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graduate school 1980-82



Bulletin of
LOMA LINDA UNIVERSITY

graduate school

This is a two-year BULLETIN.

LOMA LINDA UNIVERSITY

1980-82

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Bulletin of LOMA LINDA UNIVERSITY
Graduate School 1980-82

The information in this BULLETIN
is made as accurate as is possible
at the time of publication. Students are
responsible for knowing
and satisfactorily meeting
all requirements pertinent to their
relationship with the University.
The University reserves the right
to make such changes as circumstances
demand with reference to admission,
registration, tuition and fees,
attendance, curriculum requirements,
conduct, academic standing,
candidacy, and graduation.

BULLETIN OF
LOMA LINDA UNIVERSITY
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LOMA LINDA UNIVERSITY is a two-campus Seventh-day Adventist coeducational institution located in inland Southern California and is part of the Seventh-day Adventist system of higher education.

On the La Sierra campus, at the west edge of Riverside, curriculums in applied and liberal arts and sciences, and programs in professional education in fulfillment of requirements for teaching credentials are offered by the College of Arts and Sciences and the School of Education. On the Loma Linda campus, in the San Bernardino-Redlands area, professional curriculums are offered by the Schools of Allied Health Professions, Dentistry, Health, Medicine, and Nursing. Graduate programs of the departments of the schools are offered from both campuses through the Graduate School.

Accredited by the Accrediting Commission for Senior Colleges and Universities of the Western Association of Schools and Colleges and the North American Division Commission on Accreditation of the Board of Regents of the General Conference of Seventh-day Adventists, Loma Linda University is a member of the American Council on Education and the Association of American Colleges. The professional curriculums of the University are approved by their respective professional organizations.

Curriculums are offered leading to the Associate in Arts, Associate in Science, Bachelor of Arts, Bachelor of Music, Bachelor of Science, Bachelor of Social Work, Master of Arts, Master of Health Administration, Master of Public Health, Master of Science, Master of Science in Public Health, Specialist in Education, Doctor of Dental Surgery, Doctor of Health Science, Doctor of Medicine, Doctor of Philosophy, and Doctor of Public Health.

The core of the combined faculties consists of approximately 900 full-time teachers. Part-time and voluntary teachers, especially clinicians in the professional curriculums, bring the total past 1,685. Men and women from as many as eighty nations are represented in the annual enrollment of over 5,300 students.

Loma Linda University selects its students without discrimination based on race, color, sex, national origin, age, ancestry, or handicap. It does, however, retain the right to give preference in student admissions to qualified Seventh-day Adventist students. While this right is retained, it should be emphasized that the admission of students is not limited exclusively to Seventh-day Adventist applicants.

1980

CALENDAR

June

S	M	T	W	T	F	S	
1	2	3	4	5	6	7	22
8	9	10	11	12	13	14	23
15	16	17	18	19	20	21	23
22	23	24	25	26	27	28	23-24
29	30						27

SUMMER QUARTER 1980

Registration LS
Registration LL
Instruction begins LS
Instruction begins LL
Last day to enter a course for six- or eight-week sessions

July

S	M	T	W	T	F	S	
	1	2	3	4	5		4
6	7	8	9	10	11	12	8
13	14	15	16	17	18	19	
20	21	22	23	24	25	26	8
27	28	29	30	31			

Independence Day recess
Last day to enter a course, change status, or withdraw with no transcript record
Last day to submit thesis or dissertation in proposed final form, with blank signature sheets

August

S	M	T	W	T	F	S	
				1	2		1
3	4	5	6	7	8	9	8
10	11	12	13	14	15	16	
17	18	19	20	21	22	23	14
24	25	26	27	28	29	30	15
31							20

Instruction ends (six-week session)
Last day to apply for admission for autumn quarter
Instruction ends (eight-week session)
Last day for oral or comprehensive examinations
Last day to file with Graduate School dean the final copy of thesis or dissertation with signed approval sheets and Form 5

September

S	M	T	W	T	F	S	
	1	2	3	4	5	6	4
7	8	9	10	11	12	13	—
14	15	16	17	18	19	20	
21	22	23	24	25	26	27	
28	29	30					29

Instruction ends (summer quarter)
Summer graduation

FALL QUARTER 1980

Registration LL
Registration LS
Instruction begins LL

1980

CALENDAR

October

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

1	Instruction begins LS
14	Last day to enter a course, change status, or withdraw with no transcript record
18-24	Week of Devotion LS
20-25	Week of Devotion LL
24-26	Graduate School Retreat

November

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

1	Last day to petition doctoral candidacy for June, 1981
1	Last day to apply for admission for winter quarter
26-30	Thanksgiving recess

December

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

1	Instruction resumes
1	Last day to withdraw from a course with a W grade
15-18	Final examinations
18	Instruction ends (autumn quarter)
19	Christmas recess begins

1981

January

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

5	Registration
6	Instruction begins
19	Last day to enter a course, change status, or withdraw with no transcript record
21-24	Mission Emphasis Week LL
26-30	Mission Emphasis Week LS

WINTER QUARTER 1981

February

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28

6	Last day to apply for admission for spring quarter
16	President's Day recess

1981

CALENDAR

March

S M T W T F S
1 2 3 4 5 6 7
8 9 10 11 12 13 14
15 16 17 18 19 20 21
22 23 24 25 26 27 28
29 30 31

- 2 Last day to withdraw from a course with a W grade
16-19 Final examinations
19 Last day to petition master's candidacy for June graduation
19 Instruction ends (winter quarter)
20-29 Spring recess

SPRING QUARTER 1981

- 30 Registration
31 Instruction begins

April

S M T W T F S
1 2 3 4
5 6 7 8 9 10 11
12 13 14 15 16 17 18
19 20 21 22 23 24 25
26 27 28 29 30

- 8 Awards chapel LL
8 Last day to submit preliminary copy of thesis or dissertation to guidance committee
13 Last day to enter a course, change status, or withdraw with no transcript record
20-25 Week of Devotion

May

S M T W T F S
1 2
3 4 5 6 7 8 9
10 11 12 13 14 15 16
17 18 19 20 21 22 23
24 25 26 27 28 29 30
31

- 1 Last day for master's comprehensive examination
4 Last day to submit thesis or dissertation in proposed final form with blank signature sheets
8 Last day for final oral examination
12 Last day to file with Graduate School dean final copy of thesis or dissertation, with signed approval sheets and Form 5
25 Memorial Day recess
26 Last day to withdraw with a W grade
28 Awards Chapel LS

June

S M T W T F S
1 2 3 4 5 6
7 8 9 10 11 12 13
14 15 16 17 18 19 20
21 22 23 24 25 26 27
28 29 30

- 8-11 Final examinations
1-15 Commencement events
Instruction ends (spring quarter)

SUMMER QUARTER

The 1981-82 calendar will be published in May 1981 by the Office of the Dean of the Graduate School.





In bringing this world and its inhabitants into being, the Creator fashioned mankind to relate to others and to the world best within the context of *wholeness* while allowing for diversity in abundance. For it is only within this context that one is able to respond authentically to ultimate human concerns. But God's design became distorted; and as a result *brokenness* now characterizes societies, institutions, and individual lives.

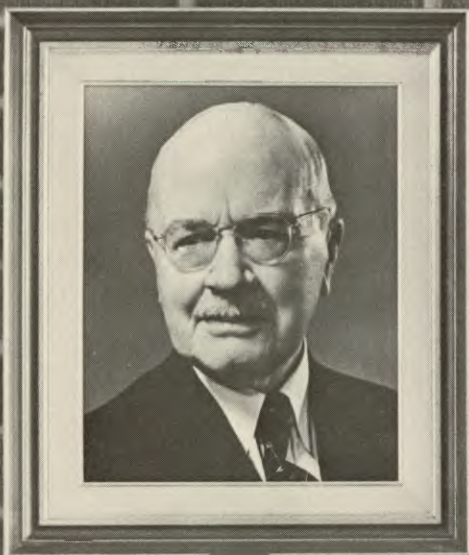
Yet God so loved that He gave, that man might again experience the joy of integrity. At Loma Linda University one is reminded of God's act and of His expectation for men. Here, at Loma Linda University —

is a community where learners who teach and teachers who learn share varied backgrounds and perspectives in the common effort to enlarge their capacities for service.

is a place where all are encouraged toward an appreciation of diversities. Discovered through the enlargement of intellectual and creative powers - developed and used - these diversities contribute to the masteries of professions and combine to lend beauty and ultimate meaning to education.

persons who seek coherence in the inner self and in the social/physical/environmental whole of which they are a part may become fulfilled as individuals in Christian community.

But the mission of Loma Linda University is not completed in the provision alone of an environment where academic competence is attained and social awareness is heightened. There is an additional dimension, one which gives meaning and purpose to all else that transpires. Here education for time is transcended by education for eternity . . . true education, which reflects the Creator's original design and leads those whom it serves into a healing, at-one relationship with Jesus Christ, whom to know is restoration and completeness.



FREDERICK GRIGGS HALL

IN GRATEFUL RECOGNITION FOR HIS LIFETIME AS
TEACHER, LEADER, COUNSELOR, LOMA LINDA UNIVERSITY
HAS NAMED THIS BUILDING IN MEMORY OF

FREDERICK GRIGGS

1867 - 1952

WHOSE COMMITMENT TO WORTHINESS IN SPIRIT AND
IN DEED INSPIRED THREE GENERATIONS OF STUDENTS

DEDICATED JANUARY 30, 1965

I

Admission Information
Financial Information
Programs and Degrees
Academic Practices

THE GRADUATE SCHOOL of Loma Linda University operates on the assumption that the goal of education is a knowledge of God. The ultimate concern of both faculty and students is the quest for meaning. Since that quest is to be served by knowledge, it becomes the obligation of graduate students not only to achieve both a broad and detailed mastery of their field of study, but also to participate with the members of the faculty in the studies and research by which knowledge is augmented.

Objectives As it attempts to create an environment favorable to the serious pursuit of knowledge and meaning, the Graduate School fosters these specific purposes:

1. To make available to graduate students who wish to study in a Seventh-day Adventist Christian setting the education necessary for scholarly careers in the arts and sciences and in the health professions.
2. To encourage the development of independent judgment and mastery of the techniques of research and the arts of expression.
3. To relate man's intellectual achievement to use in the service of mankind.

Administration The Dean, the chief administrative officer of the Graduate School, presides over the Graduate School Faculty and the Graduate Council. The Graduate Council gives continuing study to the effectiveness of graduate programs in the departments and divisions; ways to strengthen the offerings and curriculums; maintaining standards; evaluating and initiating, when advisable, appropriate action on such items or proposals as occur to them or as may be referred to them; and bringing to the Dean items that involve organization and expansion or addition to the Faculty with recommendation for action. Proposals that affect budgetary matters or overall University policy are subject to review by the Administrative Committee.

ADMISSION INFORMATION

The admissions committees of the University put forth considerable effort to be assured that an applicant to any of the schools is qualified for the proposed curriculum and seems likely to profit from educational experience in this University. The admissions committees of the Graduate School examine evidence, derived from the usual sources consulted by colleges and universities, of scholastic competence, moral and ethical standards, and significant qualities of character and personality. The ability to do a high quality of graduate work and the intention to use wisely the competence developed are the best recommendations an applicant can have. Applicants are considered for admission only on the recommendation of the department in which study is desired.

APPLICATION AND ACCEPTANCE

Where to write Inquiry about admission and application should be addressed to:

Dean, Graduate School
Loma Linda University
Loma Linda, California 92350

Procedure 1. A personal interview is desirable and should be arranged with the chairman of the department in which the student wishes to work, and, if it is possible, with the Dean of the Graduate School.

2. Application forms are available from the Graduate School office. Two copies should be filled out and mailed, together with the application fee, to the Dean. Applications and all supporting information — transcripts, test results, references — must be in the office of the Graduate School at least two months before the beginning of the term for which admission is sought.

3. Two complete official transcripts of all work previously taken in colleges, universities, or professional schools and technical schools should be provided to the University. It is the applicant's responsibility to arrange to have the transcripts sent directly by the registrar of each school attended to the Dean of the Graduate School.

4. When the department in which the student wishes to study has evaluated the application and made its recommendation, the Graduate Admissions Committee takes official action and the Dean notifies the applicant. The formal notice of admission should be presented at registration time as evidence of eligibility to register in the Graduate School.

5. A student who is accepted files a medical history with Student Health Service as part of registration.

ADMISSION REQUIREMENTS

A baccalaureate degree (or its equivalent) from an accredited college or university is prerequisite to admission to the Graduate School. Transcripts of the applicant's scholastic record should show appropriate preparation, in grades and content, for the curriculum chosen. Since there is some variation in the pattern of undergraduate coursework prescribed by different departments, the student should note the departmental descriptions.

Scholarship Applicants are expected to present an undergraduate record with a grade average of B (3.00) or better in the overall program and in the field of the major. Some students with an overall grade average between 2.50 and 3.00 may be admitted provisionally to graduate standing, provided the grades of the junior and senior years are superior.

Foreign language study It is to an applicant's advantage to have included in preparing for graduate study sufficient work in at least one foreign language to be able to read that language with ease.

Examinations Scores on the aptitude and advanced tests of the Graduate Record Examination are required with applications for admission. Students may address inquiries about these examinations to the Dean of the Graduate School who can provide application forms and information about special administrations of the examination on days other than Saturday.

Application forms for the Graduate Record Examination and information as to examination times and places are furnished by Educational Testing Service, 1947 Center Street, Berkeley, California 94701 (for the West), and Princeton, New Jersey 08540 (for the East). When pressure of time makes it impossible to secure Graduate Record Examination results, scores for the Miller Analogies Test and the Doppelt Mathematical Reasoning Test may be substituted for the GRE aptitude test.

Veterans A student who is eligible to have veteran's benefits should transfer records to the Veterans Administration Regional Office, 11000 Wilshire Boulevard, Los Angeles, California 90024. Veterans must be admitted to a degree program to be eligible to receive benefits. Application should be made well in advance of enrollment. Further information may be requested from the Office of University Records. For advance payments, the student must contact the Office of University Records at least forty days prior to enrollment.

Reentrance A student who discontinues studies at the University must meet the entrance requirements in force at the time of reentrance, unless a leave of absence has been granted.

International students The admission of students from countries other than the United States or Canada is limited to those who meet all requirements for admission; submit official English translations of their transcripts; furnish suitable recommendations from responsible persons; pass the Test of English as a Foreign Language (TOEFL) or the Michigan English Language Test (MELT), if English is not the student's native tongue; and give evidence of ability to meet all financial obligations to the University during the course of study.

Inquiry about the time and place of administration of the tests should be addressed to Educational Testing Service at the addresses noted under Examinations.

Scholarships and assistantships for first-year graduate students from abroad are extremely limited; consequently applicants should assume that they will need to have financial resources sufficient for a full year's study. An amount equivalent to the tuition charge for two quarters must be on deposit in the Office of Student Aid and Finance before immigration documents are furnished.

Exchange visitor The University program for exchange visitors, through the United States Department of State, may be advantageous for international students. A person entering on an exchange visitor visa (J-1) is subject to the same regulations on study load and work as is the F-1 student. Further information may be obtained from the University Student Affairs Office.

Visa forms Forms for both the F-1 and the J-1 visas are issued by the adviser in the University Student Affairs Office after acceptance and after financial arrangements have been made with the University Student Aid and Finance Office.

Student visa A person entering the United States on a student visa (F-1) must carry successfully a full study load during each quarter of each academic year. For a graduate student, 8 units meet this requirement. The applicant must be prepared to provide such advance deposit as is required by the University Student Aid and Finance Office and must give assurance that additional funds will be forthcoming to meet school expenses. Fellowships and assistantships for international students are limited, and employment is limited by regulations of the Immigration and Naturalization Service to no more than twenty hours per week.

Language study All international students are encouraged (and those who do not have a sufficient score on TOEFL or MELT or other evidence of English proficiency are required) to attend the Intensive American Language Institute offered during the five weeks before the beginning of the fall quarter. Further information can be obtained from the University Student Affairs Office.

ADMISSION CLASSIFICATIONS

Applicants are admitted in one of the following classifications. For regular and provisional status, applicants must be approved for acceptance by the department(s) in which they propose to do their major concentration. A limited number of special status applicants may be accepted, subject to availability of facilities.

Regular A student who meets the scholarship requirements for admission to the graduate program chosen and who has no undergraduate deficiencies is classified as a *regular* graduate student.

Provisional A student (a) whose scholarship does not reach the level for regular graduate standing but who shows promise of success in graduate studies, or (b) whose undergraduate sequence is inadequate for the chosen graduate program, or (c) whose prerequisite documentation is incomplete at the time of notification of acceptance may be classified as a *provisional* student. To continue the eligibility for graduate study, a student admitted on provisional status is expected to earn a grade point average of 3.00 quarter by quarter.

Special A student who wishes to enroll for certain graduate courses for personal or professional purposes but who does not wish to become a candidate for a graduate degree may be classified as a *special* student.

One who wishes to be a special graduate student must apply in the usual way, must place on file a complete record of previous educational experience, must meet the deadline for consideration of applications, and must be admitted in the same way as a regular student. Dental graduate students in the certificate program and those seeking professional certification only are classified as special students.

Auditor A student in any classification may register for a course as *auditor* with the consent of the adviser and the instructor of the course. The student pays tuition and agrees to attend all course lectures.

College senior A senior who otherwise meets all requirements for graduate standing may be allowed to take graduate courses simultaneously with courses that complete bachelor's degree requirements if this does not constitute an overload.

FROM MASTER'S TO PH.D. DEGREE

Bypassing master's A graduate student at this University usually proceeds first to a master's degree. If at the time of application the student wishes to qualify for the Doctor of Philosophy degree, this intention should be declared even if the first objective is a master's degree. If, after admission to the master's program the student decides to proceed toward the doctorate, a

written notice of this intention should be filed as soon as possible after the decision is made. A student who desires to bypass the master's degree may do so on recommendation of the guidance committee and with the consent of the Dean, on these grounds: coursework and research have been completed in the appropriate field equivalent in quality and scope to the master's degree requirements, a substantial part of the credits being from this University.

Second master's The University does not encourage a student who holds one master's degree to work for a second. A student who wishes to qualify for an additional master's degree in a new field, however, may request permission to do so. The Dean of the Graduate School and the faculty of the department the student wishes to enter will consider such a request on the basis of its individual merits. Some work applied toward the first master's degree may be counted toward both degrees.



FINANCIAL INFORMATION

GENERAL PRACTICES

The student is expected to arrange for financial resources to cover all expenses before the beginning of each school year. Accounts with other schools or with this University must have been settled.

Advance payment *Tuition and fees are charged and payable in full in advance of each term.* If the student withdraws from a course or courses during the first two weeks of the quarter, tuition is refundable. If withdrawal occurs after the second week, but before the midpoint of the quarter, a fourth of the tuition charged is refundable. Tuition is not refundable if withdrawal occurs after the midpoint of the term.

Monthly statement The amount of the monthly statement is due and payable in full within thirty days after presentation. A student unable to meet this requirement must make proper arrangements with the Director of Student Aid and Finance. An account that is more than thirty days past due is subject to a service charge of one percent per month (twelve percent per year). Failure to pay scheduled charges or to make proper arrangements, which is reported to the Registrar and the Dean, may cause the student to be considered absent, discontinued, or ineligible to take final examinations.

Financial clearance The student is expected to keep a clear financial status at all times. Financial clearance must be obtained before registration each term and before receiving a certificate or diploma or before requesting a transcript, statement of completion, or other certification to be issued to any person, organization, or professional board.

Checks Checks should be made payable to Loma Linda University and should show *the student's ID number* to ensure that the correct account is credited.

Veterans A student who is eligible to have veteran's benefits under the 1966 enactment should transfer records to the Veterans Administration Regional Office, 11000 Wilshire Boulevard, Los Angeles, California 90024. Veterans must be admitted to a degree program to be eligible to receive benefits. Application should be made well in advance of enrollment. Further information may be requested from the Office of University Records. For advance payments, the student must contact the Office of University Records at least forty days in advance of enrollment.

Student health reimbursement plan The Student Reimbursement Plan complements the University Health Service Plan by reimbursing students referred by Health Service for expenses of costly illness and injuries in excess

of any benefits to which students may be entitled under any medical protection or personal insurance policy or membership in any hospital association.

All Loma Linda University students for whom full graduate or undergraduate tuition is being received and who are enrolled for seven (7) units or more per quarter are automatically covered by both the Student Health Service and the Student Reimbursement Plan. Students enrolled for fewer than seven (7) units per quarter but who desire coverage should contact the Department of Risk Management. No coverage will apply until financial arrangements have been completed.

All students may secure family coverage for both plans. Eligible dependents are the spouse (residing with the insured student) and unmarried children over 14 days old and under nineteen years of age, who are not self-supporting and reside with the student.

The individual student's coverage will become effective on the date of registration or three days prior to registration if on campus. Dependents' coverage will be effective on the date application and premium are received by the Department of Risk Management.

For further information, contact the Department of Risk Management, University Arts Building, Suite 103, Ext. 3975.

SCHEDULE OF CHARGES

TUITION, GRADUATE SCHOOL PROGRAMS IN GENERAL

- \$1,320 Per quarter, for 12-14 units.
- 110 Per unit, for fewer than 12 units.

TUITION, GRADUATE DENTISTRY PROGRAM

- \$7,300 Total for twenty-two months certificate program; \$300 for first summer, \$1,000 per quarter.
- 8,000 Total for twenty-four months certificate or master's program; \$1,000 per quarter.
- 6,900 Total for thirty-six months oral surgery program; \$575 per quarter.

SPECIAL CHARGES

- \$ 25 Application. Continuous registration fee on leave.
- 25 Registration for graduate thesis supervision, per quarter.
- 10 Late registration, first day; \$3 per additional day.

Tuition and fees are subject to change without notice.

STUDENT AID

University Fellowships are awarded annually to students of outstanding performance and promise. Holders of fellowships are required to perform no routine duties except as they are a part of the program of instruction and training. University fellowships carry stipends and remission of tuition.

Assistantships A limited number of teaching and research assistantships, with stipends up to \$4,000 per academic year, are provided from operating and grant funds with the understanding that the student will perform such duties as may be required by the one to whom the student is responsible, not to exceed half time.

Application An application for fellowship or assistantship from a student not already enrolled in a graduate program at the University must be accompanied by an application for admission. All applications for financial aid must have a completed Financial Aid Form, which is available from the Dean of the Graduate School.

Closing date An application involving a request for financial aid of any kind should be in the office of the Dean of the Graduate School not later than April 15. Awards are made for an academic year beginning with the fall quarter.

Loans Financial assistance is available to the student from University loan funds, government loan funds, and other special trust funds. Inquiries concerning loans and other student financial matters should be made of the Director of Student Aid and Finance.



PROGRAMS and DEGREES

The Graduate School offers programs leading to the degrees of Master of Science, Master of Arts, and Doctor of Philosophy in the fields listed below. The campus on which each program is primarily conducted is indicated by the designation LS (La Sierra) or LL (Loma Linda).

Master of Science

Anatomy LL
Biochemistry LL
Earth Science LL
Marriage and Family
Counseling LL
Medical Technology LL

Microbiology LL
Nursing LL
Nutrition LL
Pharmacology LL
Physiology LL
Psychiatry LL

Speech-Language Pathology LS
Dentistry LL:
Endodontics
Oral Surgery
Orthodontics
Periodontics

Master of Arts

Anthropology and
Sociology LL
Biology LL

English LS
History LS
Middle Eastern Studies LL

Physical Education
and Health LS
Religion LL

Doctor of Philosophy

Anatomy LL
Biochemistry LL

Biology LL
Microbiology LL

Pharmacology LL
Physiology LL

Graduate programs Other graduate degrees are offered by the School of Health (Master of Science in Public Health, Master of Public Health, Master of Health Administration, Doctor of Health Science, and Doctor of Public Health) and the School of Education (Master of Arts and Specialist in Education).

Teacher preparation Students who are working in the Graduate School toward a master's degree in a content field and planning for secondary school teaching are encouraged to qualify for the appropriate teaching credentials. For details, they should consult the credentials adviser in the School of Education on the La Sierra campus.

Those who look forward to college teaching or to the pursuit of a Doctor of Philosophy degree are encouraged to take the master's degree in a content field offered by the Graduate School.

DEGREE REQUIREMENTS

Master of Arts/Science The following are the general requirements for earning a MASTER OF ARTS or a MASTER OF SCIENCE degree:

1. A minimum grade average of B (3.00) with no subject below C (2.00), on all work for the master's degree. This average must be maintained in formal courses and in research, computed separately. A student submitting transfer credits must earn a B average on all work taken at this University.

2. Minimum of 48 quarter units.
3. Residence of at least one academic quarter. Since 8-12 units constitute a full graduate study load, more than one year may be needed to complete the requirements for the degree.
4. Reading knowledge of a modern foreign language, or a synthetic language, if specified by the student's department.
5. Credit in a religion course (minimum of 3 quarter units).
6. Written and/or oral examinations, comprehensives and finals, as prescribed by each department.
7. Thesis (unless an alternative plan is available in the student's program).

Doctor of Philosophy The following are the general requirements for earning a DOCTOR OF PHILOSOPHY degree:

1. A minimum grade average of B (3.00), with no subject below C (2.00) on all work for the degree. This average must be maintained in formal courses and in research, computed separately. A student submitting transfer credits must earn a B average on all work taken at this University.

2. Residence of three academic years, at least two years of which must be on the Loma Linda campus after acceptance for a specific Doctor of Philosophy degree curriculum. On recommendation of the student's guidance committee and department chairman, one of the three years may be accounted for by a master's degree program in the same or a supporting field. In order to obtain full residence credit for any term, students must devote their full time and energy to graduate work, ordinarily with the equivalent of 8-12 units per quarter in courses, seminars, or research. It should be emphasized, however, that formally meeting residence requirements and a specified total and pattern of course credits does not automatically meet degree standards. Mature scholarship, productive promise, and active awareness of the history, materials, demands, and resources of a specialized field are assessed as the concluding evidence of a candidate's qualifications for a Doctor of Philosophy degree.

3. Comprehensive examinations as prescribed by the student's department.

4. Reading knowledge of two languages other than English (a synthetic language may be permitted), if specified by the student's department.

5. Credit in a graduate religion course (minimum of 3 quarter units).

6. The presentation of a dissertation related to the principal field of study, giving evidence of the candidate's ability to carry on independent and significant investigation.

7. A final oral examination.

Additional requirements In addition to the foregoing, the student is subject to the requirements stated in the section of the BULLETIN governing the specific program chosen.

Statistics and research consultation Several programs in the Graduate School require statistics, either as a prerequisite to entry, as part of the program, or both. The course, STAT 404, General Statistics, described in the School of Health bulletin, fulfills the prerequisite requirement; other requirements are specified by program. The course, STAT 698, Research Consultation, 1-4 units, described in the School of Health bulletin, provides professional guidance as individual students initiate and progress with research projects, thesis, or dissertation.

BIOMEDICAL SCIENCE PROGRAMS

Combined program The Biomedical Science Program provides opportunity for especially well-qualified and motivated students to make a joint approach to professional and graduate education and to prepare for careers in clinical specialization, teaching, or investigation of problems in health and disease in man.

The student may enter a program cooperatively offered by the School of Medicine and the Graduate School and earn concurrently the Doctor of Medicine and the Doctor of Philosophy degrees. Or similarly, the student may enter a program cooperatively offered by the School of Dentistry and the Graduate School and earn concurrently the Doctor of Dental Surgery and the Doctor of Philosophy degrees. A minimum of six years of study is required to complete such a program.

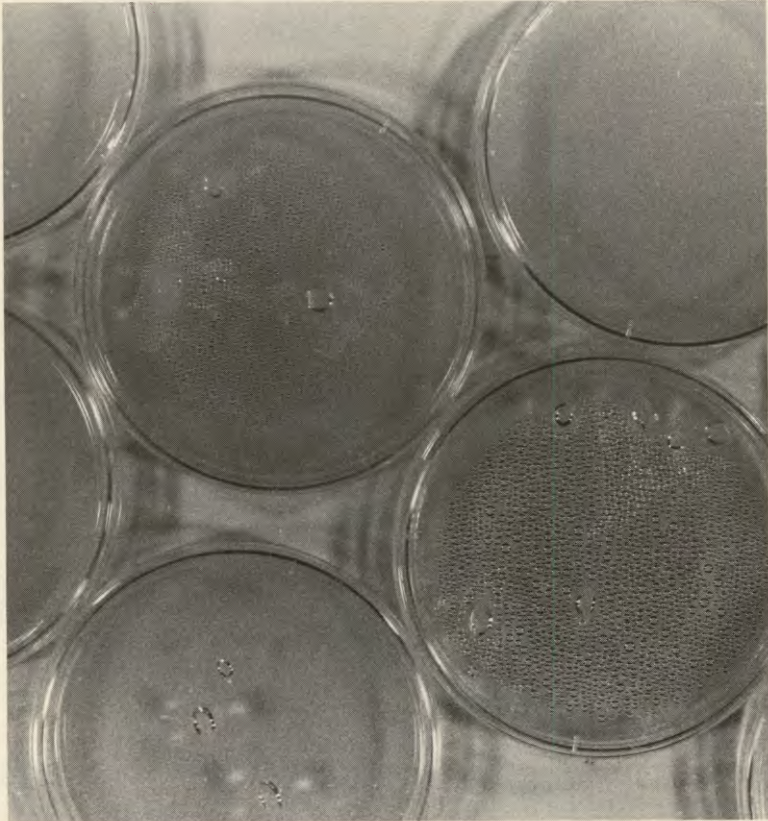
Whatever the choice of lifework, students who pursue the degrees offered in the Biomedical Science Program prepare themselves to mesh the knowledge and viewpoints of the clinician and the scientist.

Prerequisites For admission to the Biomedical Science Program, the student must have a baccalaureate degree, must qualify for admission to both the Graduate School and the professional School (Medicine or Dentistry), and must have the approval of the Biomedical Science Advisory Committee. Application may be made at any point in the student's progress in the professional school, with a year or two into the professional program as an appropriate time. The student's combination classification is regarded as continuous until the program is completed or until discontinuance is recommended by the Biomedical Science Advisory Committee, the Graduate School, or the professional school.

During the pursuit of the student's individualized program, the Biomedical Science Advisory Committee selects the adviser, recommends the membership of the graduate guidance committee, and recommends advancement to candidacy.

Majors Graduate majors are offered in anatomy, biochemistry, biology, microbiology, pharmacology, and physiology. Minors are not required but may be recommended in individual cases. A minimum of two years of full-time graduate study is required beyond the professional school curriculum. Elective time in the professional school may be spent in meeting graduate requirements.

Combined program Besides the Biomedical Science Doctoral Program described above, a combined program leading to a Master of Science degree is open to qualified students of medicine or dentistry. Students interested in establishing a broader science base for their profession, or looking toward a career in teaching or research, may register in the Graduate School at the end of the first year of professional education. They may then fulfill the requirements of the second year of professional education over a two-year period while simultaneously completing sufficient coursework and research to qualify for the Master of Science degree.



ACADEMIC PRACTICES

REGISTRATION

The student must register on the dates designated in the University calendar in this BULLETIN. Registration procedure includes recording information on forms furnished by the Registrar and clearing financial arrangements with the Director of Student Aid and Finance. The course list filed with the Registrar must have been approved by the graduate adviser and the Dean.

Late registration is permissible only when there is a compelling reason; a charge is made if registration is not completed on the designated dates. The student may not attend class without being registered, and in no case may registration take place later than the second week of a term. A change in registration after the second week affects the grade record. In the Graduate School a change in registration requires the recommendation of the student's major department chairman and the approval of the Dean.

CONDITIONS OF REGISTRATION, RESIDENCE, ATTENDANCE

Academic residence A student must meet the residence requirements indicated for a particular degree, never less than one academic quarter. A year of residence is defined as three quarters of academic work. The master's degree candidate must complete one quarter of full-time study at the University or perform the thesis research work at the University. Although 12 units is ordinarily considered a full graduate study load, a student is considered in full-time residence if registered for at least 8 units.

Extramural work When a student begins a degree program, it is understood that coursework must be conducted on a campus of the University unless, upon petition for extramural work, the student obtains consent from the department chairman and the Dean. In such instances, the student must arrange with the chairman of the department for evaluation of the work and, at its completion, recommendation as to credit and grade.

Handbook The student is required to follow the procedures outlined in the *Handbook for Graduate Students*, which can be obtained from the Office of the Dean on either campus.

Leave of absence A student who wishes to withdraw for a quarter or longer submits a written request for leave of absence, indicating the reason and the length of time needed to be out of the program. This request requires the approval of the student's department and the Dean. Stipulations for reentry are given the student in writing. During the period of leave, students maintain continuous registration by payment of a quarterly fee.

Readmission A student who interrupts graduate study without arranging for a leave of absence and who wishes to resume work toward a graduate degree is required to reapply for admission and is subject to the requirements in effect at the time of readmission.

Continuous registration A student is required to maintain continuous registration from advancement to candidacy to the awarding of the degree. For quarters during which the student is on leave or is completing the thesis, a minimum fee of \$25.00 is charged. There is a \$5.00 per quarter penalty (above the \$25.00 continuation fee) for failure to maintain registration.

Withdrawal The student wishing to withdraw from a graduate program must notify the department chairman in writing, with a copy to the Dean of the Graduate School, giving the reason for withdrawal and the approximate date. Formal withdrawal must then be arranged at the Office of University Records.

Transfer credits A transfer student who has done acceptable graduate study in an approved institution may transfer credit up to 9 quarter units toward the master's degree, but may not transfer excess grade points to offset less than a B average at the University.

A candidate for the doctorate who holds a master's degree or presents its equivalent by transcript, may receive credit up to 54 quarter units, subject to the consent of the Dean and the department chairman involved. Under no circumstances in such instances is the transfer student relieved of residence requirements at this University.

Chapel Weekly devotional services are held as part of the regular program of the University, and students are expected to attend.

Dismissal Students who are involved in dismissal proceedings, or who wish to express a grievance, may obtain from the Office of the Dean a copy of guidelines governing dismissal or presenting a grievance.

GUIDANCE COMMITTEE

Each student accepted into a degree program is appointed an adviser who helps to arrange the program of studies to meet University requirements. Subsequently (no later than when applying for candidacy) the student is put under the supervision of a guidance committee. This committee is responsible to and works with the chairman of the student's department in arranging course programs, screening thesis and dissertation topics (where applicable), guiding the student through research, arranging for final written and/or oral examinations, evaluating the thesis or dissertation and other evidence of the candidate's fitness to receive the degree, and recommending the student for graduation.

CANDIDACY

Petition Admission to the Graduate School or conferring the status of regular graduate standing does not constitute admission of the student to candidacy for a graduate degree. Admission to candidacy is initiated by a written petition from the student to the Dean, on recommendation of the major department chairman.

Master's degree Petition for candidacy for the master's degree must (a) include a statement of the student's complete program of studies; (b) present a satisfactory grade record, including at least one quarter of full-time work at the University; (c) report the satisfaction of the language requirement, where applicable; (d) include a statement of the proposed thesis or dissertation topic (where applicable) that has been approved by the student's guidance committee; and (e) note any other qualification prescribed by the department. A student must be advanced to candidacy not later than the third quarter after entry upon study toward a degree in the Graduate School.

Doctoral degree The student's petition for candidacy for the Doctor of Philosophy degree will include, in addition to the items listed above, information that comprehensive written and oral examinations have been passed. Candidates for the doctorate at the June graduation must have been advanced to candidacy not later than the previous November.

EXAMINATIONS

The student takes the written and oral examinations prescribed by the department.

Master's degree For the master's degree candidate these include a final examination not later than a month before the date of graduation.

Doctoral degree The doctoral candidate is required to take comprehensive written and oral examinations over the major and minor areas of study to ascertain the capacity for independent, productive, scientific work and to determine whether further courses are to be required before the final year of work toward the doctorate is undertaken. The examination is conducted by the guidance committee, which submits in writing to the Dean of the Graduate School its decision on the candidate's performance, competence, and general qualifications. The candidate cannot be admitted to the examination until the following requirements have been met: (a) demonstrated reading knowledge of one foreign language, where applicable; (b) completed 36 quarter units of coursework beyond the master's degree or its equivalent; and (c) been recommended in writing by the chairman of the major department.

After the completion of the thesis and not later than a month before the date of graduation, the doctoral candidate is required to appear before an examining committee of five for the final oral examination.

Failure If a candidate fails to pass a final oral or written examination for a graduate degree, the examining committee files with the Dean a written analysis of the candidate's status, with recommendations regarding the student's future relation to the School.

TIME LIMIT

Any credit transferred to the School or taken in residence and submitted toward a master's degree is nullified seven years from the date when the course was completed. Similarly, credit submitted toward a doctor's degree is nullified ten years from the date when the course was completed. In exceptional cases credit may be given for nullified courses after the fulfillment of such refresher provisions as reading, reports or conferences to bring the student up to date, and, generally, reexamination.

The time lapse from first enrollment in a graduate curriculum to the conferring of the master's degree may not exceed five years. For the doctor's degree, candidacy lapses five years after the date of admission to candidacy. A student desiring reinstatement must reapply to the Dean. This procedure implies a reevaluation of the student's total program.

THESIS AND DISSERTATION

The student's research and thesis or dissertation preparation are under the direction of the student's guidance committee. The student is urged to secure the committee's approval of the topic and research design as early as is feasible. Such approval must be secured before petition is made for advancement to candidacy.

Handbook Instructions for the preparation and format of the thesis or dissertation are in the *Handbook for Graduate Students*, available at the office of the Dean. The last day for submitting copies to the Graduate School office in final approved form is published in the calendar.

Binding Tuition covers the cost of binding three copies to be deposited in the University library and the appropriate department or School collection. Personal copies are bound at the student's expense.

Thesis supervision The student registers and pays tuition for the thesis whether the work is done in residence or in absentia. If the student has been advanced to candidacy, has completed all course requirements, and has registered for but not completed the research and thesis or dissertation, continuous registration is maintained for Thesis Supervision until the thesis or dissertation has been accepted. This involves a quarterly fee of \$25.00, paid during registration.

GRADUATION ATTENDANCE

A candidate for a graduate degree is expected to attend all public exercises that constitute the graduation events and to receive the diploma in person. Consent for the degree to be conferred in absentia is contingent on the recommendation of the Dean to the President, and can be granted only by the President.

SCHOLASTIC STANDING

The following values are assigned for calculation of the grade point average per unit of enrollment:

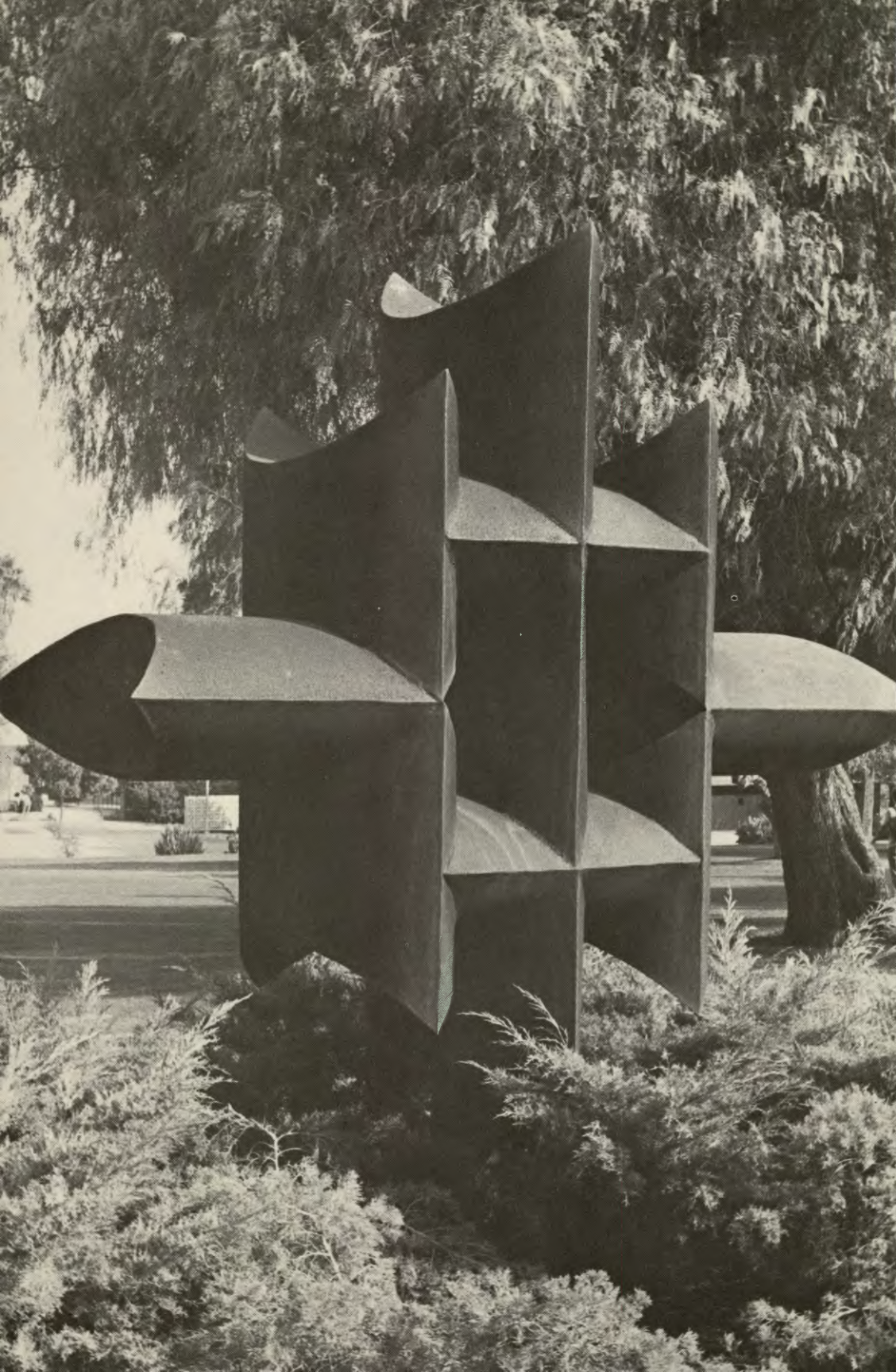
A	4.0	B	3.0	C	2.0	D	1.0
A—	3.7	B—	2.7	C—	1.7	F	0.0
B+	3.3	C+	2.3	D+	1.3		

The following designations are used to make clear the student's status but not indicate credit:

AU	audit
I	incomplete
IP	in progress (for courses which cross term boundaries)
S	satisfactory (used in pass-fail courses; does not affect GPA)
U	unsatisfactory (does not affect GPA)
W	withdraw (given from two weeks after registration until two weeks before final examinations begin)

The graduate student is expected to maintain a consistently high level of performance. The Dean receives reports on the quality of work done, in order to determine the eligibility of the student for advancement.





II

Anatomy
Anthropology and Sociology
Biochemistry
Biology
Dentistry
Earth Science
English
History
Marriage and Family Counseling
Medical Technology
Microbiology
Middle Eastern Studies
Nursing
Nutrition
Pharmacology
Physical Education and Health
Physiology
Psychiatry
Religion
Speech-Language Pathology

AT THIS POINT in the BULLETIN the student is reminded to make sure always to look in both directions before proceeding — look ahead to the specific area requirements of the chosen program and look back to the general requirements applicable to all programs in the Graduate School.

COURSE LISTINGS

Numbering Courses numbered from 301 to 499 are advanced undergraduate courses. Those from 501 to 599 are graduate courses and from 601 to 699 graduate seminar, research, and thesis or dissertation courses.

Graduate credit Certain courses at the advanced undergraduate level and basic science courses in the first and second professional years are acceptable for graduate credit provided (a) the student qualifies for graduate study and has credit for the specific prerequisites of any desired course and (b) the grade achievement is of graduate quality as required by the instructor or the Graduate School.

The advanced undergraduate courses listed in the following sections may be acceptable for graduate credit or in some cases may be offered to enable the student to make up undergraduate subject deficiencies.

Subject code letters Code letters preceding course numbers identify the department or subject as follows:

ANAT	Anatomy	NRSG	Nursing
ANTH	Anthropology	NUTR	Nutrition and Dietetics
BCHM	Biochemistry	ORBI	Oral Biology
BIOL	Biology	ORDN	Orthodontics
BIOM	Biomathematics	ORMD	Oral Medicine
CHEM	Chemistry	ORPA	Oral Pathology
EDCI	Education	ORSR	Oral Surgery
EDFO	Educational Foundations	PATH	Pathology
ENDN	Endodontics	PERI	Periodontics
ENGL	English	PHRM	Pharmacology
ENVH	Environmental Health	PETH	Physical Education and Health
EPDM	Epidemiology	PHYS	Physics
GEOL	Geology	PHSL	Physiology and Biophysics
GRAD	Graduate	PSYC	Psychology
GRDN	Graduate Dentistry	PSYT	Psychiatry
HADM	Health Administration	RELB	Religion, Biblical Studies
HLED	Health Education	RELH	Religion, Historical Studies
HLSC	Health Science	RELP	Religion, Professional Studies
HLSR	Health Services	REHE	Religion, Theological and Ethical Studies
HIST	History	RELM	Religion, Mission Studies
MEST	Middle Eastern Studies	RELT	Religion, Theological Studies
MFAM	Marriage and Family	RLGN	Religion, General
MICR	Microbiology	SOCI	Sociology
MTCH	Medical Technology	SPPA	Speech-Language Pathology
		STAT	Biostatistics

ANATOMY

WALTER H. B. ROBERTS, M.D. Loma Linda University SM 1939
Chairman; Professor of Anatomy
Gross anatomy, applied anatomy

GUY M. HUNT, M.D. Loma Linda University SM 1942; M.S.-MED. GS 1959
Professor of Anatomy and Neurology
Neuroanatomy

PAUL J. MCMILLAN, PH.D. Loma Linda University GS 1960
Professor of Anatomy
Enzyme histochemistry, histology, neuroanatomy

ROBERT L. SCHULTZ, PH.D. University of California at Los Angeles 1957
Professor of Anatomy
Electron microscopy, histology

HAROLD SHRYOCK, M.D. Loma Linda University SM 1934
Emeritus Professor of Anatomy
Embryology, cytology, neuroanatomy

WM. HOLMES TAYLOR, M.D. Loma Linda University SM 1947
Clinical Professor of Anatomy
Gross anatomy, applied anatomy

NORMAN M. CASE, PH.D. Loma Linda University GS 1958
Associate Professor of Anatomy
Histology, electron microscopy

ARTHUR E. DALGLEISH, PH.D. Stanford University 1964
Associate Professor of Anatomy
Embryology, histology

PAUL C. ENGEN, D.D.S. University of Southern California 1949
Associate Professor of Anatomy
Neuroanatomy, oral histology, gross anatomy

CHARLES W. HARRISON, M.D. Loma Linda University SM 1915
Emeritus Associate Professor of Anatomy
Gross anatomy, applied anatomy

HERBERT W. HENKEN, M.D. Loma Linda University SM 1945
Associate Professor of Anatomy; and Gynecology and Obstetrics
Gross anatomy, applied anatomy

- WILLIAM M. HOOKER, PH.D. Loma Linda University GS 1969
Associate Professor of Anatomy
Histology, neuroanatomy
- DANIEL A. MITCHELL, JR., M.D. Loma Linda University SM 1947
Associate Professor of Anatomy
Gross anatomy, applied anatomy
- P. BENIGNO NAVA, JR., PH.D. Loma Linda University GS 1974
Assistant Professor of Anatomy
Gross anatomy, neuroanatomy
- A. DWIGHT SMITH, PH.D. Loma Linda University GS 1977
Assistant Professor of Anatomy
Gross anatomy, histology
- WILLIAM WAGNER, M.D. Loma Linda University SM 1944
Clinical Assistant Professor of Anatomy
Gross anatomy, applied anatomy

The Department of Anatomy, in cooperation with other departments of the University, offers study programs leading to the Master of Science and the Doctor of Philosophy degrees in the field of anatomy. These programs provide opportunities for qualified students to prepare for careers in teaching and research.

The student desiring to register for advanced study in anatomy should have completed an undergraduate major, preferably in zoology or biology, or have had equivalent preparation with a major in a related science. In addition to meeting the requirements for admission to the Graduate School, the applicant should present credit in zoology; vertebrate embryology; one year of college physics; and one year of chemistry and organic chemistry, or the equivalent. Recommended are: comparative vertebrate anatomy, statistics, language (German or French), and microtechnique.

In addition to the requirements outlined below for each degree program, the graduate student will be expected to meet the general requirements which apply to all Loma Linda University graduate students. Moreover, while a foreign language is not required for the master's degree, students planning to proceed to the Doctor of Philosophy degree are strongly encouraged to demonstrate during the course of the master's program, reading ability in at least one of the languages required for the doctoral degree. A course in biostatistics is recommended in the master's program and is required for the doctoral degree.

MASTER OF SCIENCE

This curriculum provides opportunities for qualified students to gain experience in research methods (library and laboratory) while working on a significant problem. The student acquires experience in scientific writing by reporting the results of the effort either in thesis form or as a publishable paper.

Coursework To qualify for this degree, the student must complete a minimum of 27 quarter units in anatomy, including ANAT 511, 513, 515, and 604; 9 units in anatomy research; and 9 units in other basic science courses; and pass a comprehensive examination in these areas.

DOCTOR OF PHILOSOPHY

The purpose of the program leading to the Doctor of Philosophy degree is to give individuals the preparation needed and the opportunity to pursue an in-depth, independent investigation under conditions favorable for the maturation of scholarly attitudes and habits. A student is usually considered for admission to this program after completing the Master of Science degree (or its equivalent).

Residence A minimum of two full-time academic years is required beyond the master's level. However, in the determination of when a doctorate may be conferred, scholarly attainment and demonstration of the capacity for independent research are considered most important and must be in evidence without presumption as to the duration of residence or accumulation of formal credits. In order to obtain full residence credit for any term, the student must give full time and energy to graduate work. Only with such devotion to coursework can the student fulfill the spirit and special demands of the program for the Doctor of Philosophy degree.

Coursework For the Doctor of Philosophy degree, the student is expected to complete at least 20 units of anatomy coursework beyond the master's requirement. In addition, 21 units of cognate courses may be chosen from a single biomedical field or may be distributed among the basic medical sciences.

Comprehensive examination The comprehensive examination, which consists of oral and written parts, covers coursework both in anatomy and the cognates. The student is also expected to show familiarity with current literature in these fields.

Foreign language Reading knowledge of two languages other than English is required. A synthetic (FORTRAN or BASIC) language can be substituted for one language at the discretion of the student's guidance committee.

Advancement to candidacy The student may apply for admission to doctoral candidacy after (a) meeting the language requirement, (b) passing the comprehensive examination, and (c) passing any other examinations required by the department.

Dissertation The candidate's capacity for independent investigation and scholarly achievement must be demonstrated by the presentation and oral defense of an acceptable dissertation.

Combined M.D./PH.D. or D.D.S./PH.D. Joint programs allow qualified students to work on combined M.D./PH.D. or D.D.S./PH.D. degrees. Details regarding such combinations are provided under the heading Biomedical Science Programs in the section *Programs and Degrees*.

COURSES

ANAT 504 Oral Histology and Embryology SD (2)

Study of basic embryology development, eruption, and microanatomy of the odontogenic apparatus.

Engen.

ANAT 511 Gross Anatomy SM (14)

Anatomy of the head, neck, locomotor system, thorax, abdomen, pelvis and perineum. Correlated with radiology, applied features, and embryological development.

Staff.

ANAT 513 Histology (6)

The basic cells, tissues, and organs of the human body.

Staff.

ANAT 515 Neuroanatomy (6)

A foundation of neuroanatomy.

Staff.

ANAT 526 Head and Neck Anatomy DN (surgical) (2)

A detailed dissection of the head and neck. Demonstrations and lectures.

Prerequisite: ANAT 501 or 511, or equivalent.

Staff.

ANAT 544 Human Embryology (3)

The plan of development as it pertains to the human; consideration of principles; laboratory work involving the use of both human and comparative materials.

Prerequisite: A course in vertebrate embryology.

Dalgleish.

ANAT 546 Electron Microscopy (3)

Designed to prepare the student to use the electron microscope. Emphasis on basic theory, operational techniques, and tissue preparation.

Staff.

ANAT 547 Histochemistry (3)

The theoretical and practical aspects of histochemical methods as applied to tissue sections. One lecture and one three-hour laboratory/conference weekly.

Prerequisite: A course in biochemistry; ANAT 513.
McMillan.

ANAT 548 Advanced Cytology (3)

Detailed study of the cell.

Prerequisite: ANAT 514 or equivalent.
Staff.

ANAT 549 Molecular Cytology and Topographical Chemistry (3)

Selected aspects of the functional and chemical morphology of cells and organs; lectures and literature seminars.

Prerequisite: Courses in biochemistry and histology.
McMillan.

ANAT 594 Special Topics in Anatomy (arranged)

An intensive study of a selected topic approved by the chairman of the department; individual guidance by a staff member.

Staff.

ANAT 604 Seminar in Anatomy (1, 1, 1)

Reviews of literature; presentations and discussions of the results of individual investigations.

Three units required of graduate students.
Staff.

ANAT 697 Research (arranged)

ANAT 698 Thesis (arranged)

ANAT 699 Dissertation (arranged)



ANTHROPOLOGY and SOCIOLOGY

JOHN W. ELICK, PH.D. University of California at Los Angeles 1969
Chairman; Professor of Anthropology
Cultural anthropology, South America

WILLARD R. CENTERWALL, M.D. Yale University 1952; M.P.H., M.S.
University of Michigan 1967, 1968
Professor of Sociology
Human genetics, medical anthropology

MOLLEURUS COUPERUS, M.D. Loma Linda University SM 1934
Clinical Professor of Physical Anthropology
Physical anthropology, medical anthropology

IAN M. FRASER, PH.D. Cambridge University 1952
Professor of Pharmacology
Ethnopharmacology

ANES A. HADDAD, PH.D. University of Southern California 1971
Professor of Sociology
Family, socialization, Middle East

EARL W. LATHROP, PH.D. University of Kansas 1957
Associate Professor of Biology
Ethnobotany, ethnopharmacognosy

WOK K. YOON, PH.D. Louisiana State University 1976
Associate Professor of Sociology; Marriage and Family Counseling
Theory, research methods, social change

IAN P. CHAND, PH.D.
Assistant Professor of Sociology
Community, family, religion, youth

The aim of the Department of Anthropology and Sociology is to broaden the student's understanding of the organization and function of society and to develop a perspective from comparison of different cultures. The factors that operate to promote cultural stability and change, the effects of contact between peoples of differing cultures, and the social movements of the modern world scene are best understood against a background of theory and practice. This understanding is an essential part of a liberal education.

The departmental programs are designed for persons who intend to engage in teaching, research, medical arts, mission service, or administration, either in the United States or abroad. The department thus has two objectives: (1) to further the education of those who intend to make some aspect of sociology or anthropology their lifework; and (2) to broaden, by cognate offerings, the professional and liberal arts education given in various schools in the University.

The student may emphasize Middle Eastern studies in working toward the master's degree in sociology or anthropology. (See also the Middle Eastern Studies section of division II of this BULLETIN.)

The graduate student may choose applied anthropology as the field of study. Two emphases are offered: health related (medical) anthropology and the anthropology of mission.

Master of Arts The student specializes in either sociology or anthropology in preparing for the master's examination, but takes 8 units of coursework in the field not chosen for specialization. The program of studies is arranged in consultation with the adviser, consideration being given to the amount and quality of undergraduate preparation. The prospective student whose undergraduate major is in other than the social sciences is required to take supplementary coursework in preparation for the comprehensive examination.

Professional students The professional school registrant who desires to enroll in graduate level sociology or anthropology courses must have taken an introductory course in one of these two fields or in social psychology.

Degree requirements Essential to fulfill the requirements for the Master of Arts degree are:

1. A minimum of 3 quarters in residence as a graduate student.
2. A minimum of 45 quarter units of graduate credit in sociology, anthropology, and related fields, of which at least 24 units are in graduate-level courses and seminars (numbered 500 and above) in the field of specialization.
3. Religion, 3 quarter units.
4. A minimum grade average of B (3.00).
5. Social theory: (a) seminars in theory; (b) core literature as specified by the department; (c) critiques and/or abstracts as assigned.
6. Research competence: (a) introductory statistics (prerequisite to research methods, preferably taken before entering the graduate program); (b) graduate-level research methods course; (c) foreign language and/or computer language and/or advanced statistics.
7. Thesis, 10 quarter units.
8. Satisfactory written comprehensive examination in the candidate's field of specialization.

For information about requirements and practices to which all graduate students are subject, the student should consult the *Academic Practices* section of division I of this BULLETIN.

ANTHROPOLOGY COURSES

UPPER DIVISION COURSES APPLICABLE TO GRADUATE PROGRAM

- ANTH 304 **Biological Anthropology (4)**
- ANTH 305 **The Anthropology of Race (4)**
- ANTH 306 **Language and Culture (4)**
- ANTH 308 **Geography of Man (5)**
- ANTH 309 **Cultural Ecology (4)**
- ANTH 316 **Archaeology (4)**
- ANTH 334 **Peoples of Latin America (4)**
- ANTH 335 **Peoples of Africa (4)**
- ANTH 336 **Peoples of the Middle East (4)**
- ANTH 337 **Peoples of Asia (4)**
- ANTH 338 **Indians of North America (4)**
- ANTH 425 **Sociocultural Change (4)**
- ANTH 434 **Anthropology of Mission (2)**
- ANTH 444 **Comparative Religion (4)**
- ANTH 445 **Culture and Personality (4)**
- ANTH 446 **Folklore (4)**
- ANTH 447 **Applied Anthropology (4)**
- ANTH 448 **Medical Anthropology (4)**
- ANTH 488 **Proseminar (2)**
- ANTH 498 **Laboratory Projects (1-6)**
- LING 305 **Introduction to Linguistics (4)**
- RELB 445 **Biblical Archaeology (2-4)**

GRADUATE COURSES

ANTH 506 Transcultural Health Care (3)
Identical to NRSG 506.

ANTH 534 Anthropology of Mission (3)
Identical to RELM 534.

ANTH 544 Comparative Religion (4)
Identical to RELM 544.

ANTH 604 Seminar: Cultural Anthropology (4)
Intensive work on particular problems in some aspect of cultural anthropology.

ANTH 605 Seminar: Middle Eastern Cultural History (4)
A survey of the cultural history of the development of civilization in the East. May be taken as MEST 605 or SOCI 605 for Middle Eastern studies or sociology credit.

ANTH 614 Seminar: Physical Anthropology (4)
Group research in current problems in the study of fossil man, human genetics and evolution, race, etc.

ANTH 615 Seminar: The Middle East in the Twentieth Century (4)
Contemporary Middle East. A comparison of political systems. Problems of the area in general. May be taken as MEST 615 or SOCI 615 for Middle Eastern studies or sociology credit.

ANTH 616 Seminar: Prehistory (4)
Consideration of specific problems in archaeological research, interpretation, and historical reconstruction.

ANTH 625 Seminar: Sociocultural Change (4)
Evaluation of various theories of culture change; individual research in specific culture-change problems.

ANTH 626 Seminar: Anthropological Linguistics (4)
The role played by language in perception and cognition; ethnographic research in linguistic domains as indicators of culturally determined cognitive ranges and emphases; structural analysis of a selected language.

ANTH 634 Seminar: Social Theory (4)
A seminar required of both sociology and anthropology master's degree candidates. Credit for either ANTH 634 or SOCI 634, not both.

ANTH 644 Seminar: Comparative Religion (4)
Reading and discussion of current anthropological writing on the role of religion in maintaining the cultural system; research in particular religious systems, mythology, and world view. Identical to MEST 644.

ANTH 648 Seminar: Medical Anthropology (4)
Research in traditional medical systems (folk medicine, curanderismo, shamanism, etc.), folk psychiatry, ethnopharmacognosy, dental anthropology.

ANTH 665 Fieldwork in Ethnography (arranged)
Individual program of field research in social anthropology, under the supervision of a faculty member acquainted with the society or community chosen for study.

ANTH 667 Fieldwork in Archeology (arranged)
Field research in archaeology, under the supervision of a faculty member, usually in connection with a project sponsored by the department.

ANTH 694 Directed Reading (arranged)

ANTH 697 Research (4-6)

ANTH 698 Thesis (4-6)

SOCIOLOGY COURSES

UPPER DIVISION COURSES APPLICABLE TO GRADUATE PROGRAM

- SOCI 304 Social Psychology (4)**
- SOCI 306 Social Issues (4)**
- SOCI 307 Ethnic Relations (4)**
- SOCI 374 Social Disorganization (4)**
- SOCI 375 Criminology (4)**
- SOCI 376 Juvenile Delinquency (4)**
- SOCI 404 Foundations of Social Thought (4)**
- SOCI 414 Sociology of the Family (4)**
- SOCI 415 Urban Sociology (4)**
- SOCI 416 Collective Behavior (4)**
- SOCI 417 Sociology of Religion (4)**
- SOCI 455 Socialization (4)**
- SOCI 488 Proseminar (2)**

GRADUATE COURSES

SOCI 505 Social Research Methods and Methodology (2-4)

An analysis of current social research methods. Practice in the use of techniques. Consideration of the philosophy of scientific method. May be taken as MEST 505 for Middle Eastern studies credit.

Prerequisite: An introductory course in statistics.

SOCI 514 The Family: Cross-Cultural Family Values (4)

Structure and function, changing patterns, future in urban society. Relationship of changes in society to widespread family problems.

SOCI 525 Population (2-4)

An introduction to demography; analysis of the development and current status of population problems; consideration of current population-control programs and their progress.

SOCI 604 Seminar: Social Psychology (4)

Consideration of specific areas of social psychology; evaluation of current research in the field.

SOCI 605 Seminar: Middle Eastern Cultural History (4)

A survey of the cultural history of the development of civilization in the East. May be taken as MEST 605 or ANTH 605 for Middle Eastern studies or anthropology credit.

SOCI 607 Seminar: Ethnic Relations (4)

Group and individual research into current or historical aspects of minority and dominant group relations.

SOCI 614 Seminar: The Family (4)

Evaluation of current research on the family, especially in the United States. Research project on some aspect of family structure or function.

SOCI 615 Seminar: The Middle East in the Twentieth Century (4)

Contemporary Middle East. A comparison of political systems. Problems of the area in general. May be taken as MEST 615 or ANTH 615 for Middle Eastern Studies or anthropology credit.

SOCI 616 Seminar: Collective Behavior (4)

An analysis of various manifestations of collective behavior or of major social movements and their effects on society.

SOCI 618 Seminar: Population (4)

Consideration of specific areas of demographic research; analysis of census data, particularly of the United States.

SOCI 624 Seminar: Sociology of Religion (4)

Individual and group research into religion as a social institution, its relation to other social institutions, and its organizational forms.

SOCI 625 Seminar: The Community (4)

Study into current research on the community, especially problems of the urban and suburban community.

SOCI 634 Seminar: Social Theory (4)

A seminar required of both sociology and anthropology master's degree candidates. Credit for either SOCI 634 or ANTH 634, not both.

SOCI 674 Seminar: Medical Sociology (4)

Study of medicine as a social institution. Research into various aspects of the medical community and its relation to the rest of society.

SOCI 694 Directed Reading (arranged)

SOCI 697 Research (4-6)

SOCI 698 Thesis (arranged 4-6)

BIOCHEMISTRY

- R. BRUCE WILCOX, PH.D. University of Utah 1962
Chairman; Professor of Biochemistry
Biochemistry of the endocrine system; hormone-dependent carcinogenesis
- RICHARD E. BELTZ, PH.D. University of Southern California 1955
Professor of Biochemistry
Experimental oncology, mechanisms in the chemotherapy of cancer
- RAYMOND A. MORTENSEN, PH.D. Stanford University 1933
Distinguished Service Professor of Biochemistry
Rates of metabolism, metabolic pathways
- U. D. REGISTER, PH.D. University of Wisconsin 1950
Professor of Nutrition and Biochemistry
Biochemistry of nutrition
- W. BARTON RIPPON, PH.D. Newcastle University 1969
Professor of Biochemistry
Physical studies directed at understanding the dynamics of macromolecular structure and its role in biological function
- CHARLES W. SLATTERY, PH.D. University of Nebraska 1965
Professor of Biochemistry
Physical chemistry of macromolecules
- ROLAND C. ALOIA, PH.D. University of California at Riverside 1970
Associate Professor of Anesthesiology and Biochemistry
Effects of anesthetic agents on biological membrane function
- RENE EVARD, PH.D. Michigan State University 1959
Associate Professor of Biochemistry
Enzymology
- DAVID J. GUSSECK, PH.D. University of California at Davis 1969
Associate Professor of Biochemistry
Regulation of placental protein hormone synthesis and secretion
- E. CLIFFORD HERRMANN, PH.D. Virginia Polytechnic Institute 1970
Associate Professor of Biochemistry
Tumor-associated changes in tissue enzymes, blood coagulation.
- RICHARD W. HUBBARD, PH.D. Purdue University 1961
Associate Professor of Biochemistry
Clinical chemistry, amino acid metabolism

GEORGE M. LESSARD, PH.D. University of California at Riverside 1973

Associate Professor of Biochemistry

Regulation of hormone synthesis, salivary proteins

BARRY L. TAYLOR, PH.D. Case Western Reserve University 1973

Associate Professor of Biochemistry

Mechanism of oxygen chemoreceptors, bacterial chemotaxis

Programs The Department of Biochemistry offers study programs leading to the Master of Science and the Doctor of Philosophy degrees. Tailored to individual interests, the programs provide a broad biochemical background yet allow the student to fully develop a special area of interest. The Master of Science degree provides content appropriate for persons preparing to teach at the secondary level or in related professional school areas; or for persons pursuing careers as research technicians. The Doctor of Philosophy program is designed to prepare the graduate for a career in independent research and teaching. In addition to these programs, combined M.S./M.D., M.S./D.D.S., PH.D./M.D., and PH.D./D.D.S. degrees are offered. The combined M.S./professional degree is designed to provide additional content or research experience as background for postgraduate medical or dental education. The combined PH.D./professional degree prepares the student for a future in academic medicine or dentistry, combining research, teaching, and clinical practice

M.S. program A Under this plan the student completes 30 units of coursework in biochemistry and carries out research leading to the preparation and successful defense of a thesis or publishable paper reporting on the research. Students electing this plan need not complete a minor.

M.S. program B Under this plan the student completes 30 units of coursework in biochemistry and additional courses in a related field to complete a minor. The student must also pass a comprehensive examination over the major and minor fields.

PH.D. program For the Doctor of Philosophy degree, students must complete at least 30 units of coursework in biochemistry and 20 units in their minor field of specialization. PH.D. candidates are assigned to laboratories and are expected to participate in research during the first year of their graduate program. They must pass both written and oral comprehensive examinations over the core coursework and other areas deemed appropriate by their guidance committee. Opportunity is given to acquire teaching experience. A minimum of one quarter of teaching experience is required of each student. Finally, PH.D. candidates must present and defend a research proposal and carry out research leading to the preparation and successful defense of a dissertation.

Details of the graduate programs are given in the *Student Guide* published by the Biochemistry Department.

Combined program Applicants for combined programs must be accepted to both the Graduate School and the respective professional school. In these programs the minor requirement is met by the professional degree. Thus, with careful planning, both degrees can be completed in less time than would be possible if they were taken sequentially. Students planning to enter a combined program must advise both the Graduate School and the professional school of their intent at the time of their initial application.

Biochemistry minor A minor in the department consists of the general biochemistry (BCHM 481, 482, 483) and advanced biochemistry (BCHM 524, 525) sequences and one or more quarters of seminar (BCHM 604).

Applicants to the department programs must meet the listed prerequisites and must pass the ACS standardized examination in organic and physical chemistry. These examinations must be taken within one year of entering the biochemistry program.

Prerequisites To qualify for admission to the department programs, the student must have taken the following courses or their equivalents:

- Differential and integral calculus (8)
- General physics (12)
- Organic chemistry (12)
- Physical chemistry (8)
- General biology (12)
- Upper division biology (4)

The department reserves the right to decide on the equivalence of courses presented by the applicant. Applicants who lack minor aspects of the prerequisites may be provisionally accepted pending successful elimination of the deficiency before taking advanced courses in the department.

General information For provisions applicable to the basic sciences, the student should consult Specific Requirements for Basic Science Programs in the *Programs and Degrees* section of division I of this BULLETIN.

For information about requirements and practices to which all graduate students are subject, the student should consult the *Academic Practices* section of division I of this BULLETIN.

COURSES

BCHM 481, 482, 483 General Biochemistry I, II, III (4, 4, 4)

Comprehensive introduction to the chemistry and metabolism of biomolecules. Information processing, protein synthesis, and regulation in bacteria, plants, and animals. Emphasis on problem solving and biochemical methodology; modern techniques for isolation, identification, and quantification of biomolecules. Introductory course for the graduate sequence. Lectures and laboratory. Must be taken in sequence. Identical to CHEM 481, 482, 483.

Prerequisite: CHEM 371, 372, 373 or equivalent.

BCHM 501, 502 Dental Biochemistry (3.5, 3)

Chemistry and metabolism of carbohydrates, lipids, nucleic acids and proteins. Water, electrolyte, and acid-base balance; digestion and nutrition; hormones; special topics in biochemistry related to the practice of dentistry. Lectures and demonstrations.

BCHM 515, 516 Medical Biochemistry I, II (4, 5)

Chemistry of amino acids and proteins. Enzyme behavior and mechanisms. Bioenergetics. Biomembranes. Chemistry and metabolism of carbohydrates, lipids, amino acids and nucleic acids. Protein biosynthesis and the control of gene expression. Special topics in physiological chemistry: connective tissue components, acid-base balance, hormones, vitamins, and minerals. Lectures and laboratory.

BCHM 514 Medical Biochemistry Laboratory (1)

Laboratory to accompany BCHM 511. Acid-base equilibria. Enzyme behavior. Cellular oxidations. Quantitative analysis of blood and urine.

BCHM 524 Advanced Biochemistry I (5)

Physical biochemistry, including thermodynamics and equilibria, diffusion, sedimentation, electrophoresis. Enzyme kinetics. Spectroscopy, fibrous proteins.

Prerequisite: BCHM 481, 482; or 511, 512; or equivalent.

BCHM 525 Advanced Biochemistry II (5)

Enzyme structure and mechanisms. Carbohydrate and lipid biochemistry and metabolism, with emphasis on regulation and energetics. Membrane structure, organization, and transport. Applicable laboratory techniques.

Prerequisite: BCHM 524.

BCHM 526 Molecular Biology (4)

Mechanism and control of DNA, RNA and protein biosynthesis. Gene organization, molecular cloning, DNA damage and repair, aspects of the molecular biology of cancer.

BCHM 534 Techniques of Biochemistry (6)

An intensive integrated laboratory experience in protein chemistry, enzymology, and the physical characterization of macromolecules; nucleic acid isolation, characterization, and synthesis; protein synthesis; and the writing of scientific papers.

Prerequisite: BCHM 481, 482, 483.

BCHM 544 Special Topics in Biochemistry (2)

Examples: A. Membrane biochemistry
B. Hormone mechanisms
C. Hydrodynamic methods
D. Transport and bioenergetics

BCHM 604 Seminar in Biochemistry (1)

Enrollment required each quarter in residence.

BCHM 697 Research (arranged)

BCHM 698 Thesis (arranged)

BCHM 699 Dissertation (arranged)

BIOLOGY

- LEONARD R. BRAND, PH.D. Cornell University 1970
Chairman; Professor of Biology
Animal behavior, mammalogy
- C. DOUGLAS EDDLEMAN, PH.D. University of Texas at Austin 1973
Professor of Biology
Reproductive cytology
- EARL W. LATHROP, PH.D. University of Kansas 1957
Professor of Biology
Floristics, plant ecology
- ROBERT L. NUTTER, PH.D. Iowa State University 1957
Professor of Microbiology
Molecular biophysics, virology
- MARVIN A. PETERS, PH.D. University of Iowa 1969
Professor of Pharmacology
Drug metabolism
- ARIEL A. ROTH, PH.D. University of Michigan 1955
Professor of Biology
Invertebrate zoology
- RAYMOND E. RYCKMAN, PH.D. University of California at Berkeley 1960
Professor of Microbiology
Entomology, parasitology, systematics
- LEONARD R. BULLAS, PH.D. Montana State University 1963
Associate Professor of Microbiology
Bacterial genetics
- NORMAN M. CASE, PH.D. Loma Linda University GS 1958
Associate Professor of Anatomy
Histology, electron microscopy
- ARTHUR V. CHADWICK, PH.D. University of Miami 1969
Associate Professor of Biology
Paleobotany, palynology
- CONRAD D. CLAUSEN, PH.D. Loma Linda University GS 1972
Associate Professor of Biology
Invertebrate zoology

- ARTHUR E. DALGLEISH, PH.D. Stanford University 1964
Associate Professor of Anatomy
Embryology
- LANNY FISK, PH.D. Loma Linda University 1976 (on leave)
Associate Professor of Biology and Geology
Paleobotany and stratigraphy
- DAVID A. HESSINGER, PH.D. University of Miami 1970
Associate Professor of Pharmacology
Marine toxins, cellular and molecular biology
- YUK LIN HO, PH.D. Harvard University 1962 (on leave)
Associate Professor of Microbiology
Molecular biology
- ELWOOD S. MCCLUSKEY, PH.D. Stanford University 1959
Associate Professor of Physiology and Biophysics
Comparative physiology, entomology
- NORMAN L. MITCHELL, PH.D. University of Western Ontario 1967
Associate Professor of Biology
Ultrastructure of fungi
- RICHARD D. TKACHUCK, PH.D. University of California at Los Angeles 1970
Associate Professor of Biology
Comparative physiology, vitamin metabolism
- T. JOE WILLEY, PH.D. University of California at Berkeley 1969
Associate Professor of Physiology
Neurophysiology
- PAUL Y. YAHIKU, PH.D. University of California at Los Angeles 1967
Associate Professor of Mathematical Sciences and Biology
Statistical methodology
- KNUT ANDERSSON, M.S. University of Wyoming 1978 (on leave)
Assistant Professor of Geology
Invertebrate paleontology and micropaleontology
- PAUL H. BUCHHEIM, PH.D. University of Wyoming 1978
Assistant Professor of Biology
Geology, paleontology
- ROBERT A. CHILSON, PH.D. University of Wisconsin 1975
Assistant Professor of Biology
Electrophysiology
- ANTHONY W. LEWIS, PH.D. Arizona State University 1973
Assistant Professor of Biology
Vertebrate zoology

DONALD D. RAFUSE, PH.D. Washington State University 1973

Assistant Professor of Physiology
Neural aspects of behavior

ANTHONY J. ZUCCARELLI, PH.D. California Institute of Technology 1974

Assistant Professor of Biology
Molecular genetics, microbiology

The Department of Biology offers programs leading to the degrees of Master of Arts and Doctor of Philosophy. The programs of study have been planned to provide a broader and more unified approach to the life sciences than is often customary.

Nevertheless, a considerable degree of specialization must be undertaken, particularly in relation to the conduct of original and significant research. The planning of individual student programs provides for an appropriate degree of specialization in the selection of courses related to the area of research interest. Some of the areas of specialization include: animal behavior; animal physiology; ecology; entomology; genetics; histology and cytology; mammalogy; cell biology; virology; parasitology; paleobiology; and plant science, particularly plant ecology. Thus study in various areas, ranging from molecular biology to natural history, is available to the student seeking to prepare himself for teaching or for research in modern biology.

Facilities Research and teaching laboratories and museum facilities for the use of graduate students in biology are located in Griggs Hall and adjacent buildings. Equipment available for research application includes controlled environment rooms, greenhouse facilities, plant growth chambers, electron microscopes, x-ray microscope, spectrophotometers, spectrofluorometer, ultracentrifuges, refrigerated centrifuges, radioisotope equipment, electronic apparatus for physiological measurements, chromatography equipment, and sound spectrograph. The University computer facilities are also available.

Field stations Through the cooperation of Pacific Union College and Walla Walla College, the marine field stations operated by these institutions at Albion, California, and Anacortes, Washington, are available for coursework and research by graduate students of this University. The department operates a tropical field station in southern Mexico for use in research and special courses in biology.

Summer program Because many persons, especially secondary school teachers, pursue graduate programs during the summer months only, the department schedules a program that makes it possible for a student to complete a Master of Arts program entirely in the summer months. A well-prepared student should be able to complete the requirements for this

degree in four summers of full-time work, or in one school year and one or two summers. Teachers who have only eight weeks available during the summer will take longer to complete the program.

The biology coursework and research for a Master of Arts in the teaching of biology (offered through the School of Education) may also be taken in the biology graduate program.

Student aid Fellowships offered by agencies such as the National Science Foundation and the National Institutes of Health are tenable at this University. A limited number of fellowships and scholarships are available from University funds. Research assistantships and teaching assistantships are also available from the department. Further information can be obtained from the chairman of the department.

Dr. Edmund C. Jaeger has provided a perpetual endowment fund that permits the yearly awarding of the *Edmund C. Jaeger Fellowship in Biology* to meritorious students.

Requirements A minimum grade point average of 3.00 (B) in all research courses (research, thesis, dissertation, seminar, special problems, and research techniques) and in all formal courses (computed separately) is required for a degree. A student who has not earned a B average after taking 60 units of graduate work at the University is not recommended for a degree. No course with a grade below C (2.00) can apply on a degree.

For information about requirements and practices to which all graduate students are subject, the student should consult the *Academic Practices* section of division I of this BULLETIN.

MASTER OF ARTS

Admission Applicants must meet the general Graduate School admission requirements. Acceptable undergraduate preparation includes a Bachelor of Arts degree from an accredited college, with a biology major or equivalent; one year each of college mathematics and of general chemistry; and at least 20 quarter units from two or more of the following organic chemistry, biochemistry, general physics, geology, physical chemistry.

Curriculum The following constitute the curriculum for the Master of Arts degree.

During either undergraduate years or graduate, a course in research techniques.

Reading knowledge of one foreign language recommended for students planning to enter a Doctor of Philosophy program.

A minimum of 48 quarter units of graduate work, 30 units in biology, including 15 units at or above the 500 level (exclusive of research). A course in paleontology, or speciation, or history and philosophy of biology, such as BIOL

489, 544, 558, or GEOL 548, or other paleontology during residence. Seminar in biology, 1 unit; attendance required at all general departmental seminars.

Teaching experience (laboratory teaching during at least one quarter meets this requirement): BIOL 604 recommended.

Research and thesis.

Final oral examination.

DOCTOR OF PHILOSOPHY

Admission The applicant must meet the general Graduate School admission requirements. Acceptable undergraduate preparation in biology must include general biology (or the equivalent), and at least one course each in botany, zoology, genetics, and developmental biology. Cognate undergraduate prerequisites include one year of college mathematics (calculus recommended); one year of general physics; chemistry through organic; and at least one of the following: biochemistry, calculus, geology.

Residence A minimum of two academic years of work is required beyond the master's level. This is interpreted as registration in courses, seminars, or research for a total of 72 quarter units beyond the master's level (or 120 units beyond the baccalaureate degree). At least one of these years (three quarters, a minimum of 36 units) must be in residence on the campus at Loma Linda.

In the determination of when a doctorate may be conferred, scholarly attainment and demonstration of the capacity for independent research are considered most important and must be in good evidence without presumption as to duration of residence or accumulation of formal credits. In order to obtain full residence credit for any term, the student must give full time and energy to graduate work. Only with such devotion to the coursework and research, with time for reading and reflection, can the spirit and the special demands of the program for the Doctor of Philosophy degree be fulfilled.

Required courses Since the basic preparation for the degree represents the field of biology rather than one of its subsections, no minor is required. However, up to 15 units of work in cognate fields, such as biochemistry or biophysics, may be applied toward the major with the approval of the student's guidance committee.

In addition to the undergraduate biology prerequisites, the following are required at some time in the student's career, during either the undergraduate or the graduate program:

biostatistics

broad biology of at least one particular taxon

advanced genetics

advanced botany

two of the following:

additional paleontology

biogeography

advanced philosophy of biology

paleontology (at this University)

cell physiology, or

cell and molecular biology

animal physiology

Two units of seminar are required beyond the master's level. Attendance at all general departmental seminars is required of the biology graduate student while in residence at the Loma Linda campus.

During residence the student is required to take a 3-unit course in religion (beyond the master's level). Additional courses in biology or cognate fields are normally desirable as chosen by the student or suggested by the adviser or guidance committee.

Teaching is required during at least two quarters. It may be done in the laboratory, or it may involve presenting part of the lectures for a course. Registration in BIOL 604 is recommended.

Marine or tropical study Since the majority of life forms are best represented in the ocean and certain phenomena of biology are best demonstrated in the tropics, a field course or research (at least 4 units) is required in either a tropical or marine environment during either undergraduate or graduate years.

Comprehensive examination The student is expected to have a sufficient knowledge of the various fields of biology to serve as a broad basis for a sound philosophy of biology, as well as to give perspective and background for future specialization and research. The comprehensive examination will assume a knowledge of the major groups of plants and animals and microorganisms and an understanding of such fields as are listed in the preceding paragraphs. It is designed to test the breadth and depth of the student's thinking and philosophy rather than the mere memorization of facts. Wide reading is expected, since it will aid in the student's preparation in areas not covered specifically by courses.

Foreign language The student must demonstrate the ability to read one of the following: German, French, Russian, or Japanese literature pertaining to the major field of study. A second language, natural or synthetic, especially pertinent to the student's research interest, to be approved by the student's guidance committee, is also required.

Advancement to candidacy The student may apply for admission to doctoral candidacy after (1) meeting the language requirement, (2) passing the comprehensive examination, and (3) passing any other examinations required by the department. The department bases its recommendation to the Dean of the Graduate School on the student's performance in the comprehensive examination, on previous coursework in residence, and on other qualifications for further pursuit of doctoral work.

Dissertation The candidate's capacity must be demonstrated by a dissertation based on independent work and original research.

Oral examination The oral examination is taken when the dissertation content and organization are in final form. The examination emphasizes the dissertation research, but it may cover the relationship of the research to fundamental principles in other fields of biology also.

Biology minor A biology minor for students majoring in other departments may include any courses listed under the Department of Biology except those listed from the department in which the major is taken. At least *one course* in the minor must be from among the following primary offerings of the Department of Biology: BIOL 515, 519, 524, 544, 558.

In addition to the primary offerings of the department, the course listing includes a number of other courses that are of potential interest to graduate students in biology. The student may take courses in other departments as part of the graduate work, according to special interests and needs. See Microbiology, Physiology, Anatomy, Biochemistry, and Earth Science.

JOINT PROGRAMS

Combined M.D./PH.D. or D.D.S./PH.D. For students electing a combined program leading to the Doctor of Medicine and Doctor of Philosophy degrees or to the Doctor of Dental Surgery and Doctor of Philosophy degrees, with the PH.D. earned in biology, the following adaptations of the biology PH.D. requirements apply:

1. Up to 30 units of credit for basic science coursework and up to 30 units of research and/or graduate courses done as part of the electives of the professional curriculum, but not more than a total of 48 units, may be applied to the PH.D. program.

2. The "plant or animal physiology" and the "biostatistics" requirements would be met by the professional curriculum.

Combined M.D./M.A. or D.D.S./M.A. For students electing a combined program with the Master of Arts earned in biology, up to 12 units of credit for basic science coursework and up to 6 units of research and/or graduate courses done as part of the electives of the professional curriculum may be applied to the master's program.

COURSES

UPPER DIVISION COURSES APPLICABLE TO GRADUATE PROGRAM

- BIOL 315 **Biological Techniques (3)**
- BIOL 404 **Cellular and Molecular Biology (4)**
- BIOL 406 **Introduction to Marine Biology (4)**
- BIOL 408 **Biology of Marine Invertebrates (4)**
- BIOL 414 **General Ecology (4)**
- BIOL 418 **Biology of Lower Plants (4)**
- BIOL 419 **Biology of Higher Plants (4)**
- BIOL 424 **Wilderness Ecology (3)**
- BIOL 425 **Limnology (4)**
- BIOL 427 **Human Ecology (2)**
- BIOL 434 **Histology (4)**
- BIOL 435 **Medical Parasitology (4)**
- BIOL 438 **Mammalogy (4)**
- BIOL 446 **Mammalian Anatomy (4)**
- BIOL 447 **Genetics (4)**
- BIOL 449 **Population Biology (4)**
- BIOL 456 **Plant Pathology (4)**
- BIOL 458 **Vertebrate Biology (4)**
- BIOL 465 **Ornithology (4)**
- BIOL 466 **Vertebrate Physiology (4)**
- BIOL 467 **Herpetology (4)**
- BIOL 468 **Plant Anatomy (4)**
- BIOL 469 **Animal Behavior (4)**
- BIOL 470 **Protozoology (4)**
- BIOL 474 **Microbiology (5)**
- BIOL 475 **General Entomology (4)**
- BIOL 476 **Biostatistics (4)**

- BIOL 477 Plant Morphology (4)**
BIOL 478 Plant Physiology (4)
BIOL 485 Systematic Botany (4)
BIOL 487 Biology of the Galapagos Islands (8)
BIOL 488 Paleobiology (4)
BIOL 489 Philosophy of Science (4)
BIOL 499 Directed Study (1-4)

GRADUATE COURSES

ANAT 549 Molecular Cytology and Topographical Chemistry (3)

Selected aspects of the functional and chemical morphology of cells and organs; lectures and literature seminars.

Prerequisite: Courses in biochemistry and histology.
 McMillan.

BIOL 515 Biogeography (3)

Present distribution and past migrations of the natural populations of organisms.

Prerequisite: Biology or systematics of at least two plant or animal taxa desirable.
 Lathrop.

BIOL 518 Readings in Ecology (2)

Study, analysis, and discussion of current and classic papers.

Prerequisite: Ecology or consent of the instructor.
 Lathrop.

BIOL 519 Advanced General Ecology (4)

Analysis and interpretation of natural communities. Includes fieldwork, with emphasis on physical and biotic measurements. Especially useful for students needing to relate habitat and environmental factors to their special field projects.

Prerequisite: Field biology or general ecology.
 Lathrop.

BIOL 524 Advanced Invertebrate Biology (3)

A critical investigation of contemporary invertebrate phylogenetic schemes. Analysis of pertinent information from morphology, embryology, physiology, biochemistry, and paleontology. Three class hours.

Prerequisite: A course in invertebrate zoology or consent of the instructor.
 Clausen.

BIOL 525 Selected Topics in Marine Biology (2)

Topics selected either for their importance in current marine biology research or for their philosophical significance: coral reef biology, deep-sea biology, marine biogeography, paleoecology of marine organisms. Concentration on the invertebrates.

Prerequisite: Marine biology or invertebrate zoology or consent of the instructor.
 Clausen.

BIOL 536 Seminar in Animal Behavior (2)

Critical analysis of the research literature on selected topics in animal behavior.

Prerequisite: A course in animal behavior or consent of the instructor.
 Brand.

BIOL 544 Biosystematics and Speciation (4)

Dynamic processes of biological systems as revealed by genetics, distribution, isolation, natural selection, and morphology. Lectures, discussions, field trips, research reports.

Prerequisite: Coursework in one or more taxa.
Ryckman.

BIOL 546 Advances in Molecular Genetics (3)

Selected topics in molecular aspects of genetics, including mechanisms of recombination, the nature of mutations, the organization of eucaryotic chromosomes, split genes, overlapping genes, transposable genetic elements, and techniques in genetic engineering.

Prerequisite: A course in genetics or consent of the instructor.
Zuccarelli.

BIOL 548 Readings in Molecular Biology (2)

A survey of techniques and experiments in molecular biology through the medium of research publications. Topics include mechanisms of DNA replication, electron microscope mapping of nucleic acids, DNA heteroduplex analysis, evolution of viral genomes and structure of the genetic code.

Prerequisite: A course in biochemistry or consent of the instructor.
Zuccarelli.

BIOL 554 Philosophy of Creation (2)

Presentation of a positive approach to Creation, with discussion of its philosophical, theological, and scientific implications.

Prerequisite: Consent of the instructor.
Staff.

BIOL 558 History and Philosophy of Science (4)

A study of selected topics in the history and philosophy of science, and the application of these principles in analyzing contemporary scientific trends.

Brand.

BIOL 564 Biochemistry and Physiology of Symbiotic Organisms (4)

An examination of the interface between host and symbiont at the biochemical and physiological levels. Emphasis placed on the analysis of current research literature. Lecture two units, laboratory two units.

Tkachuck.

BIOL 604 College Biology Teaching (2-4)

One class meeting per week for discussion of methods of teaching. Student assigned responsibility for one or two laboratory sections or selected lecture sessions of an undergraduate course for the quarter. Students electing the classwork only should register for two units.

McCluskey.

BIOL 605 Seminar in Biology (1)

Selected topics dealing with recent developments.

Staff.

BIOL 606 Special Problems in _____ (1-4)

Responsibility for a special project in the field, laboratory, museum, or library. Registration must designate one of the following specific fields: ecology, animal physiology, parasitology, mammalogy, ornithology, entomology, plant physiology, mycology, systematics, biogeography, animal behavior, genetics, history and philosophy of biology, invertebrate zoology, or cytology.

Staff.

BIOL 615 Research Techniques in Biology (1)

Concepts and methods used in biological research, including scientific writing and literature.

Clausen.

BIOL 697 Research (arranged)

BIOL 698 Thesis (arranged)

Registration for the terminal part of the master's thesis should be under this number.

BIOL 699 Dissertation (arranged)

Registration for at least the terminal part of the doctoral dissertation research should be under this number.

BIOM 581, 582, 583 Biophysical Systems Analysis I, II, III (3, 3, 3)

A study of continuous linear systems with respect to feedback, regulators and servomechanisms, transient and steady-state response, and stability and performance, using frequency response. Calculus of variations, dynamic programming, and computer modeling. Study of biological examples.

ENVH 566 Air Quality and Human Health (3)

An introduction to the sources and characteristics of air pollutants and their effects on man and the environment. Consideration of methods used in sampling and control of air pollutants.

Prerequisite: ENVH 404 or equivalent.

Magie.

ENVH 568 Water Quality and Waterborne Wastes (3)

A study of the principles and processes involved in providing safe and adequate water supplies and waste disposal facilities in municipal and rural locations. The effects of polluted waters on rivers, lakes, and the sea.

Prerequisite: ENVH 404 or equivalent.

G. Johnston.

ENVH 569 Environmental Health Laboratory Sampling and Analysis (4)

A course to provide practical laboratory experience that will serve as an introduction to the techniques used in measurement and evaluation of environmental health problems. Techniques pertinent to air, water, and food sanitation; industrial hygiene; and radiological health. Two lectures and two laboratories per week.

Prerequisite: ENVH 404 or equivalent.

G. Johnston.

ENVH 586 Environmental Management (4)

Consideration of programs of governmental agencies in environmental health; the setting of environmental standards; interpretation of codes, laws, and regulations; preparation and evaluation of environmental impact statements. Urban and regional planning approached by computer simulation of environmental problems, student input of solutions, computer output of simulated environmental result. Lecture, discussion, laboratory.

Prerequisite: Consent of instructor.

G. Johnston.

GEOL. (See Earth Science section for geology and paleontology courses.)

HLSC 536 Behavioral Physiology (3)

Graduate-level approach to the applied physiology of behavior. Emphasis on neural and endocrine mechanisms; focus on stress control, physiology of violence, psychosomatic mechanisms, and improved strategies for brain enrichment.

Henry.

MICR 534 Microbial Physiology (4)

A study of the growth, nutrition, and metabolism of microorganisms; the effect of physical and chemical environment on the bacterial cell and the mechanisms of survival and virulence.

Ho.

MICR 535 Molecular Biology of Microorganisms (4)

DNA replication; the genetic coding of information, its transfer from DNA through RNA to protein, and the regulatory mechanisms of expression of genetic functions, with specific emphasis on microorganisms.

Ho.

MICR 555 Microbial Genetics (3-4)

Genetic processes of microorganisms, including molds, protozoa, viruses, and bacteria. The contribution that the study of microorganisms has made in modern genetics toward the understanding of the nature of the genetic material and the mechanism of its action.

Bullas.

MICR 556 Microbial Genetics Laboratory (2)

Laboratory exercises in bacterial and bacteriophage genetics.

Prerequisite: Microbial genetics or bacteriophage genetics.

Bullas.

MICR 565 Virology (4)

Fundamental aspects of the virus-host cell relationship of bacteriophages and selected groups of animal viruses. Principles of cell culture and virus serology.

Nutter.

MICR 566 Cell Culture (3)

The practical aspects of the growth of animal cells in culture. Experience with both primary cell cultures and established cell lines.

Nutter.

MICR 574 Arthropod Vectors of Infectious Agents (4)

Vector potential of insects, ticks, and mites. Importance of ecology and biosystematics to host-parasite relationships.

Ryckman.

MICR 575 Arthropod Vectors Laboratory (1-2)

To be taken in conjunction with MICR 574 as an option.

Ryckman.

MICR 576 Field Medical Entomology (3)

The ecology and host relationships of medically important arthropods under field conditions. Emphasis on habitat and host recognition and identification of the parasitic forms.

Ryckman.

MICR 585 Helminthology (4)

Important aspects of the parasitic helminths of animals, particularly the vertebrates. Special consideration of taxonomy, morphology, life histories, host-parasite relationships, and special techniques in the preparation of specimens for study.

Wagner.

PHSL 535 Comparative Physiology (5)

A comparison of the major animal groups, from protozoa to mammals, with emphasis on analysis of diversity. Lecture four units, laboratory one unit.

Prerequisite: Zoology (preferably invertebrate); physiology (or biochemistry).

McCluskey.

PHSL 541, 542 Cell and Molecular Biology I, II (4, 4)

Life processes fundamental to animal, plant, and microorganism; a graduate-level introduction. Lecture three units, laboratory one unit each term.

Prerequisite: Organic chemistry and one of the following: biochemistry, molecular biology, or cell biology; physics desirable.

McCluskey, Hall.

PHSL 596 Readings in Comparative Physiology (1)

Critical analysis of selected current or classic papers. Content variable. May be taken more than once for credit.

Prerequisite or concurrent: A course in physiology.

McCluskey.

PHSL 597 Readings in Circadian Rhythms (1-2)

Analysis of selected recent papers. Designed to lead to careful interpretation of the literature in other fields and to an improvement of the design of one's own research.

McCluskey.

STAT 404 General Statistics (3)

Fundamental procedures in collecting, summarizing, presenting, analyzing, and interpreting data. Measures of central tendency and variation, probability, binomial distribution, normal distribution, sampling, confidence intervals, hypothesis testing, t-test, chi-square, and correlation and regression. Laboratory for practical application of techniques.

Prerequisite: Algebra, competency examination.

G. Zimmerman.

STAT 521 Biostatistics I (4)

Fundamental procedures of collecting, tabulating, and presenting data. Measures of central tendency and variation, normal distribution, sampling, t-test, confidence intervals, chi-square, and correlation and regression. Emphasis on statistical inference.

Prerequisite: Algebra, competency examination.

Yahiku.

STAT 522 Biostatistics II (4)

Analysis of variance (one-way and k-way classifications), correlation and regression (simple, partial, and multiple), covariance analysis, and orthogonal contrasts.

Prerequisite: STAT 521.

Yahiku.

STAT 523 Biostatistics III (4)

Experimental designs, including Latin squares, incomplete block designs, nested designs. Special topics in analysis of variance, including general linear hypothesis, multiple comparisons, and missing data. Includes the application of computer programs such as the BMD.

Prerequisite: STAT 522.

Yahiku.

STAT 568 Data Analysis (2-3)

Presentation and use of the most common data analysis methods: correlation and regression, contingency table, variance, and covariance. Student provision of data encouraged. Use of data processing equipment and packaged computer programs.

Prerequisite: STAT 404, 424, or equivalent.

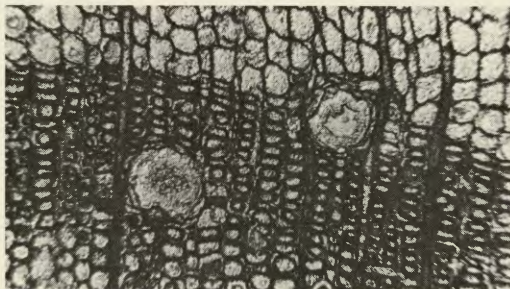
Abbey.

STAT 698 Research Consultation (1-4)

Provides individual advice on project design, data collection, analysis, and evaluation.

Prerequisite: Consent of the instructor.

G. Zimmerman.



DENTISTRY

ELMER KELLN, D.D.S. University of Nebraska 1949; M.S.D. University of Minnesota 1969

Director, graduate program in dentistry
Professor of Oral Pathology
Oral pathology

BERNARD J. BRANDSTATER, M.B.B.S.

Professor of Anesthesiology
Anesthesiology

PHILIP J. BOYNE, D.M.D. Tufts University 1947; M.S. Georgetown University 1961

Professor of Oral Surgery
Oral surgery

BERNARD C. BYRD, D.D.S. Emory University 1953; M.S. University of Southern California 1964

Professor of Oral Surgery
Oral surgery

ALDEN B. CHASE, D.D.S. Loma Linda University SD 1960; M.S. GS 1963

Professor of Orthodontics
Orthodontics

JAN H. EGELBERG, L.D.S. University of Lund 1960; Odont. Dr. University of Lund 1967

Professor of Periodontics
Dental research

ROBERT L. KINZER, D.D.S. Loma Linda University SD 1958

Professor of Restorative Dentistry
Restorative dentistry

JUDSON KLOOSTER, D.D.S. University of the Pacific 1947; M.M.S. Tulane University 1968

Professor of Restorative Dentistry
Restorative dentistry

SHIROU KUNIHIRA, PH.D. Stanford University 1967

Professor of Psychology
Psychology

DONALD L. PETERS, D.D.S. Loma Linda University SD 1961; M.S. GS 1969

Professor of Endodontics
Endodontics

- ROBERT M. RICKETTS, D.D.S. Indiana University 1945; M.S. University of Illinois
1950
Professor of Orthodontics
Orthodontics
- RICHARD A. SIMMS, D.D.S. Howard University 1953; M.S. Loma Linda University
GS 1963
Professor of Orthodontics
Orthodontics
- RALPH R. STEINMAN, D.D.S. Emory University 1938; M.S. University of Michigan
1953
Professor of Oral Medicine
Oral medicine
- JOHN L. TOMLINSON, M.S., University of Oregon 1961; PH.D. University of
Washington 1967
Professor of Orthodontics
Materials engineering
- ROLAND D. WALTERS, D.D.S. Loma Linda University SD 1957; M.S. GS 1967
Professor of Orthodontics
Orthodontics
- KENNETH E. WICAL, D.D.S. University of Southern California 1956; M.S. University
of Washington 1973
Professor of Prosthodontics
Prosthodontics
- J. MILFORD ANHOLM, D.D.S. University of the Pacific 1946; M.S. Loma Linda
University GS 1962
Associate Professor of Orthodontics
Orthodontics
- LEIF K. BAKLAND, D.D.S. Loma Linda University SD 1963
Associate Professor of Endodontics
Endodontics
- GARY C. BOGLE, D.D.S. Loma Linda University SD 1969; M.S. GS 1973
Associate Professor of Periodontics
Periodontics
- MAX CRIGGER, D.D.S. Ohio State University 1965; M.S. University of Rochester
1972
Associate Professor of Periodontics
Periodontics
- RALEIGH R. CUMMINGS, D.D.S. Loma Linda University SD 1966; M.S. GS 1970
Associate Professor of Endodontics
Endodontics

- LAWRENCE D. DAY, D.D.S. University of Illinois 1953; M.S. Loma Linda University
GS 1969
Associate Professor of Oral Surgery
Oral surgery
- RALPH P. FELLER, D.M.D. Tufts University 1964; M.S. University of Texas 1975
Associate Professor of Prosthodontics
Prosthodontics
- GEORGE C. GAMBOA, D.D.S. University of the Pacific 1946; M.S.D. University of
Minnesota 1953
Associate Professor of Oral Surgery
Oral surgery
- LLOYD E. GAUNTT, D.D.S. Loma Linda University SD 1963; M.S. GS 1965
Associate Professor of Orthodontics
Orthodontics
- VIRGIL V. HEINRICH, D.D.S. Loma Linda University SD 1961; M.S. GS 1964
Associate Professor of Orthodontics
Orthodontics
- WILLIAM T. JARVIS, PH.D. University of Oregon 1973
Associate Professor of Preventive and Community Dentistry
Preventive and community dentistry
- ROBERT D. KIGER, D.D.S. Loma Linda University SD 1970; M.S. University of
Oregon 1973
Associate Professor of Periodontics
Periodontics
- ARTHUR J. MORGAN, D.D.S. Loma Linda University SD 1960; M.S. GS 1963
Associate Professor of Orthodontics
Orthodontics
- JOHN K. PEARSON, D.D.S. Loma Linda University SD 1969; M.S. GS 1971
Associate Professor of Orthodontics
Orthodontics
- JOHN M. REEVES, PH.D. University of Southern California 1972
Associate Professor of Psychology
Psychology
- GORDON M. RICK, D.D.S. Loma Linda University SD 1968; M.S. GS 1972
Associate Professor of Oral Pathology
Oral pathology
- MERRILL E. SCHMIDT, D.D.S. Loma Linda University SD 1962
Associate Professor of Endodontics
Endodontics

- JAMES H. SIMON, D.D.S. Temple University 1961
Associate Professor of Endodontics
Endodontics
- CHARLES L. SMITH, D.D.S. Loma Linda University SD 1963; M.S. Michigan State University 1957
Associate Professor of Prosthodontics
Prosthodontics
- ARTHUR SPENST, D.D.S. Loma Linda University SD 1961
Associate Professor of Endodontics
Endodontics
- MAHMOUD TORABINEJAD, D.M.D. University of Tehran 1971; M.S.D. University of Washington 1976
Associate Professor of Endodontics
Endodontics
- JAMES R. WISE, D.D.S. Loma Linda University SD 1967; M.S. GS 1971
Associate Professor of Orthodontics
Orthodontics
- LOGAN W. BARNARD, PH.D. University of Utah 1971
Assistant Professor of Orthodontics
Orthodontics
- JOSEPH M. CARUSO, D.D.S. Loma Linda University SD 1973; M.S. GS 1975; M.P.H., SH 1976
Assistant Professor of Orthodontics
Orthodontics
- EARL R. CRANE, D.D.S. Northwestern University 1938; M.S. University of Michigan 1942
Assistant Professor of Orthodontics
Orthodontics
- JOHN S. GARRETT, D.D.S. Northwestern University 1971; M.S. GS 1976
Assistant Professor of Periodontics
Periodontics
- LAWRENCE E. MCEWEN, D.D.S. Loma Linda University SD 1963
Research Associate
Orthodontics
- LEE E. OLSEN, D.D.S. Loma Linda University SD 1967; M.S. GS 1969
Assistant Professor of Orthodontics
Orthodontics

- THOMAS L. ROBERTSON, D.D.S. Marquette University 1959; M.S. Ohio State University 1963
Assistant Professor of Orthodontics
Orthodontics
- WILLIS L. SCHLENKER, D.D.S. Loma Linda University SD 1957
Assistant Professor of Orthodontics
Orthodontics
- LAURENCE A. SEIFERT, D.D.S. Loma Linda University SD 1968; M.S. GS 1978
Assistant Professor of Orthodontics
Orthodontics
- GUY D. TAYLOR, D.D.S. West Virginia University 1967; M.S. West Virginia University 1971
Assistant Professor of Orthodontics
Orthodontics
- LAWRENCE W. WILL, D.D.S. Loma Linda University SD 1970; M.S. GS 1973
Assistant Professor of Orthodontics
Orthodontics
- WILLIAM L. YOUNG, D.D.S. University of California at San Francisco 1946; M.S. Loma Linda University GS 1971
Assistant Professor of Endodontics
Endodontics

Graduate study leading to the Master of Science degree or a specialty certificate is offered in the following areas:

Endodontics	Orthodontics	Periodontics
Oral Surgery		

The basic science approach to research and clinical practice is emphasized. The programs are organized in line with the standards of the Council on Dental Education of the American Dental Association and in objectives and content meet the requirements of the respective specialty boards.

Admission An appropriate degree from an accredited college, or the equivalent, and other specifics and personal qualifications are required for admission for graduate study. A doctoral degree in dentistry (Doctor of Dental Surgery or Doctor of Dental Medicine, or the equivalent) is required for admission to all programs. Application for admission should be made before or by November 15.

Residence The required time in residence varies with the program. For length of program, refer to information under program description.

Grades The student must achieve a general grade point average of not less than 3.00, with no subject below 2.00. In addition to earning acceptable scholastic marks, evidence of personal and professional fitness for growth in the science and art of the specialty must be submitted.

Advancement to candidacy The student desiring to qualify for a master's degree should petition the Graduate Council for advancement to candidacy not later than the close of the first academic year. At the same time the proposed thesis topic, an outline, and a comprehensive bibliography, as approved by the major professor must be submitted. If all credentials and proposals are acceptable, the student is advanced to candidacy; and a guidance and examining committee of not less than three members is named by the Graduate Council.

Thesis The student is required to pursue a problem in basic or clinical research and to present the results in thesis form according to standards set by the Graduate Council. An oral defense of the thesis may also be required.

For information about requirements and practices to which all graduate students are subject, the student should consult the *Academic Practices* section of division I of this BULLETIN.

ENDODONTICS

The goal of the graduate program in endodontics is to prepare by education and experience dentists who are eligible for certification as specialists in this area of dentistry. The course has been designed (1) to provide a comprehensive study of the biomedical sciences with emphasis on their relationship to endodontics; (2) to provide advanced competency in the clinical practice of both the usual and the unusual endodontic procedures; and (3) to provide training in research and teaching so as to encourage continued growth and involvement after completion of the program. A minimum of two years of general practice experience is preferred.

Two programs are available. The certificate program requires a minimum of twenty-two months in residence, beginning in September. Master's degree programs require a minimum of twenty-four months in residence and may require additional time, depending on the major interest area.

Required courses The following courses are required:

- ENDN 634 Special Topics in Pharmacology
- ENDN 534 Endodontic Treatment Conference
- ENDN 601 Principles of Endodontics
- ENDN 604 Literature Seminar in Endodontics
- ENDN 625 Clinical Practice in Endodontics
- ENDN 654 Practice Teaching in Endodontics
- ENDN 697 Research
- ENDN 698 Thesis
- GRAD 604 Research Methods and Methodology
- GRDN 505 Principles of Instruction
- GRDN 524 Social Dynamics of Dental Practice
- GRDN 526 Applied Anatomy
- GRDN 601 Practice Management
- ORBI 522 Cell Biology

- ORBI 526 Microbiology, Pathology, Immunology
- ORBI 531 Physiology of Bone
- ORBI 534 Special Topics in Oral Biology
- ORMD 521 Principles of Medicine, Physical Diagnosis, and Hospital Dentistry
- ORPA 531 Clinical Oral Pathology
- RLGN A course in religion
- STAT 404 General Statistics (Master of Science program)
- STAT 424 Public Health Statistics (certificate program)

ORAL SURGERY

The graduate program in oral surgery is designed to prepare the student for the practice of the specialty of oral surgery and to provide the foundation for the continued acquisition of knowledge and skills. The student is introduced to problems of research and teaching to develop an increased awareness of the profession. The content of the program is designed to conform to the standards outlined by the specialty board.

Residence A minimum of three calendar years in residence is required, with the beginning date of July 1.

Required courses The following courses are required:

- GRAD 604 Research Methods and Methodology
- GRDN 526 Applied Anatomy
- GRDN 601 Practice Management
- ORBI 522 Cell Biology
- ORBI 531 Physiology of Bone
- ORDN 521 Applied Cephalometrics for Oral Surgeons
- ORMD 521 Principles of Medicine, Physical Diagnosis, and Hospital Dentistry
- ORPA 531 Clinical Oral Pathology
- ORSR 521 General Anesthesia
- ORSR 531 Oral Surgery I
- ORSR 532 Oral Surgery II
- ORSR 533 Oral Surgery III
- ORSR 604 Literature Review in Oral and Maxillofacial Surgery
- ORSR 641 Applied Orthognathic Surgery
- ORSR 654 Practice Teaching in Oral Surgery
- ORSR 697 Research
- ORSR 698 Thesis
- RLGN A course in religion

ORTHODONTICS

The graduate program in orthodontics is organized to do the following: (1) develop technical competence in the skills of orthodontics, (2) deepen understanding of the basic natural sciences and their correlation with orthodontic practices, (3) develop analytical thinking, (4) develop skills in clinical research, (5) increase the sense of responsibility toward the patient and the community, and (6) develop increased awareness of obligation to make

contributions to the growth and stature of the profession and to coordinate with those of allied professional disciplines. All of the foregoing are designed to prepare the student for a specialty practice in orthodontics or for pursuing a teaching career. The content of the program conforms to the standards outlined by the specialty board.

Residence A minimum of twenty-four months in residence is required, beginning with the summer quarter.

Required courses The following courses are required:

- GRAD 604 Research Methods and Methodology
- GRDN 524 Social Dynamics of Dental Practice
- GRDN 526 Applied Anatomy
- GRDN 601 Practice Management
- HLSR 517 Public Health Genetics
- ORBI 522 Cell Biology
- ORBI 531 Physiology of Bone
- ORDN 524 Introduction to Graduate Orthodontics
- ORDN 525 Materials Science and Mechanics
- ORDN 535 Advanced Cephalometrics
- ORDN 536 Concepts of Physical Anthropology
- ORDN 544 Mixed Dentition in Health and Disease
- ORDN 545 Growth and Development
- ORDN 546 Fundamentals of Occlusion
- ORDN 554 Physiology and Pathology of Speech
- ORDN 574 Diagnosis and Treatment Planning
- ORDN 57 Onthognathic Surgery Conference
- ORDN 584 Current Orthodontics Literature
- ORDN 604 Seminar in Orthodontics
- ORDN 605 Advanced Seminar in Orthodontics
- ORDN 625 Clinical Practice in Orthodontics
- ORDN 634 Orthodontics Clinical Conference
- ORDN 654 Practice Teaching in Orthodontics
- ORDN 697 Research
- ORDN 698 Thesis
- ORPA 531 Clinical Oral Pathology
- RLGN A course in religion
- STAT 404 General Statistics

PERIODONTICS

The graduate program in periodontics leads to a certificate in periodontics or a Master of Science degree combined with a certificate in periodontics.

The two-year certificate program prepares the student for a specialty practice in periodontics and provides the basis for continuing professional development after completion of the program. The program includes didactic and clinical components as well as research opportunities.

The three-year Master of Science program includes the didactic and clinical work for the certificate program. In addition the residents have the opportunity to complete one or more research projects and to be involved in clinical and didactic undergraduate teaching activities. The Master of Science program prepares the residents for academic careers in periodontal research and teaching.

These programs fulfill the requirements for eligibility for certification by the American Board of Periodontology.

Residence A minimum of twenty-four months in residence is required for the certificate program, beginning in the summer quarter. The Master of Science degree requires an additional twelve months

Required courses The following courses are required:

- GRAD 604 Research Methods and Methodology
- GRDN 505 Principles of Instruction
- GRDN 526 Applied Anatomy
- GRDN 601 Practice Management
- ORBI 522 Cell Biology
- ORBI 526 Microbiology, Pathology and Immunology
- ORBI 531 Physiology of Bone
- ORBI 534 Special Topics in Oral Biology
- ORMD 521 Principles of Medicine, Physical Diagnosis, and Hospital Dentistry
- ORPA 531 Clinical Oral Pathology
- PERI 531 Periodontal Histopathology
- PERI 601 Seminar in Periodontics
- PERI 602 The Periodontium
- PERI 604 Current Periodontal Literature
- PERI 611 Introduction to Periodontics
- PERI 625 Clinical Practice in Periodontics
- PERI 634 Clinical Conferences
- PERI 654 Practice Teaching in Periodontics
- PERI 697 Research
- PERI 698 Thesis
- RLGN A course in religion
- STAT 404 General Statistics

CORE COURSES

BIOSTATISTICS

STAT 404 General Statistics (3)

Fundamental procedures in collecting, summarizing, presenting, analyzing, and interpreting data. Measures of central tendency and variation, probability, binomial distribution, normal distribution, sampling, confidence intervals, hypothesis testing, t-test, chi-square, and correlation and regression. Laboratory for practical application of techniques.

STAT 698 Research Consultation (1)

Provides individual advice on project design, data collection, analysis and evaluation.

Prerequisite: Consent of the instructor.

GRADUATE DENTISTRY CONJOINT COURSES

GRDN 505 Principles of Instruction (1)

A survey and practicum in the application of didactic and psychological principles of learning in the preparation of instructional objectives and materials, in test construction, and in evaluation of student performance.

GRDN 524 Social Dynamics of Dental Practice (2)

Current theories and principles in psychology related to learning and teaching, personality development and change, interpersonal process and dynamics, and how these principles apply to a dental specialty practice.

GRDN 526 Applied Anatomy (2)

Fundamentals of anatomy as they apply to a special region or application.

GRDN 601 Practice Management (1)

Designed to prepare the student for specialty practice, concepts of employment, records, incorporating, insurance, and practice planning.

ORBI 522 Cell Biology (3)

Presentation of a unified description of cellular structures and function as a core of current knowledge upon which the student will build new facts and concepts as they become available.

ORBI 526 Microbiology, Pathology, and Immunology (2, 2)

Current concepts of the reaction of tissues and organisms to injury or challenge. Review of mechanisms of inflammation and wound healing as they relate to the periodontal tissues. Review of current literature in oral pathology and immunology.

ORBI 531 Physiology of Bone (2)

A specialized presentation of bone healing, mechanisms of mineralization and resorption, growth and development.

ORBI 534 Special Topics in Oral Biology (1)

An analysis and review of the literature regarding enamel, fluorides, and caries. Applies the principles of chemistry and cellular function to an understanding of the important disease of dental caries.

ORMD 521 Principles of Medicine, Physical Diagnosis, and Hospital Dentistry (2)

Study of methods of recognizing normal and abnormal physical conditions in order to develop the dentist's general medical knowledge. Attention given to blood diseases, systemic diseases, and cardiac disturbances; patient admission, physical, orders, and discharge.

ORPA 531 Clinical Oral Pathology (2, 2)

A review of oral disease using the clinical-pathologic conference format. Differential diagnosis of all mucosal, soft tissue, and jawbone disease is stressed. The basic disease processes are reviewed and diagnostic aids discussed. Selected dental and extra-oral disease, as well as some systemic disorders are included.

GRADUATE

GRAD 604 Research Methods and Methodology (2)

A survey of scientific methodology: its development, rationale, and the necessity for its rigorous rules. How to develop, design, and report research in the health sciences.

COURSES

ENDODONTICS

ENDN 634 Special Topics in Pharmacology (1)

Lectures and discussions dealing with pharmacological agents used in dentistry.

ENDN 534 Endodontic Treatment Conference (2, 2, 2)

Designed to evaluate and discuss endodontic treatment cases, with an effort to integrate the treatment plan, the endodontic procedure, the total oral health, and the patient's physical status. In addition, clinical conferences are scheduled in oral pathology.

ENDN 601 Principles of Endodontics (3, 3, 3)

A comprehensive study of all aspects of clinical endodontics.

ENDN 604 Literature Seminar in Endodontics (2, 2, 2)

A review of the literature pertaining to the philosophy, teaching, and practice of endodontics.

ENDN 625 Clinical Practice in Endodontics (1000-1200 clock hours)

Clinical endodontics practice, which includes all aspects of the scope of endodontics. Emphasis placed on providing experience in treating endodontic cases which are considered of complex nature.

ENDN 654 Practice Teaching in Endodontics (1, 1, 1, 1)

ENDN 697 Research (arranged)

ENDN 698 Thesis (arranged)

ORAL SURGERY

ORSR 521 General Anesthesia (3, 3)

Study and experience in the use of general anesthetic agents on hospital surgery patients. Physiological action of the agents, methods of administration, premedication, armamentarium, complications, and accidents.

ORSR 531 Oral Surgery I (first year of oral surgery residency) (arranged)

The principles of exodontics and the evaluation of oral disease. Minor oral surgery procedures studied, outlined, and performed under local anesthesia and intravenous sedation. Introduction to ambulatory general anesthesia. Treatment of emergencies in oral surgery practice. Introduction to hospital procedures; assisting on staff hospital cases; and attendance at specified seminars, conferences, and special lectures in the Medical Center.

ORSR 532 Oral Surgery II (second year of oral surgery residence) (arranged)

Participation as assistant in major oral surgery procedure. Practice of hospital procedures, treatment of the hospitalized patient, diagnosis and treatment of fractures of the facial bones, continuation of the training in ambulatory general anesthesia for oral surgery. Rotation to other medical and surgical services in the Medical Center. Attendance at specified seminars, conferences, and special lectures in the Medical Center.

ORSR 533 Oral Surgery III (third year of oral surgery residence) (arranged)

Treatment of complicated fractures of the facial bones, reconstructive maxillofacial surgery, surgical orthognathic correction, and treatment of developmental or acquired deformities of the jaws. Preprosthetic surgery, osseous grafting of postresection and postraumatic maxillofacial defects. Study of the application of general anesthesia to ambulatory outpatient oral surgery patients. Training in assuming full responsibility for all aspects of oral surgery practice.

ORSR 604 Literature Review in Oral and Maxillofacial Surgery (1)

ORSR 641 Applied Orthognathic Surgery (2)

A seminar course emphasizing preoperative diagnosis, planning, intraoperative procedures, and postoperative care of orthognathic patients. Descriptions of congenital and developmental deformities and emphasis on all aspects of patient management.

ORSR 654 Practice Teaching in Oral Surgery (2)

ORSR 697 Research (arranged)

ORSR 698 Thesis (arranged)

ORDN 521 Applied Cephalometrics for Oral Surgeons (2)

Projection analyses, preoperative diagnosis, and planning of treatment of malocclusion through cephalometric review. Cephalometric diagnosis and follow-up of postsurgical and postorthodontic treatment.

ORDN 524 Introduction to Graduate Orthodontics (18)

Outline of the principles of appliance design, the application of forces to produce tooth movement, and the tissue response to such forces. Lecture-laboratory. Overview of orthodontics to prepare the student for clinical practice of orthodontics; diagnosis and treatment planning, including cephalometrics; growth forecasting; and preparation of visual treatment objectives.

ORDN 525 Materials, Science, and Mechanics (2)

Structure and properties of materials used in orthodontics. Analysis of the effects of mechanical and heat treatments. Survey of strength and mechanics in force delivery.

ORDN 535 Advanced Cephalometrics (2)

ORDN 536 Concepts of Physical Anthropology (2)

Basic and classic concepts of physical anthropology as they relate to orthodontics.

ORDN 544 Mixed Dentition in Health and Disease (1)

Concepts presented in anatomy and in ORDN 546 applied to the clinical problems presented by the patient in the transition period between primary and permanent dentitions. Diagnosis and treatment planning of orthodontic problems in this critical period of human development.

ORDN 545 Growth and Development (2)

Principles of growth and development from the subcellular to the tissue level. Emphasis on myogenesis and osteogenesis. Prenatal and postnatal development of the face and jaws, including the classic concepts of facial growth. Consideration of general growth, with the goal of developing ability to recognize abnormal signs, observe variations, diagnose pathological conditions, know the normal, predict height, and use various standards to assess growth and development.

ORDN 546 Fundamentals of Occlusion (2)

The development of the human face and dentition. A concept of dynamic functioning occlusion.

ORDN 554 Physiology and Pathology of Speech (2)

A seminar course in which the literature pertaining to tongue-thrust, swallowing, and related problems is considered. Problems and treatment discussed by speech therapists.

ORDN 574 Diagnosis and Treatment Planning (2)

Fundamental aspects of diagnosis and treatment planning of conventional and bizarre malocclusions.

ORDN 579 Orthognathic Surgery Conference (2)

Diagnosis and evaluation of potential patients in surgical orthodontics, treatment planning and coordination of treatment.

ORDN 584 Current Orthodontics Literature (1)

Presentation of current papers in various disciplines of orthodontics.

ORDN 604 Seminar in Orthodontics (1)

A critical review of suggested etiological factors of malocclusion. Problems of diagnosis and the rationale of various treatment philosophies. Liberal use of current literature. Discussions by guest lecturers with demonstrated competence in the field.

ORDN 605 Advanced Seminar in Orthodontics (1, 1, 1, 1)

Second-year seminar: design of clinical diagnosis, practice management.

ORDN 625 Clinical Practice in Orthodontics (1400 clock hours)

Diagnosis and treatment of twenty-five assigned patients; minimum of four patients with major dental-facial handicaps.

ORDN 634 Orthodontics Clinical Conference (1, 1, 1, 1)

Preparation and presentation of the diagnosis, case analysis, and treatment plans for patients under care.

ORDN 654 Practice Teaching in Orthodontics (1, 1, 1, 1)

ORDN 697 Research (arranged)

ORDN 698 Thesis (arranged)

PERIODONTICS

PERI 531 Periodontal Histopathology (2, 2, 2, 2)

Study of the specific scientific literature which forms the basis for current concepts on histopathology of periodontal diseases and periodontal wound healing.

PERI 601 Seminar in Periodontics (2)

Study of the specific scientific literature which forms the basis for current concepts on the epidemiology, etiology, and treatment of periodontal diseases.

PERI 602 The Periodontium (2, 2)

Study of the specific scientific literature which forms the basis for current concepts on the development, structure, and function of the normal periodontium.

PERI 604 Current Periodontal Literature (1)

Review of papers in the most recent issues of periodontal scientific journals.

PERI 611 Introduction to Periodontics (2)

Overview of the clinical science of periodontics, including epidemiology, etiology, therapy, clinical methods, and record keeping.

PERI 625 Clinical Practice in Periodontics (1450 clock hours)

Clinical experience in the diagnosis and treatment of periodontal diseases.

PERI 634 Clinical Conference (1)

Case management conferences with interdisciplinary faculty input to assist the student in diagnosis, treatment planning, and the management of patients.

PERI 654 Practice Teaching in Periodontics (1, 1, 1, 1)

PERI 697 Research (arranged)

PERI 698 Thesis (arranged)

EARTH SCIENCE

LEONARD R. BRAND, PH.D. Cornell University 1970
Coordinator; Professor of Biology
Vertebrate zoology and paleontology

ARIEL A. ROTH, PH.D. University of Michigan 1955
Professor of Biology
Paleoecology, earth history modeling

RAYMOND E. RYCKMAN, PH.D. University of California at Berkeley 1960
Professor of Microbiology
Biosystematics and speciation

ARTHUR V. CHADWICK, PH.D. University of Miami 1969
Associate Professor of Biology
Paleobotany, palynology, geology

CONRAD D. CLAUSEN, PH.D. Loma Linda University 1972
Associate Professor of Biology
Invertebrate biology and paleontology

LANNY H. FISK, PH.D. Loma Linda University 1976 (on leave)
Associate Professor of Biology and Geology
Paleobiology, stratigraphy

ELWOOD S. MCCLUSKEY, PH.D. Stanford University 1959
Associate Professor of Biology and Physiology
Physiology, numerical taxonomy

IVAN E. ROUSE, PH.D. Washington State University 1970
Associate Professor of Physics
Physics, geophysics

CLYDE L. WEBSTER, PH.D. Colorado State University 1972
Associate Professor of Chemistry
Geochemistry

KNUT ANDERSSON, M.S. University of Wyoming 1978 (on leave)
Assistant Professor of Geology
Invertebrate paleontology, micropaleontology

H. PAUL BUCHHEIM, PH.D. University of Wyoming 1978
Assistant Professor of Geology
Paleontology, sedimentology

Facilities Research and instructional facilities, including laboratories, museums, and classrooms, are located in San Fernando Hall and Palmer Hall at La Sierra, and in Griggs Hall and Mortensen Hall at Loma Linda. Advanced research equipment and facilities are available for a variety of types of laboratory and field research in biology and geology. Geographically, Loma Linda University is well situated to enable students to pursue paleontological fieldwork throughout the year.

Summer program Because some persons pursue graduate programs during the summer months only, the earth science program schedule makes it possible for a student to participate in the necessary coursework and research for the Master of Science degree during the summer sessions. Course offerings provide sufficient variety for completion of a degree in four summers of full-time work or in one school year and two summers of full-time work. Students with only eight weeks available in the summer will require more time to complete the degree.

General requirements For information about requirements and practices to which all graduate students are subject, the student should consult the *Academic Practices* section of the Graduate School BULLETIN.

MASTER OF SCIENCE (Paleobiology)

This program offers the student a sequence of studies leading to a Master of Science degree in paleobiology. The program has been planned to provide the student with interests in geology, and biology the opportunity for advanced study and professional preparation for employment or for continued education at the doctoral level. The research and thesis requirement involves the student in original and significant research utilizing advanced techniques and instrumentation. The application of analytical processes to paleobiology will develop the student's potential to solve geological and paleontological problems.

Admission Applicants must meet the general Graduate School admission requirements. Acceptable undergraduate preparation includes a bachelor's degree in biology, geology or in another science field; and must include physical geology, historical geology, mineralogy, petrology, one year of general biology, and mathematics (including a course in calculus). Students lacking the prerequisites may be accepted on a provisional basis and make up the deficiencies at Loma Linda.

Curriculum The following constitute the curriculum for the Master of Science degree in paleobiology:

A minimum of 48 quarter units of graduate work, including 15 units at or above the 500 level (exclusive of research).

The following courses are required:

Stratigraphy and Sedimentology

Two additional courses in paleontology

Seminar, 1 unit

Research Techniques

Statistics

History and philosophy of Science or Paleontological Interpretations

Biosystematics and Speciation

In addition, all students are to attend all required seminars, fulfill research and thesis expectations, and successfully pass a final oral examination.

MASTER OF SCIENCE (Earth History)

This interdepartmental program offers the student a unique, broad training in areas pertinent to the study of earth history and the history of life, including training in basic geology and paleontology. The earth history Master of Science degree is best suited for a person who plans to teach physical or biological science at the secondary or junior college level. The research and thesis requirement provides experience in the principles of original scientific research, and this experience, along with the broad range of coursework forms a firm background for effective teaching.

Admission Applicants must meet the general Graduate School admission requirements. Acceptable undergraduate preparation includes a bachelor's degree in biological or physical science which has included physical geology, mineralogy and petrology; and complete courses in general biology, general chemistry, general physics, and college-level algebra and trigonometry. It is urged that before or during the master's program the California State Credential requirements be met for either biological or physical science.

Curriculum The following constitute the curriculum for the Master of Science degree in earth history:

A minimum of 48 quarter units of graduate work, including 15 units at or above the 500 level (exclusive of research).

The following courses are required:

Stratigraphy and Sedimentology

Invertebrate Paleontology

Paleontological Interpretations

Research Techniques

Current Topics in Geology, 1 unit or Seminar in Geology, 1 unit

One course selected from BIOL 489, CHEM 489, GEOL 489, GEOL 558, or PHYS 489

In addition, all students are to attend all required seminars, fulfill research and thesis expectations and successfully pass a final oral examination.

COURSES

UPPER DIVISION COURSES APPLICABLE TO GRADUATE PROGRAMS

- BIOL 406 Introduction to Marine Biology (4)**
- BIOL 409 Invertebrate Biology (4)**
- BIOL 414 General Ecology (4)**
- BIOL 425 Limnology (4)**
- BIOL 447 Genetics (4)**
- BIOL 449 Population Biology (4)**
- BIOL 465 Ornithology (4)**
- BIOL 467 Herpetology (4)**
- BIOL 468 Plant Anatomy (4)**
- BIOL 469 Animal Behavior (4)**
- BIOL 470 Protozoology (4)**
- BIOL 475 General Entomology (4)**
- BIOL 476 Biostatistics (4)**
- BIOL 485 Systematic Botany (4)**
- BIOL 487 Biology of the Galapagos Islands (8)**
- BIOL 489 Philosophy of Science (4)**
- CHEM 489 Science and the Christian Faith (4)**
- GEOLOGICAL 424 Structural Geology (4)**
- GEOLOGICAL 431, 432 Geochemistry I, II (4, 4)**
- GEOLOGICAL 434 Stratigraphy and Sedimentology (4)**
- GEOLOGICAL 437 Geophysics (4)**
- GEOLOGICAL 444 Spring Field Geology (4)**
- GEOLOGICAL 445 Summer Field Geology (8)**
- GEOLOGICAL 456 Invertebrate Paleontology (4)**

- GEOL 458 Vertebrate Paleontology (4)**
GEOL 466 Paleobotany (4)
GEOL 470 Micropaleontology (4)
GEOL 476 Paleoenvironments (4)
GEOL 489 Philosophy of Geology (4)
PHYS 489 Christianity and the Rational Man (4)
STAT 404 General Statistics (3)

GRADUATE COURSES

BIOL 515 Biogeography (3)

Present distribution and past migrations of the natural populations of organisms.
Prerequisite: Biology or systematics of at least two plant or animal taxa desirable.
Lathrop.

BIOL 518 Readings in Ecology (2)

Study, analysis and discussion of current and classic papers.
Prerequisite: Ecology or consent of the instructor.
Lathrop.

BIOL 519 Advanced General Ecology (4)

Analysis and interpretation of natural communities. Includes fieldwork, with emphasis on physical and biotic measurements. Especially useful for students needing to relate habitat and environmental factors to their special field projects.
Prerequisite: Field biology or general ecology.
Lathrop.

BIOL 524 Advanced Invertebrate Biology (3)

A critical investigation of contemporary invertebrate phylogenetic schemes. Analysis of pertinent information from morphology, embryology, physiology, biochemistry, and paleontology. Three class hours.
Prerequisite: A course in invertebrate zoology or consent of the instructor.
Clausen.

BIOL 525 Selected Topics in Marine Biology (2)

Topics selected either for their importance in current marine biology research or for their philosophical significance: coral reef biology, deep-sea biology, marine biogeography, paleoecology of marine organisms. Concentration on the invertebrates.
Prerequisite: Marine biology or invertebrate zoology or consent of the instructor.
Clausen.

BIOL 544 Biosystematics and Speciation (4)

Dynamic processes of biological systems as revealed by genetics, distribution, isolation, natural selection, and morphology. Lectures, discussions, field trips, research reports.
Prerequisite: Coursework in one or more taxa.
Ryckman.

BIOL 605 Seminar in Biology (1)

Selected topics dealing with recent developments.
Staff.

CHEM 531, 532 Advanced Topics in Geochemistry I, II (4, 4)

Prerequisite: CHEM 111, 112, 113; GEOL 214 and consent of the instructor.
Webster.

GEOL 515 Research Techniques (1)

Concepts and methods used in geological research, including scientific writing and literature.
Clausen.

GEOL 518 Current Topics in _____ (1-4)

Review of current knowledge in specific areas of the earth sciences, offered at the discretion of the department. May repeat different sections of the course for additional credit.

Prerequisite: Consent of the instructor.
Staff.

GEOL 525 Palynology (4)

A survey of the scope, methods, and application of pollen analysis with emphasis on pollen floras of successive geological intervals and the current stratigraphic interpretations. Laboratory work integrated with lecture.

Prerequisite: A course in botany.
Fisk.

GEOL 548 Paleontological Interpretations (4)

Analysis of the fossil and sediment record, and comparison to theories of origin. Fieldwork in southwest United States. Summer only.

Roth.

GEOL 554 Paleolimnology (3)

The study of ancient lake deposits, including their sedimentologic, paleontologic, mineralogic, geochemical, and stratigraphic characteristics. The depositional processes occurring in modern lakes investigated as analogs. Laboratory and fieldwork included.

Prerequisite: GEOL 434 or consent of instructor.
Buchheim.

GEOL 555 Advanced Paleolimnology (3)

Indepth study of ancient lake deposits with particular emphasis on sedimentary processes and the reconstruction of lacustrine paleoenvironments. Field trips and individual student projects included.

Prerequisite: GEOL 554 or consent of instructor.
Buchheim.

GEOL 558 History and Philosophy of Science (4)

A study of selected topics in the history and philosophy of science, and the application of these principles in analyzing contemporary scientific trends.

Brand.

GEOL 604 College Teaching (2-4)

One class meeting a week for discussion of methods of teaching. Student assigned responsibility for one or two laboratory sections or selected lecture sessions of an undergraduate course for the quarter. Those electing the classwork only should register for 2 units.

McCluskey.

GEOL 605 Seminar in Geology (1)

Selected topics dealing with recent developments, particularly reports of current research. Student presents one seminar during the quarter in which seminar credit is received.

Staff.

GEOL 606 Special Problems in _____ (1-4)

A special project in the field, laboratory, museum, or library under the direction of a faculty member. Registration should indicate the specific field of the project

Prerequisite: Consent of the instructor.
Staff.

GEOL 618 Advanced Topics in _____ (1-4)

Review, at an advanced level, of current knowledge in specific areas of the earth sciences, offered at the discretion of the department. May repeat different sections of the course for additional credit.

Prerequisite: Consent of the instructor.
Staff.

GEOL 697 Research (arranged)

GEOL 698 Thesis (arranged)

STAT 521 Biostatistics I (4)

Fundamental procedures of collecting, tabulating, and presenting data. Measures of central tendency and variation, normal distribution, sampling, t-test, confidence intervals, chi-square, and correlation and regression. Emphasis on statistical inference.

Prerequisite: Algebra.

STAT 522 Biostatistics II (4)

Analysis of variance (one-way and K-way classifications), correlation and regression (simple, partial, and multiple), covariance analysis, and orthogonal contrasts.

Prerequisite: STAT 521.

STAT 523 Biostatistics III (4)

Experimental designs, including Latin squares, incomplete block designs, nested designs. Special topics in analysis of variance, including general linear hypothesis, multiple comparisons, and missing data. Includes the application of computer programs such as the BMD.

Prerequisite: STAT 522.

STAT 568 Data Analysis (2-3)

Presentation and use of the most common data analysis methods; correlation and regression, contingency table, variance, and covariance. Student provision of data encouraged. Use of data processing equipment and packaged computer programs.

Prerequisite: STAT 404, 424, or equivalent.

STAT 698 Research Consultation (1-4)

G. Zimmerman.

ENGLISH

ROBERT P. DUNN, PH.D. University of Wisconsin 1970
Chairman; Professor of English
English Renaissance; religion and literature

DOROTHY M. COMM, PH.D. University of Alberta 1971
Professor of English
Eighteenth century, world literature, composition

OPAL I. HAGELGANTZ, ED.D. University of Nebraska 1969
Professor of English
Nineteenth century literature, grammar and compositional theory

RICHARD B. LEWIS, PH.D. Stanford University 1949
Emeritus Professor of English
Renaissance literature, literary criticism

HELEN F. LITTLE, M.A. University of Nebraska 1938
Emeritus Professor of English

THOMAS A. LITTLE, PH.D. University of Nebraska 1950
Emeritus Professor of English

J. PAUL STAUFFER, PH.D. Harvard University 1952
Emeritus Professor of English
Nineteenth- and twentieth-century literature

GROSVENOR R. FATTIC, PH.D. Michigan State University 1972
Associate Professor of English
Medieval literature

LLEWELLYN E. FOLL, PH.D. Michigan State University 1974
Associate Professor of English
American literature

MARILYN C. TEELE, M.ED. Boston University 1961
Associate Professor of English
Reading, compositional theory

The purposes of the graduate program in English are to increase the student's resources and equipment for teaching, writing, and exploration in the areas of a specialty; to help perfect research skills; and to expand interests and information in the literature and culture of Western civilization.

The applicant should hold a baccalaureate degree with a major (or the equivalent) in English from an accredited college.

Students who have never had undergraduate courses equivalent to ENGL 465, ENGL 445 or 489, and one of ENGL 454-456 must include them as part of the minimum graduate program here. In some cases (such as when students do not present a full English major), they may be required in addition to the minimum program.

During the first term of enrollment, the student is required to take an exploratory examination. The results of this test — together with the student's undergraduate records, appropriate entrance examinations, and other test scores — are considered by the guidance committee in planning the overall graduate program. The guidance committee helps the student plan the program in such a way that the combined undergraduate and graduate work will have covered the major areas in English and American literature.

Degree Requirements The following are the requirements for the Master of Arts in English or in English studies:

1. A minimum of 3 quarters in residence as a graduate student.
2. Competency in French, German, or Latin (or in another language approved by the English department faculty).
3. Comprehensive written and oral examinations.
4. English 504 and 3 units of religion.

Additional requirements are determined by the program the student elects to follow.

Program A: This is the traditional master's program for students desiring to work after graduation toward the doctoral degree in English or for the student who wants maximum preparation in the areas of English and American literature. It consists of a minimum of 48 units as follows: (a) at least 36 units in English with no less than 24 in English courses restricted to graduate students (including at least one two-term seminar of 5 units); (b) additional hours in English or in cognate areas related to the student's program as approved by the adviser or the department faculty; (c) a thesis.

Program B: Two ways of fulfilling the requirements for the master's degree are possible under Program B, both of which are designed for those who plan to become primary or secondary teachers of English. Neither requires a thesis.

(1) The Master of Arts in English studies is available to students wishing to pursue a broadened content emphasis. It consists of 54 units, with at least 28 at the graduate level. The main advantage of this program is that it allows a student to take up to 15 units in a second area outside of English. Each student is required to submit a project to the department.

(2) The Master of Arts in English with an emphasis in literature, reading, or composition-rhetoric-linguistics is available to those who wish to emphasize the teaching of reading or composition on the primary or secondary level but who also wish a background in literature. Each student would take a minimum of 20 units in the area of interest (i.e., literature, reading, or composition-rhetoric-linguistics); in the remaining two areas a minimum of 12 units would be required. Each

student is required to present a project to the department based on work done in the major area of interest.

The student who is preparing to teach in California should consult the credentials adviser in the School of Education for guidance in qualifying for a California Standard Teaching Credential.

For information about requirements and practices to which all graduate students are subject, the student should consult the *Academic Practices* section of division I of this BULLETIN.

COURSES

UPPER DIVISION COURSES APPLICABLE TO GRADUATE PROGRAM

ENGL 404 Narrative Writing (4)

ENGL 406 Visiting Writer (1-4)

Intensive study with a visiting writer. Students will study the works of the instructor and also produce original work of their own under the writer's instruction. May be repeated for additional credit under the direction of another visiting writer.

Prerequisite: Consent of the instructor.

ENGL 415 Literature for Children (4)

ENGL 416 Literature for Adolescents (4)

ENGL 417 Knowledge and Skills in Literature (4)

ENGL 425 Major American Authors or Movements (4)

ENGL 434 Old and Middle English Literature (4)

Offered alternate years.

ENGL 435 English Renaissance Literature (4)

Offered alternate years.

ENGL 436 Restoration and Eighteenth-Century Literature (4)

Offered alternate years.

ENGL 437 Nineteenth-Century English Literature (4)

Offered alternate years.

ENGL 438 Twentieth-Century English Literature (4)

ENGL 445 Biblical Literature (4)

ENGL 457 Chaucer (4)

Offered alternate years.

ENGL 458 Shakespeare (4)

Offered alternate years.

ENGL 459 Milton (4)

Offered alternate years.

ENGL 465 Literary Criticism: The Major Texts (4)

Offered alternate years.

ENGL 475 History of the English Language (4)

Offered alternate years.

ENGL 489 Religion and Literature (4)

Offered alternate years.

ENGL 499 Directed Study (1-4)

GRADUATE COURSES

ENGL 504 Methods and Materials of Literary Study (3)

Required of all candidates.

ENGL 505 Practicum in Composition (2, 2)

Required of composition teaching assistants. May be repeated once for credit.

ENGL 506 Composition and Rhetorical Theory (4)

ENGL 507 Diagnosis and Remediation in Reading (4)

ENGL 508 Practicum in Reading (2, 2)

Required of reading teaching assistants. May be repeated once for credit.

ENGL 575 Problems in English Language and Linguistics (4)

Graduate seminars whose content varies according to the specialization and research interest of the teacher. The course schedule and the student's transcript indicate the specific area of study. For example, Seminar in a Major Author: Johnson; or Seminar in a Literary Genre: Poetry. Seminars may be repeated with new content for additional credit. A seminar typically carries 4 units of credit unless otherwise noted in the course schedule. Occasionally a seminar extends over two terms for 5 units of credit.

ENGL 615 Seminar in Literary History and Criticism (4-5)

ENGL 625 Seminar in a Major Literary Period (4-5)

ENGL 635 Seminar in a Major Author (4-5)

ENGL 645 Seminar in Religion and Literature (4-5)

ENGL 675 Directed Study (1-4)

ENGL 698 Thesis (4-8)

HISTORY

- FREDERICK G. HOYT, PH.D. Claremont Graduate School 1963
Chairman; Professor of History and Political Science
American history
- WILFRED J. AIREY, PH.D. University of Washington 1945
Professor of History
American history
- GODFREY T. ANDERSON, PH.D. University of Chicago 1944
Research Professor of American History
American history: colonial and middle periods
- ALONZO L. BAKER, PH.D. University of Southern California 1948
Emeritus Professor of Political Science
International relations
- WILLIAM M. LANDEEN, PH.D. University of Michigan 1939
Emeritus Professor of History
Reformation, Renaissance, Middle Ages
- WALTER C. MACKETT, PH.D. University of Southern California 1948
Professor of History
British empire, modern Europe
- V. NOSKOV OLSEN, PH.D. University of London 1966; D.TH. University of Basel
1968
Professor of Church History
Church history
- DELMER G. ROSS, PH.D. University of California at Santa Barbara 1970
Professor of History
Latin America
- GARY M. ROSS, PH.D. Washington State University 1966
Professor of History
American diplomatic relations, history of ideas
- DALTON D. BALDWIN, PH.D. Claremont Graduate School 1975
Associate Professor of Religion
Historical theology
- JONATHAN M. BUTLER, PH.D. University of Chicago Divinity School 1975
Associate Professor of Church History
Church history
- ROBERT C. DARNELL, PH.D. University of Michigan 1970
Associate Professor of Islamic; and Anthropology and Sociology
Comparative religions
- PAUL J. LANDA, PH.D. Vanderbilt University 1976
Associate Professor of Church History
Church history

T. RICHARD RICE, PH.D. University of Chicago Divinity School 1974
Associate Professor of Historical Theology
Historical theology

The principal purposes of the graduate program in history are to assist students in attaining the qualifications essential for teaching in secondary schools and colleges and to prepare some students for research, doctoral programs, and the pursuit of scholarly careers in history.

The applicant is normally expected to have a baccalaureate degree with a major in history from an accredited college. If the college record and test scores indicate any weaknesses or deficiencies, the student may be required to take additional compensatory undergraduate work.

Degree requirements The following are the requirements for the Master of Arts degree:

1. A minimum of 3 quarters in residence as a graduate student.
2. A minimum of 45 quarter units of graduate credit in history (at least 20 units must be in courses numbered above 500; 9 units may be transferred from an approved college or university; 8 units may be in an approved cognate area). Historiography and research methods are required. Those emphasizing church history will substitute HIST 485 for HIST 506.
3. A grade average of B (3.00).
4. Reading proficiency in a modern or classical foreign language.
5. Thesis; or two papers originally written for graduate seminars, but revised and rewritten to the satisfaction of the student's guidance committee.
6. Satisfactory written comprehensive examination on the candidate's field of study.
7. Credit in a graduate religion course.

The student may pursue a course of study emphasizing American, European, or Church history.

The student who is preparing to teach in California should consult the credentials adviser in the School of Education for guidance in qualifying for a California Standard Teaching Credential.

For information about requirements and practices to which all graduate students are subject, the student should consult the *Academic Practices* section of division I of this BULLETIN.

COURSES

UPPER DIVISION COURSES APPLICABLE TO GRADUATE PROGRAM

- HIST 414 The French Revolution and Napoleon (4)
- HIST 416, 417, 418 Europe I, II, III (4, 4, 4)
- HIST 425, 426 History of Russia I, II (4, 4)
- HIST 427 English Constitutional History (4)
- HIST 428 Mexico (4)
- HIST 429 Central America and the Caribbean (4)
- HIST 435, 436, 437 History of Ideas I, II, III (4, 4, 4)
- HIST 444, 445, 446 American Diplomatic Relations I, II, III (4, 4, 4)
- HIST 447, 448, 449 United States Constitution I, II, III (4, 4, 4)
- HIST 454 American Colonial History (4)
- HIST 455 Religion in American Life (3-4)
- HIST 456 Civil War and Reconstruction (4)
- HIST 458 Western America (4)
- HIST 459 California History (4)
- HIST 464, 465 Asia in World Affairs I, II (4, 4)
- HIST 466 The Early Christian Church (3-4)
- HIST 467 The Medieval Church (3-4)
- HIST 468 History of the Papacy (3-4)
- HIST 469 The Age of the Renaissance (3-4)
- HIST 474 The Lutheran Reformation (3-4)
- HIST 476 The Swiss Reformation and Calvinism (3-4)
- HIST 478 The English Reformation (3-4)
- HIST 484 Twentieth-Century Church History (3-4)
- HIST 485 History of Seventh-day Adventism (3-4)
- HIST 486 Ellen G. White: Her Life and Thought (3-4)
- HIST 487 Natural Theology: A Historical Survey (3-4)
- HIST 488 Protestant Thought in the Twentieth Century (3-4)

- HIST 494 History Colloquium (4)**
HIST 495 Readings in History (1-6)
HIST 497 Proseminar (4)
HIST 499 Directed Study (1-6)

GRADUATE COURSES

- HIST 504 Research Methods in History (4)**
HIST 506 Historiography (4)
HIST 507 American Historical Literature (4)
HIST 544 The Emergence of the American Constitutional System (4)
HIST 545 United States in the Far East Since 1900 (4)
HIST 555 Religion in American Life (3-4)
 The place of religion in American intellectual, political, social and cultural developments, from the Colonial period to the present. Identical to RELH 555.
HIST 564 Concepts of Diplomacy (4)
HIST 566 The Early Christian Church (3-4)
 Study from primary sources of the important men, developments, and ideas in the Christian Church from apostolic times through the fifth century A.D. Identical to RELH 566.
HIST 567 The Medieval Church (3-4)
 Study from primary sources of the important men, developments and ideas in the Christian church from the sixth through the fifteenth centuries A.D. Identical to RELH 567.
HIST 568 History of the Papacy (3-4)
 Historical and theological development of the Papacy and Roman Catholicism during patristic, medieval, and modern periods. Identical to RELH 568.
HIST 569 The Age of the Renaissance (3-4)
HIST 574 The Lutheran Reformation (3-4)
 A study of Martin Luther, his theology, and the Reformation movement he initiated, down to 1555. Identical to RELH 574.
HIST 576 The Swiss Reformation and Calvinism (3-4)
 Leading men of the Swiss Reformation (Zwingli, Bullinger, Calvin, and Beza) and the theological and sociological influences of Calvinism. Identical to RELH 576.
HIST 578 The English Reformation (3-4)
 Main historical forces and religious movements of the English Reformation until the Westminster Assembly. Identical to RELH 578.
HIST 584 Twentieth-Century Church History (3-4)
 Modern religious trends and their impact on church and society. Identical to RELH 584.

HIST 585 History of Seventh-day Adventism (3-4)

Millerism and early Sabbath-keeping Adventism, anti-Catholicism, antislavery, and church-state relations; "shut-door" theology and missionary expansion; organization, 1888 and reorganization; health and prohibition, education and evangelism. Origin and development of the Seventh-day Adventist denomination to the present. Identical to RELH 585.

HIST 586 Ellen G. White: Her Life and Thought (3-4)

A study of the key events in the life of Ellen G. White (1827-1915) and her major theological contribution. Identical to RELH 586.

HIST 587 Natural Theology: A Historical Survey (3-4)

Beginning with the Middle Ages, a historical survey of different approaches to the question of faith and reason, or what can be known of God by rational inquiry alone, within Christian thought. Identical to RELH 587.

Prerequisite: Consent of the instructor.

HIST 588 Protestant Thought in the Twentieth Century (3-4)

An examination of the major figures, issues, and resources of contemporary Protestant theology. Identical to RELH 588.

Prerequisite: Consent of the instructor.

HIST 634 Seminar in European History (4)

HIST 635 Seminar in Church History (4)

Identical to RELH 635.

Prerequisite: Consent of the instructor.

HIST 645 Seminar: The Coming of the Civil War (4)

HIST 647 Seminar in American History (4)

HIST 655 Seminar in Latin America (4)

HIST 694 Special Problems in History (directed individual study) (arranged)

HIST 697 Research (4)

HIST 698 Thesis (2)



MARRIAGE AND FAMILY COUNSELING

- ALBERTA S. MAZAT, M.S.W. University of Denver 1970
Chairman; Associate Professor, Marriage and Family Counseling
Marriage counseling, human sexuality
- ANEES A. HADDAD, PH.D. University of Southern California 1971
Professor of Sociology
Family sociology, human sexuality
- FRED H. OSBOURN, PH.D. School of Theology at Claremont 1972
Professor of Marriage and Family Counseling
Marriage counseling practice
- CLIFFORD D. ACHORD, PH.D. University of Northern Colorado 1972
Associate Professor of Marriage and Family Counseling
Crisis intervention counseling
- WON K. YOON, PH.D. Louisiana State University 1976
Associate Professor of Sociology and Marriage and Family Counseling
Theory of research methods and social change
- MARY E. MOLINE, PH.D. Brigham Young University 1979
Assistant Professor of Marriage and Family Counseling
Group therapy, dissolution therapy
- S. DOUGLAS MOLINE, PH.D. Brigham Young University 1979
Assistant Professor of Marriage and Family Counseling
Marital and family therapy

COLLABORATING FACULTY

- WILBER ALEXANDER, PH.D. Michigan State University 1962
Professor of Theology and Clinical Ministry
Pastoral counseling
- VERN R. ANDRESS, PH.D. United States International University 1976
Professor of Psychology
Psychological testing and counseling
- CLARENCE E. CARNAHAN, JR., M.D. Loma Linda University SM 1954
Professor of Psychiatry
Psychiatric problems, biofeedback

HARRISON S. EVANS, M.D. Loma Linda University SM 1936
Professor of Psychiatry
Psychiatric problems and counseling

R. RICHARD BANKS, PH.D. University of Notre Dame 1966
Associate Professor of Psychology
Counseling theory and practice

M. JERRY DAVIS, REL.D. School of Theology at Claremont 1967
Associate Professor of Religion and Pastoral Counseling
Pastoral counseling

JUNE L. HORSLEY, M.S.W. University of Denver 1970
Associate Professor of Social Work
Family therapy

L. FRANCES PRIDE, PH.D. University of Maryland 1967
PH.D. Georgetown University 1976
Associate Dean (School of Nursing), Director Graduate Division in
Nursing
Professor of Nursing
Family systems theory

PETER G. STRUTZ, PH.D. University of Alberta 1966
Associate Professor of Psychology
Counseling theory and practice

HUGO D. RIFFEL, M.D. Montevideo Medical School, Uruguay 1966
Assistant Professor of Gynecology and Obstetrics
High-risk obstetrics

JAMES F. DYER, JR., M.S.W. West Virginia University 1966
Instructor of Psychiatry, Psychiatric Social Worker
Psychiatric social work

Marriage and family counseling is an interdisciplinary program offered by the faculty of the College of Arts and Sciences and the Graduate School in fulfillment of requirements for the Master of Science degree. It is designed to give the student a broad academic background for understanding the family and its problems and to prepare the graduate to assist families in working through their problems. The master's degree enables the graduate to qualify for advanced internship and subsequent state licensure as a counselor; to teach college or adult education courses in marriage and family life; to direct

family life programs for church or secular organizations; or to go directly into marriage, family, and child counseling practice in areas where the state license is not yet required.

Marriage, family, and child counseling has been established in California by law as a profession requiring state licensure. Persons who desire to enter the profession must have the proper academic and clinical preparation and must pass the written and oral licensing examinations. Persons previously practicing as licensed marriage, family, and child counselors must update their credentials by approved continuing education programs. Other states than California have enacted or plan to enact similar legislation. The master's program at this University meets licensing standards.

In addition to preparing registrants for the master's degree, the program provides coursework and clinical training for those who do some marriage or family counseling as part of their jobs (pastors and others in helping professions). Clinical supervision is also provided for those who have already earned master's degrees but need additional clinical time to qualify for the state licensing examination.

Admission Applicants to the program must meet the Graduate School admission requirements outlined in this BULLETIN, give evidence of emotional stability and maturity, and have well-defined personal values in harmony with the Christian ethic.

In addition to completing the required application forms and providing character and academic references, the prospective student should also arrange for a personal interview with one of the program coordinators.

Although no particular undergraduate major is specified as preparation for the marriage and family counseling program, undergraduate courses in each of the following are required: human growth and development, introduction to personality, psychological testing, interviewing and counseling, and introductory statistics.

Because of the sequence of courses, students are admitted only during the autumn quarter. Students may enroll on a part-time basis with the consent of the coordinator.

Special status Persons in the helping professions, particularly pastors desiring to improve their counseling skills without proceeding toward a degree, may arrange to take relevant courses and a limited amount of supervised counseling. Before applying for clinical supervision or for special status, students should discuss their needs with the clinical coordinator.

Degree requirements Requirements for the Master of Science degree include the following:

1. Residence of at least two academic years.
2. A minimum of 84 quarter hours of graduate work which includes credit received for core coursework, electives, and 4 hours of religion.

3. Practicum in marriage and family counseling (minimum of 500 hours), inclusive of clinical training (MFAM 534, 634).
4. Maintenance of a B average (3.00) in the program and compliance with academic regulations prescribed by the Graduate School.
5. Successful completion of written comprehensive examination (taken before advancement to candidacy) and an oral examination (taken at the end of the program).

CORE COURSEWORK

MFAM 504	Research Tools and Methodology for MFAM Counselors
MFAM 515	Crisis Intervention Counseling
MFAM 534	Clinical Training
MFAM 535	Case Presentation Seminar I
MFAM 542	Professional Seminar I
MFAM 551	Marriage Counseling Theory and Practice I
MFAM 552	Marriage Counseling Theory and Practice II
MFAM 556	Diagnostic Procedures in Clinical Pathology
MFAM 614	Family Law and Ethics
MFAM 634	Advanced Clinical Training
MFAM 635	Case Presentation Seminar II
MFAM 642	Professional Seminar II
MFAM 669	Human Sexual Behavior
NRSC 577	Family Systems Theory
PSYC 555	Group Process Theory and Procedures
SOCI 514	The Family: Cross Cultural Family Values
SOCI 614	Seminar: The Family (Marriage and Family Communication)

Clinical services The Marriage Counseling Service is directed by the faculty of Marriage and Family Counseling to provide community service to families and to give opportunity for clinical practice for students and interns. (This service is based in Griggs Hall.) Part of the student's field experience and internship may be taken at other clinics in the Riverside and San Bernardino areas.

Clinical program The state of California requires 3,000 hours of supervised clinical practice over a minimum of two years for licensure in marriage, family, and child counseling. Of the total, approximately 500 hours are included in the master's program. Students planning to obtain the California license after conferral of the degree may arrange for an advanced internship of at least 2,000 hours of supervised counseling. To do this under the direction of the faculty, the student should apply for admission to the advanced clinical program on an application form available at the coordinator's office.

Persons who have acceptable degrees but who need the clinical internship to qualify for licensure should arrange for an interview with the clinical coordinator before completing the application form.

COURSES

MFAM 415 Crisis Intervention Counseling (2-4)

Lectures, discussion, and laboratory experience in crisis intervention counseling in connection with the "hot line" emergency service. Not limited to MFAM students.

MFAM 464 Relationship Enrichment (2)

Seminar experiences designed to improve interpersonal relationship skills and to prevent marriage and family problems. Not limited to non-MFAM students.

GRADUATE COURSES

MFAM 504 Research Tools and Methodology for MFAM Counselors (4)

Current social research methods, practice in the use of techniques, consideration of the philosophy of scientific method, and familiarization with MFAM testing instruments.

MFAM 515 Crisis Intervention Counseling (4)

Lectures, discussion, and laboratory experience in crisis intervention counseling in connection with the "hot line" emergency service. Limited to MFAM students.

MFAM 525 Counseling and Christian Theology (2)

Christ's counseling methods and the application of these concepts to the student's future role as counselor, in and out of the church constituency. Limited to MFAM students.

MFAM 534 Clinical Training (0)

Supervised clinical counseling of individuals, couples, families, and children. At least one hour of individual supervision per week and two hours of case presentation seminar per week. Continuous registration for this portion of the clinical training until completion of 250 clock hours.

MFAM 535 Case Presentation Seminar I (2)

Formal presentation of ongoing cases by clinical interns. Taping, videotape playbacks, and verbatim reports discussed with staff and other clinical peers. Three quarters required.

MFAM 542 Professional Seminar I (2)

The relationship between marriage counseling and other professions. Seminar guests share expertise from various disciplines and counseling approaches. Two quarters required.

MFAM 551 Marriage Counseling Theory and Practice I (4)

Intensive study of the major methods and techniques in marriage and family counseling. Role play, peer counseling, and videotaped presentations employed to enhance counseling techniques.

MFAM 552 Marriage Counseling Theory and Practice II (4)

Counseling theories and practices, dynamics of marital interaction, problems at various stages of the marital cycle, and dissolution counseling.

Prerequisite: MFAM 551.

MFAM 555 Counseling the Adolescent (2)

Special problems of the adolescent: coping with changes, need for privacy, setting limits, peer-group pressure.

MFAM 556 Diagnostic Procedures in Clinical Pathology (2)

Recognition of psychopathology. Sources of help for clients with psychopathology or other symptoms. Methods of dealing with such clients, including techniques of referral.

MFAM 577 Family Life Workshop (2)

Focus on lay-counselor skills which may be used by ministers and teachers dealing with crisis situations and in preventing problems which affect the stability of family constellations. Not limited to non-MFAM students.

MFAM 584 Treating the Troubled Child (2)

The psychodynamics involved in children's problems with respect to the parent-child relationship. Demonstration of counseling approaches.

MFAM 604 Premarital Counseling (2)

A clinically oriented course demonstrating specific problems and issues in premarital counseling.

MFAM 605 Gestalt Therapy (2)

The principles of Gestalt psychology and therapy; the relationship between the individual and the physical, emotional, societal, and spiritual environment. Group experience which permits the spiritual and affective aspects of Gestalt therapy to be expressed and integrated.

MFAM 614 Family Law and Ethics (2)

Laws pertaining to the family: child welfare, separation, divorce, and financial aspects of family maintenance. Case management, referral procedures, professional and client interaction, ethical practices, and ethical relations with other professions.

MFAM 624 Marital Assessment (2)

Application of psychological testing methods in the diagnostic assessment of individual and group behavioral dynamics as encountered in marriage and family counseling. Observations and/or laboratory experience. Identical to PSYC 556. Credit not given for both courses.

Prerequisite: PSYC 356.

MFAM 634 Advanced Clinical Training (2)

Supervised clinical counseling of individuals, couples, families, and children. At least one hour of individual supervision per week and two hours of case presentation seminar per week. Continuous registration for this portion of the clinical training until completion of the 500 clock hours required.

MFAM 635 Case Presentation Seminar II (2)

Formal presentation of ongoing cases by clinical interns. Taping, videotape playbacks, and verbatim reports discussed with staff and other clinical peers. Three quarters required.

MFAM 642 Professional Seminar II (2)

Further exploration of the interfacing between marriage counseling and other professions. Seminar guests include therapists with specialized expertise in various counseling modalities.

MFAM 655 Seminar in Family Therapy (2)

Family therapy theories and methods, problems and case studies in family life, role playing, and peer counseling.

MFAM 657 Setting up a Private Practice in MFAM (2)

Economics of starting a private practice, discussion of legal aspects, choice of location, client sources.

MFAM 665 Seminar: Marriage Enrichment (2)

Marriage and family interaction, development of communication skills for marriage partners.

MFAM 667 Dissolution Counseling (2-4)

Methods of supportive counseling for those experiencing the trauma of divorce. Self-image improvement, coping with loss.

MFAM 668 Assertion Training for MFAM Counselors (2)

Demonstration of assertion training techniques for use with clients in family therapy. Group discussion, role playing.

MFAM 669 Human Sexual Behavior (4)

Sexuality in contemporary society from the sociopsychological viewpoint. Anatomy and physiology of human sexuality: reproduction, normal and abnormal sexual response, psychosexual development, human fertility, human sexual dysfunction.

MFAM 670 Seminar in Sexual Therapy (2)

Discussion of the major male and female sexual dysfunctions, therapeutic processes of treatment.

Prerequisite: MFAM 669.

MFAM 671 Program Development in Relationship Enrichment (2)

Experience in development and implementation of workshops, seminars, and classes in relationship enrichment and improvement. A preventive mental health approach. Limited to MFAM students.

MFAM 672 Practicum in Relationship Enrichment (2)

Experience in organization and leadership in relationship enrichment groups.

Prerequisite: MFAM 671.

MFAM 675 Clinical Problems in Marriage and Family Counseling (2)

An intensive, clinically focused course using videotape, live interview, and role playing. Marriage and family counseling methods observed and applied to problems representative of clinical practice.

MFAM 694 Directed Study: Marriage and Family (2-4)

Individual study in areas of special interest concerning the family and its problems. May be reported for credit at the discretion of the faculty.

MFAM 695 Research Problem: Marriage and Family (2-6)

Directed research in the student's special field of interest in the family.

Prerequisite: MFAM 504, or concurrent registration with the consent of the coordinator.

PSYC 555 Group Process Theory and Procedure (4)

Group guidance, theories of group-individual interaction, communication processes, development and structure of organized groups.

RELP 544 Theology, Encounter, and Family Therapy (2)

The basic foundations of traditional Christian theology as they relate to the development of personality and provide foundation for effective living. Evaluation of relational processes in the light of ethical, moral, and value decisions.

SOCI 514 The Family: Cross-Cultural Family Values (4)

Structure and function, changing patterns, future in urban society. Relationship of changes in society to widespread family problems.

SOCI 614 Seminar: The Family (Marriage and Family Communications) (4)

Evaluation of current research on the family, especially in the United States. Research project on some aspect of family structure or function. Styles of communication within the family unit (verbal and nonverbal), sources of communication pathology, methods of reestablishment of communication.

NRSG 577 Family Systems Theory (2)

Review of systems theory. A study of Bowen Family Theory and an introduction to family psychotherapy as an outgrowth of the theory.

NRSG 579 Family Systems Seminar (1)

Application of Bowen Family Theory to student's family and client families.

Prerequisite: NRSG 577.

RELP 664 Seminar in Marriage, Religion, and the Family (2)

Contemporary family theory in the light of the Bible and the writings of Ellen G. White; the family as the basic unit of the church and as the primary environment for personal and spiritual growth.

MEDICAL TECHNOLOGY

RICHARD W. HUBBARD, PH.D. Purdue University 1961

Chairman; Associate Professor of Biochemistry
Clinical chemistry, metabolism, toxicology

BRIAN S. BULL, M.D. Loma Linda University 1961

Professor of Pathology and Laboratory Medicine
Laboratory medicine, hematology

EDWARD D. WAGNER, PH.D. University of Southern California 1953

Professor of Microbiology
Parasitology

R. BRUCE WILCOX, PH.D. University of Utah 1962

Professor of Biochemistry
Metabolism of steroid hormones, biochemistry of the endocrine system

CHARLES E. WINTER, PH.D. University of Maryland 1947

Professor of Microbiology
Immunology, medical bacteriology

BENJAMIN H. S. LAU, PH.D. University of Kentucky 1966

Associate Professor of Microbiology
Immunology, medical bacteriology, mycology

ARTHUR J. SILVERGLEID, M.D. New York University 1967

Associate Professor of Medical Technology
Hematology, immunohematology

RONALD H. HILLOCK, PH.D. University of Alabama 1972

Assistant Professor of Medical Technology
Clinical chemistry

JOHN E. LEWIS, PH.D. Loma Linda University GS 1969

Assistant Professor of Pathology and Laboratory Medicine
Immunology, medical microbiology

ROBERT J. LODER, M.A. Claremont Graduate School 1975

Assistant Professor of Medical Technology
Management

ROBERT E. MONCRIEFF, M.D. Loma Linda University SM 1967

Assistant Professor of Pathology
Immunohematology

The department offers a graduate program leading to the Master of Science degree. The sequence of study prepares the student to be a technical specialist, with emphasis in one area of laboratory science, and intends to qualify the student for leadership positions in education, administration, and advanced technology.

Facilities The service, research and education facilities of the University Medical Center, the Jerry L. Pettis Memorial Veterans Administration Hospital, the Blood Bank of San Bernardino/Riverside Counties, the Departments of Pathology, Biochemistry, and Microbiology of the School of Medicine and the Department of Medical Technology of the School of Allied Health Professions provide the graduate student with opportunities for research and development.

Admission A baccalaureate degree in medical technology or in a related laboratory science acceptable to the department is required for admission. The student must either be eligible for certification or be already certified by the Registry of Medical Technologists of the American Society of Clinical Pathologists, or an equivalent certifying or licensing agency acceptable to the department. A California state license in medical technology may be required.

Applicants whose undergraduate work was taken more than five years before they begin graduate studies may be asked to demonstrate proficiency by passing a qualifying examination. Subject deficiencies may be made up by (a) independent study and reexamination or (b) appropriate courses and reexamination.

Students who have not taken their undergraduate work in medical technology at Loma Linda University in the recent past may be required to take and/or show competency in the undergraduate courses offered by the department in the major chosen by the student.

Advancement to candidacy Admission to the Graduate School or to full graduate standing does not constitute admission to candidacy for the degree. Admission to candidacy is initiated by a written petition from the student to the Dean, on recommendation of the department chairman. Subject deficiencies in undergraduate studies must be completed and requirements for regular graduate standing met before the student requests advancement to degree candidacy.

At the time the student petitions for candidacy, a proposed project title, as approved by the major professor must be submitted. If all credentials and proposals are acceptable, the student is advanced to candidacy, and a guidance and examining committee of not less than three members is named. A student must qualify for advancement to candidacy not later than the beginning of the term in which completion of degree requirements is expected.

Thesis The student is required to select and conduct a research project of appropriate scope and to present the results in a thesis written in a standard format acceptable to the Graduate School.

Examinations After submitting the thesis and completing other requirements, the candidate must take an oral examination dealing with the area of special emphasis chosen, particularly relative to the defense of the thesis.

The student may select a minor (a minimum of 9 units in a specific field) from offerings available from the Departments of Biochemistry, Physiology, Pharmacology, or Microbiology. A minor may also be selected from within the Department of Medical Technology where suitable course offerings are available.

After the completion of a minor for the nonthesis option, the candidate must take a written examination dealing with the chosen major. An oral examination may also be required.

Degree requirements The following are the requirements for the Master of Science degree:

1. A minimum of 24 quarter units in the chosen area of specialization.
2. A minimum of 8 quarter units in related courses (including advanced laboratory management, data analysis, and allied health practicum) recommended by the major professor.
3. Religion, 3 quarter units.
4. Proficiency in a synthetic language (FORTRAN or suitable equivalent) may be required for certain areas of emphasis, such as clinical chemistry. The student's guidance committee will select a suitable area of endeavor for the student to meet this requirement.
5. Research and thesis, 8 quarter units, or the nonthesis option of a minimum of 9 units.

For information about requirements and practices to which all graduate students are subject, the student should consult the *Academic Practices* section of division I of this BULLETIN.

SUBJECT REQUIREMENTS FOR AREAS OF EMPHASIS

CLINICAL CHEMISTRY

BCHM	511, 512	Medical Biochemistry I, II (5, 5)
BCHM	534	Techniques of Biochemistry (4-5)
MTCH	504	Advanced Laboratory Management (2)
MTCH	601, 602	Seminar in Microbiology and Chemistry I, II (1,1)
MTCH	621, 622, 623	Advanced Clinical Chemistry I, II, III (3, 3, 3)
MTCH	665	Allied Health Practicum (3)
MTCH	697	Research (6)
MTCH	698	Thesis (2)
		Nonthesis Option (9)
STAT	568	Data Analysis (3)
		Religion (3)
		Electives (4)

Total required for graduation: 48

CLINICAL MICROBIOLOGY

MICR	521, 522	Medical Microbiology I, II (5,5)
MICR	546	Advanced Immunology (4)
MICR	568	Laboratory Techniques in Virology (2-3)
MICR	584	Advanced Medical Parasitology (2)
MICR	594	Medical Mycology (4)
MTCH	504	Advanced Laboratory Management (2)
MTCH	601, 602	Seminar in Microbiology and Chemistry I, II (1, 1)
MTCH	665	Allied Health Practicum (3)
MTCH	697	Research (6)
MTCH	698	Thesis (2)
	555	Nonthesis Option (9)
STAT	568	Data Analysis (3)
	555	Religion (3)
	999	Electives (3)

Total required for graduation :48

IMMUNOHEMATOLOGY

MICR	524	Immunology (2)
MICR	546	Advanced Immunology (4)
MTCH	504	Advanced Laboratory Management (2)
MTCH	525	Advanced Immunohematology (5)
MTCH	531, 532	Interpretative Clinical Hematology I, II (3,2)
MTCH	535	Problems in Hemostasis (4)
MTCH	555	Medical Genetics (3)
MTCH	635, 636	Seminar in Hematology and Immunohematology I, II (1,1)
MTCH	665	Allied Health Practicum (3)
MTCH	697	Research (6)
MTCH	698	Thesis (2)
		Nonthesis Option (9)
STAT	568	Data Analysis (3)
		Religion (3)
		Electives (4)

Total required for graduation: 48

HEMATOLOGY

MTCH	504	Advanced Laboratory Management (2)
MTCH	525	Advanced Immunohematology (5)
MTCH	531, 532	Interpretative Clinical Hematology I, II (3, 2)
MTCH	535	Problems in Hemostasis (4)
MTCH	537	Advanced Hematology Instrumentation (2)
MTCH	541, 542	Advanced Morphologic Hematology I, II (3, 3)
MTCH	634	Literature of Hematology (2)
MTCH	635, 636	Seminar in Hematology and Immunohematology I, II (1, 1)
MTCH	665	Allied Health Practicum (3)
MTCH	697	Research (6)
MTCH	698	Thesis (2)
		Nonthesis Option (9)

STAT 568 Data Analysis 3 (3)
Religion (3)
Electives (3)

Total required for graduation: 48

COURSES

MTCH 504 Advanced Laboratory Management (2)

Management methods applicable to clinical laboratories.

MTCH 525 Advanced Immunohematology (5)

Advanced concepts and practice of bloodbanking.

MTCH 531, 532 Interpretative Clinical Hematology I, II (3, 2)

Aspects of hematology in relation to patient care.

MTCH 535 Problems in Hemostasis (4)

Aspects of bleeding disorders and associated diagnostic laboratory procedures.

MTCH 537 Advanced Hematology Instrumentation (2)

Study of instruments used in hematology laboratories. Instrument design.

MTCH 541, 542 Advanced Morphologic Hematology I, II (3, 3)

Bone marrow studies and interpretation. Peripheral blood film interpretation in relation to disease.

MTCH 555 Medical Genetics (3)

Inheritance of human disease, environmental interrelationships.

MTCH 601, 602 Seminar in Microbiology and Chemistry I, II (1, 1)

Current topics in immunology, microbiology, and clinical chemistry as related to laboratory medicine. Students enrolled in seminar courses expected to make two or three presentations per quarter.

MTCH 621, 622, 623 Advanced Clinical Chemistry I, II, III (3, 3, 3)

Principles and practices of clinical chemistry as it relates to the fields of science.

MTCH 634 Literature of Hematology (2)

Current literature. Bibliographic research.

MTCH 635, 636 Seminar in Hematology and Immunohematology I, II (1, 1)

Current topics in hematology and immunohematology. Students enrolled in the seminar courses expected to make two or three presentations per quarter.

MTCH 665 Allied Health Practicum (3)

Techniques in education. Practice teaching.

MTCH 697 Research (6)

Investigation of appropriate scope conducted under the direction of the major adviser.

MTCH 698 Thesis (2)

Thesis will be written under the direction of the major adviser.

BIOCHEMISTRY

BCHM 511, 512 Medical Biochemistry I, II (5, 5)
A prerequisite to all other courses in biochemistry.

BCHM 534 Techniques of Biochemistry (4-6)

BIOSTATISTICS

STAT 568 Data Analysis (3)

MICROBIOLOGY

MICR 521, 522 Medical Microbiology I, II (7, 5)

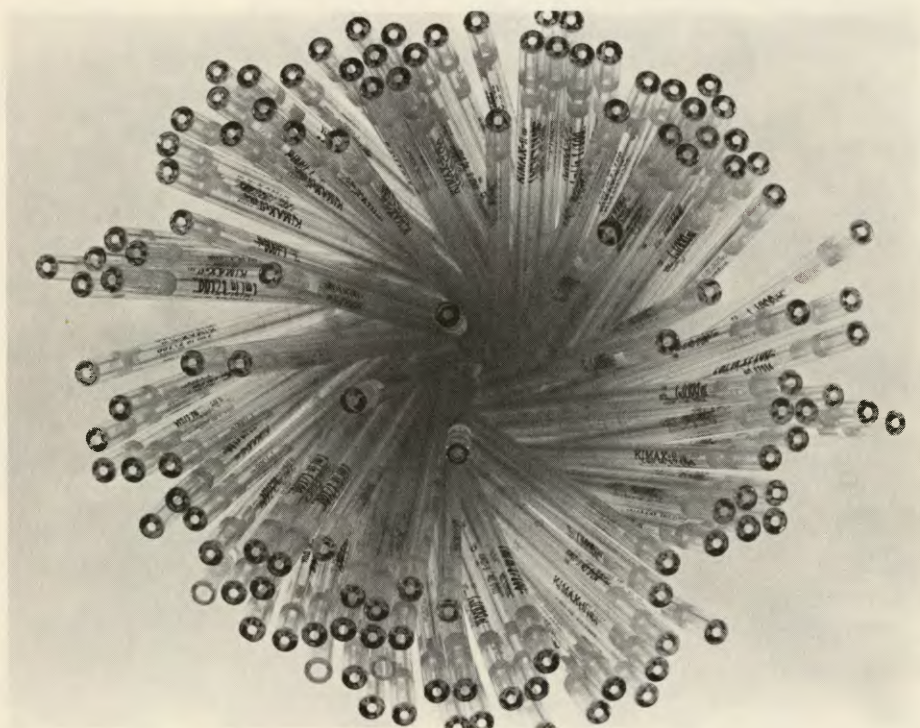
MICR 524 Immunology (arranged)

MICR 545 Applied Clinical Microbiology (4)

MICR 546 Advanced Immunology (4)

MICR 568 Laboratory Techniques in Virology (2-3)

MICR 594 Medical Mycology (4)



MICROBIOLOGY

RAYMOND E. RYCKMAN, PH.D. University of California at Berkeley 1960
Chairman; Professor of Microbiology
Medical entomology, parasitology, biosystematics

ROBERT L. NUTTER, PH.D. Iowa State University 1957
Professor of Microbiology
Virology, molecular biophysics

EDWARD D. WAGNER, PH.D. University of Southern California 1953
Professor of Microbiology
Parasitology

CHARLES E. WINTER, PH.D. University of Maryland 1947
Professor of Microbiology
Immunology, medical bacteriology

LEONARD R. BULLAS, PH.D. Montana State University 1963
Associate Professor of Microbiology
Microbial genetics, bacteriology

HARVEY A. ELDER, M.D. Loma Linda University SM 1957
Associate Professor of Medicine
Infectious diseases, microbiology

YUK LIN HO, PH.D. Harvard University 1962 (on leave)
Associate Professor of Microbiology
Molecular biology

BENJAMIN H. S. LAU, PH.D. University of Kentucky 1966 (on leave)
Associate Professor of Microbiology
Immunology, medical bacteriology, mycology

JAMES D. KETTERING, PH.D. Loma Linda University 1974
Assistant Professor of Microbiology
Virology, medical bacteriology

WILLIAM C. EBY, M.D. Loma Linda University 1967, PH.D. University of Illinois
1978
Assistant professor of Microbiology and Pathology
Immunology

Medical microbiology encompasses the broad scope of human host-parasite relationships. This is understood to include a knowledge of bacteria, fungi, spirochetes, rickettsiae, viruses, protozoa and metazoa, arthropod vectors; and the immunologic, physiologic, biochemical, and other principles which concern each division of the field.

The main objective of the graduate program in microbiology is to prepare teachers, research workers, and administrators in education, research, and health programs either in this country or in other parts of the world.

The minimum science prerequisites for admission to the graduate programs are:

One year of general biology

One year of general chemistry

One complete course in organic chemistry

One complete course in general physics

Waiver of any one of these requirements is only on departmental consent before admission to the graduate program.

Master of Science Advanced study leading to the Master of Science degree is offered for the student having a bachelor's degree, including the minimum course requirements specified for admission to the Graduate School; for the student who has the equivalent of a bachelor's degree and has completed the first year of the professional curriculum in medicine or in dentistry; and for the graduate from medicine or dentistry.

During the time of study, the student acquires a clear understanding of the fundamental principles of microbiology and a familiarity with their application in the laboratory. In addition, provision is made for concentration in a special field of microbiology and the corresponding mastery of its techniques.

Although reading knowledge of a language other than English is not required for the master's degree, it is strongly recommended if there is any desire or intention to proceed to the Doctor of Philosophy degree.

Of the 48 quarter units required for the Master of Science degree, the student must complete at least 20 units of graduate coursework in microbiology. A minimum of 9 units of graduate coursework in another area (usually biochemistry, biology, physiology, pharmacology, or biophysics) constitutes a minor. The student must present an acceptable thesis based on at least 6 units of research and 3 units of thesis in microbiology.

Doctor of Philosophy A student who is completing a master's degree and who wishes to proceed to the Doctor of Philosophy degree applies in writing to the Department of Microbiology.

The student plans a program of courses under the direction of the guidance committee. Usually the coursework (including courses in the major field, the minor field, and, in some cases, in related areas) is completed within the first two years beyond the master's degree. A reading knowledge of two modern languages, other than English, is required. The departmental advisory com-

mittee, in approving the selection, gives preference to the languages in which significant publications in the area of concentration are found or a synthetic language pertinent to the area. The examination for the second foreign language should be taken sometime during the second year of the doctoral program.

After passing the written comprehensive examination, the language examinations, and the oral comprehensive examination, the student applies for candidacy for the doctoral degree. During the candidacy period, most of the time is spent in research. On completion of the research and the writing of the dissertation, the student defends the dissertation at an oral examination administered by the committee. Prior to advancement to candidacy the student must have completed satisfactorily a minimum of 8 quarter units of graduate biochemistry. It is recommended that a course in differential and integral calculus be included in the undergraduate preparation.

For information about requirements and practices to which all graduate students are subject, the student should consult the *Academic Practices* section of division I of this BULLETIN.

COURSES

MICR 484 Diagnostic Medical Parasitology (2-3)

Didactic and laboratory study emphasizing morphology and laboratory recognition of medically important protozoan and metazoan parasites of man. Collateral work on life cycles, diagnostic methods, and procedures.

Wagner.

MICR 521, 522 Medical Microbiology (7, 5)

Fundamental techniques and concepts of microbiology; principles involved in the mechanism of resistance to infection, including those concerned with hypersensitiveness; a systematic study of pathogenic bacteria, spirochetes, actinomycetes, fungi, rickettsiae, viruses, protozoa, and helminths; methods of sterilization, disinfection and chemotherapy; important aspects of medical entomology.

Staff.

MICR 524, 525, 526, 527 Immunology, Virology, Bacteriology, Parasitology (arranged)

A portion of the department 521 and 522. By consent of the department chairman only.

Staff.

MICR 534 Microbial Physiology (4)

A study of the growth, nutrition, and metabolism of microorganisms; the effect of physical and chemical environment on the bacterial cell and the mechanisms of survival and virulence.

Ho.

MICR 535 Molecular Biology of Microorganisms (4)

DNA replication, the genetic coding of information, its transfer from DNA through RNA to protein, and the regulatory mechanisms of expression of genetic functions, with specific emphasis on microorganisms.

Ho.

MICR 544 Advanced Basic Bacteriology (4)

A course to bridge the gap between the elementary level and research status of the basic bacteriology in the fields of occurrence, taxonomy, cytology, staining, and physical properties.
Winter.

MICR 546 Advanced Immunology (4)

Fundamental biological and chemical aspects of immunity, hypersensitivity, and serology, with particular consideration of the following: mechanisms of native immunity, mechanisms of acquired immunity, mechanisms of hypersensitivity, and serology and antigenic systems.
Winter.

MICR 555 Microbial Genetics (3-4)

Genetic processes of microorganisms, including molds, protozoa, viruses, and bacteria. The contribution that the study of microorganisms has made in modern genetics toward the understanding of the nature of the genetic material and the mechanism of its action.
Bullas.

MICR 556 Microbial Genetics Laboratory (2)

Laboratory exercises in bacterial and bacteriophage genetics.
Prerequisite: Microbial genetics or bacteriophage genetics.
Bullas.

MICR 565 Virology (3)

Fundamental aspects of virus-host cell relationships of bacteriophages and selected groups of animal viruses.
Nutter.

MICR 566 Cell Culture (3)

The practical aspects of the growth of animal cells in culture. Experience with both primary cell cultures and established cell lines.
Nutter.

MICR 568 Laboratory Techniques in Virology (2-3)

Laboratory exercises involving bacteriophages and animal viruses. Handling, growth, assay, serological, and other procedures utilized in virus research.
Prerequisite: MICR 521, 522 or MICR 565.
Kettering.

MICR 574 Arthropod Vectors of Infectious Agents (4)

Vector potential of insects, ticks, and mites. Importance of ecology and biosystematics to host-parasite relationships.
Ryckman.

MICR 575 Arthropod Vectors Laboratory (1-2)

To be taken in conjunction with MICR 574 as an option.
Ryckman.

MICR 576 Field Medical Entomology (3)

The ecology and host relationships of medically important arthropods under field conditions. Emphasis on habitat and host recognition and identification of the parasitic forms.
Ryckman.

MICR 585 Helminthology (4)

Important aspects of the parasitic helminths of animals, particularly the vertebrates. Special consideration of taxonomy, morphology, life histories, host-parasite relationships, and special techniques in the preparation of specimens for study.
Wagner.

MICR 594 Medical Mycology (3)

A systematic study of those fungi that cause disease in humans and animals, with special emphasis on the clinical and diagnostic features of fungus infections and the epidemiology and public health significance of the fungi.
Lau.

MICR 604 Seminar in Microbiology

Required for a major in microbiology.

MICR 624 Special Problems in Microbiology (2-4)

Required for a major in microbiology.

MICR 697 Research (arranged)

MICR 698 Thesis (arranged)

MICR 699 Dissertation (arranged)



MIDDLE EASTERN STUDIES

ANEES A. HADDAD, PH.D. University of Southern California 1971
Coordinator; Professor of Sociology
The family, race relations, Arabic

JOHN W. ELICK, PH.D. University of California at Los Angeles 1969
Professor of Anthropology
Cultural anthropology, comparative religion

A. GRAHAM MAXWELL, PH.D. University of Chicago Divinity School 1959
Professor of New Testament
New Testament backgrounds

JACK W. PROVONSHA, M.D. Loma Linda University SM 1953; PH.D. Claremont
Graduate School 1967
Professor of Philosophy of Religion and Christian Ethics
Comparative ethics, comparative religions

KENNETH L. VINE, PH.D. University of Michigan 1965
Professor of Biblical Studies
Archeology, biblical backgrounds

ROBERT C. DARNELL, PH.D. University of Michigan 1970
Associate Professor of Islamic; Anthropology and Sociology
Comparative religion, area studies

SALIM MAJEED ELIAS, B.A. Middle East College
Lecturer in Arabic

The Middle Eastern studies program — an interdisciplinary program sponsored by the graduate faculties of the Division of Behavioral Sciences in cooperation with the Divisions of Religion and Humanities — leads to a Master of Arts degree. It is designed for students in any of these fields and for others (such as ministers, teachers, or missionaries) whose work naturally stimulates interest in the Muslim world.

The program offers opportunities for firsthand study of an area of great importance politically, religiously, culturally, and historically. The Middle East

has long been of interest to the Seventh-day Adventist church because of its biblical emphasis and its eschatological concern. Furthermore, continuous crises have made the Middle East a focal point of interest to the entire world. The graduate program in Middle Eastern studies is intended to further understanding among peoples of the Middle East and of the Western world, particularly the United States.

Admission To work toward the degree with a major in Middle Eastern studies, the student should hold a bachelor's degree or its equivalent from an accredited college or university, with a major in either the social sciences or the humanities. For a degree in sociology, anthropology, religion, or history, with emphasis in Middle Eastern studies, the student should consult this BULLETIN for the admission and course requirements of these departments. In either case, the student's program of study is arranged in consultation with the adviser, consideration being given to the range and quality of undergraduate preparation.

Admission to regular standing in the program assumes a baccalaureate degree with a major in one of the fields indicated in the foregoing paragraph. Applicants with a major other than one of these are ordinarily expected to strengthen their backgrounds in one or more of the areas mentioned. This may be done concurrently with the graduate program.

Degree requirements The following are requirements for the Master of Arts degree:

1. A minimum of 5 quarters as a graduate student, to include at least 2 quarters at the Loma Linda campus and at least 2 quarters in the Middle East.

2. A minimum of 58 quarter units as follows: (a) 28 units of Middle Eastern core courses taken in the first two quarters at the University campus; (b) 20 additional units of courses in an area of emphasis: anthropology, history, religion, sociology. The specific requirements for these areas of emphasis are:

Anthropology: ANTH 308, 316, 425, 634.

History: HIST 506; the rest chosen in consultation with the chairman of the Department of History.

Religion.

Sociology: SOCI 414, 525, 604, 634.

3. A thesis in the area of specialization, on a subject directly connected with the Middle East (10 units).

4. Comprehensive written and oral examinations.

For information about requirements and practices to which all graduate students are subject, the student should consult the *Academic Practices* section of division I of this BULLETIN.

COURSES

MEST 351, 352 Introductory Arabic (8)

Consecutive courses introducing the student to the spoken Arabic language, with an elementary introduction to the written language.

MEST 425 Peoples of the Middle East (4)

A descriptive and analytical survey of the major societies and culture types of the Eastern Mediterranean and North Africa. May be taken as ANTH 336 for anthropology credit.

MEST 444 Comparative Religion (4)

Beliefs and practices directed toward manipulation or control of supernatural forces; animatism, animism, magic, witchcraft, ritual, concepts of the afterlife, shamanism; the role of religion as an integrative factor of culture. Identical to ANTH 444.

MICR 445 Religions of the Middle East and the Western World (2-4)

A survey of the history, beliefs, and practices of the religions of the Middle East and their present extensions in the Western world, with special attention to Islam.

MEST 505 Social Research Methods and Methodology (4)

An analysis of current social research methods. Practice in the use of techniques. Consideration of the philosophy of scientific method. May be taken as SOCI 505 for sociology credit.

Prerequisite: An introductory course in statistics or consent of the instructor.

MEST 526 The Legacy of Hellenism (2)

A survey of the traditional culture of the Middle East as it relates to Hellenism. Special emphasis is given to the interaction with Semitic religion as manifested in Judaism, Christianity, and Islam. Should be taken simultaneously with MEST 527.

MEST 527 Muhammad and His Times (2)

A study of the history of the Arabs during the time of Muhammad, based primarily on the materials of the Qur'an. Special attention given to the person of the apostle. Should be taken simultaneously with MEST 526.

MEST 537 The Qur'an (2)

A study of the Qur'an noting its structure, style, inspiration, and purpose. Attention is given to the background setting of the Qur'an, the Qur'an as literature, the great ideas of the Qur'an, and to the principles of its interpretation. Must be taken simultaneously with MEST 538.

MEST 538 Islamic Religious Literature (2)

A study of the genres of Islamic religious literature as represented in English translation from the Arabic, Persian, and Turkish languages. The genres include Hadeeth collections, biographies of Muhammad, wisdom literature, mystic writings, treatises on law and theology, Qur'an commentary, apologetics, and modern Qur'an interpretation. Must be taken simultaneously with MEST 537.

MEST 605 Seminar: Middle Eastern Cultural History (4)

A survey of the cultural history of the development of civilization in the East. May be taken as ANTH 605 or SOCI 605 for anthropology or sociology credit.

MEST 615 Seminar: The Middle East in the Twentieth Century (4)

Contemporary Middle East. A comparison of political systems. Problems of the area in general. May be taken as ANTH 615 or SOCI 615 for anthropology or sociology credit.

MEST 644 Seminar: Comparative Religion (4)

Reading and discussion of current anthropological writing on the role of religion in maintaining the cultural system; research in particular religious systems, mythology, and world view. Identical to ANTH 644, but with emphasis on Islam.

MEST 694 Directed Reading (arranged)

MEST 697 Research (5)

MEST 698 Thesis (5)

AREA OF EMPHASIS

For courses available in the area of emphasis, see the listings under History, Religion, Sociology, and Anthropology.

NURSING

L. FRANCES PRIDE, PH.D. University of Maryland 1967; Georgetown University
1976

Associate Dean. Director, Graduate Division in Nursing
Professor of Nursing
Psychiatric/mental health, research design, systems theory

MARILYN C. SMITH, ED.D. University of Southern California 1974

Professor of Nursing
Community health, higher education, administration

FRANCES L. FICKESS, D.N.SC. Catholic University of America 1976

Professor of Nursing
Medical/surgical

CLARICE W. WOODWARD, M.S. University of California at Los Angeles 1964

Professor of Nursing
Parent/child

AUDREY L. BURGESS, M.S. Boston University 1966

Associate Professor of Nursing
Parent/child, developmental nursing

EVELYN L. ELWELL, D.N.SC. Catholic University of America

Associate Professor of Nursing
Medical/surgical, research, sleep and biorhythms

PATRICIA C. FOSTER, PH.D. Claremont Graduate School 1979

Associate Professor of Nursing
Medical/surgical, curriculum-teaching in higher education

M. ANABELLE HILLS, M.S. University of Colorado 1956

Associate Professor of Nursing
Medical/surgical

DARLENE B. JOHNSON, M.S. University of Maryland 1975

Associate Professor of Nursing
Community health

BETTY T. LONNSTROM, M.S. University of California at Los Angeles 1957

Associate Professor of Nursing
Parent/child

FRANCES P. MILLER, M.S. Loma Linda University GS 1973

Associate Professor of Nursing
Community health

NANCY L. TESTERMAN, M.S. Loma Linda University GS 1971, 1975
Associate Professor of Nursing
Psychiatric/mental health, marriage/family counseling

NANCY L. HOSEK, M.S. Loma Linda University GS 1976
Assistant Professor of Nursing
Parent/child, pediatric nurse practitioner

Philosophy The graduate program in nursing shares with the total University the philosophy that God uses human agencies to assist him in restoring individuals to wholeness. Seventh-day Adventist Christian nursing is a service to humanity which is motivated by love for God and people and which strives to help others better understand God's will and purpose. Based on the belief that the individual is of infinite worth, the nursing system, through the nursing process, interfaces to assist the human client system when it is unable to manage its self-care functions.

Objectives The primary aim of this program is to prepare Christian nurse leaders. The program is organized around elements of advanced clinical nursing theory, research, and theory and practice in a functional area either of teaching in nursing, administration in nursing, or clinical specialization in nursing. Upon completion of the program, the graduate should have:

1. Acquired a body of knowledge from literature in the nursing major and related fields from interaction with experts in these fields, and from development and use of conceptual and analytic skills.
2. Used this knowledge in clinical settings, employing the Loma Linda University theoretical framework for nursing to—
 - further develop clinical and functional expertness in the nursing of individuals, groups, and families with diverse ideologic and ethnic backgrounds and in varying states of health;
 - increase understanding of issues in health care;
 - analyze and evaluate present and potential roles for nursing in health care delivery systems;
 - study and refine therapeutic process in nursing;
 - explore the dynamics of change in moving toward expanded roles in nursing;
 - begin formulating a personal theoretical position for the practice of nursing.
3. Developed advanced collaborative skills with colleagues in the health professions.

4. Developed beginning systematic investigative skills needed to expand the theoretical and clinical base for nursing and to provide innovative nursing care.

5. Acquired sufficient stimulation and reinforcement of scholarly abilities and interests to continue such pursuits beyond the academic experience.

Clinical facilities The facilities of the University Medical Center and of community hospitals and agencies provide the student with actual situations in which to observe and practice in the field of special interest.

ADMISSION TO THE GRADUATE PROGRAM

Admission The student who desires admission to the program for the Master of Science degree should present the following:

A baccalaureate degree in nursing (or its equivalent) in a college or university accredited by the National League for Nursing.

An undergraduate record with a grade of B (3.00) cumulative and in the nursing major.

A minimum of 24 quarter units in clinical nursing on the upper division level, of which 6-8 units are in the area of graduate clinical specialization.

A course in general statistics (3 quarter units).

Scores on the Graduate Record Examination, aptitude section.

Students who challenge upper division clinical nursing courses must present 20 quarter units of unchallenged upper division clinical nursing.

The student who lacks upper division nursing and wishes to take it at Loma Linda University should apply a year before expected enrollment in order to be assured of space in the particular clinical courses needed in the baccalaureate program.

The student is encouraged to have nursing experience in the area of the desired clinical major before beginning graduate study.

ACADEMIC PRACTICES

Program requirements The program is four quarters in length. Although latitude is given for individual variation, the entire course of study is a unified program planned with the consultation and approval of the student's major adviser. Full-time study is planned to begin with the autumn quarter. Part-time study is possible. No foreign language is required.

FIELDS: Clinical, functional The major in nursing includes courses in the selected clinical field, in the selected functional area of nursing leadership, and in nursing research. The following areas of clinical nursing are offered:

- Community health nursing
- Medical/surgical nursing
- Parent/child nursing
- Psychiatric/mental health nursing

The following areas of functional nursing leadership are offered:

- Teaching in nursing
- Administration in nursing
- Clinical practice in nursing

To take a program that combines two areas of clinical nursing requires a longer program and additional time; and the student may be required to take an additional course in the natural and the social sciences, depending on the combination of fields selected.

Grades A minimum grade point average of 3.00 must be maintained in all clinical nursing courses and in all work taken for the degree.

RESEARCH: Thesis, nonthesis The student has the option of completing a thesis or a nonthesis program for the master's degree. The choice of program is based on evaluation of which program better prepares the individual student for a leadership role in nursing. The decision is made in consultation with the student's adviser.

The student who elects the thesis option completes a minimum of 48 quarter units. Of this total, the nursing major is 30 quarter units, inclusive of 6 units in research and thesis. The student conducts a systematic research study related to nursing and reports the findings in one of two formats: as a thesis or as a publishable paper. A faculty committee of three guides the student in the research and writing of the project.

The student who elects the nonthesis option completes a minimum of 52 quarter units. Of this total, the nursing major is 30 quarter units, inclusive of 2 units in the research project. The additional units of coursework are planned to augment preparation for career goals. The student completes a research project approved by a faculty adviser.

Examination A comprehensive written and oral examination is given at the end of the first academic year of full-time study.

Required courses The following subjects are required of all students:

- NRSG 507 Concept and Theory Development in Nursing
- NRSG 691, 692 Nursing Research Seminar
- NRSG 545 or 546 or 547 Practicum in Nursing Leadership: Teaching, Administration, Clinical Practice
- NRSG _____ Clinical Nursing (3-quarter sequence)
- _____ Religion, 3 units
- _____ Behavioral and natural science cognates, 6 units
- STAT 698 Research Consultation, 1 unit (required for thesis only)

The following subjects are required of students in the various clinical areas:

PSYCHIATRIC/MENTAL HEALTH NURSING

HLSC 536 Behavioral Physiology
PSYC 555 Group Processes: Theory and Practice

NRSG 548 Process Consultation
NRSG 554 Introduction to Primary Care

COMMUNITY NURSING

EPDM 404 Epidemiology

The following subjects are required of students in the various functional areas:

ADMINISTRATION

NRSG 543 Nursing Leadership: Administration (4)
NRSG 546 Practicum in Nursing Leadership: Administration (4)
Electives in Administration as approved by adviser.

TEACHING

NRSG 544 Nursing Leadership: Teaching (3)
NRSG 545 Practicum in Nursing Leadership: Teaching (4)
EDCI 515 Curriculum Development in Higher Education (3)

CLINICAL SPECIALIZATION

NRSG 544 Nursing Leadership: Teaching (3)
NRSG 547 Practicum in Nursing Leadership: Clinical Practice (4)
NRSG 548 Process Consultation (2)
NRSG 554 Introduction to Primary Care (3)

Information For information about requirements and practices to which all graduate students are subject, the student should consult the *Academic Practices* section of division I of this BULLETIN.

Curriculum change To maintain quality education, the curriculum of the graduate program is subject to change without prior notice. Students in continuous attendance will meet graduation requirements of the BULLETIN under which they enter the Graduate School.

COURSES

NRSG 506 Transcultural Nursing (3)

A "world view" of nursing, fostered through the study of world health needs, health manpower, and sociocultural influences. Examines problems of providing nursing services and nursing education as they relate to culture and economics. Emphasis on techniques of helping ethnic health workers meet their needs. Requisites for undertaking an international nursing assignment. Contributions of international health agencies.

Waldron.

NRSG 507 Concept and Theory Development in Nursing (2)

Explores need and methods for concept and theory development in nursing. Relationship of concepts and conceptual models to theory. Practice in concept development and beginning theory building.

Pride, Staff.

NRSG 509 Guided Study in _____ (2-6)

Opportunity for study in a particular area of nursing or nursing education under faculty direction.

Prerequisite: Consent of the adviser.
Staff.

NRSG 511 School Nursing Services and Procedures (3-8)

Focuses on the principles of planning and implementing effective health services and health counseling in the elementary grades through college. Procedures for vision screening, hearing screening, scoliosis screening, dental examination, and health appraisals are included within the context of conservation practices. Consideration of issues in the field of school nursing. Provides theory and laboratory in school nursing services. Supervised field experience up to 180 clock hours. The student who has had two years of full-time experience (under nursing supervision) in school nursing or in a health department in which half of the experience was in a school setting may register for a minimum of four units. May be taken in two quarters of study.

Prerequisite: Public health nursing certificate; HLED 516 Methods in School Health Education (may be taken concurrently).

E. Miller, Staff.

NRSG 535 Gerontological Nursing (2-4)

Focuses on identification of some major problems of aging to the individual, the family, and the community. Social conditions, personal adjustment to aging, health maintenance, and nursing implications.

Burgess.

NRSG 543 Nursing Leadership: Administration (4)

Study, evaluation, and application of principles of administration and management for the imaginative implementation of nursing leadership in the delivery of health services.

Smith, Weber.

NRSG 544 Nursing Leadership: Teaching (3)

Exploration of the components of the teaching-learning process. Opportunity provided for students to practice specific teaching skills.

Foster.

NRSG 545 Practicum in Nursing Leadership: Teaching (4)

Designed to help the student develop ability to teach nursing in the clinical area of choice. Emphasis on the nurse-teacher as facilitator of learning. Practice in teaching students in clinical and classroom settings.

Prerequisite or concurrent: EDCI 515, NRSG 544, and three quarters of clinical nursing.
Foster and Staff.

NRSG 546 Practicum in Nursing Leadership: Administration (4)

Observation and practice in selected levels of administration of nursing service and/or nursing education.

Prerequisite: NRSG 543 or equivalent and three quarters of clinical nursing. For *nursing education administration*, two years of teaching experience or consent of the instructor. For *nursing service administration*, one year of experience as a staff nurse.

Smith, Weber.

NRSG 547 Practicum in Nursing Leadership: Clinical Practice (4)

Principles of leadership applied to nursing practice. Development of clinical expertise and observation. Practice in primary health care, teaching, and consultative roles of the clinical specialist.

Prerequisite: NRSG 544, 548, 554 and three quarters of clinical nursing.
Staff.

NRSG 548 Process Consultation (2)

Organized around the process of consultation. Focus on the consultant and consultant role. Various models of consultation will be explored. Concepts of group process and change used to assist the client/system in professional or organizational development.

Johnson.

NRSG 551, 552, 553 Medical/Surgical Nursing I, II, III (4, 4, 2-4)

An exploration of key concepts of family systems in today's society. Focus is on the family as a unit of action in health maintenance and illness prevention. Nursing care problems of adult medical and surgical patients explored in relation to family dynamics, pathophysiology, and psychosocial implications. Focus is on competence in nursing process with a sound knowledge base. Individualized clinical experience designed to develop an innovative, investigative approach to nursing practice.

Prerequisite or concurrent: NRSG 507.
Elwell, Fickess.

NRSG 554 Introduction to Primary Care (3)

Introduction to expanded role in nursing. Theory and practice of physical examination of the adult; introduction to newborn and pediatric assessment. Organized reporting and recording used in the problem-oriented medical record system. Emphasis on collaboration with the physician and on accountability for nursing actions.

Prerequisite: Consent of the instructor.
Hasek, Sherrard.

NRSG 556 Oncological Nursing (2-4)

Nursing care problems of cancer patients examined in relation to family dynamics, pathophysiology, and psychosocial implications. Current therapeutic modalities and research findings studied for their influence on nursing practice. Clinical experience includes cancer screening and other community programs and work with patients and their families in all stages of cancer.
Staff.

NRSG 558 Sleep and Biorhythms (2-4)

In-depth study of the psychophysiologic and pathophysiologic processes and problems associated with sleep and biorhythms, with emphasis on research findings and nursing therapy in major clinical areas and settings.

Elwell.

NRSG 561, 562, 563 Parent/Child Nursing I, II, III (4, 4, 2-4)

A systems model used as the organizing framework for the major in parent/child nursing. Study of family as an open system within which human development occurs and health care needs are met. Focus on the changing roles, relationships, and activities occurring during childbearing and childrearing. Analysis and application of concepts, theories, and research findings to help the nurse interact with the family system. Individualized laboratory experience to develop an innovative, investigative approach to nursing practice.

Prerequisite or concurrent: NRSG 507
Burgess, Woodward.

NRSG 564 Survey of Human Development Research (2)

Study of research dealing with normal physical, intellectual, emotional, and social development throughout the life cycle. Implications for nursing care.

Prerequisite: Developmental psychology or equivalent.
Burgess.

NRSG 566 The Handicapped Child (2)

Focus on identification of nursing care problems facing an individual who is handicapped; problems faced by the family of such an individual. Topics include types of handicapping conditions, family and intergenerational support, resources available, community reactions and resources, current research, and nursing interventions.

Burgess.

NRSG 567 Education for Parenthood (2-3)

Focus on approaches used in establishing and conducting classes for both expectant parents and parents of young children. Major areas of concern in parenting discussed. Emphasis on group leadership and the role of nursing. Students taking the course for three units participate in ongoing programs for parents.

Woodward.

NRSNG 571, 572, 573 Psychiatric/Mental Health Nursing I, II, III (4, 4, 2-4)

An exploration of key concepts of family systems in today's society. Focus is on the family as a unit of action in health maintenance and illness prevention. Study is given to health care systems and health planning on a community level. Analysis of nursing care problems and approaches related to persons with psychiatric/mental health needs. Particular emphasis is placed on cross-cultural awareness. Included in the clinical experience are one-to-one, group, and family therapy in both inpatient and outpatient settings.

Prerequisite or concurrent: NRSNG 507.
Testerman.

NRSNG 577 Family Systems Theory (2)

A review of systems theory. A study of Bowen's Family Theory and an introduction to family psychotherapy as an outgrowth of the theory.

Pride.

NRSNG 579 Family Systems Seminar (1)

Application of Bowen Family Theory to students' and client families.

Prerequisite: NRSNG 577.
Pride.

NRSNG 581, 582, 583 Community Health Nursing I, II, III (4, 4, 2-4)

An exploration of key concepts of family systems in today's society. Focus is on the family as a unit of action in health maintenance and illness prevention. Study is given to health care systems and health planning on the community level. Critical elements of the community nursing process are analyzed and evaluated for effectiveness in mobilizing families and communities toward healthful behavior. Planning and utilization of community health services and programs to meet specific needs.

Prerequisite or concurrent: NRSNG 507.
Johnson, P. Miller.

NRSNG 691, 692 Nursing Research Seminar I, II (1, 1)

Consideration of specific problems in nursing research; interpretation and application. Formulation of an individual research plan to study a nursing problem.

Prerequisite or concurrent: GRAD 504. The first clinical course in the major prerequisite to NRSNG 692.

NRSNG 698 Research and Thesis in Nursing (2-6)

The nonthesis project requires registration for 2 units only. For thesis credit, a total of 6 units is required.

Direct inquiries for additional information to:

L. Frances Pride, PH.D., Associate Dean
Director, Graduate Division of Nursing
School of Nursing
Loma Linda University
Loma Linda, California 92350

POSTBACCALAUREATE CERTIFICATE PROGRAMS

Two postbaccalaureate programs are offered for students desiring certification as adult nurse practitioners or pediatric nurse practitioners. For details regarding these programs, direct inquiries to the office of the Associate Dean of the Graduate Division, address as indicated above.

NUTRITION

U. D. REGISTER, PH.D. University of Wisconsin 1950

Chairman; Professor of Nutrition
Biochemistry of nutrition

JAMES W. BLANKENSHIP, PH.D. University of Wyoming 1969

Professor of Nutrition
Lipids, biochemistry, and nutrition

MERVYN G. HARDINGE, M.D. Loma Linda University SM 1942; DR.P.H. Harvard
University 1952; PH.D. Stanford University 1956

Professor of Preventive Care
Public health nutrition

IRMA B. VYHMEISTER, DR.P.H. University of California at Los Angeles 1974

Professor of Nutrition
Public health and clinical nutrition

KATHLEEN K. ZOLBER, PH.D. University of Wisconsin 1968

Professor of Nutrition
Food systems administration

KENNETH I. BURKE, PH.D. Florida State University 1973

Associate Professor of Nutrition
Foods and nutrition

BERTRUM C. CONNELL, M.S. Loma Linda University GS 1972

Assistant Professor of Nutrition
Food systems administration

VOLUNTARY FACULTY

WINSTON J. CRAIG, PH.D. University of Queensland 1971

Assistant Professor of Nutrition
Nutritional biochemistry

ELLA HADDAD, D.H.SC. Loma Linda University 1979

Assistant Professor of Nutrition
Public health nutrition

PATRICIA K. JOHNSTON, M.P.H. Loma Linda University 1978; M.S. University of Washington 1979
Instructor in Nutrition
Community Nutrition

Programs The Department of Nutrition offers three programs:

1. A professional program for the Master of Public Health degree is offered through the School of Health and is outlined in the BULLETIN of that School.
2. A program for the Master of Science degree (with majors in three areas available) is offered through the Graduate School, as outlined below.

Objectives The offerings of the department are directed toward objectives that —

1. Provide students with an understanding of nutritional concepts for guidance in their efforts to improve the nutritional status of the individual and the community.
2. Prepare students to evaluate the diets of individuals and populations and provide sound bases for making recommendations or initiating programs for nutritional improvements.
3. Instruct in the principles of diet therapy and encourage cooperation with the physician and other members of the medical team.
4. Stimulate scientific curiosity and provide opportunities and facilities for research that will contribute to the fundamental knowledge of nutrition, both basic and applied.
5. Initiate habits of continuing self-education that will enhance professional growth.
6. Assist in fulfilling the objectives of the School and the University.

MASTER OF SCIENCE DEGREE

The Department of Nutrition offers three programs through the Graduate School. Majors may be elected from these areas as follows:

Food administration A student who has a baccalaureate degree with a major in foods and nutrition, or in business management with supporting courses in nutrition, may apply for graduate work in food administration. Preparation of mature students for positions of responsibility and leadership in food systems management, teaching, research, and allied fields is the primary objective of this graduate program.

Nutrition A student who has a baccalaureate degree with a major in foods and nutrition, or in related areas, with an adequate background in nutrition and biochemistry, may apply for graduate study in nutrition. This program is

planned to provide for anticipated careers in teaching, research, or public health. A minor in biochemistry is desirable with a nutrition major.

Prerequisite course requirements for this program are as follows: basic nutrition, foods, general chemistry, organic chemistry, and human physiology. Biochemistry is helpful but not required for entrance.

Dietetics The program in dietetics is planned for the registered dietitian interested in preparing for a career in teaching, clinical supervision, or research.

The entrance requirements are the same as described for the nutrition program.

Thesis The student is required to present a thesis on an approved subject. The title should be filed with the Graduate Council and approved before the student is eligible for admission to candidacy for the degree. At least 9 units of research and thesis are required. A student engaged in research and thesis work must register for such work in order to obtain residence credit toward the degree. The student may be permitted to do part of the work on the thesis while on leave of absence if the coursework has already been completed. To secure this privilege the student petitions the Dean, submits an approved outline of the proposed study, and presents evidence that adequate facilities are available for study.

A minimum of 21 quarter units of coursework is required for the major or subject of principal emphasis. Courses leading to a major may be chosen from the following lists.

Food administration For a major in food administration, the following courses are required:

BIOM 421 Beginning Fortran Programming
HADM 404 Principles of Administration in Public Health
NUTR 575 Administrative Dietetics
NUTR 576 Operations Analysis in Food Systems Management
NUTR 605, 606 Seminar in Nutrition I, II
NUTR 697 Research
NUTR 698 Thesis
PSYC 474 Industrial Psychology
STAT 404 General Statistics

Nutrition For a major in nutrition, the following courses are required:

NUTR 501, 502 Biochemistry I, II (or equivalent) and BCHM 514 Medical Biochemistry Laboratory
NUTR 424 Public Health Nutrition
NUTR 506 Carbohydrates
NUTR 507 Proteins
NUTR 508 Lipids
NUTR 545 Preventive and Therapeutic Nutrition (required for dietitians)
NUTR 605, 606, 607 Seminar in Nutrition I, II, III
NUTR 694 Research
NUTR 695 Thesis
STAT 404 General Statistics

Dietetics For a major in dietetics, the following courses are required:

STAT 404	General Statistics
NUTR 506	Carbohydrates
NUTR 507	Proteins
NUTR 508	Lipids
NUTR 545	Preventive and Therapeutic Nutrition
NUTR 575	Administrative Dietetics
NUTR 576	Operations Analysis in Food Systems Management
NUTR 605, 606	Seminar in Nutrition I, II (minimum of 2 units)
NUTR 694	Research
NUTR 695	Thesis

For information about requirements and practices to which all graduate students are subject, the student should consult the *Academic Practices* section of division I of this BULLETIN.

In addition to the above requirements, a three-hour course in religion is required of all students.

COURSES

NUTR 424 Public Health Nutrition (3)

A survey of national and international nutrition problems in the field of public health; concepts of applied nutrition.

Register.

NUTR 427 Special Topics in Nutrition (1)

The science of nutrition as related to the Adventist holistic philosophy of health.

Burke.

NUTR 475 Current Trends in Food Systems (2)

Demonstrations, field trips, lectures, and discussions showing high-quality food preparation and service and new ideas in menu planning and recipes.

Zolber.

NUTR 501, 502 Biochemistry I, II (3, 3)

Study of structures, metabolism, and biosynthesis of carbohydrates, lipids, proteins, and nucleic acids. Proper ties of enzymes and their regulation. Mechanisms of biological oxidation. Other topics in physiological chemistry.

Craig.

NUTR 506 Carbohydrates (3)

Nutrition and metabolism of carbohydrates as related to health and disease.

Prerequisite: Biochemistry.

Blankenship.

NUTR 507 Proteins (4)

Nutrition, chemistry, and metabolism of proteins as related to health and disease.

Prerequisite: Biochemistry or NUTR 506, or consent of the instructor.

Haddad, Vyhmeister.

NUTR 508 Lipids (3)

Metabolism and nutrition of lipids as related to health and disease.

Prerequisite: Biochemistry or NUTR 506, or consent of the instructor.
Blankenship.

NUTR 515 Minerals (2)

Study of physiological functions and metabolism of macrominerals and trace minerals in humans. Interaction of essential minerals with vitamins and toxic minerals.

Craig.

NUTR 516 Vitamins (2)

Descriptive information on water and fat-soluble vitamins. Biochemical and physiological role or functions and their implication in the health and nutrition of the individual. Newer research in the field of vitamins.

Prerequisite: Biochemistry and physiology.
U. D. Register.

NUTR 525 Community Nutrition (2)

Designed to teach methods and concepts used in community nutrition programs. Survey of existing community organizations and legislative action governing nutrition programs. One lecture and one laboratory per week.

Prerequisite: NUTR 424.
Johnston, Vyhmeister.

NUTR 527 Assessment of Nutritional Status (3)

A course designed to acquaint the student with the techniques of nutritional assessment. The dietary history, record, evaluation of nutritional data, anthropometric measurements, biochemical and clinical evaluation, and nutritional counseling.

Prerequisite: NUTR 545.
Vyhmeister.

NUTR 545 Preventive and Therapeutic Nutrition (3)

A practical approach to the most common nutritional problems met in public health; prevention and therapeutic measures related to patients' needs. Laboratory.

Prerequisite: NUTR 404, physiology, or the equivalent.
Haddad, Vyhmeister.

NUTR 575 Administrative Dietetics (2)

Application of current management concepts to the administration of a dietary service for effective utilization of resources.

Zolber.

NUTR 576 Operations Analysis in Food Systems Management (2)

Identification and evaluation of quantitative methods of management science to optimize decisions about policies and procedures for control of resources.

Prerequisite: HADM 515.
Zolber.

NUTR 594 Research Technique (2)

Survey of general laboratory techniques used in analytical work required in nutritional research.

Blankenship, Craig.

NUTR 605, 606, 607 Seminar in Nutrition I, II, III (1, 1, 1)

Presentation and discussion in the area of interest, individual reports dealing with recent developments. NUTR 605 includes orientation to research.

Prerequisite: Consent of the instructor.
Staff.

NUTR 694 Research (arranged)

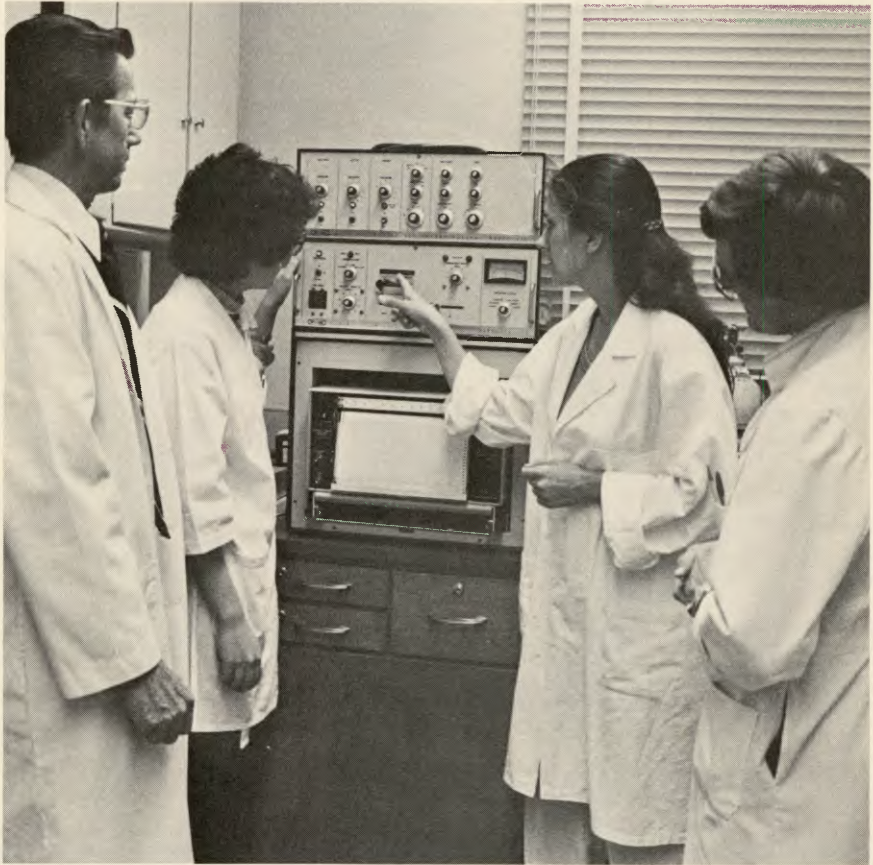
NUTR 695 Thesis (2)

NUTR 696 Directed Study (1-4)

Open by arrangement to the advanced student.

NUTR 697 Special Project (1-4)

Extensive study and written report on a selected problem.



PHARMACOLOGY

IAN M. FRASER, PH.D. Cambridge University 1952

Chairman; Professor of Pharmacology

Drug metabolism, chemotherapy

MARVIN A. PETERS, PH.D. University of Iowa 1969

Professor of Pharmacology

Drug metabolism, biochemical pharmacology

ALLEN STROTHER, PH.D. Texas A and M University 1963

Professor of Pharmacology

Drug metabolism, biochemical pharmacology, nutrition

BERNARD E. TILTON, M.D. Loma Linda University SM 1948; PH.D. University of

California at Los Angeles 1960

Professor of Pharmacology

Autonomic pharmacology, clinical pharmacology

C. RAYMOND CRESS, PH.D. Oregon State University 1970

Associate Professor of Pharmacology

Toxicology

DAVID A. HESSINGER, PH.D. University of Miami 1970

Associate Professor of Physiology/Pharmacology

Structure and function of cell membranes, marine toxicology

DONALD I. PETERSON, M.D. Loma Linda University SM 1947

Associate Professor of Pharmacology

Neuropharmacology

MERVYN G. HARDINGE, M.D. Loma Linda University SM 1942; DR.P.H. Harvard

University 1952; PH.D. Stanford University 1956

Professor of Preventive Medicine

Neuropharmacology, cancer chemotherapy

Programs Qualified students may be admitted to programs leading to the Master of Science degree, the Doctor of Philosophy degree, or concurrent programs for the D.D.S./M.S. degrees, the M.D./M.S. degrees, the D.D.S./PH.D. degrees, or the M.D./PH.D. degrees. The student must have completed the prerequisites or have made suitable arrangements to do so, as stated below and in the *Programs and Degrees* and the *Academic Practices* sections of division I of this BULLETIN.

Applicants for a graduate program in pharmacology are expected to have the following minimum units in their undergraduate preparation:

Biology, 8 quarter units

Chemistry, 20 quarter units (inclusive of general, quantitative, and organic chemistry)

Physics, 8 quarter units

With the consent of the department, applicants who do not meet the foregoing requirements may be admitted to the Graduate School on a provisional basis until the requirements are satisfied.

The optimum undergraduate preparation for a student to do well in graduate pharmacology is a major in chemistry with a minor in biology, or a biology major with a chemistry minor. Either combination should include a good background in elementary physics.

Master of Science The Department of Pharmacology offers two study plans by which the student may satisfy the requirements for the Master of Science degree. A minimum of 48 quarter units is required for the degree. Of this total, 30 units must be in pharmacology. The student may select 18 units of cognate courses in consultation with his departmental adviser. Cognate courses usually include biochemistry and physiology, unless the student has had acceptable work previously in one or both areas, in which case other courses may be selected.

Plan A. A maximum of 12 units of the 30 units of pharmacology may be in research leading to the preparation and successful oral defense of a formal thesis.

Plan B. A maximum of 12 units of the 30 units of pharmacology may be in research; but instead of preparing a formal thesis, the student may elect to present the results of the research to the committee in the form of a publishable scientific paper and take an oral examination broadly related to the field of research.

The student planning to continue toward the Doctor of Philosophy degree in pharmacology at this University may elect to bypass the master's degree and go directly into the PH.D. program after completing the course work and research requirements for the M.S. degree. If the student desires to continue in such a program, a written request must be made to the department and the Graduate School before the last quarter of study toward the master's degree.

Although a foreign language is not a requirement for the master's degree, students who plan to proceed to a Doctor of Philosophy degree are strongly encouraged to demonstrate, during the course of the master's program, reading ability in at least one of the languages required for the PH.D.

Doctor of Philosophy A student may be admitted to a program of study toward the Doctor of Philosophy degree with a major in pharmacology after completing the Master of Science degree or its equivalent. A minimum of 72

quarter units beyond the master's degree is required. Of this total, 48 units must be in the major field of study, 28 units of which must be formal coursework. The remainder may be composed of 20 units of research and 24 units of selected cognate courses.

The candidate must take comprehensive written and oral examinations over the major field of study and prepare an acceptable dissertation based on the research program, as stated in section I of this BULLETIN.

Combined programs In the combined programs, some Graduate School credit may be accepted for certain courses taken toward the professional degree. Consent for such credit must be obtained from the Department of Pharmacology and the Graduate School after the courses are completed with satisfactory grades. For a course taken in a professional curriculum to be accepted for graduate credit, the student must maintain the competence required for the respective graduate level.

For information about requirements and practices to which all graduate students are subject, the student should consult the *Academic Practices* section of division I of this BULLETIN.

COURSES

PHARMACOLOGY

PHRM 511, 512 General and Systematic Pharmacology I, II (6, 3)

Principles of drug action: drug receptors, absorption and fate of drugs, drug toxicity, and drug development. Systematic consideration of the pharmacology and the therapeutic value of the drugs used in medicine. Demonstration and laboratory exercises illustrating the effects of drugs in man or animals.
Staff.

PHRM 534 Topics in Pharmacology for Dentistry (2)

Lectures and discussions dealing with pharmacologic agents used in dentistry; emphasis on the current agents used in dental anesthesia, both local and general.
Fraser, Staff.

PHRM 535 Clinical Pharmacology (3)

Lectures, discussions, ward rounds, and/or laboratory exercises dealing with therapeutic problems related to common medicinal agents.
Tilton, Staff.

PHRM 544 Topics in Advanced Pharmacology (3)

Lectures and discussions dealing with current advanced concepts in pharmacology, such as structure-action relationships, mechanisms of action, and metabolism and detoxification of therapeutic agents.
Fraser, Staff.

PHRM 545 Laboratory in Advanced Pharmacology (1-2)

Experimental studies illustrating the didactic material presented in PHRM 544.
Fraser, Staff.

PHRM 554 Neuropharmacology (4)

Systematic discussion of drugs that affect primarily the nervous system, with major emphasis on mechanism of action.

Tilton, Staff.

PHRM 555 Laboratory in Neuropharmacology (1)

Experimental studies illustrating the didactic material presented in PHRM 554.

Tilton, Staff.

PHRM 564 Cardiovascular and Renal Pharmacology (3)

Systematic discussion of drugs that affect primarily the cardiovascular and renal systems, with major emphasis on mechanism of action.

Tilton, Staff.

PHRM 565 Laboratory in Cardiovascular and Renal Pharmacology (1)

Experimental studies illustrating the didactic material presented in PHRM 564.

Tilton, Staff.

PHRM 574 Chemotherapy (3)

Systematic discussion of drugs that are used primarily in the treatment of infections, with major emphasis on mechanism of action.

Fraser, Staff.

PHRM 575 Laboratory in Chemotherapy (1)

Experimental studies illustrating the didactic material presented in PHRM 574.

Fraser, Staff.

PHRM 584 Drug Metabolism and Biochemical Pharmacology (3)

Detailed discussion of the fate of drugs in the body, together with related aspects of biochemical actions of drugs.

Strother, Staff.

PHRM 585 Laboratory in Drug Metabolism and Biochemical Pharmacology (1)

Experimental studies illustrating the didactic material presented in PHRM 584.

Strother, Peters.

PHRM 586 Toxicology (3)

Discussion of deleterious effects of drugs and common poisons; measures that can be taken to combat poisoning.

Cress, Staff.

PHRM 594 Special Topics in _____ (1-3)

Responsibility for a special literature or laboratory project. Registration must designate one of the following specific fields: autonomic pharmacology, biochemical pharmacology, cardiovascular pharmacology, chemotherapy, clinical pharmacology, comparative pharmacology, drug abuse, drug interactions, drug metabolism, endocrine pharmacology, neuropharmacology, pharmacogenetics, psychopharmacology, renal pharmacology, toxicology.

Fraser, Staff.

PHRM 604 Seminar in Pharmacology (1)

Reports and discussions of recent research in pharmacology.

PHRM 684 Special Problems in Pharmacology (2-6)

Assignments in literature reviews and/or laboratory exercises.

PHRM 697 Research (arranged)

PHRM 698 Thesis (arranged)

PHRM 699 Dissertation (arranged)

BIOLOGY

BIOL 615 Research Techniques in Biology (1)

Concepts and methods used in biological research, including scientific writing and literature.



PHYSICAL EDUCATION and HEALTH

WALTER S. HAMERSLOUGH, ED.D. University of Oregon 1971

Chairman; Professor of Physical Education

Exercise physiology, motor learning, philosophy

LECTURERS

ROBERT K. SCHNEIDER, M.A. Loma Linda University 1974

Associate Professor of Physical Education

Administration

DERYL G. ROWE, PH.D. University of West Virginia 1979

Instructor in Health Science and Services, School of Health

Exercise physiology

The main objectives of the graduate program in physical education and health are to assist students in attaining qualifications necessary for teaching in secondary schools and in colleges; to prepare students for research in physical education and health; to prepare students to develop and administer physical fitness programs in churches, schools and industry; and to prepare students for advanced graduate study.

The applicant is normally expected to have a baccalaureate degree with a major in physical education or health from an accredited college. If the college record and test scores indicate any weaknesses or deficiencies, the student may be required to take additional compensatory undergraduate work.

Degree requirements Degree requirements include:

1. A minimum of 3 quarters in residence as a graduate student. This may be met by attendance for three summers.
2. A minimum of 48 quarter units of graduate credit (at least 24 units must be courses numbered above 500).
3. A minimum of 20 units in physical education courses.
4. From 12-16 units in health.
5. Three units in religion.
6. A course in research methods.
7. Master's thesis or an approved alternative project.
8. Comprehensive written and oral examinations.

The student who is preparing to teach should consult the credentials adviser in the School of Education for guidance in qualifying for a Cali-

fornia Standard Teaching Credential and for Seventh-day Adventist teaching credentials.

For information about requirements and practices to which all graduate students are subject, the student should consult the *Academic Practices* section in division I of this BULLETIN.

COURSES

UPPER DIVISION COURSES APPLICABLE TO GRADUATE PROGRAMS

- PETH 314 **Community Health (3)**
- PETH 408 **Management of Physical Education and Intramural Programs (4)**
- PETH 414 **Mental Health and Drug Education (4)**
- PETH 415 **Consumer Health and Disease (4)**
- PETH 416 **Human Sexuality (2)**
- PETH 417 **Safety Education (2)**
- PETH 418 **School Health Programs (4)**
- PETH 424 **Biomechanics (4)**
- PETH 426 **Exercise Physiology (4)**
- PETH 427 **Motor Learning (4)**
- PETH 429 **Tests and Measurements (4)**
- PETH 444 **Principles of Physical Fitness (2)**

GRADUATE COURSES

- PETH 505 **History and Sociology of Physical Education (4)**
Genesis, development, events and trends, with an emphasis on group and community interaction.
- PETH 508 **Administration and Issues of Physical Education Programs (4)**
Budgeting, purchasing, organization of intramural activities, legal implications and current problems.
- PETH 509 **Curriculum and Facilities (4)**
Steps in curriculum construction, planning, design, and evaluation, of facilities.
- PETH 524 **Human Performance Laboratory (1-4)**
Advanced techniques and analysis of selected motor skills.

PETH 526 Scientific Aspects of Physical Activity (4)

Current issues and problems in the area of biomechanics, exercise physiology, and sports medicine.

PETH 527 Psychology of Physical Activity (4)

Variables that influence athletic behavior.

PETH 528 Laboratory Techniques (4)

Use of equipment and techniques utilized in research.

PETH 585 Movement Education (3)

Value of techniques and programs in movement exploration.

PETH 589 Research Methods (4)

Methods of scientific inquiry; includes development and presentation of thesis proposal.

PETH 599 Directed Study (2-4)

Emphasis on research.

PETH 698 Thesis (arranged)

PHYSIOLOGY

- JOHN LEONORA, PH.D. University of Wisconsin 1957
Cochairman; Professor of Physiology
Endocrinology
- W. ROSS ADEY, M.D. University of Adelaide 1949
Professor of Physiology
Neurophysiology
- KENNETH A. ARENDT, PH.D. Boston University 1955
Professor of Physiology
Cardiovascular physiology, microcirculation
- WELDON B. JOLLEY, PH.D. University of Southern California 1959
Professor of Physiology and of Surgery
Cancer and transplant immunology, hemodynamics
- LAWRENCE D. LONGO, M.D. Loma Linda University SM 1954
Professor of Gynecology/Obstetrics and of Physiology
Placental exchange, fetal physiology
- IVAN R. NEILSEN, PH.D. Stanford University 1952
Professor of Biomathematics
Radiation biophysics, mathematical modeling
- GORDON G. POWER, M.D. University of Pennsylvania 1961
Professor of Gynecology/Obstetrics and of Physiology
Placental exchange, fetal physiology
- ROBERT A. BRACE, PH.D. Michigan State University 1973
Associate Professor of Physiology
Cardiovascular physiology, fluid dynamics, microcirculation
- RAYMOND D. GILBERT, PH.D. University of Florida 1971
Associate Professor of Physiology
Fetal cardiovascular physiology
- RAYMOND G. HALL, JR., PH.D. Loma Linda University GS 1968
Associate Professor of Physiology
Cell physiology
- DAVID A. HESSINGER, PH.D. University of Miami 1970
Associate Professor of Physiology/Pharmacology
Structure and function of cell membranes, marine toxicology

ELWOOD S. MCCLUSKEY, PH.D. Stanford University 1959

Associate Professor of Physiology
Comparative physiology

ROBERT W. TEEL, PH.D. Loma Linda University GS 1972

Associate Professor of Physiology
Cell physiology, differentiated cells in vitro

T. JOE WILLEY, PH.D. University of California at Berkeley 1969

Associate Professor of Physiology

CECELIA Y. CHEUNG, PH.D. Stanford University 1975

Assistant Research Professor in Gynecology and Obstetrics and
Physiology
Neuroendocrinology

RAMON R. GONZALEZ, JR., PH.D. Wake Forest University 1973

Assistant Professor of Physiology
Cardiovascular physiology, control of circulation

ROGER L. PLATA, D.D.S., M.S. Loma Linda University 1973

Assistant Professor of Physiology
Oral and respiratory physiology

DONALD D. RAFUSE, PH.D. Washington State University 1973

Assistant Professor of Physiology
Neural aspects of behavior

Prerequisite Coursework leading to the Master of Science and the Doctor of Philosophy degrees is offered in physiology. The equivalent of a major in one field of science or mathematics and a minor in another is a prerequisite. Undergraduate courses should include zoology, chemistry through physical chemistry, and general physics. Mathematics through calculus is highly recommended.

Master of Science The thesis program requires a minimum of 48 quarter units for the master's degree. Of this total, a minimum of 30 units in physiology — including PHSL 511, 512 — must be completed successfully. The remaining 18 units may be composed of selected cognate courses. A maximum of 12 units of the 30 units in physiology should be in research leading to the preparation and successful defense of a formal thesis. The candidate must take a comprehensive written examination in physiology.

The nonthesis program also requires 48 units. Of this total, a minimum of 30 units in physiology — including PHSL 511, 512 — and 4 units of re-

search must be completed successfully. The research can be done in an area of physiology selected by the student. The remaining 18 units may be composed of selected cognate courses. The candidate must take a comprehensive written examination in physiology.

Doctor of Philosophy A student may be admitted to a program of study toward the Doctor of Philosophy degree with a major in physiology after completing the Master of Science degree or its equivalent. A minimum of 72 quarter units beyond the master's degree is required. Of this total, 48 units must be in physiology, 28 units of which must be formal coursework, including PHSL 541, 542. The remainder may be composed of 20 units of research. A minor of 24 units of selected cognate courses is required.

The candidate must take comprehensive written and oral examinations over the major field of study and prepare an acceptable dissertation based on the research program, as stated in section I of this BULLETIN.

Language requirements A reading knowledge of two modern languages other than English is required. However, a synthetic language (e.g., FORTRAN) may be substituted for one language requirement.

Combined M.D./PH.D. or D.D.S./PH.D. In the combined M.D./PH.D. and D.D.S./PH.D. programs, the requirement for a minor may generally be fulfilled by the professional degree. The department may choose to ask the student to take courses to cover certain deficiencies.

For information about requirements and practices to which all graduate students are subject, the student should consult the *Academic Practices* section of division I of this BULLETIN.

COURSES

PHSL 504 Physiology (6)

The physiological basis of normal body function. Designed primarily for dental students.
Plata.

PHSL 511, 512 Medical Physiology I, II (6, 6)

The physiological basis of normal and selected pathological conditions, modern concepts of homeostasis and negative feedback control systems. Utilization of modern electronic instrumentation to study function in man or experimental animals in laboratory sessions.

PHSL 521, 522 Lectures in Physiology I, II (5, 5)

Lectures from PHSL 511, 512.

PHSL 533, 534 Physiology I, II (4, 3)

Study of basic human physiology at the cellular and systemic levels, and of pathological conditions. Laboratory sessions utilizing modern electronic instrumentation to study function in man and experimental animals. Designed for students in all applied and basic sciences, except physiology.

Hall.

PHSL 535 Comparative Physiology (5)

A comparison of the major animal groups, from protozoa to mammals, with emphasis on analysis of diversity. Lecture four units, laboratory one unit.

Prerequisite: Zoology (preferably invertebrate), physiology (or biochemistry).
McCluskey.

PHSL 541, 542 Cell and Molecular Biology I, II (4, 4)

Life processes fundamental to animal, plant, and microorganism; a graduate-level introduction. Lecture three units, laboratory one unit each term.

Prerequisite: Organic chemistry and one of the following: biochemistry, molecular biology, or cell biology. Physics desirable.
McCluskey, Hall.

Courses 550-587 are advanced lecture and conference courses exploring the latest concepts in the respective area. Prerequisite or concurrent: PHSL 511, 512, or the equivalent.

PHSL 550 Properties of the Nervous System (3)

A critical analysis of current neurophysiological data attempting to characterize the vertebrate nervous system. Emphasis on selected topics covering neuronal topology, intracellular recordings, ultrastructure, evoked potentials, and neurotransmitter chemistry.

Prerequisite: Consent of the instructor.
Willey, Rafuse.

PHSL 555 Regulation in Normal and Cancer Cells (lecture) (2)

The regulatory mechanisms of both normal and cancer cells; emphasis on control of DNA synthesis and cell division.

Hall.

PHSL 556 Regulation in Normal and Cancer Cells (laboratory) (2)

Introduction to techniques in cell culture, autoradiography, and cell cycle analysis.

Concurrent with, or subsequent to, PHSL 555.
Hall

PHSL 558 Physiology of Exercise and Inactivity (3)

The effects of exercise and inactivity on the physiological systems of the body, including the skeletal, muscular, cardiovascular, respiratory, and others. Emphasis at the cellular and molecular levels. Study not only of immediate changes in the body necessary to meet the demands of exercise, but also the long-term adaptive changes.

Prerequisite: Medical physiology.
Hall.

PHSL 567 Respiratory Physiology (2)

An intensive course encouraging student participation in the principles and application of functional anatomy, gaseous physics and diffusional processes, respiratory mechanics, blood gases and reaction kinetics, uneven ventilation/blood flow, high altitude, exercise and pulmonary function testing. Original reference reading required. Open to graduate, medical, and other students and technicians with experience in and commitment to the field.

Longo, Power.

PHSL 568 Microcirculation and Fluid Dynamics (3)

A study of the microcirculatory control of local blood flow rates and fluid volume distributions between blood and tissues. Emphasis on mechanisms and aspecific characteristics of individual organs, including brain, heart, lungs, kidneys, skin, and skeletal muscles. Includes lymphatic and renal contributions to overall fluid balance.

Prerequisite: Medical Physiology 511, 512 or equivalent.
Brace.

PHSL 569 Oxygenation of Tissues (2)

The dynamics and control of oxygen delivery to tissues. Exploration of any or all the steps in the pathway linking blood oxygen transport, control of blood flow to the brain and other organs, theoretical and experimental aspects of oxygen diffusion in tissues, and the control of cellular respiration.

Longo.

PHSL 575 Neurobiological Basis of Behavior (2-3)

The study of animal behavior through consideration of the contribution to behavior by single neurons and neuronal networks. Plasticity and memory overlearning explained at the neuronal network level. The majority of systems studies are invertebrate, although application is made to vertebrate behavior.

Rafuse.

PHSL 577 Cardiac Physiology (3)

A didactic course dealing with the developmental, transitional, and adult anatomy of the heart, as well as its electrical, mechanical, and metabolic processes in health and disease.

Prerequisite: An advanced physiology course or permission of the instructors.

Gonzalez, Gilbert, Arendt.

PHSL 578 Vascular Physiology (3)

A study of the physical principles which govern flow of fluids (rheology), the functional anatomy, and the reflexes of the peripheral circulation. Also considered are the autonomic control of vascular smooth muscle and the hemodynamic behavior of special circulations such as brain, heart, skeletal muscle, etc.

Prerequisite: Calculus, an advanced physiology course, or permission of the instructors.

Gonzalez, Gilbert, Arendt.

PHSL 579 Classic Readings in Circulatory Physiology (2)

An analysis of the pathology of scientific discovery in gaining an understanding of the dynamics and control of the cardiovascular system. Reading and discussion of some of the landmark works in the field, including those of William Harvey, Richard Lower, Stephen Hales, Jean L. M. Poiseuille, Carl F. W. Ludwig, Claude Bernard, Otto Frank, Ernest H. Starling, and others.

Prerequisite: Medical Physiology 511, 512; or equivalent.

Longo.

PHSL 584 Readings in Neurophysiology (2)

A seminar tracing the development of twentieth-century ideas about the nervous system. The writings of three early neurobiologists (Sherrington, Pavlov, Herrick) emphasized in context with classical and current understanding of the nervous system.

Prerequisite: Consent of the instructor.

Rafuse, Willey.

PHSL 585 Endocrinology (3)

A study of the physiologic effects of hormones secreted by the hypothalamus, pituitary, thyroid, adrenals, parathyroids, and pancreas. Emphasis on the specific effects on carbohydrate, protein, lipid, water, and electrolyte metabolism.

PHSL 586 Fetal and Neonatal Physiology (2)

A study of the normal and abnormal physiology of the developing fetus and neonate. Emphasis on problems of placental exchange, placental and fetal circulation, and blood gases; papers and current investigative work.

Longo, Power.

PHSL 587 Physiology of Reproduction (2)

A study of the development of the male and female reproductive systems, the hormonal control of reproductive function, fetal development, and parturition.

Leonora.

PHSL 595 Readings in Physiology (arranged)

Assigned reading and conferences on special problems in physiology.

Staff.

PHSL 596 Readings in Comparative Physiology (1)

Critical analysis of selected current or classic papers. Content variable. May be taken more than once for credit.

Prerequisite: A course in physiology.
McCluskey.

PHSL 597 Readings in Circadian Rhythms (1-2)

Analysis of selected recent papers. Designed to lead to careful interpretation of the literature in other fields and to an improvement of the design of one's own research.

McCluskey.

PHSL 604 Seminar in Physiology (1)

Literature and research reports on selected topics. Required of all graduate students. Credit optional.

PHSL 694 Special Problems in physiology (arranged)

PHSL 697 Research (arranged)

PHSL 698 Thesis (arranged)

PHSL 699 Dissertation (arranged)



PSYCHIATRY

HARRISON S. EVANS, M.D. Loma Linda University SM 1936

Chairman; Professor of Psychiatry
Administration, general psychiatry

CLARENCE E. CARNAHAN, JR., M.D. Loma Linda University SM 1954

Professor of Psychiatry
General psychiatry

RAY B. EVANS, PH.D. University of Southern California 1958

Professor of Psychiatry
Clinical psychology

DURAN F. JACOBS, PH.D. Michigan State University 1953

Professor of Psychiatry
Clinical Psychology

BENJAMIN KOVITZ, M.D. University of Wisconsin 1938

Professor of Psychiatry
General psychiatry

BERNARD E. TILTON, M.D. Loma Linda University SM 1948; PH.D. University of
California at Los Angeles 1960

Professor of Pharmacology
Pharmacology

T. JOE WILLEY, PH.D. University of California at Berkeley 1969

Associate Professor of Physiology
Neurological basis of behavior

DONALD L. ANDERSON, M.D. Loma Linda University SM 1971

Assistant Professor of Psychiatry
General psychiatry and psychosomatic medicine

JEFFREY A. BOUNDS, M.D. Loma Linda University 1972

Assistant Professor
Neurology

KENRIC W. HAMMOND, M.D. University of California at San Diego 1974

Assistant Professor
General Psychiatry

GREGG A. SENTENN, M.D. Loma Linda University 1972

Assistant Clinical Professor
Child Psychiatry

WILLIAM H. BRUNIE, M.D. Loma Linda University SM 1955
Assistant Clinical Professor of Psychiatry
General psychiatry

JOHN V. FLOWERS, PH.D. University of Southern California 1972
Assistant Clinical Professor of Psychiatry
Behavior modification

The purposes of the Master of Science program in psychiatry are (a) to give opportunity to residents in psychiatry to earn academic recognition for their coursework and research, and (b) to enable those who may engage in teaching or government work to give evidence of both academic and clinical achievement. The master's program coordinates and fosters research in the Department of Psychiatry.

Admission Admission to the master's program is limited to those accepted for the residency program of the department. Qualifications include having a Doctor of Medicine degree, acceptable undergraduate preparation, and a grade average acceptable to the Graduate School (an overall 3.00 grade point average). Although admission to the master's degree program is limited to resident physicians in psychiatry, other graduate students may take certain seminars with the consent of the instructor.

Degree requirements The master's program runs concurrently with the psychiatry residency program. Arrangements may be made for the resident who desires to take the fourth year at other than the University Medical Center. Degree requirements are:

1. Residence of four years.
2. Completion of a minimum of 51 graduate units, to include: (a) at least 38 units of coursework and seminars in psychiatry; (b) a 3-unit graduate course in religion chosen in consultation with the adviser; (c) a thesis or publishable paper (usually stemming from a research project begun in PSYT 504, or part of a department research project), 10 units.
3. A minimum grade average of B (3.00), with no subject below C (2.00) on all work for the master's degree (this average to be maintained in formal courses and in research, computed separately). A student submitting transfer credits must earn a B average on all work taken at this University.
4. Written and/or oral comprehensive examinations at the end of the third year, before advancement to candidacy.

COURSES

PSYT 504 Research Methods (1)

Brief introduction to research methods.

PSYT 505 Advanced Research Methods (1)

Requires the planning of a research project relevant to some aspect of psychiatry.

PSYT 601, 602, 603, 604 Clinical Syndromes and Psychodynamics (2, 2, 2, 2)

Psychiatric syndromes considered from the standpoint of their clinical manifestation, etiology, psychodynamics, and treatment.

PSYT 605, 606, 607, 608 Comparative Approaches to Psychotherapy (2, 2, 2, 2)

Concepts and techniques the clinician uses in approaches to the patient: interviewing techniques, psychological tests, the principles underlying the doctor-patient relationship; the use of the doctor-patient relationship in therapy; transference, countertransference, and psychoanalytic concepts, and behavioral concepts in patient care.

PSYT 614 Psychophysiology and Neurophysiology (2)

Psychophysiological and neurophysiological correlates of behavior, body-mind relationships, biofeedback mechanisms.

PSYT 615 Psychopharmacology (2)

Basic pharmacology and neurochemistry of the psychotropic drugs, with application to clinical practice.

PSYT 624 Social Psychiatry (2)

Sociological concepts and methods in the study of human behavior, with particular application to mental health disorder.

PSYT 625, 626, 627, 628 Theories of Personality and Personality Development (2, 2, 2, 2)

The development of human behavior and personality from the perspectives of learning theory, psychoanalysis (Freud and Erikson), and cognitive theory (Piaget).

PSYT 629 Special Problems in Child Therapy (2)

Specific therapeutic techniques used in dealing with emotional problems of children and adolescents.

PSYT 634 Group Processes and Group Therapy (2)

Group dynamics and group psychotherapy. Enrollment limited to residents in psychiatry.

PSYT 635 Seminar in Behavior Modification (2)

Operational approaches to the study, prediction, and control of behavior.

PSYT 645 Seminar in Community Psychiatry (2)

The community approach to mental health problems; crisis intervention; mental health consultation. Concurrent clinical work required.

PSYT 675 Literature Seminar (8)

Basic and current literature in psychiatry approached through assigned reading and critical analysis. One unit per quarter, two years required.

PSYT 697 Research (5)

PSYT 698 Thesis (5)

RELIGION

KENNETH L. VINE, PH.D. University of Michigan 1965

Dean; Professor of Biblical Studies
Archeology and Old Testament

WILBER ALEXANDER, PH.D. Michigan State University 1962

Professor of Theology and Clinical Ministry
Clinical ministry

A. GRAHAM MAXWELL, PH.D. University of Chicago Divinity School 1959

Professor of New Testament
New Testament

JACK W. PROVONSHA, M.D. Loma Linda University 1953; PH.D. Claremont

Graduate School 1967
Professor of Philosophy of Religion and Christian Ethics
Christian ethics

WALTER F. SPECHT, PH.D. University of Chicago 1955

Emeritus Professor of New Testament
New Testament

NIELS-ERIK ANDREASEN, PH.D. Vanderbilt University 1971

Associate Professor of Old Testament
Old Testament

DALTON D. BALDWIN, PH.D. Claremont Graduate School 1975

Associate Professor of Christian Theology
Theology

JONATHAN M. BUTLER, PH.D. University of Chicago Divinity School 1975

Associate Professor of Church History
Church history

ROBERT C. DARNELL, PH.D. University of Michigan 1970

Associate Professor of Religion and Middle Eastern Studies
Mission and comparative religion

M. JERRY DAVIS, REL.D. School of Theology at Claremont 1967

Associate Professor of Pastoral Care
Clinical ministry/chaplain training

V. BAILEY GILLESPIE, PH.D. Claremont Graduate School 1973

Associate Professor of Theology and Christian Personality
Theology/christian nurture

- PAUL J. LANDA, PH.D. Vanderbilt University 1976
Associate Professor of Church History
Church history
- F. LYNN MALLERY, D.MIN. San Francisco Theological Seminary 1973; S.T.D.
San Francisco Theological Seminary 1979
Associate Professor of Applied Theology
Applied theology
- T. RICHARD RICE, PH.D. University of Chicago Divinity School 1974
Associate Professor of Theology
Theology
- CHARLES W. TEEL, JR., PH.D. Boston University 1972
Associate Professor of Religion and Sociology
Religion and society
- LOUIS VENDEN, PH.D. Princeton Theological Seminary 1979
Associate Professor of Preaching
Applied theology
- DANIEL CHAVEZ, PH.D. School of Theology at Claremont 1979
Assistant Professor of Biblical Studies
Bible
- DON R. HAMER, REL.D. School of Theology at Claremont 1968; PH.D. Claremont
Graduate School 1980
Assistant Professor of Theology
Theology
- REUBEN A. HUBBARD, M.A. Andrews University 1960; M.S.P.H. Loma Linda
University 1974
Assistant Professor of Health Education
Religion and health
- DAVID R. LARSON, D.MIN. School of Theology at Claremont 1973
Assistant Professor of Christian Ethics
Christian ethics
- JAMES W. WALTERS, PH.D. Claremont Graduate School 1979
Assistant Professor of Religion and Christian Ethics
Christian ethics
- DAROLD BIGGER, PH.D. School of Theology at Claremont 1978
Lecturer
Pastoral counseling
- ROBERT POOLEY, M.A. Andrews University 1965; M.DIV. Andrews Univer-
sity 1966
Lecturer
Field religious education

Degrees The Division of Religion offers programs leading to the following degrees: Master of Arts in religion, Master of Arts in religious education, and Master of Arts in religion and health. The general purpose of these degrees is to equip students for research and other scholarly careers in religion, to train teachers of religion for secondary schools and to prepare Christian workers.

MASTER OF ARTS (RELIGION)

Admission This degree is designed to prepare qualified students for scholarly work in the field of religion. Admission to the degree program is offered to qualified applicants who meet the general admission requirements of the Graduate School and who in addition have an adequate undergraduate preparation in religion (a minimum of 32 quarter units).

Requirements Degree requirements for the Master of Arts in religion include:

1. A total of 48 quarter units of graduate credit in religion, with at least 28 units in courses numbered 500-699 — including a course in research methods in religion, a reading tutorial in the area of specialization, and a minimum of two graduate seminars.

2. A reading proficiency in a modern or classical foreign language (for students specializing in Bible or Church history).

3. Satisfactory performance on a written comprehensive examination in the candidate's field of study.

4. A thesis or two major papers originally written for graduate seminars but revised and rewritten to the satisfaction of the student's guidance committee.

Programs The Master of Arts degree in religion is offered with emphases in Bible, church history (in cooperation with the Department of History), ethics, mission, theology, and applied theology.

MASTER OF ARTS (RELIGIOUS EDUCATION)

Admission This degree is designed primarily to prepare secondary teachers in religion in junior and senior secondary schools, or those who have a career in educational ministry. Admission to this degree program is offered to qualified applicants who meet the general admission requirements of the Graduate School and who hold an undergraduate major in religion. It is recommended that the undergraduate major include studies in applied theology.

Requirements Degree requirements for the Master of Arts in religious education include:

1. A total of 65 quarter units of graduate credit with at least 35 units in courses numbered 500-699 — including a course in research methods in religion, a reading tutorial in the area of specialization and a minimum of two graduate seminars.

2. A core curriculum selected from one of the following four areas:

Biblical Studies: 12 quarter units, including courses in both Old and New Testament.

Historical Studies: 8 quarter units, including one course in Seventh-day Adventist history; and one course in the general area of Church history, the American church, or world religions.

Theological Studies: 8 quarter units, including courses in Christian theology, philosophy, or ethics.

Religious Education: 30 quarter units, including EDFO 635, History and Philosophy of Religious Education; RELT 564, Religious Development and Nurture; or their equivalent.

3. The completion of an approved program in field education or student teaching certification.

4. Satisfactory performance on a written comprehensive examination over the core curriculum.

5. A project/thesis normally prepared after formal coursework and examination are completed, or two major papers originally written for graduate seminars but revised and rewritten to the satisfaction of the student's guidance committee.

MASTER OF ARTS (RELIGION AND HEALTH)

Admission This degree is designed to prepare health professionals for religious evangelistic work in connection with the practice of their profession. Admission to this degree program is offered to qualified applicants who meet the general admission requirements of the Graduate School and who hold a bachelor's degree in one of the healing arts or who are currently enrolled in the Master of Public Health program in the School of Health. In addition, applicants must present a minimum of 16 undergraduate quarter units in religion, to include courses in Old Testament, New Testament, and Seventh-day Adventist beliefs.

Requirements Degree requirements for the Master of Arts in religion and health include:

1. A total of 60 quarter units of graduate credit, with at least 30 units in courses numbered 500-699 — including a course in research methods in religion, a reading tutorial in the area of specialization, and a minimum of two graduate seminars.

2. A core curriculum in the following four areas:

Biblical Studies: 11 quarter units: RELB 505, Canon, Manuscripts, and Versions of the Bible; RELB 558, Old Testament Theology; RELB 559, New Testament Theology.

Theological and Ethical Studies: 8 quarter units: RELT 404, Christian Foundations; RELE 551, 552, Christian Ethics I, II.

Historical Studies: 8 quarter units: RELH 415, Contemporary American Denominations; RELH 585, History of Seventh-day Adventism.

Professional Studies: 13 quarter units: RELP 436, Pastoral Counseling; RELP 431, 432, Proseminar in Pastoral Counseling I, II; RELP 466, 467, Homiletics for Health Professionals I, II; RELP 601, 602, 603, Seminar in Personal Evangelism I, II, III.

Health Studies: 16 quarter units from the School of Health: HLED 555, Health Evangelism; HLED 556, Principles of Health Bible Education; HLED 558, Biblical Resources for Health Education; HLED 699, Health Evangelism Field School.

3. Satisfactory performance in a written comprehensive examination over the core curriculum.

Clinical pastoral education program In the setting of the University Medical Center, the University makes available a program in clinical pastoral education approved by the Association for Clinical Pastoral Education, Inc., an interdenominational body that certifies ministers and seminary students for the clinical experience. The applicant should be a graduate of an accredited college and should have completed at least one year at a theological seminary, with courses in pastoral counseling and psychology. Students who wish graduate credit must meet the entrance requirements of the Graduate School. Questions should be addressed to the Chaplain Supervisor, Loma Linda University Medical Center, Loma Linda, California 92350.

Courses of instruction Graduate students will normally choose courses numbered between 500-699. Certain advanced upper division undergraduate courses (numbered 400-499) are also acceptable for graduate credit. Unless specified in a curriculum, such undergraduate courses should be selected *only* in consultation with a Division of Religion adviser (for a listing of advanced upper division undergraduate courses, refer to the Division of Religion BULLETIN). Students who anticipate having to transfer graduate credits from Loma Linda University to professional or graduate programs in other schools of religion or theological seminaries should know that ordinarily only courses numbered 500-699 will be acceptable as graduate transfer credit.

COURSES

BIBLICAL STUDIES

RELB 505 Canon, Manuscripts, and Versions of the Bible (3-4)

The formation of the Old and New Testaments, their transmission in manuscripts, the development of textual criticism, and the history and an evaluation of the modern English versions.

RELB 506 The Pentateuch (3-4)

The place of the Pentateuch in the Old Testament, followed by an investigation of its key themes, such as creation and fall, election and promise, law and covenant, and wanderings in the wilderness.

RELB 507 Wisdom Books of the Old Testament (3-4)

The meaning and role of wisdom in Israel and in surrounding nations, followed by an examination of the Old Testament wisdom literature: Job, Proverbs, Ecclesiastes, and certain Psalms.

RELB 508 Eighth-Century Prophets (3-4)

The prophetic movement in eighth-century Israel followed by a detailed study of selected passages from the writings of the eighth-century prophets.

RELB 545 Biblical Archeology (3-4)

The Bible in its religious, cultural, and political environment as illuminated by discoveries of modern archeology.

RELB 554 The Gospels (3-4)

A study of the Gospels that includes an examination of the synoptic problem, and an exegesis of major passages.

RELB 555, 556, 557 Old Testament Exegesis I, II, III (3-4 ea.)

Prerequisite: Working knowledge of Hebrew, consent of the instructor.

RELB 558 Old Testament Theology (4)

The major theological concepts of the Old Testament with a view to their impact on Christian life and thought.

RELB 559 New Testament Theology (4)

An examination of the major theological themes of the teaching of Jesus as set forth in the Gospels, the Kerygma of the primitive church, the letters of Paul, and the Johannine writings.

RELB 564 The Letter to the Romans (3-4)

An exegetical study of Paul's most complete summation of the Christian gospel.

RELB 565, 566, 567 New Testament Exegesis I, II, III (3-4 ea.)

Prerequisite: Working knowledge of Greek, consent of the instructor.

RELB 568 The Letter to the Hebrews (3-4)

An introduction to the book with an exegesis of its text and a consideration of the major theological themes presented.

RELB 606 Seminar in Near Eastern History and Literature (3-4)

Prerequisite: Consent of the instructor.

RELB 614 Old Testament Seminar (3-4)

May be repeated up to 12 units.

Prerequisite: Consent of the instructor.

RELB 624 New Testament Seminar (3-4)

May be repeated up to 12 units.

Prerequisite: Consent of the instructor.

RELB 630 Fieldwork in Middle East Archeology (1-8)

Prerequisite: Consent of the instructor.

RELB 674 Reading Tutorial in Biblical Studies (3-4)

Prerequisite: Consent of the instructor.

RELB 698 Thesis (4)

RELB 699 Directed Study (2-6)

Prerequisite: Consent of the instructor.

CHURCH AND MINISTRY

PROFESSIONAL STUDIES

RELP 504 Research Methods in Religion (2)

The basic resources and procedures of scholarly research in the area of religion: the use of the library, bibliography in the various religious disciplines, the construction of term papers and theses.

RELP 511, 512, 513 Fieldwork in Educational Ministry I, II, III (1, 1, 1)

Practice in teaching in an educational setting, interaction with students in a learning setting either in a school or a church.

Prerequisite: RELP 468.

RELP 515 Youth Ministry and the Local Church (3)

Designed to provide insight into the theology, organization, and methods of local youth ministry. The problem of what to do in the local setting with youth as they grow toward God. Consideration of the problems of leadership, activities, models of ministry, and current materials available.

RELP 521, 522, 523 Fieldwork in Pastoral Ministry I, II, III (1, 1, 1)

Practical application and integration of the practice of ministry into an overall theory of ministry.

Prerequisite: Consent of the instructor.

RELP 524 Clinical Pastoral Education (8-12)

A twelve-week course for church pastors and seminary students, including supervised experience with patients, lectures by hospital staff, seminars, conferences, and hospital rounds with physicians. Five eight-hour days per week. Limited to six students per quarter. Accepted for credit by the Association for Clinical Pastoral Education, Incorporated.

RELP 525 Crisis Counseling (3-4)

Counseling placed in the clinical setting. Student interviewing of patients, written verbatims, viewing of films, and active participation in group discussions.

RELP 544 Theology, Encounter and Family Therapy (3-4)

A study of the basic foundations of traditional Christian theology as they relate to the development of personality and provide a basis for effective living. Evaluation of relational processes in the light of ethical, moral, and value decisions.

RELP 568 Methods of Educational Ministry (4)

A critical examination of the foundations, theories, and practices of Christian education as an aspect of ministry. Emphasis on practical application of theology and religious development as it relates to the educational setting. Development of materials for secondary Bible teaching.

Prerequisite: RELT 564.

RELP 584 The Christian Nurture of Children (3)

The nurture and religious needs of children from birth to twelve years of age. An exploration of the responsibilities of the home, the church school, and the congregation for the nurture of children.

RELP 585 Adult Development and Religious Experience (3)

Exploration of the dynamics in adult crises and faith emergence and their expression in the religious commitments of the adult years. Methods and materials for working with adults in the church.

RELP 586 Moral Learning and Values in Religious Formation (3)

A critical, in-depth examination of faith emergence, value formation, and moral growth. A study of the major theorists (e.g., Fowler, Kohlberg, Simons, James, Sherrill) as they relate to religious development.

RELP 601, 602, 603 Seminar in Personal Evangelism I, II, III (1, 1, 1)

A practical seminar in which the student gains experience in giving Bible studies to interested people in the community under the guidance of the instructor.

RELP 604 Seminar in Applied Theology (3-4)

Prerequisite: Consent of the instructor.

RELP 615 Seminar in Religious Learning (3-4)

Prerequisite: Consent of the instructor.

RELP 664 Seminar in Marriage, Religion, and the Family (3)

Contemporary family theory in the light of the Bible and the writings of Ellen G. White. The family as the basic unit of the church and as the primary environment for personal and spiritual growth.

RELP 674 Reading Tutorial in Professional Studies (3-4)

Prerequisite: Consent of the instructor.

RELP 698 Thesis (4)

RELP 699 Directed Study (2-6)

Prerequisite: Consent of the instructor.

CHRISTIAN ETHICS

RELE 544 Church and Society I (3)

SOCIAL ETHICS: A normative examination of church as a community of faith. Biblical and traditional themes probing the social imperatives of the religious community. Content analysis of theological bases for social concern as articulated in the early *Review and Herald* periodicals. Identical to RELT 544.

RELE 545 Church and Society II (3)

SOCIOLOGY OF RELIGION: A descriptive examination of church as a social institution. Dynamics of change as religious movement evolves toward religious institution. Models of relationship between church and world. Content analysis of sectarian characteristics in the early *Review and Herald* periodicals. Identical to RELT 545.

RELE 546 Theology, Encounter, and Family Therapy (3-4)

A study of the basic foundations of traditional Christian theology as they relate to the development of personality and provide a basis for effective living. Evaluation of relational processes in the light of ethical, moral, and value decisions.

RELE 547 Religion and Society (4)

Advanced exploration of biblical themes which call the individual of faith and the community of faith to fulfill personal as well as social obligations. Examination of the dynamics involved as religious movement evolves toward religious institution. Models of relationship between church and world. Identical to RELT 547.

RELE 551 Christian Ethics I (3)

An examination of the moral life from the perspective of the Christian norm for behavior, including a survey of various methods, ancient and modern, by which men have answered the questions of right and wrong; and setting forth a method based on the biblical love ethic for dealing with contemporary moral problems.

RELE 552 Christian Ethics II (3)

Application of the methods outlined in RELE 551 to specific moral problems, especially those posed by modern medical technology, such as abortion, prolongation of life, organ transplantation, and genetic engineering. Issues raised by changing sex values, racial tensions, and mind-altering drugs; manipulative techniques also considered as demonstrations of the adequacy of the Christian norm for contemporary life.

Prerequisite: RELE 551.

RELE 586 Moral Learning and Values in Religious Formation (3)

A critical, in-depth examination of faith emergence, value formation and moral growth. A study of the major theorists (e.g., Fowler, Kohlberg, Simons, James, Sherrill) as they relate to religious development. Identical to RELP 586.

RELE 624 Seminar in Christian Ethics (3-4)

Prerequisite: Consent of the instructor.

RELE 664 Seminar in Marriage, Religion, and Family (3)

Contemporary family theory in the light of the Bible and the writings of Ellen G. White. The family as the basic unit of the church and as the primary environment for personal and spiritual growth. Identical to RELP 664.

RELE 674 Reading Tutorial in Christian Ethics (3-4)

Prerequisite: Consent of the instructor.

RELE 698 Thesis (4)

RELE 699 Directed Study (2-6)

Prerequisite: Consent of the instructor.

HISTORICAL STUDIES

RELH 528 Alexander and Muhammad (4)

A history of the thought and practice of religion in the Middle East as the antecedent of contemporary ethical monotheism. Attention given to Semitic religion in the ancient Near Eastern tradition; the development of religion in the Hellenistic civilization; the influence of Hellenism in Judaism, Christianity, and Islam; and the life and person of Muhammad.

RELH 535 History of Seventh-day Adventist Medical Evangelism I (3)

NINETEENTH CENTURY: The origin and development of Seventh-day Adventist involvement in health education and the healing arts; the role of John Harvey Kellogg and the Battle Creek Sanitarium.

RELH 536 History of Seventh-day Adventist Medical Evangelism II (3)

TWENTIETH CENTURY: The history of Loma Linda University; the significance of the healing arts in the worldwide expansion of the Seventh-day Adventist church.

RELH 555 Religion in American Life (3-4)

The place of religion in American intellectual, political, social and cultural developments, from the Colonial period to the present. Identical to HIST 555.

RELH 566 The Early Christian Church (3-4)

Study from primary sources of the important men, developments and ideas in the Christian church from apostolic times through the fifth century A.D. Identical to HIST 566.

RELH 567 The Medieval Church (3-4)

Study from the primary sources of the important men, developments and ideas in the Christian church from the sixth through the fifteenth centuries. Identical to HIST 567.

RELH 568 History of the Papacy (3-4)

Historical and theological development of the Papacy and Roman Catholicism during patristic, medieval and modern periods. Identical to HIST 568.

RELH 574 The Lutheran Reformation (3-4)

A study of Martin Luther, his theology, and the Reformation movement he initiated, down to 1555. Identical to HIST 574.

RELH 576 The Swiss Reformation and Calvinism (3-4)

Leading men of the Swiss Reformation (Zwingli, Bullinger, Calvin, and Beza) and the theological and sociological influences of Calvinism. Identical to HIST 576.

RELH 578 The English Reformation (3-4)

Main historical forces and religious movements of the English Reformation until the Westminster Assembly. Identical to HIST 578.

RELH 584 Twentieth-Century Church History (3-4)

Modern religious trends and their impact on church and society. Identical to HIST 584.

RELH 585 History of Seventh-day Adventism (3-4)

Millerism and early Sabbath-keeping Adventism, anti-Catholicism, antislavery, and church-state relations; "shut-door" theology and missionary expansion; organization, 1888 and reorganization; health and prohibition, education and evangelism. Origin and development of the Seventh-day Adventist denomination to the present. Identical to HIST 585.

RELH 586 Ellen G. White: Her Life and Thought (3-4)

A study of the key events in the life of Ellen G. White (1827-1915) and her major theological contribution. Identical to HIST 586.

RELH 587 Natural Theology: A Historical Survey (3-4)

A historical survey, beginning with the Middle Ages, of different approaches to the question of faith and reason, or what can be known of God by rational inquiry alone, within Christian thought. Identical to HIST 587.

Prerequisite: Consent of the instructor.

RELH 588 Protestant Thought in the Twentieth Century (3-4)

An examination of the major figures, issues, and resources of contemporary Protestant theology. Identical to HIST 588.

Prerequisite: Consent of the instructor.

RELH 604 Seminar: Problems in the History of Seventh-day Adventist Theology (3-4)

Prerequisite: Consent of the instructor.

RELH 635 Seminar in Church History (4)

Prerequisite: Consent of the instructor.

RELH 674 Reading Tutorial in Historical Studies (3-4)

Prerequisite: Consent of the instructor.

RELH 698 Thesis (4)

RELH 699 Directed Study (2-6)

Prerequisite: Consent of the instructor.



THEOLOGICAL STUDIES

RELT 506 Seventh-day Adventist Beliefs and Life (2-3)

An introduction to beliefs and life-style in Seventh-day Adventism. Limited to students who are not members of the Seventh-day Adventist church.

RELT 507 Christian Theological Method (3-4)

The nature and purpose of Christian theology, different concepts of the theological task, Adventist theological method.

RELT 511 Philosophy of Religion I (3)

RELIGIOUS EPISTEMOLOGY: The means by which we know religious truth. What is truth? How do we know the truth about God? How does God reveal Himself? What is the nature of ultimate reality? What is the meaning of the concept of God as Creator? What is the relation of God to nature, and what are the implications of the study of science and religion?

RELT 512 Philosophy of Religion II (3)

THE PROBLEM OF EVIL AND ESCHATOLOGY: An in-depth exploration of the problem of sin and suffering and its immediate and ultimate solution — at-one-ment. Consideration of the contributions depth psychology has made to this ancient Christian dilemma. A study of the ultimate destiny of man.

RELT 516 God and Human Suffering (3)

The Christian philosophy of sin, suffering, redemption, and healing.

RELT 524 Inspiration and Revelation (3-4)

Various views of revelation and inspiration in the light of contemporary issues affecting the problem of scriptural authority, Christian faith, and saving knowledge.

RELT 531, 532 Faith, Righteousness and Salvation I, II (3, 3)

Meaning and scope of the central biblical doctrines of righteousness and salvation by faith in Jesus Christ.

Prerequisite: Consent of the instructor.

RELT 536 Religious Belief and the Modern World (3-4)

Reality and relevance of God for contemporary man.

RELT 537 Current Issues in Seventh-day Adventism (3-4)

Selected questions of current interest concerning theological understanding, ecclesiastical polity, church policies and practices, etc., in preparation for active involvement in the life of the church. Does not apply toward a major in religion or ministerial studies.

Prerequisite: Consent of the instructor.

RELT 538 The Doctrine of Man (3-4)

The Christian understanding of the nature and destiny of human beings. Anthropological concepts in the Bible and in Christian thought.

RELT 539 The Doctrine of God (3-4)

A study of the nature and attributes of God, the trinitarian concept of God, and God's relation to the temporal world.

RELT 544 Church and Society I (3)

Social Ethics: A normative examination of church as a community of faith. Biblical and traditional themes probing the social imperatives of the religious community. Content analysis of theological bases for social concern as articulated in the early *Review and Herald* periodicals.

RELT 545 Church and Society II (3)

Sociology of Religion: A descriptive examination of church as a social institution. Dynamics of change as religious movement evolves toward religious institution. Models of relationship between church and world. Content analysis of sectarian characteristics in the early *Review and Herald* periodicals.

RELT 546 Contemporary Challenges to Christian Faith (3-4)

The various challenges to Christian belief arising within contemporary Western culture from such sources as philosophy, the natural sciences, the sciences of man, and the secular spirit.

RELT 548 The Doctrine of Christ (3-4)

A study of the person and work of Christ. Attention will be given to the nature of Christ and his atoning work in his life on earth, his death on the cross, and his intercession in the heavenly sanctuary.

RELT 564 Religious Development and Nurture (4)

Biblical principles of emerging self-identity and faith concepts; religious development of children, adolescents, and youth; religious learning problems and practical methodologies in communicating religious values.

RELT 585 The Doctrine of Church (3-4)

The nature, mission, and function of church. An examination of selected models for church, denominational, and congregational life in New Testament, Reformation, and contemporary times.

RELT 586 Christian Eschatology [3-4]

The Christian understanding of the end of human history; the relation of Seventh-day Adventist views to those of other religious communities, past and present.

RELT 604 Seminar in Religion and Science [3-4]

Prerequisite: Consent of the instructor.

RELT 614 Seminar in Theological Studies [3-4]

May be repeated up to 12 units.

Prerequisite: Consent of the instructor.

RELT 615 Seminar in Philosophy of Religion [3-4]

Prerequisite: Consent of the instructor.

RELT 616 Seminar in Religious Experience [3-4]

Prerequisite: Consent of the instructor.

RELT 674 Reading Tutorial in Theological Studies (3-4)

Prerequisite: Consent of the instructor.

RELT 698 Thesis (4)

RELT 699 Directed Study (2-6)

Prerequisite: Consent of the instructor.

MISSION STUDIES

RELM 534 Anthropology of Mission (3)

A study of mission, applying the findings of anthropology as they relate to cultural change. The processes of religious development, the means of diffusion, the factors affecting religious acculturation, and the analysis from case studies of programs planned to direct changes in religion. Identical to ANTH 534.

RELM 537 The Qur'an (3)

A study of the Qur'an, noting its sources, structures, inspiration, and purpose. Attention given to the Qur'an as literature, to the great ideas of the Qur'an, and to principles of interpretation.

RELM 538 Islamic Religious Literature (3)

A survey of the genres of Islamic religious literature, with attention to English translations of representative samples of each genre. The course focuses on the literature of Arabic, Persian, and Turkish languages and includes the study of Hadeeth collections, biographies of Muhammad, wisdom literature, ascetic writing, treatises on law and theology. Qur'an commentaries, poems of the mystics, apologetics and modern Qur'an interpretation.

Prerequisite: Previous or concurrent enrollment in RELM 537.

RELM 545 The Religion of Islam (3-4)

A study of the history of the development of Islamic institutions. Islam depicted as a way of life based on divine law. Periods discussed include the formative era for law and theology, institutions of the Persian and Turkish dynasties, and more recent movements of reform and revival.

RELM 546 The Religions of the East (3)

A survey of Hinduism, Buddhism, Confucianism, Taoism, and Shinto. Emphasis determined by the interest of the class.

Prerequisite: RELM 444, or consent of the instructor.

RELM 547 The Religions of Africa (3)

An investigation of folk religion through case studies; the investigation of African forms of Christianity and Islam.

Prerequisite: RELM 444, or consent of the instructor.

RELM 548 The Religions of Latin America (3)

A study of the historic religions of Latin America and their interaction with Christianity and contemporary religious movements in the area.

Prerequisite: RELM 444, or consent of the instructor.

RELM 564 Theology of Mission (3)

A study of the biblical theology applied to defining the concerns, structures, and methods of mission. Mission as a general function of the church and as specific activities related to persons, time and place. Topics include the idea of the church, the definition of missionary, the priorities of mission, and the places of eschatology.

RELM 575 Structure and Practice of Mission (3)

A study of mission, noting the structures and programs of the Seventh-day Adventist church for mission, and the major problems encountered by the missionary. Problems of religious experience, career planning, health maintenance, family needs, and personal relationships.

RELM 624 Seminar: Mission Studies (2-4)

Prerequisite: Consent of the instructor.

RELM 637 Seminar: Teachings of the Qur'an (2-4)

Prerequisite: Consent of the instructor.

RELM 644 Seminar: Comparative Religion (2-4)

Prerequisite: Consent of the instructor.

RELM 674 Reading Tutorial in Mission Studies (2-4)

Prerequisite: Consent of the instructor.

RELM 698 Thesis (4)

RELM 699 Directed Study (2-6)

Prerequisite: Consent of the instructor.



SPEECH-LANGUAGE PATHOLOGY

E. EVELYN BRITT, SC.D. Johns Hopkins University 1963

Associate Professor of Communication/Audiology

Pediatric audiology and psychoacoustics

MELVIN S. COHEN, PH.D. University of Utah 1973

Associate Professor of Speech-Language Pathology

Research, augmentative communication, and blissymbolics

RODNEY R. ROWLEY, PH.D. University of Oklahoma 1966

Associate Professor of Audiology

Medical audiology

JEAN B. LOWRY, PH.D. Kent State University 1973 (on leave

Assistant Professor of Speech-Language Pathology

Adult aphasia

CHARLOTTE A. BLANKENSHIP, M.A. Western Michigan University 1974

Assistant Professor of Communication

Childhood speech-language and learning disorders

JACK L. HARTLEY, M.A. University of Southern California 1973

Assistant Professor of Communication

Childhood language, stuttering, and voice disorders

MELISSA L. POISET, M.S. University of California, Humboldt 1976

Assistant Professor of Speech-Language Pathology

Aphasia, cleft palate, and voice disorders

ROBERT S. STRETTER, M.A. California State College, Stanislaus 1972

Assistant Professor of Speech-Language Pathology

Language development, adult aphasia, and professional aspects
of speech-language pathology

CLINICAL INSTRUCTORS

NANCY E. ALDRICH, M.S. Loma Linda University 1974

LAURIE K. DEAN, M.S. University of Redlands 1978

RAMESH M. GOUD, M.A. Northern Michigan University 1976

JULI A. HOKANA, M.S. University of Redlands 1976

KAREN L. JONES, M.C.S.D. University of Montana 1977

KEIKO I. KHOO, M.S. Loma Linda University 1979

DAVID G. McGANN, M.S. Colorado State University 1972

The purposes of this graduate program are to offer preparation for careers in the professional practice of speech-language pathology and audiology, to provide a basis for graduate study and research at a more advanced level, and to encourage the development of capacity for independent growth. The courses are designed to (a) increase understanding in the basic sciences of communication, (b) develop competence in the practice of speech-language pathology and audiology, and (c) promote a sense of responsibility toward the speech, language, and hearing handicapped and toward the community.

The clinical services of the La Sierra and Loma Linda campuses and of affiliated agencies provide opportunity to obtain breadth of experience in a variety of settings. Study in related disciplines at the advanced level is available through the offerings of other departments of the College of Arts and Sciences, the professional schools of the University, and the Graduate School.

Admission Acceptable undergraduate preparation includes courses in language and language development, in speech science, in behavioral sciences, and in introductory speech-language pathology and audiology. Applicants whose records show subject deficiencies in one or more of these areas may be admitted; but before they are advanced to candidacy for the master's degree they must make up all deficiencies. Subjects required to make up deficiencies are indicated to the applicant (in writing) at the time of acceptance.

Residence The graduate with an undergraduate major in speech-language pathology and audiology should plan to take five quarters, beginning with the summer quarter, to complete the requirements for the master's degree. The applicant who desires to include directed teaching in speech-language pathology; who begins full-time graduate study in the autumn, winter, or spring quarters; or who enters with a major in another field or with subject deficiencies, should expect to take from six to nine quarters.

Program Graduate study in speech-language pathology leads to the Master of Science degree. Although the program does not offer a master's degree in audiology, course offerings and clinical practicum are provided for the student who wishes to become certified and/or licensed in audiology. Therefore, the program provides opportunity for the graduate (a) to satisfy all academic and clinical requirements for the Certificate of Clinical Competence and the California License in Speech-Language Pathology or Audiology, or (b) to prepare for doctoral study or careers in related fields.

The speech-language pathology program is approved by the Commission for Teacher Preparation and Licensing to prepare students for a California Clinical Rehabilitative Services Credential in Language, Speech, and Hearing. A student preparing for a career in California schools should consult the department adviser regarding specific course and practicum requirements of this credential.

The program of study consists of completing (a) all subject deficiencies, (b) the academic core courses listed below, (c) all required graduate-level courses, (d) supervised clinical practice, and (e) research. Courses of the academic core, or their equivalent, may be completed before entry to the graduate program; but courses which have not been taken before entry to graduate study must be included in the student's program. The clinical program for a full-time graduate student consists of eight hours of clinical practice each week.

THE ACADEMIC CORE COURSES

- SPPA 424 **Adult Language Pathology (4)**
- SPPA 434 **Disorders of Fluency (4)**
- SPPA 435 **Phonatory Disorders (4)**
- SPPA 444 **Organic Speech Disorders (4)**
- SPPA 454 **Audiometry (4)**
- SPPA 464 **Aural Rehabilitation (4)**
- SPPA 475 **Acoustic and Physiologic Phonetics (4)**
- SPPA 477 **Psycholinguistics (4)**
- SPPA 486 **Diagnostic Methods in Speech and Language Pathology (4)**
- SPPA 524 **Language Disorders of Children, Advanced (3)**
- SPPA 564 **Auditory Habilitation and Hearing Aids (4)**
- SPPA 578 **Psychoacoustics and Instrumentation (4)**
- SPPA 598 **Research Methods in Speech-Language Pathology (3)**

DEGREE REQUIREMENTS

The following are the requirements for the degree Master of Science:

1. A minimum of 3 quarters in residence as a graduate student.
2. A minimum of 48 quarter units of graduate work, distributed as follows: (a) courses to complete the academic core coursework (as itemized above); (b) 24 units of content courses and seminars in speech-language pathology with a minimum of 18 units in courses and seminars numbered above 500; (c) a 3-unit course in religion; (d) additional units in speech-language pathology and cognate areas as approved by the guidance committee, with not more than 4 units of clinical practice applicable toward the degree.
3. Selection and completion of a research option — with thesis (option A) or oral report (option B).

4. Maintenance of a general grade point average of 3.00. (The student whose grade point average is below 3.00 for two consecutive quarters, or who has more than 9 units of C, is not recommended for candidacy.)

RESEARCH Thesis option A Option A calls for completion of 6 units of Thesis (SPPA 698) and an oral examination.

Oral report option B Option B calls for completion of 4 units of Research (SPPA 697) and an oral presentation of the research.

For information about requirements and practices to which all graduate students are subject, the student should consult the *Academic Practices* section of division I of this BULLETIN.

COURSES

UPPER DIVISION COURSES APPLICABLE TO GRADUATE PROGRAM

- SPPA 424 **Adult Language Pathology (4)**
- SPPA 434 **Disorders of Fluency (4)**
- SPPA 435 **Phonatory Disorders (4)**
- SPPA 444 **Organic Speech Disorders (4)**
- SPPA 454 **Audiometry (4)**
- SPPA 457 **Clinical Practice in Audiology (1-4)**
- SPPA 464 **Aural Rehabilitation (4)**
- SPPA 475 **Acoustic and Physiologic Phonetics (4)**
- SPPA 477 **Psycholinguistics (4)**
- SPPA 485 **Procedures and Materials in Speech-Language Pathology (3)**
- SPPA 486 **Diagnostic Methods in Speech-Language Pathology (4)**
- SPPA 487 **Clinical Practice in Speech-Language Pathology (1-4)**

GRADUATE COURSES

SPPA 524 **Language Disorders of Children, Advanced (3)**

Lectures and discussions dealing with assessment and management of the preschool- and primary school-age child with language disabilities. A study of the classical and contemporary literature relating to differential diagnosis and therapeutic procedures. Consideration given to language disabilities of childhood, learning disabilities, autism, and severe dysacusis.

SPPA 525 Communication Training for the Developmentally Disabled (3)

Lectures and discussions pertaining to the assessment and treatment of communicative disorders which are unique to the individual with a developmental disability (cerebral palsy and/or mental retardation). Emphasis is placed upon the implementation of augmentative nonvocal communication systems (including Blissymbolics) and the use of electronic, computerized nonoral communication prostheses.

SPPA 544 Cleft Palate (3)

Consideration of the etiologies, differential diagnosis, and management of the impairments of communicative function associated with congenital or acquired oral-facial anomalies. Primary emphasis given to cleft palate deformity.

SPPA 554 Advanced Audiological Assessment (4)

Study of the application of psychoacoustics and instrumentation to the selection and use of hearing tests and hearing aids. Experience in the administration of tests for intensive diagnostic and rehabilitation purposes. Measurement and methodology.

SPPA 555 Middle Ear Analysis (3)

Lectures, discussions, and the study of literature relating to middle ear pathology and the instrumentation and procedures employed for the differential diagnosis of middle ear disease. Primary emphasis given to the use and interpretation of tympanometry.

SPPA 557 Central Auditory Analysis (3)

Lectures and discussions dealing with the function and pathologies of the central auditory pathways and auditory cortex. An analytic study of the use and interpretation of psychoacoustic and electrophysiologic procedures.

SPPA 558 Pediatric Audiology (3)

Study of the (a) development of the auditory systems in the embryo, infant, and child; (b) pathologies of the auditory mechanism of the child; and (c) instrumentation and procedures for assessing hearing function of infants and children.

SPPA 564 Auditory Habilitation and Hearing Aids (4)

Study of the mechanisms for achieving hearing habilitation, including amplification, speech reading, auditory training, hearing aid orientation, and speech conservation. Consideration given to hearing aid function and philosophies of habilitation for the hearing impaired (e.g., auditory, aural, manual, and total communication).

SPPA 578 Psychoacoustics and Instrumentation (4)

Consideration given to the nature of stimulus, the manner of its presentation, neurophysiology of audition, and the instrumentation for its analysis and description.

SPPA 585 Professional Aspects of Speech-Language Pathology and Audiology (3)

Study of the methods of organizing and administering programs relating to evaluative procedures, records, case selection, case load, supervision, staff, budget, and interagency cooperation in schools, clinics, and private practice.

SPPA 586 Diagnostics in Speech-Language Pathology, Advanced (3)

Study of the principles of diagnosis applicable to communication; consideration of factors related to patient management in various allied health professional settings.

SPPA 587 Externship in Speech-Language Pathology (2-4)

Practicum in rehabilitation centers, clinics, and/or schools. May be repeated.

SPPA 588 Directed Teaching in Speech-Language Pathology (8-12)

Supervised therapy on the elementary and/or secondary level. Twenty-two clock hours required for each unit of credit. Not more than four units of clinical practicum are applicable toward the master's degree. This includes directed teaching. Transfer students who have completed directed teaching as an undergraduate are required to do a minimum of eight units of directed teaching during their fifth year of master's program if they wish to qualify for the California Rehabilitative Services Credential under Loma Linda University's credential program.

SPPA 589 Externship in Audiology (1-4)

Practicum in clinical settings. May be repeated for additional credit.

SPPA 598 Research Methods in Speech-Language Pathology (3)

Lectures and discussion designed to facilitate the student's ability to develop research ideas, leading to formulation of a master's degree project or thesis. Attention is directed toward use of the scientific method, techniques of grantsmanship, and professional writing style.

Prerequisite STAT404.

SEMINARS. Analysis of current literature relating to theory, research, and applications within the area of consideration.

Prerequisite: A content course in which the area of consideration has been studied, or consent of the instructor.

SPPA 654 Seminar in Audiology (3)

Problems delineated by title, such as "Noise Exposure."

SPPA 684 Seminar: Adult Language Disorders (3)

SPPA 685 Seminar: Stuttering (3)

SPPA 686 Seminar: Phonatory Disorders (3)

SPPA 687 Seminar in Speech-Language Pathology (3)

Problems delineated by title, such as "Articulation."

SPPA 697 Research (4)

SPPA 698 Thesis (6)

SPPA 699 Directed Study (1-3)

Independent study on a research project selected in consultation with the adviser. For advanced students. May be repeated once. The student's transcript will show specific area of study: for example, SPPA 699 DIR STDY — ADLT LANG.





III

University Administration The Graduate School Alumni Federation Instructional Resources

THE TRUSTEES

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	Vice Chairman	WALTER P. BLEHM
	Secretary	ROBERT J. RADCLIFFE

UNIVERSITY ADMINISTRATION

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THE GRADUATE SCHOOL

MAURICE HODGEN, ED.D., Dean

GRADUATE SCHOOL COUNCIL

Niels-Erik Andreassen
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Leonard R. Brand
E. Evelyn Britt
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John W. Elick
Ray B. Evans

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Walter Hamerslough
Frederick C. Hoyt
Richard W. Hubbard
Elmer Kelln
Arno Kutzner

John Leonora
Alberta Mazat
Frances Pride
Walter B. Roberts
Raymond E. Ryckman
Bruce Wilcox
Norman J. Woods

THE FACULTY AND LECTURERS

In the alphabetical list of teachers, the code letters indicate the section(s) in which the teacher's name is found.

ANAT	Anatomy
ANTH	Anthropology/Sociology
BCHM	Biochemistry
BIOL	Biology
DENT	Dentistry
ENGL	English
GEOL	Earth Science
HIST	History
MEST	Middle Eastern Studies
MFAM	Marriage and Family Counseling
MTCH	Medical Technology
MICR	Microbiology
NRSC	Nursing
NUTR	Nutrition
PETH	Physical Education and Health
PHRM	Pharmacology
PHSL	Physiology
PSYT	Psychiatry
RLGN	Religion
SPPA	Speech-Language Pathology

Achord, Clifford D.	MFAM	Elder, Harvey A.	MICR
Adey, W. Ross	PHSL	Elias, Salim Majeed	MEST
Airey, Wilfred J.	HIST	Elick, John W.	MEST, ANTH
Alexander, Wilber	MFAM, RLG	Elwell, Evelyn L.	NRSG
Aloia, Roland C.	BCHM	Engen, Paul C.	ANAT
Anderson, Donald L.	PSYT	Evans, Harrison S.	MFAM, PSYT
Anderson, Godfrey T.	HIST	Evans, Ray B.	PSYT
Andersson, Knut	GEOL	Evard, Rene	BCHM
Andreasen, Niels-Erik	RLGN	Fattic, Grosvenor R.	ENGL
Andress, Monte R.	ANTH	Feller, Ralph P.	DENT
Andress, Vern	MFAM	Fickess, Frances L.	NRSG
Anholm, J. Milford	DENT	Fisk, Lanny	BIOL, GEOL
Arendt, Kenneth A.	PHSL	Flowers, John V.	PSYT
Baker, Alonzo L.	HIST	Foll, Llewellyn E.	ENGL
Bakland, Leif K.	DENT	Foster, Patricia C.	NRSG
Baldwin, Dalton D.	HIST, RLG	Fraser, Ian M.	PHRM
Banks, R. Richard	MFAM	Gamboa, George C.	DENT
Beltz, Richard E.	BCHM	Garrett, John S.	DENT
Bigger, Darold	RLGN	Gauntt, Lloyd E.	DENT
Blankenship, Charlotte A.	SPPA	Gilbert, Raymond D.	PHSL
Blankenship, James W.	NUTR	Gillespie, V. Bailey	RLGN
Bogle, Gary C.	DENT	Gonzalez, Ramon R.	PHSL
Bounds, Jeffrey A.	PSYT	Gusseck, David J.	BCHM
Boyne, Philip J.	DENT	Haddad, Anees A.	ANTH, MEST, MFAM
Brand, Leonard R.	BIOL, GEOL	Hagelgantz, Opal I.	ENGL
Britt, E. Evelyn	SPPA	Hall, Raymond G.	PHSL
Brunie, William H.	PSYT	Hamerslough, Walter S.	PETH
Buchheim, Paul H.	BIOL, EHIS	Hammond, Kenric W.	PSYT
Bull, Brian S.	MTCH	Hardinge, Mervyn G.	NUTR, PHRM
Bullas, Leonard R.	BIOL, MICR	Harrison, Charles W.	ANAT
Burgess, Audrey L.	NRSG	Hartley, Jack L.	SPPA
Burke, Kenneth I.	NUTR	Heinrich, Virgil V.	DENT
Butler, Jonathan M.	HIST, RLG	Henken, Herbert W.	ANAT
Byrd, Bernard C.	DENT	Herrmann, E. Clifford	BCHM
Carnahan, Clarence E., Jr.	MFAM, PSYT	Hessinger, David A.	BIOL, PHRM
Caruso, Joseph M.	DENT	Hillock, Ronald H.	MTCH
Case, Norman M.	ANAT, BIOL	Hills, M. Anabelle	NRSG
Centerwall, Willard R.	ANTH	Ho, Yuk Lin	BIOL, MICR
Chadwick, Arthur V.	BIOL, EHIS	Hooker, William M.	ANAT
Chand, Ian P.	ANTH	Horsley, June L.	MFAM
Chase, Alden B.	DENT	Hosek, Nancy L.	NRSG
Cheung, Cecelia Y.	PHSL	Hoyt, Frederick G.	HIST
Chilson, Robert A.	BIOL	Hubbard, Reuben A.	RLGN
Clausen, Conrad D.	BIOL	Hubbard, Richard W.	BCHM, MTCH
Cohen, Melvin S.	SPPA	Hunt, Guy M.	ANAT
Comm, Dorothy M.	ENGL	Jacobs, Duran F.	PSYT
Connell, Bertrum C.	NUTR	Jarvis, William T.	DENT
Couperus, Molleurus	ANTH	Johnson, Darlene B.	NRSG
Crane, Earl R.	DENT	Jolley, Weldon B.	PHSL
Cress, C. Raymond	PHRM	Kelln, Elmer E.	DENT
Crigger, Max	DENT	Kettering, James D.	MICR
Cummings, Raleigh R.	DENT	Kiger, Robert D.	DENT
Dalgleish, Arthur E.	ANAT, BIOL	Kinzer, Robert L.	DENT
Darnell, Robert C.	ANTH, HIST, MEST	Klooster, Judson	DENT
Davis, M. Jerry	MFAM, RLG	Kovitz, Benjamin	PSYT
Day, Lawrence D.	DENT	Kunihira, Shirou	DENT
Deal, Laurie K.	SPPA	Landa, Paul J.	HIST, RLG
Dunn, Robert P.	ENGL	Landeon, William M.	HIST
Dyer, James F., Jr.	MFAM	Larson, David R.	RLGN
Eby, William C.	MICR	Lathrop, Earl W.	BIOL
Eddleman, C. Douglas	BIOL	Lau, Benjamin H. S.	MICR, MTCH
Egelberg, Jan H.	DENT		

Leonora, John	PHSL	Schlenker, Willis L.	DENT
Lessard, George M.	BCHM	Schmidt, Merrill E.	DENT
Lewis, Anthony W.	BIOL	Schneider, Robert K.	PETH
Lewis, John E.	MTCH	Schultz, Robert L.	ANAT
Lewis, Richard B.	ENGL	Seifert, Laurence A.	DENT
Little, Helen F.	ENGL	Sentenn, Gregg A.	PSYT
Little, Thomas A.	ENGL	Sherrard, Dena R.	NRSG
Loder, Robert J.	MTCH	Shryock, Harold	ANAT
Longo, Lawrence D.	PHSL	Silvergleid, Arthur J.	MTCH
Lonnstrom, Betty T.	NRSG	Simms, Richard A.	DENT
Lowry, Jean B.	SPPA	Simon, James H.	DENT
Mackett, Walter C.	HIST	Slattery, Charles W.	BCHM
Mallery, F. Lynn	RLGN	Smith, A. Dwight	ANAT
Maxwell, A. Graham	MEST, RLGN	Smith, Charles L.	DENT
Mazat, Alberta S.	MFAM	Smith, Marilyn C.	NRSG
McCluskey, Elwood S.	BIOL, GEOL, PHSL	Specht, Walter F.	RLGN
McEwen, Lawrence E.	DENT	Spent, Arthur	DENT
McMillan, Paul J.	ANAT, BIOL	Stauffer, J. Paul	ENGL
Miller, Frances P.	NRSG	Steinman, Ralph R.	DENT
Mitchell, Daniel A., Jr.	ANAT	Stirling, James H.	ANTH
Mitchell, Norman L.	BIOL	Stretter, Robert S.	SPPA
Moline, Mary E.	MFAM	Strother, Allen	PHRM
Moline, S. Douglas	MFAM	Strutz, Peter G.	MFAM
Moncrieff, Robert E.	MTCH	Taylor, Barry L.	BCHM
Morgan, Arthur J.	DENT	Taylor, D. Taylor	DENT
Mortensen, Raymond A.	BCHM	Taylor, Wm. Holmes	ANAT
Nava, P. Benigno	ANAT	Teel, Charles W., Jr.	RLGN
Neilsen, Ivan R.	PHSL	Teel, Robert W.	PHSL
Nutter, Robert L.	BIOL, MICR	Teele, Marilyn C.	ENGL
Olsen, Lee E.	DENT	Testerman, Nancy L.	NRSG
Olsen, V. Norskov	HIST	Thomas, Nelson E.	PETH
Osbourne, Fred H.	MFAM	Tilton, Bernard E.	PHRM, PSYT
Pearson, John K.	DENT	Tkachuck, Richard D.	BIOL
Peters, Donald L.	DENT	Tomlinson, John L.	DENT
Peters, Marvin A.	BIOL, PHRM	Torabinejad, Mahmoud	DENT
Peterson, Donald I.	PHRM	Venden, Louis	RLGN
Plata, Roger L.	PHSL	Vine, Kenneth L.	MEST, RLGN
Poiset, Melissa L.	SPPA	Vyhmeister, Irma B.	NUTR
Pooley, Robert	RLGN	Wagner, Edward D.	MICR, MTCH
Power, Gordon G.	PHSL	Wagner, William	ANAT
Pride, L. Frances	MFAM, NRSG	Waldron, Mary J.	NRSG
Provonsha, Jack W.	MEST, RLGN	Walters, Roland D.	DENT
Rafuse, Donald D.	BIOL, PHSL	Weber, Ruth S.	NRSG
Reeves, John M.	DENT	Webster, Clyde L.	GEOL
Register, U. D.	BCHM, NUTR	Wical, Kenneth E.	DENT
Rice, T. Richard	HIST, RLGN	Wilcox, R. Bruce	BCHM, MTCH
Rick, Gordon M.	DENT	Will, Lawrence W.	DENT
Ricketts, Robert M.	DENT	Willey, T. Joe	BIOL, PHSL, PSYT
Riffel, Hugo D.	MFAM	Winter, Charles E.	MICR, MTCH
Rippon, W. Barton	BCHM	Wise, James R.	DENT
Roberts, Walter H. B.	ANAT	Woodward, Clarice W.	NRSG
Robertson, Thomas L.	DENT	Yahiku, Paul Y.	BIOL
Ross, Delmer G.	HIST	Yoon, Wok K.	MFAM
Ross, Gary M.	HIST	Young, William L.	DENT
Roth, Ariel A.	BIOL	Zolber, Kathleen K.	NUTR
Rouse, Ivan E.	GEOL	Zuccarelli, Anthony J.	BIOL
Rowe, Deryl G.	PETH		
Rowley, Rodney R.	SPPA		
Ryckman, Raymond E.	BIOL, EHIS, MICR		

INSTRUCTIONAL RESOURCES

LIBRARIES

The University has two main libraries (one on the Loma Linda campus and one on the La Sierra campus), and the joint holdings are as follows:

Books, bound periodicals, audiovisual materials	435,780
Current periodical subscriptions	3,179

Bus service is supplied on schedule each weekday between the two campus libraries so that students and faculty can have access to both libraries. Immediate information can be obtained and lending arrangements made by telephone or mail.

Materials that are not available in either campus library or in the immediate community are obtainable through interlibrary loan. At Loma Linda the teletypewriter TWX can be used for interlibrary communication. This equipment can also provide teachers and graduate students computer-printed bibliographies on medical-related subjects through the Medline and services in which the Loma Linda library participates.

LA SIERRA CAMPUS

Books, bound periodicals, audiovisual materials	184,496
Current periodical subscriptions	1,210

The La Sierra campus library is a general liberal arts collection, with concentrations in history, religion, English, and education. A collection of nineteenth-century Seventh-day Adventist books and pamphlets is in the Heritage Collection. In addition to the microfiche Library of American Civilization already purchased (21,000 titles), the library is augmenting microform holdings.

LOMA LINDA CAMPUS

Books and bound periodicals	251,294
Current periodical subscriptions	1,967

The acquisitions of the Vernier Radcliffe Memorial Library on the Loma Linda campus are in medicine, dentistry, allied health professions, and graduate programs; and included in the acquisitions is a liberal arts undergraduate collection in support of certain graduate and professional programs. About half of the resources are in medical and related fields. Some rare materials in the history of medicine are included in the holdings.

Since 1957 this library has been the official west coast depository for Seventh-day Adventist literature regularly provided by church publishing houses in North America. The publications are in the Heritage Collection established in 1971. Here also are the Ellen G. White source materials, University archives, and an in-process collection of published and unpublished works pertaining to the early Adventist Movement.

The Human Relations Area Files on microfiche make available primary source materials on most of the known cultures of the world.

The Jorgensen Memorial Library, established in 1978, serves the Loma Linda University School of Dentistry through extensive holdings in the current literature of the profession, a circulating inventory of audiovisual equipment, the acquisition of instructional media and the hardware for its use, and the performance of on-line bibliographic searches.

Consortium The following colleges and universities have formed a consortium under the name Inland Empire Academic Library Cooperative to give full borrowing privileges to students and faculty members of the following institutions:

Azusa Pacific College, Azusa
California Baptist College, Riverside
California State College, San Bernardino
California State Polytechnic University, Pomona
La Verne College, La Verne
Loma Linda University, Loma Linda/La Sierra campuses
University of California, Riverside
University of Redlands, Redlands
Community colleges in the area

Community Within driving distance of the University campuses are other collections accessible to faculty and students: the University of California (Los Angeles and Irvine campuses), the University of Southern California, the Los Angeles public library, the inland area public libraries, and the unique holdings of the Henry E. Huntington Library and Art Gallery.

Computer System The University maintains an extensive computer complex which serves the students and faculty of the University in instructional and research functions. Available facilities span the range from small-scale to large-scale systems. Particular emphasis has been given to providing real-time data acquisition and graphical output capabilities. An advanced and powerful computing system has recently been installed to facilitate the modeling and simulation of complex systems. Programing aids are available to expedite the man-machine dialogue and to assist in applying the computer to the solution of problems in a variety of disciplines. An extensive program library serves many routine needs; but researchers are encouraged to write their own specialized programs for their own particular needs. Programing instruction and assistance are provided for this purpose.

ALUMNI FEDERATION

The Alumni Federation was organized in 1958. This organization provides an avenue by which the several alumni associations, distinctive of emphasis represented by curriculums of the University, join their common concern for the continued welfare of the institution. In turn, through the Federation the University demonstrates its interest in the continued general and professional development of the alumni, whom it regards as the ultimate and true expression of its accomplishments.

By united and reciprocal interaction, the Alumni and the University seek to ensure a growing community of scholars, practitioners, and citizens dedicated to excellence. Vitaly concerned with excellence in education, the Federation lends itself to enlarging the sphere of influence for good envisioned by the founders of the University.

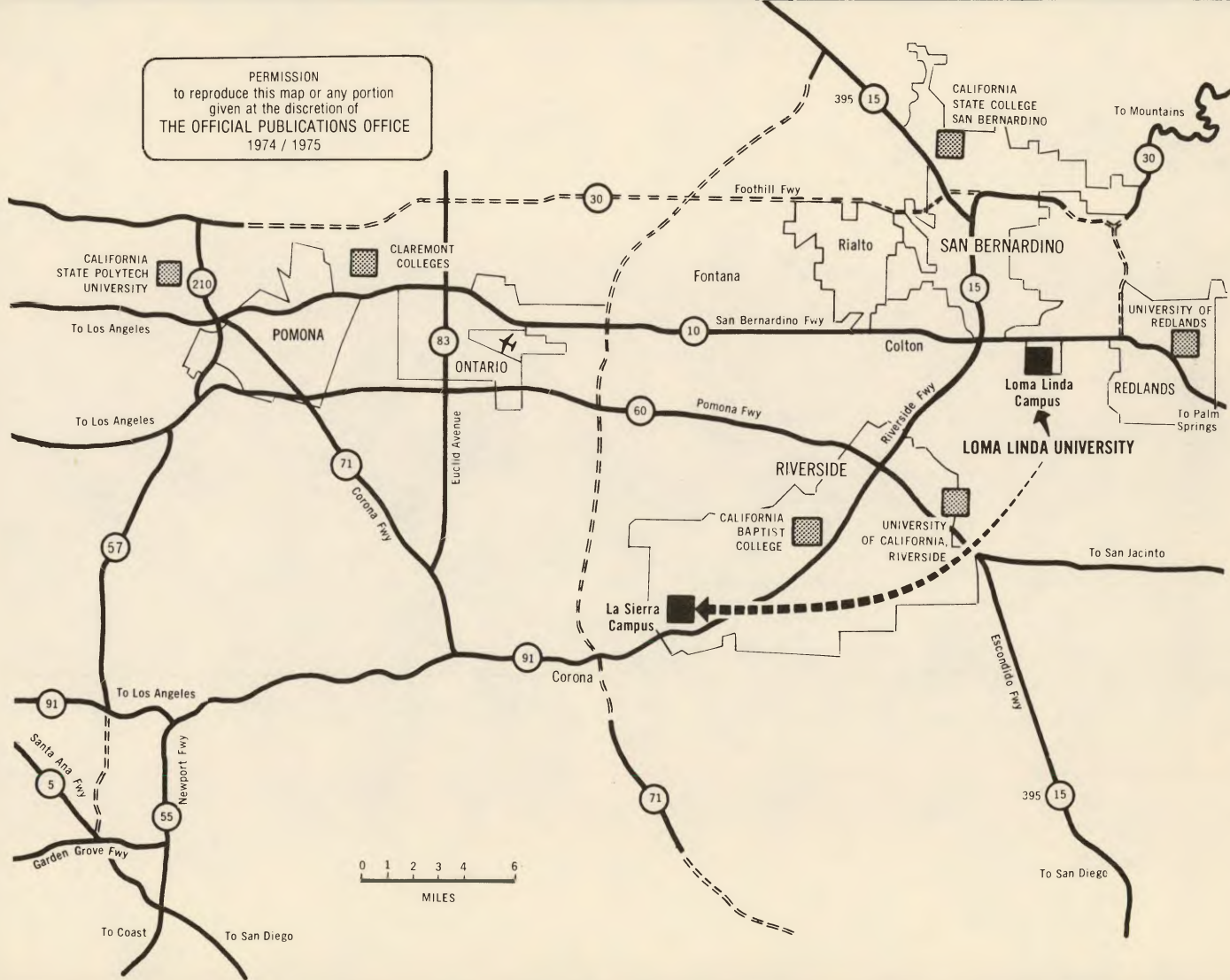
The Federation seeks to foster unity and loyalty and to promote the growth of the total institution and at the same time the best interests of each part. The Federation endeavors—

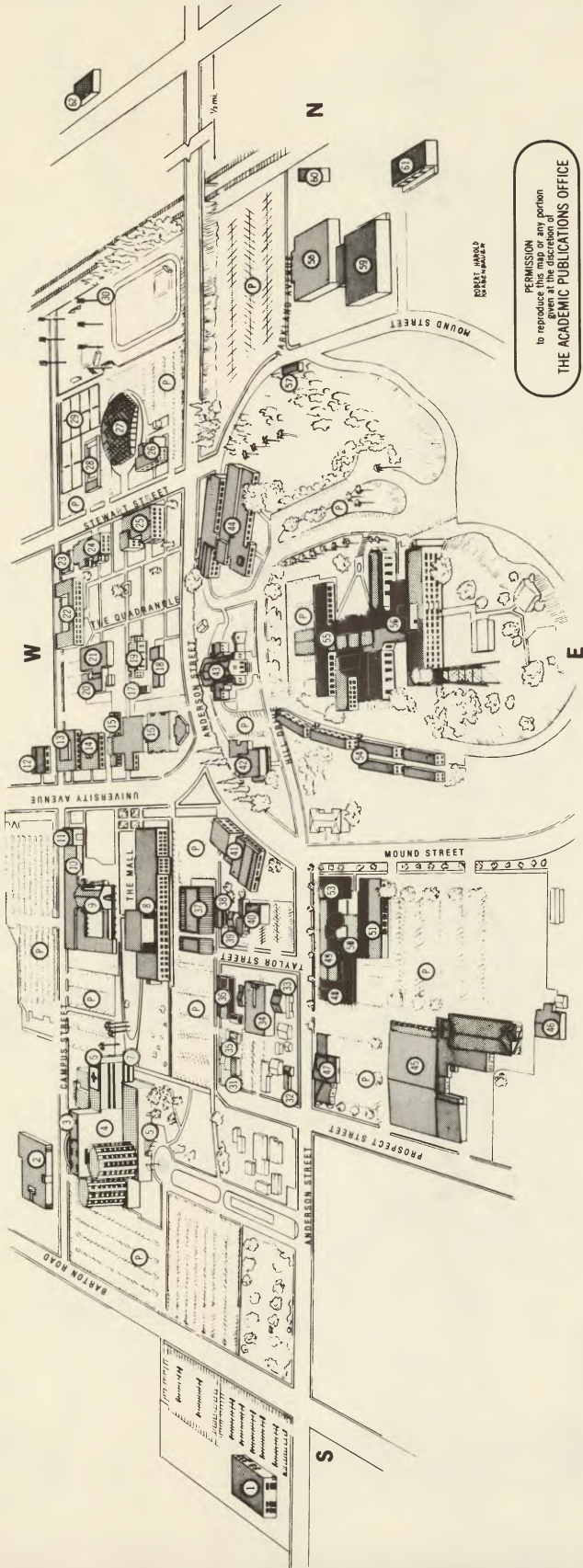
1. To foster the natural bond among alumni of each individual school, maintaining the right of alumni to direct their own group activities.
2. To assist the University and its schools in their duty to provide for the continuing general welfare of all students, faculty, and alumni.
3. To encourage alumni through constituent associations to assist in providing adequate and dependable financial support both for the University and for alumni activities.





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 Student Housing
 Dining
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 Other

ROBERT JAMES
1952-1953

LOMA LINDA CAMPUS MAP

NUMERICAL LEGEND

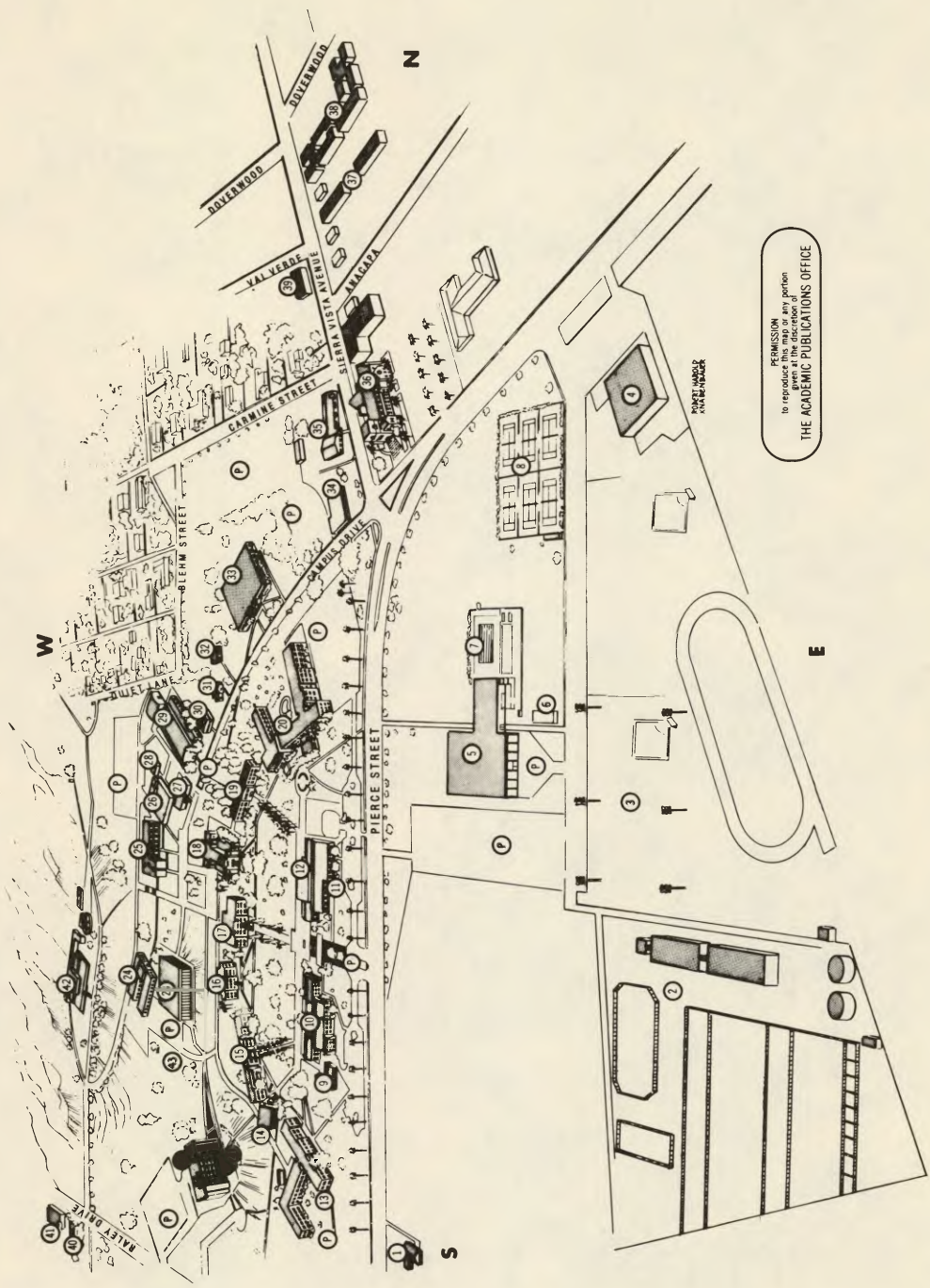
- 1 Loma Linda University Faculty Medical Offices
- 2 West Hall, Counseling Center / Psychiatry / School of Nursing
- 3 Health Service (student, employee)
- 4 Medical Center / School of Medicine / Medical Affairs VP
- 5 Medical Center (main entrance)
- 6 Heliport
- 7 Medical Center (student entrance)
- 8 Prince Hall, School of Dentistry / Jorgensen Memorial Library
- 9 University Church
- 10 Fellowship Hall / Child Care Center
- 11 Campus Chapel, University Church
- 12 Orthotics and Prosthetics
- 13 Mortensen Hall (biochemistry)
- 14 Griggs Hall, Graduate School / Division of Religion / Geoscience Research Institute
- 15 Magan Hall, The President / Academic Administration VP / Affirmative Action / Development and Public Relations VP / Financial Administration VP / Corporate Relations / Corporate Secretary / Gift Records / Trust Development / University Controller
- 16 University Library
- 17 Periodicals / Adventist Heritage Magazine Office
- 18 Microbiology Annex
- 19 Burden Hall, Academic Publications / Alumni Associations (Allied Health Professions, Graduate School, Health, Nursing) / Alumni Federation / Auditorium / News offices / SAC (Social Action Corps) / University Relations
- 20 Animal quarters
- 21 Risley Hall (physiology, pharmacology)
- 22 Daniells Hall (men's residence)
- 23 Dean of men's residence
- 24 Shryock Hall (anatomy, museum)
- 25 Evans Hall (pathology, microbiology)
- 26 Audiovisual Service
- 27 Gentry Gymnasium
- 28 Swimming pool
- 29 Tennis courts
- 30 Recreation field
- 31 Hospital Collection
- 32 Alumni Association, Medicine
- 33 Safety and Security
- 34 University Arts Building, Alumni Association, Dentistry / Blissymbolics Resource Centre / Department of Speech and Language Development / Employee Relations / Foundation Real Estate / Grants Resources Service / Payroll /

- 35 private practice offices / Purchasing / Risk Management and Insurance / University Quik Copy Service
 - 36 Forms Management
 - 37 Dentistry faculty practice
 - 38 Power Plant
 - 39 Dentistry research
 - 40 Graphics Studio, School of Dentistry
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 - 43 Linda Hall / Welfare Center, Campus Hill Church
 - 44 Campus Hill Church
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 - 46 Convenience Center, Bakery / Bookstore / businesses / Camera Shop / Campus Store / General Conference
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LA SIERRA CAMPUS MAP

NUMERICAL LEGEND

- 1 Agriculture
- 2 Dopp Equestrian Center
- 3 Recreation fields
- 4 College Market / Bookstore
- 5 Alumni Pavilion / Gymnasium
- 6 Physical Education office
- 7 Swimming pool
- 8 Tennis courts
- 9 Safety and Security
- 10 Administration Building (academic, financial): The President / Vice Presidents of Academic Administration, Development and Public Relations, Financial Administration, Student Affairs / Accounting Service / Alumni Affairs / Dean of Students / Departments of Business and Economics, Secretarial and Business Education / Graduate School / Offices of Admissions and Records, Business, News and Public Information, Payroll, Personnel, Purchasing / Student Admissions, Affairs, Aid, Employment, Finance, Loans, Recruitment
- 11 Student Center
- 12 The Commons / Food Service (cafeteria)
- 13 Calkins Hall: men
- 14 Matheson Chapel
- 15 South Hall: women
- 16 San Fernando Hall: Physics
- 17 La Sierra Hall: Counseling Center / Division of Religion / English / History and Political Science / Mathematics / Modern Languages / School of Education
- 18 Hole Memorial Auditorium: Auditorium / Education / Music / Testing
- 19 Gladwyn Hall: women
- 20 Angwin Hall: women
- 21 Meier Chapel
- 22 Sierra Towers: men
- 23 University Library / Learning Advancement Program / Media Services
- 24 Ambs Hall: Industrial Studies
- 25 Consumer Related Sciences / Nursery School
- 26 Communication / KSGN / Nursing

- 27 Art
- 28 Nursing
- 29 Campus Industries (Fast Pak)
- 30 Mail Service / Custodial Service
- 31 Health Service
- 32 Animal quarters
- 33 Palmer Hall: Biology / Chemistry / World Museum of Natural History
- 34 Behavioral Sciences: Anthropology / Psychology / Sociology
- 35 Sierra Vista Chapel / Welfare Center
- 36 La Sierra Collegiate Church
- 37 Walnut Grove Apartments
- 38 Sierra Vista Apartments
- 39 Sierra Vista House
- 40 Rhoads House
- 41 Raley House
- 42 Physical Plant Services (maintenance) / Receiving
- 43 John Clough Park

ALPHABETICAL LEGEND

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UNIVERSITY INFORMATION

BOTH CAMPUSES

General University interests	The President
Admission	Admissions Office
Student welfare, housing, visas	Student Affairs Office
Student finance	Student Aid and Finance Office
Records	Office of Admissions and Records

LA SIERRA CAMPUS

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College of Arts and Sciences	Dean 785-2210
School of Education	Dean 785-2266

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All other Schools	796-7311 Redlands 824-0800 Riverside, San Bernardino
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Division of Religion	Dean
The Graduate School	Dean

