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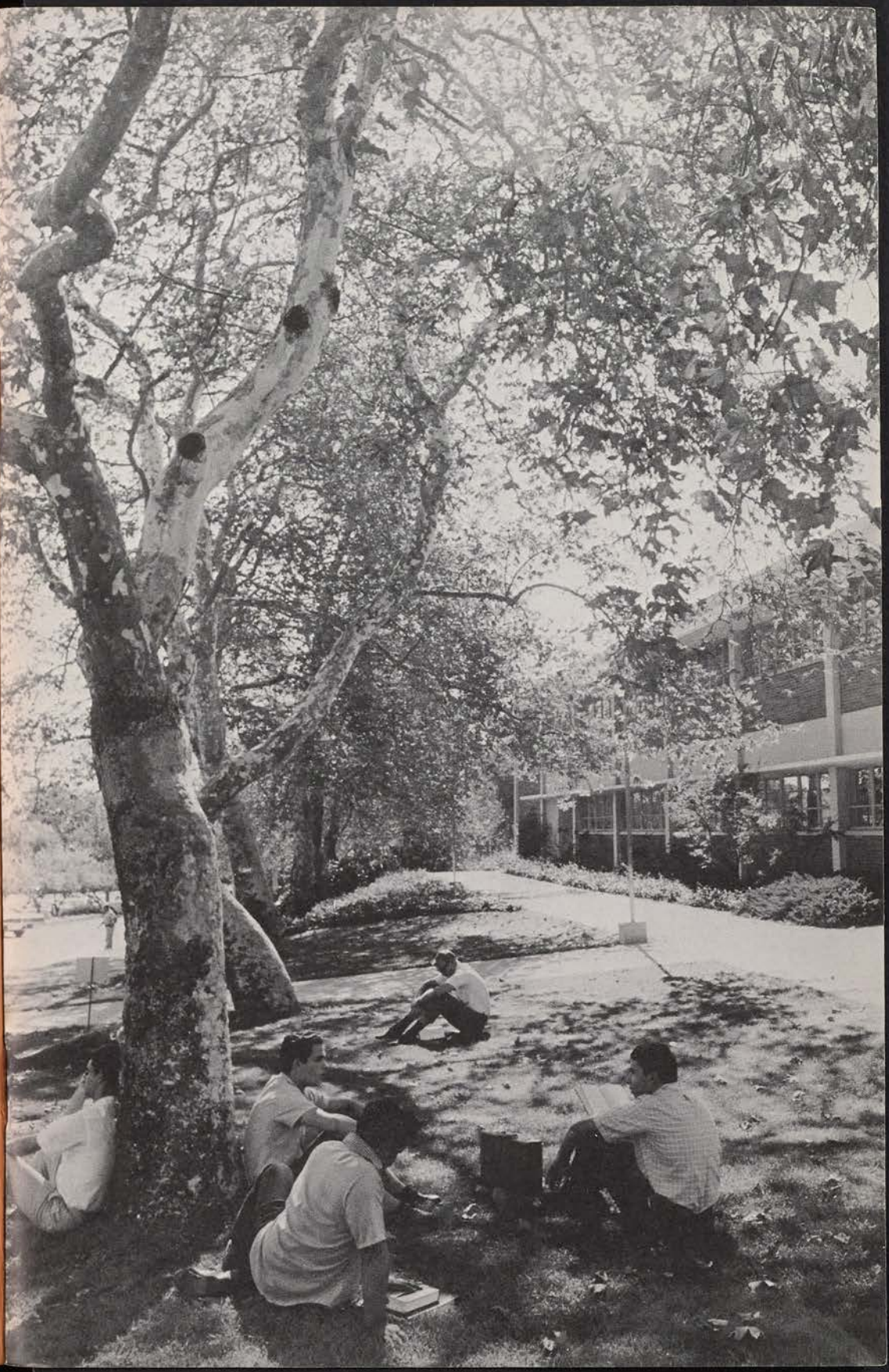
CALIFORNIA STATE
POLYTECHNIC COLLEGE
Kellogg-Voorhis · Pomona

GRADUATE BULLETIN
1971-72



CALIFORNIA STATE
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1971-72

COVER DESIGN BY YORAM MAKOW

FOREWORD

The Graduate Bulletin is published to provide information to prospective and continuing graduate students. It serves as a handbook to students working toward master's degrees and credentials and contains all information essential to enrollment in the college for graduate study and progress toward post-graduate objectives available at the college. Included are descriptions of programs leading to master's degrees authorized by the Trustees of the California State Colleges and to credentials authorized by the Trustees and the California State Board of Education.

The reader who seeks further information or assistance regarding master's degrees or teaching credentials is invited to visit the Office of the Graduate Division, Administration 221, the Teacher Preparation Center, Administration 211, or the appropriate departmental or school office.

For general information about the college, descriptions of undergraduate curricula and courses, and information regarding facilities and special programs, see the college catalog which may be purchased from the bookstore for $1.40.

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September 13 ..... Beginning of quarter for faculty
September 20 ..... Classes begin for all students
September 24 ..... Last day to add classes
October 4 ..... Last day to withdraw from classes without penalty
October 11 ..... Columbus Day—Academic Holiday
October 15 ..... Last day to apply for fall quarter graduation
October 25 ..... Veteran's Day—Academic Holiday

JULY

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AUGUST

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SEPTEMBER

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OCTOBER

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31						

November 1–30.....System-wide initial application period for fall quarter 1972
November 4.....Current student deadline for winter quarter scheduling
November 19.....Last day to apply for admission to winter quarter
November 24.....Last day to submit approved master's thesis or project
Last day for notification of completion of comprehensive examination
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January 3–29 .....System-wide initial application period for summer quarter 1972
January 3 .....Classes begin for all students
January 7 .....Last day to add classes
January 17 .....Last day to withdraw from classes without penalty
January 21 .....Last day to apply for winter quarter graduation
February 18 .....Deadline to apply for admission to spring quarter
February 21 .....Washington's Birthday—Academic Holiday
February 24 .....Current student deadline for spring quarter scheduling

NOVEMBER

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DECEMBER

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JANUARY

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March 6.....Last day to submit approved master's thesis or project
Last day for notification of completion of comprehensive examination
March 14–18.....Final examinations

SPRING QUARTER, 1972

March 27.....Classes begin for all students
March 31.....Last day to add classes
April 10.....Last day to withdraw from classes without penalty
April 14.....Last day to apply for June commencement
April 27.....Current student deadline for summer quarter scheduling
May 12.....Deadline to apply for admission to summer quarter
May 18.....Current student deadline for fall quarter scheduling
May 26.....Last day to submit approved master's thesis or project
Last day for notification of completion of comprehensive examination
May 29.....Memorial Day—Academic Holiday
June 6–9.....Final examinations
June 10.....Commencement—End of college year

SUMMER 1972

Information regarding summer offerings may be obtained from the Admissions Office.

MARCH

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MAY

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JUNE

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THE CALIFORNIA STATE COLLEGES

Glenn S. Dumke, *Chancellor*

The 19 campuses of the California State Colleges, spanning the state from Humboldt County in the north to San Diego in the south, represent the largest system of public higher education in the Western Hemisphere and one of the largest in the world. Current enrollment exceeds 212,000 full-time and part-time students. The faculty and administrative staff number approximately 10,000.

Each college in this system, with a geographic and curricular character of its own, offers a basic program in the liberal arts. Course offerings leading to the bachelor's and master's degree and a limited number of joint doctoral degrees are designed to satisfy existing student interests while serving the educational and professional requirements of the state.

The California State Colleges are dedicated to rigorous academic standards. The primary faculty responsibility is the instructional process, with recognition of the necessary role of research in institutions of higher education.

Responsibility for the California State Colleges is vested in the Board of Trustees, appointed by the Governor, and its administrative officer, the Chancellor. The Trustees and the Chancellor set broad policy for the colleges while delegating responsibility for implementation to the colleges. A statewide Academic Senate, made up of representatives elected by the faculty at each college, recommends academic policy to the Board of Trustees through the Chancellor.

While the oldest of the colleges, San Jose State College, was founded over a century ago, the California State Colleges system under an independent Board of Trustees was created by the Donahoe Act of 1960.

The California State Colleges are now in a dynamic period of development. Prior to World War II there were seven State Colleges with a peak total enrollment of 13,000. Since 1947, 12 new colleges have been established and sites have been selected for new campuses in Ventura, San Mateo and Contra Costa counties. Enrollment in the system is expected to reach 300,000 by 1980.

Trustees of the California State Colleges: 1970–71

EX OFFICIO TRUSTEES

HON. RONALD REAGAN
Governor of California
President of the Trustees
State Capitol, Sacramento 95814

HON. ED REINECKE
Lieutenant Governor of California
State Capitol, Sacramento 95814

HON. BOB MORETTI
Speaker of the Assembly
State Capitol, Sacramento 95814

HON. WILSON C. RILES
Superintendent of Public Instruction
721 Capitol Mall, Sacramento 95814

DR. GLENN S. DUMKE
Chancellor, California State Colleges
5670 Wilshire Boulevard, Los Angeles 90036

APPOINTED TRUSTEES

Appointments are for a term of eight years expiring March 1 on the years in parentheses. Names are listed in order of accession to the Board.

CHARLES LUCKMAN (1974)
9220 Sunset Boulevard
Los Angeles 90069

THEODORE MERIAM (1971)
P.O. Box 370
Chico 95926

ALBERT J. RUFFO (1971)
675 North First Street, Suite 1200
San Jose 95112

MRS. PHILIP CONLEY (1972)
3729 Huntington Boulevard
Fresno 93702

E. GUY WARREN (1973)
P.O. Box 59
Hayward 94541

DANIEL H. RIDDER (1975)
604 Pine Ave.
Long Beach 90801

GEORGE D. HART (1975)
111 Sutter Street
San Francisco 94104

ALEC L. CORY (1973)
530 B Street, Suite 1900
San Diego 92101

WILLIAM A. NORRIS (1972)
609 South Grand Ave.
Los Angeles 90017

EDWARD O. LEE (1974)
P.O. Box 23361
Oakland 94623

DUDLEY SWIM (1976)
Route 2, Box 5000
Carmel Valley Road
Carmel 93921

KARL L. WENTE (1976)
5565 Tesla Road
Livermore 94550

W. O. WEISSICH (1977)
1299 4th Street
San Rafael 94901

ROBERT A. HORNBY (1978)
P.O. Box 60043, Terminal Annex
Los Angeles 90060

PHILLIP V. SANCHEZ (1978)
1015 East Alluvial Street
Fresno 93726

OFFICERS OF THE TRUSTEES

President
Governor Ronald Reagan

Chairman
E. Guy Warren

Vice-Chairman
Alec L. Cory

Secretary-Treasurer
Chancellor Glenn S. Dumke

OFFICE OF THE CHANCELLOR

THE CALIFORNIA STATE COLLEGES

5670 Wilshire Boulevard, Los Angeles 90036
213 938-2981

Chancellor
Glenn S. Dumke

Executive Vice Chancellor
Harry E. Brakebill

Vice Chancellor, Academic Affairs
William B. Langsdorf

Vice Chancellor, Business Affairs
D. Dale Hanner

Assistant Chancellor, Faculty and Staff Affairs
C. Mansel Keene

Vice Chancellor and General Counsel
Norman Epstein

Vice Chancellor, Physical Planning and Development
Harry Harmon

THE CALIFORNIA STATE COLLEGES

California State College, Bakersfield
9001 Stockdale Highway
Bakersfield, California 93309
Paul F. Romberg, *President*
805 327-9101

California State College, Dominguez Hills
1000 East Victoria Street
Dominguez Hills, California 90247
Leo F.Cain, *President*
213 532-4300

California State College at Fullerton
800 North State College Boulevard
Fullerton, California 92631
L. Donald Shields, *Acting President*
714 870-2011

California State College at Hayward
25800 Hillary Street
Hayward, California 94542
Ellis E. McCune, *President*
415 538-8000

California State College at Long Beach
6101 East Seventh Street
Long Beach, California 90804
Stephen Horn, *President*
213 433-0951

California State College at Los Angeles
5151 State College Drive
Los Angeles, California 90032
John A. Greenlee, *President*
213 224-0111

California State College at San Bernardino
5500 State College Parkway
San Bernardino, California 92407
John M. Pfau, *President*
714 887-6311

California State Polytechnic College, Kellogg-Voorhis
3801 West Temple Avenue
Pomona, California 91768
Robert C. Kramer, *President*
213 964-6424 714 595-1241

California State Polytechnic College, San Luis Obispo
San Luis Obispo, California 93401
Robert E. Kennedy, *President*
805 546-0111

Chico State College
First and Normal Streets
Chico, California 95926
Stanford Tazier, *President*
916 345-5011

Fresno State College
Shaw and Cedar Avenues
Fresno, California 93726
Norman A. Baxter, *President*
209 487-9011

Humboldt State College
Arcata, California 95521
Cornelius H. Siemens, *President*
707 826-3011

Sacramento State Collge
6000 Jay Street
Sacramento, California 95819
Bernard L. Hyink, *President*
916 454-6011

San Diego State College
5402 College Avenue
San Diego, California 92115
Malcolm A. Love, *President*
714 286-5000

San Fernando Valley State College
18111 Nordhoff Street
Northridge, California 91324
James W. Cleary, *President*
213 349-1200

San Francisco State College
1600 Holloway Avenue
San Francisco, California 94132
S. I. Hayakawa, *President*
415 469-9123

San Jose State College
125 South Seventh Street
San Jose, California 95114
John H. Bunzel, *President*
408 294-6414

Sonoma State College
1801 East Cotati Avenue
Rohnert Park (Cotati), California 94928
Thomas H. McGrath, *President*
707 795-2011

Stanislaus State College
800 Monte Vista Avenue
Turlock, California 95380
Carl Gatlin, *President*
209 634-9101

CALIFORNIA STATE POLYTECHNIC COLLEGE, KELLOGG-VOORHIS, POMONA

Robert C. Kramer, *President*

In historical development, methods of education, and dedication to professional and occupationally-centered curricula the California State Polytechnic College, Kellogg-Voorhis, has a distinctive identity among colleges in California.

As one of the 19 colleges in the state college system, it offers educational programs in agriculture, arts, business, engineering, environmental design, science and the preparation of elementary and secondary teachers.

Cal Poly's graduate programs continue the college's emphasis upon instruction which is specific and practical. Faculty members are selected on the basis of academic qualifications, professional experience, and teaching ability. Graduate instruction emphasizes individualized programming, independent study, and searching and deep analysis of significant problems. Beyond practical application, graudate students exhibit a high level of scholarship and critical insight.

HISTORICAL DEVELOPMENT

The college was established in 1901 at San Luis Obispo. The Cal Poly program was extended to Southern California in 1938, when the 157-acre Voorhis School for Boys near San Dimas was deeded to the state by Charles B. Voorhis of Pasadena, and his son, former Congressman Jerry Voorhis.

The Kellogg campus, originally founded by W. K. Kellogg as an Arabian Horse Ranch in 1925, was given to the State of California in 1949 for use by California State Polytechnic College. Academic instruction began on the 813-acre campus in 1956.

Since 1956, the educational program at the Kellogg campus has grown from six academic majors with an enrollment of 550 men, to 47 academic programs and an enrollment of over 10,000 men and women. The number of degrees granted increased from 54 in June, 1957, to over 1,500 in June, 1970, when the first master's degrees were granted.

From his appointment as president of California State Polytechnic School in 1933 until his retirement in 1966, the late Dr. Julian A. McPhee was chief administrator of the San Luis Obispo and Kellogg-Voorhis campuses of California State Polytechnic College. In October, 1966, the Trustees of the California State Colleges formally established California State Polytechnic College, Kellogg-Voorhis as a separate state college. They named Dr. Robert C. Kramer president of the college.

Further development of curricula and facilities as provided by the Legislature and the Trustees of the California State Colleges will insure the continuation of a valuable and distinctive polytechnic education for California's citizens.

ACCREDITATION

The college is accredited as a degree-granting institution by the Western Association of Schools and Colleges and is authorized by the California State Board of Education to recommend candidates for California Teacher Credentials, both ele-

mentary and secondary specializations, in a number of subject areas.

The School of Engineering is accredited by the Engineers' Council for Professional Development for its baccalaureate programs in Aerospace Engineering, Civil Engineering, Electrical and Electronics Engineering, and Mechanical Engineering.

The School of Environmental Design is accredited by the American Society of Landscape Architects for its program in Landscape Architecture and recognized by the American Institute of Planners for its program in Urban Planning.

The School of Science is accredited by the American Chemical Society for its program in Chemistry.

CAMPUS SITE

Located south of the San Bernardino Freeway on the eastern slope of Kellogg Hill at the western edge of Pomona, the campus is one of the largest in the state college system. The buildings represent a careful blending of the tile-roofed Spanish ranch structures built by W. K. Kellogg and the modern laboratory and classroom buildings of concrete and red brick. Campus development has preserved the beauty of the ranch and its original plantings. The combination of agricultural crops and livestock areas with science, engineering, and liberal arts facilities provides for the full range of instruction at Cal Poly, Pomona.

Now nearing completion at the northeast corner of the campus is a multi-level interchange for the San Bernardino, Corona, and Orange freeways. When completed in 1972, the interchange will make the campus only a few minutes from the Pomona and Foothill Freeways. The college is easily accessible from downtown Los Angeles and San Bernardino as well as numerous other communities in Orange, Los Angeles, Riverside, and San Bernardino Counties.

ADMINISTRATIVE OFFICERS OF THE COLLEGE

President
Robert C. Kramer

Vice President for Academic Affairs
Hugh O. LaBounty, Jr.

Administrative Vice President
Richard M. Swenson

Director of Business Affairs
Cecil W. Jones

Dean of Academic Planning
Kenneth H. Anderson

Dean of Graduate Studies
Robert L. Maurer

Dean of Undergraduate Studies
Don W. Schafroth

Dean of Continuing Education
John B. O'Hara

Director of Educational Services
Douglas C. Dowell

Director of the College Library
Harold F. Wells

Acting Dean, School of Agriculture
Ramiro C. Dutra

Dean, School of Arts
Albert J. Aschenbrenner

Acting Dean, School of Business Administration
William E. Fox

Dean, School of Engineering
B. J. Shell

Dean, School of Environmental Design
William R. Dale

Dean, School of Science
Vincent E. Parker

Director of the Teacher Preparation Center
Rodman F. Garrity

Executive Dean, Planning
Robert G. Bonde

Dean of Students
Henry House

The Graduate Council

Robert L. Maurer
Dean of Graduate Studies, *Chairman*

V. Barney Anooshian
School of Arts

David E. Bess
School of Environmental Design

Charles E. Bowen
School of Science

Homer D. Fausch
Director of Research, *ex-officio*

Rodman F. Garrity
Director of Teacher Preparation Center,
ex-officio

Sherman W. Griselle
School of Environmental Design

Richard J. Hermsen
School of Engineering

Eugene K. Keating
School of Agriculture

Russell F. McDonald
School of Agriculture

Joseph W. McKinley
School of Engineering

James C. Petersen
School of Business

Raymond Riznyk
School of Science

Floyd H. Ross
School of Arts

Stanley Taylor
School of Arts, *Secretary*

Warren C. Weber
School of Business

Harold F. Wells
Director of College Library, *ex-officio*

ADMISSION, REGISTRATION, AND CREDIT

Requirements for admission to California State Polytechnic College, Kellogg-Voorhis are in accordance with Title 5, *California Administrative Code,* Chapter 5, Subchapter 2, as amended by the Board of Trustees of the California State Colleges on November 24, 1970. A prospective applicant who is unsure of his status under these requirements is encouraged to consult with the Graduate Studies Office or the Admissions Office at this college.

Admission as a Graduate Student

In order to register for graduate study at the college, an applicant must file complete application forms and be accepted by the Office of Admissions and Records as a student. In addition, two sets of official transcripts must be *received* by the college no later than two weeks preceding the last day for payment of fees. Applications for fall quarter admission are accepted the preceding November 1 and until program quotas are filled or until August 10, whichever is earlier. The opening of application periods for other quarters is indicated in the calendar.

Applicants must request the registrars of all colleges or universities attended to forward official transcripts to the Office of Admissions and Records. Official transcripts will not be accepted from the applicant. The student should carry his own copies of his transcripts to show to the department faculty when requesting advice concerning either an advanced degree or a credential.

Admission to the college with graduate-standing does not constitute admission to a graduate degree or credential program.

A student may be admitted as either a classified or an unclassified graduate student. To become a candidate for a master's degree or a college recommended credential, a student must achieve classified status.

An applicant's objective is the particular graduate program he wishes to enter and within that program the particular concentration or emphasis, if any, he wishes to pursue. An applicant declares his objective by filling in the appropriate space on the application form when applying for admission to the college. Graduate objectives include the following: (a) master's degree (by major); (b) credential only; (c) master's degree and credential; (d) neither degree nor credential.

ADMISSION TO UNCLASSIFIED STANDING

For admission as an unclassified graduate student, an applicant must hold an acceptable baccalaureate degree from an accredited institution, and must meet the academic and other standards specified by the college at the time of application.[1]

Graduate students admitted to the college who are not presently qualified for or do not wish to pursue programs leading to master's degrees or credentials to be awarded through this institution will be placed in unclassified status. While in this status, they will be restricted from enrolling in certain courses for which attainment of classified status is a prerequisite.

[1] *California Administrative Code,* Title 5, Education, Section 41000.

LIMITATIONS ON ADMISSIONS

The admission of graduate students with no degree or credential objective may be limited or suspended because of facility or staff availability. Each master's degree or credential program will also be limited in enrollment whenever the availability of facilities and/or staff warrants.

ADMISSION TO CLASSIFIED STANDING

Classified standing is awarded to an applicant for admission to a degree program who meets the criteria for admission specified in the departmental section of this Bulletin. An applicant admitted to a degree program in unclassified status is in probationary standing and will be expected to qualify for classification at the end of the second quarter of attendance or the completion of 12 units of credit, whichever occurs first. An unclassified degree student who does not meet this requirement may be dropped from graduate standing in the college.

In departments or programs with limited enrollments due to lack of staff or facilities admission may be limited partly or entirely to applicants who qualify for classified standing.

ADMISSION OF CONTINUING BACCALAUREATE STUDENTS

A student who holds a baccalaureate degree from this college and plans to continue as a graduate student need not apply for admission to the college. Completion of an application for change to graduate status at the Office of Admissions and Records is required. This should be done during the final quarter of the senior year. A continuing student who fails to carry out this procedure will be continued on the rolls as an undergraduate student, and he may thus hamper his progress in a graduate program. The necessary transcripts will generally be on file at the college, but it is the student's responsibility to be sure he has met requirements for admission to graduate standing. Continuing students must meet departmental criteria for classified standing and are subject to the same enrollment quotas as are new applicants.

ADMISSION OF FORMER STUDENTS

A student previously enrolled in the college planning to return after an absence of more than one quarter must file a new application for admission. If the absence was for one year or less and if the student did not attend another institution during that time, no application fee will be charged. If the absence was only for one quarter and if the student did not attend another institution during that quarter, admission to graduate status may be accomplished by completing an application for change to graduate status.

ADMISSION FROM NONACCREDITED SCHOOLS

A student who is a graduate of a nonaccredited school who gives evidence of unusual promise and superior background may petition the department concerned for unclassified graduate student status, and if the petition is granted, he may then proceed in the graduate program.

ADMISSION OF FOREIGN STUDENTS

A student from a foreign country should contact the Office of the Graduate Division to determine the special college regulations which apply for admission to graduate status. Students whose native language is not English must submit the results of the

Test of English as a Foreign Language (TOEFL) prior to consideration for admission. Foreign nationals who are not graduates of the college will be accepted as graduate students only if they are in the United States of America with a J-1 (student visitor) visa. The admission of foreign students to graduate status may be limited or suspended due to facility or staff availability.

TEST REQUIREMENTS

Most departments require new graduate students enrolling at this college with a degree objective to take the Aptitude Test of the Graduate Record Examination before or during the first quarter of residence. In some cases, admission will depend upon test scores.

The Admission Test for Graduate Study in Business is required of those who seek the Master of Business Administration and Master of Science in Business Administration degrees. Some departments of the college also require the Advanced Test of the Graduate Record Examination in their subject matter areas. Other departments require a locally developed qualification examination. See the respective departmental sections of this Bulletin and the chart below.

Foreign students must take English proficiency examinations in addition to the Aptitude Test of the Graduate Record Examination. Information concerning the Test of English as a Foreign Language may be obtained from the Counseling Center. No foreign students are excused from departmental requirements for advanced tests or other qualifying examinations.

REQUIRED ADMISSION TESTS

Program	GRE Aptitude	GRE Advanced	ATGSB	Foreign Language	TOEFL (Foreign Applicants)
M Arch					X
MS in Bio. Sci.	X	X			X
MBA			X		X
MS in Bus. Adm.			X		X
MS in Chemistry				German [1]	X
MS in Economics	X	X			X
MA in Education	X	X			X
MLA	X				X
MS in Phys. Ed.	X				X
MUP	X [2]				X

[1] Before advancement to candidacy.
[2] Under 3.0 undergraduate GPA.

Fees and Expenses

Tuition is not charged to legal residents of California; however, fees for various materials, activities, and services are charged. Tuition is payable by nonresidents and foreign-visa students in addition to fees required of other students. *All fees are subject to change by the trustees of the California State Colleges*

SERVICE FEE AND TUITION

Residents of California
- Material and Service fee, per quarter
  - 0- 3.9 units $26.50
  - 4- 7.9 units 30.00
  - 8-11.9 units 33.00
  - 12 or more units 39.00

Nonresidents
- In addition to Material and Service fee
  - Tuition (15 or more units) per quarter 370.00
  - Tuition (less than 15 units) per unit per quarter 25.00

Foreign-Visa Students as Prescribed by Regulations
- In addition to Material and Service fee
  - Tuition (15 or more units) per quarter 370.00
  - Tuition (less than 15 units) per unit per quarter 25.00

MISCELLANEOUS FEES

Application to college charged of all applicants—
- payable by check or money order at time of applying—*nonrefundable* 20.00

Change of program 1.00
Check returned for any cause 2.00
Conference, short course or institute, per person ..... Estimated Cost
Course credit by special examination (per unit) 1.00
Failure to meet administratively required appointment or time limit 2.00
Graduation for master's degree candidates (not a state fee) 12.00
Late registration 5.00
Library ..... See schedule in library
Transcript of record (no charge for first copy) 1.00
Parking fee
- Nonreserved spaces (per quarter):
  - Each student enrolled for more than six units 9.00
  - Each student enrolled for six units or less 4.00
  - Each alternate car in addition to fee for first vehicle 1.00
- Special groups, per week 1.00

Associated Students, Inc., membership (not a state fee):
- Fall quarter 10.00
- Winter, spring and summer quarters, each 5.00

College Union (not a state fee):
- Summer quarter 3.00
- Fall quarter 8.00
- Winter, Spring quarter each 6.00

REFUNDS

Any student who withdraws from college may be entitled to a refund of a portion of registration fees paid. A student must file an application for a refund with the Records Office at the time of withdrawal to be eligible for a refund.

Residence Halls

Each of the six air-conditioned residence halls on the campus accommodates about 200 students in comfortable double rooms. Recreation and lounge facilities are provided for each hall, as are convenient laundry facilities, refreshment vending machines, kitchenettes, and ironing and study rooms. Student rooms are furnished with beds, dressers, wardrobes, bookcases, desks and chairs, and residents are supplied with clean sheets weekly. Students supply their own pillows, blankets, towels, study lamps and room decorations. Dining facilities located in nearby Sycamore Canyon provide for outdoor or indoor dining. Breakfast, lunch and dinner are offered weekdays, with brunch and dinner on Saturday and Sunday. No meals are served on college holidays.

New students interested in on-campus housing should request a housing application at the time of application for admisson to the college. Contracts issued for the academic year provide for both room and board. Residence hall fees were $366 per quarter during the 1970–71 academic year. Payments may be made in periodic installments in accordance with the schedule available from the Housing Office.

Head resident positions are sometimes available to married graduate students who have no children. Interested applicants should communicate with the Housing Manager for information.

Registration Procedures

GENERAL PROCEDURES

A new student will receive a registration fee statement with his notice of admission. Registration fees must be received in the Accounting Office not later than the deadline date indicated on the fee statement. Classes will not be schedled until these fees are paid. A person applying or admitted late is not assured of admission to classes.

Instructions for registration of a continuing student are included in the class schedule issued prior to the opening of each quarter.

Credit for a course is given only when a student is properly registered in the college and successfully completes the course. An individual is not properly registered unless his completed registration forms listing the program approved by his adviser are on file in the Registrar's Office. A student may not be admitted to a course unless he is properly registered in the college.

Late registration may be permitted after classes begin upon payment of a $5.00 late fee, until the date noted in the academic calender.

Course Numbering System

Courses are grouped into number series indicating the college level at which they are presented. Graduate-level courses are numbered 500 through 699. These courses are open only to graduate students. Seniors who petition for graduate standing when within 12 units of reaching the bachelor's degree may take 500–599 courses. Otherwise, undergraduate students may not enroll in graduate courses.

100–299	Courses taught primarily in the freshman and sophomore years and generally introductory in nature.
300–399	Courses primarily for advanced undergraduate students, usually having prerequisites, but bearing no graduate degree

credit. (NOTE: Courses numbered 300–499 may be used for post-graduate credential credit.)

400–499 Courses for advanced undergraduates and graduate students. Each department will specify which of these courses may be applied to master's degrees.

500–599 Courses open only to graduate students or undergraduate students with graduate standing.

500–509 Professional education courses; degree credit only by petition.

510–699 Graduate degree credit courses.

600–699 Open only to classified graduate students.

900–999 Courses including specialized workshops, seminars and institutes designed to provide professional and occupational improvement.

Grading System

The college employs the following grading system:

A—Outstanding work, representing effective representation, unusual competence and high skill.

B—Excellent work, meeting full requirements for performance at the graduate level.

C—Meets minimum requirements of the course; acceptable for graduate credit.

D—Below minimum requirements for the course; not acceptable for graduate credit.

E—Incomplete W—Withdrawn, passing

F—Fail AU—Audit (no credit)

Pr—Progress; may be used to indicate satisfactory progress in thesis, project or directed study only. No units or grade points are assigned until completion, when the final grade and appropriate grade points will be assigned to all units for which the student has registered under that course number.

Grade points are assigned as follow:

A—4 points E—0 points

B—3 points F—0 points

C—2 points Pr—0 points

INCOMPLETE GRADES

When a student has been doing satisfactory work in a course, but for reasons judged appropriate by the professor has been permitted additional time to complete requirements, the professor will submit a grade of Incomplete and the symbol "E" will be entered on the student's permanent record. The grade Incomplete will be issued only if the student is doing work of "C" quality or better; otherwise, the grade of "F" will be assigned. In order to receive a final grade in the course, the student must complete the remaining requirements in the manner and by a date acceptable to the professor, but no later than the close of the next quarter in residence and in no case later than two quarters after the incomplete has been incurred. Graduate students are urged to avoid Incomplete grades if at all possible.

An Incomplete will not be counted in the grade point average for the quarter in which it was assigned. After the lapse of the one-quarter grace period, an "E" grade which has not been removed will be included in the grade point average. An Incomplete grade may be changed only by authorization of the professor on a change of grade form.

A student may not remove an Incomplete by re-enrolling in the course. In cases where repetition of the course is deemed

appropriate, the student will be assigned a withdrawal or failing grade rather than an "E" grade.

If a student subsequently completes a course which is recorded as Incomplete on a transcript from another institution, it is his responsibility to submit a corrected official transcript and advise the registrar that he wishes to receive credit.

GRADUATE COURSES TAKEN BY UNDERGRADUATES

A senior who is within 12 quarter units of qualifying for graduation with a baccalaureate degree may petition through his major department to use as many as nine quarter units of his senior year load as graduate credit provided the following conditions are met:

1. The student has completed his graduation check.
2. The adviser endorses the request.
3. The student agrees to enroll for no more than the maximum load of 16 units for the quarter in which this work is taken.
4. Neither the courses involved nor the credit for them is needed to complete requirements for the baccalaureate degree.

If approved, these credits will apply to graduate objectives, as appropriate, and will be recorded on the student's permanent record as graduate credit.

CREDIT BY EXAMINATION

A student may be permitted, at the discretion of his school dean, to obtain credit by examination for undergraduate courses in subject matter fields in which he is especially qualified through previous education or experience and for which credit has not otherwise been given. Units of credit received through this procedure may not apply toward the residence requirements for any of the degrees or credentials offered by the college. Such credit may not apply toward requirements for a master's degree, but it may be used to meet undergraduate prerequisite requirements for graduate courses. Detailed instructions for applying for credit by examination may be obtained from the Registrar's Office.

OTHER REGULATIONS

For other college regulations and additional detailed information related to admission, registration and credit, see appropriate sections of the current college catalog.

GRADUATE SCHOLASTIC REQUIREMENTS

Graduate Studies Program

STANDARDS OF GRADUATE STUDY

Graduate study deals with more complex ideas and demands more sophisticated techniques, searching analysis, creative thinking and more time than undergraduate study. The research required is extensive in both primary and secondary sources and a high quality of writing is expected.

A student seeking a graduate degree enjoys certain privileges not available to other students and is obligated to follow some procedures not required of those pursuing other objectives. Careful and prompt attention to required procedures should be followed in pursuing a master's degree program to prevent unnecessary confusion and delay. Although advisory services are provided to assist students, the student alone is responsible for following the procedures and completing the steps required in his program. Failure of an adviser to remind a student of a requirement or deadline date is not acceptable as a basis for waiver of the requirement. Requirements for advanced degrees, both procedural and substantive, may be waived only upon a written request of the student and/or committee concerned and approved by the Dean of Graduate Studies and by the academic school dean, if required by school policy. Petition forms are available in department offices and the Graduate Division Office.

A student who wishes to enroll in postgraduate courses before his transcripts or test scores have been transmitted to the department concerned may receive unofficial advisement by making an appointment with a graduate adviser at the appropriate department or school office. If the student brings his own copies of transcripts with him to the conference, his adviser can be specific in his suggestions, but the adviser can make no formal decisions on the basis of hand-carried transcripts.

The Dean of Graduate Studies maintains a progress file of records on each graduate student in his office and is available to assist graduate students with information or counsel. Specific program advising is always done by the department or school adviser.

REQUIREMENTS FOR MASTER'S DEGREES

Graduate programs are based upon adequate preparation at the undergraduate level. A student who plans to become a candidate for a master's degree must hold a bachelor's degree substantially equivalent to that of California State Polytechnic College, Kellogg-Voorhis in the discipline in which he intends to do his advanced work, or he must be prepared to undertake additional work to make up any deficiency.

A student seeking a master's degree at this college will present an acceptable thesis or project which will consist of the presentation of an appropriate topic or the projection of a design or other project related to the student's primary emphasis in graduate study. No later than the time the student applies for advancement to candidacy, he will consult with an adviser regarding a topic. Before the student is certified for the master's degree, he may be required to present a defense of his thesis in addition to meeting all other requirements prescribed in his approved program.

GENERAL REQUIREMENTS

The requirements for graduation depend upon the master's degree program undertaken and upon the major field. The following requirements apply to all master's degrees offered by the college.

1. The program for the one-year master's degree must consist of not less than 45 units in courses numbered 400 and above with a minimum of 24 units of 500 and 600 level courses completed at the college consistent with departmental requirements. Work unacceptable for graduate credit in the school where it was taken is not acceptable for graduate credit at this college. At least 27 units of work must be taken in the student's approved program after he has been advanced to candidacy for the degree.
2. At least 36 units of 400, 500 and 600 series offerings must be completed in residence at this college.
3. Two-year master's degrees have higher unit requirements than specified above. See detailed information in the appropriate sections in this Bulletin.
4. A candidate for the master's degree must earn a 3.0 (B) average in all graduate work taken at this college. No course with a grade lower than "C" may apply toward the fulfillment of degree requirements.
5. A 3.0 (B) average must be earned in all work in the student's approved degree program.
6. A thesis or project must be successfully completed and approved.
7. A favorable vote of the appropriate faculty is required before the degree may be conferred.
8. A graduate student who expects to receive a degree at the end of any quarter must complete an application for graduation in the Graduate Division Office prior to the deadline listed in the academic calendar. Graduates will not be permitted to participate in commencement ceremonies until all degree requirements have been met.

DEGREE REQUIREMENTS

Specific degree requirements and graduate course offerings currently available are outlined in departmental sections of this Bulletin. Each student seeking a graduate degree will be held responsible for meeting specific requirements applicable to the program of his choice and to fulfilling general master's degree requirements.

DEGREE PROGRAM

At the time a student is accorded classified standing in a master's degree curriculum, he should arrange with his adviser to prepare an official program. If he is admitted as a classified graduate student, he should accomplish this step as early in the first quarter of attendance as possible. A program must be prepared and submitted for approval no later than the date the student applies for advancement to candidacy.

Each department offering a master's degree has a distinctive form which is used to define the student's program. When the program has been approved, a copy is sent to the student and to the adviser who has approved it. The original is retained in the Graduate Office and is used as the official record of the student's progress toward the degree. It will be updated at least once a quarter, based upon official transcripts and documents. The student and his adviser will complete the form, listing all courses and other requirements which the student

must fulfill to receive the degree. The proposed program must meet the following specifications:

1. At least 45 quarter units of graduate work must be included in the graduate degree program. Of these, at least 24 units must be courses numbered 510–699. These requirements are appropriately modified for programs requiring more than 45 units.
2. The complete program may be chosen from within the offerings of the major department or it may include offerings drawn from other fields acceptable to the major adviser or committee. In developing the program, the student and adviser will seek to plan a meaningful pattern of courses focused upon the objectives of the major and the student. If the candidate has deficiencies or lacks prerequisites to enroll in certain courses necessary to his program, he will be expected to complete them in addition to the minimum requirements of his approved master's degree program. Advisers will permit the use of already completed courses in a master's degree program only if they clearly fit into the requirements of the student's curriculum.
3. No more than nine quarter units of credit for thesis or project may be included.

The master's degree program must be approved by the candidate's departmental graduate committee and by the Dean of Graduate Studies. The student and adviser receive copies of the approved program, which is an official agreement between the institution and the candidate.

ELECTION OF REGULATIONS

Regulations governing requirements for a master's degree become effective when classified graduate student status is achieved.

A graduate student remaining in continuous attendance after achieving classified status may elect to meet the degree requirements in effect either at the time of his classification or at the time he completes the last requirement for the degree, except that substitutions for discontinued courses may be authorized or required by the department offering the degree.

THESIS OR PROJECT

A student may register for course 695 (project) or 696 (thesis) only after he has been advanced to candidacy in a master's degree program. Before registration for thesis, the student must have conferred with his thesis adviser and the departmental graduate coordinator, if required, and have an officially appointed thesis committee and a tentative subject. Each student registering for thesis or project is required to register each succeeding regular quarter for a minimum of one unit until the work is complete; any candidate failing to do so will be considered as having dropped out of the degree program. When a student has failed to register in the approved manner after commencing a thesis or project, his readmission to the program will require departmental recommendation and approval of the Dean of Graduate Studies.

A thesis or project in the official master's degree program will carry not less than three nor more than nine units of credit depending upon departmental policy. When the thesis has been completed, the committee has signed the approval page and there has been library clearance of the thesis, the credit for course 696 will be recorded on the official transcript. Deadline dates for submission of the thesis to the Graduate Division Office can be found in

the academic calendar. Projects must be completed on the same time schedule but may have separate departmental rules for approval and submission.

The student must submit the approved original copy of the thesis to be deposited in the library. Arrangements for reproduction of additional required copies and for binding of all copies are made through the Graduate Division. Further information is contained in the thesis instructional manual available at the Graduate Division Office and in department offices.

FOREIGN LANGUAGE

A reading knowledge of a foreign language may be required by some departments. A student should consult his adviser or the section of this Bulletin in which requirements for his degree field are given.

TIME LIMIT

The graduate degree program of not less than 45 units must be completed within seven years from the time the first course which applies to the degree requirements is started. This seven-year time limit, at the option of the college, may be extended for students who pass a comprehensive examination in the entire subject field.

LEAVE OF ABSENCE

A classified graduate student may petition the Graduate Division for a leave of absence, and if the leave is approved he may upon his return continue under the requirements that applied to his enrollment prior to the absence. Except in the case of required military service, a leave of absence may be granted for a maximum of one year. Illness and compulsory military service are the only routinely approved reasons for leave of absence. Even though granted a leave of absence, a student must file an application for admission to the college in order to be readmitted when his leave terminates. A leave of absence may not extend the seven-year limit for completion of degree requirements.

ADVANCEMENT TO CANDIDACY

In order to progress toward the master's degree a classified graduate student must be advanced to candidacy for the degree. Requesting advancement to candidacy is the responsibility of the student. The following qualifications and procedure are necessary:

1. Scholarship—At the time the student applies for candidacy, his grade-point average for all degree program courses must be at least 3.0 (B). In addition, his grade-point average for all courses taken at this college subsequent to receipt of his bachelor's degree must be at least 3.0 (B). Courses numbered 399 and lower and courses completed more than seven years previous to application will not be included when computing this average. A student may not be advanced to candidacy before he has completed at least nine units of work, including at least one graduate level course, which are acceptable to the school and department in which the advanced degree is sought. Application should be made no later than the quarter in which a student completes 18 units of credit in his degree program or 40 percent of the required credit in a professional program.
2. The student should initiate an application for advancement to candidacy. Forms are available at the Graduate Division and in departmental offices.
3. Along with the completed request for candidacy, the student will submit an

official master's degree program form if one is not already on file in the Graduate Office. The student and his adviser will complete the form, listing all courses and other requirements which the student must fulfill to receive the degree.

4. At least 27 quarter units or 60 percent of the required units of graduate work must be taken after advancement to candidacy as part of the degree requirements. If more than 18 units or 40 percent have been completed at the time of advancement, the adviser will specify which units will be applied.
5. When action has been taken on a graduate student's application for advancement to candidacy, the student will receive a letter from the Dean of Graduate Studies informing him of the action. If the application is denied, the reasons for denial will be stated.

Academic Policies

SCHOLARSHIP REQUIREMENTS

All graduate students, classified or unclassified, may be disqualified from the college if their postgraduate grade point average on work completed at this college falls below 2.7 after completion of 12 or more quarter units or one quarter of attendance.

All classified graduate students, after completing a minimum of 12 quarter units in postgraduate status, must subsequently maintain a 3.0 grade point average in all work at this college. If a classified graduate student's grade point average falls below 3.0, he may be placed in unclassified graduate status.

MINIMUM GRADE POINT AVERAGE

If a graduate student completes his master's degree approved program with less than a 3.0 (B) average, the student's major department may (1) terminate his program, or (2) require him to take additional courses in an attempt to raise his program grade point average to the minimum 3.0. When the student's major department recommends that he be allowed to do the latter, the additional courses selected must:

1. Be at least two courses at the 510–699 level and total not less than six quarter units.
2. Apply directly to the student's master's degree objective, although they need not be drawn from offerings in the student's major department.
3. Be new courses (courses previously completed but not originally listed in the master's degree program may not be used).

If the student fails to earn the minimum 3.0 grade point average on completion of the revised master's degree program as outlined above, his program will be terminated without award of the master's degree.

Grades earned at another institution may not be used to offset grade point deficiencies in courses taken at this college.

REPETITION OF COURSES

A student who has received a grade of "F" in a graduate course (or a grade of "D" or "F" in an undergraduate course included in the degree program) may repeat the course and receive the grade assigned by the professor under whom the course is repeated. The extra units so earned may not be counted toward the degree, but such units will be counted in the total units attempted for computation of the student's overall grade point average.

MAXIMUM LOAD

The maximum load for graduate students is 16 units per quarter. Students who are employed full time should not exceed eight units per quarter. A graduate student holding a full assistantship may earn a maximum of 10 units each quarter he has the assignment. Proportionate class load reductions are made for other assignments and for outside employment.

CONCURRENT ENROLLMENT

A graduate student enrolled at the college may enroll concurrently for additional courses at another institution only with advance written approval from the student's academic adviser and the Graduate Division. Permission will not be granted when the study load in the proposed combined program exceeds the 16 quarter units authorized at this college.

TRANSFER CREDIT

If accepted by the faculty of the discipline involved, a maximum of nine units of graduate credit from another accredited institution may be applied toward the master's degree. Directed teaching and methods courses may not be used in master's degree programs.

Correspondence courses may not be used to satisfy degree requirements. Extension course work may be used to satisfy prerequisites or degree requirements when such work is acceptable to the department or school offering the master's degree and by petition for such credit. No waiver of course requirements or credit by examination may be used to satisfy master's degree requirements. See the appropriate sections for special regulations applying to professional master's degrees (more than 45 units).

COURSES TAKEN BY UNCLASSIFIED STUDENTS

Courses taken in unclassified graduate standing will be accepted in fulfillment of degree requirements only if the department and graduate adviser accept them on an advanced program. Such work taken during unclassified standing must average "B" or better with no grades below "C" if the student wishes consideration for classified status for an advanced degree. Students who receive postgraduate credit for courses taken during their final quarter as a senior shall include them as preclassification course work.

ENROLLMENT IN A NEW MASTER'S DEGREE PROGRAM

In special instances, a disqualified graduate student may be permitted to enroll in a different graduate program. All cases involving the reinstatement of disqualified graduate students must have the approval of the Dean of Graduate Studies and must be reported to the Graduate Council.

SECOND MASTER'S DEGREE

Students may obtain a second master's degree. Courses taken to meet the requirements for one degree will not be applicable to the second degree.

INTERNATIONAL STUDY

The college participates in the California State Colleges' program of study abroad. Under this program, some courses taken at designated foreign universities, when arranged in advance through the appropriate department, may be applied toward the requirements for a degree awarded by this college. It is important that plans be completed several months in advance of starting such a program. For details, consult the international study adviser.

CHANGES IN OBJECTIVE

Official changes in graduate objective are to be initiated in the Graduate Division Office. A change of objective may be one or more of the following:

1. Changing from one major field to another for the master's degree.
2. Adding a credential objective to an existing master's degree objective.
3. Adding a master's degree objective to a credential objective.
4. Changing from no graduate objective to some stated objective as listed in this Bulletin.

The evaluation of credits transferred to the college is based in part upon the objective indicated on the application for admission. Thus, a change in objective may affect the acceptance of transfer credits. A candidate who wishes to change his objective from that indicated on his original application must follow these proecedures:

1. Obtain a graduate student academic petition from the Graduate Division.
2. Obtain the signatures of the faculty adviser and the graduate coordinator of the department in which he plans to register.
3. Submit a new graduate program in the new discipline.

A student who discontinues working for a master's degree in one department to undertake master's work in another department must replace the first master's program, if he has one, by one in the new field. Up to 18 quarter units of degree credit may be transferred from the original program, but the transfer of credits must be approved by the new department.

Financial Assistance

Various forms of financial assistance are available to qualified students. The college Placement Office maintains an employment bureau to assist students in obtaining part-time employment while attending college. Head resident positions in the residence halls are sometimes available through the college Housing Manager.

State Graduate Fellowships are available from the California State Scholarship and Loan Commission, 714 P Street, Sacramento 95814. Information about these awards, which pay tuition and required fees, and application forms may be obtained from the Commission or from the Graduate Office or the Director of Research. Applicants for awards must be residents of California, in need of assistance, and planning to teach in higher education (including community colleges) in California. The application deadline is generally mid-January for the following academic year.

TEACHING ASSISTANTSHIPS

Teaching assistantships are faculty appointments on a limited basis. A few departments may have openings on occasion. For further information, or to make application, a student should consult the chairman of the department in which he seeks the assistantship.

GRADUATE ASSISTANTSHIPS

There are a limited number of appointments as graduate assistants available to outstanding graduate students who are working on graduate degree programs. The pay varies with the assignment and the duration of the appointment. Interested applicants should consult the chairman of the department in which degree study is being taken.

STUDENT ASSISTANTS

Most departments throughout the college employ graduate and undergraduate students to assist faculty members with various instructional activities. Rates of pay, on an hourly basis, vary according to the types of work performed. A graduate student wishing to be considered for such work should apply directly to the chairman of the department in which he seeks employment.

NONRESIDENT TUITION FEE WAIVER

To be granted a waiver of the nonresident tuition fee, the nonresident student must make formal application to the Dean of Graduate Studies at the time of enrollment at the college. Waivers are based on both scholarship and financial need. Application forms are available in the Graduate Office. Only graduate students who are classified in programs leading to advanced degrees or credentials are eligible for consideration, and any student accepting such a waiver is legally obligated to complete a minimum of ten units of acceptable work in upper division or graduate courses in each quarter for which he receives a waiver.

California school district employees who are not yet legal residents of California may be exempted from the nonresident tuition fee if they are provisionally certificated and if they are working toward fulfilling regular California credential requirements or completing a fifth year of study under the 1961 law.

Children or spouses of California State College academic or administrative employees are also eligible to apply for exemption from the nonresident fee.

ENROLLMENT PRIORITIES

Departments with high graduate enrollments may assign priorities to students wishing to enroll in graduate-level courses. Applicants for a master's degree who are in the last quarter of residence have first priority; other classified graduate students, degree or credential, have second priority; unclassified graduate students have third priority. Nonobjective unclassified graduate students are admitted on a space-available basis.

LIBRARY FACILITIES

The college library's book collection and reference services are organized on a broad subject divisional plan: Social Science-Humanities and Science-Technology. Reference books are available and reference librarians who specialize in the disciplines within the two broad subject areas can offer assistance. The library maintains collections of journals and other materials required to support graduate-level research.

The library has several group study rooms which may be scheduled by students on a day-to-day basis for seminars. Book trucks which may be locked and left in the library are available on a quarterly basis to graduate students working on theses and projects.

Two library services of special significance to graduate students are inter-library loan and individual or group assistance in literature research techniques by librarians of the Reference Department.

MASTER'S DEGREES AND CREDENTIALS OFFERED

All graduate study in the college is under the general direction of the Dean of Graduate Studies. The advanced programs are the products of the faculties of the academic schools and the Teacher Preparation Center. The graduate programs offered by the academic schools are as follows:

Master of Architecture
Master of Science in Biological Sciences
Master of Business Administration
Master of Science in Business Administration
Master of Science in Chemistry
Standard Teaching Credential—Elementary Specialization
Standard Teaching Credential—Secondary Specialization
Master of Science in Economics
Master of Arts in Education (Elementary)
Master of Landscape Architecture (To be offered in 1972-73)
Master of Science in Physical Education
Master of Urban Planning

ARCHITECTURE

Master of Architecture

In the Department of Architecture, School of Environmental Design

Raymond L. Kappe, F.A.I.A., *Chairman*

Architecture Graduate Studies Committee

Richard Chylinski, *Chairman*
Glen Small
Bernard Zimmerman

Although the undergraduate program in the Department of Architecture is structured in a manner to prepare the student for employment in the architectural profession as it is presently practiced, the Master of Architecture is the degree the profession and licensing boards will primarily be accepting in the future. This additional two-year period allows the student the opportunity to engage in areas of concentration, do independent research, and become a more valuable participant in the architectural and related professions.

A candidate for the Master of Architecture degree will have the opportunity to choose from five areas of specialization: architectural design, urban design, architectural industrialization and technology, architectural administration, and architectural construction administration. A recommended list of electives will be offered for each area of specialization from elective courses within the School of Environmental Design as well as from other graduate programs and schools of the college.

Admission to the Program

An applicant for admission to this program must have received a baccalaureate degree in architecture (or environmental design) composed of courses which are generally comparable to those contained in the undergraduate environmental design major at this college. Each student's program is composed to fit his particular needs, and the selection of component courses is determined on the basis of the undergraduate program in architecture (environmental design). A student with a reasonable equivalent of this college's undergraduate program will be in a position to complete the required graduate work earlier than the student lacking adequate background in fundamental subject areas, who will be required first to compensate for any deficiencies in his background by completing appropriate collateral courses. Consequently, a student will be admitted to unclassified (probationary) status until a time determined by the department graduate advisory committee.

An undergraduate grade point average of 2.8, or an undergraduate grade point average of 2.5 or better with a 3.0 grade point average in all architectural upper division work is required for admission to the program with classified standing. A student not meeting these standards may be admitted as an unclassified (probationary) student if space is available. He must qualify for classification by the time he has completed twelve units of program work or within two quarters, whichever occurs first. He must complete ten quarter units of graduate course work with a 3.0 or better average before requesting classification. Included must be ARC 511, Architectural Design, which requires a B grade for successful completion. All candidates must have approval of the department graduate studies committee for admission.

Student Program

Following admission, the student and his advisory committee will complete a master's degree program which lists all courses and other requirements which the student must fulfill to earn the degree. Selection of all elective courses must be with the approval of the advisory committee. The program must meet the general requirements for the degree, as specified below. The curriculum specified in the program may be altered only by written petition. Such a petition must be submitted by the student and approved by the advisory committee, the department head and the graduate dean, in that order.

Requirements

1. At least 90 quarters units of graduate work must be completed in the graduate degree program; of these, at least 45 units must be at the graduate level. None may be below

the 400 level to receive graduate credit, and 400-level courses must be approved by the student's advisory committee and the department head.
2. No more than 9 quarter units of graduate credit earned at other accredited institutions may be used toward the degree. That is, a minimum of 81 units must be completed in residence at this college.
3. Not more than 18 units of graduate work taken prior to advancement to candidacy for the degree may be applied to the 90-unit degree requirement.
4. A grade point average of B (3.0) or better must be maintained in all courses taken to satisfy the degree requirements.

Curriculum

Required Courses

		Units
ARC 511	Architectural Design	4
ARC 512	Architectural Design	4
ARC 513	Architectural Design	4
ARC 531	Architectural Administration	4
ARC 532	Architectural Administration	4
ARC 533	Architectural Administration	4
ARC 561	Architectural Seminar	2
ARC 562	Architectural Seminar	2
ARC 563	Architectural Seminar	2
ARC 611	Architectural Design	6
ARC 612	Architectural Design	6
ARC 613	Architectural Design	6
ARC 661	Architectural Seminar	2
ARC 662	Architectural Seminar	2
ARC 663	Architectural Seminar	2
ARC 691	Directed Study	(1–3)
ARC 695 or 696	Project or Thesis	(1–3)
		(56–60)

Electives

Elective courses to complete the required minimum of 90 units will be selected with the approval of the student's adviser and related to particular areas of specialization.

BIOLOGICAL SCIENCES

Master of Science in Biological Sciences

In the Department of Biological Sciences, School of Science

Jerome E. Dimitman, *Chairman*

Departmental Graduate Committee

Fred Shafia, *Chairman,* Microbiology
Ronald S. Daniel, Zoology
Edward K. Mercer, Biology
Raymond Riznyk, Botany
Martin F. Stoner, Botany
Lazlo J. Szijj, Zoology

The purpose of the Master of Science degree in the Biological Sciences is to enhance the knowledge and competence of the candidate in his field of specialization as well as to develop his potential for continuing self-directed study and research. The curriculum is planned to provide theoretical, technical, and practical studies which will increase the student's knowledge of his discipline, educate him in research techniques, and promote his familiarity with and critical evaluation of the professional literature. Graduate study specializations may be elected in the disciplines of the Biological Sciences: biology, botany, entomology, microbiology, physiology, and zoology.

Admission to the Program

Applicants for admission to this program must have a bachelor's degree with a major in one of the disciplines of the biological sciences or a bachelor's degree in a related field with 45 quarter units of upper division courses in biological sciences. These courses must be comparable to those required for a baccalaureate major at this college.

An undergraduate grade point average of 2.5 or better with a 3.0 average in all upper division work is required for admission to the master's degree program in biological sciences. An applicant not meeting these standards may be admitted as a probationary (unclassified) student with the approval of the departmental graduate committee. He must gain the committee's approval to be admitted to the degree program within two quarters or upon completion of 12 units of graduate course work, whichever occurs first.

The student with his advisory committee will develop a program in his selected discipline of biology based upon his interests and preparation. The student's approved program will include required core courses, a selection of additional formal courses in a specialization, independent study, and an appropriate thesis. It will normally constitute 45 to 50 quarter units of credit.

To be advanced to candidacy for a master's degree in this department, a student must apply to the departmental graduate committee through his major professor. When the student's candidacy has been approved by the departmental graduate committee, he will be notified in writing by the Dean of Graduate Studies.

Requirements

1. The degree program must include a minimum of 45 quarter units, including no more than 9 acceptable units transferred from another graduate institution. No more than 21 units may be in approved 400-level courses.
2. All requirements specified by the college and by the student's thesis committee must be met.
3. The student must complete his program based upon the curriculum outlined below.
4. An acceptable thesis must be completed and a final copy submitted for binding in accordance with college regulations.
5. A final oral examination must be successfully completed.

Curriculum

Required Courses	Units
Seminar in Biology (BIO 680)	3
Research in Biological Sciences (BIO 670)	6
Thesis (BIO 696)	3
	12

Courses in a Specialization

To be selected with consent of the student's thesis committee from 500 and 600-level courses, 33–38 units with not to exceed 21 units of approved 400-level courses.

Total 45–50

BUSINESS ADMINISTRATION

Graduate Program Committee

James C. Petersen, *Chairman,* Marketing
Ralph L. Boyd, Accounting
Leon A Dale, Business Management
Peter P. Dawson, Data Processing
Raymond C. Rauch, Finance, Insurance, and Real Estate
Warren C. Weber, Business Management

Master of Business Administration

In the School of Business Administration

The Master of Business Administration curriculum is designed to provide a two-year program of broad professional development. The objectives are to develop a better understanding of the role of the professional manager and his responsibilities within the firm and society; to assist the student in developing a critical approach to decision making and the ability to speak and write effectively and professionally; to develop skill in interpersonal relations; to develop a sound theoretical understanding of organizations and a management perspective for considering problems and making decisions from the viewpoint of the entire firm, industry, and economy; to develop an increased understanding and awareness of the world in which he lives; and to give him the capability of acquiring additional education by himself.

Admission to the Program and Requirements

After a prospective student has submitted his application for admission to the MBA program to the Office of Admissions, the procedure will be as follows:

1. Admission to the MBA program will be granted on recommendation of the School of Business Administration Graduate Program Committee. Selection will be on the basis of evidence of ability to perform at a high academic level. Minimum requirement for admission to the program is a 2.50 GPA in undergraduate courses completed for a bachelor's degree from an accredited college or university, or a minimum score of 450 on the Admission Test for Graduate Study in Business. Exceptions may be granted on petition of the applicant, recommendation of the Graduate Program Committee and approval by the Dean.
2. All applicants are required to take the Admission Test for Graduate Study in Business. This test may be taken at any time prior to action on the candidate's application, but must be taken not later than the earliest possible date offered after notice of selection is received.
3. The Dean of the School of Business Administration will notify applicants of their selection or rejection by the School of Business Administration graduate program committee.
4. Each selected applicant will be assigned a School of Business Administration graduate adviser.
5. First year program courses may be waived if equivalent courses have been successfully completed by the student. Waiver will be granted on recommendation of the student's graduate adviser and approval of the graduate program committee.
6. Transfer credits not exceeding nine quarter units completed in a graduate school of an accredited college or university may be accepted for second year program courses or their equivalents upon recommendation of the graduate adviser and approval of the graduate program committee.
7. An advisory program study worksheet for the MBA degree objective will be prepared by the graduate adviser for guidance of the student. An official program will be prepared when the student is granted classified standing. On recommendation of the graduate adviser and approval of the graduate program committee, the official program will be submitted to the Office of Graduate Studies.

Curriculum

First Year

		Units
GBA 510	Managerial Accounting I	3
GBA 511	Managerial Accounting II	3

GBA 515 Marketing Concepts 3
GBA 516 Marketing Decisions in Business Administration 3
GBA 520 Automated Business Information Systems 3
GBA 521 Systems Analysis and Design 3
GBA 525 Managerial Finance 3
GBA 526 Advanced Managerial Finance 3
GBA 530 Legal Environment of Business 3
GBA 531 Management and Organizational Theory 3
GBA 532 Business Statistics and Probability 3
GBA 533 Management Policies 3
GBA 534 Introduction to Quantitative Methods in Business 3
EC 510 Economic Analysis and Policy I 3
EC 511 Economic Analysis and Policy II 3

Total, First Year.....45

Second Year

GBA 551 Accounting for Executive Administration 3
GBA 561 Seminar in Organization Theory 3
GBA 564 Quantitative Business Analysis 3
GBA 571 Marketing Strategies 3
GBA 581 Corporation Financial Planning 3
HST 610 History of American Business 3
GBA 643 Management Information Systems 3
GBA 651 Seminar in Marketing 3
GBA 662 Corporate Financial Evaluation Seminar.....3
GBA 671 Management Seminar.....3
GBA 691 Directed Comprehensive Studies 3
GBA 695a Business Research Project
or
GBA 695b Field Analysis of the Firm.....3
or
GBA 696 Thesis

At least nine units from:

ACC 401 Advanced Accounting 4
ACC 402 Advanced Accounting 4
ACC 403 Advanced Accounting 4
ACC 413 Case Studies in Controllership 4
ACC 422 Federal Tax II.....3
ACC 424 Internal Operational Auditing and Systems 4
ACC 475 CPA Law Problems.....3
ACC 476 CPA Auditing Problems 3
ACC 477 CPA Practice Problems and Theory.....6
FIN 401 Security Analysis and Management 4
FIN 403 Real Property Evaluation 4
FIN 412 Real Property Analysis 4
FIN 414 Social Insurance and Pension Plans.....4
FIN 415 Risk Management Seminar 4
FIN 416 Legal Aspects of Real Estate 4
BUS 417 Laws of Estate and Trust.....4
MKT 408 Marketing Research 5
MKT 414 International Marketing 4
MKT 419 Legal Environments of Marketing 4
DP 431 Comparative Programming Languages 4
DP 444 Advanced Computer Concepts 4
DP 453 Data Communications.....4
EC 423 Economic Conditions Analysis 3
GBA 563 Executive Development 3
GBA 617 Industrial Dynamics 4
GBA 626 Instructional Development in Higher Education for Business 3
GBA 627 Communications in Management 3
GBA 631 Management of Marketing Channels.....3
GBA 633 Marketing Information and Communication Systems.....3
GBA 635 Motivation and Marketing Behavior.....3
GBA 645 Methods in Operations Analysis 3
GBA 659 Seminar in Current Accounting Theory 3
GBA 675 Theory of the Firm.....3
GBA 694 Accounting Research 3

Total, Second Year 45

Master of Science in Business Administration

In the School of Business Administration

The Master of Science degree in Business Administration with an option in business education is intended primarily for individuals with an interest in teaching business subjects in secondary schools, junior colleges, or four-year colleges. The objectives of the program are to develop an understanding of the role and scope of business education and its relationship to the total educational program; to develop the ability to read, interpret, and conduct research in business education; to prepare students for secondary, junior college, and college positions as professional classroom teachers, supervisors of instruction, and department heads; to prepare students to teach in or supervise a business education program in a business college, an adult education school, or in the training department of a business firm; and to provide the necessary background for doctoral study and for continued, self-directed study.

Admission to the Program

1. To be admitted to the Master of Science program an applicant shall have a bachelor's degree with a major in business or business education from an accredited college or university; an undergraduate grade point average of 2.50 or higher, or a minimum score of 450 on the Admission Test for Graduate Study in Business (ATGSB); and acceptance by the graduate program committee of the School of Business Administration. Exceptions to these requirements may be granted on petition of the applicant, recommendation of the graduate program committee, and approval by the Dean.
2. All applicants are required to take the Admission Test for Graduate Study in Business. This test may be taken at any time prior to action on the candidate's application, but must be taken not later than the earliest possible date offered after notice of selection is received.
3. The Dean of the School of Business Administration will notify applicants of their selection or rejection by the School of Business Administration graduate program committee.
4. Each selected applicant will be assigned a graduate advisor in the School of Business Administration.
5. Applicants who meet all admission requirements will enter as classified students and are eligible for filing the official degree program immediately. Students admitted on an unclassified basis will prepare the official program when they apply for classified standing, which must be done by the time the student has completed nine quarter units of courses in the program. On recommendation of the graduate advisor and approval of the graduate program committee, the official program will be submitted to the Graduate Division.

Requirements

1. The degree program must include a minimum of 45 quarter units. Transfer credits not exceeding nine quarter units completed in a graduate school of an accredited college or university may be accepted upon recommendation of the graduate advisor and approval of the graduate program committee. No more than 15 units of approved 400-level courses may apply toward the degree.
2. A grade point average of "B" (3.0) or better must be maintained in all course taken to satisfy the degree requirements and in all graduate-level course work taken at this college.

Curriculum

The program of study for a candidate for the Master of Science degree in Business Administration will consist of 12 required units and 33 approved elective units. At least eight elective units must be selected from Group A. No more than 15 units of approved 400-level courses may apply toward the 45 units required for the degree.

Required Courses

GBA 540	Foundations of Business Education	3
GBA 541	Review of Research in Business Education	3
GBA 550	Seminar in Business Education	3
GBA 695a	Business Research Project (or)	3
GBA 696	Thesis	3
	Total	12

Elective Courses—Group A

BUS 403	Records Management	3
GBA 542	Problems in Business Education	3
GBA 543	Innovations and Trends in Business Education	3
GBA 691	Directed Study in Business	1-3
HST 610	History of American Business	3

GBA 551 Accounting for Executive Administration 3
GBA 561 Organization Theory 3
GBA 564 Quantitative Business Analysis 3
GBA 571 Marketing Strategies 3
GBA 581 Corporation Financial Planning 3
GBA 626 Instructional Development in Higher Education for Business 3
GBA 627 Communications in Management 3
GBA 643 Management Information Systems 3

Total Group A.....18 to 33

Elective Courses—Group B

With the consent of the graduate adviser, up to 15 units may be selected from:

ACC 401 Advanced Accounting 4
ACC 402 Advanced Accounting 4
ACC 403 Advanced Accounting 4
ACC 413 Case Studies in Controllership 4
ACC 422 Federal Tax II 3
ACC 424 Internal Operational Auditing and Systems 4
ACC 475 CPA Law Problems.....3
ACC 476 CPA Auditing Problems 3
ACC 477 CPA Practice Problems and Theory.....6
BUS 410 Management Policies and Systems 4
BUS 417 Laws of Estate and Trust 4
EC 401 International Trade and Finance 4
EC 402 Economic Development 4
EC 403 Comparative Economic Systems 4
EC 413 Managerial Economics.....4
EC 414 Labor Economics.....4
EC 415 Labor Problems and Practices 4
EC 421 Econometrics.....4
EC 422 Economic Programming.....4
EC 423 Economic Conditions Analysis.....4
EC 431 Regional Economic Analysis.....4
EC 432 Urban Economics 4
EC 433 Economics of Transportation.....4
EC 540 Seminar in Economics 1–3
DP 431 Comparative Programming Languages.....4
DP 444 Advanced Computer Concepts 4
DP 453 Data Communications.....4
FIN 401 Security Analysis and Management 4
FIN 402 Mortgage Banking 4
FIN 403 Real Property Evaluation 4
FIN 411 Life and Casualty Insurance 4
FIN 412 Real Property Analysis 4
FIN 414 Social Insurance and Pension Plans.....4
FIN 415 Risk Management.....4
FIN 416 Legal Aspects of Real Estate.....4
MKT 407 Industrial Marketing 4
MKT 408 Marketing Research 5
MKT 414 International Marketing 4
MKT 419 Legal Environments of Marketing 4
GBA 563 Executive Development 3
GBA 617 Industrial Dynamics 3
GBA 631 Management of Marketing Channels.....3
GBA 633 Marketing Information and Communication Systems.....3
GBA 635 Motivation and Marketing Behavior.....3
GBA 645 Methods in Operations Analysis 3
GBA 651 Seminar in Marketing 3
GBA 659 Seminar in Current Accounting Theory 3
GBA 662 Corporation Financial Evaluation Seminar.....3
GBA 671 Management Seminar.....3
GBA 694 Accounting Research 3
TEP 410 Psychological Foundations of Education.....5
TEP 550 Seminar in Educational Issues 2–3

Total Group B..... (maximum) 15

Total for Degree .....(minimum) 45

CHEMISTRY

Master of Science in Chemistry

In the Department of Chemistry, School of Science

Irwin Geller, *Acting Chairman*

Graduate Program Committee

J. Ernest Simpson, *Chairman,* Organic Chemistry
Charles E. Bowen, Biochemistry
David A. Haner, Chemical Physics
Yu-Ping Hsia, Physical Chemistry

The purpose of the Master of Science degree in Chemistry is to provide a comprehensive understanding of the principles of chemistry and application in detail to advanced problems. This understanding will be gained through course work, seminars, independent study, and research. The program is designed to provide the student with the necessary skills and techniques to reach his particular objective, whether it be for a successful career in teaching or industry or to pursue further graduate work. The student in this program may pursue one of several fields of specialization which include analytical, inorganic, organic, and physical chemistry, and biochemistry.

Admission to the Program

An applicant for admission to the graduate program in chemistry must have received a baccalaureate degree in chemistry or in a related discipline, including at least 36 quarter units of chemistry courses. An applicant lacking these qualifications may be admitted subject to a review of his academic background by the departmental graduate program committee. Admission to the program requires an undergraduate grade point average of 2.5 and an average of 3.0 in chemistry courses. A limited number of students not meeting these requirements may be admitted in probationary (unclassified) status if facilities permit. Such students must meet requirements for classification no later than the second quarter of attendance.

Each selected applicant with his advisory committee will design a program in his selected area of specialization based upon his interests, preparation, and performance on a departmental placement examination. The program will include required courses, a selection of courses in an area of specialization, independent study, and a thesis. It will normally constitute 45 to 50 quarter units of credit.

In order to be advanced to candidacy for a Master of Science degree in Chemistry, the student must meet all of the general requirements specified in this Bulletin. He must also perform satisfactorily on departmental examinations, at entrance, on reexamination, or by completion of specified courses.

Requirements

1. The degree program must include a minimum of 45 quarter units, including no more than 9 acceptable units transferred from another graduate institution. No more than 21 units may be in approved 400-level courses.
2. The student must complete his program based upon the curriculum outlined below.
3. The student must demonstrate a reading knowledge of a foreign language acceptable to the Chemistry Department. Ordinarily this will be German.
4. An acceptable thesis must be completed and the necessary copies submitted in accordance with college regulations.
5. A final comprehensive examination must be successfully completed.

Curriculum

Required Courses

	Units
CHM 521, 522 Theoretical Chemistry	6
CHM 550 Seminar in Chemistry (Not more than 3 units of seminar may be included in the 45-unit minimum.)	3
CHM 551, 552 Independent Study in Theoretical Chemistry	2
CHM 696 Research and Thesis	9
Courses in an area of specialization	8

Select 6 units in a 2-quarter sequence in an area of specialization, to be selected from CHM 541, 542 (organic); CHM 553, 554 (physical); CHM 561, 562 (biochemistry); CHM 571, 572 (inorganic); or CHM 581, 582 (analytical). Each of these courses requires a concurrent enrollment in 1 unit of CHM 513, Independent Study.

Approved electives.....17

Total minimum 45

CREDENTIAL PROGRAMS

Standard Teaching Credential with Elementary and Secondary Specializations

In the Teacher Preparation Center

Rodman F. Garrity, *Director*

California teaching credentials are certification objectives of college curricula just as baccalaureate and master's degrees are. Graduate students admitted to a program leading to college recommendation for a teaching credential are accorded classified status parallel to that of master's degree candidates.

The college is accredited by the State Board of Education to recommend qualified students for the Standard Teaching Credential with Elementary Specialization and the Standard Teaching Credential with Secondary Specialization. Information on admission and course requirements for the standard teaching credentials is available from the Director of the Teacher Preparation Center and from members of the college-wide Teacher Education Advisory Committee. Members of this committee act as departmental advisers to credential students.

Teacher Preparation Center

Teacher preparation is a college-wide function. The Teacher Preparation Center serves as the college-wide planning and coordinating office for all teaching credential programs. Faculty members from all schools have a role to play in meeting teacher preparation objectives. The members of the campus-wide Teacher Education Advisory Committee represent the departments offering credential majors and minors. The functions of this committee are:

1. To advise teacher education staff on matters relating to their respective areas.
2. To advise on changes and alterations in education programs.
3. To interpret and implement the college's education program to their departments.
4. To recommend to the chairman on instructional matters, student teaching, public relations and school district relations.

Credential Majors and Minors

The prospective elementary or secondary teacher must choose a major and a teaching minor from among the following:

ELEMENTARY MAJORS

Biological Sciences
Humanities
Mathematics
Physical Sciences
Social Sciences

ELEMENTARY MINORS

Art
Biological Sciences
Chemistry
History
Home Economics
Mathematics
Music
Economics
English
Geography
Physical Education
Physical Science
Physics
Political Science

SECONDARY MAJORS

Agricultural Sciences
Vocational Agriculture
Biological Sciences
Business Education
Chemistry
Drama
English
Communication Arts (Journalism)
History
Home Economics
Language Arts (Speech)
Mathematics
Physical Education
Physics
Political Science

SECONDARY MINORS

Agricultural Sciences
Art
Biological Sciences
Business Education
Chemistry
Drama
Economics
English
History
Home Economics
Journalism
Mathematics
Music
Physical Education
Physics
Political Science
Speech

Requirements

The following courses are required to gain college recommendation for the Standard Teaching Credential, elementary or secondary specialization.

		El	Sec
TEP 301	Principles of Education	3	3
TEP 401	Teaching Minority Group Children (recommended)	4	4
TEP 410	Psychological Foundations of Education	5	5
TEP 420	Materials & Methods	4	
TEP 421	Materials & Methods	4	
TEP 426	Problems of Teaching Reading	4	
TEP 430	Student Teaching	12	
TEP 431	Student Teaching		12
TEP 432	Seminar	3	
TEP 503	Curriculum Procedures and Methods		6
TEP 504	Seminar		3
TEP 505	Philosophical-Sociological Foundations of Education	5	5
		40	34

Admission to Candidacy

Admission to the college is not equivalent to being accepted into the teacher preparation program. A candidate for a teaching credential is selected through a three-step process involving college-wide teacher education committees, which supervise the teacher preparation program, review the qualifications of the candidate, and decide whether or not the candidate should be admitted to the program.

A candidate for a teaching credential must be granted approval by the teacher education committees to enter the teacher preparation program, to participate in student teaching, and to receive a recommendation for the credential. Detailed information is available at the Teacher Preparation Center.

ECONOMICS

Master of Science in Economics

In the Department of Economics, School of Arts

Franklin Y. H. Ho, *Chairman*

The purposes of the program leading to a Master of Science degree in economics are (1) the preparation of economists qualified for immediate employment by industry, agriculture, and the various levels of government; (2) the preparation of economists for research positions in fields such as public administration, labor organization, finance, and insurance; (3) the preparation of teachers of economics at the secondary school and community college level; (4) the enhancing of the competence of those students who wish to pursue additional graduate work in economics. Graduate study specialization may be elected in any of the following areas: managerial economics and operations analysis; economic planning and development; quantitative economics; international economics; money and capital markets; industrial organization and public policy; urban and regional economics.

Admission to the Program

An applicant for admission to this program must hold a bachelor's degree in economics from an accredited college or university and satisfy college and departmental requirements for admission to graduate study. An applicant holding a bachelor's degree in a field other than economics who has at least 36 units in economics courses may also apply for admission. In his undergraduate work, the applicant must have maintained a grade point average of 3.0 or better in economics courses and a grade point average of 2.7 overall. All applicants for admission to the program are required to take the Graduate Record Examination Aptitude Test and the Advanced Economics Test. Admission to the graduate program in economics requires that the applicant be accepted by the Department of Economics.

Requirements

A minimum of 45 quarter units are required for the Master of Science degree in economics. All students must take 16 units of required core courses and complete a thesis. Courses for the balance of the 45 quarter units are selected by the individual student in his area of interest or specializaton with the advice and consent of his faculty adviser(s).

No more than nine quarter units of acceptable credit may be transferred from another graduate institution. A maximum of 21 units may be taken in approved upper-division courses.

Curriculum

	Units
Required Courses	**16**
Ec 550 Microeconomic Analysis (4)	
EC 551 Macroeconomic Analysis(4)	
EC 552, 553 Econometrics I, II (4,4)	
Thesis	**9**
EC 696 Thesis (1–3)	
Field of Specialization	**8**
Electives	**12**
Total	**45**

EDUCATION

Master of Arts in Education

In the Teacher Preparation Center

Rodman F. Garrity, *Director*

Education Graduate Committee

Rodman F. Garrity, *Chairman*
Gerald F. Corey
Raymond Garris
W. Rolland Jacks
Jane McGraw
George Platner

The Master of Arts in Education at Cal Poly, Pomona is planned to enhance the teaching competencies of people who hold a valid California elementary teaching credential. It will be a continuation at a higher level of the college's undergraduate programs presently supplying curricula for elementary teaching credentials.

The curriculum for each graduate student will be an individual one based upon individual needs. It will consist of work in subject areas, as well as professional course work. Specialization in reading is presently offered in this program. Plans are being made to offer additional specializations in the future. They will be announced in succeeding issues of this Bulletin. The Master of Arts in Education with a specialization in reading, in addition to the basic educational and research objectives of graduate study, will prepare students as specialists in reading and will assist them in qualifying for the certificate as Specialist Teacher in Reading under the Miller-Unruh Basic Reading Act of 1965. Methods courses and student teaching may not be applied to the master's degree. This means that in most cases, a credential seeker will have a program totaling a minimum of four post-graduate quarters.

Admission to the Program

An applicant for this program must possess a credential authorizing elementary school teaching or have been admitted to such a program at this college. The applicant must also hold a bachelor's degree from an accredited institution.

Admission to the program requires an undergraduate grade point average of 2.5 or better and satisfactory test scores. Scores on the Graduate Record Examination Aptitude Test and on the Advanced Test in Education are required as part of the application procedure. Applicants should arrange to have completed these tests early enough so that scores are available at the college prior to the deadline for applying.

Applicants who do not meet the minimum criteria but who show compensating strengths may be admitted probationally as unclassified by action of the Education Graduate Committee. Students admitted in this category may have no more than two quarters to demonstrate their fitness to remain in the degree program.

Each student admitted to the program in classified standing will prepare a formal degree program in consultation with his adviser prior to or immediately after the beginning of his first quarter of enrollment. Accepted applicants are advised to obtain a copy of the Handbook for Graduate Students in Education available in the Teacher Preparation Center.

Requirements

1. A minimum 45 quarter units of acceptable graduate level work must be completed in the program; at least 24 quarter units must be at the 500 and 600 level (graduate). All 400-level courses accepted for master's degree credit will be specified by the Education Graduate Committee.
2. At least 27 units of credit must be taken in the program after the student has been advanced to candidacy for the degree.
3. Completion of all requirements for a California elementary teaching credential is required prior to the granting of the degree of Master of Arts in Education.
4. A thesis or project must be satisfactorily completed and defended by the candidate.

Curriculum

The program is a flexible curriculum requiring a minimum of 45 units, organized as follows: 15 quarter hours in core courses, 18 quarter hours in an area of specialization, and 12 quarter hours of electives. The student will be encouraged to take courses in other disciplines that relate to his

needs in developing his program leading to the master's degree.

Required Courses

		Units
TEP 650	Seminar in Current Problems and Strategies in Education	2–3
TEP 690	Methods and Techniques of Research	3
TEP 691	Independent Study	1–6
TEP 695	Project	1–3
	or	
TEP 696	Thesis	1–3
		15

Specialization Courses

A minimum of 18 units will be selected from an area of specialization. In 1971–72, a specialization in reading is the only one offered.

READING

TEP 520	Diagnosis of Reading Difficulties	3
TEP 521	Analysis of Corrective Reading Practices and Techniques	3
TEP 522	Laboratory of Clinical Practice: Treatment of Reading Disorders	3

Nine Units Selected from

TEP 401	Teaching Minority Group Children	4
TEP 550	Seminar in Educational Issues	2–4
TEP 415	Abnormal Psychology	3
TEP 403	Psychology of Personality	3

Electives

To complete the minimum of 45 units, students will select courses from the elective list or from other upper-division or graduate courses approved by the Education Graduate Committee.

LANDSCAPE ARCHITECTURE

Master of Landscape Architecture

To be offered in 1972-73

In the Department of Landscape Architecture, School of Environmental Design

Jere Stuart French, *Acting Chairman*

Landscape Architecture Graduate Studies Committee

John Lyle, *Chairman*
Rodney Tapp
Chester Volski

It is the purpose of this program to provide the environment and the resources for students from varied academic backgrounds to learn the best and most advanced approaches and methods for establishing strong, clearly-defined and mutually life-sustaining and enhancing relationships between man and the land, along with the other organic systems that it supports. Emphasis is on the carrying out of actual projects with frequent review, discussion and seminar sessions.

Upon completion of the program, a student will have acquired a sufficient comprehension of these relationships as defined by nature and altered by man in the past to enable him to communicate effectively with experts in any specific area of the field of landscape architecture, as well as a sufficiently profound knowledge of the methods and techniques for one area of approach to design to enable him to apply it professionally.

Students with degrees in fields other than landscape architecture must take either the introductory concentrated design course (ENV 510) offered during the summer, or equivalent undergraduate courses, before proceeding with regular graduate course work.

After his first two quarters of work in the program, the student will choose between two general directions in landscape design: the bahavioral, which is based on the understanding of human needs, or the ecosystematic, which views the physical environment as a complex system, of which man and his needs are one subsystem. In general, the student should choose the direction that will permit him to put his previous education to best use. He will also be required to take an elective concentration in one of eight academic areas. Later, he will make a further choice between specializations in research and applications.

Admission to the Program

Admission to the Master of Landscape Architecture program as a classified graduate student requires an undergraduate grade point average of 3.0 or better. An applicant with an average between 2.5 and 3.0 will be considered for admission on the basis of his score on the Aptitude Test of the Graduate Record Examination. All applicants are expected to submit GRE scores prior to admission.

Students with baccalaureate degrees in areas other than Landscape Architecture or from unaccredited schools will be required to demonstrate a minimum proficiency in this field before entering the degree program. In most cases, this work will constitute or be equivalent to this student's minor emphasis area.

Following admission, the student and his advisory committee will plan a program of study which lists all courses and other requirements which the student must fulfill for the degree. The curriculum specified in the program may be altered only by written petition. Such a petition must be submitted by the student and aapproved by the advisory committee, the department head, and the graduate dean in that order.

Requirements

1. At least 72 quarter units of graduate work must be completed in the graduate degree program; of these, at least 45 units must be at the graduate level. Upper division courses in elective and minor emphasis areas must be approved by the student's advisory committee and the department chairman for graduate credit. No more than 9 quarter units of graduate credit earned at other accredited institutions may be used toward the degree. Not more than 24 units of graduate work taken prior to advancement to candidacy for the degree may be applied to the 72-unit degree requirement. A minimum grade point

average of 3.0 must be maintained in all courses taken to satisfy degree requirements.

2. Satisfactory completion of an examination, including (but not limited to) a defense of the thesis or project will be required of all students prior to the awarding of the degree. The examination will be conducted by the graduate advisory committee, but other faculty members may be invited to participate.

Curriculum

		Units
ENV	510	Environmental Design and Graphics 6
ENV	511	Landscape Planting and Construction 6
LA	512	Methods and Applications for Landscape Architecture 12
LA	551	Graduate Seminar 2
LA	601	Theory and Literature of Landscape Architecture 6
LA	602	Ecosystematic Landscape Design 6
LA	603	Human Needs in Landscape Design 6
LA	604	Ecosystems Applications 6
LA	605	Design of the Humanized Landscape 6
LA	652	Graduate Seminar 2
LA	691	Special Project (Required each quarter) 1
LA	692	Directed Research 1–6
LA	695	Project 2
LA	696	Thesis 4

The student in consultation with his advisory committee will select elective courses to complete the 72-unit requirement for the master's degree.

PHYSICAL EDUCATION

Master of Science in Physical Education

In the Department of Physical Education, School of Arts

Don Warhurst, *Chairman*

Physical Education Graduate Committee

V. B. Anooshian, *Chairman*
Stanley Bassin
L. Lynne Emery
Arthur Ridgeway
Magnus Syverson
Leo Teghtmeyer

The purpose of the Master of Science degree in Physical Education is to enhance the knowledge and competence of the physical education teacher and to prepare those students interested in graduate study beyond the master's degree. The curriculum is planned to provide an opportunity to improve the student's professional competencies within his chosen area of specialization. Experiences will be provided to enhance the analytical and critical tools for research and decision making. Historical and philosophical study will provide the student with a frame of reference that will aid in understanding today's problems in the profession.

A candidate for the master's degree in physical education will be required to choose between two areas of specialization, behavioral science of human performance or the scientific bases of physical education. The behavioral sciences specialization will be directed to the needs of the teacher in a school situation. It will be descriptive in nature and will emphasize causes of, and methods for, coping with today's problems. The scientific bases specialization will provide an experimental approach to problems in physical education. One of its objectives will be to prepare students for research and advanced graduate programs. Opportunity is provided for selection of elective courses within the department as well as from other graduate programs.

Admission to the Program

An applicant for admission to this program must have received a baccalaureate degree in physical education or a related discipline from an accredited institution. A candidate with a baccalaureate degree in a major other than physical education may be admitted subject to review of his academic background and performance by the departmental graduate studies committee.

An undergraduate grade point average of 3.0 or better, or an undergraduate grade point average of 2.5 or better with a 3.0 grade point average in all upper division work is required for admission with classified standing. A student not meeting these standards must complete 12 quarter units of graduate course work with a 3.0 or better average before requesting classification. Included must be PE 590, Research Methods, which requires a B grade for successful completion. All candiates must have approval of the departmental graduate studies committee.

Each selected applicant will be assigned a Physical Education Department adviser. The student, with his adviser, will develop a program based on his interests and preparation. This program will include required core courses, area of specialization courses and appropriate elective courses. All programs will be reviewed and approved by the departmental graduate studies committee.

Requirements

1. The degree program must include a minimum of 45 quarter units, including no more than 9 acceptable units transferred from another graduate institution. No more than 18 units may be in approved 400-level courses. An overall 3.0 grade point average in all graduate work attempted is required.
2. Upon completion of the required core courses and the area of specialization courses, the candidate must successfully pass written and oral examinations. The examinations shall consist of a comprehensive section dealing with the required core areas and an intensive section relating to the individual's area of specialization. The oral portion of the examination will be administered on an individual basis approximately two weeks following the written examination.
3. An acceptable thesis must be completed and approved by the candidate's thesis committee. Where appropriate, oral defense of the thesis will be required.

Curriculum

Required Courses

		Units
PE 510	Philosophical Bases of Physical Education	3
PE 590	Research Methods	3
PE 650	Problems in Physical Education	3
PE 696	Thesis	9
		18

Specialization Courses

BEHAVIORAL SCIENCE OF HUMAN PERFORMANCE

PE 540	Cultural Patterns and Physical Education	3
PE 640	Socio-Cultural Aspects of Sport	3
PE 643	World History of Physical Education	3
		9

SCIENTIFIC BASES OF PHYSICAL EDUCATION

PE 580	Advanced Motor Learning and Human Performance	3
	or	
PE 583	Advanced Motor Development	3
PE 680	Advanced Kinesiological Analysis	4
PE 683	Advanced Physiology of Exercise	4
		11

Electives

Elective courses to complete the required minimum of 45 units must be selected. Electives must have approval of the student's adviser.

URBAN PLANNING

Master of Urban Planning

In the Department of Urban Planning, School of Environmental Design

Sherman W. Griselle, *Chairman*

Urban Planning Graduate Studies Committee

Sherman W. Griselle, *Chairman*
David E. Bess
Richard J. Chylinski
John T. Lyle

The objectives of the program leading to the degree of Master of Urban Planning are to provide post-graduate education to qualified persons who desire to further their education in urban planning. The goal is to provide high level, professional education through specialized planning instruction combined with supporting studies, seminars, and studio projects to be interplayed with "real world" field work. Both the theoretical and the applied aspects of planning will be pursued. The curriculum is designed to prepare students to meet both present and future objectives of the planning profession. Holders of the Master of Urban Planning degree will be prepared for employment in city, county, regional, state, and national planning and related agencies; employment with foundations, industries, and private consultative organizations; teaching urban planning at junior college, college, and agency levels (in-service training programs) following prerequisite work experience; and advanced graduate study.

Admission to the Program

An undergraduate grade point average of 3.0 or better, or an undergraduate grade point average of 2.5 or better with satisfactory performance on the Graduate Record Examination is required for classified admission. The departmental graduate studies committee may approve admission for students not meeting these standards but exhibiting promise of successfully engaging in graduate work.

A baccalaureate degree in urban planning (or city and regional planning) composed of courses which are generally comparable to those contained in the undergraduate urban planning major at this college is the best preparation for this program of graduate studies. However, a baccalaureate degree in another discipline is acceptable. The field of undergraduate study is not critical for admission to the program, but a background in one of the social sciences, geography, architecture, or landscape architecture will shorten the time necessary for completing a prescribed program of collateral background courses. Each student's program is composed to fit his particular needs, and the selection of background courses is determined on the basis of the college's undergraduate program in urban planning. A student with a reasonable equivalent of the undergraduate program will be able to complete the required graduate work earlier than the student lacking adequate background in fundamental subject areas. The latter will be required to compensate for deficiencies by completing appropriate courses.

Following his admission to classified status, the student and his advisory committee will prepare a master's degree program which lists all courses and other requirements which the student must fulfill to earn the degree. Selection of all elective courses must be with the approval of the departmental graduate studies committee.

Requirements

1. At least 72 quarter units of graduate work must be completed in the graduate degree program. The normal program will consist of 44 units of environmental design and urban planning courses along with 28 units of electives. At least 45 units must be at the graduate level. None may be below the 400 level to receive graduate credit, and 400 level courses must be approved by the departmental graduate studies committee.
2. No more than nine quarter units of graduate credit earned at other accredited institutions may be used toward the degree. At least 42 units of course work must be taken after advancement to candidacy for the degree. A grade point average of "B" (3.0) or better must be maintained to satisfy the degree requirements and in all graduate-level course work taken at this college.
3. Satisfactory completion of an examination, including a defense of the thesis, where appropriate, will be required of all students prior to the awarding of the degree. The examination will be conducted by the depart-

mental graduate studies committee, but other faculty and members of the profession may be invited to participate.

Curriculum

Required Courses

		Units
ENV	621	Design of Urban Projects and Spaces 4
ENV	622	Design of the Residential Environment 4
ENV	623	Design of the Metropolis 4
UP	534	Urban Housing and Development 4
UP	535	Urban Data and Simulation Programs 4
UP	536	Urban Circulation and Communication Systems 4
UP	537	Regional, State, and National Planning 4
UP	651	Planning in Contemporary Society Seminar 3
UP	652	Planning Administration Seminar 3
UP	653	Professional Practice Seminar 3
UP	691	Research Methods and Techniques 4
UP	696	Thesis 3
		44

Electives

Elective courses to complete the required-minimum of 72 units must be selected from a list of courses prepared by the departmental graduate studies committee. The student should select a group of electives that will be beneficial to him both as a person and as a professional planner.

DESCRIPTIONS OF GRADUATE COURSES

Aerospace Engineering

ARO 520 Elasticity in Aerospace Structures (4)

Theory of stress and strain for continuous media. Stress-strain relations of elasticity. Plane stress and strain. Introduction to thermoelasticity. Lecture-discussion, 4 hours. Prerequisites: ARO 328, MAT 318, or consent of instructor. *Mr. Graves*

ARO 521 Structural Dynamics (4)

Concepts of the dynamics of elastic bodies. Longitudinal, transverse and torsional vibrations of structural elements. Vibrations of plates and shells. Approximate methods in dynamics of structures. Lecture-discussion, 4 hours. Prerequisites: ARO 309, 328, MAT 318, or consent of instructor. *Mr. Graves*

ARO 526 Hydrodynamics (4)

Application of continuity, energy and momentum equations. Two- and three-dimensional potential flow; method of images. Conformal mapping; Schwarz-Christoffel transformation. Electroconductive analog. Navier-Stokes equations; some exact solutions. Boundary layer flows; pressure gradient. Laminar motion, transition and turbulent motion; cavitation. Introduction to unsteady flow. Introduction to non-Newtonian fluid mechanics. Lecture-discussion, 4 hours. Prerequisites: ARO 302, MAT 318, or consent of instructor. *Mr. Newberry*

ARO 527 Advanced Gas Dynamics (4)

Method of characteristics and applications; non-steady flows; the blunt body problem and curved shock waves; similarity rules; real gas results; Newtonian gas dynamics. Lecture-discussion, 4 hours. Prerequisite: ARO 311 or consent of instructor.

ARO 528 Hypersonic Aerodynamics (4)

Two- and three-dimensional flow fields. Hypersonic small disturbance and Newtonian impact theories and application. Boundary layer interaction with the inviscid flow field. Real gas phenomena. Blunt body and conical flow fields; minimum drag bodies; aerodynamic analysis of complete configurations. Lecture-discussion, 4 hours. Prerequisites: ARO 304, 404, or consent of instructor. *Mr. Newberry*

Agriculture

AG 550 Seminar in Agriculture (1–3)

Current findings and research problems in the field of agriculture and their application to the industry. Seminar, 1 to 3 hours. Maximum of six units may be earned.

Animal Science

AS 512 Nutritional Energetics (4)

The biochemical, physiological, and nutritional functions of energy transformation involved in the formation of animal products. Lecture-discussion, 4 hours. Prerequisites: Monogastric or ruminant nutrition, physiology, and biochemistry, or permission of the instructor.

AS 545 Designed Analysis of Experimental Research (4)

Experimental statistics. Applications of statistical estimation and inference. Linear regression and correlation; analysis of variance for completely randomized design, randomized blocks, Latin squares, factorials and analysis of covariance. Concepts of design for experimental investigations. Lecture-discussion, 3 hours, laboratory, 3 hours. Prerequisite: BIO 411. *Dr. Knight*

Architecture

ARC 511, 512, 513 Architectural Design (4) (4) (4)

After deciding upon his area of specialty, the student with his graduate advisory committee will select an area of study and develop a program and progress outline. Lecture-discussion, 1 hour, laboratory, 9 hours.

ARC 531, 532, 533 Architectural Administration (4) (4) (4)

Work experience in architectural offices under the direction of architects especially chosen to teach the aspects of professional practice

to the student. Specific percentages of time will be devoted to contract drawings, client and consultant meetings, architectural administration, and supervision. 10 hours per week.

ARC 561, 562, 563 Architectural Seminar (2) (2) (2)

Seminar programs developed to discuss relevant environmental, planning, architectural, administrative, and technological issues. Seminar, 2 hours.

ARC 611, 612, 613 Architectural Design (6) (6) (6)

At the discretion of the graduate advisory committee, a student may continue his work from the fifth year or begin a new area of study for his sixth year. Lecture-discussion, 2 hours, laboratory, 12 hours.

ARC 661, 662, 663 Architectural Seminar (2) (2) (2)

Seminar programs developed to discuss relevant environmental, planning, architecural, administrative, and technological issues. Seminar, 2 hours.

ARC 691 Directed Study (1–3)

Individual student research on a subject of critical importance to architecture. Maximum credit, 9 units.

ARC 695 Project (1–3)

Development of a terminal research project on a topic selected by the student, approved by the department, and submitted to the faculty. Maximum credit, 9 units.

ARC 696 Thesis (1–3)

Development of a terminal research report on a topic selected by the student, approved by the department, and submitted to the faculty. Approved, bound thesis filed in college library. Maximum credit, 9 units.

Biology

BIO 510 Cytogenetics (3)

Nuclear and cytoplasmic structures and phenomena as related to inheritance. Lecture-discussion, 2 hours, laboratory, 3 hours. Prerequisites: BIO 303 and BIO 423. *Dr. Martinek*

BIO 515 Physiology of Parasitism (3)

Physiology and biochemistry of host-parasite interactions; infection phenomena; host or parasite-specific toxins, resistance mechanisms; symptomatology; phenomena of obligate parasitism. Lecture-discussion, 3 hours. Prerequisites: CHM 327, BIO 435. *Dr. Dimitman*

BIO 520 Endocrinology (4)

Study of the endocrine glands and their role in growth development, metabolic regulation, and reproduction in animals. Lecture-discussion, 3 hours, laboratory, 3 hours. Prerequisites: CHM 327, ZOO 324, and/or consent of instructor. *Dr. Lindley*

BIO 525 Ecology of Fungi (4)

Autecology and synecology of fungi in soil, water, atmosphere, living and dead tissues, and other environments; saprophytism, commensualism, mutualism, and parasitism; methods of collection, isolation, and ecological study; some independent study required. Lecture-discussion, 2 hours, laboratory, 6 hours. Prerequisite: BOT 425, BOT 426; BIO 325 or BOT 421 recommended; or consent of instructor. *Dr. Stoner, Dr. Dimitman*

BIO 530 Mechanisms of Speciation (3)

Principles and concepts of evolutionary mechanisms in plants and animals. Lecture-discussion, 3 hours. Prerequisites: BIO 213, BIO 303, BIO 325. *Dr. Szijj*

BIO 535 Advanced Cell Biology (4)

Molecular, ultrastructural and functional approach to cell biology. Lecture-discussion, 4 hours. Prerequisites: BIO 435, CHM 327, or consent of instructor. *Dr. Wu*

BIO 540 Biogeography (3)

Principles and concepts of the distribution of plants and animals throughout the world. Origins and dispersal of modern floras and faunas as related to environmental and historical factors. Lecture-discussion, 3 hours. Prerequisites: BIO 213 and BIO 325. *Dr. Stewart, Dr. Szijj*

BIO 545 Physiology of Plant Disease (4)

Physiological bases of infectious and noninfectious plant diseases, including aspects of disease development and host-parasite interaction. Lecture-discussion, 2 hours, laboratory, 6 hours. Prerequisites: BOT 322, CHM 327, and PTH 223. *Dr. Stoner*

BIO 546 Mineral Nutrition of Plants (3)

Present day concepts of inorganic nutrition in plants, effects of hydrogen ion, deficiency and excess diseases, nitrogen metabolism, photosynthesis; relationship of plant nutrition to animal nutrition. Lecture-discussion, 3 hours. Prerequisite: BOT 322. *Dr. Wu*

BIO 550 Plant Growth and Development (4)

Hormonal and Environmental control of plant morphogenesis. Lecture-discussion, 2 hours, laboratory, 6 hours. Prerequisite: BOT 322. *Dr. Blakely*

BIO 555 Microbial Genetics (4)

Principles of heredity in micro-organisms with emphasis on bacterial and fungal systems. Lecture-discussion, 3 hours, laboratory, 3 hours. Prerequsite: MIC 432 or consent of instructor. *Dr. Martinek*

BIO 560 Bacterial Physiology (4)

Physiological characteristics of bacteria with emphasis upon growth, biosynthetic capabilities and regulation of enzyme formation and function. Lecture-discussion, 2 hours, laboratory, 6 hours. Prerequisites: MIC 432 and CHM 327. *Dr. Goehler*

BIO 565 Comparative Physiology (4)

Mechanisms of basic functions in the important animal phyla. Lecture-discussion, 3 hours, laboratory, 3 hours. Prerequisites: ZOO 324 and ZOO 326. *Dr. Knill*

BIO 570 Insect Physiology (4)

Functions of insect organs and organ systems. Lecture-discussion, 3 hours, laboratory, 3 hours. Prerequisites: CHM 327 and ENT 423. *Dr. Daniel*

BIO 575 Advanced Topics in Biology (2)

Discussion of advanced topics in biology. Topics selected to correspond to the changes in the field or needs of advanced students. Total credit limited to 6 units with a maximum of 2 units per quarter. Lecture-discussion, 2 hours.

BIO 590 Experimental Biology (3)

Lecture series concerning recent research in selected fields of biology; each series to have a subtitle identifying the field. Lecture-discussion, 3 hours. Total credit limited to 9 units.

BIO 690 Research in Biological Sciences (2)

Selection and completion of a research project under supervision of faculty member. Total credit limited to 6 units with a maximum of 2 units per quarter. Laboratory, 6 hours.

BIO 680 Seminar in Biology (1–3)

Arrangements to be made with faculty. Topics in disciplines of biology offered according to interests and needs of students. Each seminar to have a subtitle identifying the discipline. 1–3 units in one quarter, maximum of 9 units.

BIO 691 Directed Study (1–3)

Independent study in an area chosen by the student under the supervision and direction of a graduate faculty member.

BIO 696 Thesis (1–3)

Compilation, evaluation, interpretation, and report of research for thesis. Completion of approved, bound thesis. Prerequisite: BIO 690

Business Administration

GBA 510 Managerial Accounting I (3)

Accounting principles used in the collection, interpretation, and use of financial data from the standpoints of creditors, investors, and management. Lecture-discussion, 3 hours.

GBA 511 Managerial Accounting II (3)

Principles of financial analysis, costing concepts, the interpretation of costed data, and decision making. Lecture-discussion, 3 hours. Prerequisite: GBA 510

GBA 515 Marketing Concepts (3)

Marketing activities and structure. Development of markets, analysis of external and internal environments affecting market performance, forces of change and their influence on the firm's strategies and actions. Lecture-discussion, 3 hours.

GBA 516 Marketing Decisions in Business Administration (3)

Problems affecting the management of marketing effort. Development of marketing plans and programs, their execution and evaluation from the viewpoint of management and society. Lecture-discussion, 3 hours. Prerequisite: GBA 515

GBA 520 Automated Business Information Systems (3)

Concepts of automated business information systems. The computer as an information processing system and as a business management tool. Management information programming. Lecture-discussion, 3 hours.

GBA 521 Systems Analysis and Design (3)

Business information systems from a "total systems" concept. Investigation of information gathering, analysis, design, and implementation of information systems. Alternative approaches to solution of practical management problems. Lecture-discussion, 3 hours. Prerequisite: GBA 520

GBA 525 Managerial Finance (3)

Short and long term sources of finance for a business. Internal control of assets and financial evaluation of managerial planning and capital expenditures. Lecture-discussion, 3 hours. Prerequisite: GBA 510

GBA 526 Advanced Managerial Finance (3)

Quantitative financial problem solving through application of capital budgeting theory, cost of capital theory and treatment of uncertainty. Lecture-discussion, 3 hours. Prerequisite: GBA 525

GBA 530 Legal Environment of Business (3)

Essential legal aspects of the business environment. Legal systems and procedures, enforceable agreements, agency, bailments, and bankruptcy. Case studies. Lecture-discussion, 3 hours.

GBA 531 Management and Organizational Theory (3)

Development of theories of management and organization in the twentieth century. Managerial principles and functions and the utilization of these concepts. Case studies. Lecture-discussion, 3 hours.

GBA 532 Business Statistics and Probability (3)

Theory and application of probability and random variables, sampling, empirical and theoretical distributions, parametric and nonparametric tests, regression and correlation analysis in business problem solving. Lecture-discussion, 3 hours.

GBA 533 Management Policies (3)

An integration of functional areas of business in the approach to problem solving. Top management policy development and practices. Case studies. Lecture-discussion, 3 hours. Prerequisite: GBA 531

GBA 534 Introduction to Quantitative Methods in Business (3)

Quantitative concepts and methods in management decision making. Operations research, decision models, decision theory, and complex problem solving in dynamic systems. Lecture-discussion, 3 hours. Prerequisite: GBA 532

GBA 540 Foundations of Business Education (3)

Principles, philosophy, and history of business education. Principles of curriculum development and evaluation; the role and scope of business education and its relationship to the total educational program. Lecture-discussion, 3 hours.

GBA 541 Review of Research in Business Education (3)

Criteria for the evaluation of research in business education. Survey of methods employed in research; review and evaluation of reported research; areas of needed research. Lecture-discussion, 3 hours. Prerequisite: GBA 540

GBA 542 Problems in Business Education (3)

Special problems in selected areas of business education, including community relations, classroom equipment, personnel, in-service programs, and governmental regulation of programs. Lecture-discussion, 3 hours.

GBA 543 Innovations and Trends in Business Education (3)

Study of current trends and innovations in business education on the secondary and collegiate levels. Seminar discussions, demonstrations, observations. Seminar, 3 hours. Course may be taken in two different areas. Selection may be made from the following fields:

a. Bookkeeping and Accounting
b. Business-Economic Education
c. Data Processing for Teachers
d. Distributive Education
e. Office-Secretarial Subjects

GBA 550 Seminar in Business Education (3)

Identification and analysis of problems in the organization, administration, and teaching of business subjects in secondary schools. Current trends. Directed research. Seminar, 3 hours.

GBA 551 Accounting for Executive Administration (3)

Control systems, responsibility in profit planning and control, capital investment decisions, and federal income tax aspects of decisions. Lecture-discussion, 3 hours. Prerequisite: GBA 511

GBA 561 Seminar in Organization Theory (3)

Current research in organization dynamics and the influence of the behavioral sciences. Implications of this research to humanistic and quantitative models. Seminar, 3 hours. Prerequisite: GBA 533

GBA 563 Executive Development (3)

Problems and techniques in the development of personnel for management responsibility. Current practices of business in stimulating self-development. Seminar, 3 hours. Prerequisite: GBA 561

GBA 564 Quantitative Business Analysis (3)

Quantitative theory and techniques. Linear, integer, non-linear, and dynamic programming, queuing theory, Monte Carlo methods, game theory, Markov processes, simulation and the development of inventory models. Lecture-discussion, 3 hours. To be taken during first quarter of the second year of the MBA program. Prerequisite: GBA 534

GBA 571 Marketing Strategies (3)

Setting of objectives and goals for the performance of marketing functions. Development of strategies to reach these objectives. Seminar, 3 hours. Prerequisite: GBA 516

GBA 581 Corporation Financial Planning (3)

Financial implications of long-range corporate planning and the effect on profitability and liquidity of the firm. Case problems, model developing, and testing of various plans. Lecture-discussion, 3 hours. Prerequisite: GBA 526

GBA 617 Industrial Dynamics (3)

Changing interaction of supervisors and employees within the social system of the plant. Resolution of problems and tensions through the communications process viewed as an administrative tool. The development of leadership and a realistic view of managerial hierarchy and power struggles. The strategy of planning and decision making. Lecture-discussion, 3 hours.

GBA 626 Instructional Development in Higher Education for Business (3)

An examination and appraisal of the development, scope, and diversity of schools of business administrtion, varieties of institutions, purposes, and programs; trends and current issues. Seminar, 3 hours.

GBA 627 Communications in Management (3)

Communications as a process in the management function. Development and improvement of advanced techniques of writing for business. Lecture-discussion, 3 hours.

GBA 631 Management of Marketing Channels (3)

Historical development, functions, and management of marketing channels. Channel relationships and funds. Lecture-discussion, 3 hours. Prerequisite: GBA 571

GBA 633 Marketing Information and Communications Systems (3)

Generation and analysis of marketing information. Research, theory and methods of market stimulation and mass communications. Use of marketing information in communications to the market and to channel members. Lecture-discussion, 3 hours. Prerequisite: GBA 571

GBA 635 Motivation and Market Behavior (3)

Significant theories and research contributions toward understanding consumer marketplace behavior. Application of these findings to managerial decisions and policies in the areas of product, price, promotion and distribution. Lecture-discussion, 3 hours. Prerequisite: GBA 571

GBA 643 Management Information Systems (3)

Establishment and control of information flow, storage, and retrieval from a common data bank. Management tools in data communication and information retrieval. Use of automated computer systems. Lecture-discussion, 3 hours. Prerequisite: GBA 521

GBA 645 Methods in Operations Analysis (3)

Applications of electronic computers to management techniques. Formulating linear programming for use on a computer, simulation using FORTRAN, Simscript, or GPSS computer languages, random number generation; solving regression and sales forecasting problems on a computer. Lecture-discussion, 3 hours. Prerequisite: GBA 564 and 643

GBA 651 Seminar in Marketing (3)

Advanced theory, newest concepts and technical advances, current problems, and possible future developments in marketing. Seminar, 3 hours. Prerequisite: GBA 571

GBA 659 Seminar in Current Accounting Theory (3)

Evolution of accounting theory. Emphasis on current problems, reasons, and causes for controversy, and future developments. Seminar, 3 hours. Prerequisite: GBA 551

GBA 662 Corporation Financial Evaluation Seminar (3)

Establishing the value of a going concern using quantitative, qualitative, and market analysis techniques, present value theory, quantitative models and methods applied to case studies on expansion acquisitions through mergers and tender offers. Case study. Lecture-discussion, 3 hours. Prerequisite: GBA 581

GBA 671 Management Seminar (3)

Business policy; analysis of alternatives; selection of appropriate courses of action, draws upon functional areas of business. Seminar, 3 hours. To be taken in last quarter of the MBA program. Prerequisite: GBA 561

GBA 675 Theory of the Firm (3)

Development of a model to predict behavior of business firms. Integration of functional areas and internal and external environments of the firm. Seminar, 3 hours. To be taken in last quarter of the MBA program. Prerequisite: GBA 561

GBA 691 Directed Study in Business (1–3)

Independent, directed study of advanced topics in the field. Individual conferences with the instructor.

GBA 694 Accounting Research (3)

Application of selected theory concepts in model construction. The determination of changes in reported operating results arising from changes in accounting theory. Seminar, 3 hours. Prerequisite: GBA 564

GBA 695a Business Research Project (3)

A written research project concerning a significant problem in the field of business. Prerequisite: GBA 691 for MBA candidates, GBA 541 for MS Candidates.

GBA 695b Field Analysis of the Firm (3)

Team analysis of the power structure, communication networks, problems, objectives, and policies of a specific firm. Oral and written report. Field work and seminar. Prerequisite: GBA 691 for MBA candidates.

GBA 696 Thesis (3)

A formal thesis concerning a significant problem in the field of business. Prerequisite: GBA 691 for MBA candidates, GBA 541 for MS Candidates.

Chemistry

CHM 513 Independent Study in Advanced Chemistry (1–4)

Reading and reports on papers in the literature, solving of assigned problems. Minimum of 60 hours total time. Concurrent: Any of CHM 541, 542, 553, 554, 561, 562, 571, 572, 581, 582. May be repeated for a maximum of 7 units.

CHM 521, 522 Theoretical Chemistry (3) (3)

Quantum chemistry; applications of quantum mechanics to problems of atomic and molecular structure. Molecular orbital and valence bond theories; their applications and extensions. Electronic states and transitions. Organic and inorganic molecular structures and reaction mechanisms. Lecture-discussion, 3 hours. Concurrent: CHM 551, 552. *Dr. Hsia*

CHM 541, 542 Advances in Organic Chemistry (3) (3)

Modern synthetic organic chemistry with emphasis on reactions, reaction mechanisms, structure, structure determination, and sterochemistry of organic compounds. Selected topics from organic photochemical reactions and chemistry of organometallic, heterocyclic, organophos-

phorus, and organoboron compounds. Lecture-discussion, 3 hours. Concurrent: CHM 513. *Dr. Dev*

CHM 543 Chemistry of Heterocyclic Compounds (3)

Chemistry of organic compounds, having three, four, five, and six membered cyclic structure and containing one or more than one hereroatom. Lecture-discussion, 3 hours. *Dr. Vollmar*

CHM 544 Chemistry of Natural Products (3)

Isolation, structure elucidation and synthesis of naturally occurring compounds like alkaloids, carbohydrates, hormones, peptides, steroids, and terpenes. Lecture-discussion, 3 hours. *Dr. Simpson*

CHM 545 Organic Photochemistry (3)

Light-induced chemical reactions of organic compounds. The mechanism of photochemical reactions and applications to synthesis problems encountered in organic chemistry. Lecture-discussion, 3 hours. Prerequisite: CHM 542. *Dr. Dev*

CHM 550 Seminar in Chemistry (1–3)

Special problems in selected areas of chemistry. Seminar, 1 to 3 hours. Maximum of 6 units may be earned.

CHM 551, 552 Independent Study in Theoretical Chemistry (1) (1)

Reading and reports on papers in the literature; solving of assigned problems. Minimum of 60 hours total time. Concurrent: CHM 521, 522. *Dr. Hsia*

CHM 553, 554 Advanced Physical Chemistry (3) (3)

Selected advanced topics in physical chemistry such as molecular spectra, optical activity, transport phenomena, dielectrics, elasticity and electrode processes. Lecture-discussion, 3 hours. Concurrent: CHM 513. *Dr. Hiemenz*

CHM 561, 562 Selected Topics in Biochemistry (3) (3)

Basic chemical principles as applied to topics of biochemical interest, for example, cellular energetics and kinetics, analysis of the structure and function of proteins and other supermolecules, feedback control of metabolism, biochemical behavior of organelles. Concurrent: CHM 513. *Dr. Bowen*

CHM 563 Enzymology (3)

The nature of enzymes including enzyme kinetics, mechanisms of enzyme catalyzed reactions, enzyme inhibitors, classification of enzymes. Lecture-discussion, 3 hours. *Dr. Rice*

CHM 564 Enzymology Laboratory (2)

Techniques for the isolation and characterization of enzymes from plant and animal sources. Kinetic studies, specificity, physical chemical properties. Laboratory, 6 hours. Concurrent: CHM 563. *Dr. Rice*

CHM 565 Biochemical Mechanisms (3)

General mechanistic principles of organic and inorganic chemistry as they relate to biochemistry. Lecture-discussion, 3 hours. *Dr. Bowen*

CHM 566 Biochemical Preparations (2)

Isolation of some eight different materials from plant and animal sources, such as a blood protein fraction, a plant nucleic acid, a plant terpene, a hormone preparation, a metabolic intermediate, and an urinary excretion product. Laboratory, 6 hours. Prerequisite: CHM 321 or CHM 327. *Dr. Abernethy*

CHM 571, 572 Advanced Inorganic Chemistry (3) (3)

Chemical applications of group theory; bonding theories and their applications to the properties of inorganic compounds; inorganic reaction mechanisms; physical methods in inorganic chemistry. Lecture-discussion, 3 hours. Concurrent: CHM 513. *Dr. McKown*

CHM 58l, 582 Advances in Analytical Chemistry (3) (3)

Selected topics in modern analytical chemistry. Lecture-discussion, 3 hours. Concurrent: CHM 513. *Dr. Geller*

CHM 691 Directed Study (1–2)

Independent study in an area chosen by the student under the supervision and direction of a graduate faculty member.

CHM 696 Thesis (1–3)

Compilation, evaluation, interpretation, and report of research for thesis. Completion of approved, bound thesis.

Civil Engineering

CE 515 Advanced Indeterminate Structures (4)

Advanced topics in analysis of multi-degree of freedom systems by slope deflection and superposition of distribution process. Elements of matrix application including flexibility and stiffness methods. Deflection of continuous trusses and frames structures. Stability analysis of beam-column utilizing classical strain energy theorems. Lecture-discussion, 4 hours. Prerequisite: CE 305

CE 516 Advanced Structural Design—Steel (4)

Advanced topics in structural steel analysis and design including long span and tapered girders, orthotropic plates, spare frames. Column stability and post buckling states, secondary stresses. Design of lateral force resistant building frames. Plastic analysis and design of rigid frame structures. Lecture-discussion, 3 hours, laboratory, 3 hours. Prerequisite: CE 306

CE 519 Dynamics of Structures (4)

Basic concepts in structural dynamics, in elastic response of structures to pulse loads and earthquakes, dynamic properties of structures, vibration of beams and other systems. Design approach to earthquake resistant structures. Basic for new earthquake factors in latest building codes. Lecture-discussion, 4 hours. Prerequisite: Consent of instructor.

CE 522 Advanced Reinforced Concrete Design (4)

Advanced design and analysis of continuous building frames to include floor systems, eccentrically loaded columns, folded plate and shell roof elements. Retaining structures, footings subject to overturning, composite deck sections. Lecture-discussion, 4 hours. Prerequisite: CE 421

CE 525 Foundation Engineering (3)

Advanced theories of soil bearing capacity and stress distribution of soils. Analysis and design of mat, pile and drilled caisson foundations involving advanced theories of foundation action. Design of foundations subjected to overturning forces and dynamic loads. Lecture-discussion, 3 hours. Prerequisite: CE 423

CE 563 Structural Engineering Seminar (2)

Discussion of new developments and procedures in structural analysis and design. Problems related to various phases of design. Presentation by student of new practices in structural field that are of particular interest to him. Laboratory-seminar, 6 hours.

Economics

EC 510 Economic Analysis and Policy I (3)

Microeconomic relationships in a market system. Behavior of individual economic units. Analysis and policy. Not open to students with prior courses in economics. Lecture-discussion, 3 hours.

EC 511 Economic Analysis and Policy II (3)

Macroeconomic relationships in a market system. Determinants of aggregate economic activity. Analysis and policy. Lecture-discussion, 3 hours. Prerequisite: EC 510

EC 540 Seminar in Economics (1–3)

Special problems in selected areas of economics. Each seminar will be structured to meet the needs of individual students. Seminar, 1 to 3 hours.

EC 550 Microeconomic Analysis (4)

Analysis of the resources allocation systems and behavior of producing and consuming units. Lecture-discussion, 4 hours. Prerequisites: Some knowledge of elementary calculus and linear algebra; intermediate price theory (equivalent to EC 311); or consent of the instructor.

EC 551 Macroeconomic Analysis (4)

Analysis of aggregate national economic activities. Lecture-discussion, 4 hours. Prerequisites: Some knowledge of elementary calculus and linear algebra; intermediate income theory (equivalent to EC 312); or consent of the instructor.

EC 552, 553 Econometrics I, II (4) (4)

Specification and statistical inference in economic models; estimation, verification and prediction of economic variables; recent empirical studies. Lecture-discussion, 4 hours. Prerequisites: Elementary calculus and matrix algebra; intermediate price and income analysis; one year of statistics; or equivalent; or consent of instructor.

EC 560, 561 Managerial Economics and Operations Analysis (4) (4)

Advanced topics and new developments in managerial economics and operations analysis. Lecture-discussion, 4 hours. Prerequisites: Intermediate microeconomics, mathematical analysis (equivalent to Math 108, 109, 204), and statistics (equivalent to EC 321, 322); or consent of instructor.

EC 656, 657 Money and Capital Markets I, II (4) (4)

Topics in monetary and capital theory. Liquidity creation, financial intermediation and capital formation. Development of capital policy. Lecture-discussion, 4 hours. Prerequisites: Intermediate Price and Income Theory and undergraduate Money and Banking.

EC 658 Industrial Organization and Public Policy (4)

The organization and structure of the American enterprise economy with special reference to manufacturing and processing industries. Corporate behavior, price policy and workability of competition in industries. Public policy towards monopoly and competition. Lecture-discussion, 4 hours. Prerequisite: EC 311 and 312 or consent of instructor.

EC 691 Directed Study (1–2)

Independent study in an area chosen by the student under the supervision and direction of a graduate faculty member.

EC 696 Thesis (1–3)

Independent research and study under the supervision of the faculty. Reporting the research results in the approved form. Maximum credit, 9 units.

Education

Graduate courses in education are listed under Teacher Preparation.

Electrical and Electronics Engineering

EE 510 Linear Systems (4)

Application of vector spaces and matrix theory to the representation and solution of systems in state-space. Introduction of the concepts of equilibrium and stability. Lecture-discussion, 4 hours. Prerequisite: EE 309 or equivalent.

EE 511 Advanced Networks Analysis I (4)

Advanced methods of network analysis. Two-part matrix analysis of active networks; interconnection of two-parts; network topology; signal flow graph theory and state variable techniques with application to complex electric networks. Lecture-discussion, 4 hours. Prerequisite: EE 309 or equivalent.

EE 512 Sampled-Data Control Systems (4)

Basic theory of sampling and quantizing, state-space and Z-transform representation. Time response stability and design using both classical and modern techniques. Lecture-discussion, 4 hours. Prerequisites: EE 414, 510

EE 513 Advanced Digital Computer Organization (4)

Sequential systems organization. Digital computer major state diagrams, machine programming, tuning diagrams and sequence analysis. Special commands, I/O operations, jumps and interrupts. Register operations, elementary machines and generalized digital computer specification. Term paper on analysis of approved topic in digital computer systems. Lecture-discussion, 4 hours. Prerequisites: EE 404, 425, or equivalent.

EE 514 Communication Theory I (4)

Information theory for continuous and discrete channels. Signal detection and recognition, coding for optimal communication nets. Lecture-discussion, 4 hours. Prerequisites: EE 405, 409 or equivalent.

EE 518 Solid State Electronics I (4)

Quantum theory and atomic structure. Classical and quantum statistics. Description of crystal structures. Lattic vibrations. Band theory of solids. Transport phenomena in semiconductors and metals. Lecture-discussion, 4 hours. Prerequisite: EE 412, or equivalent.

EE 691 Directed Study (1–3)

Analytical or laboratory investigations under direction of a graduate faculty member of selected electrical engineering problems with emphasis on individual initiative in gathering and organizing data, self-study, and reporting of such investigations. May be repeated.

English

ENG 550 English Seminar (1–3)

Topics in advanced areas of language or literature. Seminar, 1 to 3 hours. Prerequisite: Instructor's approval. May be repeated for a total of 9 units.

ENG 570 Practical Criticism (3)

Practice in applying to works of various genres such modes of criticism as the formal, the historical, and the psychological. Seminar, 3 hours.

ENG 571, 572 Studies in Fiction (3) (3)

Selected authors and topics. In the first quarter, extensive reading. In the second, explication, by students, of selected texts; long paper. First quarter prerequisite to the second. Seminar, 3 hours.

ENG 573, 574 Studies in Drama (3) (3)

Selected authors and topics. In the first quarter, extensive reading. In the second, explication, by students, of selected texts; long paper. First quarter prerequisite to the second. Seminar, 3 hours.

ENG 575, 576 Studies in Poetry (3) (3)

Selected authors and topics. In the first quarter, extensive reading. In the second, explication, by students, of selected texts; long paper. First quarter prerequisite to the second. Seminar, 3 hours.

ENG 585 The New Rhetoric in Theory and Practice (3)

Readings in I. A. Richards, Kenneth Burke, Francis Christensen, and others. Application of rhetorical principles to problems in writing. Stylistic analyses of contemporary expository prose. Seminar, 3 hours.

Environmental Design

ENV 510 Environmental Design and Graphics (6)

For graduate students with degrees in fields other than environmental design to develop basic skills in design and graphic communications in preparation for advanced methodology. Lecture-discussion, 3 hours, laboratory, 9 hours.

ENV 511 Landscape Planting and Construction (6)

For graduate students with degrees in fields other than landscape architecture to develop the ability to use a basic plant vocabulary and to prepare simple contract drawings. Lecture-discussion, 3 hours, laboratory, 9 hours.

ENV 621 Design of Urban Projects and Spaces (4)

Design assignments in the city, such as open spaces, large scale public works projects. Commercial, industrial, and institutional land use, preparation and presentation of workable design solutions considering all aspects of the problems. Lecture-discussion, 1 hour, studio, 9 hours.

ENV 622 Design of the Residential Environment (4)

Creation of new housing policies and programs; design involving a variety of types of living areas; redesign of in-city neighborhoods. Lecture-discussion, 1 hour, studio, 9 hours.

ENV 623 Design of the Metropolis (4)

Design experience in large scale metropolitan planning; development of functional relationships between systems and sub-areas of the metropolis; new towns; the application of design and aesthetic principles to metropolitan areas. Lecture-discussion, 1 hour, studio, 9 hours.

ENV 691 Independent Study (1–4)

Independent study in an area chosen by the student with approval and supervision of faculty. Maximum of 4 units may be earned.

History

HST 610 History of American Business (3)

American business from colonial beginnings to present. Economic, social and political forces influencing the structure and status of business in American life. Consequences of the Industrial Revolution and the prevailing social idealogies upon the organization and ethical values of the business community. Effect of technology, wars, industrialization, and welfare state upon business and its role in society. Lecture-discussion, 3 hours. *Dr. Heath*

Landscape Architecture

LA 512 Methods and Applications for Landscape Architecture (12)

Detailed exploration of the concerns underlying landscape design with particular emphasis

on ecosystems and human needs; study of methods for relating these concerns to design and practice in their application. Lecture-discussion, 6 hours, laboratory, 18 hours.

LA 551 Graduate Seminar (2)

For first year graduate students. Information on contemporary environmental problems; consideration of various approaches to their solutions; particularly for interchange among students in the two simultaneous studios. Prerequisite: LA 601. Seminar, 2 hours.

LA 601 Theory and Literature of Landscape Architecture (6)

Review and analysis of the existing body of literature concerning relationships between man and his natural environment, with particular concentration on ecosystems or human needs according to the preference of the individual student. Prerequisite: LA 512. Lecture-discussion, 3 hours, laboratory, 9 hours.

LA 602 Ecosystematic Landscape Design (6)

Applications of ecosystematic principles and methods explored in the first two quarters to physical problems of landscape design, encompassing a broad and complex range of human and natural considerations. Prerequisite: LA 601. Lecture-discussion, 3 hours, laboratory, 9 hours.

LA 603 Human Needs in Landscape Design (6)

Application of approaches to the determination, satisfaction and expression of human needs in the shaping of space for human use and habitation. Prerequisite: LA 601. Lecture-discussion, 3 hours, laboratory, 9 hours.

LA 604 Ecosystems Applications (6)

Applications of the ecosystematic approach to complex large scale problems of landscape design. Prerequisite: LA 602. Lecture-discussion, 3 hours, laboratory, 9 hours.

LA 605 Design of the Humanized Landscape (6)

Definition and solution of problems in the shaping of space involving human needs both individual and social, as a primary determinant of form. Prerequisite: LA 603. Lecture-discussion, 3 hours, laboratory, 9 hours.

LA 652 Graduate Seminar (2)

Seminar presentations and discussion of work in progress by all graduate students. Prerequisite: LA 551. Seminar, 2 hours.

LA 691 Special Project (1)

Individual exploration of particular area of concern. Required each quarter.

LA 692 Directed Research (1–6)

Independent study and research on a subject chosen by the student with the consultation, approval and direction of his adviser. Prerequisite: LA 602 or 603

LA 695 Project (2)

To be taken concurrently with final design course by all students electing applications concentration.

LA 696 Thesis (4)

Development of a terminal creative research report, selected by the student and approved by the department, on a problem in the field of landscape architecture.

Mathematics

MAT 511, 512 Real Analysis (3) (3)

Properties of Lebesgue measure and integration, Borel Sets, monotone functions and functions of bounded variation, classical Banach spaces, metric spaces, measure spaces and measurable functions, Lebesgue-Stieltjes integrals and Daniell integrals, the Radon-Nikodym theorem. Lecture-discussion, 3 hours. Prerequisite: MAT 315; MAT 450 recommended.

MAT 517, 518 Abstract Algebra (3) (3)

Theory of algebraic structures: groups, rings, integral domains, fields, vector spaces. Isomorphisms, homomorphisms; operators. Lecture-discussion, 3 hours. Prerequisite: MAT 418

MAT 521, 522 Point Set Topology (3) (3)

Topological spaces; connectedness, compactness, continuity, separation and countability axioms, metric spaces, product spaces, function spaces and quotient spaces, uniform spaces, paracompactness. Lecture-discussion, 3 hours. Prerequisite: MAT 450 recommended. *Dr. Vought*

MAT 544, 545 Topics in Applied Mathematics (3) (3)

Topics from applied mathematics with emphasis on modern mathematical techniques as well as their related abstract concepts; linear operators, integral transforms, partial differential equations, the eigenvalue problem, integral

equations, calculus of variations, tensor analysis, group representations. Lecture-discussion, 3 hours. *Dr. Fan*

MAT 550 Seminar in Mathematics (1–3)

Topics in advanced mathematics chosen according to the interests and needs of the students enrolled. Each seminar will have a subtitle according to the nature of the content. Seminar, 1 to 3 hours. Prerequisite: Instructor's approval. May be repeated for a maximum of 6 units.

Physical Education

PE 510 Philosophical Bases of Physical Education (3)

The development of the philosophies of physical education and the assumptions upon which current professional philosophies rest. Lecture-discussion, 3 hours. *Mr. Lansford*

PE 540 Cultural Patterns and Physical Education (3)

Preparation and presentation of critical reviews of literature in sociology of sport. The topics to be considered are: the impact of sport on industry, economics and the institutions of politics and education, and sport as it affects man's sociocultural development and his value system. Lecture-discussion, 3 hours. *Dr. Bell*

PE 580 Advanced Motor Learning and Human Performance (3)

Preparation and presentation of critical reviews of literature in motor learning. Topics are: kinesthesis, reaction time, strength in neuromotor coordination, motor learning, and transfer factors affecting motor performance. Lecture-discussion, 3 hours. *Dr. Bassin*

PE 583 Advanced Motor Development (3)

Analysis of physical growth and motor development from infancy to adulthood. Changes in anthropometric measurements, rates of growth of various body tissues, organs, and segments, and ossification of the skeleton during childhood and adolescence. Aspects of motor development at various ages. Prerequisite: PE 322. Lecture-discussion, 3 hours. *Dr. Bassin*

PE 590 Research Methods and Design (3)

Advanced evaluation of experimental design, instrumentation procedures and analysis of factors relating to human performance. Prerequisite: PE 425 and a course in basic statistics, or the equivalent. Lecture-discussion, 3 hours. *Dr. Ridgeway*

PE 640 Socio-cultural Aspects of Sport (3)

Discussion and analysis of interrelationships between sport and society. Consideration of sport as a subsystem of more inclusive social systems. Development of sociological, anthropological, and cultural implications and patterns. Lecture-discussion, 3 hours. *Dr. Bell*

PE 643 World History of Physical Education (3)

The development of physical education from ancient times to the present in both Eastern and Western cultures. Emphasis on the growth and development of physical education in Greece and Rome. Lecture-discussion, 3 hours. *Dr. Emery*

PE 645 The Behavioral Sciences of Human Movement (3)

Preparation and presentation of critical reviews of current research literature in behavioral science of physical education leading to an understanding of the research process and applying techniques to the solution of specific problems. Seminar, 3 hours. *Dr. Ridgeway*

PE 650 Problems in Physical Education (3)

Recent developments in physical education; relations with other social and educational agencies, curriculum changes, professional organization, individual and group problem solving. Seminar, 3 hours. *Dr. Syverson*

PE 680 Advanced Kinesiological Analysis (4)

Advanced kinesiological analysis of athletics utilizing knowledge of muscle groups, principles of movement, and principles of human performance to develop a logical and cohesive understanding of human movement. Prerequisites: PE 406, 427, or equivalent. Lecture-discussion, 3 hours, laboratory, 2 hours. *Mr. Gasser*

PE 683 Advanced Physiology of Exercise (4)

Lectures on the physiological adjustments made by the body during exercise and the changes which result from prolonged periods of intensive physical training. Laboratory instruction and experiments using various instruments for physiological testing. Prerequisite: PE 303. Lecture-discussion, 3 hours, laboratory, 2 hours. *Dr. Teghtmeyer*

PE 685 The Scientific Bases of Physical Education (3)

Group discussion and individual presentations of the literature and research on motor learning. In-depth study in an area of student's special interest. Prerequisites: 8 units of credit in area of specialization and consent of instructor. Seminar, 3 hours. *Dr. Teghtmeyer*

PE 691 Independent Study (1–2)

Independent study in an area chosen by the student under the direction and supervision of faculty.

PE 696 Thesis (1–3)

Development of a terminal creative research report on a topic selected by the student, approved by the department graduate studies committee and submitted to the faculty as evidence of his mastery of the principles of the profession. May be scheduled for a maximum of 9 units.

Physics

PHY 550 Seminar in Physics (1–3)

Special problems in selected areas of physics. Seminar, 1 to 3 hours. Maximum of 6 units may be earned.

Social Sciences

SSC 550 Seminar in the Social Sciences (1–3)

Special problems in selected areas of the social sciences. Each seminar will have a subtitle describing its nature and content. Seminar, 1 to 3 hours. May be repeated for a maximum of 9 units.

Teacher Preparation

*TEP 503 Secondary Curriculum Procedures and Methods (2–6)

Curriculum practices, instructional prcedures and materials. Visual and auditory methods and materials of value for classroom teaching. Laboratory sections in student's major and minor fields will be taught by joint appointment faculty in the respective major and minor departments. A total of 6 units must be taken in the initial registration. Lecture-discussion, 4 hours, activity, 4 hours. Prerequisite: Admission to the teacher preparation program. *Dr. Tucker*

* TEP 504 Seminar in Secondary Education (3)

Critical analysis of problems of teaching and supervising in the secondary school; recent developments in the curriculum; reports of professional groups and current bibliography from professional journals. Lecture-discussion, 3 hours. Prerequisite: Concurrent enrollment in secondary student teaching. *Dr. Tucker*

* TEP 505 Philosophical-Sociological Foundations of Education (5)

The role of education and teaching in America, synthesizing the contribution of philosophical, sociological, and comparative studies; influence of social structure on schools; American cultural values and their influence on education. Lecture-discussion, 5 hours. Prerequisite: Permission of instructor. *Dr. Platner*

TEP 520 Diagnosis of Reading Difficulties (3)

Emphasis upon individualized diagnosis and remediation of critically handicapped readers. Analysis of difficulties in reading and writing language. Practice in the use of diagnostic procedures, tests and laboratory equipment. Use and interpretation of informal, formal, group and individual tests used in the analysis of reading difficulties; methods of difficulty analysis, diagnostic test evaluation, assessment of psychological, emotional and physical factors. Lecture-discussion, 3 hours. Prerequisite: TEP 410 and TEP 426. *Mrs. McGraw*

TEP 521 Analysis of Corrective Reading Practices and Techniques (3)

Inhibiting factors associated with reading disabilities among children in school, informal techniques of reading evaluation and corrective procedures in the improvement of word recognition, vocabulary and comprehension skills; materials and organization of a corrective program. Group and individual techniques, case studies, sample lessons and demonstrations of remedial methods. Lecture-discussion, 3 hours. Prerequisite: TEP 520. *Mrs. McGraw*

*Credential courses not applicable to master's degrees.

TEP 522 Laboratory of Clinical Practice: Treatment of Reading Disorders (3)

Observation and supervised experience in individual and group diagnostic and therapeutic procedures with pupils who evidence reading disabilities. Supervised case study, diagnosis and remedial instruction in reading, using techniques of analysis and appropriate remedial instruction. Teacher will practice individual tutoring, group remedial activities, parent interviews, case study and clinic reports. Laboratory. Prerequisite: TEP 521. *Mrs. McGraw*

TEP 550 Seminar in Educational Issues (2–3)

Intensive study of selected issues, problems, or areas in education, according to the interests of the students enrolled. Each seminar subtitled by its content. Seminar, 2–3 hours. May be repeated for a maximum of 6 units.

TEP 650 Seminar in Current Problems and Strategies in Education (2–3)

Critical treatment of new strategies, innovations, conditions, and the findings of research that currently affect or involve education. Choice of topics will be related to contemporary education problems. Seminar, 2–3 hours. May be repeated for a maximum of 6 units.

TEP 690 Methods and Techniques of Research (3)

Definition and methods of solution of problems in education. Emphasis on experimental research and use of the library. Criteria for evaluation of education research, critical analysis of representative research reports, survey of methods employed in educational research, common research errors, problems of criteria, selected statistical concepts. Seminar, 3 hours.

TEP 691 Independent Study (1–3)

An intensive study of a particular problem in education under the direction of a member of the Teacher Education Advisory Committee. Maximum credit, 6 units. Prerequisite: Consent of a professor to act as sponsor.

TEP 695 Project (1–3)

independent research leading to successful completion of a project. Open to graduate students advanced to candidacy and with approval of adviser. Maximum credit for TEP 690 and TEP 695 or TEP 696, 9 units. Prerequisite: TEP 690.

TEP 696 Thesis (1–3)

Independent research leading to successful completion of a thesis. Open to graduate students advanced to candidacy and with approval of adviser. Maximum credit for TEP 690 and TEP 695 or TEP 696, 9 units. Prerequisite: TEP 690

Urban Planning

UP 534 Urban Housing and Development (4)

Shelter requirements and prospects; the urban renewal role in the city, local, state, and federal housing and development policies; alternative solutions to housing problems. Lecture-discussion, 3 hours, studio, 3 hours.

UP 535 Urban Data and Simulation Programs (4)

Use of computers; mathematical models, gaming methods, simulation techniques, and data systems. Application of advanced urban planning methods and techniques to the solution of urban problems. Lecture-discussion, 3 hours, studio, 3 hours.

UP 536 Urban Circulation and Communication Systems (4)

Problems of planning for urban circulation and communication facilities. Interrelationship of these systems with land use and future requirements. Public and private responsibilities. Lecture-discussion, 3 hours, studio, 3 hours.

UP 537 Regional, State, and National Planning (4)

Development of land use and resource plans and regulations; policy planning and political influences; creation of new institutions to guide change; speculation on the future of regional, state, and national planning. Lecture-discussion, 3 hours, studio, 3 hours.

UP 651 Planning in Contemporary Society (3)

The contemporary planning role and prospects; planning's relationship to political, social and economic institutions; advocacy planning and participatory government. Seminar, 3 hours.

UP 652 Planning Administration (3)

Problems affecting orderly development of urban areas; administrative coordination in government; organizational aspects; planning regulation and control techniques. Seminar, 3 hours.

UP 653 Professional Practice (3)

Planning as a profession; function of the planner in public and private practice; professional ethics and responsibilities. Seminar, 3 hours.

UP 691 Urban Research Methods and Techniques (4)

Individual student research on a subject of critical importance to urban planning that will demonstrate the student's competence in urban research methods and techniques.

UP 696 Thesis (3)

Development of a terminal creative research report on a topic selected by the student, approved by the department, and submitted to the faculty as evidence of his mastery of the principles of his profession.

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Animal Science

Dale R. Christiansen, M.S.
Ornamental Horticulture

Haven Q. Conard, M.S.
Agriculture Engineering

Anahid Crecelius, Ph.D.
Foods and Nutrition

Gerald L. Croissant, Ph.D.
Plant and Soil Sciences

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Agricultural Business Management

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Agricultural Business Management

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International Agriculture

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Albert J. Aschenbrenner, Ed.D.
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Rudolph Zrimc, Ph.D.
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