *Retail Promotion and Display*. Planning and budgeting of promotional activities in the retail store; preparation of advertising for various media; creation of window and interior displays; coordination of promotion with merchandising and sales efforts. Prerequisites: AD 275; MK 321. Credit, 2 hours.

371 *Radio and Television Advertising*. Techniques and problems of radio and television as advertising media including program selection and planning, preparation of continuity, and coordination with other forms of advertising. Prerequisite: AD 275. Credit, 3 hours. (Same as 1-RT 371.)

453g *Advertising Campaign Problems*. Problems in the planning and preparation of advertising for various media. Includes layout, copy, and the complete production process. Prerequisite: AD 311. One hour lecture, two hours laboratory. Credit, 2 hours.

461g *Advertising Management*. A study of advertising planning media selection, and the creation of advertising matter, including preparation of complete advertising campaigns and the solving of typical advertising problems. Prerequisites: MK 460; AD 275. Credit, 3 hours.

472 *Radio-Television Station Management*. Background in the organization, procedures, and policies of radio-television stations. Financial and creative basis of station operation. Consideration of personnel and production problems, relationship with advertising agencies, networks and sponsors. Prerequisites: AD 275 and 1-SE 332 or 1-SE 431. Credit, 3 hours. (Same as 1-RT 472.)

Business Education

BE 480g *Methods of Teaching Business Subjects*. Methods of instruction, organization, and presentation of appropriate content in typewriting, shorthand, bookkeeping, business machines, and basic business courses. Prerequisite: 2-SE 311 or concurrent registration. Credit, 3 hours.

501 *Foundations of Business Education*. The history, philosophy, principles and objectives of business education; problems of curriculum and curriculum evaluation; contribution of business education to general education. Registration subject to approval of instructor. Credit, 2 hours.

502 *Administration and Supervision of Business Education.* Departmental and classroom problems related to curriculums, equipment, guidance, in-service training, and personnel. The regulation of vocational business education programs by state and federal agencies. Credit, 3 hours.

503 *Tests and Measurements in Business Education.* Constructing, administering, and evaluating tests in secretarial and general business subjects. Diagnostic testing for remedial teaching in these subjects. Credit, 3 hours.

511 *Improving Instruction in Secretarial Subjects.* Modern methodology in teaching typewriting, shorthand, and office practice courses. The psychology of skill building and techniques of office production. Credit, 2 hours.

513 *Improving Instruction in Bookkeeping and General Business Subjects.* Evaluation of methodology and materials used in teaching bookkeeping, general business, and related subjects. The place of basic business education in general education. Credit, 2 hours.

514 *The Work Study Program in the Business Occupations.* To provide preparation for teachers of the work-study program for business occupations. Methods and procedures in developing and co-ordinating a work-study program in the secondary schools and the preparation of materials for instruction. Registration subject to approval of instructor. Credit, 2 hours.

Special Graduate Courses. BE 590, 591, 592, 593. See page 210.

Economics

EC 201 *Principles of Economics.* Descriptive analysis of the structure and functioning of the American economy; emphasizes basic economic institutions and the factors determining income and employment levels. Credit, 3 hours.

202 *Principles of Economics.* Price determination and income distribution in a capitalistic economy, investigation of current economic issues with particular emphasis on labor-management relations, agriculture, international trade, and government regulation of business. Prerequisite: EC 201. Credit, 3 hours.

321 *Labor Economics.* Historical and theoretical analysis of labor problems and labor relations; labor force, wage theories, and practices; employment and unemployment; government regulations. Prerequisite: EC 202. Credit, 3 hours.

331 *Comparative Economic Systems.* Economic theories and practices of capitalism, socialism, communism, and fascism. Prerequisite: EC 202. Credit, 3 hours.

336 *International Economics.* Principles and practices of international finance. Techniques of international payments. Exchange rates and their determination. Economic aspects of major international organizations. Prerequisite: EC 202. Credit, 2 hours.

341 *Public Finance*. Principles and practices of taxation, public expenditures, credit, budgetary policy. Prerequisite: EC 202. Credit, 3 hours.

401g *Intermediate Price Analysis*. Value and distribution theory; price and output decisions of business firms under conditions of competition, monopolistic competition, oligopoly, and monopoly. Prerequisite: EC 202. Credit, 3 hours.

402g *Economics of Income and Employment*. Analysis of determinants of aggregate level of employment, output and income of an economy. Prerequisite: EC 202. Credit, 3 hours.

412g *Business Cycles*. Historical, statistical and analytical study of business cycle theory. Comparison of theories of leading economists. Methods of control of cyclical fluctuations. Prerequisite: GB 321 or concurrent registration. Credit, 2 hours.

441g *History of Economic Thought*. Development of economic doctrines; theories of mercantilism, physiocracy, classicism, neo-classicism, Marxism, and contemporary economists. Prerequisite: 12 hours of economics or approval of instructor. Credit, 3 hours.

451g *Economics of Public Utilities*. Economic, legislative, and administrative problems in the regulation of public utility rates and service standards. Study of public utility costs, pricing policies, rates, plant utilization, and competition. Prerequisite: EC 202. Credit, 3 hours.

453g *Government and Business*. Development of public policies toward business; anti-trust activity; economic effects of government policies. Prerequisite: EC 202. Credit, 3 hours.

461g *Current Economic Problems*. Discussion of current economic issues; oral and written reports on assigned topics. Prerequisite: 12 hours of economics or approval of instructor. Credit, 3 hours.

501 *Managerial Economics*. An approach to management problems from an economic point of view. Includes the application of economic analysis to decision-making in various areas of business policy development. Credit, 2 hours.

502 *Advanced Economic Analysis*. Value, price, and distribution theories; national income analysis and application to public policy; recent developments in economic theory. Prerequisites: EC 401, 402. Credit, 3 hours.

503 *International Economic Theory*. Problems of balance-of-payments, commercial policies of the major nations, international economic organizations in theory and practice. Credit, 2 hours.

504 *Fiscal Policy*. Fiscal theory and its appropriate role in determining the economic policies of government. Credit, 2 hours.

Special Graduate Courses. EC 590, 591, 592, 593, See page 210.

Finance

FI 301 *Money and Banking.* Functions of money, monetary systems, credit functions, banking practices and policies. Prerequisite: EC 202. Credit, 3 hours.

305 *Credits and Collections.* Principles and current practices in the field of commercial credit; organization of the credit department; evaluation of the various sources of credit information, analysis of credit risk. Credit, 3 hours.

325 *Business Finance.* The financial structure of various types of business organizations, including sole proprietorships, partnerships, and corporations. Methods of securing and managing funds to meet short- and long-term capital requirements. Prerequisites: AC 102; GB 101; EC 202. Credit, 3 hours.

403g *Personal and Family Finance.* Financial problems and institutions affecting individuals: borrowing, saving, insurance, investment, financial agencies. Not open to students in the College of Business Administration. Credit, 2 hours.

441 *Investments.* Analysis and evaluation of various types of securities. Principles of sound investment policy. Prerequisite: EC 202. Credit, 3 hours.

451g *Bank Organization and Management.* Management of bank funds; credit policies; credit analysis; commercial, agricultural, real estate, consumer, and security loans; handling of distressed loans; investment portfolios of banks, bank earnings, expenses, and dividend policies. Prerequisite: FI 301. Credit, 3 hours.

461g *Cases in Business Finance.* Case problems in the financing of business. Analysis of various types of financing. Prerequisite: FI 325. Credit, 3 hours.

501 *Financial Institutions.* Comprehensive analysis of American financial institutions, both private and governmental; their influence upon the operations of the economy; their relationships to the individual enterprise. Extensive reading and intensive analysis of cases. Credit, 2 hours.

521 *Banking and Monetary Management.* Current policies and problems in commercial and central banking. Prerequisite: FI 301. Credit, 2 hours.

542 *Security Analysis.* Investigation of the securities of representative corporations in major industries; analysis of financial statements and of pertinent economic data; security markets; investment management. Prerequisite: FI 501. Credit, 2 hours.

General Business Administration

GB 101 *Introduction to Business.* The organization, functions, activities, and role of business in the American economic system. Orientation of the student to business terminology, practices, problems, and career opportunities. Not open to students who have received credit in EC 202 and MG 301. Credit, 3 hours.

141 *Mathematics of Business.* The mathematical problems ordinarily encountered in business, excluding compound interest and annuities. Credit, 2 hours.

233 *Business Communication.* Mechanics and psychological principles of business letter writing. Correct application of word usage and grammar to business correspondence. Composition of letters of inquiry, reply, application, sales, credit adjustment, and collection. Prerequisites: 1-EN 102, OA 101, or equivalent. Credit, 3 hours.

301 *Mechanized Data Processing.* Key-driven equipment. Punched card accounting machines. Integrated systems using communication channels. Paper tape methods. Credit, 3 hours.

302 *Electronic Data Processing and Programming.* Stored program machines. Input and output units. Computer applications. Elementary programming including flow charts, filters, loops and verification. Credit, 3 hours.

305 *Business Law.* Contracts, sales, agency, partnerships, corporations, negotiable instruments, personal property, real property, and federal and state regulation of business. Credit, 3 hours.

306 *Business Law.* A continuation of 305. Prerequisite: GB 305. Credit, 3 hours.

321 *Business Statistics.* Application of basic statistical methods to business problems; sources, classification and tabulation of data; index numbers, graphs, inference, time series, correlation. Prerequisites: EC 202 and 1-MA116 or equivalent. Three lectures, 2 hours laboratory. Credit, 4 hours.

341 *Transportation.* Survey of transportation systems; facilities, services and policies of carriers; construction and use of tariffs; traffic procedures. Prerequisites: AC 102; GB 101. Credit, 3 hours.

345 *Traffic Management.* Analysis of the business relationships between shippers and carriers with respect to rates and services in the transportation of goods by rail, highway, water, and air. The role and organization of traffic management as a function in business enterprise. Prerequisites: GB 101 and EC 202. Credit, 3 hours.

371 *Principles of Hotel Administration.* The development and organization of the hospitality industry. A survey and evaluation of hotel and motel services. Responsibilities and procedures of the departments of food, maintenance, engineering, and the front office. Career opportunities in hotel administration. Credit, 2 hours.

372 *Hotel Office Procedures and Control.* Control procedures applicable to hotels and motels; the uniform system of accounting; inventory control; guest histories; transcripts, supervision of office personnel. Prerequisite: GB 371. Credit, 2 hours.

401g *Business Systems Analysis.* Sources of information. Rationalization of the report function. Forms design. Flow charts:

laying out work for tabulating installation or data processor. Planning controls. Prerequisite: GB 302. Credit, 3 hours.

402g *Data Processor Programming*. Typical order codes. Programming techniques: relative addresses, loops, subroutine entries. Debugging programs. Input-output equipment timing. Prerequisite: GB 302. Credit, 3 hours.

422g *Statistical Analysis*. Application of advanced statistical techniques to the analysis of business and economic data; emphasis upon inference, multiple correlation, cyclical and seasonal variation, construction of index numbers, and the development of sampling procedures. Prerequisite: GB 321. Credit, 3 hours.

431g *Business Report Writing*. The organization and preparation of reports of the types used in business. Techniques of collecting, interpreting, and presenting information useful to management. Prerequisite: GB 233. Credit, 2 hours.

451g *Business Research Methods*. Techniques and procedures of general business research, statistical investigation, interpretation and presentation of results, with practical application to actual problems of the business community. Prerequisites: MK 251; GB 321. Credit, 3 hours.

460 *Commercial Motor Transportation*. Highway systems of the U.S., motor carrier operations, and the regulation of motor transportation. Costs, rates, services, taxes, weights and sizes, coordination and consolidation. Relationships with competitive modes of transportation. Prerequisite: GB 341. Credit, 3 hours.

462g *Problems in Transportation and Traffic*. Case problems in transportation operations and traffic management of transportation firms. Selection of equipment, pricing, control, finance, labor relations, organization, and location of transportation operations. Prerequisite: GB 341. Credit, 3 hours.

471 *Hotel Organization and Management*. Buying, building, or leasing facilities. Organizing for efficient operation. Control of income and expenditures. Financial statement analysis. Risks and insurance. Prerequisite: GB 372. Credit, 3 hours.

472g *Hotel Policies and Problems*. Profitable food and beverage operation; forecasting staff and material requirements; analysis of payroll costs; case study of current operating problems. Prerequisite: GB 471. Credit, 2 hours.

Special Graduate Courses. GB 590, 591, 592, 593. See page 210.

Insurance

IN 251 *Principles of Insurance*. Coverages available, buying methods, procedures in settling claims, insurance companies, and vocational opportunities. Prerequisite: GB 101. Credit, 3 hours.

321 *Life Insurance*. Fundamentals of life insurance including types of contracts, functions of various contracts, company or-

ganization, rate making, selection of risks and other home office operations. Governmental supervision of life insurance companies. Prerequisite: IN 251. Credit, 3 hours.

331 *Property Insurance Principles and Coverages*. Policies and principles of fire and casualty insurance. For students planning to make careers in agency or home office work as well as those needing a fundamental knowledge of insurance for business. Prerequisite: IN 251. Credit, 3 hours.

425g *Current Problems in Insurance*. An analysis of major problems and issues in the insurance industry. Prerequisite: Nine hours of insurance. Credit, 2 hours.

432g *Property Insurance Administration*. Rate making, reserves, financial statements, investments, underwriting, claims, prevention, and surveys. For students planning careers in agency or home office work. Prerequisite: IN 331. Credit, 3 hours.

451g *Social Insurance*. Insurance coverages provided by state and federal governments: social security, unemployment insurance, workmen's compensation, and other social or governmental insurance plans. Prerequisite: IN 321. Credit, 2 hours.

501 *Managerial Insurance*. Evaluation of insurance coverages and theory related to managerial decisions. Credit, 2 hours.

Management

MG 301 *Principles of Management*. The fundamentals of organization and administration. Planning, organizing, directing, coordinating, and controlling business activity. Prerequisite: GB 101. Credit, 3 hours.

311 *Personnel Administration*. Personnel selection, placement, training, promotion, wage incentives, absenteeism, and counseling. Prerequisite: EC 202 or approval of instructor. Credit, 3 hours.

331 *Industrial Management*. The principal functions, departmental activities, and policies of manufacturing firms. Organization for production and analysis of production methods. Prerequisite: MG 301 or 4-ME 152. Credit, 3 hours.

335 *Methods and Motion Study*. Methods used in developing procedures for effective utilization of effort in industrial operations. Laboratory practice in analyzing job situations. Process charts, operation charts, micro-motion study, principles of motion economy, job standards, and time standards. Fee, \$4.00. Two lectures, 3 hours laboratory. Credit, 3 hours. (Same as 4-IE 321.)

338 *Industrial Safety*. Safety methods in industry. Safety codes, compensation, inspection, safety educational program, industrial facilities to care for injured workmen, health hazards and protective measures, safeguards on equipment and buildings to prevent accidents. Prerequisite: MG 301. Credit, 2 hours. (Same as 4-IE 331.)

413g *Job Evaluation*. Development of job description and detailed comparison of requirements for jobs within a given organization. Selection procedures to find the individual to meet job requirements. Prerequisite: MG 311. Credit, 2 hours.

422g *Employee Training and Supervision*. A study of the principles of supervision, the techniques of leadership, adjustment of grievances, policy interpretation, group attitude and morale, training and learning processes, and counseling techniques. Prerequisite: MG 311. Credit, 2 hours.

423g *Industrial Relations and Collective Bargaining*. The processes and procedures of collective bargaining. The scope and negotiation of union contracts. Prerequisite: EC 321. Credit, 3 hours.

432g *Production Control*. Production planning and budgeting, development of the production control system, including product development, materials control, plant and equipment analysis, production standards and methods, personnel and supervision; control of production quantity through routing, scheduling, and dispatching; measurement of production efficiency. Prerequisite: MG 331. Credit, 2 hours.

433g *Statistical Quality Control*. The use of statistical techniques in the control of quality of manufactured products. Introduction of probability theory with applications to sampling acceptance procedures. Prerequisite: MG 331 or approval of instructor. Credit, 2 hours. (Same as 4-IE 471.)

451g *Human Relations in Business*. Human aspects of business, as distinguished from economic and technical aspects, and how they influence efficiency, morale, and management practice. Prerequisite: MG 301. Credit, 3 hours.

463g *Business Policies*. Analysis of problems encountered by management in its daily operations. Investigation of sound business principles and practices. Prerequisites: MG 301; FI 325. Credit, 3 hours.

491g *Operations Research*. A study of the scientific methods which make available to executive departments, a quantitative basis for decisions regarding the operations under their control. Early development, value, mathematical analysis, methods, personnel, and organization for effective operations research. Credit, 3 hours. (Same as 4-IE 401.)

501 *Management Policies and Procedures*. An analysis of managerial techniques. Evaluation and application of such tools of management as job analysis, merit rating, time and motion study, and the personnel audit. The development of an operating philosophy of management. Credit, 2 hours.

502 *The Development of Management Thought*. The origin and growth of management concepts. The contribution of leaders in scientific management. Organizational theory, management philosophy, and techniques. Prerequisite: MG 501 or equivalent. Credit, 2 hours.

503 *Cases in Human Relations*. The development of effective work groups in business. Analysis of cases in organizational relationships. Group dynamics, effects of change and informal organization. Prerequisite: MG 451 or MG 501 or equivalent. Credit, 2 hours.

522 *Labor Relations and Public Policy*. The development of state and federal legislation. Analysis of recent decisions of courts and labor bonds. The legal rights and duties of employers, unions, and the public. Credit, 2 hours.

581 *Cases in Industrial Management*. Actual management problems are studied by the case method. Experience in managerial decision making. Credit, 2 hours.

Marketing

MK 201 *Principles of Selling*. The techniques of personal selling. The analysis, organization, and presentation of sales interviews. Prerequisite: GB 101. Credit, 3 hours.

251 *Principles of Marketing*. Survey of principles and trends. Prerequisite: EC 202 or concurrent registration. Credit, 3 hours.

321 *Principles of Retailing*. Survey of store operations including buying, pricing, selling, control, and store services; markup and expense relationships; store organization and system. Prerequisites: MK 251; AC 102. Credit, 3 hours.

332 *Wholesaling*. Organization and function of wholesaling in the marketing channel. Services, price policies, regulation and recent trends. Prerequisite: MK 251. Credit, 2 hours.

334 *Industrial Marketing*. An analysis of the marketing structure for industrial products. Product lines, channels of distribution, selling, pricing, and warehousing problems. Prerequisite: MK 251. Credit, 2 hours.

335 *International Trade*. Principles and practices of international trade; import-export procedures; foreign marketing and financing practices. Prerequisite: MK 251. Credit, 2 hours.

355 *Purchasing*. Practices and problems confronting the purchasing agent, including sources of supply, market information, material specification and inspection, control records, inventories, stores, and the purchase budget. Prerequisites: MK 251; MG 301. Credit, 3 hours.

401 *Public Relations*. Publicity methods and public relations; representation of business firms and institutions to the public. Includes training on what constitutes newsworthy material and how to communicate it through newspapers, magazines, radio-television stations, and other media. Prerequisite: GB 233 or 1-JO 211. Credit, 2 hours. (Same as 1-JO 401.)

411g *Sales Management*. Organization of the sales department; sales planning; selection, training, control, and compensation of the sales forces. Prerequisite: MK 483. Credit, 3 hours.

412 *Sales Promotion Policies.* Analysis of sales appeals. The coordination of personal selling with other types of sales promotion. Methods of developing a clientele, including the locating of new markets. Prerequisite: MK 201. Credit, 2 hours

423g *Retail Buying and Stock Control.* Buying procedures for retail stores; group buying, central buying, and use of resident buying offices; inventory methods and systems; dollar control and unit control; merchandise planning and open-to-buy; application of control systems to various types of retail stores. Prerequisite: MK 321. Credit, 2 hours.

424g *Retail Store Management.* Problems of store management including location, layout, customer services, personnel, and operational factors as they affect successful retailing. Prerequisite: MK 321. Credit, 3 hours.

460g *Marketing Policies.* Practices and problems confronting the marketing executive and the development of techniques found useful in their solution. Prerequisite: MK 251. Credit, 3 hours.

471g *Price Policies.* Relationship of demand, costs, and price to marketing decisions. Evaluation of profit objectives and manipulative techniques relative to demand for both consumer and industrial goods. Prerequisite: MK 251. Credit, 2 hours.

483g *Marketing Research.* Use of marketing data in solving marketing problems. Determining consumer demand, sales potentials, and quotas. Evaluation and presentation of findings. Prerequisite: GB 321. Credit, 3 hours.

501 *Marketing Management.* Analysis of marketing problems from the management point of view. Credit, 2 hours.

502 *Public Relations Policies.* Case analysis of problems encountered in maintenance of favorable relationships between business organizations and the public; development of sound public relations policies. Credit, 2 hours.

522 *Sales Analysis and Control.* An analytical approach to marketing problems, particularly in the interpretation of findings from sales analysis. Credit, 2 hours.

535 *Marketing Institutions.* The role and development of marketing institutions in retailing, wholesaling, manufacturing and institutional distribution. Credit, 2 hours.

563 *Cases in Marketing.* Methodology and techniques as applied to the solution of marketing management problems. Credit, 2 hours.

Office Administration

OA 101 *Beginning Typewriting.* Mastery of the keyboard and development of speed and accuracy by the touch system. Introduction to tabulation, centering, and business letter typing. Minimum requirement for credit, 25 correct words a minute. Fee, \$2.00. One lecture, 2 hours laboratory. Credit, 2 hours.

102 *Intermediate Typewriting.* The development of skill in office production: business letters, rough drafts, business forms, and manuscripts. Minimum requirement for credit in the course, 50 correct words a minute. Fee, \$2.00. One lecture, 2 hours laboratory. Credit, 2 hours.

113 *Elementary Gregg Shorthand.* The basic principles of reading and writing shorthand. Dictation of practiced material. Two lectures, 2 hours laboratory. Credit, 3 hours.

114 *Intermediate Gregg Shorthand.* Building dictation speed with unpracticed material, and a review of shorthand principles. Two lectures, 2 hours laboratory. Credit, 3 hours.

143 *Business Machines.* Instruction and practice in addition, subtraction, multiplication, and division on full-key, ten-key, and rotary calculators. Fee, \$2.00. One lecture, 2 hours laboratory. Credit, 2 hours.

201 *Advanced Typewriting.* Building skill in typing practical office problems to meet business production standards. Use of electric machines. Minimum requirement for credit in the course, 60 correct words per minute. Fee, \$2.00. One lecture, 2 hours laboratory. Credit, 2 hours.

211 *Beginning Transcription.* Building skill in taking dictation and transcribing mailable copies. Two lectures, 2 hours laboratory. Credit, 3 hours.

232 *Records Systems and Filing.* Administration of records systems; analysis and application of various filing systems in the business office. One lecture, 2 hours laboratory. Credit, 2 hours.

312 *Advanced Transcription.* Increased speed in sustained dictation and the transcription of mailable business correspondence. Two lectures, 2 hours laboratory. Credit, 3 hours.

331 *Secretarial Procedures.* Instruction and practice in performing various office duties, including methods of handling mail, arranging itineraries, procuring office supplies, using the telephone, and improving human relations. Prerequisite: OA 312. Credit, 3 hours.

344 *Office Appliances.* Instruction in the use of dictating and transcribing machines, duplicating machines, the Varityper, and PBX. The investigation of suitable office equipment for selected uses. One lecture, 2 hours laboratory. Credit, 2 hours.

351 *Principles of Office Management.* Relationship of the office function to the business enterprise including office location and layout, selection of office equipment and supplies, principles of office organization, supervision of office personnel, employee training programs, office services, and control of office output. Credit, 3 hours.

452g *Office Systems and Procedures.* Methods of establishing, analyzing, standardizing, and controlling administrative systems and procedures including: work simplification, forms analysis,

work-flow charting, layout and space analysis, office manuals. Prerequisite: OA 351. Credit, 3 hours.

Real Estate

RE 251 *Real Estate Principles*. The regulations, practices, legal aspects, and professional ethics of the real estate business. Prerequisite: EC 202. Credit, 3 hours.

302 *Real Estate Management*. Management of residences, apartments, and commercial properties. Consideration of professional standards, methods of business promotion, leasing, insuring, and maintaining properties as an agent of the owners. Prerequisites: AC 102; RE 251. Credit, 3 hours.

331 *Real Estate Finance*. Sources and availability of funds. Management, servicing and repayment of loans. Prerequisite: RE 251. Credit, 2 hours.

401g *Real Estate Appraisal*. The factors affecting the value of real estate. Theory and practice of appraising and preparation of the appraisal report. Techniques in appraisals. Prerequisite: RE 251. Credit, 2 hours.

411g *Real Estate Law*. Legal practices as they apply to the real estate field in general and to the field of titles, mortgages, lending, and trust work in particular. Prerequisites: RE 302; GB 306. Credit, 3 hours.

441g *Real Estate Land Development*. Neighborhood and city growth; municipal planning and zoning; development of subdivisions; agricultural land utilization. Prerequisites: EC 202; RE 411 or equivalent. Credit, 3 hours.

461g *Current Real Estate Problems*. Recent developments in the field of real estate, finance, taxation, zoning, planning government regulations, and government assistance programs. Prerequisite: RE 302, or equivalent. Credit, 3 hours.

Chemistry

CLYDE A. CROWLEY, Chairman, Department of Chemistry

Chemistry

CH 100 *Essentials of Chemistry*. Essentials of general, organic and biochemistry. Especially adapted to the needs of nursing and related fields. Does not meet science requirement in pre-professional curriculums. Fee, \$4.00. Four lectures, 1 quiz, 2 hours laboratory. Credit, 5 hours.

111* *College Chemistry*. Fundamental principles of chemistry. For students without credit in high school chemistry. Fee, \$4.00. Three lectures, 2 quizzes, 3 hours laboratory. Credit, 5 hours.

*In each of the following groups credit is allowed for one course only: CH 111, 113; CH 231, 331; CH 341, 441.

113* *General Chemistry*. Fundamental principles of chemistry. Prerequisites: MA 116 or high school mathematics equivalent and high school chemistry. Fee, \$4.00. Three lectures, 1 quiz, 2 hours laboratory. Credit, 4 hours.

114* *General Chemistry*. Chemistry of metals, nonmetals, and carbon. Prerequisite: CH 111 or 113. Fee, \$4.00. Three lectures, 1 quiz, 2 hours laboratory. Credit, 4 hours.

115* *General Chemistry and Qualitative Analysis*. Qualitative separation and identification of common cations and anions. Prerequisite: CH 111 or 113. Fee, \$5.00. Three lectures, 2 quizzes, 4 hours laboratory. Credit, 5 hours.

121 *Qualitative Analysis*. Qualitative separation and identification of common cations and anions. Prerequisite: CH 114. Fee, \$5.00. Two quizzes, 4 hours laboratory. Credit, 2 hours.

225 *Quantitative Analysis*. Principles and methods of volumetric and gravimetric analysis. Prerequisite: CH 114 or 115. Primarily for students in agriculture, pre-medicine, pre-dentistry, medical technology. Fee, \$6.00. Two lectures, 1 quiz, 6 hours laboratory. Credit, 4 hours.

231* *Elementary Organic Chemistry*. Survey of the compounds of carbon, including representative groups of aliphatic and aromatic series. For students of home economics, agriculture and biology. Prerequisite: CH 111 or 113. Fee, \$4.00. Three lectures, 1 quiz, 2 hours laboratory. Credit, 4 hours.

300 *Glass Blowing*. Laboratory techniques in glass blowing. Limited to science majors. Fee, \$6.00. Four hours laboratory. Credit, 1 hour.

327 *Quantitative Analysis*. Principles and methods of volumetric and gravimetric analysis. Prerequisite: CH 114 or 115. Required of B.S. chemistry majors. Fee, \$6.00. Two lectures, 1 quiz, 9 hours laboratory. Credit, 5 hours.

331*, 332 *General Organic Chemistry*. Chemistry of organic compounds. Prerequisite: CH 114 or 115. Fee, \$6.00 each semester. Three lectures, 3 hours laboratory. Credit, 4 hours each semester.

341* *Elementary Physical Chemistry*. Properties of solids, liquids, gases, solutions, equilibrium, colloidal state. For premedical, biology, agriculture, etc. students. Prerequisites: CH 225 and 231 or 331. Fee, \$5.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

351 *Inorganic Chemistry*. Survey of atomic structure, periodic relationships, chemical bonding, nomenclature, aqueous and non-aqueous chemistry. Prerequisite: CH 114 or 115. Credit, 3 hours.

421g *Instrumental Analysis*. Theory and applications of colorimetry, absorption and emission spectroscopy, X-ray diffraction, and other instrumental methods of analysis. Prerequisites: CH

331 and PH 112. Fee, \$6.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

425g *Metallurgy*. Extraction of metals, crystal and atomic structure, phase transformations, tests and properties of high temperature metals and refractories, and instruction to spectroscopy. Prerequisite: 4-ES 351. Credit, 3 hours. (Same as 4-ES 452.)

431g *Qualitative Organic Analysis*. Systematic identification of organic compounds. Prerequisites: CH 225 or 327 and 332. Fee, \$8.00. One lecture, 6 hours laboratory. Credit, 3 hours.

435g *Organic Laboratory Methods*. Methods of organic synthesis. Emphasis on general types of organic reactions and laboratory techniques employed in preparation, isolation and purification of complex organic products. Prerequisite: CH 332. Fee, \$8.00. One lecture, 1 conference, 5 hours laboratory. Credit, 3 hours.

441g*, 442g *General Physical Chemistry*. Includes gases, liquids, solids, solutions, equilibrium, phase rule, electrochemistry, thermodynamics, atomic structure, radioactivity, and colloids. Prerequisites: CH 225 or 327, or 4-KE 211; PH 112; MA 212. Fee, \$6.00 each semester. Three lectures, 3 hours laboratory. Credit, 4 hours each semester.

447g *Radiochemistry*. Fundamentals of radioactivity, natural and artificial radioisotopes, nuclear reactions, isolation of isotopes, nuclear energetics, measurement of radioactivity, tracer techniques and other applications. Prerequisite: CH 442 (or concurrently). Credit, 2 hours.

448g *Radiochemistry Laboratory*. Radiation measurements, tracer methods, quantitative identification of isotopes, and other procedures applicable to chemical, physical, engineering and biological problems. Prerequisite: CH 447 (or concurrently). Fee, \$6.00. One conference, 5 hours laboratory. Credit, 2 hours.

452g *Inorganic Chemistry Laboratory*. Preparation and purification of typical inorganic substances with emphasis on methods and techniques. Prerequisite: Approval of instructor. Fee, \$6.00. One lecture, 3 hours laboratory. Credit, 2 hours.

464g *Biochemistry*. Chemistry of animal and plant life including biological compounds, tissues, foods and digestion, enzymes, etc. Prerequisite: CH 231 or 332. Credit, 3 hours.

465g *Biochemistry Laboratory*. Qualitative and quantitative chemistry of carbohydrates, fats, proteins, enzymes; milk, blood and urine analysis. Prerequisite: Approval of instructor. Fee, \$6.00. Three hours laboratory. Credit, 1 hour.

471g *Applied Chemistry*. Application of chemistry to agriculture, mining, water, sanitation, and fuels. Prerequisite: CH 231 or 332. Credit, 3 hours.

511, 512 *Chemistry for In-service Teachers*. An integrated approach to the concepts and principles of chemistry. Prerequisite: Approval of instructor. Credit, 3 hours each semester.

514 *Recent Advances in Chemistry*. Survey of background material and treatment of recent developments in chemistry to refresh and augment training of secondary school chemistry teachers. Prerequisite: Approval of instructor. Credit, 2 hours.

515 *Techniques in Teaching Chemistry*. Experience in solving of problems; preparation of reagents, demonstrations, experiments, and projects; and organization and operation of stock-rooms and laboratories. Prerequisite: Approval of instructor. Credit, 2 hours.

525 *Optical Methods of Chemical Analysis*. Theoretical and practical considerations involving the use of optical instruments for chemical analysis with special emphasis on emission and absorption spectroscopy. Prerequisite: CH 442. Fee, \$6.00. Two conferences, 3 hours laboratory. Credit, 3 hours.

526 *X-Ray Diffraction*. Theoretical and practical considerations involving the use of x-ray diffraction techniques for chemical and structural analyses. Prerequisite: CH 442. Fee, \$8.00. Two conferences, 3 hours laboratory. Credit, 3 hours.

527 *Electrical Methods of Chemical Analysis*. Theoretical and practical considerations of polarography, potentiometric, amperometric, and conductometric titrations. Prerequisite: CH 442. Fee, \$6.00. Two conferences, 3 hours laboratory. Credit, 3 hours.

531 *Quantitative Organic Analysis*. Quantitative determination on a semi-micro scale of organic compounds. Includes the quantitative determination of various organic functional groups. Prerequisite: CH 431. Fee, \$6.00. One lecture, 6 hours laboratory. Credit, 3 hours.

533 *Organic Chemistry*. An advanced course in the principles of organic chemistry. Prerequisite: CH 332. Credit, 3 hours.

534 *Organic Chemistry*. Stereoisomerism, carbohydrates, terpenes, nitrogen heterocyclics. Prerequisites: CH 331, 332. Credit, 3 hours.

543 *Electrochemistry*. Reversible and irreversible processes including electromotive force of cells, activity coefficients, electrolytic conductance, corrosion, electrolysis, and overvoltage phenomena. Prerequisite: CH 442. Fee, \$6.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

545 *Physical Chemistry*. Chemical thermodynamics. Prerequisite: CH 442. Credit, 3 hours.

546 *Physical Chemistry*. Chemical kinetics, classical kinetic theory, statistical mechanics, surface chemistry and catalysis. Prerequisite: CH 442. Credit, 3 hours.

547 *Quantum Chemistry*. Development of principles of quantum theory with survey of approximation methods as applied to chemical problems. Prerequisite: CH 442. Credit, 3 hours.

553 *Inorganic Chemistry*. An advanced course in the principles of inorganic chemistry. Prerequisite: CH 442. Credit, 3 hours.

554 *Inorganic Chemistry*. Systematic descriptive inorganic chemistry. Credit, 3 hours.

563 *Biochemistry*. Chemistry of biologically important compounds and their transformation in plants and animals. Prerequisite: CH 464. Credit, 3 hours.

Special Graduate Courses. CH 500, 590, 591, 592, 593. See page 210.

Education

G. D. McGRATH, Dean, College of Education

GERTRUDE BOYD, Chairman, Kindergarten-Primary Education

DUANE MANNING, Chairman, Elementary Education

B. J. FULLERTON, Chairman, Secondary Education

ROY C. RICE, Chairman, Adult Education

ROBERT MENKE, Chairman, Higher Education

RAYMOND E. WOCHNER, Chairman,

School Administration and Supervision

JOHN VERGIS, Chairman, Audio-Visual Education

GLENN AUSTIN, Chairman, Social Foundations

WILLARD ABRAHAM, Chairman, Special Education

ROBERT L. BAKER, Chairman, Educational Psychology

ROBERT HEIMANN, Chairman, Guidance and Counseling

ROBERT ASHE, Chairman, Research and Surveys

MACK RALSTON, Chairman, Basic Education

HAROLD BATCHELOR, Chairman, Library Science

Kindergarten-Primary Education

KP 211 *Techniques in Story Telling*. The art of story telling, preparation, adaptation, creative writing. Emphasis upon and practice in story telling to young children. Prerequisite: EE211. Credit, 2 hours.

322 *Construction Activities in the Kindergarten-Primary School*. The unit method teaching with emphasis on creative instructional materials of all kinds used in the integrated experience program. Covers first half of school year. Credit, 3 hours.

323 *Construction Activities in the Kindergarten-Primary School*. Continuation of KP 322, second semester. Prerequisite: KP 322. Credit, 3 hours.

344 *Plays and Games for the Kindergarten-Primary School.* Creative and traditional plays and games. A study of types, and actual playing of games for analysis and evaluation. Credit, 3 hours.

355 *Reading and Language Arts in the Kindergarten-Primary Grades.* Emphasis on all phases of the language arts program in the kindergarten-primary grades. The philosophy and techniques of developmental reading and the areas of oral expression, creative writing, manuscript and cursive writing, and listening are included. Required of and open only to kindergarten-primary students. Credit, 6 hours.

366 *Kindergarten-Primary Curriculum and Teaching Problems.* The philosophy, principles, and practices of kindergarten-primary education; discusses all phases of the curriculum. Prerequisites: KP 322, 344, 355, or approval of instructor. Credit, 3 hours.

417 *Directed Teaching in the Kindergarten-Primary School.* The relationship of theory and practice in methods of teaching; the practice of teaching; practice in guidance, measurement, extra-curricular activities, and classroom management procedures. Credit, 1-16 hours.

428 *Problems of Teachers in the Kindergarten-Primary School.* Individual problems encountered by students in their observations and practice teaching experiences; appraisal of teacher-education backgrounds; bridging of gaps in teacher-education backgrounds. Prerequisite or co-requisite: KP 417. Credit, 3 hours.

522 *Practices and Techniques in Construction Activities.* The place of construction materials and their function in the learning process. Experience with diversified materials in terms of the specific needs of the teacher in the classroom situation. Credit, 3 hours.

533 *Play Education.* Treatment of the philosophies of play. Practical application to the utilization of rhythms, plays, and games. Credit, 3 hours.

544 *Reading and Language in the Kindergarten-Primary Curriculum.* Practical suggestions for meeting the reading needs encountered in teaching on the primary level. Diagnosis of unique problems faced by teachers in the reading and language arts program. Prerequisites: EE 322, 333, or KP 355 or equivalent. Credit, 3 hours.

555 *Modern Practices in the Kindergarten-Primary School.* Practices, materials, and policies with emphasis on curriculum trends, methods of instruction, pupil-teacher and teacher-parent relationships. Prerequisites: KP 366; EE 344, or the equivalent. Credit, 3 hours.

566 *The Kindergarten Movement.* Development of the kindergarten; foreign influences contributing to its establishment; early pioneers; progressive techniques in kindergarten practice. Credit, 3 hours.

577 *Planning, Organizing, and Establishing Kindergartens*. Practical steps for inaugurating a kindergarten program. Credit, 3 hours.

Special Graduate Courses. KP 590, 591, 592, 593, 790, 791, 792. See page 210.

Elementary Education

EE 211 *Children's Literature*. Folk and modern literature for elementary school children; a study of types, wide reading. Credit, 3 hours.

322 *Language Arts in the Lower Elementary Grades*. Foundations of a developmental reading program for elementary majors. Integrated treatment of speaking, listening, manuscript writing, reading, creative writing, and spelling. Credit, 3 hours.

333 *Language Arts in the Upper Elementary Grades*. A continuation of the developmental reading program for elementary majors. Integrated treatment of study and recreatory types of reading, listening, speaking, cursive writing, spelling, creative and formal type writing. Credit, 3 hours.

335 *Methods and Materials for Teaching Indian Children*. Experience in production of materials and the use of special methods of presentation. Credit, 3 hours.

344 *Elementary Curriculum*. Curriculum types or designs, social studies in curriculum. Curriculum principles, practices, and problems. Credit, 3 hours.

345 *Social Studies in the Elementary School*. The core function of social studies, scope and sequence, unit organization, methods of instruction, materials and resources for learning. Credit, 3 hours.

355 *Curriculum and Practices for Indian Education*. Curriculum problems and recommended practices for Indian education. Credit, 3 hours.

356 *Observation and Participation in the Elementary School*. This course provides an opportunity for students to observe and work directly with elementary children in a classroom situation. It includes a critical evaluation of the student's experiences. Credit, 3 hours.

456g *Construction Activities in the Elementary School*. The interrelationships of creative construction activities with units taught in the elementary school program. Emphasis upon materials available in the typical classroom, methods of evaluating and encouraging growth through manipulation and experimentation. Two hours class, 3 hours laboratory. Credit, 3 hours.

478 *Directed Teaching in the Elementary School*. The relationship of theory and practice in methods of teaching; the practice of teaching; practice in guidance, measurement, extra-curricular activities, and classroom management procedures. Credit, 1-16 hours.

489 *Problems of Teachers in the Elementary School*. Individual problems encountered by students in their observations and practice teaching experiences; appraisal of teacher-education backgrounds; bridging of gaps in teacher-education backgrounds. Prerequisite or co-requisite: EE 478. Credit, 3 hours.

490g *Problems of Teachers of Indian Children*. Issues, trends, and general problems encountered by teachers of Indian children. Credit, 3 hours.

511 *Elementary Curriculum Development*. Criteria of appraisal, typical curriculum problems, curriculum construction and improvement. Prerequisite: EE 344, or equivalent. Credit, 3 hours.

522 *Reading Problems at the Elementary School Level*. Practical suggestions for meeting the reading and language problems encountered in teaching at elementary school levels are treated with diagnosis of unique problems faced by members taking the course. Prerequisite: EE 322, 333 or KP 335 or equivalent. Credit, 3 hours.

533 *Evaluation of Children's Literature*. Social and educational concepts expressed in literature and changes in values and principles that are needed. Prerequisite: At least one course in literature. Credit, 3 hours.

Special Graduate Courses. EE 590, 591, 592, 593, 790, 791, 792. See page 210.

Secondary Education

SE 311 *Principles and Curricula of Secondary Schools*. Principles, functions, objectives, curricula, problems and trends in secondary education. Prerequisite: BE 333. Credit, 3 hours.

411 *Methods of Teaching and Evaluating in the Secondary School*. Procedures, methods, techniques, and instruments of teaching, and evaluating in secondary schools. Prerequisite: BE 333. Credit, 4 hours.

422g *Driver Education*. The preparation of instructors for the secondary school. Includes the study of the automobile, Arizona laws pertaining to motor vehicles, and behind-the-wheel instruction. Prerequisite: BE 444 and a valid driver's license. Fee, \$7.50. Lectures and laboratory. Credit, 2 hours.

433 *Directed Teaching in the Secondary School*. The relationship of theory and practice in methods of teaching; practice of teaching; practice in guidance, measurement, extra-curricular activities, and classroom management procedures. Prerequisites: BE 333 and SE 411. Credit, 1-16 hours.

511 *The Junior High School*. The development, population, organization, curriculum, purposes and methods of the Junior High School, with a major emphasis upon curriculum. Prerequisites: SE 311, 411 and 433. Credit, 3 hours.

512 *The Junior College*. The development, population, organization, curriculum, purposes, and methods of the Junior College with a major emphasis upon methods of teaching. Prerequisites: SE 311, 433, and 444. Credit, 3 hours.

522 *Secondary School Curriculum Development*. The social processes, issues, principles, patterns, and procedures in curriculum development. Prerequisites: SE 311, 411 and 433. Credit, 3 hours.

533 *The Improvement of Instruction in the Secondary School*. Principles of teaching in terms of the interests and needs of individuals and groups in the class. Prerequisites: SE 311, 411 and 433. Credit, 3 hours.

544 *Reading Problems in the Secondary School*. Methods for meeting the reading and language problems encountered by junior and senior high school pupils. Prerequisites: SE 311, 411 and 433 or undergraduate major in elementary education. Credit, 3 hours.

555 *Student Activities in the Secondary School*. The development, purposes, and principles of student activities concerned with school publications, student participation in government, athletics, clubs, and others, as they are related to the educational program of the secondary school. Prerequisites: SE 311, 411 and 433. Credit, 3 hours.

711 *Problems in Secondary Curriculum Development*. Factors bearing upon the development of a qualitative learning environment in the secondary school; the evaluation of research and the individual study of fundamental problems in secondary curriculum development. Prerequisites: SE 433 and 522. Credit, 4 hours.

722 *Problems in the Improvement of Instruction in the Secondary School*. Factors bearing upon the improvement of instruction in the secondary school; the evaluation of research and the individual study of fundamental problems in the improvement of instruction in the secondary school. Prerequisites: SE 311, 433, and 533. Credit, 4 hours.

Special Graduate Courses, SE 590, 591, 592, 593, 790, 791, 792. See page 210.

Adult Education

AE 511 *Adult Education*. The historical development, objectives, scope, trends, and significance of adult education. The philosophy and trends of adult education in relation to desirable present and future local public school programs. Credit, 3 hours.

711 *Adult Education*. Existing types, methods, and administration of adult programs. Emphasis is given to ways and means of implementing adult activity and to the use of adult activity in the study and improvement of educational services provided in local communities. Each student will participate in a research

study of some area of adult education. Prerequisite: AE 511. Credit, 4 hours.

Special Graduate Courses, AE 590, 591, 592, 593, 790, 791, 792. See page 210.

Higher Education

HE 511 *Higher Education in the United States*. Designed for the graduate student interested in the organization and structure of higher education. Involves study of purposes, programs, issues, trends, controls, and personnel. Credit, 4 hours.

522 *Principles of Higher Education*. Current issues and trends in instruction in the field of higher education. Credit, 3 hours.

Special Graduate Courses, HE 590, 591, 592, 593, 790, 791, 792. See page 210.

School Administration and Supervision

SA 511 *Public School Curriculum Improvement*. General principles and criteria effective in formulating curriculum practices. Administrative and supervisory aspects of curriculum construction and improvement in local school systems. Prerequisite: EE 344 or SE 444. Credit, 3 hours.

522 *Public School Administration*. The organization and administration of public education. Emphasis given to all major phases of school administration. Credit, 3 hours.

533 *Public School Supervision*. Principles, types, aims, procedures, and evaluation in educational supervision. Emphasis given to thorough analysis of practices in public school supervision. Prerequisite or co-requisite: SA 522. Credit, 2 hours.

544 *Public School Finance*. Methods and problems of financing public education and current problems in school support. Initial study given to the preparation of the school budget and financial accounting systems for use in schools. Prerequisite or co-requisite: SA 522. Credit, 3 hours.

555 *School House Planning and Maintenance*. The survey of school-building needs, the educational planning of public school buildings, the equipping and the maintenance of school buildings. Prerequisite or co-requisite: SA 522. Credit, 3 hours.

566 *School-Community Relationships*. Principles, philosophy, and techniques for improving the educational program through school-community action. Special attention given to the role of the school administrator in coordinating school-community experiences. Credit, 2 hours.

568 *Supervision of Student Teaching*. Experiences and content for those planning to become supervisors of student teaching in teacher education programs. Also serves as in-service training for those already working in student teaching. Credit, 2 hours.

571 *School Budget Preparation and Control*. Principles and techniques of budgetary preparation and control relative to financial accounting, auditing, reporting, and management of property and supplies. Prerequisites: SA 522, 544. Credit, 3 hours.

573 *School Personnel Administration*. Desirable administrative policy to govern selection, placement, transfer, welfare, remuneration, and morale of teaching and non-teaching personnel. Prerequisite: SA 522. Credit, 3 hours.

575 *Arizona School System, Laws, and Records*. The legal provisions for Arizona's school districts, Arizona school laws, the general concept of school law, and the court's responsibility for interpreting the laws. Credit, 2 hours.

577 *Functions of the Principal*. Problem and laboratory approaches used to provide application of administrative principles and procedures to the administrative activities of school principals. Attention given to the functions of both elementary and secondary school principals. Prerequisites: SA 522 and six additional hours in educational administration. Credit, 3 hours.

579 *Administration of the Junior College*. A study of the organization and administration of junior colleges with special emphasis upon procedures, practices, and problems encountered in their operation. Prerequisite: HE 522. Credit, 2 hours.

711 *The Administrator and School-Community Planning*. The various basic areas of school-community integration and improvement; applications made in school surveys, finance, evaluation of school systems, and cooperative development of local school systems. Prerequisite: SA 566. Credit, 4 hours.

722 *Leadership in School Administration*. The processes and conditions contributing to administrative leadership. Attention given to the application of administrative leadership in all aspects of a school system's operation, with major emphasis upon curriculum improvement. Study of major researches and participation in a research project. Prerequisite: SA 511, and nine additional hours in educational administration. Credit, 4 hours.

733 *Instructional Improvement Through Constructive Supervision*. Organization, personnel, and procedures involved in upgrading instruction through supervisory practices. Democratic theory, creative school control, and supervisor-teacher relationships emphasized. Study of major researches and participation in a research project. Prerequisite: SA 533. Credit, 4 hours.

Special Graduate Courses, SA 590, 591, 592, 593, 790, 791, 792. See page 210.

Audio-Visual Education

AV 411g *Audio-Visual Aids in Education*. Principles underlying the selection and use of materials for instructional purposes. Laboratory experiences include the operation of equipment and the selection, preparation, and evaluation of audio-visual materials. One hour class, 3 hours laboratory. Credit, 2 hours.

412g *Audio-Visual Practices*. Application of principles emphasized in AV 411. Development of teaching aids and resource units. Prerequisite: AV 411. Credit, 2 hours.

422g *Radio and Television in Education*. For students and teachers interested in making more effective use of radio and television broadcasts in the classroom situation. Designed to acquaint teachers with the possibilities available and the means of adapting materials for learning experiences. Credit, 2 hours.

511 *Photography in Public Education*. A laboratory course in the fundamentals of photography and darkroom procedure. For the teacher who wishes to use photography in preparing instructional materials. Fee, \$10.00. One hour class, 3 hours laboratory. Credit, 2 hours.

522 *Production of Audio-Visual Aids*. Making of photographs, slides, filmstrips, motion pictures, and recordings. Preparation of scripts. Technical problems of production. Prerequisite: AV 511. Fee, \$10.00. One hour class, 3 hours laboratory. Credit, 2 hours.

533 *Administration of Audio-Visual Aids Programs*. The qualifications and duties of the director, preparing the budget, buying equipment, handling materials, in-service training, and evaluation of the program. Credit, 2 hours.

544 *Graphic Arts in Education*. Graphic techniques, including lettering, simple sketching, cartooning, silk-screen and other duplicating processes. Credit, 3 hours.

Special Graduate Courses, AV 590, 591, 592, 593, 790, 791, 792. See page 210.

Social Foundations

SF 411g *History of Education*. The social life, ideas, and institutions that gave direction to western education. A background for understanding and evaluating present educational and social problems. Credit, 3 hours.

422g *Educational Sociology*. Education in relation to social institutions. Considers methods of gathering data in social research, the family, problems of educational reconstruction, social relationships, and social measurements. Credit, 3 hours.

433g *Philosophy of Education*. The philosophical and social foundations of education, including an analysis of the significance of contemporary social issues, and of the implications of the various interpretations of democracy, for the development of a guiding philosophy for the modern school. Credit, 3 hours.

511 *School and Society*. The interrelationship of school and society and the place of education in social change. Prerequisites: SF 433 or one from KP 428; EE 489; SE 444. Credit, 3 hours.

522 *Education and Democratic Values*. Education as a moral enterprise in which the school seeks to cultivate selected values by the subject matter and methods it employs in its program. Prerequisites: SF 433, or one from KP 428; EE 489; SE 444. Credit, 2 hours.

533 *Comparative Education*. Contemporary education in other lands with implications for the United States educational structure. Prerequisites: SF 433, or one from KP 428; EE 489; SE 444. Credit, 2 hours.

544 *Philosophic Foundations of Education*. The major points of view in contemporary educational thought, with considerable emphasis on the basic issues in general philosophy which are foundational to philosophies of education. Prerequisites: SF 433, or one from KP 428; EE 489; SE 444. Credit, 3 hours.

555 *Education Classics*. Major philosophies of education from the past for the purpose of finding useful suggestions for dealing with present educational problems. Prerequisites: SF 433, or one from KP 428; EE 489; SE 444. Credit, 2 hours.

711 *Historical and Social Foundations*. Institutions, human relations, and social forces influencing the nature of educational problems current in American society. Significant cultural trends are treated from local, national, and international perspective. Prerequisite: SF 544. Credit, 4 hours.

Special Graduate Courses, SF 590, 591, 592, 593, 790, 791, 792. See page 210.

Special Education

SP 311 *Orientation to Education of Exceptional Children*. Exceptional child categories, including gifted, mentally retarded, sight, hearing, speech, emotionally disturbed, and others. This orientation will include observation of exceptional children in classroom situations. Credit, 3 hours.

420g *Speech Correction for the Classroom Teacher*. The role of the teacher in understanding and aiding speech and hearing development in normal and speech-defective children with emphasis upon the recognition and prevention of disorders. May not be counted toward the major in speech and drama. Credit, 3 hours. (Same as 1-SE 420g.)

455g *Education of the Hearing-Handicapped*. Curriculum and techniques in pre-schools primary and intermediate levels. Consideration of the psychological correlates of hearing handicaps and their effect upon the child, the family and the community. Philosophy and methods of language and speech development. Credit, 3 hours.

456g *Education of the Hearing-Handicapped*. Language and speech development, reading techniques and the teaching of elementary subjects to the hearing handicapped. Prerequisite: SP 455. Credit, 3 hours.

511 *Workshop in Education of the Exceptional Child*. Exceptional children, consisting of the following groups: Mentally retarded; gifted; emotionally maladjusted; visual, speech, and hearing handicaps; orthopedically handicapped; bilingual; others. The

workshop method is followed, including the participation of consultants and speakers, films, other audio-visual aids, visits to appropriate schools and other institutions, and cooperation with organizations working in these fields. Credit, 6 hours.

522 *Experience in Exceptional Child Clinics*. Provides experience with exceptional children in cooperating clinics, organizations, and institutions in Arizona which work with mentally retarded, orthopedic, sight, speech, hearing, bilingual, and other areas in special education. Pre-registration necessary. Prerequisite: SP 511 and teaching experience. Credit, 6 hours.

523 *Participation with Gifted Children*. Intensified study and participation with gifted children in either a campus or community setting. The course will be organized around both a college class for background study and research and a special class of gifted children. Prerequisite: SP 511 or experience in working with exceptional children in this category, and teaching experience. Credit, 6 hours.

524 *Participation with Cerebral Palsy Children*. Intensified study and participation with cerebral palsy children in either a campus or community setting. This course will be organized around both a college class for background study and research and a special class of cerebral palsy children. Prerequisite: SP 511 or experience in working with exceptional children in this category, and teaching experience. Credit, 6 hours.

533 *The Bilingual Child*. The study of Spanish-American and Indian children, including their educational needs, materials and methods appropriate to their backgrounds and language problems. Credit, 3 hours.

544 *The Orthopedically Handicapped Child*. Orthopedically handicapped children, including their needs and characteristics, appropriate materials and teaching methods, teacher qualifications, educability, definitions, and terminology. Among the specific categories to be covered in this course are children with orthopedic, cardiac, tubercular, and glandular handicaps. Credit, 3 hours.

555 *The Child with Hearing Problems*. Children with hearing disabilities of either a partial or complete nature, including their needs and characteristics, appropriate materials and teaching methods, teacher qualifications, educability, definitions, and terminology. Study of the hearing-handicapped child in the regular classroom situation and in special classes. Credit, 3 hours.

566 *The Visually Handicapped Child*. Visually handicapped children, including their needs and characteristics, appropriate materials and teaching methods, teacher qualifications, definitions, and terminology. Credit, 3 hours.

577 *The Mentally Retarded Child*. The educational needs of mentally retarded children, appropriate materials and methods, teacher qualifications, educability, and special problems. Credit, 3 hours.

588 *The Gifted Child*. Gifted children, including their needs and characteristics, appropriate materials and methods, and teacher qualifications. Emphasis is placed on the techniques and values related to acceleration, enrichment, and special classes, and to the research of Terman, Hollingworth, Witty, and others. Credit, 3 hours.

Special Graduate Courses, SP 590, 591, 592, 593, 790, 791, 792. See page 210.

Educational Psychology

EP 411g *Educational Measurements and Evaluation*. Evaluation techniques and group tests of ability and achievement with special emphasis upon the interpretation and use of test results in the improvement of instructional and administrative procedure. Credit, 3 hours.

422 *Educational Psychology*. Psychological facts and laws particularly relevant to the problems of education. Prerequisite: 1-PY 100. Credit, 3 hours. (Same as 1-PY 371.)

511 *Educational Psychology*. The psychological basis of education; development of human abilities; individual differences; the relationship of school activities to personality development; and introduction to learning and transfer of training. Prerequisite: BE 333. Credit, 3 hours. (Same as 1-PY 572.)

522 *Directed Learning*. Theories of learning and experimental investigations in the field of human learning, with special emphasis on their applications to teacher-learning situations in the school. Prerequisite: EP 511. Credit, 3 hours.

525 *Individual Measurements in Education*. Individual test administration and experience in interpreting the results of the test to school personnel. Prerequisite: PY 493 or equivalent, and approval of instructor. Credit, 3 hours.

533. *Educational Statistics*. Statistical tests of significance and emphasis on measures of relationship. Elementary probability theory, chi-square, introduction of small sample theory, multiple, partial, bi-serial, tetrachoric, curvilinear correlation, and regression equations, with special reference to their use in prognosis. Prerequisite: 1-PY 492. Credit, 3 hours.

544 *Appraisal and Evaluation Techniques*. Factors involved in the construction of tests—formal and informal, old and new types. Practice in discovering and formulating objectives and in constructing techniques for ascertaining the extent of achievement of these objectives. Prerequisites: EP 411 and 1-PY 492, or equivalent. Credit, 3 hours.

555 *Statistical Inference and Experimental Design*. Computation procedures and interpretation of advanced statistical designs and techniques; analysis of variance, linear and non-linear regression, discriminant analysis, analysis of co-variance, appropriate statistical methods for analyzing educational data. Prerequisite: EP 533. Credit, 3 hours.

566 *Recent Studies in Educational Psychology*. A critical psychological analysis of school activities emphasizing what the literature has to say about application of current personality theory to the educative process. Prerequisite: Six hours of Educational Psychology. Credit, 3 hours. (Same as 1-PY 573.)

711 *Educational Psychology*. Theory and research in educational psychology, and their implications for educational practice. Credit, 4 hours.

Special Graduate Courses, EP 590, 591, 592, 593, 790, 791, 792. See page 210.

Guidance and Counseling

GC 411g *The Guidance Role of the Teacher*. An overview of the guidance services in schools with emphasis on the role of the teacher. Credit, 3 hours.

511 *Basic Course in Guidance*. The areas of guidance with consideration of the interrelation of the various guidance services found in schools. Prerequisite to other courses in the guidance sequence. Credit, 3 hours.

522 *Guidance Testing*. Standardized tests and their application in counseling psychology. The contribution of testing to the vocational, educational, and personal problems of youth. Prerequisite or co-requisite: GC 511. Credit, 3 hours.

533 *Educational and Occupational Information*. Selection, utilization, and evaluation of educational and occupational information materials. Familiarization with standard labor market data and materials, and sources of information concerning training opportunities. Prerequisite or co-requisite: GC 511. Credit, 2 hours.

544 *Analysis of the Individual*. Guidance techniques employed in the appraisal of the individual, including the interview, observation, rating scales, records and reports, autobiographies and other personal documents, case study, and case conference as applied to the secondary school. Prerequisite or co-requisite: GC 511. Credit, 3 hours.

555 *Techniques of Child Study*. Guidance techniques employed in the appraisal and study of children, including tests, interviews, inventories, records and reports, observations, rating scales, and the case study. Prerequisite or co-requisite: GC 511. Credit, 3 hours.

566 *Group Guidance*. Principles and techniques of group procedures used in the guidance program with emphasis on their application in group guidance courses. Prerequisites: GC 511, 522, 533, 544 or 555. Credit, 3 hours.

577 *Counseling*. Principles and application of counseling techniques with particular emphasis on the counseling interview. Prerequisites: GC 511, 522, 533, 544 or 555. Credit, 3 hours.

578 *Organization and Administration of Guidance Programs.* Organizational procedures and patterns, and administrative relationships of school personnel functioning in the guidance program. Prerequisites: GC 511, 522, 533, 544 or 555; and/or co-requisite 566, 577. Credit, 2 hours.

579 *Supervised Practice in Guidance.* Assignment in a public school guidance program and opportunity for experience under supervision. May also include experiences in Guidance Center. Prerequisite: Approval of instructor. Credit, 2-6 hours.

580 *Practicum in Guidance.* Supervised experience in the campus Guidance Center. Includes counseling, testing, writing case reports, participation in case conferences, and utilization of occupational information materials. Credit, 1-6 hours.

Special Graduate Courses, GC 590, 591, 592, 593, 790, 791, 792. See page 210.

Research and Surveys

RS 511 *Public School Surveys.* The history and development of public school surveys, with a critical study of current practices, trends, and objectives. Practical experience provided in collecting and preparing survey data. Prerequisite: SA 522 and six additional hours in school administration. Credit, 2 hours.

622 *Field Work and Surveys.* Observation and participation in work-study programs in selected schools. Available in guidance administration and supervision, secondary education, or elementary education. Prerequisite: Approval of doctoral adviser. Credit, 4 hours.

Special Graduate Courses, RS 500, 590, 591, 592, 593, 700, 790, 791, 792. See page 210.

Basic Courses in Education

BE 111 *Exploration of Education.* Historical development of education; role of the school in American culture; the school, its organization and functions; general and professional orientation and student self-appraisal. Credit, 3 hours.

222 *Psychological Foundations of Education.* Childhood and youth; physical, motor, intellectual, social, emotional and moral development of students, and the observing, recording, and interpreting of human behavior; functional concepts of learning; modern theories of education. Prerequisite: BE 111. Credit, 3 hours.

333 *Fundamentals of Teaching.* The basic principles of teaching; appraisal of learning and instruction; relationship between instruction and the curriculum; philosophical basis of instruction and the curriculum; observation of teaching practices. Prerequisite: BE 222. Credit, 3 hours.

444g *Safety Education*. Various phases of safety education: home, school, and on-the-job. Emphasis on special interests of class members. Credit, 2 hours.

511 *Internship*. Closely supervised practice in selected schools for graduate students in a variety of areas of administration, higher education, and other fields. By special arrangement the student may be employed up to half time by the school in which he interns. Prerequisite: Approval of Dean of College of Education. Credit, 3-6 hours.

522 *Education Workshop*. In-service workshop for teachers, supervisors, and administrators with emphasis on selected problems of interest to those enrolled. Credit, 3 or 6 hours.

533 *Conference in Education*. Seminar experiences in special conferences conducted by outstanding leaders in education. Individual conferences, reports, group work, and work on individual problems. Credit, 1-3 hours.

611 *Applied Project in Education*. A written project in the field of specialization. Required of students enrolled in the Ed. S. Program. Credit, 6 hours.

Special Graduate Courses, BE 590, 591, 592, 593, 790, 791, 792, 799. See page 210.

Library Science

LS 213 *The Library in the Modern School*. Acquaints the prospective or in-service teacher with the school library collection and its services, characteristics of appropriate books, sources of teaching materials, reading interests of boys and girls, and ways of using the school library in classroom instruction. Provision is made for specialization in elementary, junior, and senior high school fields. Credit, 3 hours.

223 *Books, Libraries and Society*. A history of books and libraries, library agencies and services, with particular emphasis on the school library in the modern world and librarianship as a profession. Credit, 3 hours.

351 *Card Catalog Management*. A study of the American Library Association rules for the organization, filing and use of catalog card records. One lecture, 2 hours laboratory. Credit, 1 hour.

352 *Book Conservation*. Practice in the techniques of the mending and preservation of library materials. One lecture, 2 hours laboratory. Credit, 1 hour.

441g *Book Organization: Dewey Decimal Classification*. The principles and applications of subject classification and the assigning of Cutter numbers. Credit, 2 hours.

442g *Book Organization: Catalog Records*. The purpose and principles of cataloging library materials with emphasis upon the use of printed cards. Knowledge of touch-typing necessary. Prerequisite: LS 441. Two lectures, 4 hours laboratory. Credit, 2 hours.

461g *Library Book Selection.* Techniques and problems of selecting books for the school and public library. Attention given guides and aids, reading interests, publishers, dealers, etc. Credit, 3 hours.

462g *Reading and Communication.* Modern communication and its social and psychological effects through various media, considered in relation to the school library collections and services for youth. Prerequisite: LS 461. Credit, 2 hours.

463g *Library Materials for Children.* Books and related materials for children. Develops ability to select and integrate vital books and materials into the school curriculum and a free-reading library program. Credit, 3 hours.

464g *Library Materials for Adolescents.* The use of books and related materials in youth libraries and in the secondary school program. Develops ability to select and integrate vital books and materials into the school curriculum and a free-reading program. Credit, 3 hours.

471g *Basic Reference Resources.* The philosophy and techniques of reference service, with a study of the content and use of the basic ready-reference works such as encyclopedias, dictionaries, periodical indexes, biographical dictionaries, atlases, yearbooks, directories, handbooks, and general bibliographies. Credit, 3 hours.

481g *School Library Administration.* Organization and administration of the school library, its backgrounds, activities, functions, personnel, materials and equipment. Credit, 3 hours.

493g *Library Science Workshop.* Selected school library problems, directed by the regular staff and/or visiting specialists. Recommended for in-service school and/or public librarians with no fewer than 12 credits in Library Science. Credit, 3 hours.

511 *Systems in Cataloging Administration.* The administrative problems of cataloging in regard to organization and operation, re-cataloging of materials, handling materials for special departments and services, and current developments in the field. Special emphasis on the problems of centralized cataloging for the school district. Prerequisites: LS 441, 442. Credit, 2 hours.

522 *Reference Service.* Critical evaluation of the most frequently used reference materials in the subject fields; bibliographic form and practice; special emphasis on government publications. Prerequisite: LS 471. Credit, 3 hours.

533 *Current Library Problems.* Reading in professional library literature on unsolved problems and current issues of librarianship as related particularly to the school and/or public library. Credit, 2 hours.

Special Graduate Courses, LS 590, 591, 592, 593. See page 210.

Engineering

LEE P. THOMPSON, Dean, College of Applied Arts and Sciences
and Director, School of Engineering

Chemical Engineering

KE 211 *Chemical Process Calculations*. Chemical reactions, combustion, conversions, material and energy balances; special methods for solving chemical problems. Prerequisites: 1-CH 114; 1-MA 121. Credit, 3 hours.

331 *Energy, Mass and Momentum Transfer*. Transport processes including fluid flow, heat and mass transfer. Prerequisites: KE 211; 1-MA 220; 1-CH 441. Credit, 3 hours.

432 *Chemical Engineering Operations*. Process operations including distillation, extraction, absorption, drying, crystallization, filtration, materials handling and preparation. Prerequisite: KE 331. Credit, 3 hours.

441 *Chemical Processes*. Physical and chemical equilibria; chemical reaction kinetics and chemical thermodynamics as applied to the process industries. Prerequisites: 1-CH 332; KE 331. Credit, 3 hours.

442g *Chemical Processes*. Application of chemical process principles to industrial processing. Prerequisites: KE 432, KE 441. Credit, 3 hours.

445g *Nuclear Materials Processing*. Chemical processing of nuclear materials for the production and recovery of fuel. Separation and recovery of radioactive by-products. Co-requisite: KE 432. Credit, 3 hours.

451, 452 *Chemical Engineering Laboratory*. Operation, control, and design of chemical process equipment. Co-requisite: KE 432. Six hours laboratory. Credit, 2 hours.

462 *Process Economics and Design*. Application of economic principles to optimize equipment selection and design. Development and design of process plants. Prerequisites: KE 432, KE 441. Credit, 4 hours.

481g *Chemical Process Analysis*. Mathematical analysis and development of chemical process operations. Prerequisites: KE 432, 441. Credit, 3 hours.

521 *Extractive Metallurgy*. Principles and unit processes by which metals are extracted from their naturally occurring ores and other raw material sources. Prerequisite: KE 442. Credit, 3 hours.

562 *Fuel and Energy Utilization*. Fuel costs in the supply of electrical power and steam generation; trends in the use of nuclear energy. Credit, 3 hours.

571 *Electrochemical Engineering*. Theoretical and engineering aspects of electrochemistry applied to the production of chlorine, caustic, oxygen, and hydrogen; anodizing, electrolytic condensers, electro-metallurgy, electro-orientation, and electrothermics. Prerequisite: 1-CH 442. Two lectures, 3 hours laboratory. Credit, 3 hours.

Special Graduate Courses, KE 500, 590, 591, 592, 593. See page 210.

Civil Engineering

CE 241 *Surveying*. Theory and field work in construction and land surveys. Prerequisite: 1-MA 118. Fee, \$6.00. One lecture, 6 hours laboratory. Credit, 3 hours.

311 *Materials of Engineering*. Characteristics of ordinary materials of construction; specifications, contracts, and engineering economy. Prerequisite: ES 321. Two lectures, 3 hours laboratory. Credit, 3 hours.

321 *Design of Steel Structures*. Analysis and design of elements of steel structures (riveted and welded). Selected details and drawings required. Prerequisite: ES 321. Two lectures, 3 hours laboratory. Credit, 3 hours.

322 *Design of Concrete Structures*. Analysis and design of elements of reinforced concrete structures. Selected details and drawings required. Co-requisite: CE 321. Two lectures, 3 hours laboratory. Credit, 3 hours.

342 *Surveying*. Precise traverse triangulation, azimuth determination, and leveling; errors and correction; plane coordinate systems. Elements of photogrammetry, topographic mapping, hydrographic, mine, and special surveys. Prerequisite: CE 241. Fee, \$6.00. One lecture, 6 hours laboratory. Credit, 3 hours.

343 *Surveying and Geodesy*. Methods of geodetic surveying. Adjustment of observations. Geodetic positions. Map projections. Prerequisite: CE 342. Fee, \$6.00. One lecture, 6 hours laboratory. Credit, 3 hours.

344 *Route Surveying*. Simple, compound and transition curves, reconnaissance, preliminary, and location survey. Calculation of earthwork. Prerequisite: CE 342. Fee, \$6.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

381 *Hydrology*. Precipitation, evapotranspiration, infiltration, runoff; subsurface water; hydraulics of wells. Co-requisite: ES 371. Credit, 3 hours.

423 *Structural Design*. Planning and design of steel mill or industrial type buildings, bridges, retaining walls, and their components. Selected details and drawing required. Prerequisites: CE 321, 322. Two lectures, 3 hours laboratory. Credit, 3 hours.

424 *Structural Design*. Structural design applied to architectural structures. Selected details and drawings required. Prerequisites: CE 321, 322. Two lectures, 3 hours laboratory. Credit, 3 hours.

431g *Theory of Structures*. Analysis of girders, arches, and bents. Methods of analysis include generalized area moment, slope deflection, moment distribution, and virtual work. Prerequisites: CE 321, 322, or ES 422. Credit, 3 hours.

432g *Theory of Structures*. Analysis of continuous frames, complex frames, multi-story buildings, towers and frames with bent and curved members. Prerequisite: CE 431. Credit, 3 hours.

441g *Photogrammetry*. Mapping and surveying using aerial photographs and stereoscopic plotters. Prerequisite: CE 342. Fee, \$6.00. One lecture, 6 hours laboratory. Credit, 3 hours.

451 *Soil Mechanics and Foundations of Structures*. Structural use of soil. Principles of foundation action. Prerequisite: CE 322. Two lectures, 3 hours laboratory. Credit, 3 hours.

452g *Soil Mechanics*. Index properties. Compressibility, consolidation, shearing strength, bearing capacity, lateral pressure, stress analysis, and settlement. Soil tests and site investigations. Prerequisite: CE 322. Fee, \$6.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

461 *Water Supply*. Design, construction and operation of reservoirs, transmission and distribution systems; unit operation of water treatment. Prerequisite: ES 371. Credit, 3 hours.

462 *Sewerage and Sewage Disposal*. Design and construction of sanitary and storm sewer systems. Treatment and disposal of sewage; unit operations of sewage treatment. Prerequisite: ES 371. Credit, 3 hours.

471g *City Planning*. Municipal organization and administration; public health, public utilities, services, zoning, replanning; critical studies. Credit, 3 hours.

472 *Highway Engineering*. Design of roads and streets. Highway administration, organization, planning, financing, and operation. Credit, 3 hours.

473g *Municipal Engineering*. Engineering and legal problems of the city engineer, city government, city surveys, subdivision design, building codes, legal procedures for making public improvements. Credit, 3 hours.

480 *Hydraulic Engineering*. Elements of hydrology. Application of fluid mechanics to hydraulic problems; flow in open channels and pressure conduits; flow measurement. Two lectures, 3 hours laboratory. Prerequisite: ES 371. Credit, 3 hours.

481g *Hydraulic Structures*. Reservoirs, dams, spillways, outlet works, canals, hydraulic machinery, economy in hydraulic design. Prerequisite: CE 480. Credit, 3 hours.

482g *Applied Hydraulics*. Applications in water supply, sewerage, irrigation, drainage, navigation, flood control, hydro-electric power. Prerequisite: CE 480. Credit, 3 hours.

525 *Structural Design*. Design of simple and continuous bridges with constant or variable moments of inertia utilizing steel, concrete, prestressed concrete and/or composite structural members. Prerequisites: CE 423, 424. Two lectures. 3 hours laboratory. Credit, 3 hours.

526 *Structural Design*. Structural design of buildings utilizing aluminum, wood, steel, concrete and prestressed concrete. Methods of framing, wind and earthquake forces; special systems. Prerequisites: CE 423, 424. Two hours lecture. 3 hours laboratory. Credit, 3 hours.

533 *Theory of Structures*. Analysis of box frames, truss frames, vierendeel trusses and trusses in general. Secondary stresses, Castigliano theorem, superposition theorem, reciprocal theorem, and relaxation. Prerequisite: CE 431. Credit, 3 hours.

534 *Theory of Structures*. Three dimensional analysis of beams, arches, bents, frames, towers, and trusses. Prerequisite: CE 431. Credit, 3 hours.

553 *Theoretical Soil Mechanics*. Behavior of soils as structural materials. Prerequisite: CE 451. Credit, 3 hours.

563 *Design of Water Supply and Waste-Water Treatment Facilities*. Engineering design of water supply and waste-water treatment facilities. Prerequisites: CE 461, 462. Credit, 3 hours.

583 *Hydraulics of Open Channels*. Theory of back water curves and hydraulic jump; non-steady channel flow; hydraulics of intakes, transitions, spillways, culverts. Prerequisite: CE 480. Credit, 3 hours.

584 *Theoretical and Applied Hydraulics*. Flow in pipe systems and porous materials; surge tanks, water hammer, tidal flow, model laws, sediment transport. Prerequisite: CE 480. Credit, 3 hours.

585 *Hydraulic Laboratory*. Principles of fluid motion; experimental investigations of hydraulic model laws, river and harbor models, hydraulic structures, sediment transport, and energy dissipation. Prerequisite: CE 583 or 584. Credit, 3 hours.

Special Graduate Courses, CE 500, 590, 591, 592, 593. See page 210.

Computer Engineering

GE 316 *Digital Computer Programming*. Scientific application of digital computers. Problems are set up by the students and solved on computers. Prerequisite: 1-MA 212. Credit, 3 hours.

401g *Computing Techniques*. Direct analog principles; basic digital computing methods, and differential analyser methods. Prerequisite: EE 305 or 322. Credit, 3 hours.

411g *Analog Computers*. Electrical analogs of physical systems. Co-requisite: EE 302. Fee, \$6.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

416g *Digital Computer Programming*. A continuation of GE 316. Credit, 3 hours.

430g *Switching Networks*. Application of Boolean algebra to the analysis and design of switching networks. Prerequisite: EE 301 or 305. Credit, 3 hours.

431g, 432g *Digital Computers*. Arithmetic operations; digital computer components, and circuits. Prerequisite: GE 430. Credit, 3 hours each.

511 *Analog Computer Design*. Design of circuitry of electronic analog computers. Prerequisite: GE 411. Credit, 3 hours.

531 *Digital Computer Design*. Design of circuitry of electronic digital computers. Prerequisites: GE 432; EE 430. Credit, 3 hours.

532, 533 *Logical Design of Digital Computers*. Logical structure of components; interrelations necessary for automatic operation. Prerequisite: GE 430. Credit, 3 hours each semester.

541 *Numerical Control of Machine Tools*. Application of computers to machine tool programming. Credit, 3 hours.

551 *Conversion Techniques*. Theory of sampling, quantizing and coding. Current analog-digital conversion techniques. Credit, 3 hours.

Special Graduate Courses, GE 500, 590 591, 592, 593. See page 210.

Electrical Engineering

EE 202 *Electrical Science*. Concepts and interrelations of electromagnetic field theory and network theory. Prerequisites: 1-PH 211, 1-MA 212. Credit, 4 hours.

301 *Electrical Networks*. Continuation of EE 202. Fee, \$6.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

302 *Electrical Networks*. Mathematical analysis of networks and linear systems; transient solutions and network synthesis. Prerequisites: EE 301 or 305; 1-MA 220. Credit, 3 hours.

305 *Fundamentals of Electrical Engineering*. Electric and magnetic fields, and circuits; electronic devices. Prerequisite: 1-PH 212. Fee, \$6.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

321 *Electron Devices*. Theory, design, operational characteristics, and applications of electron devices. Prerequisites: 1-MA 220; EE 202. Credit, 3 hours.

322 *Electronic Engineering*. Electronic theory and circuits. Prerequisites: EE 321, 301 or 305. Fee, \$6.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

362 *Electrical Machinery*. Principles common to all rotating electrical machines and their application to dc and ac machines. Prerequisite: EE 301 or 305. Fee, \$6.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

401g *Electrical Networks*. Design and analysis of 2 and 4 terminal passive networks. Prerequisite: EE 301. Fee, \$6.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

410g *Pulse Techniques*. Analysis and synthesis of pulse circuits. Prerequisites: EE 302, 322. Credit, 3 hours.

421g *Electronic Engineering*. Continuation of EE 322. Fee, \$6.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

422 *Electrical and Electronic Measurements*. Theory and techniques of laboratory measurements of time, frequency, power, fields, noise, and circuit parameters. Prerequisite: EE 421. Fee, \$6.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

425 *Television Engineering*. Theory and practice of television transmitting and receiving systems. Prerequisite: EE 421. Fee, \$6.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

430g *Semiconductor Electronics*. Semiconductor theory and circuits. Prerequisite: EE 421. Fee, \$6.00. Three lectures, 3 hours laboratory. Credit, 4 hours. (Same as 1-PH 432.)

441g *Electromagnetic Waves*. Field theory. Prerequisites: EE 301, 1-MA 362. Credit, 3 hours. (Same as 1-PH 431.)

445g *Microwaves*. Theory and application of microwave systems. Prerequisite: EE 441. Fee, \$6.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

461g *Electrical Machinery*. Continuation of EE 362. Fee, \$6.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

462g *Motor Applications and Control*. Application of d-c and a-c motors and associated control circuits. Prerequisite: EE 362. Two lectures, 3 hours laboratory. Credit, 3 hours.

471g, 472g *Electric Power Systems*. Elements of power-system analysis. Prerequisite: EE 362. Credit, 3 hours each semester.
EE 475g *Economics of Public Utilities*. Economic, legislative, and administrative problems in the regulation of public utility rates and service standards. Public utility costs, pricing policies, rates, plant utilization, and competition. Credit, 3 hours.

480g *Feedback Control Systems*. Theory and application of closed-loop electrical, mechanical, and hydraulic control devices. Prerequisites: EE 302, 362. Fee \$6.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

485g *Industrial Electronics*. Theory and application of electronics to the industrial field. Prerequisite: EE 322 or 305. Fee, \$6.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

490 *Acoustics*. Acoustical theory and problems. Prerequisite: EE 302. Credit, 2 hours.

495g *Magnetics*. Theory and design of cores, coils, magnetic amplifiers, toroidal transformers, linear and non-linear inductors and associated circuitry. Prerequisite: EE 302. Fee, \$6.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

501, 502 *Network Analysis and Synthesis*. Theory, design and analysis of linear networks by advanced techniques. Prerequisite: EE 401. Credit, 3 hours each semester.

- 510 *Pulse Techniques*. Continuation of EE 410. Credit, 3 hours.
- 516 *Vacuum Tubes*. Theory and application of vacuum tubes. Prerequisite: EE 421. Credit, 3 hours.
- 520 *Electronic Circuits*. Design and analysis of electronic circuits. Prerequisite: EE 421. Fee, \$6.00. Three lectures, 3 hours laboratory. Credit, 4 hours.
- 522 *Electronic Measurements*. Theory and techniques of measurement in the microwave frequency spectrum. Prerequisite: EE 422. Fee, \$6.00. Two lectures, 3 hours laboratory. Credit, 3 hours.
- 530 *Solid-State Devices*. Theory and application of solid-state devices. Prerequisite: EE 430. Credit, 3 hours.
- 541 *Electromagnetic Waves*. Theory of static and dynamic electromagnetic fields; wave propagation and radiation. Prerequisite: EE 441. Credit, 3 hours.
- 542 *Applied Electromagnetic Theory*. Field theory applied to rectangular and cylindrical wave guides, antennas, arrays, horns, and apertures. Prerequisite: EE 541. Credit, 3 hours.
- 545 *Microwave Techniques*. Microwave resonators, amplifiers and oscillators; klystrons, magnetrons, and traveling-wave tubes. Prerequisite: EE 445. Credit, 3 hours.
- 560 *Electrical Machinery*. Topics in d-c and a-c machinery and controls. Prerequisite: EE 461. Credit, 3 hours.
- 562 *Symmetrical Components*. Theory and application of symmetrical components to the analysis of power systems and machines. Credit, 3 hours.
- 564 *Power System Stability*. Transient and steady-state stability limits of power systems. Credit, 3 hours.
- 566 *Protective Systems*. Theory and application of protective relays and other devices to power systems and machines. Credit, 3 hours.
- 568 *Synchronous Machines*. Study of synchronous apparatus. Credit, 3 hours.
- 570 *Power-Systems*. Theory and application of power-system apparatus. Credit, 3 hours.
- 572 *High-Voltage Engineering*. High-voltage sources, breakdown, measurements, and transmission. Credit, 3 hours.
- 574 *Distribution Systems*. Electric power distribution and associated apparatus. Credit, 3 hours.
- 580, 581 *Feedback Control Systems*. Continuation of EE 480, with emphasis on system design. Credit, 3 hours each semester.
- 582 *Information Theory*. Discrete systems and continuous signals; signal space and noise reduction. Credit, 3 hours.
- 585 *Guidance Systems*. Theory, design, and analysis of guidance systems. Prerequisite: EE 480. Credit, 3 hours.

586 *Non-linear Systems*. Non-linear vibrations and oscillations in physical systems. Credit, 3 hours.

Special Graduate Courses. EE 500, 591, 592, 593. See page 210.

Engineering Science

ES 211 *Engineering Mechanics*. Force systems, equilibrium, frame structures, center of gravity, and moments of inertia. Prerequisites: ME 102 or 1-PH 111; 1-MA 212. Credit, 3 hours.

312 *Engineering Mechanics*. Kinematics, kinetics, dynamics, work, energy, impact, and momentum. Prerequisite: ES 211. Credit, 3 hours.

320 *Man and Machine*. How the processes of mechanical invention and technical progress affected, and were in turn affected by, the evolution of social forms and institutions. Credit, 2 hours.

321 *Mechanics of Solids*. Concepts of stress and strain, Hooke's law; strength and deflection of axial force members, shafts in torsion and beams in flexure; combined stress; stability of columns. Prerequisite: ES 211. Credit, 3 hours.

350 *Theory of Material Properties*. Kinetic theory. Atomic structure. Microscopic structure of gases, liquids, and solids. Elasticity, plasticity, viscosity, thermal conductivity, diffusion, specific heat, and electrical conductivity. Prerequisites: ES 321, 381. Credit, 2 hours.

351 *Metallurgy*. Metallurgy of iron, steel, and alloys; atomic structure, crystal structure, and micro-structure of materials. Prerequisites: 1-CH 114; 1-PH 212. Credit, 3 hours.

371 *Fluid Mechanics*. Application of the laws of statics, buoyancy, stability, energy, and momentum to the behavior of ideal and real fluids. Prerequisites: ES 312, 381 or 1-CH 441. Credit, 3 hours.

381 *Thermodynamics*. Thermodynamic systems, first law, second law, Carnot cycle, properties, and vapor processes. Prerequisites: 1-MA 212; 1-PH 212. Credit, 3 hours.

400 *Technical Communications*. Composition for technical papers, reports and scientific articles suitable for publication. Oral and written presentation. Credit, 3 hours.

401g *Methods of Research*. Application of experimental and statistical methods to engineering problems, inductive and deductive inference. Credit, 3 hours.

421g *Vibrations*. Harmonic motion, free and forced vibrations, damped vibrations, and complex systems. Prerequisites: 1-MA 220; ES 312. Credit, 3 hours.

422g *Mechanics of Solids*. Continuation of ES 321. Shear flow theory, shear center, statically indeterminate members, and energy methods. Credit, 2 hours.

452g *Metallurgy*. Extraction of metals, crystal and atomic structure, phase transformations, tests and properties of high temperature metals and refractories, and introduction to spectroscopy. Prerequisite: ES 351 or 1-CH 441. Credit, 3 hours. (Same as 1-CH 425.)

465g *Applied Vector Analysis and Matrices*. Vectors and complex numbers, vector and scalar products, differentiation, analytic functions, and applications to engineering analysis. Prerequisite: 1-MA 220. Credit, 3 hours.

470 *Engineering Measurements*. Instrumentation and its application in engineering, industrial, and research measurements. Two lectures, 3 hours laboratory. Credit, 3 hours.

471, 472 *Engineering Research and Development*. Projects of a research design or development nature. A student will define the problem, select a method of approach, develop the theory, design an experiment to check the theory, set up the experiment, collect and analyze the data, and compare results with the theory. Each project will terminate with a critical report of the work performed and a proposed program for further research. Fee, \$10.00. Two lectures, 3 hours laboratory. Credit, 3 hours each semester.

483g *Heat Transfer*. Heat transfer by conduction, convection, and radiation; steady state fluid flow; analogs; techniques to solve engineering problems. Prerequisites: 1-MA 220; ES 381. Credit, 3 hours.

513, 514 *Dynamics*. Kinematics and kinetics, exterior ballistics and planetary motion; momentum and energy theorems; gyroscopes; Hamilton's Principle, and Lagrange's equations. Prerequisite: ES 312. Credit, 3 hours each semester.

515 *Vibrations*. Continuation of ES 421. Many degree of freedom systems, continuous systems, and non-linear systems. Credit, 3 hours.

522, 523 *Mechanics of Materials*. Beams on an elastic foundation. Reciprocal theorem, Castigliano's theorem with application to rings. Theory of plates and shells including analysis of stress and deformation in plates bent by transverse loads; vibration of plates; stresses in cylindrical and axially symmetrical shells. Credit, 3 hours each semester.

524 *Theory of Elasticity*. Stress and strain in three dimensions; plane stress and plane strain; rectangular and circular plates and cylinders, effects of holes; torsion of non-circular sections and non-uniform shafts. Prerequisite: ES 522. Credit, 3 hours.

527 *Plasticity*. Mechanics of materials beyond the range of Hooke's Law. Limit analysis. Shake-down procedure. Inelastic buckling. Credit, 3 hours.

529 *Theory of Elastic Stability*. Stability analysis of bars under separate or combined axial, lateral, and torsional loading. Buckling of plates. Selected topics. Credit, 3 hours. (Same as 1-PH 423.)

572, 573, 574 *Fluid Mechanics*. Development of the laws of fluid motion; potential field theory; airfoils, wing theory and cascades; gas dynamics; heat transfer and fluid friction in subsonic and supersonic flow; normal and oblique shock waves; viscous fluid motion; hydrodynamic and thermal boundary layers; statistical theory of turbulence and shear flows. Credit, 3 hours each semester.

582 *Thermodynamics*. Laws of thermodynamics; relations between properties and aspects of the second law; stability criteria and introduction to the thermodynamics of irreversible processes. Credit, 3 hours.

583 *Kinetic Theory of Gases and Statistical Mechanics*. Kinetic theory of the ideal gas, transport phenomena, distribution of molecular velocities; Maxwell-Boltzmann, Bose-Einstein, and Fermi-Dirac statistics. Prerequisite: ES 582. Credit, 3 hours.

585, 586 *Heat Transfer*. Conduction of heat, steady and unsteady heat flow, function theory, relaxation techniques, and electrical analogs; convection and radiation; thermal boundary layer theory; dimensional analysis. Credit, 3 hours each semester.

Special Graduate Courses. ES 500, 590, 591, 592, 593. See page 210.

Industrial Engineering

IE 311 *Engineering Economy*. Comparison of the relative economy of engineering alternatives. Credit, 2 hours.

321 *Methods and Motion Study*. Principles of motion economy, job standards and time standards. Laboratory practice in analyzing job situations. Fee, \$4.00. Two lectures, 3 hours laboratory. Credit, 3 hours. (Same as 3-MG 335.)

331 *Industrial Safety*. Safety programs for industry; control measures; analysis of the causes of accidents. Safety problems in nuclear activities. Prerequisite: ME 251. Credit, 3 hours. (Same as 3-MG 338.)

401g *Operations Research*. Early development, value, mathematical analysis, methods, personnel and organization for effective operations research. Co-requisite: 1-MA 437. Credit, 3 hours. (Same as 3-MG 491.)

411 *Tool Engineering*. Processes and machine tools of production; design of jigs fixtures, punches, dies, and other production tools. Prerequisites: ES 321; IE 321. Two lectures, 3 hours laboratory. Credit, 3 hours.

412g *Production Planning and Control*. Design for manufacturing; planning, scheduling, and procedures analysis of production control; value analysis; systematic approach to design at reduced costs. Prerequisites: ME 251; IE 321. Credit, 3 hours.

431g *Engineering Administration*. Management processes including principles of cooperative action, economy of incentives,

theory and structure of formal organizations, authority, bases of specialization, and the nature of executive responsibility. Credit, 3 hours.

441 *Engineering Law*. Influence of contract, property, and tort law upon engineering activities; contracts, agency partnerships, corporations, liens and expert testimony. Credit, 3 hours.

451g *Job Evaluation and Wage Incentives*. Methods employed in job analysis; job descriptions, evaluation, merit rating systems. Prerequisite: IE 321. Credit, 3 hours.

461 *Factory Planning*. Factors affecting the layout and relay-out of small and medium industrial plants. Fee, \$4.00. One lecture, 6 hours laboratory. Credit, 3 hours.

471g *Statistical Quality Control*. Application of statistical methods to control the quality of manufactured products. Co-requisite: 1-MA 437. Credit, 3 hours. (Same as 3-MG 471.)

481g *Supervision and Labor*. Inter-relations between supervisory personnel and labor. Organization and characteristics of labor unions. Grievances. Arbitration. Credit, 2 hours.

502 *Operations Research*. Application of mathematical models to industrial problems. Prerequisite: 1-MA 437. Credit, 3 hours.

522 *Methods-Time Analysis*. Work analysis, nature of human effort, work methods and measurement; ratio-delay, micro-motion studies, and predetermined time studies. Prerequisites: IE 321, 1-MA 437. Credit, 3 hours.

532 *Project Engineering*. Development and application of management techniques to engineering projects; planning, supervision, cost control and use of consulting specialists by the project engineer. Credit, 3 hours.

533 *Systems Analysis*. Analytical study of manufacturing systems. Application of fluid, thermodynamic and electrical analogies to production systems. Credit, 3 hours.

572 *Quality Control*. Industrial quality control. Applications of statistical quality control. Prerequisite: IE 471. Credit, 3 hours.

Special Graduate Courses. IE 500, 590, 591, 592, 593. See page 210.

Mechanical Engineering

ME 102 *Engineering Problem Analysis*. Significant figures and mathematical tools useful in problem solving; unit analysis, the free-body diagram, and model studies in engineering analysis; graphing. Co-requisite: 1-MA 120. Credit, 2 hours.

111 *Engineering Drawing*. Lettering, sketching, orthographic projection, sectional views, dimensioning, auxiliary projection and drawing for interchangeable assembly. Six hours laboratory. Credit, 2 hours.

112 *Descriptive Geometry*. Geometry of engineering drawing, intersections and developments, axonometric projection, oblique projection and graphing techniques. Six hours laboratory. Credit, 2 hours.

113 *Engineering Graphics*. Engineering drawing, descriptive geometry and graphics; spatial visualization, sketching, simplified drafting and current practices of industry. One lecture, 6 hours laboratory. Credit, 3 hours.

251 *Mechanical and Industrial Processes*. Methods of processing engineering materials. Laboratory projects and industrial plant tours emphasize current process techniques. Fee, \$5.00. One lecture, 3 hours laboratory. Credit, 2 hours.

311 *Mechanisms*. Relative motions of machine parts; cams, rolling contact, gearing, and flexible connectors. Prerequisites: ME 113, ES 312. Fee, \$3.00. One lecture, 3 hours laboratory. Credit, 2 hours.

341 *Analysis and Design*. Principles of machine design, theory and practice as applied to various machine parts. Prerequisite: ES 321. Two lectures, 3 hours laboratory. Credit, 3 hours.

382 *Thermodynamics of Mechanical Systems*. Applied thermodynamics; gas mixtures, power cycles, and reactive systems. Prerequisite: ES 381. Credit, 3 hours.

401 *Theory and Prediction of Invention*. Invention considered as an instrument of change in civilization; evolutionary nature of inventions, cycle of growth and decline, causation and social effects; possibility, past success and art of predicting the cultural future. Credit, 3 hours.

412g *Mechanics of Orbits and Trajectories*. Celestial mechanics, orbits and perturbations, space flight trajectories, exterior ballistics of rockets and powered flight trajectories. Prerequisite: ES 312. Credit, 3 hours.

421 *Aircraft Aerodynamics*. The atmosphere; types of air flow; lift and drag; types and characteristics of airfoils, Reynolds number, and compressibility effects; wing and auxiliary lift devices. Prerequisites: ES 371, 381. Credit, 3 hours.

422g *Aircraft Stability and Control*. Aircraft performance problems; maneuvers; theory and design of control surfaces; stability derivatives of wings and bodies applied to longitudinal, lateral and directional stability, and control. Prerequisite: ME 421. Credit, 2 hours.

431 *Air Conditioning*. Heating and cooling loads, physiological principles, psychrometry and its applications to air conditioning; cycles for heating, cooling, humidifying and dehumidifying. Prerequisite: ES 381. Credit, 3 hours.

442g *Analysis and Design*. Continuation of ME 341. Two lectures, 3 hours laboratory. Credit, 3 hours.

443 *Aero-Space Design*. Preliminary design of aircraft and space vehicles. Prerequisites: ES 422, ME 421; CE 431. One lecture, 6 hours laboratory. Credit, 3 hours.

451g *Fluid Power*. Hydrostatics and hydrodynamics, viscous and turbulent flow; hydraulic pumps and motors, circuit design, and the application of hydraulic power. Prerequisite: ES 371. Credit, 3 hours. (Same as 1-PH 424.)

452g *Gas Turbines and Jet Propulsion*. Thermodynamic and aerodynamic principles, gas turbine power plant, and the ramjet. Prerequisite: ES 371. Credit, 3 hours.

453g *Rocket Propulsion and Rocketry*. Rocket power plants, thermodynamic flow of fluids and combustion; theory and applications of propellants; liquid propellant feed systems; heat transfer, performance, and testing. Prerequisite: ES 371. Credit, 3 hours.

462 *Mechanical Engineering Laboratory*. A continuation of the principles of engineering measurements; detailed investigations. Prerequisite: ES 470. Fee, \$5.00. One lecture, 6 hours laboratory. Credit, 3 hours.

463 *Aero-Space Laboratory*. Model suspensions, experimentation of aerodynamic phenomena; experimental techniques in fluid mechanics and aerodynamics. Prerequisites: ME 421; ES 470. Fee, \$6.00. One lecture, 6 hours laboratory. Credit, 3 hours.

471g *Human Factors in Space Travel*. Artificial environments and environmental control. Physiological and psychological aspects of the environment of upper atmosphere and space. Credit, 4 hours.

483 *Internal Combustion Engines*. Application of thermodynamics, fluid mechanics, and chemistry to internal combustion engines; performance characteristics, combustion, carburetion, cooling, and controls. Prerequisite: ES 371. Credit, 3 hours.

522 *Theoretical Aerodynamics*. Aerodynamics of perfect and viscous fluids, laws of vortex motion, streamline bodies, and theory of airfoils in non-uniform motion; turbulence and skin friction. Prerequisite: ME 421. Credit, 3 hours.

544, 545 *Design*. Creative design emphasizing the analysis and design of complete machines and systems. Prerequisite: ME 442. Credit, 3 hours each semester.

546 *Systems Engineering*. Application of project engineering techniques and the synthesis of model solutions; integration of concepts studied in mathematics and the engineering sciences. Credit, 3 hours.

554 *Reaction Engines*. Continuation of ME 452. Credit, 3 hours.

555 *Gas Turbines*. Combustion and fuel equipment; heat exchangers; part load operation; variations of the basic cycle; aircraft gas turbines. Prerequisite: ME 452. Credit, 3 hours.

Special Graduate Courses, ME 500, 590, 591, 592, 593. See page 210.

Nuclear Engineering

NE 411g *Nuclear Reactor Theory*. Neutron diffusion, chain reactions, critical mass, reactor control, and radiation shielding. Prerequisite: 1-PH 212. Credit, 3 hours.

421g *Nucleonics Laboratory*. Operation of apparatus for measuring ionizing radiations. Prerequisite: 1-PH 212. Fee, \$6.00. One lecture, 3 hours laboratory. Credit, 2 hours. (Same as 1-PH 463.)

431g *Nuclear Reactor Engineering*. Engineering design of nuclear reactors, radiation protection, heat removal and temperature control, optimization of reactor variables, and assured safety. Prerequisite: NE 411. Credit, 3 hours. (Same as 1-PH 465.)

441g *Radiation Hazards and Facilities*. Safe limits of exposure, tolerance dosage of alpha, beta, gamma and neutron radiation; design of safe radiation facilities. Prerequisite: 1-PH 464 or NE 411. Credit, 3 hours. (Same as 1-PH 467.)

451g *Reactor Design*. Engineering design of typical reactors: homogeneous, heterogeneous, stationary power, and power breeders. Co-requisite: NE 431. Credit, 3 hours. (Same as 1-PH 468.)

472g *Nuclear Engineering Laboratory*. Operation, instrumentation, control, and design of nuclear equipment. Prerequisite: NE 411. Fee, \$6.00. One lecture, 6 hours laboratory. Credit, 3 hours.

512 *Reactor Theory*. Neutron motion and reactor behavior; transport and diffusion theory. Prerequisite: NE 411. Credit, 3 hours. (Same as 1-PH 466.)

English

COLLICE PORTNOFF, Chairman, Department of English

English

EN 101 *First Year English*. Narrative and descriptive writing; emphasis on paragraph structure, correctness in English fundamentals, exactness and concreteness of statement; dictionary and library practice; intensive and extensive reading. Credit, 3 hours.

102 *First Year English*. Expository writing; emphasis on organizing and unifying long papers, improvement in style, expansion of vocabulary. Introduction to word study; practice in research, including the writing of a model term paper. Intensive and extensive reading. Prerequisite: EN 101. Credit, 3 hours.

103 *Introduction to Literature*. An introduction to literature through literary types, designed for students not majoring in English. Selections taken mainly from modern writers. Credit, 3 hours.

111, 112 *English for Foreign Students*. A course for foreign students who have studied English in their native countries, but who require practice in the idioms of English. Intensive reading, writing, and discussion to acquaint students with the colloquial flavor of English. Satisfies the graduation requirement of EN 101, 102. Credit, 3 hours each semester.

151, 152 *Directed Reading for English Majors and Minors.* Supervised reading with a weekly individual conference with instructor. Credit, 1 hour each semester.

201 *World Literature—The Classical and Medieval Periods.* Selections from the great literature of the world in translation and lectures on the cultural background of the writings. Prerequisite: EN 101. Credit, 3 hours.

202 *World Literature—The Renaissance and Modern Periods.* A continuation of EN 201. Selections from the great literature of the world in translation, and lectures on the cultural background of the writings. Prerequisite: EN 101. Credit, 3 hours.

204 *Literature of Today.* Biography, short story, novel, and drama. Not for English majors. Not open to freshmen. Credit, 3 hours.

211 *Advanced Composition.* For students interested in further training in organization and expression of ideas. Factual and imaginative discourse are treated. Prerequisite: EN 102. Credit, 3 hours.

221 *Survey of English Literature.* A consideration of the content and form of the earlier English literature, including a study of the individual and national characteristics of certain authors. Prerequisite: EN 102. Primarily for English majors and minors. Credit, 3 hours.

222 *Survey of English Literature.* A continuation of EN 221, based upon the later English literature. Prerequisite: EN 102. Primarily for English majors and minors. Credit, 3 hours.

311 *Creative Writing.* Writing laboratory. Lectures and conferences dealing with the various forms of imaginative writing. Prerequisite: EN 211 or recommendation of instructor in EN 102. Credit, 3 hours.

312 *Current English Usage.* Recent changes and current trends in the language, with emphasis on American English and the factual basis of grammar. Prerequisite: EN 222 or equivalent. Credit, 3 hours.

313 *Introduction to Semantics.* Nature of meaning and the function of language, designed to improve accuracy of communication and to provide a technique for analyzing false or misleading statements. Prerequisite: Junior standing. Credit, 2 hours.

321 *Contemporary British Poetry.* British poetry of the twentieth century; techniques, aims, and significance. Prerequisite: EN 103 or equivalent. Credit, 3 hours.

341 *American Literature.* From colonial times to the Civil War, including the growth of nationalism and the rise of the New England school. Open to those specializing in other departments who have junior standing. Prerequisite: EN 102. Credit, 3 hours.

342 *American Literature*. From Whitman to the present. The influence of westward expansion, the growth of regionalism, the literature of social protest. Open to those specializing in other departments who have junior standing. Prerequisite: EN 102. Credit, 3 hours.

343 *Contemporary American Poetry*. American poetry of the twentieth century; techniques, aims, and significance. Prerequisite: EN 103 or equivalent. Credit, 3 hours.

351 *Contemporary Fiction*. A study of important contemporary writers; their careers and distinctive traits, with particular attention to the relationship of their ideas with present-day problems. Prerequisite: EN 103 or equivalent. Credit, 3 hours.

352 *Short Story*. The development of the short story as a literary form; analysis of its technique through study of examples from the work of representative authors. Prerequisite: EN 103 or equivalent. Credit, 3 hours.

355 *History of the Drama*. The English drama from the Middle Ages to the present, with selective examples of foreign influences. Reading of representative plays of each period. Credit, 3 hours.

411g *Advanced Creative Writing*. Continuation of EN 311. Prerequisite: EN 311 or approval of instructor. Credit, 3 hours.

412g *Professional Writing*. Lectures and conferences concerning techniques of writing for publication. Prerequisite: EN 311 or approval of instructor. Credit, 3 hours.

413g *History of the English Language*. Development of the language from the earliest times to the modern period. Prerequisites: EN 211, 221. Credit, 3 hours.

420g *Renaissance Drama*. Plays of Elizabethan, Jacobean and Caroline dramatists, excluding Shakespeare. Prerequisite: EN 221. Credit, 3 hours.

421g *Shakespeare: The Tragedies*. Critical study of five plays. An introduction to the problems of Shakespearean scholarship. Prerequisite: EN 221. Credit, 3 hours.

422g *Shakespeare: The Comedies*. A rapid reading of all the comedies. Studies of the comic spirit and Shakespeare's comic genius. Prerequisite: EN 221. Credit, 3 hours.

423g *Milton*. The life of Milton, his relation to the literary and social background of his period, and textual study of his chief works. Prerequisite: EN 221. Credit, 3 hours.

424g *Chaucer*. A study of Chaucer's language, poetry and intellectual background. Prerequisite: EN 221. Credit, 3 hours.

425g *Nineteenth Century Poetry: Romantic Period*. Study of and readings in the poetry of Wordsworth, Coleridge, Shelley, Keats, Byron. Prerequisite: EN 222. Credit, 3 hours.

426g *Nineteenth Century Poetry: Victorian Period*. The poetry of the second half of the century. Special study of Tennyson, Browning, Arnold. Prerequisite: EN 222. Credit, 3 hours.

427g *Age of Johnson*. The chief writers, movements, and books during Johnson's career as a dominating literary figure, together with their most important relationships to predecessors and followers. Prerequisite: EN 221, 222. Credit, 3 hours.

428g *Age of Satire*. English satirists of the Restoration and early eighteenth century: Dryden, Pope, Swift, and others. Prerequisite: EN 222. Credit, 3 hours.

441g *Contemporary American Drama*. A study of the American Drama since World War I, with special attention to experimental techniques. Prerequisite: EN 222 or equivalent. Credit, 3 hours.

451g *Development of the Novel*. From the origins of prose fiction to 1850. Analysis of typical examples and reading of outside assignments. Prerequisite: EN 103 or 222. Credit, 3 hours.

452g *Modern Fiction*. A study of the modern novel beginning with Flaubert and ending with Conrad. Prerequisite: EN 222 or equivalent. Credit, 3 hours.

454g *Modern Drama*. The chief dramatic writers of the generation preceding World War I, with special attention to experimental techniques. Prerequisite: EN 222 or equivalent. Credit, 3 hours.

455g *The Form of Verse: Theory and Practice*. A study of the types, history, criticism, and schools of theory of metrical form. Analysis of lyric, narrative, and dramatic poetry. Original verse writing optional. Prerequisite: One semester survey of American or British literature, or equivalent. Credit, 2 hours.

456g *Classical Background of English Literature*. A study of the myths and legends of Greece and Rome and some of the works in which they appear. Credit, 2 hours.

460g *Literature of the Southwest*. The literature, folklore and traditions of the American Southwest. Credit, 2 hours.

471g *Literature for Junior and Senior High School Students*. A study of prose and poetry which meet the interests, desires and capabilities of the high school boy and girl. Recent literature stressed. Prerequisite: EN 222. Credit, 3 hours.

480g *Methods of Teaching English*. Methods of instruction, organization, and presentation of appropriate content in English. Prerequisite: 2-SE 311 or concurrent registration. Credit, 3 hours.

510 *The Structure of English*. Analysis of the structural patterns of English from both the grammatical and linguistic points of view. Prerequisite: EN 312. Credit, 3 hours.

511 *Theory and Practice of Rhetoric*. Students will be required to demonstrate their grasp of stylistic theory by doing at least competent apprentice work in various assigned forms. Prerequisite: EN 510, or approval of department chairman. Credit, 3 hours.

520 *Renaissance Literature*. Poetry and prose of the English Renaissance, excluding drama. Prerequisite: EN 221. Credit, 3 hours.

550 *Contemporary Comparative Literature*. A study of current trends in American and other literatures with emphasis on their significance in contemporary thought. Prerequisite: EN 351 or approval of department chairman. Credit, 3 hours.

Special Graduate Courses, EN 500, 590, 591, 592, 593. See page 210.

Foreign Languages

RUSSELL K. BOWMAN, Chairman, Department of
Foreign Languages

Foreign Languages

FL 100 *Introduction to Foreign Languages*. This course portrays the significance of languages in society, including study of the history of language, family relationships existing among languages, word relationships, and meanings. Emphasis will be upon languages of Western Europe with some reference to Slavic and Oriental tongues. Credit, 2 hours.

480g *Methods of Teaching Foreign Languages*. Methods of instruction, organization, and presentation of appropriate content in Foreign Languages. Prerequisite: 2-SE 311 or concurrent registration. Credit, 3 hours.

Special Graduate Course, FL 500. See page 210.

French

FR 101, 102 *Elementary French*. For beginning students only—
MAY NOT BE TAKEN FOR CREDIT BY STUDENTS WHO
HAVE COMPLETED TWO OR MORE SECONDARY SCHOOL
UNITS OR THE EQUIVALENT. Credit, 4 hours each semester.

110 *Practical Phonetics for Singers*. To acquaint singers with the fundamentals of French phonetics and sound production. Correct pronunciation in reading and singing. Credit, 2 hours.

201, 202 *Intermediate French*. Additional emphasis on the development of ability to speak, read, write, and comprehend French, through grammar review and the reading of selected materials. Prerequisite: FR 102, or its equivalent. Credit, 4 hours each semester.

311, 312 *French Composition and Conversation*. Designed to increase writing ability and fluency in conversation for business, travel, or social purposes, with emphasis on correct pronunciation, intonation and extension of practical vocabulary. Prerequisite: FR 202, or approval of the instructor. Credit, 3 hours each semester.

321, 322 *Survey of French Literature*. The most significant works, authors, and literary movements of French literature from its beginnings to the end of the 19th century. Lectures, discussions, collateral readings and reports. Prerequisite: FR 202, or approval of the instructor. Credit, 3 hours each semester.

435g *French Literature of the 16th Century*. The influence of the Renaissance on the literature of France in the 16th century, as found in the works of Rabelais, Marot, DuBellay, Ronsard, and Montaigne. Prerequisite: FR 202. Credit, 3 hours.

441g *French Literature of the 17th Century*. A study of "le Grand Siècle," with emphasis on the classical writers of drama, prose, and poetry. Prerequisite: FR 202. Credit, 3 hours.

445g *French Literature of the 18th Century*. The most significant writers of the "Age of Reason," including Montesquieu, Voltaire, Diderot, and Rousseau; the contributions of Lesage, Marivaux, Prevost, and Beaumarchais to the development of the novel and drama. Prerequisite: FR 202, or approval of the instructor. Credit, 3 hours.

451g *French Literature of the 19th Century*. Representative works of the principal dramatists, novelists, poets, and essay writers from early Romanticism to the end of the century. Prerequisite: FR 202. Credit, 3 hours.

461g *French Literature of the 20th Century*. A survey of the most significant novelists, dramatists, essayists, and poets of France in the 20th century. Prerequisite: FR 322. Credit, 3 hours.

523 *History of the French Drama*. Development of the French drama from its origins to Romanticism, with special emphasis on the classical period. Credit, 3 hours.

524 *The Modern French Drama*. Representative dramatists of the 19th and 20th centuries. Credit, 3 hours.

525, 526 *History of the French Novel*. Development of the French novel from its beginnings to the present. Credit, 3 hours each semester.

Special Graduate Courses, FR 500, 590, 591, 592, 593. See page 210.

German

GR 100 *Reading Knowledge of German*. Basic grammar to develop the ability to read the language accurately for research purposes. Stress on intensive reading in the sciences and other fields. Intended only as a research tool, cannot be taken as a substitute for GR 101. No prerequisite. Three hours per week. No credit.

101, 102 *Elementary German*. For beginning students only—MAY NOT BE TAKEN FOR CREDIT BY STUDENTS WHO HAVE COMPLETED TWO OR MORE SECONDARY SCHOOL UNITS OR THE EQUIVALENT. Credit, 4 hours each semester.

110 *Practical Phonetics for Singers*. To acquaint singers with the fundamentals and the elements of German phonetics and sound production. Correct pronunciation in reading and singing. Credit, 2 hours.

201, 202 *Intermediate German*. Reading of literary texts; practice in conversation and composition; review of grammar. Prerequisite: GR 102. Credit, 4 hours each semester.

311, 312 *German Composition and Conversation*. Development of writing ability and oral expression. Material based on everyday life in Germany. Prerequisite: GR 202. Credit, 3 hours each semester.

321, 322 *Survey of German Literature*. A survey of German literature from its beginnings to the present, with special emphasis on the Classical period. Prerequisite: GR 202, or approval of instructor. Credit, 3 hours each semester.

435g *German Literature of the 16th Century*. A study of literary, historical, sociological and religious problems of the "Age of Luther," as found in such authors as Hans Sachs, Brant, Hutten, Fischart and Luther. Prerequisite: GR 202. Credit, 3 hours.

441g *German Literature of the 17th Century*. A study of German literature of the Barock Period. The reforms of Opitz, the lyric period, the mysticism of Angelus Silesius and Jakob Bohme, the plays of Gryphius and the prose of Grimmelshausen. Prerequisite: GR 202. Credit, 3 hours.

445g *German Literature of the 18th Century*. The various literary trends of the 18th century, with special emphasis on Lessing, Wieland, Klopstock and Herder. Prerequisite: GR 202. Credit, 3 hours.

451g *German Literature of the 19th Century*. Study of the major prose writers and dramatists. Readings, lectures, and reports. Prerequisite: GR 202. Credit, 3 hours.

461g *German Literature of the 20th Century*. A study of leading German writers of the 20th century, including Hauptmann, Mann, Rilke, Hofmannsthal, Kafka, and Frank. Lectures, discussions, reports. Prerequisite: GR 322 or approval of instructor. Credit, 3 hours.

523 *History of the German Drama*. German drama from its origins to Romanticism, with special emphasis on Lessing, Goethe, and Schiller. Credit, 3 hours.

524 *The Modern German Drama*. Representative dramatists of the 19th and 20th centuries. Credit, 3 hours.

525, 526 *History of the German Novel*. The German novel from Goethe to Thomas Mann. Credit, 3 hours each semester

Special Graduate Courses. GR 500, 590, 591, 592, 593. See page 210.

Greek

GK 101, 102 *Elementary Greek*. For beginning students only—**MAY NOT BE TAKEN FOR CREDIT BY STUDENTS WHO HAVE COMPLETED TWO OR MORE SECONDARY SCHOOL UNITS OR THE EQUIVALENT.** Credit, 4 hours each semester.

Latin

LA 101, 102 *Elementary Latin*. For beginning students only—MAY NOT BE TAKEN FOR CREDIT BY STUDENTS WHO HAVE COMPLETED TWO OR MORE SECONDARY SCHOOL UNITS OR THE EQUIVALENT. Credit, 4 hours each semester.

201, 202 *Intermediate Latin*. Readings from the orations of Cicero; and selections from Ovid or other authors. Prerequisite: LA 102. Credit, 4 hours each semester.

Russian

RU 101, 102 *Elementary Russian*. For beginning students only—MAY NOT BE TAKEN FOR CREDIT BY STUDENTS WHO HAVE COMPLETED TWO OR MORE SECONDARY SCHOOL UNITS OR THE EQUIVALENT. Credit, 4 hours each semester.

201, 202 *Intermediate Russian*. Development of a sound reading knowledge of Russian. Systematic review of grammar. Rapid reading and oral expression. Outside reading in the student's field of interest. Prerequisite: RU 102. Credit, 4 hours each semester.

203 *Scientific Russian*. Reading of military, diplomatic, and scientific materials. Prerequisite: RU 201. Credit, 3 hours.

311, 312 *Russian Composition and Conversation*. Development of writing ability and oral expression. Prerequisite: RU 202. Credit, 3 hours each semester.

321, 322 *Survey of Russian Literature*. The most significant works, authors, and literary movements of Russian literature from its beginnings to the present. Prerequisite: RU 202. Credit, 3 hours each semester.

Spanish

SP 101, 102 *Elementary Spanish*. For beginning students only—MAY NOT BE TAKEN FOR CREDIT BY STUDENTS WHO HAVE COMPLETED TWO OR MORE SECONDARY SCHOOL UNITS OR THE EQUIVALENT. Credit, 4 hours each semester.

201, 202 *Intermediate Spanish*. Review of grammar. Vocabulary-building, reading, oral and written expression. Prerequisite: SP 102. Credit, 4 hours each semester.

211 *Commercial Spanish*. Develops ability in Spanish commercial vocabulary and business correspondence. Information regarding Spanish-American exports, imports and industry. Prerequisites: SP 101, 102. Credit, 2 hours.

311 *Spanish Conversation*. Intensive drill to develop basic conversational skills, using topics of everyday life. Prerequisite: SP 202, or approval of instructor. Credit, 2 hours.

312 *Spanish Conversation*. Emphasis on the development of fluency beyond the dialog stage, to promote facility in the discussion of ideas. Prerequisite: SP 311, or approval of instructor. Credit, 2 hours.

313, 314 *Advanced Spanish Composition*. Course designed to develop skill and accuracy in self-expression in Spanish. Special emphasis on structure and form. Study of style in selections from representative authors. Prerequisite: SP 202. Credit, 3 hours each semester.

321, 322 *Survey of Spanish Literature*. A comprehensive view of the development of Spanish literature from its beginnings to the present with some emphasis on the evolution of Spanish thought and literary ideals. Conducted in Spanish. Prerequisite: SP 202 or approval of instructor. Credit, 3 hours each semester.

427g, 428g *Spanish American Literature*. A survey of the significant literature and writers from the colonial period to the present. Prerequisite: SP 322. Credit, 3 hours each semester.

443g *Life and Works of Cervantes*. A study of the life and works of Cervantes with emphasis upon *Don Quijote* and the *Novelas ejemplares*. Lectures, readings, and reports. Prerequisite: 12 hours in upper division courses. Credit, 3 hours.

451g, 452g *Spanish Literature of the 19th Century*. A study of the Romantic dramatists of this century and the most representative novelists and poets of the second half of the century. Prerequisite: SP 322. Credit, 3 hours each semester.

455g *The Regional Novel*. The chief characteristics of the Spanish regional novel as shown in representative works. Prerequisite: SP 322, or approval of instructor. Credit, 3 hours.

456g *Manuel Galvez and the Novela de la Ciudad*. A study of the works of Manuel Galvez and the interpretation of urban life in Argentina. Prerequisite: 12 hours in upper division courses in Spanish or graduate standing. Credit, 3 hours.

461g, 462g *Spanish Literature of the 20th Century*. A study of the creative achievements of the Generation of 1898 and significant tendencies in the works of contemporary writers. Prerequisite: SP 322. Credit, 3 hours each semester.

472g *Spanish-American Civilization*. A study of the people, the growth of their institutions and culture, and the aspirations of their great men. A knowledge of Spanish is not necessary. No prerequisite. Credit, 3 hours.

481g *History of the Spanish Language*. Survey of the linguistic development of the Spanish language from the epoch of Vulgar Latin to the present day. Prerequisites: SP 313, 314 or equivalent. Credit, 2 hours.

493g *The Teaching of Spanish in the Elementary School*. The course is designed for teachers who are interested in introducing the teaching of Spanish in the elementary grades. It integrates the techniques of teaching with the rudiments of the Spanish language from a linguistic point of view. Credit, 3 hours.

494g *Introductory Spanish for Teachers of Bilingual Children.* The course is designed to help teachers of bilingual children to orient these children to the American public school system. It emphasizes the study of fundamentals of Spanish and the vocabulary pertinent to everyday situations among those of Hispanic culture. Prerequisite: Senior or graduate standing. Credit, 3 hours.

523 *History of the Spanish Drama.* The development of the Spanish drama from its origins to Romanticism, with special emphasis on the drama of the Golden Age. Lectures, readings, and reports. Credit, 3 hours.

524 *The Modern Spanish Drama.* A study of the representative dramatists of the 19th and 20th centuries. Lectures, readings, and reports. Credit, 3 hours.

525, 526 *History of the Spanish Novel.* The development of the novel from its beginnings to the present. Reading of representative works of the different periods. Credit, 3 hours each semester.

529 *Mexican Literature.* A study of the representative writers and literary movements of Mexico since 1810 to the present. Credit, 3 hours.

Special Graduate Courses, SP 590, 591, 592, 593. See page 210.

General Physical Sciences

ERNEST E. SNYDER, Chairman, Department of
General Physical Sciences

General Physical Science

PL 110 *Physical Universe.* The universe as a unit; the stars; the solar system; the earth and the atom. The nature of energy and matter and relations between atoms, elements and compounds. Designed for general education. Does not meet science requirement in preprofessional curriculums. Fee, \$2.00. Credit, 4 hours.

320 *Science for the Elementary School.* Development of an integrated science program in each grade of the elementary school. Lectures, library reports, class discussion, field observation and a three-day camping trip. Prerequisites: BI 100; PL 110. Fee, \$3.00. Credit, 3 hours.

340 *Outdoor Science Education.* Physical and life sciences in the world of nature. Arizona natural resources and their conservation. Techniques of conducting field trips out of doors. Prerequisite: Seven hours credit in science and/or mathematics. Credit, 3 hours.

360 *Science and Man.* The effects upon man of his technological civilization and a consideration of recent advances in both pure and applied physical and life sciences. Prerequisite: Seven semester hours credit in science and/or mathematics. Credit, 3 hours.

410g *History of the Physical Sciences.* A study of the growth of astronomy, chemistry, and physics; and of the scientists who have made outstanding contributions, and of the effect of these contributions on man's life. Credit, 3 hours.

470g *General Physical Science for the Elementary School.* Recent advances in the physical sciences with emphasis on how the new concepts may be incorporated in the elementary science program. Prerequisite: Seven hours credit in science and/or mathematics. Fee, \$3.00. Credit, 3 hours.

480g *Methods of Teaching Physical Science.* Methods of instruction, organization, and presentation of appropriate content in Physical Science. Prerequisite: 2-SE 311 or concurrent registration. Credit, 3 hours.

522 *Workshop in Elementary School Science.* Science programs of leading elementary schools and detailed study of the State Course of Study in Science. Lectures, assigned reading, classroom demonstrations, and field studies. Open to experienced teachers, supervisors, and administrators. Two lectures, 3 hours laboratory. Credit, 3 hours.

Special Graduate Courses, PL 500, 590, 591, 592. See page 210.

Geography

GEORGE T. RENNER, III, Chairman, Department of Geography

Geography

GE 111 *Elements of Geography.* Climate, relief, drainage, soils, plant and animal life; their inter-relationship and influence upon man. Three lectures, 3 hours laboratory. Credit, 4 hours.

112 *Geomorphology.* Development and interpretation of the relief features of the earth. Prerequisite: GE 111 or 131. Credit, 2 hours.

131 *Economic Geography.* Production, distribution, and consumption of various types of commodities of the world and relationships to the activities of man. Credit, 3 hours.

141 *Map Reading and Interpretation.* Use of map symbols, projections, methods of graphic presentation used by the different sciences. Interpretation of maps, diagrams, and cartograms. One lecture, 3 hours laboratory. Credit, 2 hours.

142 *Map Making.* Development of map compilation and drafting skills. Construction of projections, contours, trachographics, hypsometrics, etc. Prerequisite: GE 111 or 131. One lecture, 3 hours laboratory. Credit, 2 hours.

151 *Meteorology.* Weather elements, meteorological instruments, weather maps, forecasting and their relation to activities of man. Prerequisite: GE 111. Credit, 3 hours.

221 *Geography of Arizona*. Landscape features, climate, soils, minerals, water resources, plant and animal life, and industries and their influence on man's activities. Prerequisite: GE 111 or 131. Credit, 2 hours.

222 *Geography of North America*. Physiographic provinces of the continent with their respective climates, products, and major activities of man. Prerequisite: GE 111 or 131. Credit, 3 hours.

223 *Geography of South America*. Physiographic regions, their climates, products, and human activities. Prerequisite: GE 111 or 131. Credit, 3 hours.

224 *Geography of Caribbean America*. A topical and regional study of the lands bordering the Caribbean, with a view to creating a basis for an understanding of the problems of the people as they are related to their own environment, to the rest of the world, and particularly to the United States. Prerequisite: GE 111 or 131. Credit, 2 hours.

242 *Aerial Photograph Interpretation*. Geographic, physiographic, and military interpretation of aerial photographs. Application to topographic charts and to cartography. Prerequisite: GE 111 or 131. One lecture, 3 hours laboratory. Credit, 2 hours.

311 *Conservation of Natural Resources*. Distribution, conservation, and most efficient use of natural resources of the United States, including soil, water, minerals, wild life, and recreational facilities. Prerequisite: GE 111 or 131. Credit, 3 hours.

321 *Geography of Europe*. Natural regions of Europe, their climates, relief features, drainage, soils, plants, and animals and their influence upon man's activities. Prerequisite: GE 111 or 131. Credit, 3 hours.

322 *Geography of Near, Middle, and Far East*. Regions, resources, and potentialities of Asia. A survey of the geographic background of the continent and interpretation of the physical, social, economic, and political factors. Prerequisite: GE 111 or 131. Credit, 3 hours.

323 *Geography of Africa, Australia, Oceania, and Antarctica*. Climates, vegetation, surface features, resources, and peoples, and their role in the modern world. Prerequisite: GE 111 or 131. Credit, 3 hours.

324 *Geography of the Soviet Union*. People, space, resources, and power potential of the U.S.S.R. Prerequisite: GE 111 or 131. Credit, 2 hours.

341 *Cartography*. Continuation of topographic drafting and interpretation of aerial surveys. Introduction to cadastrals and land utilization surveys. Prerequisite: GE 142. One lecture, 3 hours laboratory. Credit, 2 hours.

351 *Climatology*. Principles of climate; attention to climatic regions and climate cycles. Prerequisites: GE 111, 151. Credit, 3 hours.

411g *Principles of Physical Geography*. A study of selected areas within the major physiographic regions. Basic introduction to physiography and the physical elements of the environment. Credit, 3 hours.

412g *Principles of Oceanography*. Marine relief, topography, water masses, currents, isohalines, isotherms, biotic environment, marine geo-chemistry, marine sedimentation as factors in the geography of the oceans. Prerequisites: GE 111; CH 111; or PH 101 or equivalent. Three lectures. Credit, 3 hours.

419g *Field Studies in Geography*. Systematic cataloging, mapping and analysis of geographic phenomena by means of actual field work. Written report required. Prerequisite: Approval of instructor. Credit, 3 hours.

421g *World Geography*. Evolution or modification of cultures and economics influenced by natural environment. Prerequisite: GE 111 or 131. Credit, 3 hours.

422g *Geopolitics of Europe and the Near East*. Examination of the principles of geopolitics and their application to current affairs. Major emphasis on Russia, Britain, Germany, and Israel with attention to American interests. Prerequisites: GE 111 or 131, HI 101 and 102, or PS 101. Credit, 3 hours.

424g *Geography of World Problems*. The study of world problems as a product of their geographic setting and the effects of man in changing his environment. Prerequisite: GE 111 or 131. Credit, 3 hours.

433g *Geography of Trade and Transportation*. Geographic analysis of the world's trade routes by land, sea, and air. Prerequisite: GE 111 or 131. Credit, 3 hours.

Geology

PAUL T. MILLER, Chairman, Department of Geology

Geology

GL 111 *General Geology*. Survey of physical and historical geology with applications to everyday life. Credit, 4 hours.

113 *Physical Geology*. Earth changes due to temperature, wind, water, ice, volcanoes, earthquakes, etc. Fee, \$2.00. Three lectures, 3 hours laboratory, a minimum of 18 hours field work a semester. Credit, 4 hours.

114 *Historical Geology*. Origin and chronological succession of events that have developed our earth and its life. Fee, \$2.00. Three lectures, 3 hours laboratory, a minimum of 18 hours field work a semester. Credit, 4 hours.

126 *Rocks and Minerals*. The identification, field classification, origin, variation, occurrence, associations, and uses of important types. Prerequisite: GL 113. Two lectures, 3 hours laboratory. Credit, 3 hours.

213 *Geomorphology*. Development and classification of landforms; a detailed analysis of the effect of geologic structure on the landforms developed during the normal cycle of erosion. Prerequisites: GL 113, 114. Two lectures, 3 hours laboratory. Credit, 3 hours.

215 *Geologic Maps*. Structural, stratigraphic, and historical interpretation of geologic maps and cross-sections. Prerequisite: GL 114. Fee, \$2.00. One lecture, 3 hours laboratory. Credit, 2 hours.

246 *Structural Geology*. Study of rock structures, the principles and mechanics of their formation, and their relation to surface features and mineral deposits. Prerequisites: GL 113 and 114. Credit, 3 hours.

311 *Engineering Geology*. Physical geology with special emphasis on structural geology, ground water, soil genesis, and relation of geology to engineering problems. Laboratory exercises include rock and mineral identification, and interpretation of geological and topographic maps. Prerequisites: CH 114; 4-CE 241. Two lectures, 3 hours laboratory. Credit, 3 hours.

319 *Field Geology*. Detailed systematic field work and preparation of a report which includes geologic maps and structure sections. Prerequisites: GL 246 and approval of the department chairman. Credit, 3 hours.

321, 322 *Mineralogy*. Mineral structure and identification based on crystal forms, physical properties and chemical composition. Prerequisites: CH 115; GL 114. Fee, \$3.00. Two lectures, 3 hours laboratory. Credit, 3 hours each semester.

335, 336 *Invertebrate Paleontology*. The structure and evolutionary development of fossil invertebrates with emphasis on morphology of skeletal parts and the application of paleontology to stratigraphic problems. Prerequisite: GL 114. Fee, \$2.00. Two lectures, 3 hours laboratory. Credit, 3 hours each semester.

352 *Sedimentation*. Origin, transportation, deposition, and methods of statistical analysis applied to problems of ancient and modern sediments. Prerequisite: GL 114. Fee, \$2.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

436g *Micropaleontology*. Classification, morphology, and paleoecology of microscopic organisms including Foraminifera, Ostracoda, and Conodonts. Prerequisites: GL 335 and 336. Fee, \$2.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

451g *Stratigraphy*. Sources of sediments, depositional environments, and the principles involved in delimiting, correlating, and naming of stratigraphic units. Prerequisites: GL 114 and 352. Credit, 3 hours.

453g *Quantitative Sedimentation*. Theory and application of various laboratory techniques in the study of sediments. Prerequisite: GL 352. Fee, \$2.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

460g *Topics in Geology*. Special topics in petrology, optical mineralogy, petroleum geology, regional geology, and sedimentology are open to students qualified to pursue independent studies. Prerequisite: Approval of instructor. Fee, arranged. Credit to be arranged.

461g *Economic Geology*. Distribution, origin, occurrence, production and utilization of metallic and nonmetallic minerals. Fee, \$2.00. Credit, 3 hours.

465g *Principles of Geophysics*. Principles of the various geophysical methods used in subsurface exploration, methods of geologic interpretation, and factors governing the selection of methods to be used. Prerequisites: PH 112 and GL 114. Credit, 2 hours.

468g *Ground Water Geology*. Principles governing the occurrence, movement, quality, and recovery of underground water with special reference to Arizona. Prerequisite: GL 352. Credit, 3 hours.

Health, Physical Education, and Recreation

RONALD G. THOMSON, Chairman, Department of Health,
Physical Education, and Recreation

Health Education

HE 100 *Healthful Living*. Knowledge and appreciations related to healthful living. Credit, 2 hours.

360 *School-Community Health*. The three main divisions of the school health program—health services, health instruction, healthful school living—in relation to community health programs. Credit, 3 hours.

370 *Organization and Administration of Health Education*. The areas of school health services, health instruction, healthful school living, and physical education in relationship to each other, and to the general educational program of school and communities. Prerequisite: HE 360. Credit, 3 hours.

371 *Teaching Health in Schools*. The methods and materials currently important to the problems of health instruction in the schools. Units of instruction are developed for both the elementary and secondary schools. Prerequisite: HE 360. Credit, 3 hours.

461g *School Health Problems*. An advanced and intensive study of the school health program to help teachers develop skills in the analysis of health problems, and the solution of selected problems. Prerequisite: HE 360, or teaching experience. Credit, 2 hours.

470g *School-Community Health Councils*. The organization and operation of school health councils and school-community health councils. Prerequisite: HE 360, or teaching experience. Credit, 2 hours.

481g *Principles and Practices of Public Health.* The major areas of public health and the principles involved in the operation of an adequate community health program. Particular stress is directed to the public health programs of Arizona. Afternoon and evening field trips may be scheduled. Credit, 2 hours.

560 *Curriculum Construction in Health Education.* This course covers the problems of curriculum construction with respect to the following areas: acquisition of materials, the establishment of basic curriculum philosophies, the application of educational principles, and the sequence of course content. Credit, 2 hours.

561 *Health Education Workshop.* The purpose of this workshop is to provide in-service training for teachers and administrators. Opportunities are provided to develop specific projects within the three major areas of elementary, secondary, and college health programs. Credit, 3 hours.

562 *Evaluation in Health Education.* This course is designed to discuss evaluation with respect to the use of textbooks, related literature, test construction, audio-visual aids, and the underlying bases of visual and auditory screening. Credit, 2 hours.

563 *Administration of School Health Programs.* Principles and techniques for coordinating and administering school health programs; personnel, legal aspects, public relations, policies, and organization. Prerequisite: HE 360, or teaching experience. Credit, 3 hours.

Special Graduate Courses, HE 500, 590, 591, 592, 593. See page 210.

Physical Education

PE 101, 102 *Freshman Physical Education.* Required of all freshmen not specializing in physical education. Twice a week. Credit, $\frac{1}{2}$ hour each semester.

103, 104, 105, 106. *Restricted Activities.* Limited activities for students who cannot, because of disabilities, enroll in regular physical education classes. Written recommendation of the school physician required. Twice a week. Credit, $\frac{1}{2}$ hour each semester.

110, 111 *Beginning Team Sports.* Classes in football, basketball, hockey, track and field, baseball, softball, soccer, speedball, volleyball, and other team sports. Credit may be given for varsity participation in these sports. Credit, $\frac{1}{2}$ hour each semester.

120, 121 *Beginning Individual and Dual Sports.* Instruction in golf, tennis, badminton, archery, fencing, boxing, wrestling, rifle, gymnastics, and other individual and dual sports. Credit may be given for varsity participation in these sports. Credit, $\frac{1}{2}$ hour each semester.

130, 131 *Beginning Dance.* Classes in tap, square, folk, social and modern dance and other dance activities are offered. Credit $\frac{1}{2}$ hour each semester.

140, 141 *Beginning Aquatics*. Swimming, diving and other aquatic activities. Credit, $\frac{1}{2}$ hour each semester.

150, 151 *Professional Activities*. The activities included are required of all men and women physical education majors. Required of freshmen and sophomores. Six hours a week, three days a week. Credit, 3 hours each semester.

160 *First Aid*. Prevention of accidents, methods of examination and temporary care for victims of accident or sudden illness. Red Cross certification. Credit, 2 hours.

161 *Introduction to Physical Education*. Orientation to the field of physical education. Required of all freshmen specializing in physical education. Credit, 3 hours.

210, 211 *Intermediate Team Sports*. Continuation of PE 111. Credit, $\frac{1}{2}$ hour each semester.

220, 221 *Intermediate Individual and Dual Sports*. Continuation of PE 121. Credit, $\frac{1}{2}$ hour each semester.

230, 231 *Intermediate Dance*. Continuation of PE 131. Credit, $\frac{1}{2}$ hour each semester.

240, 241, *Intermediate Aquatics*. Continuation of PE 141. Credit, $\frac{1}{2}$ hour each semester.

250, 251 *Professional Activities*. Continuation of PE 151. Credit, 3 hours each semester.

260 *First Aid Instructorship*. For individuals who wish to receive certification as Red Cross First Aid Instructors. Prerequisite: Must be 20 years of age and hold current advanced certificate. Credit, 1 hour.

261 *Dance Composition*. Study and analysis of theme and dramatic ideas drawn from poetry, drama, music, and other art forms for use in dance composition. Workshop experience in developing these dance compositions into dance programs for production. Prerequisite: PE 330. Three times a week. Credit, 2 hours.

262 *Dance Production*. Theory of, and experience in, the staging of dance programs, including lighting, costuming, scenery, and make-up. Three times a week. Credit, 2 hours.

280 *History and Philosophy of Dance*. A study of dance from ancient times to the present. Consideration of dance as an art in relation to other arts; primitive, pre-classic, and modern forms. Dance composition, rhythm analysis, and accompaniment for dance. Three times a week. Credit, 2 hours.

310, 311, 312, 313 *Advanced Team Sports*. Continuation of PE 211. Credit, $\frac{1}{2}$ hour each semester.

320, 321, 322, 323 *Advanced Individual and Dual Sports*. Continuation of PE 221. Credit, $\frac{1}{2}$ hour each semester.

330, 331, 332, 333. *Advanced Dance*. Continuation of PE 231. Credit, $\frac{1}{2}$ hour each semester.

340, 341 *Advanced Aquatics*. Continuation of PE 240, 241. Advanced skills such as Red Cross Senior Life Saving, Red Cross Water Safety Instructorship, Synchronized Swimming. Credit, $\frac{1}{2}$ hour each semester.

360 *Theory and Practice of Teaching Dance*. The theory and practice in the teaching of folk, square, and social dance. Students study, analyze, and acquire materials suitable for elementary, secondary, college and recreation use. Credit, 2 hours.

361 *Theory and Practice of Teaching Dance*. Theory of and practice in the teaching of fundamental rhythms and modern dance. Study, analysis, and acquisition of materials suitable for elementary, secondary, college, and recreational use. Credit, 2 hours.

362 *Officiating Football, Basketball, Baseball and Track*. A study of rules and the mechanics of officiating used in football, basketball, baseball, and track. Credit, 3 hours.

363 *Techniques of Officiating*. Qualification of officials, techniques of officiating, interpretation of rules and opportunity to qualify as an NSGWS rated official in tennis, volleyball, basketball, softball. Credit, 3 hours.

364, 365 *Coaching*. Theory and techniques of varsity sports. Four hours a week. Credit, 2 hours each semester.

366 *Playground Leadership*. Games and rhythmic activities suitable for the use of classroom teachers in the direction and supervision of play activities. Required for elementary certification. Credit, 2 hours.

367 *Theory and Practice of Teaching Physical Education in the Elementary Schools*. Practice in, and analysis of, the activities suitable for elementary school programs as a basis for the development of units, sequence of units by year and grade level. Credit, 2 hours.

368 *Theory and Practice of Teaching Sports*. Class organization, teaching and coaching of team, individual, and dual sports are discussed and experienced in laboratory situations. Prerequisite: PE 251, or the equivalent. Four hours a week. Credit, 3 hours.

371 *Organization and Administration of Physical Education*. Organization and administration procedures are analyzed in terms of needs of elementary and secondary students. Practice relating to program, budget, facilities, scheduling, and staff are examined. Credit, 3 hours.

385 *Kinesiology*. Analytic and synthetic studies of body movements. Neuromuscular skills and body mechanics are emphasized. Prerequisite: ZO 102. Credit, 3 hours.

386 *Physiology of Exercise*. The effects of the various types of exercises upon body structure and function. Prerequisite: ZO 102. Credit, 3 hours.

430 *Boys' Club Field Experience.* The student is assigned to a cooperating Boys' Club for a period of 12 weeks, 30 hours a week. To be taken during the fall semester of the senior year. Open only to majors in this program. Credit, 8 hours.

461g *Evaluation in Physical Education.* The need and importance of evaluation in physical education activities. Skill tests, knowledge tests, attitude tests, motor capacity tests, and classification tests are studied, and opportunity for practical experience in administering the several types of tests is provided. Credit, 3 hours.

462g *Techniques of Athletic Training.* Emphasizes the correct use of personal and field equipment, support procedures and therapeutic aids. Laboratory work includes practical techniques in the clinical use of supporting apparatus, physiotherapy. Prerequisite: ZO 102. Two lectures, 1 hour laboratory. Credit, 2 hours.

463g *Advanced Dance Composition.* The investigation and practice of archaic, preclassic, and contemporary styles of choreography. Prerequisite: PE 261, or approval of the instructor. Credit, 2 hours.

464g *Dance Accompaniment.* An opportunity for the analysis of the function of accompaniment for dance; experience in the use of percussion, voice, records, piano, and selected instruments in relation to their use in composition. Credit, 2 hours.

465g *Modern Practices in Physical Education.* Current practices, materials, and trends of physical education activities and their function in contemporary physical education programs are analyzed and experienced. Credit, 2 hours.

470g *Adapted Physical Education.* The organization, administration and content of adapted physical education programs including an examination of the principles of body mechanics and their application to exercise and to adapted physical education activities, experience in related screening tests, and the preventative rather than the corrective aspects of postural improvement. Prerequisite: PE 385, or the equivalent. Credit, 3 hours.

471g *Organization and Administration of Intramural Activities.* Principles and practices of the organization of intramural programs on the elementary and secondary levels. Credit, 2 hours.

480g *Methods of Teaching Physical Education.* Methods of instruction, organization, and presentation of appropriate content in physical education. Prerequisite: 2-SE 311 or concurrent registration. Credit, 3 hours.

560 *Curriculum Construction in Physical Education.* Application of the principles, practices, and functional philosophies of curriculum making in physical education. Prerequisite: Major in physical education or teaching experience. Credit, 2 hours.

570 *Organization and Administration of Athletics.* This course offers practical suggestions and guides for managing the affairs of an athletic program. Athletic financing, policies, budgets, contests, schedules, travel, insurance, and current athletic trends are considered. Credit, 2 hours.

571 *Supervision of School Health and Physical Education.* This course is designed to provide an analysis of contemporary trends and practices in the supervision of health and physical education with special emphasis on: supervision of teachers, in-service training, public relations and policies related to promotions. Credit, 2 hours.

580 *History and Philosophy of Physical Education.* The historical development of the philosophies of physical education and the assumptions on which current professional philosophies rest. Credit, 3 hours.

585 *Synthesis of Body Movement.* This is a study of basic movement common to all physical education activities combined with derivations peculiar to special forms of movement. The course provides opportunity to investigate and experience movement in relation to space, time, dynamics, kinesthetic cognition and purpose. Credit, 3 hours.

Special Graduate Courses. PE 500, 590, 591, 592, 593. See page 210.

Recreation

RE 120 *Recreational Games.* Instruction and playing experience in table tennis, shuffleboard, bowling, paddle tennis, deck tennis, croquet. Twice a week. Credit, $\frac{1}{2}$ hour.

150 *Camping Activities and Skills.* An introductory course in camp counseling involving outdoor cookery, nature study, nature crafts, camp crafts, story telling, dramatics, songs and music. overnight trips, shelters, orienting, axmanship, firecraft, food preservation, and cooking devices. Fee, \$5.00. One hour discussion, 3 hour laboratory. Credit, 3 hours.

260 *Introduction to Community Recreation.* Orientation to the field of organized recreation in terms of its history, philosophy, and development; and the contribution of organized recreation to the school and community. Credit, 2 hours.

261 *Social Recreation.* The development of methods and materials for leadership in social recreational activities for school, church, home, club, and other social groups. Credit, 2 hours.

262 *Program Planning and Recreational Leadership.* Study of principles and practices involved in planning and carrying out programs of recreation for playgrounds, community centers and youth serving organizations. Acquisition of methods, materials and leadership skills and techniques through laboratory practice. Credit, 3 hours.

370 *Public School Camping and Program Planning*. Designed to equip the student with materials, procedures, and plans for a school camp program, and to establish the relationship of camping to other areas of education. Fee, \$3.00. Credit, 3 hours.

371 *Organization and Administration of Recreation*. The study and analysis of the administrative structure and organizational policies and practices on the local, state, and national level. Analysis of methods of operation, finance, personnel standards and problems, legal aspects and study of modern trends in terms of present and projected future community needs. Credit, 3 hours.

372 *Youth Organizations*. Orientation in principles, practices, and leadership experience of natural youth serving organizations. Credit, 3 hours.

470g *Camp Organization and Administration*. Organization and administration of camps with special emphasis on school camps; preparation for camp management; consideration of budget, camp site, and personnel. Fee, \$3.00. Credit, 2 hours.

570 *Modern Practices in Supervisory Techniques in Recreation*. This course presents a comparative study of modern practices in supervision, evaluation, and organizational structure of recreation programs as related to existing administrative structures. Credit, 2 hours.

History

ROBERT W. COONROD, Chairman, Department of History

History

HI 101, 102 *Survey of Western Civilization*. The first semester traces western civilization from its origins through the seventeenth century; the second semester continues the survey to modern times. Not open to history majors. Credit, 3 hours each semester.

103, 104 *History of the United States*. The growth of the Republic from colonial times, with the first semester covering through the Civil War period and the second continuing to the present day. Credit, 3 hours each semester.

121, 122 *Foundations of European Civilization*. Development of European ideas and institutions. First semester, ancient and medieval periods; second semester, 1300 to 1789. Required of history majors. Credit, 3 hours each semester.

132 *History of the Southwest*. Development of the southwestern states, people and economic life, with emphasis on Arizona. Credit, 3 hours.

223, 224 *Europe Since 1789*. Political, social, economic, and intellectual currents in Western Europe. First semester, the French Revolution in 1870; second semester, 1870 to the present. Prerequisite: HI 102 or 122 or approval of instructor. Credit, 3 hours each semester.

241, 242 *History of Latin America*. In the first semester ancient civilization, explorers and conquerors, and colonial institutions are studied. In the second semester the nationalistic development of the independent republics since 1825 is covered. Credit, 3 hours each semester.

251, 252 *History of England*. A survey of the political, economic and social development of the English people. The first semester covers the period from the earliest times to the seventeenth century; the second semester brings the survey up to the present. Credit, 3 hours each semester.

261 *The Soviet Union*. The development of the Soviet System since the Revolution of 1917, with emphasis on its Russian, European, Asian, and global significance. Prerequisite: HI 102 or 104 or 122. Credit, 3 hours.

301, 302 *Ancient Orient and the Classical World*. The first semester deals with the history and civilization of the Ancient Orient and Greece; the second semester continues classical history to the downfall of the Roman Empire. Credit, 3 hours each semester.

303, 304 *American Cultural History*. The study of culture in a broad connotation including ideas, ideals, the arts, and social and economic standards. The first semester traces the nation's colonial background and early national period. The second semester deals with the age of industrialism and modern America. Credit, 3 hours each semester.

311 *Historical Literature*. Deals comparatively with the works and ideas of leading historians. Prerequisites: Previous completion of at least six hours in upper division courses in history. Credit, 2 hours.

321 *The Middle Ages*. The development of Western Europe from the fall of Rome to the Renaissance with particular emphasis on the social and cultural development. Prerequisite: HI 101 or 121 or approval of instructor. Credit, 2 hours.

331 *Colonization of North America*. Colonial era of American history, both Spanish and English, with some consideration of French and other colonial peoples to 1783. Credit, 3 hours.

336 *Recent American History*. Covers the important developments in American history since 1914. Prerequisite: HI 104. Credit, 3 hours.

337 *American Frontier*. Territorial expansion and westward movement of the American people from colonial times to 1890. Prerequisites: HI 103, 104. Credit, 3 hours.

338 *Economic History of the United States*. The development of American economic institutions, with attention given to their early background in Europe. Prerequisite: 3-EC 201 or approval of instructor. Credit, 3 hours.

341 *History of Mexico*. The formation, culture and social life of the Mexican people since colonial times. A knowledge of Spanish is desirable but not essential. Credit, 3 hours.

423g *Renaissance and Reformation*. Antecedents and development of the Renaissance in Italy, its spread into the rest of Europe, and the subsequent changes in religious and political thought. Prerequisite: HI 101 or 121, or 122 or approval of instructor. Credit, 3 hours.

427g *Modern France*. France since 1870. Prerequisite: HI 224. Credit, 3 hours.

429g *Contemporary Europe*. Europe in its world setting during and since World War II. Emphasis on major political issues of the contemporary scene. Prerequisite: HI 102 or 104 or approval of instructor. Credit, 3 hours.

431g, 432g *American Biography*. Considers the noted Americans who made important contributions to United States history. The first semester deals with the period prior to 1860; the second semester with the period since 1860. Prerequisites: First semester, HI 103, or approval of instructor; second semester, HI 104, or approval of instructor. Credit, 3 hours each semester.

433g *American Foreign Relations*. The machinery of American diplomacy and development of American foreign policy. Prerequisites: HI 103, 104. Credit, 3 hours.

434g *Constitutional History of the United States*. The origin and development of the Constitution of the United States with special emphasis on how it has been interpreted by the courts. Prerequisites: HI 103, 104. Credit, 3 hours.

437g *Civil War and Reconstruction*. Analysis of the causes and development of the war, political, constitutional and social issues of reconstruction, and their effects on post-war America. Prerequisite: HI 103 or 104. Credit, 3 hours.

438g *Populism and Progressivism*. Political trends in the United States, 1877-1918. Prerequisite: HI 104. Credit, 3 hours.

442g *History of Brazil*. The political, economic, social and intellectual aspects of the Brazilian people since colonial times. Credit, 3 hours.

449g *Intellectual and Cultural History of Latin America*. Emphasis given to main currents of thought, the outstanding thinkers and their impact on nineteenth and twentieth century Latin America. Attention will also be given to the cultural and institutional basis of Latin American life. Credit, 3 hours.

451g *History of the British Empire*. The growth and development of the British Empire with particular stress on the commercial, economic, and governmental aspects of the empire. Prerequisite: HI 102 or 122 or 252. Credit, 3 hours.

452g *Tudor and Stuart England*. Emphasis upon the political, social, economic, and cultural developments which contributed to the forming of the modern world. Prerequisite: HI 101 or 122 or 252. Credit, 3 hours.

454g *British Constitutional History*. Traces the historical development of the constitutional system of Great Britain from the Middle Ages to the present with particular emphasis on the growth of democracy. Prerequisite: HI 102 or 122 or 252. Credit, 2 hours.

461g *Development of Russian Institutions*. The development of Russian political, economic, social, religious, and intellectual institutions and traditions from the 9th century to the Revolution of 1917. Prerequisite: HI 102 or 104 or 122. Credit, 2 hours.

471g *Far Eastern Civilization*. History of China, Central Asia, Japan, Malaysia, and India from antiquity to about 1640. Credit, 2 hours.

472g *The Impact of the West upon the Orient*. Emphasis upon the changes wrought upon China, Central Asia, Korea, and Japan to the present. Credit, 2 hours.

481g *History of the Middle East*. Historical development of the area inhabited by the Arab, Turkish, Israeli, and Persian people, emphasizing the cultures and the world strategic significance of the area. Prerequisite: HI 102 or 104 or 122. Credit, 2 hours.

512 *European Historiography*. Studies in the methods and theories of the writers of Ancient and European History. Credit, 3 hours.

513 *American Historiography*. Studies in the methods and theories of the writers of United States history. Credit, 3 hours.

Special Graduate Courses, HI 500, 590, 591, 592, 593. See page 210.

Home Economics

JESSIE M. RANNELLS, Head, Division of Home Economics

Home Economics

HO 112 *Personal Adjustment for Family Living*. Consideration of the individual's adjustment to present and future personal and family relations. Designed for majors and non-majors. Open to men and women. Credit, 2 hours.

122 *Clothing Selection*. The selection of clothing with consideration of material, cost, style, design, the individual, and the occasion. Primarily for non-majors. Credit, 2 hours.

123 *Clothing Construction*. Basic processes applied to the making of clothing becoming to the individual. Study of and use of commercial patterns. Development of skills in basic fitting techniques. Open to both majors and non-majors who have not had previous training or on approval of instructor. Six hours a week. Credit, 3 hours.

124 *Wardrobe Planning and Construction*. Selection and care of clothing with consideration of the total family clothing problem. Judgment in using and improving ready-made garments. Experience in the construction of a garment using speed methods. Six hours a week. Credit, 4 hours.

131 *Home Nursing*. Information on health for the family, care of the sick, the mother through pregnancy and childbirth, and infant care. Credit, 1 hour.

141 *Elementary Nutrition*. Principles of nutrition, diet, food in its relation to health. Open to men and women. Credit, 2 hours.

142 *Food Principles and Preparation*. Scientific principles and nutritive facts related to preparing and serving of food. Designed for majors and non-majors. Fee, \$5.00. One lecture, four hours laboratory. Credit, 3 hours.

222 *Textiles*. Textile fibers, their construction, finish, sources, characteristics, identification, and uses. Credit, 2 hours.

223 *Home Selection and Furnishing*. Housing; selection, combination, and arrangement of furniture; color schemes; choice of wall finishes, floor coverings, draperies, and accessories. Credit, 3 hours.

232 *Child Development*. Physical, emotional, social, and intellectual development of children from birth to five years. Observation in the nursery school. Open to men and women. Prerequisite: PY 100. One hour observation and 3 hours discussion. Credit, 3 hours.

233 *Household Equipment*. A study of the selection, construction, use, care, and repair of all types of household equipment. Credit, 3 hours.

234 *Management of Personal and Family Resources*. Management in terms of goals for the individual and the family. Importance of choices in regard to the wise use of time, money, energy, abilities, skills and material goods on the basis of family relations and the optimum development of the individual. Credit, 2 hours.

321 *Clothing: Pattern Designing*. Fundamental principles in designing, cutting, and fitting individualized garments. Flat patterns used. Prerequisites: HO 122 and 123 or 124. Fee, \$2.00. Six hours a week. Credit, 3 hours.

322 *Art Related to the Home*. The application of the principles of art to daily living with experience in selecting and creating objects for the home and personal use. Credit, 2 hours.

331 *Family Relationships*. Understanding of family life and current problems including preparation for marriage. Open to men and women. Credit, 3 hours.

333 *Home Management House*. To assist the student in carrying on the responsibilities of the home, stressing goals and values of homemaking in related group activities as care of the house, planning, buying, preparing and serving meals, entertaining, laundering, and care of a young baby. Residence—advanced reservations required. Board and room at regular University rates. Prerequisites: HO 232, 234, 343. Credit, 4 hours.

334 *Consumer Problems and Family Finance.* A study of the economic problems of the individual and family, with the consideration of wise use of income, the selection and use of consumer goods on different levels, analysis of standards for buying, including comparative costs, and the influence of advertising, retail stores, and government agencies. Credit, 3 hours.

341 *Quantity Cookery.* Standard methods of food preparation in quantity; operation of institutional equipment, menu planning for institutions. Experience in quantity food service. Prerequisite: HO 142. Fee, \$2.00. One lecture, 6 hours laboratory. Credit, 3 hours.

342 *Food Demonstration.* Purposes and techniques of food demonstrations. Practical experience before audiences. Prerequisite: HO 142. Fee, \$5.00. Four hours a week. Credit, 3 hours.

343 *Meal Management.* Nutritional and social aspects of planning, preparing and serving of meals for families. Emphasis on time, energy and equipment management; food arrangements; food costs; and table appointments. Prerequisite: HO 142. Fee, \$5.00. Six hours a week. Credit, 3 hours.

422g *Clothing: Draping and Dress Design.* Working with fabric on a dress form expressing original ideas in dress design; emphasis upon the understanding of the principles involved in fitting and pattern construction. Prerequisites: HO 122, 123, or 124. Fee, \$3.00. Six hours a week. Credit, 3 hours.

423g *Clothing: Tailoring.* Construction of coat or suit; tailoring techniques, alteration of patterns, and fitting emphasized. Prerequisites: HO 124, 321. Six hours a week. Credit, 3 hours.

424g *Applied Home Furnishing.* Theory and experience in home furnishing projects such as construction of curtains, draperies, and slip covers, as well as refinishing of furniture. Prerequisites: HO 124 and 223. Credit, 2 hours.

427g *Children's Clothing.* Selection of appropriate fabric; self-help, comfort and artistic features. Credit, 3 hours.

431g *Nursery School Education.* The student does apprentice teaching in the university laboratory preschool. Discussion and application of methods for guiding children in routines and free play situation. Prerequisite: HO 232 or 1 course in psychology. Credit, 3 hours.

432g *Problems of Normal Preschool Children.* Discussion of problems occurring most frequently in early childhood and their significance. Guidance methods. Survey of recent literature. Prerequisite: HO 232 or 1 course in psychology. Credit, 2 hours.

434g *Organization and Administration of Preschools.* Curriculum planning and evaluation of existing and proposed programs in relation to recommended standards and needs of the community. Prerequisite: HO 431 or equivalent. Credit, 3 hours.

435g *Family Living*. The inter-personal relationships of family members as a factor in their growth and development. Prerequisites: HO 232 and 331. Credit, 3 hours.

436g *The Meaning of Play*. Each student will observe, analyze and interpret play activities in relation to the development of the child. Prerequisite: HO 232 or equivalent. One lecture, 2 hours laboratory. Credit, 2 hours.

441g *Advanced Nutrition*. Special problems in diet and nutrition. Prerequisites: HO 141; CH 111. Credit, 3 hours.

442g *Experimental Foods*. Application of experimental methods to preparation of food; reports and reading of food research. Prerequisites: HO 142 and science approved by instructor. Fee, \$5.00. Six hours a week. Credit, 3 hours.

443g *Child Nutrition*. Special emphasis upon the nutritional needs from prenatal development through adolescence. Includes the study of food requirements, feeding practices, and indices of good nutritional status. Prerequisites: HO 141, 232, or approval of instructor. Fee, \$2.00. Two lectures, 2 hours laboratory. Credit, 3 hours.

444g *Diet Therapy*. A study of methods of adapting, modifying, and applying normal nutrition principles to abnormalities of metabolism. Prerequisites: HO 343, 441. Fee, \$2.00. Two lectures, 2 hours laboratory. Credit, 3 hours.

445g *Institutional Food Service*. The organization, administration and management of food service in hospitals and institutions. Prerequisite: HO 341. Credit, 3 hours.

446g *Institution Food Purchasing*. Food purchasing for institutions; understanding of cost factors, food laws, quality standards, and basic manufacturing processes. Prerequisite: HO 341, or approval of instructor. Credit, 3 hours.

452g *The Teaching of Clothing and Textiles*. For teachers of clothing selection, construction, and care. Use of equipment, motivation and standards of work, individual illustrative material, evaluation. Students bring sewing equipment, including pieces of fabric. Prerequisite: An undergraduate class in methods of teaching homemaking. Credit, 2 hours.

454g *The Teaching of Food and Nutrition*. For homemaking teachers in elementary and secondary schools. Emphasis on family-centered focus within the limitations of the 50-minute class period. Prerequisite: Undergraduate class in methods of teaching homemaking. Credit, 2 hours.

480g *Methods of Teaching Home Economics*. Methods of instruction, organization, and presentation of appropriate content in Home Economics. Prerequisite: 2-SE 311 or concurrent registration. Credit, 3 hours.

521 *Recent Developments in Textiles*. The study of the recent developments in the textile field as they affect the consumer. Prerequisite: HO 222. Credit, 2 hours.

522 *Pattern Design*. Distinction in design through the use of the flat pattern. Prerequisite: HO 321. Fee, \$2.00. Credit, 3 hours.

523 *Textile Economics*. The determining factors in the selection and buying of family clothing and of fabrics used in the home. Prerequisite: HO 222. Credit, 2 hours.

531 *Advanced Child Development*. Facts and concepts for interpreting and understanding personality and social development of the young child in the family. Methods, techniques, and patterns. Prerequisites: HO 232; PY 281, or approval of instructor. Credit, 3 hours.

541 *Recent Developments in Nutrition*. A study of recent research in nutrition with view of finding practical applications. Prerequisite: HO 141. Credit, 2 hours.

551 *Supervision of Home Economics Education*. For off-campus teachers of homemaking cooperating in the student-teaching program of the University and others qualified. An evaluation of programs of other states. A program suited to the needs of Arizona is developed. Prerequisite: Approval of instructor. Credit, 2 hours.

552 *Evaluation in Home Economics Education*. Newer concepts concerning evaluation and testing instruments and techniques in elementary and secondary schools. Prerequisite: Undergraduate course in methods of teaching homemaking. Credit, 3 hours.

Special Graduate Courses, HO 500, 590, 591, 592, 593. See page 210.

Humanities

DOROTHY C. SCHILLING, Chairman, Department of Humanities

Humanities

HU 101, 102 *Ideas and Values in the Humanities*. The interrelation of art, literature, music, and philosophy in the modern world. Credit given for General Education only when both HU 101 and 102 are taken. Credit, 4 hours each semester.

201, 202 *The Humanities in the Western World*. An integrated course designed to develop a discriminating appreciation of art, music, literature, philosophy, and religion. The heritage of the past is presented in relation to life today. Credit given for attending selected plays, exhibitions, concerts. Prerequisites: Thirty hours; EN 101, 102. Credit for General Education given only when both HU 201, 202, are taken. Credit, 4 hours each semester.

301, 302 *The Humanities in Modern America*. An integrated course in American art, music, literature, and philosophy, with emphasis upon present developments. Participation in current university and community offerings in the subject fields is a supplementary activity. Prerequisites: EN 107, 102. One lecture and two discussion periods a week. Both HU 301, 302 must be taken to receive credit in General Education. Credit, 3 hours each semester.

Industrial Education

WALTER E. BURDETTE, Head, Division of Industrial Education

Aeronautics

TA 180 *Aircraft Covering*. Fabric materials, methods, equipment; testing and inspection standards. Fee, \$4.00. One lecture, 3 hours laboratory. Credit, 2 hours.

183 *Theory of Flight*. Forces, lift, drag, stability, performance, and control. Credit, 3 hours.

186 *Aircraft Woodwork*. Rib and wing constructions, spar splicing, alignment of drag truss, and inspections. Fee, \$6.00. One lecture, 3 hours laboratory. Credit, 2 hours.

287 *Aircraft Engines*. Complete top overhaul; synchronizing magnetos; carburetion, ignition and oil systems. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

380 *Primary Ground School*. Navigation, meteorology, aerodynamics, aircraft radio and C.A.R., private pilot written examination. Credit, 4 hours.

381 *Secondary Ground School*. Advanced navigation, meteorology, aerodynamics; powerplants; commercial pilot's written examination. Credit, 8 hours.

384 *C.A.A. Ground Instructor's Rating: Civil Air Regulations*. Methods and techniques of teaching Civil Air regulations. Credit, 3 hours.

388 *Airplane Mechanics*. Specialized techniques in metals, woods and fabric; air worthiness certification procedures. Fee, \$4.00. One lecture, 5 hours laboratory. Credit, 3 hours.

Technical Design

TD 101 *Production Engineering Language*. Technical terms and symbols, industrial standards and tolerances, sketching and reading working drawings. Fee, \$2.00. One lecture, 3 hours laboratory. Credit, 2 hours.

302 *Engineering Drawing*. Application emphasized in all fields of industrial drafting. Prerequisites: ME 111, 1-MA 117; TD 101. Fee, \$3.00. One lecture, 5 hours laboratory. Credit, 3 hours.

303 *Descriptive Geometry*. Warped and contoured surfaces, difficult intersections and developments. Prerequisites: ME 112, 1-MA 118. Fee, \$3.00. One lecture, 5 hours laboratory. Credit, 3 hours.

305 *Detail and Assembly Drawing*. Dimensioning, tolerance, bills of material, use of catalogs, and standards. Prerequisites: TD 302; 1-MA 118. Fee, \$3.00. One lecture, 5 hours laboratory. Credit, 3 hours.

350 *Design Laboratory*. Experiments in stress strain determination and analysis, hardness and modern measurements. Prerequisites: TD 302; ME 251; 1-PH 131. Fee, \$3.00. One lecture, 5 hours laboratory. Credit, 3 hours.

402 *Structural Detailing*. AISC riveted and welded fabrication design. Prerequisites: AC 261, 262; ME 111. Fee, \$3.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

406 *Mechanical Design*. Mechanisms, kinematics, linkage, cams, and gears. Prerequisites: TD 305, 350; 1-PH 211; AC 262. Fee, \$3.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

407 *Mechanical Design*. Strength design of machine parts. Prerequisite: TD 406. Fee, \$3.00. Three lectures, 3 hours laboratory. Credit, 4 hours .

408 *Nomographics*. Use and creation of graphs for design problems and publication. Prerequisites: TD 303, 350. Fee, \$2.00. One lecture, 3 hours laboratory. Credit, 2 hours .

Electronics

TE 200 *Electricity and Electronics*. Theory and applications of d-c and a-c. circuits. Prerequisites: IA 109; 1-MA 118. Fee, \$3.00. Two lectures, 3 hours laboratory. Credit, 3 hours

210 *Radio Code*. International Morse Code; Required: Ten words per minute. Commercial procedures. Fee, \$2.00. One lecture, 3 hours laboratory. Credit, 2 hours.

213 *Vacuum Tubes and Transistors*. Principles, construction, and operation. Prerequisites: TE 200; 1-MA 121. Fee, \$4.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

310 *Direct Current Circuits*. Power circuits and measurements. Prerequisite: TE 200. Fee, \$2.00. Two lectures, 3 hours laboratory or problem session. Credit, 3 hours.

311 *Alternating Current Circuits*. A.C. power circuits and measurements. Prerequisite: TE 200. Fee, \$2.00. Two lectures, 3 hours laboratory or problem session. Credit, 3 hours.

315 *Electronics*. Electronic circuits and applications. Prerequisite: TE 213. Fee, \$6.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

316 *Electronics*. Continuation of TE 315. Prerequisite: TE 315. Fee, \$6.00. Two lectures, 3 hours laboratory. Credit 3 hours.

317 *Electronic Measurements*. Equipment and techniques used in laboratory and industry. Prerequisite: TE 213. Fee, \$4.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

318 *Aircraft Radio*. Theory and operation of equipment. Requirements for 3rd class operator's license included. Prerequisite: TE 200 or IA 220. Credit, 3 hours.

319 *Industrial and House Wiring*. Installation of lighting and power circuits, underwriters regulations, cable and conduit layout, and cost estimation. Prerequisite: TE 200. Fee, \$6.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

320 *Acoustics*. Industrial sound and noise problems. Prerequisite: TE 315. Credit, 2 hours.

410 *Electronics in Industry*. Theory and applications in the industrial field. Prerequisite: TE 316. Credit, 2 hours.

412 *Microwaves*. Circuits with emphasis on typical television, telemetry, and radar applications. Prerequisite: TE 317. Fee, \$6.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

414 *Television*. Emphasizes monochrome and color receivers. Prerequisite: TE 316. Fee, \$4.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

415g *Television*. Continuation of TE 414 with emphasis on transmitters. Prerequisite: TE 414. Two lectures, 3 hours laboratory. Credit, 3 hours.

417 *Circuit Analysis*. Fundamental network theorems. Prerequisite: TE 316. Credit, 3 hours.

418g *Communication Circuits*. Control room and transmission equipment; includes preparation for first class operator's license. Prerequisite: TE 316. Two lectures, laboratory arranged. Credit 2-4 hours.

419g *Communication Circuits*. Continuation of TE 418. Prerequisite: TE 418. Two lectures, laboratory arranged. Credit, 2-4 hours.

420g *Circuit Analysis*. Complex network theorems. Prerequisite: TE 417. Credit, 3 hours.

Mechanics

TM 161 *Machine Shop*. Measurement, layout, benchwork, drill press and lathe operations. Fee, \$6.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

162 *Machine Shop*. Engine, lathe operations and practical metallurgical problems. Prerequisite: TM 161. Two lectures, 3 hours laboratory. Credit, 3 hours.

164 *Sheet Metal*. Layout, cutting, soldering, joining; manufacture and applications. Prerequisite: IA 103. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

169 *Oxy-Acetylene Welding*. Materials, setup, safety; types of welds, positions and cutting. Fee, \$8.00. One lecture, 5 hours laboratory. Credit, 3 hours.

173 *Automotive Electrical Equipment*. Principles, specifications, circuits, and adjustment of components. Fee, \$3.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

274 *Basic Automotives*. Engines, power transmission, brakes, and chassis assemblies; design, tolerance measurements, corrective procedures. Fee, \$6.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

364 *Sheet Metal*. Pattern development and machine emphasis; industrial applications, and estimating. Prerequisite: TM 164. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

369 *Electric Arc Welding*. Making lap, ridge, flat, vertical, horizontal, overhead and T-welds; metallurgy and rods. Prerequisite: TM 169. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

371 *Auto Body Repair*. Welding, re-shaping, and refinishing. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

376 *Diesel Engines*. Compression and fuel ratios; fuel injection methods, pressure lubrication, heat problems, fuels; operation and maintenance. Fee, \$6.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

377 *Automotive Machine Work*. Engine rebuilding, boring, honing, and fitting. Prerequisite: TM 274. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

461g *Machine Shop*. Milling machines and shapers; design, cutters, holding devices and typical operations. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

462g *Machine Shop*. Complex milling, shaping, grinding problems and operations. Prerequisite: TM 461. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

467 *Jigs and Fixtures*. Design, construction and experimentation for quantity production. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

469g *Welding Problems*. Specialized techniques in oxy-acetylene welding-cutting and electric arc welding; heliarc inert gas welding. Fee, \$8.00. Two lectures, 4 hours laboratory. Credit, 3 hours.

478g *Auto Testing and Tuning*. Instruments, methods; electrical and carburetion systems emphasized. Prerequisites: TM 173, 274. Fee, \$4.00. Two lectures, 4 hours laboratory. Credit, 3 hours.

Industrial Arts

IA 103 *General Drafting*. Elements of orthographic projection. Fee, \$3.00. Six hours laboratory. Credit, 2 hours.

104 *Drafting and Design*. Elements of descriptive geometry, architectural drafting; design principles and problems. Prerequisite: IA 103. Fee, \$3.00. Six hours laboratory. Credit, 2 hours.

109 *Calculations*. Slide rule and technical problems. Credit, 2 hours.

121 *Woods*. Wood technology, constructions and history. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

135 *Basic Graphic Arts*. Type composition, presswork, book binding, screen processes, duplicating. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

156 *Upholstery*. Frame design and constructions, filler materials, fabrics. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

161 *Materials Laboratory*. Plastics, leather, lapidary; industrial emphasis. Fee, \$6.00. One lecture, 3 hours laboratory. Credit, 2 hours.

170 *Automobile Theory and Function*. Consumer approach to acquaint the average owner with limitations, correct operation and maintenance. Fee, \$3.00. One lecture, 3 hours laboratory. Credit, 2 hours.

220 *Electricity*. Principles of a-c, d-c, and machines. Prerequisite: 1-MA 116 or 117. Fee, \$3.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

256 *Upholstery*. Design emphasis, power sewing and materials studies. Prerequisite: IA 156. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

261 *General Metals*. Properties, tools and machines, welding, casting, heat treating. Fee, \$6.00. One lecture, 7 hours laboratory. Credit, 4 hours.

322 *Machine Woods*. Power tool operation, industrial woods application. Prerequisite: IA 121. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

323 *Shop Maintenance*. School and industrial maintenance organization and operations. Fee, \$3.00. One lecture, 3 hours laboratory. Credit, 2 hours.

327 *Finishing Materials and Techniques*. Materials origin, composition and application for woods and metals. Prerequisite: IA 322. Fee, \$4.00. Two lectures, 4 hours laboratory. Credit, 3 hours.

335 *Graphic Arts*. Layout and design, photo offset lithography, photo screen processes, production techniques. Prerequisite: IA 135. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

342 *Selection and Organization of Subject Matter*. Selective learning units through job analysis; course development. Credit, 3 hours.

356 *Industrial Upholstery*. Commercial procedures in design, construction and assembly. Prerequisite: IA 256. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

401g *Drafting Procedures*. Methods, evaluation drafting problem sequences, and equipment. Fee, \$3.00. Two lectures, 4 hours laboratory. Credit, 3 hours.

421g *Production Woods*. Product and process design, jigs and fixtures, quality control, assembly, finishing. Prerequisite: IA 322. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

442g *Planning and Equipment*. Planning industrial arts laboratories; equipment selection, auxiliary facilities. Credit, 3 hours.

444g *Modern Industries*. Aspects of management, labor, plant and product; for interpretation of industry in secondary school industrial arts programs. Credit, 3 hours.

446g *Instructional Aids*. Selection, method, preparation and construction. Credit, 3 hours.

461g *The General Shop*. Principles, methods of organization and equipping; practicum. Fee, \$4.00. Two lectures, 4 hours laboratory. Credit, 3 hours.

465g *General Metals*. Continues properties, sheet-metal, casting, welding; emphasizes machine, spinning and metal finishes. Fee, \$6.00. One lecture, 5 hours laboratory. Credit, 3 hours.

480g *Methods of Teaching Industrial Arts*. Teaching techniques, organization, and evaluation of teaching efficiency. Prerequisite: 2-SE 311. Credit, 3 hours.

486g *Aeronautical Instructional Materials*. Preparation of aids for ground school instruction. Fee, \$3.00. Two lectures, 2 hours laboratory. Credit, 3 hours.

487g *Pre-Flight Aeronautics for Teachers and Laymen*. Practical applications of navigation, meteorology and operation of aircraft. Fee, \$3.00. Credit, 3 hours.

488g *Celestial Navigation for Ground School Instructors and Teachers*. Establishment of fixes from sextant observations. Credit, 3 hours.

494 *Techniques of Construction from Prints to Completion: FHA Standards*. Fee, \$4.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

513 *Electricity and Radio for Teachers*. Programs, courses, syllabi and laboratory projects. Credit, 3 hours.

515 *Electrical and Electronic Laboratory Design*. Requirement studies of high school laboratories for electricity and radio. Credit, 3 hours.

540 *Evaluation in Industrial Subjects*. Evaluative factors such as attitudes, behavioral factors, skills, technical and related information; instrument construction. Credit, 3 hours.

544 *History of Industrial Education*. Factors motivating evolution of modern programs; implication for future; trends. Credit, 3 hours.

548 *Supervision and Administration of Industrial Education*. Improving instruction, fund and material control, student personnel problems, curricular patterns. Credit, 3 hours.

549 *Current Literature and Research*. Research techniques; analysis of literature; investigations and reporting. Credit, 3 hours.

Special Graduate Courses, IA 590, 591, 592, 593. See page 210.

Mass Communications

MARVIN H. ALISKY, Chairman, Department of Mass Communications

Journalism

JO 110 *Mass Communications*. General survey of the communications industry, including the press, radio, and television; basic concepts of news, news values, and reporting of news; fundamentals of journalism; laboratory practice in news-gathering and news-writing. Prerequisite: EN 101. Two lectures, 2 hours laboratory. Credit, 3 hours.

211 *Reporting*. Study and practice in the coverage and writing of news; structure of the news story and development of news values; laboratory practice; experience as reporter on the *State Press*. Prerequisite: JO 110. One lecture, 4 hours laboratory. Credit, 3 hours.

212 *Advanced Reporting*. Continuation of JO 211. Main types and sources of news; interviewing and re-writing; laboratory and *State Press* experience. Prerequisite: JO 211. One lecture, 4 hours laboratory. Credit, 3 hours.

275 *Advertising Principles*. Advertising as a communications tool in marketing and business management. Consideration of creative methods, survey of media, measurement of effectiveness, and coordination with other aspects of the sales and promotional program. Prerequisite: 3-MK 251 or JO 110. Credit, 3 hours. (Same as 3-AD 275.)

311 *News Photography*. Instruction with field and laboratory practice in camera and darkroom techniques for newspaper and magazine photographic work. Prerequisite: JO 110, or approval of instructor. Fee, \$10.00. One lecture, 3 hours activity. Credit, 2 hours.

312 *Communications Law*. Legal aspects of the rights and responsibilities of the press, radio, and television; regulations, restrictions, and "the people's right to know"; basic features of the law of libel, privilege, contempts, copyrights, access to information; background of court reporting. Prerequisite: JO 212. Credit, 3 hours.

313 *Copyreading and Editing*. Practical work in copyreading and headline writing; use of the newspaper stylebook; principles of typography and of makeup. Laboratory practice. Prerequisite: JO 212. Credit, 2 hours.

314 *History of Communications*. Development of American journalism from its English and colonial origins to the present day; development of radio and television, and the progression of the various media toward an industry of mass communications. Prerequisite: JO 212. Credit, 3 hours.

315 *Radio-Television News*. Techniques and practices of editing and preparing local and wire news copy for radio and television news broadcasts; laboratory practice in preparation of same for actual broadcasting. Prerequisite: JO 212. Credit, 3 hours.

320 *Staff Activity*. Experience and responsibility of editing and making up a complete newspaper as a member of its masthead staff. The University newspaper, the *State Press*, is used as the laboratory or work-project for this class. Prerequisite: JO 313. Credit, 2 hours.

330 *International Communications*. Survey of press and broadcasting of Latin America and selected European and Asian nations. Foreign correspondents. Worldwide news agencies. Voice of America and international broadcasting. Problems in worldwide flow of information. Prerequisite: JO 110. Credit, 3 hours.

340 *Magazine and Industrial Journalism*. Study of general magazine and house organ publishing, writing, and editing. Prerequisite: JO 110. Credit, 3 hours.

401 *Public Relations*. Publicity methods and public relations; representation of business firms and institutions to the public. Includes training on what constitutes news-worthy material and how to communicate it through newspapers, magazines, radio-television stations, and other media. Prerequisite: 3-GB 233 or JO 211. Credit, 2 hours. (Same as 3-AD 401.)

411g *Special Assignment*. Selection and performance of a major project or projects on an individual basis. Prerequisites: JO 312, 320, 412. Credit, 2 to 5 hours.

412g *Editorial Interpretation*. The press as an influence upon public opinion. The byline story, editorial, and work of the columnists, in analyzing and interpreting current events. Prerequisite: JO 212. Credit, 2 hours.

413g *Advising High School Publications*. A course designed for high school journalism advisers. Problems of annual and newspaper staffs discussed. Credit, 2 hours.

421 *News Problems and Policies*. Seminar in journalism with emphasis upon major difficulties encountered and editorial decisions required in the writing, handling and publishing of news. Prerequisite: JO 312 or 412. Credit, 2 hours.

Radio-Television

RT 230 *Radio and Television Speech*. The application of public speaking principles to the media of radio and television. Practice in conducting round table discussions, interviews, and speeches. All assignments before television cameras or microphones. Credit, 3 hours. (Same as SE 230.)

232 *Radio-Television Announcing*. Techniques of radio and television announcing. Prerequisites: JO 110; SE 120, or SE 200. Radio-television majors only. Credit, 3 hours.

321 *Radio-Television Drama*. The production of both radio drama and television drama, with emphasis on acting techniques appropriate to each form. Prerequisite: RT 230. Credit, 3 hours. (Same as DR 321.)

332 *Radio Programming and Production*. Principles of production and fundamentals of programming market radio stations, as well as modern networks. Application of the principles through work on KASN and Radio-TV Bureau programs. Prerequisite: RT 230. Two hours class, 2 hours laboratory. Credit, 3 hours.

336 *Television Production*. Skills of planning, staging, and presentation, with practical experience as cameraman, floor manager, mike operator. Prerequisite: RT 232. Fee, \$5.00. Two lectures, 2 hours laboratory. Credit, 3 hours.

371 *Radio and Television Advertising*. Techniques and problems of radio and television as advertising media, including program selection and planning, preparation of continuity and coordination with other forms of advertising. Prerequisite: 3-AD 275. Credit, 3 hours. (Same as 3-AD 371.)

431 *Television Writing*. Principles and techniques of writing for television with emphasis on television drama. Credit, 3 hours.

433, 434 *Radio-Television Station Operation*. Radio and television programming and production. Specific assignments in the operation of college radio-television stations. Prerequisite: RT 332 or 336. Credit, 2 hours each semester.

472 *Radio-Television Station Management*. Background in the organization, procedures, and policies of radio-television stations. Financial and creative basis of station operation. Consideration of personnel and production problems, relationship with advertising agencies, networks and sponsors. Prerequisites: 3-AD 275 and SE 332 or 431. Credit, 3 hours. (Same as 3-AD 472.)

Mathematics

LLOYD L. LOWENSTEIN, Chairman, Department of Mathematics

Mathematics

MA 116 *Intermediate Algebra*. The real number system, algebraic operations, polynomials, special products, factoring, functions and graphs, exponents, equations and their solutions. Meets three or five days a week, depending on student's qualifications in algebra. Credit, 3 hours.

117 *College Algebra*. Progressions, permutations and combinations, probability, mathematical induction, determinants, and theory of equations. Prerequisite: MA 116 or equivalent. Credit, 3 hours.

118 *Trigonometry*. The six trigonometric functions and their graphs, radian measure, identities and equations, inverse trigonometric functions, logarithms, solution of triangles. Prerequisite or co-requisite: MA 117 or grade of A or B in MA 116. Credit, 3 hours.

119 *Algebra and Trigonometry*. An accelerated treatment of subject matter equivalent to both MA 117 and 118 in one semester. Prerequisite: MA 116 or equivalent. Credit, 4 hours.

120, 121 *Analytic Geometry and Calculus*. Basic concepts of analytic geometry, differential and integral calculus. Applications to science and engineering. Prerequisite: College algebra and trigonometry (or equivalent) with grade of C or better. Credit, 4 hours each semester.

205 *Mathematics for General Education*. A study of the development of mathematics with emphasis on the influence of mathematics on other branches of our culture. Fundamental aims, methods, and results are considered rather than development of techniques. Credit, 4 hours.

212 *Analytic Geometry and Calculus*. Continuation of MA 120, 121. Prerequisite: MA 121. Credit, 4 hours.

220 *Differential Equations*. Methods of solution of typical differential equations in science and engineering. Prerequisite: MA 212. Credit, 3 hours.

226 *Introduction to Modern Statistics*. An informal treatment of the basic concepts and methods of statistics, including descriptive statistics, significance tests, estimation, sampling and correlation. A basic statistics course for students from all fields in which statistics finds application. Credit, 3 hours.

305 *Arithmetic in the Elementary School*. A teacher's view of arithmetic as a system of related concepts, facts, and principles; instruction in the subject matter of arithmetic. Materials and methods used to teach arithmetic with meaning. Prerequisite: Junior standing. Three lectures, 1 hour laboratory (waived for those who demonstrate proficiency). Credit, 3 hours.

323 *Symbolic Logic*. Methods of systematic thinking; the logic of sentences; variables by the theory of quantification; general theories of sets, relations, variables, and identity. Prerequisite: Eight hours of mathematics, or approval of instructor. Credit, 3 hours.

325 *Numerical Analysis*. Finite differences; various methods of interpolation; numerical differentiation, integration, and summation. Solution of transcendental equations. Prerequisite: MA 212. Credit, 3 hours.

329 *Vector Analysis*. The algebra and calculus of vectors with applications to engineering and physics. Prerequisite: MA 212. Credit, 3 hours.

335 *Digital Computer Programming*. Typical scientific applications of digital computers are studied. Methods for using existing modern equipment are shown; and practice problems set up by the students are solved on the IBM 704 computer. Prerequisite: MA 212. Credit, 3 hours.

356 *Projective Geometry*. The elements of plane projective geometry and its relationship to Euclidean and other geometries. Prerequisite: Approval of instructor. Credit, 3 hours.

362, 363 *Mathematical Methods for Engineering and Physics.* An introduction to complex variables, vector analysis, Fourier series, and partial differential equations. The special functions occurring in Mathematical Physics. Prerequisite: MA 220. Credit, 3 hours each semester.

405g *Mathematics for the Secondary School Teacher.* Choice of topics from higher algebra, trigonometry, and geometry. Credit, 3 hours.

406g *Theory of Equations.* Complex numbers, theorems and methods relating to the solution of polynomial equations, numerical approximations, determinants and their use in the solution of systems of linear equations. Prerequisite: MA 212. Credit, 3 hours.

407g *College Geometry.* Advanced plane geometry; a study of the methods of proof, construction and major theorems of Euclidean Geometry. Prerequisite: 18 semester hours credit in mathematics and approval of instructor. Credit, 3 hours.

412g, 413g *Advanced Calculus.* Further topics in partial differentiation, multiple integration, and infinite series; line integrals and their applications. Limits of sequences and functions, continuity, differentiation, implicit functions. Prerequisite: MA 212. Credit, 3 hours each semester.

419g *Probability.* Combinatorial analysis, probability distributions and density functions, moments, limit theorems. Prerequisite: MA 212. Credit, 3 hours.

425g *Numerical Analysis.* Numerical solutions of ordinary and partial differential equations by finite difference methods. The theory of matrices and determinants and its application to the solution of simultaneous linear equations. Harmonic analysis. The method of least squares and Chebyshev polynomials. Prerequisites: MA 220 and 325, or approval of instructor. Credit, 3 hours.

426g, 427g *Mathematical Statistics.* Empirical and theoretical distributions, regression and correlation, sampling distributions, estimation and tests of hypotheses, analysis of variance. Prerequisite: MA 212. Credit, 3 hours each semester.

437g *Statistical Methods for Engineering and Physical Sciences.* An introduction to the theory and methods of experimental statistics including tests of hypotheses, analysis and variance, factorial experimentation. Prerequisite: MA 212. MA 427 and 437 may not both be counted for credit. Credit, 3 hours.

438g *Statistics in Applied Research.* An applied treatment of the principles of experimental design, regression and correlation, analysis of variance, factorial experimentation, special designs, analysis of covariance. Prerequisite: MA 226. Credit, 3 hours.

455g *Theory of Numbers.* The properties of whole numbers, including the study of Prime Numbers, the Unique Factorization Theorem, Congruences, Diophantine Equations, Primitive Roots,

and the Quadratic Reciprocity Theorem. Prerequisite: MA 212. or approval of instructor. Credit, 3 hours.

457g *Modern Algebra*. A systematic treatment of recent developments in Algebra. Topics taken from theory of groups, rings, fields, and related systems. Prerequisite: MA 212. Credit, 3 hours.

458g *Matrix Theory*. Fundamental operations on matrices; adjoint, transpose, and universe of a matrix; characteristic roots; application to quadratic forms; and other selected topics. Credit, 3 hours.

468g *Differential Geometry*. Theory of plane and space curves and surfaces; curvature, invariants, geodesics. Prerequisite: MA 212. Credit, 3 hours.

480g *Methods of Teaching Mathematics*. Methods of instruction, organization, and presentation of appropriate content in mathematics. Prerequisite: 2-SE 311 or concurrent registration, or approval of instructor. Credit, 3 hours.

485g *History of Mathematics*. A survey of the origin and development of mathematical ideas beginning with geometry and algebra and continuing through selected topics in modern mathematics. Prerequisite: Approval of instructor. Credit, 3 hours.

511 *Calculus of Variations*. The basic ideas and techniques of the calculus of variations are developed. Applications to geometry, particle dynamics, elasticity, vibration theory, and geometrical optics. Prerequisite: MA 212. Credit, 3 hours.

514 *Survey of Modern Mathematics*. An introduction to the theory of sets, the real numbers system, transfinite numbers, and other selected topics. This course is designed specially for teachers of secondary mathematics. Prerequisite: Approval of instructor. Credit, 2 hours.

520 *Theory of Differential Equations*. Advanced study of linear and non-linear ordinary differential equations, including systems, existence proofs, singularities, asymptotic behavior of solutions, boundedness of solutions, eigen values and eigen functions, Rayleigh-Ritz methods, perturbation theory. Prerequisites: MA 220, 413, 542. Credit, 3 hours.

525 *Numerical Analysis*. An advanced treatment and extension of the material described in MA 325 and 425. Prerequisite: MA 425 or equivalent. Credit, 3 hours.

527 *Theoretical Statistics*. An introduction to theories of point and interval estimation, the Neyman-Pearson theory, game theory, and decision theory. Prerequisites: MA 426 and 427. Credit, 3 hours.

528 *Least Squares Analysis*. A theoretical treatment of least squares estimation, regression analysis, special designs, factorial experimentation, analysis of covariance. Prerequisites: MA 426 and 427. Credit, 3 hours.

541, 542 *Functions of a Complex Variable*. Analytic functions, contour integration, power series, analytic continuation, conformal mapping, and entire functions. Prerequisite: MA 413. Credit, 3 hours each semester.

545, 546 *Functions of a Real Variable*. The real number system; concepts of limits, continuity, derivatives, integrals, and measure. Prerequisite: MA 412. Credit, 3 hours each semester.

560 *Techniques of Operations Research*. Selected topics on game theory, linear programming, Monte Carlo methods, organization theory, inventory management, and model making. Prerequisites: MA 212 and approval of instructor. Credit, 3 hours.

561 *Applied Partial Differential Equations*. Application of Fourier Series, Bessel Functions, Legendre Polynomials to the solution of partial differential equations of the physical sciences. Credit, 3 hours.

562 *Applied Complex Variables*. The Theory and application of functions of a complex variable; analytic functions; infinite series, contour integration, and mapping. Prerequisites: MA 220 and approval of instructor. Credit, 3 hours.

563 *Applied Transform Theory*. Fourier transforms; Laplace transforms; and their applications in physical science and engineering. Credit, 3 hours.

567, 568 *Topology*. A discussion of the basic concepts of set theory, cardinal and ordinal numbers, and the well-ordering theorem and its equivalents. A study of general topological spaces including an introduction to function theory in abstract spaces and topological algebraic structures. Prerequisite: Approval of instructor. Credit, 3 hours each semester.

580, 581 *Mathematics for In-service Teachers*. Subject matter in mathematics required for changes in secondary curricula. Prerequisite: Approval of instructor. Credit, 3 hours each semester.

586 *Probability and Statistics*. Introduction to probability theory, based on the theory of sets, and the modern concepts of statistical inference. Special attention will be given to problems connected with the teaching of statistics in the high school. Enrollment in this course is restricted to in-service teachers. Prerequisite: Approval of instructor. Credit, 3 hours.

587 *Abstract Algebra*. A study of the postulational approach to algebra; elementary mathematical systems, including groups and fields. Enrollment in this course is restricted to in-service teachers. Prerequisite: Approval of instructor. Credit, 3 hours.

588 *Modern Geometry*. Survey of topics in Euclidean Geometry, Projective Geometry, and Non-Euclidean Geometry. Prerequisite: Approval of instructor; restricted to in-service teachers. Credit, 2 hours.

Special Graduate Courses, MA 590, 591, 592, 593. See page 210.

Military Science and Tactics

LT. COL. PALMORE A. FERRELL, Chairman, Department of Military Science and Tactics

Military Science

MS 101 *Basic Military Science (First Year)*. Organization of the Army, individual weapons and marksmanship, and school of the soldier. Two lectures, 2 drills a week. Credit, 1.5 hours.

102 *Basic Military Science (First Year)*. American military history and school of the soldier. Two lectures, 2 drills a week. Credit, 1.5 hours.

201 *Basic Military Science (Second Year)*. Map reading, United States Army and National Security, school of the soldier. Prerequisites: MS 101 and 102. Two lectures, 2 drills a week. Credit, 1.5 hours.

202 *Basic Military Science (Second Year)*. Crew-served weapons and gunnery, and school of the soldier. Prerequisites: MS 101 and 102. Two lectures, 2 drills a week. Credit, 1.5 hours.

301 *Advanced Military Science*. Leadership; military teaching methods; organization, function, and mission of the arms and services; and exercise of command. Prerequisite: Two-year basic course or equivalent. Four lectures, 2 drills a week. Credit, 3 hours.

302 *Advanced Military Science*. Small unit tactics and communications, and exercise of command. Prerequisite: Two-year basic course or equivalent. Four lectures, 2 drills a week. Credit, 3 hours.

311 *Advanced Military Science*. Operations, training management, logistics and exercise of command. Army flight training for accepted volunteers. Prerequisites: MS 301 and 302. Four lectures, 2 drills a week. Credit, 3 hours.

312 *Advanced Military Science*. Military administration and personnel management, military law, service orientation, and exercise of command. Army flight training for accepted volunteers. Prerequisites: MS 301 and 302. Four lectures, 2 drills a week. Credit, 3 hours.

All Military Sciences. A Military Ball is scheduled annually to provide military social training.

Music

WENDELL J. RIDER, Chairman, Department of Music

Music

MU 100 *Fundamentals of Music Notation*. To provide non-music majors with sufficient symbol literacy to begin work in the field of musical learning. No credit for music majors. Credit, 2 hours.

105 *Music in Living.* The function of music in social, political, and cultural developments past and present. The relationship of music to various aspects of life and the other arts. For students not majoring in music. Credit, 2 hours.

107 *Introduction to Music.* The correlation of music with literature, science, and art. A non-technical course in the humanities primarily created for non-music majors. Credit, 2 hours.

123 *Rhythm.* A basic course covering the essentials of rhythmic notation and production which are necessary for quick learning of all advanced skills and development of sight reading facility. Credit, 1 hour.

124, 126, 224, 226 *Integrated Theory.* Basic theory needed for musicians to develop musical understandings, and skills in written harmony. To be taken concurrently with Integrated Theory Laboratory. Three times a week. Credit, 2 hours each semester.

125, 127, 225, 227 *Integrated Theory Laboratory.* Sight singing, dictation, ear training, and keyboard work. To be taken concurrently with Integrated Theory. Twice a week. Credit, 1 hour each semester.

211, 212 *Kindergarten and Primary Music Methods.* A sequence planned for education students following the kindergarten-primary curricula. Prepares teachers to teach their own classroom music. Previous musical training not required. Prerequisite: Courses taken in order. Credit, 2 hours each semester.

241, 242, 341, 342 *History and Literature of Music.* History and literature of music, designed to give perspective in judgments, based upon essential information and understanding as well as covering sources of information. Three times a week. Credit, 2 hours each semester.

311, 312 *Classroom Music in Lower Elementary Grades.* To prepare elementary education majors to teach music in their own classroom. Previous musical training not necessary. Credit, 3 hours each semester.

321, 322 *Modern Harmony.* Theory and analysis of contemporary harmonic and tonal systems. The uses of dissonance growing from techniques of Moussorgsky, Debussy, and Wagner to Schoenberg, Bartok, Stravinsky and Hanson; the Hindemith Root Theory; the Four Principles of Sounding Relationship; Dissonant Contact Theories. Prerequisite: MU 226. Credit, 2 hours each semester.

323 *Counterpoint.* Strict counterpoint in all species in two, three, and four or more parts. Creative writing on original cantata. Prerequisite: MU 226. Credit, 2 hours.

324 *Counterpoint.* A continuation of MU 323. Combined forms; double and triple with free parts. Original compositions in the style for organ or piano. Trios for piano and strings, woodwinds, or string quartet. Prerequisite: MU 323. Credit, 2 hours.

355 *Survey of American Music.* The growth and development of America's music. A humanities course for non-music majors. Credit, 2 hours.

356 *Survey of the Musical Theater.* An examination of music's place in the theater, viewed in terms of its historical importance and relative function. A humanities course for non-music majors. Credit, 2 hours.

421g, 422g *Aural Theory.* Aural recognition of chords in all positions; hearing skills developed by harmonic, rhythmic and melodic dictation, use of clefs for transposition and sight singing; development of intervallic, functional and chordal hearing. Prerequisite: MU 226. Five times a week. Credit, 2 hours each semester.

423g *Composition.* Creative writing in the smaller forms including harmonic textures and use of contrapuntal devices. Prerequisites: MU 323 or 226. Credit, 2 hours.

424g *Composition.* A continuation of MU 423. Concentrated creative writing for voice and instrumental works. To include solo and ensemble compositions. Prerequisite: MU 423. Credit, 2 hours.

427g *Form and Analysis.* Harmonic and structural analysis of musical forms. The study of simpler forms to and including the Sonata Allegro form. Prerequisite: MU 226. Credit, 2 hours.

428g *Form and Analysis.* A continuation of MU 427. Includes the larger forms, such as symphonic and tone poems with free adaptations and combinations of all forms. Prerequisite: MU 427. Credit, 2 hours.

431g *Choral Arranging.* Arrangements for three, four, and more parts mixed choirs and glees; accompaniments; special effects. Emphasis upon choral requirements of school and radio performance. Prerequisite: MU 226. Credit, 2 hours.

433g *Instrumentation.* Theoretical and practical study of scoring for wind instruments in various combinations, ranging from small ensembles to the full band. Prerequisite: MU 226. Credit, 2 hours.

434g *Instrumentation.* A continuation of MU 433. Adds problems of scoring for the string section, and progresses to full scoring for symphony orchestra and symphonic band. Prerequisite: MU 433. Credit, 2 hours.

445g *Twentieth Century Music.* An approach, through recorded music and discussion, to the works of composers of the Twentieth century. Prerequisite: MU 342 or approval of instructor. Three times a week. Credit, 2 hours.

451 *Repertoire.* A thorough study of the literature available for performance in all performing media. Prerequisite: MP 242. May be repeated for credit. Credit, 2 hours.

452 *Choral Literature.* A survey of choral music through all periods which is now available to choral directors for performance. Prerequisite: Approval of instructor. Credit, 2 hours.

454 *Chamber Music Literature.* An intensive study of the development of chamber music literature; the ensemble music of the Renaissance; the Baroque Suites; the contributions of Haydn and Mozart; Beethoven Quartets; important developments in the Romantic and Modern periods. Prerequisite: Approval of instructor. Credit, 3 hours.

461g *Education Methods: Band and Orchestra.* Survey of wind, string, and percussion methods and materials used in the development of junior and senior high school bands and orchestras. Prerequisite: Twenty semester hours of music. Credit, 2 hours.

464g *Listening Activities in the Elementary School.* Phonograph recordings, films, and radio programs suitable for use with experience units in the elementary grades. For classroom teachers and music teachers. Credit, 2 hours.

465 *Public School Music Survey.* For music majors in the B.A. in Education curriculum. Surveys the entire field of music education on the national, state, and local scale. Includes philosophy, curriculum, materials, and teaching methods. Credit, 3 hours.

480g *Methods of Teaching Music.* Methods of instruction, organization, and presentation of appropriate content in music. Prerequisite: 2-SE 311 or concurrent registration. Credit, 3 hours.

481g *Piano Teaching Procedures and Materials.* Principles of piano teaching are carefully analyzed. The various methods of teaching techniques, tone quality, phrasing, dynamics, etc. are demonstrated. Keyboard literature from its beginning to the present time will be surveyed, emphasizing the teaching of musical interpretation through an understanding of the structure, style, and period of the composition. Prerequisite: Four years of piano study or equivalent. Credit, 2 hours.

523 *Advanced Composition.* Continued creative writing in the larger forms for chorus, orchestra, and band. Prerequisite: MU 424. Credit, 2 hours.

524 *Advanced Composition.* A continuation of MU 523. Concentrated writing in the larger forms, vocal and instrumental, making use of modern harmonic devices. Prerequisite: MU 523. Credit, 2 hours.

525 *Pedagogy of Theory.* A comprehensive study of practices and principles of teaching music theory. Emphasis will be directed towards setting up the most desirable and practical offerings possible. Comparative studies of existing practices throughout the United States. Prerequisite: MU 226, or equivalent. Five times a week. Credit, 2 hours.

564 *The Marching Band—Pageantry.* The marching band; performances at athletic events; various formations, mechanics of stunts. Prerequisite: Approval of instructor. Credit, 2 hours.

567 *Organization and Administration of High School Bands and Orchestras.* Organization problems, procedures and materials. Credit, 2 hours.

571 *Choral Procedures and Techniques*. An analysis of choral-vocal problems chiefly at the secondary school level and a study of materials for the small choral ensembles and the large chorus. Prerequisite: MP 339. Credit, 2 hours.

Special Graduate Courses, MU 500, 590, 591, 592, 593. See page 210.

Music Performance

MP 109 *Elements of Conducting*. Essentials of conducting techniques used by both instrumental and vocal teachers in elementary and secondary school musical organizations. Twice a week. Credit, 1 hour.

111, 112, 211, 212 *Applied Music—Private Instruction*. Private instruction in piano, organ, voice, violin, viola, violoncello, contrabass, flute, oboe, clarinet, bassoon, saxophone, trumpet (cornet), French horn, baritone, trombone, tuba, and percussion. Prerequisites: Courses taken in numerical order to complete repertory and technical requirements or proficiency equivalent. Fee, \$40.00 each semester. Two lessons a week. Credit, 2 hours each semester.

121, 122, 221, 222 *Applied Music—Private Instruction*. Private instruction in piano, organ, voice, violin, viola, violoncello, contrabass, flute, oboe, clarinet, bassoon, saxophone, trumpet (cornet), french horn, baritone, trombone, tuba, and percussion. Prerequisites: Courses taken in numerical order to complete repertory and technical requirements or proficiency equivalent. Fee, \$27.00 each semester. One lesson a week. Credit, 1 hour each semester.

125, 126, 225, 226 *Basic Piano*. Instruction in Applied Music to be taken only by music majors who qualify in placement examinations. Two lessons a week. Credit, 1 hour each semester.

131, 132, 231, 232 *Class Piano*. A four-semester sequence of courses designed for those lacking piano experience and those who need piano as a classroom tool. Emphasis on keyboard technique, sight reading, simple accompaniments and improvisation. Two hours a week. Credit, 1 hour each semester.

133, 134, 233, 234 *Class Voice*. The systematic development of the principles of good singing. For non-music majors and as substitute for credits in Applied Music minor of music majors. Credit, 1 hour each semester.

145 *Symphony Orchestra*. Membership in the orchestra is open to all students of the colleges who can qualify on the basis of auditions with the director. Over a four-year period, the student is introduced to the great masterpieces of symphony orchestra literature. Four times a week. May be repeated for credit. Credit, 1 hour.

151 *Choral Union*. Membership in the Choral Union is open to all students of the colleges who can qualify on the basis of auditions with the director. Superior singers from the Choral Union are selected for membership in the Concert Choir. The Concert

Choir members represent the University on concert tours and in special programs, performing important choral literature designed for the smaller, select choir. Choral Union holds three rehearsals a week, and the Concert Choir members meet a minimum of two additional hours a week. May be repeated for credit. Credit, 1 hour.

155 *Men's Glee Club*. Experience in rehearsal and performance of music for male voices. Public performances. Prerequisite: Approval of the conductor. Open to male students of any of the colleges. May be repeated for credit. Credit, 1 hour.

161 *Symphonic and Marching Band*. Membership in the Symphonic and Marching Band is open to all students in the colleges who can qualify on the basis of auditions with the Director. In addition to the staging of formations and drills for football games and other events, the student is introduced to the great masterpieces of symphonic band literature over a period of four years. Five times a week. May be repeated for credit. Credit, 1 hour.

171 *Opera Workshop*. Rehearsal and performance of operatic works. Study of practical production problems in the musical theatre. Several public productions yearly. Prerequisite: Approval of instructor. Open to students of any of the colleges. May be repeated for credit. Credit, 1 hour.

181 *Chamber Music Ensembles*. String, brass, woodwind, percussion, keyboard, vocal and mixed ensembles. Prerequisite: Approval of instructor. Twice a week. May be repeated for credit. Credit, 1 hour.

235, 236 *Educational Methods for Strings*. Practical class in gaining the string knowledge necessary for instrumental teachers in public schools. Fee: Instrumental rental \$2.50 per semester. Meets daily. Credit, 1 hour each semester.

237, 238 *Educational Methods for Brass and Percussion*. Practical class in gaining the brass and percussion knowledge necessary for instrumental teachers in public schools. Fee: Instrumental rental \$2.50 a semester. Meets daily. Credit, 1 hour each semester.

311, 312, 411, 412 *Applied Music—Private Instruction*. Private instruction in piano, organ, voice, violin, viola, violoncello, contrabass, flute, oboe, clarinet, bassoon, saxophone, trumpet (cornet), French horn, baritone, trombone, tuba, and percussion. Prerequisite: Courses taken in numerical order to complete repertory and technical requirements or proficiency equivalent. Fee, \$40.00 each semester. Two lessons a week. Credit, 2 hours each semester.

321, 322, 421, 422 *Applied Music—Private Instruction*. Private instruction in piano, organ, voice, violin, viola, violoncello, contrabass, flute, oboe, clarinet, bassoon, saxophone, trumpet (cornet), French horn, baritone, trombone, tuba, and percussion. Prerequisites: Courses taken in numerical order to complete repertory and technical requirements or proficiency equivalent. Fee, \$27.00 each semester. One lesson a week. Credit, 1 hour each semester.

337, 338 *Educational Methods for Woodwinds and Percussion.* Practical class in gaining the woodwind and percussion knowledge necessary for instrumental teachers in public schools. Fee: Instrumental rental \$2.50 a semester. Meets daily. Credit, 1 hour each semester.

339 *Choral Conducting.* Elements of choral technique and interpretation. Required of music education vocal students. Prerequisite: MP 109. Three times a week. Credit, 2 hours.

340 *Instrumental Conducting.* Fundamentals of score reading, and interpretation of instrumental music. Required of all music education instrumental major students. Prerequisite: MP 109. Three times a week. Credit, 2 hours.

511, 512, 513, 514 *Applied Music—Private Instruction in Major.* For the student who has had the equivalent of four years training in his major performing field, voice or instruments. Prerequisite: MP 412 or equivalent. Two lessons a week. Credit, 2 hours each semester.

521, 522, 523, 524 *Applied Music—Private Instruction in Minor.* For the student who has had the equivalent of four years training in his major or minor performing field. Prerequisite: MP 412 or 422, or approval of Department Chairman. One lesson a week. Credit, 1 hour each semester.

539 *Advanced Conducting.* The study and practice of advanced baton technique for band and orchestra. Score reading, mechanics of conducting, individual criticisms of style. Prerequisite: major in Music or Music Education. Credit, 2 hours.

Nursing

LORETTA A. HANNER, Director, School of Nursing

Nursing

NU 101 *Introduction to Nursing.* The organization, purposes and breadth of the nursing profession and its relationship to other health professions and to community health agencies, and the meaning and use of concepts and principles in professional nursing care. Two lectures, 3 hours field work. Credit, 2 hours.

102 *Introduction to Nursing.* Basic principles and concepts of patient care with emphasis on the application of beginning skills in the clinical situation. One lecture, 3 hours laboratory. Credit, 2 hours.

103, 104 *Foundations in Biological and Physical Science.* An integrated course for nursing majors presenting principles and concepts from the biological sciences, microbiology, anatomy and physiology, and the physical sciences, chemistry and physics. Designed to provide the scientific foundation necessary for professional nursing practice. Fee, \$5.00. Four hours lecture, 3 hours laboratory. Credit, 5 hours each semester.

203 *Foundations in Biological and Physical Science.* A continuation of NU 103, 104. Prerequisite: NU 104. Fee, \$5.00. Four hours lecture, 3 hours laboratory. Credit, 5 hours.

211 *Human Relationships in Nursing.* Designed to further develop basic nursing skills. Stress is placed on meeting the emotional needs of patients with emphasis placed on the feelings and attitudes of the expectant mother. Provision is made for the development of understanding and skills fundamental to good interpersonal relations in hospital and home situations. Prerequisite: NU 102. Two hours discussion and conference, 3 hours supervised clinical practice and home visits. Credit, 2 hours.

221 *Maternal and Child Health Nursing.* The study of the individual needs of the mother and child during pregnancy, parturition, puerperium, childhood, and adolescence. Emphasis is placed on the role of the nurse in meeting the health problems of these individuals in relation to family and community life. Prerequisites: NU 211; HO 232, science requirements in nursing curriculum. Fee, \$15.00. Three lectures, 20 hours supervised practice and conferences. Credit, 8 hours.

271, 272 *Scientific Basis for Nursing Preparation.* An integrated course for registered nurses, including principles and concepts of the biological and physical sciences needed for professional nursing practice. Fee, \$5.00. Three hours lecture, 3 hours laboratory. Credit, 4 hours each semester.

303 *Public Health Science.* Presents the basic concepts of Public Health functions, organization, and administration; and relates the principles of epidemiology, statistical methods, and environmental sanitation. Coordinated with the role of the nurse in the promotion of health and the prevention of disease in the community, family, and individual. Field trips may be scheduled. Prerequisite: Nursing major. Three hours lecture and discussion. Credit, 3 hours.

306 *Modern Professional Nursing.* New concepts and trends in professional practice and nursing education. Limited to students enrolled in the graduate nurse program. Credit, 2 hours.

322 *Maternal and Child Health Nursing.* Major health problems encountered in the nursing care of mothers and children. Prerequisite: NU 221. Fee, \$15.00. Three hours lecture, 20 hours supervised practice and conferences. Credit, 8 hours.

331 *Medical and Surgical Nursing.* The nursing care of selected patients with medical and surgical conditions. Prerequisite: NU 221 or approval of instructor. Fee, \$15.00. Four hours lecture, 16 hours supervised practice and conferences. Credit, 8 hours.

341 *Psychiatric Nursing.* Current psychiatric concepts and the nursing care of selected patients with psychiatric conditions. Prerequisite: NU 322 or approval of instructor. Fee, \$10.00. Four hours lecture, 8 hours supervised practice and conferences. Credit, 6 hours.

350 *Leadership Skills in Nursing*. An introduction to the functions and responsibilities of the leader of the nursing team; techniques of management and teaching in the clinical units. A consideration of the leadership role of the professional nurse directing her activity toward comprehensive patient care. Credit, 1 hour.

407 *Professional Nursing Practice*. Supervised clinical nursing practice in a general hospital setting. Prerequisites: NU 306 and senior status in registered nurse program. Sixteen hours supervised clinical experience, class, and conferences. Credit, 4 hours.

450 *Community Health Nursing*. The individual and his family in the home and school, at work, and in the community. Prerequisite: Senior status in registered nurse program. Sixteen hours of clinical experience, class, and conferences. Credit, 4 hours.

Physics and Astronomy

ALAN T. WAGER, Chairman, Department of Physics and Astronomy

Physics

PH 101 *Introduction to Physics*. Survey of the fundamental principles of physics, presented with a minimum of mathematics, to give the student an understanding of the concepts of physics as applied to everyday life. Fee, \$4.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

111* *General Physics*. The fundamental principles of mechanics, heat, and sound presented with an emphasis on applications to medicine, dentistry, and other professional fields, except engineering. Prerequisites: MA 116 or 117 and MA 118. Fee, \$5.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

112* *General Physics*. The fundamental principles of magnetism, electricity, and light. Prerequisite: PH 111. Fee, \$5.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

121 *Descriptive Astronomy*. A study of the solar system, planets, and stars from the observational and descriptive viewpoint. Credit, 2 hours.

131 *Physics*. Classical and modern physics utilizing the calculus. Prerequisite: MA 120. Two lectures, 1 recitation, 2 hours laboratory. Credit, 3 hours.

211* *Physics*. Continuation of PH 131. Prerequisites: MA 121; PH 131. Fee, \$5.00. Three lectures, 1 recitation, 2 hours laboratory. Credit, 4 hours.

212* *Physics*. A continuation of PH 211. Prerequisites: MA 212; PH 211. Fee, \$6.00. Two lectures, 1 recitation, 2 hours laboratory. Credit, 3 hours.

*Credit is allowed for one course only in each of the following groups: PH 111, 211; 112, 212.

221 *General Astronomy*. A study of the solar system, motions of the planets, eclipses, stars, galaxies, and an introduction to navigation and astrophysics. Prerequisite: PH 112. Credit, 3 hours.

222 *Physical Mechanics*. A study of the motion of a particle and of systems of particles in one, two, and three dimensions; including a discussion of gravitation and of moving coordinate systems. Prerequisites: PH 112; MA 121 or equivalent. Credit, 4 hours.

223 *Physical Mechanics*. Continuation of PH 222 including kinematics of rigid body motion, and an introduction to Lagrangian and Hamiltonian mechanics and to the special theory of relativity in classical mechanics. Prerequisites: PH 222 and MA 212. Credit, 3 hours.

241 *Intermediate Heat and Thermodynamics*. A study of the principles of heat energy with an introduction to thermodynamics. Prerequisites: MA 122 and PH 112, or equivalent. Credit, 3 hours.

261 *Introductory Modern Physics*. Fundamental principles of spectroscopy, X-rays, nuclear theory, cosmic rays, photoelectricity. Prerequisites: PH 112 or CH 115, or equivalent; algebra and trigonometry. Credit, 3 hours.

301 *Basic Principles of Modern Physics*. A treatment of those portions of mechanics, electricity and magnetism, and optics necessary to the understanding of atomic and nuclear phenomena. This course is designed for teachers. Credit, 3 hours.

322 *Wave Motion and Sound*. Mechanics of vibration on strings, membranes, and fluids. Prerequisites: PH 222 and MA 220. Credit, 3 hours.

331, 332 *Principles of Electricity and Magnetism*. A study of electrostatics, magnetostatics, direct current theory, alternating current theory, propagation of electromagnetic waves and related topics. Prerequisites: PH 223 and MA 220 or equivalent. Credit, 3 hours each semester.

423g *Continuum Mechanics*. Analysis of stress and strain, velocity conditions, compatibility equations, elasticity, torsion, plate problems. Prerequisites: PH 223; MA 220. Credit, 3 hours. (Same as 4-ES 529.)

424g *Fluid Power*. A study of hydrostatics and hydrodynamics. Viscous and turbulent flow. Hydraulic pumps and motors, circuit design, and the application of hydraulic power. Prerequisite: 4-ES 371. Two lectures, 3 hours laboratory. Credit, 3 hours. (Same as 4-ME 451.)

431g *Radiating Systems and Propagation*. Radiation and field theory: emphasis on basic theory and concepts. Prerequisite: PH 332; MA 362. Credit, 3 hours. (Same as 4-EE 441.)

432g *Transistor Theory Circuits*. Semi-conductor theory and circuit applications; emphasis on recent contributions to the theory. Prerequisite: PH 332; MA 362. Fee, \$6.00. Three lectures, 3 hours laboratory. Credit, 4 hours. (Same as 4-EE 430.)

433g *Electron Physics.* A study of the principles and theories of electron motion in free space, solids and plasmas, electron emission and the principles of circuit theory. Prerequisite: PH 332. Credit, 3 hours.

442g *Kinetic Theory of Gases.* A study of the classical theories of Maxwell-Boltzmann with an introduction to the theories of Fermi-Dirac and Bose-Einstein. Prerequisites: MA 220 and PH 241 or equivalent. Credit, 3 hours.

451g *Optics.* A study of physical and geometrical optics based on the Maxwell equations and including interference, diffraction, crystal and metal optics. Prerequisites: MA 220; PH 223, and PH 332. Credit, 3 hours.

460g *Atomic and Nuclear Physics.* A presentation of the recent advances in the field of atomic and nuclear physics. This course is designed for teachers. Prerequisite: PH 301 or one year of college physics. Credit, 3 hours.

461g *Atomic Physics.* A study of extra-nuclear phenomena from an advanced viewpoint. Prerequisites: PH 332; MA 220 or 221, or equivalent. Credit, 3 hours.

462g *Nuclear Physics.* Study of intra-nuclear phenomena from an advanced viewpoint. Prerequisite: PH 461 or equivalent. Credit, 3 hours.

463g *Nucleonic Laboratory.* Techniques of nuclear physics. Prerequisite: PH 212. Fee, \$6.00. One lecture, 3 hours laboratory. Credit, 2 hours. (Same as 4-NE 421.)

464g *Applied Nuclear Physics.* Nuclear Physics for engineering. Prerequisite: PH 212. Credit, 3 hours.

465g *Nuclear Reactor Theory.* Principles of chain reactors, neutrons, conditions for criticality, reactor dimensions, time dependent reactor behavior. Prerequisite: PH 462. Credit, 3 hours. (Same as 4-NE 431.)

466g *Reactor Theory.* Mathematical and physical description of neutron motion and reactor behavior; transport theory, and diffusion theory. Prerequisite: PH 462. Credit, 3 hours. (Same as 4-NE 512.)

467g *Radiation Hazard and Protection.* Safe limits of exposure and tolerance dosage of alpha, beta, gamma, and neutron radiation; monitoring procedures; calculation of exposure doses and protective methods. Prerequisite: PH 462. Credit, 3 hours. (Same as 4-NE 441.)

468g *Reactor Design.* Engineering design of typical reactors; homogeneous, stationary power, power breeders. Prerequisite: PH 465 or concurrently. Credit, 3 hours. (Same as 4-NE 451.)

471g *Quantum Mechanics and Atomic Spectra.* Treatment of hydrogen atom and hydrogen-like ions, hyperfine structure of atomic spectra, Zeeman effect. Prerequisites: MA 220, PH 223, and PH 332. Credit, 3 hours.

490g *Advanced Physical Measurements*. Prerequisites: PH 112 or equivalent, and approval of instructor.

- Mechanics and Heat. Fee, \$5.00. Three hours laboratory. Credit, 1 hour.
- Electricity and Magnetism. Fee, \$10.00. Six hours laboratory. Credit, 2 hours.
- Optics and Light. Fee, \$5.00. Three hours laboratory. Credit, 1 hour.
- Atomic Physics. Fee, \$5.00. Three hours laboratory. Credit, 1 hour.
- Nuclear Physics. Fee, \$5.00. Three hours laboratory. Credit, 1 hour.

514 *A Survey of Modern Physics*. A survey of background material of physics followed by a thorough treatment of recent additions in the field. This course is designed particularly for secondary school teachers who wish to augment the background required in their earlier training. Prerequisite: Approval of instructor. Credit, 2 hours.

515 *Techniques in Teaching Physics*. Experience in problem solving; preparation of demonstrations, experiments, and projects; organization of laboratories. Designed primarily for secondary school physics teachers. Prerequisite: Approval of instructor. Credit, 2 hours.

516, 517 *Physics for In-service Teachers*. Concepts and principles of physics. Prerequisite: Approval of instructor. Credit, 3 hours each semester.

521 *Mechanics*. An advanced treatment of mechanics with topics chosen from the following: variational principles and Lagrange's equations, rigid body motion, Hamilton's equations, canonical transformations, Hamilton-Jacobi theory and small oscillations. Prerequisite: Approval of instructor. Credit, 3 hours.

522 *The Generalized Theory of Small Vibrations*. The theory of small vibrations is extended (through Lagrangian mechanics) to apply to problems in electricity and magnetism, and modern physics. The subject is discussed mathematically in terms of operational methods, including the Laplace and Fourier transforms. Credit, 3 hours.

531, 532 *Electromagnetic Theory*. Electrostatics, magnetostatics, Maxwell's equations, the stress tensor, plane and spherical waves, and multipole radiation; Hamiltonian formulation of the field equations and Cerenkov radiation. Credit, 3 hours each semester.

541 *Thermodynamics and Introduction to Statistical Mechanics*. A study of the laws of thermodynamics, entropy, thermodynamic potentials with applications to gases and solutions; chemical equilibria and phase rule; principles of statistical mechanics and application to thermodynamic systems. Prerequisite: Approval of instructor. Credit, 3 hours.

561, 562 *Modern Physics*. A study of relativity, quantum theory, wave mechanics, atomic structure, atomic and molecular spectra, radioactivity and nuclear phenomena, cosmic radiation, and related topics. Prerequisite: Approval of instructor. Credit, 3 hours each semester.

563 *Atomic Spectra and Structure*. Atomic spectra from the viewpoint of quantum mechanics, including selection rules, intensities, the Stark and Zeeman effects, and hyperfine structure. Credit, 3 hours.

564 *Molecular Spectra and Structure*. Molecular spectra from the viewpoint of quantum mechanics including the analysis of electronic, vibrational and rotational spectra of polyatomic molecules and the use of group theory to simplify the calculations. Credit, 3 hours.

576, 577 *Quantum Mechanics*. A study of the Schroedinger wave equation, eigenfunctions and eigenvalues, collision theory, approximation methods with applications to atoms, molecules, solids, radiation, and related topics. Prerequisite: Approval of instructor. Credit, 3 hours each semester.

580 *Current Topics in Solid State Physics*. Credit, 1 hour.

581 *Solid State Physics*. Topics chosen from crystallography, free electron theory, band theory, etc. Prerequisite: Approval of instructor. Credit, 3 hours.

582 *Solid State Physics*. A continuation of PH 581, with the topics chosen from Brillouin zones, solid types and properties, semi-conductors, solid rectifier and transistor physics, etc. Prerequisite: Approval of instructor. Credit, 3 hours.

Special Graduate Courses, PH 500, 590, 591, 592, 593. See page 210.

Political Science

ROSS R. RICE, Chairman, Department of Political Science

Political Science

PS 101 *Modern Politics and Government*. The role and principles of government in the world today. Origins, structure, and practices of government. Not designed for students desiring to major in political science. Credit, 3 hours.

102 *American Government*. A survey of American national, state, and local government. Constitutionalism; principles; federal-state-local relations; organization; functions. Designed for non-majors. Credit, 3 hours.

212 *State and Local Government*. The politics and administration of state, county, and town and city government in the United States. Consideration of organizational problems. Services offered the public by these governments. Special attention to Arizona government. Acceptable for teacher certification in lieu of PS 311. Credit, 3 hours.

213 *Municipal Government.* The politics and administration of city and town government in the United States. Problems, forms, and services of city governments. Credit, 3 hours.

310 *Federal Constitution and Government.* The Constitution and government of the United States at the national level. Meets the federal government requirement for teacher certification. Credit, 2 hours.

311 *Arizona Constitution and Government.* The Constitution and government of the State of Arizona. Meets the Arizona government requirement for teacher certification. Credit, 1 hour.

321 *The Legislative Process.* Consideration of the lawmaking process followed in selected legislative bodies. Composition of membership, organization, powers. Impact of internal and external forces on legislation. Prerequisite: One course in political science. Credit, 2 hours.

322 *Political Parties and Pressure Groups.* Development of the American two-party system. Role of parties in relationship to public opinion, pressure groups, and public officials. Party organization and activities. Prerequisite: One course in political science. Credit, 3 hours.

331 *Western Political Thought.* Western political philosophers and their theories from Plato and Aristotle to the eighteenth century. Prerequisite: One course in political science. Credit, 3 hours.

341 *Public Administration.* Comparison of administration in private business and government. Organizational principles and administrative techniques used in national, state, and local governments in the United States. Powers of public administrators and their control. Prerequisite: One course in political science. Credit, 3 hours.

351 *International Politics.* The development of the modern system of nation-states. Analysis of power politics. Role of international law. Prerequisite: One course in political science. Credit, 2 hours.

352 *Modern European Diplomacy.* A study of the principal European diplomatic developments and international affairs from 1648 to the present. Prerequisite: HI 102. Credit, 3 hours.

361 *Public Law.* Nature, purposes, and sanctions of law as an agency of social control. Sources of law; private law and public law; common law and civil law. Role of the courts and nature of the judicial process. Prerequisite: One course in political science. Credit, 3 hours.

411g *Problems in State and Local Government.* Techniques and tools for research in state and local government with particular application to current problems of Arizona governments. Individual and group projects. Prerequisite: Approval of instructor. Credit, 2 hours.

412g *Modern Democracies*. A comparative treatment of the governmental institutions and practices of England, France, and Italy, with special reference to the United States. Less attention to such governments as those of the Scandinavian countries, Japan, and West Germany. Credit, 2 hours.

413g *Modern Totalitarian States*. Comparison of the objectives and techniques of governmental leadership in the Soviet Union, Communist China, Spain, and other modern dictatorships. Attention to the recent dictatorships of Nazi Germany and Fascist Italy. Credit, 2 hours.

421g *Political Opinion and Propaganda*. Analysis of informal and organized influences and pressures upon our political institutions. Prerequisite: Twelve hours in political science or approval of instructor. Credit, 2 hours.

422g *Problems in Political Parties and Elections*. Problems in the American party system, supplemented by student field work. Prerequisite: Twelve hours in political science. Credit, 3 hours.

431g *Recent Political Thought*. Political ideas and philosophies from the eighteenth century to the present. Prerequisite: Twelve hours in political science or approval of instructor. Credit, 2 hours.

441g *Public Personnel Management*. History of civil service; comparison of the older civil concept with the recent concept of the merit system. Problems of recruitment, examination preparation, pay scales, promotion, employee motivation, discipline. Prerequisite: Twelve hours in political science or approval of instructor. Credit, 2 hours.

443g *Governmental Budgeting and Finance Administration*. Analysis of the legal and social nature of governmental budgets. Examination of budgetary procedures and administrative methods of financial control through the devices of allotments, allocations, accounting, auditing, and reporting. Prerequisite: Twelve hours in political science or approval of instructor. Credit, 2 hours.

451g *International Organizations*. Collective security as a means of maintaining world peace. Aims and accomplishments of the League of Nations, the United Nations, and other world organizations. Prerequisite: Twelve hours in political science or approval of instructor. Credit, 2 hours.

461g *Constitutional Law*. Development of the United States Constitution as reflected in decisions of the Supreme Court. Prerequisite: Twelve hours in political science. Credit, 3 hours.

473g *Latin American Politics*. A study of the development and problems of national Latin American governments and international relations with special emphasis on Mexico. Prerequisite: Twelve hours in political science or approval of instructor. Credit, 3 hours.

541 *Municipal Management*. Analysis of management practices in cities and towns in the United States. Attention given to formal and informal organization structure and management practices, with a definitive examination of management tools. Credit, 3 hours.

542 *Governmental Organization*. Analysis of organization theories and their application to administrative organizations at the national, state, and municipal levels of government. Credit, 3 hours.

561 *Administrative Law*. Nature, sources, and scope of administrative law; government agencies and personnel; internal remedies and judicial control of administrative action. Credit, 3 hours.

Special Graduate Courses, PS 500, 590, 591, 592, 593. See page 210.

Psychology and Philosophy

HUDSON JOST, Chairman, Department of Psychology and Philosophy

Philosophy

PI 101 *Introduction to Philosophy*. Great thought in Western culture, ancient, and modern times: Plato and Aristotle to Hume and Kant, James and Dewey. Credit, 3 hours.

222 *Ancient and Medieval Philosophy*. Readings in the Pre-Socratic Philosophies, Socrates and Plato, Aristotle; the Epicureans and Stoics, Aquinas and the Scholastics. Prerequisite: PI 101. Credit, 3 hours.

223 *Modern Philosophy*. Readings from Descartes, Hume, Berkeley, Hegel, Kant, Russell, Whitehead and others, Philosophers of the Twentieth Century. Prerequisite: PI 101. Credit, 3 hours.

231 *Logic*. An examination of the rules of deductive inference and an introduction to symbolic processes in logical calculation. Examples of fallacies, their detection, and practice in logical thought in abstract, scientific, and legal contexts. Credit, 3 hours.

235 *Philosophy of Science*. An examination of the ideas basic to modern science, and of their impact on our culture, on the progress of science, on morality, and on education. A clarification of scientific description, explanation, prediction, and theory formation. An examination of causality, probability, and determinism. Credit, 3 hours.

301 *Philosophies of the Western World*. Critical inquiry into the Great Thought of the West, ancient and modern, including Ethics, Metaphysics, Religion, Epistemology, and the Philosophy of History. Credit, 3 hours.

311 *Principles of Ethics*. The meaning of right and wrong, the development of moral understanding, the ethical foundations of personal and social relations. Prerequisites: PY 100; PI 101. Credit, 3 hours.

312 *Social Philosophy*. Important contributions to social thinking, with special emphasis on the ideological conflicts of modern times. Prerequisite: PI 101 or approval of instructor. Credit, 3 hours.

321 *Readings in Ancient Philosophy*. Readings in the philosophical classics of ancient Greece and Rome with special emphasis upon the works of Plato and Aristotle. Prerequisite: PI 101. Credit, 2 hours.

328 *Contemporary Philosophy*. An examination of the problems in modern philosophy; Pragmatism, Existentialism, Positivism, Realism, and other kinds of modern doctrine. Prerequisite: PI 101 or approval of instructor. Credit, 3 hours.

341 *Philosophy of Religion*. An inquiry concerning the nature of religion, various conceptions of God, good and evil, revelation and mysticism. Great philosophers, theologians and psychologists including James, Tillich, Niebuhr, Schweitzer, Jung, Ghandi and Marcel are considered. Prerequisite: PI 101. Credit, 3 hours.

415g *Ethical Philosophies*. An examination of practical ethics with reference to great ethical thinkers such as Aristotle, Kant, Confucius, Buddha, Kierkegaard, Schweitzer and modern psychological doctrine. Prerequisite: Twelve hours in philosophy or by approval of instructor. Credit, 3 hours.

436g *Philosophy of Mathematics*. Logicism, Intuitionism, Formalism, axiomatic procedure, the nature of proof and definition in mathematics, and the relation between mathematics and the empirical sciences. Prerequisite: Nine hours in philosophy or 9 hours in mathematics. Credit, 3 hours.

Psychology

PY 100 *Elementary Psychology*. Considers such activities as emotions, motives, thinking, observing, learning, and intelligence, and their role in the development and adjustment of the individual. Credit, 3 hours.

112 *General Psychology*. Scientific psychology and the principles of behavior. Readings in general psychology with emphasis on scientific and experimental studies. Lecture, demonstrations, and class experiments. Prerequisite: PY 100. Two lectures, 2 hours laboratory. Credit, 3 hours.

114 *Mental Hygiene*. Factors necessary for good mental health; basic needs of the individual; prevention of mental disorders and correction of personality disorders in their early stages. Credit, 2 hours.

131 *Applied Psychology*. A survey course in which the applications of psychological principles and researches in several fields of human endeavor are discussed. Prerequisite: PY 100. Credit, 3 hours.

232 *Business Psychology*. A consideration of the problems of human behavior in the business setting; the contributions of psychology to the understanding and solution of these problems. Prerequisite: PY 100. Credit, 3 hours.

281 *Human Growth and Development*. A survey of the physical, mental, emotional, and social growth and development throughout the life span. Lectures supplemented by field trips and laboratory experiences. Prerequisites: SO 101; PY 100. Credit, 3 hours.

305 *Statistical Methods*. Application of statistics to behavioral and social sciences. Prerequisite: MA 226. Credit, 3 hours.

333 *Techniques of Selection in Industry*. Psychological methods of determining the qualifications of a worker for a job. Emphasis on the methods used to improve the usefulness of tests, interviews, and application blanks in personnel work. Prerequisite: PY 100. Credit, 3 hours.

341 *History of Psychology*. Major problems and trends of modern psychology traced from their beginnings to the present including the development of the modern scientific approach. Prerequisite: Twelve hours in psychology. Credit, 3 hours.

343 *Experimental Psychology*. A survey of typical experiments in psychology including reaction time, perception, learning and problem solving. Emphasis on methods of experimentation. Demonstrations. Prerequisite: PY 100. Two lectures, 3 hours laboratory. Credit, 3 hours.

362 *Psychology of Personality*. The elements of personality, and the conditions which determine the pattern and the direction of its growth. Methods of judging personality and character. Prerequisite: at least 3 courses in psychology. Credit, 3 hours.

367 *Social Psychology*. The behavior of man in his social relations. Problems of crowd behavior, social control, propaganda, suggestion, imitation, competition, cooperation, and leadership. Prerequisites: PY 100 and SO 101. Credit, 3 hours.

371 *Educational Psychology*. An analysis and application of psychology facts and laws particularly relevant to the problems of education. Prerequisite: PY 100. Credit, 3 hours. (Same as 2-EP 422.)

381 *Behavior Problems and Juvenile Delinquency*. A review of investigations in behavior problems and delinquency; contributing factors, prevention and correction, case studies. Prerequisite: Three courses in psychology and sociology. Credit, 2 hours.

382 *Child Psychology*. Development, growth and psychological activities of the child. Problems of adjustment and child training. Survey of experimental and observational studies. Prerequisite: PY 100. Credit, 3 hours.

383 *Psychology of Adolescence*. Methods and findings of recent studies of the development, growth and problems of the adolescent, with implications for education. Prerequisite: PY 281 or 371. Credit, 2 hours.

385 *Abnormal Psychology*. Survey of psychiatric categories; study of their dynamics, etiology, and treatment. Prerequisite: Nine hours of psychology. Credit, 3 hours.

387 *Psychology of Learning*. A consideration of principles and theories of learning; conditioning and other basic forms of learning; experiments and principles making for effective learning. Prerequisite: Nine hours in psychology. Credit, 3 hours.

422, 423 *Introduction to Clinical Psychology*. The study of case material for the purpose of developing a clinical point of view. Cases will run the range of psychopathology and developmental levels. Credit, 3 hours each semester.

451g *Psychology of Reading*. An exploration of reading behavior as a function of psychological principles with particular attention to the fields of perception, emotions and motivation, learning and psychodiagnostics. Prerequisite: Six hours in psychology or approval of instructor. Credit, 3 hours.

452g *Psychology of Retarded Readers*. A study of the physiological, psychological, and cultural factors in reading problems. Emphasis on diagnosis and therapy at all levels. Prerequisites: PY 451, 491 or approval of instructor. Credit, 3 hours.

453g *Clinical Practice in Reading*. Supervised clinical experience with one or more retarded readers. Practice with diagnostic and remedial techniques. Amount of supervision dependent upon the student's background. Prerequisite: Approval of instructor. Fee, \$3.00. Credit, 3 hours.

464g *Physiological Psychology*. A study of the physiological basis of behavior, including the nervous system and nerve physiology, special senses, motor response mechanisms, learning, and emotions. Prerequisite: Fifteen hours of psychology. Credit, 3 hours.

465g *Psychology of Motivation and Emotions*. An analysis of underlying motives and emotions functioning in human development. Emphasis is placed on applications to educational and clinical psychology. Prerequisite: PY 422. Credit, 2 hours.

466g *The Psychology of Perception*. A study of experimental and theoretical results in the field of perception. All the senses, as well as the role of cognition, learning and motivation in perception are examined. Emphasis will be on applications in the fields of Educational, Clinical, Advertising and Communications Psychology. Prerequisite: Twelve credits in psychology or approval of instructor. Credit, 3 hours.

468g *Group Dynamics*. Consideration of the psychological theories and methods of study in various forms of collective behavior including group leadership, group effectiveness, communication within groups, and relations between groups and individual members. Prerequisite: PY 367 or 3-MG 311. Credit, 2 hours.

484g *Directed Experiences with Infants and Young People.* A study of the methods in evaluating the development of infants and young children; directed experiences, and special studies adapted to the needs of the student. Prerequisites: PY 281, 382. Credit, 3 hours.

491g *Tests and Measurements.* Evaluation and measurement of the individual in school and other experiences. Analysis and construction of tests; meanings of scores; diagnosis of individual strengths and weaknesses; remedies suggested for the individual having difficulty. An appreciation of the need for adequate measurement before evaluation. Prerequisite: PY 371. Credit, 3 hours.

505 *Advanced Statistics.* Experimental designs involving simple and complex analysis of variance. Two lectures, 3 hours laboratory. Credit, 3 hours.

526 *Theory and Practice of Clinical Counseling.* A survey of the major theories and techniques underlying psychotherapy including psychoanalysis, directive therapy, non-directive therapy, group therapy, play therapy, psychodrama, etc., together with their possible application to the school situation. Credit, 2 hours.

527 *Diagnostic Methods.* An intensive introduction to the mechanics of individual mental testing with special emphasis on the Stanford-Binet and the Wechsler-Bellevue. Two hours lecture, 2 hours laboratory. Credit, 3 hours.

528 *Diagnostic Methods.* A study of the inference process aimed at understanding the clinical use of psychological test data. Credit, 3 hours.

535 *Psychological Measurement.* Test construction with emphasis on psychological scaling, quantitative methods, psychophysical methods, and multiple operation measurement. Credit, 3 hours.

536 *Personnel Techniques and Problems.* Application of psychological principles of student, business and industrial personnel problems. Prerequisite: At least eight hours in psychology. Credit, 2 hours.

545 *Systematic Psychology.* The development of a consistent approach to psychology; a survey of Behaviorism, Phenomenology, Gestalt and other systems in modern psychology. Theory construction and experiment and the relation of psychology to the social and physical sciences, and of logic and mathematics in psychology. Prerequisite: PY 341. Credit, 3 hours.

547, 548 *Clinical Practicum.* Supervised experience in a clinical school or institutional setting. Credit, 4 hours each semester.

552 *Learning.* Critical, experimental, and theoretical evaluation of selected current learning issues. Prerequisite: PY 464. Two lectures, 3 hours laboratory. Credit, 3 hours.

553 *Symbolic Processes.* Extension of experimental principles of behavior to verbal behavior, problem solving, thinking, concept formation. Two lectures, 3 hours laboratory. Credit, 3 hours.

554 *Physiological Psychology*. Laboratory investigation in the role of sensory, endocrine, muscular, and neural processes. Two lectures, 3 hours laboratory. Credit, 3 hours.

572 *Advanced Educational Psychology*. Review of scientific publications on the facts, laws, and theories of learning, with reference to problems of education. Prerequisites: PY 371, 491. Credit, 2 hours. (Same as 2-EP 511).

573 *Recent Studies in Educational Psychology*. Survey of the latest experimental reports relevant to current problems of teaching. Prerequisites: PY 371, 491. Credit, 2 hours. (Same as 2-EP 566.)

577 *Aptitudes and Aptitude Tests*. The theory of aptitudes, types of aptitude tests, and use of aptitude tests in the guidance program. Prerequisite: PY 491. Credit, 2 hours.

578 *Individual Differences*. The nature and extent of psychological differences among individuals and groups, and their significance for curriculums and educational methods. Prerequisites: PY 371, 491. Credit, 2 hours.

581 *Theories of Personality*. The theories of personality which are of current significance in psychology. Credit, 3 hours.

585 *Psychopathology*. A test-oriented approach to an understanding of the major neurotic and psychotic symptoms and syndromes. Credit, 3 hours.

587 *The Clinical Interaction*. The study of the patient-clinician relations fundamental to the diagnostic and therapeutic functions of the psychologist. Credit, 3 hours.

Special Graduate Courses, PY 500, 590, 591, 592, 593. See page 210.

Sociology and Anthropology

LESTER S. PERRIL, Chairman, Department of Sociology
and Anthropology

Anthropology

AN 111 *Elementary Anthropology*. Primitive society, religion, material culture, the origin and antiquity of man and civilization, modern races, the linguistic phases of culture, and the principles of anthropology. Credit, 3 hours.

221 *Indians of the Southwest*. Culture of living Indian tribes—Navajo, Hopi, Pima, Papago, etc. Southwestern archaeology. Social problems of the Southwestern Indians. Credit, 3 hours.

231 *Archaeological Field Methods*. The excavation of archaeological sites and the recording and interpretation of data. Includes field experience in this locality. Fee, \$3.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

312 *Peoples of the World*. An ethnographic survey of the peoples and cultures of Africa, Eurasia, and Oceania. Prerequisite: SO 101 or AN 111. Credit, 3 hours.

313 *Primitive Society*. The development and varieties of human societies; a survey of primitive social institutions; the role of property in primitive society; the problem of control and authority in society. Prerequisite: AN 111 or SO 101. Credit, 2 hours.

314 *Primitive Religion*. The origins, elements, forms, and symbolism of religion; a comparative survey of primitive religious beliefs and ceremonies; the place of religion in the total culture. Prerequisite: AN 111 or SO 101. Credit, 2 hours.

321 *Indians of Mexico and Peru*. Archaeology and ethnology of the Mayas, Aztecs, Chibchas, Incas. Present day tribes of Middle America. Social problems of Mexican and Peruvian Indians. Prerequisite: AN 111 or SO 101. Credit, 3 hours.

331 *Prehistory*. The development of Old World cultures from the Old Stone Age through the Iron Age. Prerequisite: SO 101 or AN 111. Credit, 2 hours.

332 *Southwestern Archaeology*. The development of prehistoric cultures in the Southwest; early man and the Hohokam, Mogollon, Basket Maker and Pueblo cultures. Prerequisite: SO 101 or AN 111. Credit, 3 hours.

341 *Physical Anthropology*. Fossil men, race classification and distribution, racial history and race problems, man's place in the animal kingdom, human heredity. Prerequisite: AN 111 or SO 101. Credit, 2 hours.

351 *Culture and Personality*. The way a culture determines personalities; accepted and deviant behavior; cultural values; comparisons of widely differing cultures. Prerequisite: Approval of instructor. Credit, 3 hours.

411g *Social Anthropology*. Social organization, social institutions, and cultural diffusion; acculturation, culture and personality, the community study, selected primitive cultures. Prerequisite: SO 101 or AN 111. Credit, 3 hours.

412g *American Minority Peoples*. Problems of racial, national and religious minorities in the United States. Prejudice, acculturation and assimilation. Prerequisite: SO 101 or AN 111. Credit, 3 hours.

414g *Acculturation and Applied Anthropology*. The dynamic processes of culture contact. The impact of Western civilization upon native societies; anthropological problems in colonial and native administration; applied anthropology in the modern world. Prerequisite: AN 111 or SO 101. Credit, 3 hours.

421g *The North American Indian*. Archaeology, ethnology, and linguistic relationship of the Indians of North America. Current social and economic problems of the Indians. Prerequisite: SO 101 or AN 111. Credit, 3 hours.

Social Sciences

SS 101, 102 *Introduction to the Social Sciences*. An integrated course including introductory material from the fields of sociology, anthropology, politics, government, and economics. Enrollment limited to freshmen and sophomores. Credit, 3 hours each semester.

480g *Methods of Teaching Social Sciences*. Methods of instruction, organization, and presentation of appropriate content in Social Sciences. Prerequisite: 2-SE 311 or concurrent registration. Credit, 3 hours.

Sociology

SO 101 *Sociology*. Scientific study of society and culture. Designed as a general education course for freshmen and sophomores. Credit, 3 hours.

211 *Introduction to Social Work*. A survey of social welfare services with consideration of the areas of social needs, the social agencies developed to meet them, their philosophy and methods. Credit, 3 hours.

212 *Introduction to Child Welfare*. A general survey of the child welfare field, with special reference to contemporary programs, such as aid to dependent children, rural child welfare services, foster home placement, day nurseries, children's homes, and adoption services. Credit, 2 hours.

231 *The Community*. The consideration of how a community is organized and how it develops. Special emphasis is upon the inter-relationship of the many organizations and agencies, their functions, and their influence on the individuals involved. Prerequisites: SS 101, 102 or SO 101. Credit, 3 hours.

312 *Social Change*. Study of patterns of social change, resistance to change, and change-producing agencies and processes. Prerequisites: SO 101 or SS 101, 102. Credit, 3 hours.

313 *Modern Social Problems*. Current problems of race relations, poverty and unemployment, mental disease, mental deficiency, etc. Prerequisites: SS 101, 102 or SO 101. Credit, 3 hours.

321 *Marriage and the Family*. A functional approach to marriage; courtship, engagement, marital adjustment. Prerequisite: SO 101, or approval of instructor. Credit, 3 hours.

331 *Rural Sociology*. Rural regions of the U.S.; rural people; rural social organizations. Emphasis on rural life in Arizona. Prerequisites: SS 101, 102 or SO 101. Credit, 2 hours.

332 *Urban Sociology*. Growth, characteristics, and problems of the modern city. Emphasis on urbanization in Arizona. Prerequisites: SS 101, 102 or SO 101. Credit, 2 hours.

333 *Population Problems*. Theories of population growth; births, death, migration; population policies. Prerequisites: SS 101, 102 or SO 101. Credit, 3 hours.

337 *History of Social Welfare.* The historical development of social welfare and its relation to the social forces of the time. Prerequisite: SO 211 or approval of instructor. Credit, 3 hours.

338 *Public Welfare.* The programs and philosophy of the social security system. Prerequisites: SO 211 and 337, or approval of instructor. Credit, 3 hours.

345 *Society and Juvenile Delinquency.* Delinquency viewed as a product of the society; the societal factors of apprehension, treatment, and prevention. Prerequisites: SO 101, or SS 101, 102, plus two courses in sociology. Credit, 3 hours.

361 *Industrial Sociology.* Social and cultural analysis of industry. Attention given to occupational roles, status, and social participation of workers. Prerequisite: SO 101 or SS 101, 102. Credit, 3 hours.

421g *The Family.* The family is considered from the institutional viewpoint, its historical development, and its adaptation to a changing culture. A study of the family system in many cultures. Prerequisites: SO 101 or SS 101, 102 and 6 hours in sociology. Credit, 3 hours.

431g *Social Class and Stratification.* Social classes and the function of these groupings in a cultural organization. Prerequisite: Six hours of sociology. Credit, 3 hours.

432g *Social Control.* The various methods used by individuals and groups to control others. Prerequisite: Six hours of sociology. Credit, 3 hours.

433g *Social Interaction in Group Living.* Social relationships involved in small and large group living. Prerequisite: Six hours of sociology. Credit, 3 hours.

434g *Demography.* The science of population analysis; problems in measurement of the size, composition and changes in population. Prerequisite: Six hours of sociology. Credit, 3 hours.

438 *Social Welfare Services.* The administration of welfare services, the principles of interviewing, and a synthesis of social work philosophy. Prerequisites: SO 211, 337, and 338, or approval of instructor. Two hour classroom discussion, plus 4 hours limited participation in the program of a local social agency. Credit, 3 hours.

441g *Principles of Criminology.* Causation of crime; juvenile delinquency; classes of crime; criminal as a social type. Prerequisites: SS 101, 102 or SO 101. Credit, 3 hours.

442g *Penology.* Theories of punishment; methods of dealing with convicts; police, courts, prisons, probation, and parole. Prerequisites: SS 101, 102 or SO 101. Credit, 3 hours.

451g *Gerontology.* The social processes in aging and their relationship to the physical changes. Prerequisite: Six hours of sociology. Credit, 3 hours.

461g *Family Education*. The development of marriage and family education; current emphasis and present trends. A treatment of both the content involved and the various kinds of educational programs in this field. Prerequisite: Approval of instructor. Credit, 3 hours.

531, 532 *Development of Sociological Thought*. Sociological theory with its European beginnings and American developments. Credit, 3 hours each semester.

Special Graduate Courses, SO 500, 590, 591, 592, 593. See page 210.

Speech and Drama

ROBERT W. ALBRIGHT, Chairman, Department of Speech and Drama

Drama

DR 111 *Introduction to Drama*. A study of the various types of drama with reference to their theatric representation. Credit, 3 hours.

112 *Acting*. Reading in theory; laboratory projects. Credit, 3 hours.

113 *Make-up*. The techniques of theatrical make-up; laboratory projects. Fee, \$5.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

213 *Stage Scenery*. Theory and practice of designing stage decor; laboratory projects in connection with settings for the Drama Workshop productions. Two lectures, 6 hours laboratory. Credit, 4 hours.

311 *Creative Dramatics*. Methods of making a play from a lesson or story, helping children to improvise their own roles; selection of literature and subject matter suitable for play making. Laboratory work with school children during latter part of course. Prerequisite: SE 120 or 200. Credit, 3 hours.

312 *Children's Theatre*. Formal dramatics for children. The selection and production of plays and pageants suitable for children through the elementary grades. Prerequisite: SE 120 or 200. Credit, 3 hours.

313 *Play Production*. Problems connected with staging of plays in elementary and secondary schools. Prerequisites: SE 120 or 200; DR 111. Credit, 3 hours.

314 *Advanced Acting*. A history of the art of acting. Group participation in scenes from plays to illustrate the various styles of acting. Prerequisite: DR 112. Credit, 3 hours.

315 *Directing*. The principles of play direction; laboratory projects. Prerequisite: DR 213. Credit, 3 hours.

320 *History of the Theater*. A study of twenty plays to illustrate the art of theatric representation at successive stages in the evolution of the physical playhouse of the Western World. Credit, 3 hours.

321 *Radio-Television Drama*. The production of both radio drama and television drama, with emphasis on acting techniques appropriate to each form. Prerequisite: RT 230. Credit, 3 hours. (Same as RT 321.)

415g *Directing*. Aesthetic and technical theories of play direction, with laboratory projects in stylized and period plays. Prerequisite: DR 315. Credit, 3 hours.

Speech

SE 120 *Speech Fundamentals*. An introduction to the physical and functional bases of speech production. Required of Speech majors and minors. Credit, 2 hours.

200 *Elements of Speech*. Adjustment to the speech situation; obtaining and organizing material. The conversational mode; articulation, pronunciation, and tone; bodily movement. Not open to freshmen. Credit, 2 hours.

211 *Public Speaking*. Organization and delivery of various types of speeches. Emphasis on types which occur most often in everyday life. Prerequisite: SE 200 or 120 or approval of instructor. Credit, 2 hours.

214 *Intercollegiate Debate*. Preparation for and participation in intercollegiate debates. Prerequisite: Approval of instructor. Credit, 2 hours.

221 *Voice and Diction*. A course designed to develop and improve the speaking voice. Background discussion and individual and group exercises and drills. Prerequisite: SE 120 or 200. Credit, 2 hours.

230 *Radio and Television Speech*. The application of public speaking principles to the media of radio and television. Practice in conducting round table discussions, interviews, and speeches. All assignments before television cameras or microphones. Credit, 3 hours. (Same as RT 230.)

241 *Oral Interpretation*. Techniques of the reading aloud of prose, poetry, and drama. Prerequisite: SE 120 or 200. Credit, 3 hours.

300 *Principles and Methods of Discussion*. The development of attitudes and skills for effective participation and leadership in discussion. Practice in symposiums, panels, and conferences. Prerequisite: Approval of instructor. Credit, 2 hours.

312 *Principles of Argumentation*. Construction and delivery of various types of argumentative speeches. Essential to students engaging in intercollegiate debate. Prerequisite: SE 120 or 200. Credit, 2 hours.

313 *Speech Composition*. Practice in the organization and compositional development of speeches. Prerequisite: SE 120 or 200. Credit, 2 hours.

315 *Intercollegiate Debate*. Continuation of SE 214. Prerequisite: SE 214. Credit, 2 hours.

316 *Intercollegiate Debate*. Continuation of SE 315. Prerequisite: SE 315. Credit, 2 hours.

341 *Advanced Oral Interpretation*. A further and more technical study of the art of reading aloud effectively from prose, poetry, and drama. Prerequisite: SE 241. Credit, 3 hours.

411g *Business and Professional Speech*. The application of rhetorical principles to specific business and professional speaking situations. Practice in using the forms of persuasion, conference speaking techniques, and group participation methods. Credit, 3 hours.

420g *Speech Correction for the Classroom Teacher*. The role of the teacher in understanding and aiding speech and hearing development in normal and speech-defective children with emphasis upon the recognition and prevention of disorders. May not be counted toward the major in speech and drama. Credit, 3 hours. (Same as 2-SP 420g.)

421g *Speech Correction*. Cause and correction of disorders of speech. Prerequisite: SE 120 or 221. Credit, 3 hours.

422g *Speech Pathology*. The nature and treatment of major disorders of speech with emphasis upon aphasia, cerebral palsy, cleft palate, and stuttering. Prerequisite: SE 421 or approval of instructor. Credit, 3 hours.

423g *Clinical Practice in Speech Correction*. A laboratory course consisting of case treatment of speech disorders in the University Speech Clinic. Prerequisite: SE 421. Credit, 1-3 hours. Note: May be repeated for credit.

This course may be taken for more than one semester.

424g *Phonetics*. Study of phonetics, including phonetic symbols, the production, the general characteristics and the application of the sounds of American speech to the acquisition and teaching of good pronunciation. Prerequisite: SE 200. Credit, 2 hours.

425g *Audiology*. The normal process of hearing, and the nature, causes, and rehabilitation of hearing disabilities. Credit, 3 hours.

426g *Audiometry*. Theory and practice of testing hearing acuity, and of evaluating and interpreting test results. Credit, 3 hours.

427g *Clinical Practice in Audiology and Audiometry*. Theories of lip-reading and auditory training; practical experience in testing and rehabilitating the hearing handicapped. Prerequisite: SE 425. May be repeated for credit. Credit, 1-3 hours.

450g *Contemporary Public Address*. Leading contemporary public speakers and their influence on social and political life. Credit, 3 hours.

Zoology

HUGH HANSON, Chairman, Department of Zoology

HERBERT L. STAHNKE, Chairman, Biology, and
Head, Division of Life Sciences

GORDON L. BENDER, Chairman, Entomology

ROY M. JOHNSON, Chairman,
Medical Technology and Microbiology

Biology

BI 100 *The Living World*. A survey of the major biological principles as illustrated by the areas of behavior, biogeography, ecology, evolution, hygiene, morphology, physiology, reproduction and development, and taxonomy. Does not meet science requirement in preprofessional curriculum. Fee, \$2.00. Credit, 4 hours.

110 *Special Techniques in Biology*. Approval of instructor and chairman of the department required. Fee, \$3.00. Credit, 1 hour.

120 *Field Biology*. Observation, identification, and natural history of plants and animals of aquatic and terrestrial habitats. Open only to B.A. Ed. freshmen or sophomores or non-biology majors. Prerequisite: BI 100 or equivalent. Fee, \$3.00. One lecture, 3 hours field or laboratory. One week-end field trip. Credit, 2 hours.

218 *The History of Medicine*. From Babylonian times through present day medicine. For pre-medical and pre-dental students. Credit, 1 hour.

340 *Genetics and Eugenics*. Principles and facts of heredity developed from plants and animals. Principles of race improvement. Prerequisites: BI 100 or BO 100, and ZO 100 or equivalent. Credit, 3 hours.

480g *Methods of Teaching Biology*. Methods of instruction, organization, and presentation of appropriate content in biology. Prerequisite: 2-SE 311 or concurrent registration. Credit, 3 hours.

495g *Pro-seminar in the Biological Sciences*. A review of the major principles of biology and the recent advances in various areas as obtained through student reports of the literature and reports by staff members in their specialties. Prerequisites: Twenty-five hours in biological sciences and approval of instructor. Credit, 2 hours.

510 *Techniques in Teaching Biology*. Includes microtechniques, photography, dissection, and the collection and preparation of biological materials for laboratory and demonstration purposes. Designed primarily for secondary school teachers. BO 100; ZO 100 and MI 201 recommended. Fee, \$5.00. Six hours laboratory. Credit, 2 hours.

514 *Recent Advances in the Biological Sciences*. A review of the current literature and reports by departmental staff covering recent developments in biological concepts. Prerequisites: At least 24 hours of biological sciences. Credit, 2 hours.

515 *Biogeography*. Principles of plant and animal distribution. Prerequisite: Approval of instructor. Credit, 2 hours.

518 *The Development of Biological Concepts*. A biographical and conceptional study of the history of the biological sciences. Prerequisite: Twenty-four hours of biological sciences. Credit, 2 hours.

Special Graduate Courses, BI 500, 590, 591, 592, 593. See page 210.

Entomology

ET 102 *Agricultural Entomology*. The recognition, economic importance, life history, habits and control of harmful and beneficial insects of importance to agriculture, particularly of the Southwest. Properties, formulations, and recommended uses of commercially important insecticides will be considered. Prerequisite: BI 100 or ZO 100, or equivalent. Fee, \$5.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

three-hour laboratory. Credit, 3 hours.

200 *General Entomology*. Form, activities, and classification of insects. Prerequisite: ZO 100 or equivalent. Fee, \$5.00. Three lectures, 4 hours laboratory. Credit, 4 hours.

320 *Field Entomology*. Study and collection of insects in their natural habitats, with emphasis on ecology, life histories, and field recognition. Prerequisite: ET 200 or approval of instructor. Fee, \$5.00. Nine hours laboratory. Credit, 3 hours.

350 *Insect Morphology*. Morphology of typical insects including both external and internal structure. Prerequisite: ET 200. Fee, \$5.00. Two lectures, 6 hours laboratory. Credit, 4 hours.

404g *Apiculture*. A study of bees and their ways, including methods of management. Students work with bee hives and honey, performing most of the operations essential to good bee-keeping and honey production. Prerequisite: ET 200. Fee, \$5.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

420g *Toxicology of Insecticides*. A study of the mode of action of insecticides, the relationship of chemical structure to toxicity, and the physiological explanation of the chemical poisoning of insects. Prerequisites: ET 200 or equivalent and Organic Chemistry. Credit, 2 hours.

460g *Insect Physiology*. A survey of the life processes of insects. Prerequisite: ET 200 (chemistry desirable but not required). Fee, \$5.00. Two lectures, 4 hours laboratory. Credit, 3 hours.

470g *Systematic Entomology*. The classification of insects; taxonomic categories and procedure; bibliographical methods; nomenclature; museum practices. Prerequisite: ET 200. Fee, \$2.00. Two lectures, 6 hours laboratory. Credit, 4 hours.

496g *Entomological Techniques*. A practical consideration of important techniques not adequately treated in other courses, particularly: scientific illustration, use of the literature, mount-

ing, preserving, and preparing insects for study, record keeping, elementary mathematical treatment of data, interpretation of graphs, charts and maps. Prerequisite: ET 200. Fee, \$2.00. One lecture, 3 hours laboratory. Credit, 2 hours.

502 *Entomology for Teachers*. Methods of collection, recognition and preparation of insects for classroom use. The care and handling of living as well as pinned specimens will be considered. Emphasis will be placed on Arizona insects and their biology. Prerequisite: At least 10 hours in biology and/or approval of instructor. Fee, \$5.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

570 *Insect Identification*. Detailed consideration of classification and literature of a selected order of insects with practice in identification of adult and immature forms. Prerequisites: ET 200 and 470. Fee, \$2.00. Nine hours laboratory. Credit, 3 hours.

Medical Technology

The following courses are offered in the laboratories at St. Joseph's, Good Samaritan, and Memorial Hospitals in Phoenix and are open only to seniors taking the Medical Technology curriculum. See page 130.

ME 411 *Clinical Medical Technology*. Clinical training in pathogenic bacteriology, biology techniques, histology, serology, parasitology, hematology, biochemistry, blood chemistry, urinalysis, and chemistry of digestion. Fee, \$25.00 (payable at hospital). Credit, 16 hours.

412 *Clinical Medical Technology*. Continuation of ME 411. Fee, \$25.00 (payable at hospital). Credit, 16 hours.

Microbiology

MI 102 *Elements of Microbiology*. A fundamental study of micro-organisms, including parasitic worms, with an emphasis on species of medical importance. Includes fundamental diagnosis, cultivation and handling of human pathogens. Not open to biology and medical technology majors. Fee, \$5.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

103 *Microbiology*. Medical bacteriology and its applications to nursing arts. Two lectures, 3 hours laboratory. Credit, 3 hours.

201 *Microbiology*. Bacteria, molds, and other micro-organisms, and their application in industrial, agricultural, hygienic and domestic problems. Prerequisites: CH 111; BI 100 or equivalent. Credit, 3 hours.

202 *Microbiology Laboratory*. The principles and laboratory techniques used in identifying and handling of micro-organisms. Prerequisite or taken concurrently: MI 201. Fee, \$5.00. Three hours laboratory. Credit, 1 hour.

410g *Advanced Microbiology*. A comparative study of the systematic and pathogenic relationships of micro-organisms with a consideration of the physiological activities of the micro-organisms involved. Prerequisites: MI 202 and CH 231 and approval of instructor. Fee, \$6.00. Three lectures, 6 hours laboratory. Credit, 5 hours.

420g *Immunology*. Principles of immunity and their application to diagnosis, systematics and allergies. Prerequisites: MI 202 and CH 231 or equivalent. Fee, \$7.00. Two lectures, 6 hours laboratory. Credit, 4 hours.

445g *General Parasitology*. Pathogenic protozoa, worms, and arthropod parasites. Prerequisite: ZO 100 or equivalent. Fee, \$5.00. Three lectures, 4 hours laboratory. Credit, 4 hours.

530 *Epidemiology*. Dissemination, incidence and virulence of the etiological agents of human disease in the community, and factors influencing them; principles basic to control. Prerequisite: Ten hours of microbiology. Credit, 2 hours.

540 *General Protozoology*. Identification, classification, life cycles, physiology and economic importance of the free-living and parasitic protozoa, and host-parasite relationships. Fee, \$7.00. Three lectures, 4 hours laboratory. Credit, 4 hours.

545 *Parasitology*. Historical and analytical approach to the treatment of selected areas in the body of knowledge relating to parasites and parasitism. Prerequisites: MI 202 and 445. Credit, 3 hours.

560 *Bacterial Physiology*. Study of fermentation, respiration and other metabolic processes of bacteria. Prerequisites: Eight hours of microbiology and CH 465, or equivalent. Fee, \$7.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

570 *Systematic Bacteriology*. Classification and identification of bacteria. Prerequisite: Eight hours of microbiology. Fee, \$7.00. One lecture, 6 hours laboratory. Credit, 3 hours.

580 *Pathogenic Bacteriology*. Study of the etiology of bacterial disease. The pathology, diagnosis and epidemiology of human pathogenic bacteria. Prerequisites: MI 202 and CH 231. Fee, \$7.00. Three lectures, 6 hours laboratory. Credit, 5 hours.

585 *Virology*. Principles of diagnosis and pathology of viruses and rickettsiae. Prerequisite: MI 580. Fee, \$7.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

Zoology

ZO 100 *General Zoology*. The fundamental principles of zoology as applied to the study of the main groups of invertebrate and vertebrate animals. Fee, \$5.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

102 *Human Anatomy-Physiology*. Consideration of the structure and dynamics of the human mechanism. Prerequisites: High school biology and chemistry; or PL 110 and BI 100 or equivalent.

Not open to biology or medical technology majors, pre-medical, or pre-dental students. Fee, \$2.00. Credit, 4 hours. With laboratory, credit, 5 or 6 hours.

103 *Human Anatomy-Physiology Laboratory*. To be taken concurrently with ZO 102. Fee, \$5.00. Six hours laboratory. Credit, 2 hours.

150 *Invertebrate Zoology*. The characteristics, life cycles, habits, economic importance, and evolution of the major groups of invertebrate animals. Prerequisite: ZO 100 or approval of instructor. Fee, \$5.00. Two lectures, 4 hours laboratory. One week-end field trip. Credit, 3 hours.

271 *Chordate Anatomy*. Fundamental principles of the structure, development, and homology of the chordates. Prerequisite: ZO 100. Fee, \$8.00. Two lectures, 6 hours laboratory. Credit, 4 hours.

273 *Ichthyology*. Life histories, habitats, and habits of fish. Prerequisites: BI 100 or ZO 100 and approval of instructor. Fee, \$4.00. One lecture, 3 hours laboratory. Credit, 2 hours.

274 *Ornithology*. A study of birds; particularly habits, behavior, and economic importance of Arizona species. Recognition of species by size, form, color, song, and habit. Prerequisite: BI 100 or equivalent. Fee, \$3.00. One lecture, 3 hours laboratory. One week-end field trip. Credit, 2 hours.

275 *Mammalogy*. A study of the classification, structure, habits, ecology, and distribution of mammals, with emphasis on North American forms. Prerequisite: BI 100 or ZO 100. Fee, \$4.00. One lecture, 3 hours laboratory. One week-end field trip. Credit, 2 hours.

276 *Reptiles and Amphibians*. An overview of the large taxonomic categories of reptiles and amphibians of the world. Emphasis on life histories, habitats, and habits. Prerequisites: BI 100 or ZO 100 and approval of instructor. Fee, \$4.00. One lecture, 3 hours laboratory. Credit, 2 hours.

340 *Animal Microtechnique*. Zoological microtechnique, including the preparation for microscopic examination of animal structures, tissues, cells and whole mounts. Prerequisite: ZO 100. Fee, \$5.00. Six hours laboratory. Credit, 2 hours.

360 *General Physiology*. The functions and structures of the animal body with emphasis on fundamental physiological processes and mechanisms. Prerequisites: ZO 100; CH 111 or equivalent. Fee, \$5.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

425g *Animal Ecology*. Interrelations of animals and their environments. Prerequisites: BO 100; ZO 100. Fee, \$4.00. Three lectures, 4 hours laboratory or field trips. One week-end field trip. Credit, 4 hours.

440g *Animal Cytology*. Structure, differentiation, and functions of cells. Prerequisite: ZO 100. Fee, \$4.00. Two lectures, 4 hours laboratory. Credit, 3 hours.

441g *Poisonous Animals of Arizona*. Form, activities, and identification of venomous animals of Arizona and others thought venomous. Prerequisite: ZO 100 or equivalent. Fee, \$4.00. Two lectures, 3 hours laboratory. Credit, 3 hours.

460g *Human Mechanisms*. Stressing the functions of the human body: muscle activity; metabolic processes and systems involved, coordination mechanisms; the life cycle. Prerequisites: CH 111; ZO 100 or equivalent. Fee, \$5.00. Three lectures, 3 hours laboratory. Credit, 4 hours.

470g *Animal Histology*. Microscopic anatomy of animal tissues and identification of tissues. Prerequisite: ZO 100. Fee, \$4.00. One lecture, 3 hours laboratory. Credit, 2 hours.

472g *Embryology*. Animal development from egg to the period of extra-uterine or extra-ovular existence, including invertebrates but with the most emphasis on vertebrates. Prerequisites: ZO 100 and ZO 271 or approval of instructor. Fee, \$6.00. Three lectures, 4 hours laboratory. Credit, 4 hours.

475g *Wildlife Biology*. Principles and basic techniques. Prerequisites: ZO 274 and 275 or approval of instructor. Fee, \$4.00. Two lectures, 3 hours laboratory or field trip. Credit, 3 hours.

550 *Invertebrate Zoology*. Prerequisites: Twelve hours of biology and approval of instructor. Fee, \$6.00. One lecture, 6 hours laboratory. One week-end field trip. Credit, 3 hours.

560 *Experimental Mammalian Physiology*. Directed experiments to develop skill in the use of physiological equipment and in the handling of animals followed by an independent study project. Prerequisite: Approval of instructor. Fee, \$6.00. Six hours laboratory. Credit, 2 hours.

561 *Comparative Physiology*. Comparative analysis of the general physiological processes of the different animal groups. Prerequisites: One course in physiology; 1 year of chemistry. Physics and organic chemistry recommended. Fee, \$7.00. Two lectures, 6 hours laboratory. Credit, 4 hours.

570 *Systematics and Evolution*. Principles and theories of evolution; methods and principles of systematic zoology. Prerequisites: Twelve hours of biology including BI 340. Credit, 2 hours.

Statistics

Summary of Registration 1956-57

On Campus Students—Regular Session

	Freshmen	Sophomores	Juniors	Seniors	Graduates	Total	
Men	2011	937	868	705	679	5200	
Women	921	433	389	322	480	2545	
Total	2932	1370	1257	1027	1159		7745

Extension Division

Residence Center Students—Regular Session

Men	885
Women	791
Total	1676

Correspondence

Men	78
Women	135
Total	213

Summer Session 1956

Men	1919
Women	1691
Total	3610

Extension Division

Residence Center Students—Summer Session 1956

Men	91
Women	5
Total	96

Total Registration in College

Men	8173
Women	5167
Total	13340

Training Schools

Boys	145
Girls	147
Total	292

GRAND TOTAL.....13632

Summary of Registration 1957-58

On Campus Students—Regular Session

	Freshmen	Sophomores	Juniors	Seniors	Graduates	Total	
Men	2138	1205	1207	934	1122	6606	
Women	1138	530	465	396	539	3071	
Total	3276	1735	1675	1330	1661		9677

Extension Division

Residence Center Students—Regular Session

Men	711
Women	779
Total	1490

Correspondence

Men	126
Women	179
Total	305

Summer Session 1957

Men	1865
Women	2032
Total	3897

Extension Division

Residence Center Students—Summer Session 1957

Men	74
Women	4
Total	78

Total Registration in College

Men	9382
Women	6065
Total	15447

Training Schools

Boys	125
Girls	127
Total	252

GRAND TOTAL 15699

Summary of Graduates 1956-57

Total Graduates Through May 29, 1956.....13530

One, Two, and Three Year Diplomas:

(Discontinued Commencement 1936).....3522

Earned Degrees:

Bachelors

Bachelor of Arts..... 401

Bachelor of Science.....2463

Bachelor of Arts in Education.....5660

Total 8524

Masters

Master of Arts in Education.....1471

Total 1471

Doctors

Doctor of Education..... 4

Total 4

Total Through May, 1956..... 9999

Honorary Degrees:

Master of Arts in Education..... 2

Doctor of Laws..... 5

Doctor of Literature..... 1

Doctor of Science..... 1

Total 9

Total Degrees Granted Through May 29, 1956.....10008

Earned Degrees Granted May 28, 1957

Bachelors

Bachelor of Arts..... 69

Bachelor of Science..... 365

Bachelor of Arts in Education..... 381

Total 815

Masters

Master of Arts in Education..... 238

Total 238

Doctors

Doctor of Education..... 3

Total 3

Total May, 1957.....1056

Honorary Degrees:

Doctor of Laws..... 1

Doctor of Science..... 1

Total 2

Total Degrees Granted May 28, 1957..... 1058

Summary of Graduates 1957-58

Total Graduates Through May 28, 1957.....14588

One, Two, and Three Year Diplomas:

(Discontinued Commencement 1936) 3522

Earned Degrees:

Bachelors

Bachelor of Arts..... 470

Bachelor of Science.....2828

Bachelor of Arts in Education.....6041

Total 9339

Masters

Master of Arts in Education.....1709

Total 1709

Doctors

Doctor of Education..... 7

Total 7

Total Through May, 1957.....11055

Honorary Degrees:

Master of Arts in Education..... 2

Doctor of Laws..... 6

Doctor of Literature..... 1

Doctor of Science..... 2

Total 11

Total Degrees Granted Through May 28, 1957.....11066

Earned Degrees Granted May 27, 1958

Bachelors

Bachelor of Arts..... 107

Bachelor of Science..... 393

Bachelor of Arts in Education..... 402

Total 902

Masters

Master of Art..... 12

Master of Arts in Education..... 206

Master of Science..... 3

Total 221

Doctors	
Doctor of Education.....	2
Total	2
Total May, 1958.....	1128
Honorary Degrees:	
Doctor of Laws.....	2
Doctor of Science.....	1
Total	3
Total Degrees Granted May 27, 1958.....	1128
Total Graduates Through May 28, 1957.....	14588
One, Two, and Three Year Diplomas:	
(Discontinued Commencement 1936)	3522
Earned Degrees:	
Bachelors	
Bachelor of Arts.....	577
Bachelor of Science.....	3221
Bachelor of Arts in Education.....	6443
Total	10241
Masters	
Master of Arts.....	12
Master of Arts in Education.....	1915
Master of Science.....	3
Total	1930
Doctors	
Doctor of Education.....	9
Total	9
Total Through May, 1958.....	12180
Honorary Degrees:	
Master of Arts in Education.....	2
Doctor of Laws.....	8
Doctor of Literature.....	1
Doctor of Science.....	3
Total	14
Total Degrees Granted Through May 27, 1958.....	12194

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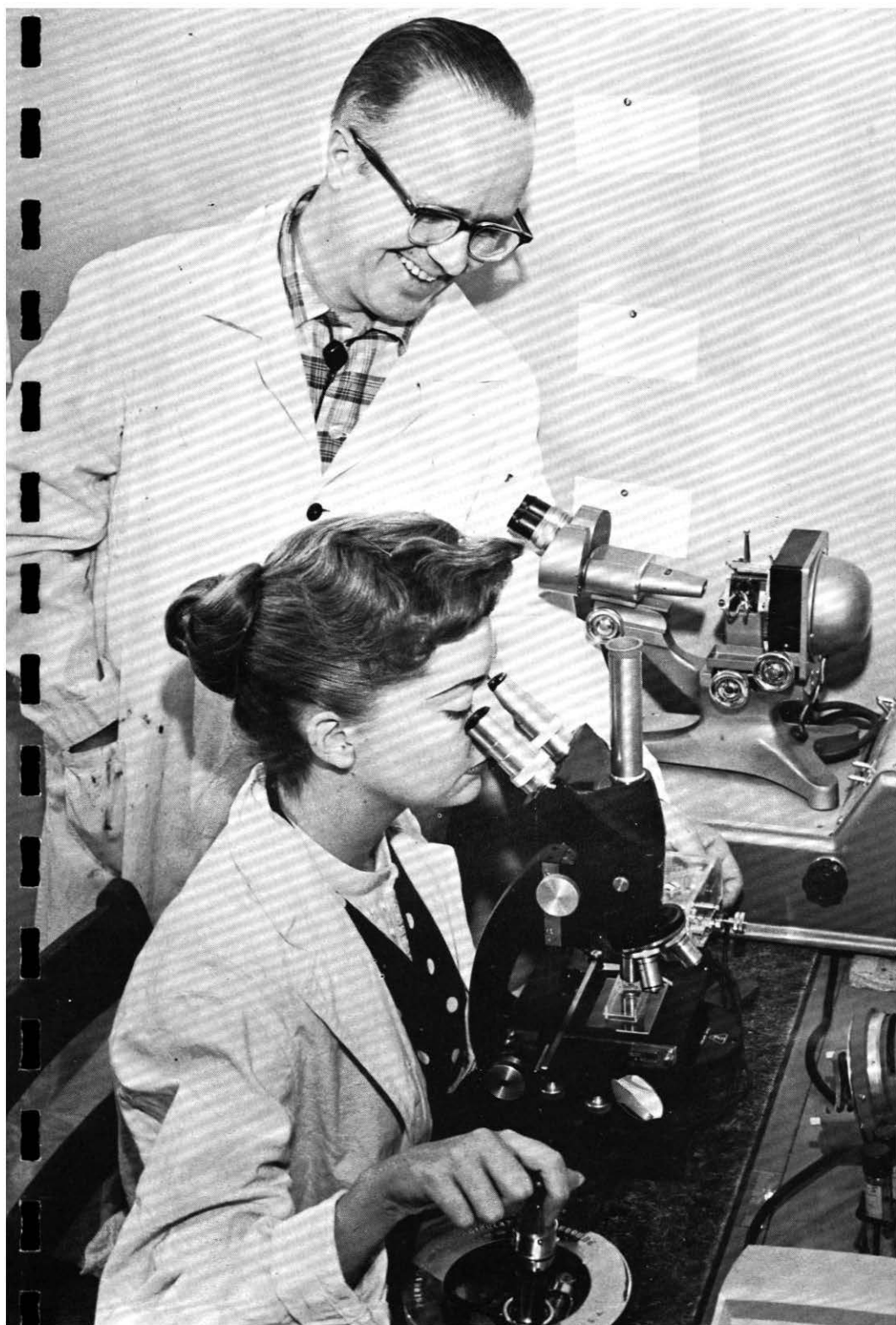
Palo Verde is a four-wing women's residence hall accommodating 600 women. Co-eds at Palo Verde enjoy a spacious, grass patio, a luxurious central lounge, and their own cafeteria within the hall.



The new men's gymnasium, which provides indoor seating for 6,000 people, also houses physical education training equipment, offices, and offices of the ROTC. The swimming pool is located to the left of this picture.

The three-story classroom wing of the new multi-unit Engineering Center is pictured above. Construction included the use of the lift-slab technique. Inner walls are of unfinished block and concrete.





Under the watchful and amused eye of her instructor, an ASU co-ed takes a first look through a modern binocular microscope. Up-to-date equipment is constantly being acquired to provide students with modern facilities.



West Hall, one of the older, classically-styled women's residence halls, is located near mid-campus. West, like all residence halls, preserves and fosters many gracious traditions.

Matthews Library, now utilizing seven stacks, also provides spacious reading rooms. In addition to furnishing all library services, this building houses an extensive curriculum laboratory and the notable Collection of American Art.





Military polish at its best comes to the front during inspection on ROTC parade days. Students may elect to continue through advanced ROTC training leading to direct commissions in the Army and Air Force.



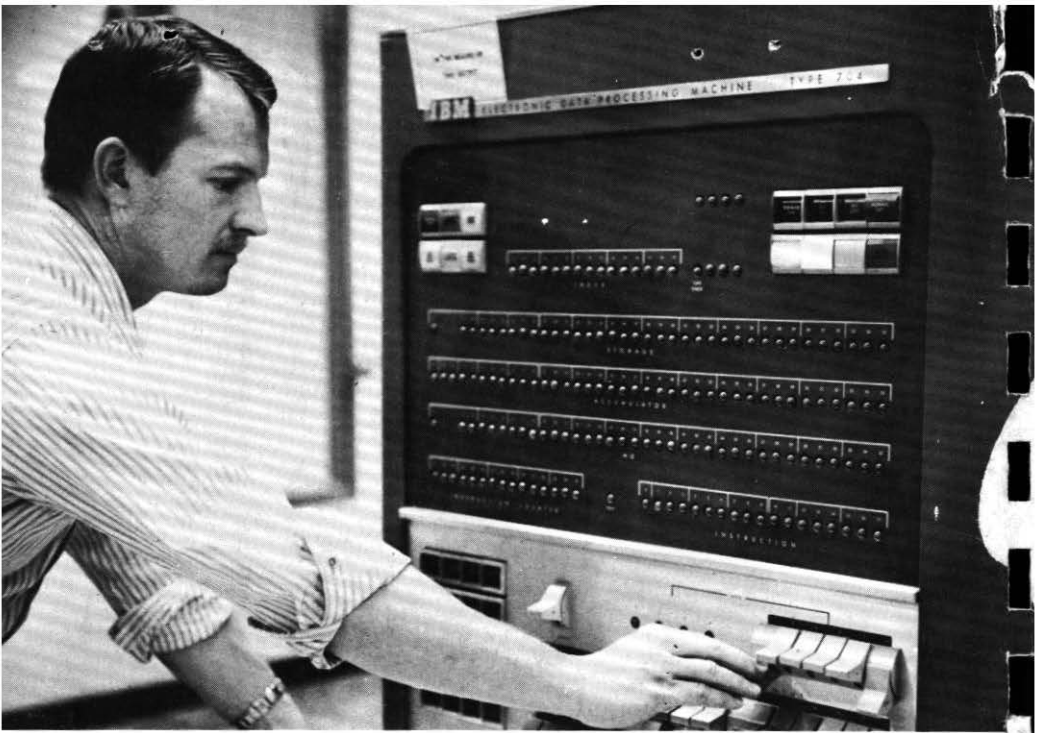
Three co-eds complement this view of the Olympic-size ASU swimming pool. The pool is open year round for both recreation and instruction, and is adjacent to the new men's gymnasium.

The new ASU Life Sciences Center, a three-story unit containing classrooms and laboratories designed specifically for biological research and study, is identified by symbolic living forms on the front panel.





The training school and the nursery school, both located on the campus, give students enrolled in the College of Education actual practice in working with real live—and unquestionably lively—little people.



The operator above is making an adjustment at the central control panel of the "giant brain," the electronic computer located in a wing of the new Engineering Center. The computer is used for processing industrial problems as well as a teaching aid.

In maroon and gold uniforms, the fast-stepping Sun Devil Band plays the ASU Fight Song through the streets of Disneyland. Tours are a part of the annual band program, which includes many public performances at football games and in concert.

