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Loma Linda University

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LOMA LINDA UNIVERSITY

Graduate School

1993 ♡ 1995

LOMA LINDA UNIVERSITY
GRADUATE SCHOOL
Bulletin 1993-95

LOMA LINDA, CALIFORNIA

Cover: The Good Samaritan sculpture, located on the campus mall,
is a graphic representation of the parable told by Jesus in Luke 10:30-37.

The information in this BULLETIN is made as accurate as is possible at the time of publication. Students are responsible for informing themselves of 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.

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graduate school

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LOMA LINDA UNIVERSITY
Loma Linda, California 92350
1993-95

A health sciences university

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Loma Linda University

HISTORY

Loma Linda University has grown out of the institution founded at Loma Linda, California, by the Seventh-day Adventist church in 1905. The original schools — Nursing and Medicine — have been joined by Allied Health Professions, Dentistry, Public Health, the Graduate School, and the Faculty of Religion.

The University, operated by the Seventh-day Adventist church, is committed to the vision of its founders and sustained by its close association with the church.

Loma Linda University is a Seventh-day Adventist coeducational, health sciences institution located in inland southern California. It is part of the Seventh-day Adventist system of higher education. Professional curricula are offered by the School of Allied Health Professions, Dentistry, Public Health, Medicine, and Nursing. Graduate programs in various biomedical sciences of the schools are offered by departments. The professional curricula of the University are approved by their respective professional organizations.

The core of the combined faculties consists of approximately 885 full-time teachers. Part-time and voluntary teachers, especially clinicians in the professional curricula, bring the total past 1,900. Men and women from as many as 85 nations are represented in the annual enrollment of nearly 2,700 students.

PHILOSOPHY

As implied by its motto, "TO MAKE MAN WHOLE," the University affirms these tenets as central to its view of education:

God is the creator and sustainer of the universe.

Mankind's fullest development entails a growing understanding of the individual in relation to both God and society.

The quest for truth and professional expertise, in an environment permeated by religious values, benefits the individual and society and advances the ministry of the Seventh-day Adventist church.

The Mission

OUR MISSION

The mission of Loma Linda University is to further the healing and teaching ministry of Jesus Christ “to make man whole” by:

- Educating Ethical and proficient Christian health professionals and scholars through instruction, example, and the pursuit of truth;
- Expanding human knowledge and its application to health and disease through basic and applied research in the biological and behavioral sciences;
- Providing comprehensive, competent, and compassionate health care for the whole person through faculty, students, and alumni.

This Seventh-day Adventist health sciences university, in harmony with its heritage, fosters a caring Christian environment which emphasizes and facilitates both professional and personal balance leading to an integrated development of the intellectual, spiritual, social, and physical qualities of our students, faculty, staff, and administration. To achieve this mission we are committed to:

OUR STUDENTS

Our primary responsibility is the education of our students, who come from diverse ethnic and cultural backgrounds, enabling them to acquire the foundation of knowledge, skills, values, and attitudes appropriate for their chosen academic or health-care ministry. We nurture the intellectual curiosity of students. We facilitate their development into active, independent learners. We provide continuing educational opportunities for both our alumni and professional peers. We encourage a personal Christian faith that permeates their lives.

OUR FACULTY, STAFF, AND ADMINISTRATION

We respect our faculty, staff, and administration who through education, research, and service create a stimulating learning environment for our students. They contribute to the development of new understandings in their chosen fields. They demonstrate both Christian values and competence in their scholarship and professions.

OUR PATIENTS AND OTHERS WE SERVE

We provide humanitarian service through people, programs, and facilities. We promote healthful living and respond to the therapeutic and rehabilitative needs of the people. We seek to enhance the quality of life for individuals in local, regional, national, and world communities.

OUR GOD AND OUR CHURCH

We believe all persons are children of God called to friendship with Him now and throughout eternity. We support the global mission of the Seventh-day Adventist church by responding to its needs for skilled health professionals and scholars. We strive to honor God and uphold the values of the Seventh-day Adventist church and its commitment to awakening inquiry, promoting healthful living, caring for the sick, and spreading the good news of a loving God contained in the gospel of Jesus Christ.



Nondiscrimination Policy

The University was established by the Seventh-day Adventist church as an integral part of its teaching ministry. It is committed to equal education and employment opportunities for men and women of all races and does not discriminate on the basis of handicap, sex, race, color, or national origin in its educational and admissions policies, financial affairs, employment programs, student life and services, or any University-administered program.

To this end, the University is in compliance with Titles VI and VII of the Civil Rights Act of 1964 as amended, and substantial compliance with Title IX of the Education Amendments of 1972 (45 CFR 86 et seq.) and Sections 503 and 504 of the Rehabilitation Act of 1973. The University also complies with the Age Discrimination in Employment Act of 1967 and Section 402 of the Vietnam Era Veterans Adjustment Act of 1974 and does not discriminate against any employee or applicant for employment on the basis of age or because they are disabled veterans or veterans of the Vietnam era. In addition, the University administers student programs without discrimination on the basis of age, except in those programs where age is a bona fide academic qualification for admission in accordance with the provisions of the Age Discrimination Act of 1975.

The University reserves constitutional and statutory rights as a religious institution and employer to give preference to Seventh-day Adventists in admissions and employment including, but not limited to, 42 USC Secs. 2000e-1, 2000e-2, Sec. 6-15 of Federal Executive order 11246; 41 CFR Sec. 60-1.5(5); 34 CFR Secs. 86.21, 86.31, 86.40, and 86.57(b); California Government Code sections 12926(c); and Title II, Division 3, part 2.8 of the California Administration Code, the First Amendment to the United States Constitution, and Article I, Section 4, of the California Constitution. The University believes that Title IX regulations are subject to constitutional guarantees against unreasonable entanglement with or infringements on the religious teachings and practices of the Seventh-day Adventist church. The University expects students and employees to uphold biblical principles of morality and deportment as interpreted by the Seventh-day Adventist church. The University claims exemptions from the provisions of Title IX set forth in 34 CFR Secs. 86.21, 86.31, 86.40, and 86.57(b) insofar as they conflict with church teachings and practices of morality, deportment, and appearance.

Affirmative Action

The University routinely monitors its educational and employment practice regarding, women, minorities, and the handicapped to ensure compliance with the law and University policy. The University's affirmative action policy is to provide equal access to admissions, educational programs and activities, financial aid, student services, and employment.

In compliance with Title IX of the Educational Amendments of 1972 and Section 504 of the Rehabilitation Act of 1973, a grievance procedure has been established to process student complaints alleging violation of these regulations or of the University's policy of nondiscrimination based on sex or handicap. Inquiries concerning Title IX may be directed to the affirmative action officer. Employment-related discrimination complaints, including those filed by student employees, are processed in conformity with the provisions outlined in existing staff personnel policies. Complaints related to discrimination in academic areas are reviewed in conformity with the procedures established by the academic administration.

The Calendar

1993

JUNE

S	M	T	W	T	F	S		
			1	2	3	4	5	
6	7	8	9	10	11	12	7-10	Final examinations
13	14	15	16	17	18	19	10	<i>Spring Commencement</i>
20	21	22	23	24	25	26		SUMMER QUARTER 1993
27	28	29	30					Master's degree students initiate a Petition for Admission to Candidacy (Form A) in the third quarter after beginning study in the Graduate School
							21	Registration
							22	Instruction begins

JULY

S	M	T	W	T	F	S		
				1	2	3		
4	5	6	7	8	9	10	5	Independence Day recess
11	12	13	14	15	16	17	14	Last day to petition doctoral candidacy (Form A) for winter completion
18	19	20	21	22	23	24		
25	26	27	28	29	30	31		

AUGUST

S	M	T	W	T	F	S		
1	2	3	4	5	6	7	2	Certain basic medical science classes commence
8	9	10	11	12	13	14	8	Last day to submit Petition for Admission to Candidacy (Form A) if this is the student's third quarter of study in a master's degree program
15	16	17	18	19	20	21	27	Last day to submit final copy of thesis, publishable paper, or dissertation, including signed approvals, and Certification of Completion of Requirements for Degree (Form D) to the Graduate School for summer completion
22	23	24	25	26	27	28		
29	30	31						

SEPTEMBER

S	M	T	W	T	F	S		
			1	2	3	4	1	Instruction ends
5	6	7	8	9	10	11	6	Labor Day recess
12	13	14	15	16	17	18		POSTSUMMER SESSION
19	20	21	22	23	24	25	7	Instruction begins
26	27	28	29	30				FALL QUARTER 1993
								Master's degree students initiate a Petition for Admission to Candidacy (Form A) in the third quarter after beginning study in the Graduate School
							20-24	Early registration (returning students)
							27	Registration
							28	Instruction begins

The Calendar

1993

OCTOBER

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

Last day to enter a course
 Last day to submit Petition for Graduation (Form C) for fall completion
 Last day to withdraw with no transcript record

NOVEMBER

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

Week of Devotion
 Last day to petition doctoral degree candidacy (Form A) for spring completion
 Thanksgiving recess
 Instruction resumes
 Last day to withdraw with a W grade or to submit S/U petition

DECEMBER

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

Last day to submit Petition for Graduation (Form C) for winter completion
 Early registration
 Last day to submit Petition for Admission to Candidacy (Form A) if this is the student's third quarter of study in a master's degree program
 Last day to submit final copy of thesis, publishable paper, or dissertation, including signed approvals, and Certification of Completion of Requirements for Degree (Form D) to the Graduate School for fall completion
 Final examinations
 Christmas recess

1994

JANUARY

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

WINTER QUARTER 1994
 Master's degree students initiate a Petition for Admission to Candidacy (Form A) in the third quarter after beginning study in the Graduate School
 Registration
 Instruction begins
 Last day to enter a course
 Last day to petition doctoral degree candidacy (Form A) for summer completion
 Martin Luther King, Jr., Day recess
 Last day to withdraw with no transcript record

FEBRUARY

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

Black Emphasis Week
 Student Week of Spiritual Emphasis
 Presidents' Day recess
 Last day to withdraw with a W grade or to submit S/U petition
 Last day to submit Petition for Graduation (Form C) for spring completion

The Calendar

1994

MARCH

S	M	T	W	T	F	S		
		1	2	3	4	5	4	Last day to submit Petition for Admission to Candidacy (Form A) if this is the student's third quarter of study in a master's degree program
6	7	8	9	10	11	12		
13	14	15	16	17	18	19	7-25	Early registration
20	21	22	23	24	25	26	11	Last day to submit final copy of thesis, publishable paper, or dissertation, including signed approvals, and Certification of Completion of Requirements for Degree (Form D) to the Graduate School for winter completion
27	28	29	30	31			14-17	Final examinations
							18-27	Spring recess
								SPRING QUARTER 1994
								Master's degree students initiate a Petition for Admission to Candidacy (Form A) in the third quarter after beginning study in the Graduate School
							28	Registration
							29	Instruction begins

APRIL

S	M	T	W	T	F	S		
					1	2		
3	4	5	6	7	8	9	5	Last day to enter a course
10	11	12	13	14	15	16	-	Graduate School Retreat (to be announced)
17	18	19	20	21	22	23	12	Last day to withdraw with no transcript record
24	25	26	27	28	29	30	13	Last day to petition doctoral candidacy (Form A) for fall completion
							18-23	Week of Devotion
							24-MAY 1	Fine Arts Festival

MAY

S	M	T	W	T	F	S		
1	2	3	4	5	6	7	1	Submit form indicating intent to complete requirements
8	9	10	11	12	13	14	13	Last day to submit Petition for Admission to Candidacy (Form A) if this is the student's third quarter of study in a master's degree program
15	16	17	18	19	20	21	13	Last day to Petition for Graduation (Form C) for summer completion
22	23	24	25	26	27	28	23	Last day to withdraw with a W grade or to submit S/U petition
29	30	31					30	Memorial Day recess
							31-JUN 17	Early registration

JUNE

S	M	T	W	T	F	S		
			1	2	3	4	3	Last day to submit final copy of thesis, publishable paper, or dissertation, including signed approvals, and Certification of Completion of Requirements for Degree (Form D) to the Graduate School for spring completion
5	6	7	8	9	10	11		
12	13	14	15	16	17	18	6-9	Final examinations
19	20	21	22	23	24	25	9	<i>Spring Commencement</i>
26	27	28	29	30				SUMMER QUARTER 1994
								Master's degree students initiate a Petition for Admission to Candidacy (Form A) in the third quarter after beginning study in the Graduate School
							20	Registration
							21	Instruction begins

The Calendar

1994

JULY

S	M	T	W	T	F	S	
					1	2	
3	4	5	6	7	8	9	4 Independence Day recess
10	11	12	13	14	15	16	13 Last day to petition doctoral candidacy (Form A) for winter completion
17	18	19	20	21	22	23	
24	25	26	27	28	29	30	
31							

AUGUST

S	M	T	W	T	F	S	
					1	2	
7	8	9	10	11	12	13	1 Certain basic medical science classes commence
14	15	16	17	18	19	20	12 Last day to submit Petition for Admission to Candidacy (Form A) if this is the student's third quarter of study in a master's degree program
21	22	23	24	25	26	27	26 Last day to submit final copy of thesis, publishable paper, or dissertation, including signed approvals, and Certification of Completion of Requirements for Degree (Form D) to the Graduate School for summer completion
28	29	30	31				

SEPTEMBER

S	M	T	W	T	F	S	
					1	2	
4	5	6	7	8	9	10	5 POSTSUMMER SESSION Labor Day recess
11	12	13	14	15	16	17	6 Instruction begins
18	19	20	21	22	23	24	23 Instruction ends
25	26	27	28	29	30		FALL QUARTER 1994 Master's degree students initiate a Petition for Admission to Candidacy (Form A) in the third quarter after beginning study in the Graduate School
							19-23 Early Registration (returning students)
							26 Registration
							27 Instruction begins

OCTOBER

S	M	T	W	T	F	S	
					1		
2	3	4	5	6	7	8	
9	10	11	12	13	14	15	4 Last day to enter a course
16	17	18	19	20	21	22	4 Last day to submit Petition for Graduation (Form C) for fall completion
23	24	25	26	27	28	29	11 Last day to withdraw with no transcript record
30	31						17-22 Week of Devotion

NOVEMBER

S	M	T	W	T	F	S	
					1	2	
6	7	8	9	10	11	12	
13	14	15	16	17	18	19	14 Last day to petition doctoral degree candidacy (Form A) for spring completion
20	21	22	23	24	25	26	
27	28	29	30				23-27 Thanksgiving recess
							28 Instruction resumes
							28 Last day to withdraw with a W grade or to submit S/U petition

The Calendar

1994

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

2 Last day to submit Petition for Graduation (Form C) for winter completion
 5-29 Early registration
 8 Last day to submit Petition for Admission to Candidacy (Form A) if this is the student's third quarter of study in a master's degree program
 9 Last day to submit final copy of thesis, publishable paper, or dissertation, including signed approvals, and Certification of Completion of Requirements for Degree (Form D) to the Graduate School for fall completion
 12-15 Final examinations
 16-JAN 2 Christmas recess

1995

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

WINTER QUARTER 1994
 Master's degree students initiate a Petition for Admission to Candidacy (Form A) in the third quarter after beginning study in the Graduate School
 2 Registration
 3 Instruction begins
 10 Last day to enter a course
 13 Last day to petition doctoral degree candidacy (Form A) for summer completion
 13-20 Mission Emphasis Week
 16 Martin Luther King, Jr., Day recess
 17 Last day to withdraw with no transcript record

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

JAN 30-5 Black Emphasis Week
 20 Presidents' Day recess

27 Last day to withdraw with a W grade or to submit S/U petition
 27 Last day to submit Petition for Graduation (Form C) for spring completion

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 submit Petition for Admission to Candidacy (Form A) if this is the student's third quarter of study in a master's degree program
 6-24 Early registration
 10 Last day to submit final copy of thesis, publishable paper, or dissertation, including signed approvals, and Certification of Completion of Requirements for Degree (Form D) to the Graduate School for winter completion
 13-16 Final examinations
 17-26 Spring recess
SPRING QUARTER 1995
 Master's degree students initiate a Petition for Admission to Candidacy (Form A) in the third quarter after beginning study in the Graduate School
 27 Registration
 28 Instruction begins

The Calendar

1995

APRIL

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

Last day to enter a course
 Last day to withdraw with no transcript record
 Graduate School retreat (to be announced)
 Last day to petition doctoral candidacy (Form A) for fall completion
 Week of Devotion

MAY

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

Last day to submit Petition for Admission to Candidacy (Form A) if this is the student's third quarter of study in a master's degree program
 Last day to Petition for Graduation (Form C) for summer completion
 Last day to withdraw with a W grade or to submit S/U petition
 Memorial Day recess

JUNE

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

Last day to submit final copy of thesis, publishable paper, or dissertation, including signed approvals, and Certification of Completion of Requirements for Degree (Form D) to the Graduate School for spring completion
 Final examinations
Spring Commencement
SUMMER QUARTER 1995
 Master's degree students initiate a Petition for Admission to Candidacy (Form A) in the third quarter after beginning study in the Graduate School
 19 Registration
 20 Instruction begins

We're glad you have chosen to consider Loma Linda University Graduate School as you make plans to continue your educational goals. This bulletin describes who we are and what we have to offer. It will familiarize you with the philosophy and structure of our programs along with a listing of the participating faculty and their educational backgrounds.

The Graduate School is a diverse entity with programs whose faculty are drawn from all the schools of the University. We embrace the University mission as articulated in this bulletin and are committed to education, research, and service within the Christian context.

You'll find vigorous academic programs that will stretch your mind as you take time to make new discoveries, get to understand our world, and apply Christian principles to your life and profession.

Our administrators, faculty, and staff are here to work with you and help you prepare for your future as a caring, Christian professional in the world of service to mankind.

If you'd like to know more about us, you can call us toll free at 1-800-422-4LLU.



A handwritten signature in black ink, appearing to read 'R. D. King', with a long horizontal line extending to the right.

Dean

I

ADMISSION INFORMATION

PROGRAMS AND DEGREES

STUDENT LIFE

POLICIES AND GENERAL REGULATIONS

FINANCIAL INFORMATION

FACULTY OF RELIGION

In the Graduate School of Loma Linda University the essential concern of both faculty and students is the quest for meaning. Because this quest is served by knowledge, graduate students are obliged to achieve both broad and detailed mastery of their field of study. They also participate with the faculty in the process by which knowledge is augmented.

OBJECTIVES

The Graduate School attempts to create an environment favorable to the pursuit of knowledge and meaning by:

1. Making available to graduate students who wish to study in a Seventh-day Adventist Christian setting the education necessary for scholarly careers in the sciences and the health professions.
2. Encouraging development of independent judgment, mastery of research techniques and scholarly communication.
3. Relating intellectual achievement to the service of mankind.

Admission Information

The program admissions committees of the University intend that an applicant to any of the schools is qualified for the proposed curriculum and is capable of profiting from the educational experience in this University. The admissions committees of the Graduate School accomplish this by examining evidence of scholastic competence, moral and ethical standards, and significant qualities of character and personality. Applicants are considered for admission only on the recommendation of the program in which study is desired.

APPLICATION AND ACCEPTANCE

Where to write

Inquiries regarding application and admission should be addressed to:

Office of Admissions
Graduate School
Loma Linda University
Loma Linda, California 92350

Application procedure

1. Two copies of the graduate application should be filled out and mailed, together with the application fee, to the above address. Applications and all supporting information — transcripts, test results, references — should be submitted at least two months before the beginning of the term for which admission is sought.

2. Two complete official transcripts of all academic records from all colleges, universities, and professional or technical schools should be provided. It is the applicant's responsibility to arrange to have the transcripts sent directly by the registrar of each school attended to the Graduate School Office of Admissions.

3. A personal interview is often desirable and should be arranged with the coordinator of the program in which the student wishes to study.

Acceptance procedure

1. When the program in which the student wishes to study has evaluated the application and made its recommendation, the dean of the Graduate School takes official action and notifies the applicant. The formal notice of admission should be presented at registration as evidence of eligibility to enter in the Graduate School.

2. Students accepted may be asked to file a medical history with Student Health Service as part of registration.

3. Transcripts of records and all other application documents are retained permanently by the University for students who enroll and may not be withdrawn and used by students for any purpose. Records of students who do not enroll are destroyed two years from their date of arrival in the Graduate School.

ADMISSION REQUIREMENTS

A four-year baccalaureate degree (or its equivalent) from an accredited college or university is a prerequisite for 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 courses prescribed by different programs, the student should note the specific requirements of the chosen program.

Scholarship

Applicants are expected to present an undergraduate record with a grade point average of B (3.00) or better in the overall program and in the field of the major. Some students with an overall grade point 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.

Graduate Record Examinations

Scores on the general test of the Graduate Record Examination (GRE) are required with applications for admission to degree programs. Requirements for certificate programs vary, and applicants are advised to request information specific to their proposed program of study. Students may address inquiries about these examinations to Office of Admissions Graduate School, which can provide application forms and information about special administration of the examination on days other than Saturday.

Application forms for the GRE 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 the GRE results, students seeking admission who have otherwise above-average achievement may be admitted provisionally, subject to review when the required test results are received. In such cases, test results are to be submitted within the first quarter of attendance. Certain programs with limited admissions may require the GRE results prior to acceptance while some programs require the subject test. Please check student guides from individual programs for further information.

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. 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-five days prior to enrollment.

Reentrance

A student who discontinues studies at the University must meet the entrance requirements effective at the time of reentrance, unless a leave of absence has been granted. Fees are required for reentrance applications, and supplementary documents may also be required.

International students

The admission of students from countries where English is not the first language 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 Test of English Language Proficiency (MTELP); 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 the paragraph "Graduate Record 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. A deposit must be made to the International Student Affairs Office 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 the United States 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 International Student Affairs Office after acceptance and after financial arrangements have been made with that office.

Student visa

A graduate student entering the United States on a student visa (F-1) must successfully carry a study load of at least eight units during each quarter of the academic year. The applicant must be prepared to provide such advance deposit as is

required by Student Finance 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.

English competence

All international students are encouraged (particularly those who do not have an adequate score on TOEFL or MTELP or other evidence of English proficiency) to attend an intensive American Language Institute prior to entering their program. Further information about opportunities for such programs can be obtained from the University's Student Affairs Office. Further study of English may be required to assure progress toward the degree.

ADMISSION CLASSIFICATIONS

Applicants are admitted to one of the following classifications. For regular and provisional status, applicants must be approved for acceptance by the program in which they propose to study. Others may be permitted to enroll, subject to availability of facilities, and classified as nondegree students.

Regular

Regular status is given to a student who meets the scholarship and examinations requirements for admission to the graduate program of choice, has met all prerequisites, and has no undergraduate deficiencies

Provisional

Provisional status is given to a student (a) whose scholarship does not reach the level for regular graduate standing but who shows strong promise of success in graduate studies, or (b) who has the prerequisites but whose undergraduate preparation is inadequate for the chosen graduate program, or (c) whose admissions documentation is incomplete at the time of notification of acceptance. To continue eligibility for graduate study, a student admitted on provisional status must achieve a grade point average of 3.00 quarter by quarter with no course grade less than C (2.00).

Nondegree

Nondegree status is given to a student who wishes to enroll in graduate courses for personal or professional benefit but who is not seeking a graduate degree. Such applicants complete a specially designed application form.

Nondegree students in the Graduate School are permitted only 12 units of study for regular grades. Beyond the 12 units, only audit (AU) may be recorded.

Certificate

Students seeking admission to one of the Graduate School's postbaccalaureate or postdoctoral certificate programs apply in the usual way for regular or provisional admission but are classified as *certificate* 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 is required to pay tuition and agrees to attend at least 80 percent of course lectures.

College senior

A senior with a grade point average of 3.0 or above may request to take a graduate course simultaneously with courses that complete bachelor's degree requirements if the total does not constitute more than 12 academic units. Registration requires instructor and Graduate School dean approval.

FROM MASTER'S TO PH.D. DEGREE

Bypassing master's

A graduate student at this University often 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 degree program a student decides to go on to the doctoral degree, written application should be made to the adviser and the dean of the Graduate School. If the award of the master's degree is sought, the student will be expected to complete that degree before embarking on doctoral activity for credit. 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: courses 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

A student who wishes to qualify for an additional master's degree in a different discipline may apply. The dean of the Graduate School and the faculty of the program the student wishes to enter will consider such a request on its individual merits.

Concurrent admission

Students may not be admitted to a Graduate School program while admitted to another program at this University or elsewhere. The exceptions to this are the combined degree programs, discussed in the following paragraph.

Combined degrees

The Graduate School provides for concurrent registration for two degrees only in its combined science/professional degree programs – M.D./Ph.D., M.D./M.S., D.D.S./Ph.D., and D.D.S./M.S. – all in biomedical sciences. Concurrent application is required in some but not all of these. See page 27 of this BULLETIN; see also "Becoming a Medical Scientist at Loma Linda University," a brochure obtained from the dean's office.



Programs and Degrees

The Graduate School offers programs leading to the degrees Master of Science, Master of Arts, Master of Social Work, and Doctor of Philosophy as listed below. The campus on which registration is conducted is indicated by the designation LL (Loma Linda) or CUC (Canadian Union College).

Master of Science

Anatomy
Biochemistry
Biology
Clinical Nutrition
Marriage and Family Therapy,
LL/CUC

Microbiology

Nursing
Paleontology
Pharmacology
Physiology
Speech-Language Pathology

Dentistry:

Endodontics
Oral Implantology
Oral and Maxillofacial Surgery
Orthodontics
Periodontics

Master of Arts

Family Life Education
Biomedical and Clinical Ethics

Master of Social Work

Doctor of Philosophy

Anatomy
Biochemistry
Biology
Medical Scientist Program

Microbiology
Pharmacology

Physiology

GENERAL INFORMATION

Other graduate degrees are offered in the University by the School of Allied Health Professions (Master of Physical Therapy) and the School of Public Health (Master of Science in Public Health, Master of Public Health, Master of Health Administration, Doctor of Health Science, and Doctor of Public Health).

MASTER OF ARTS / SCIENCE / SOCIAL WORK

Adviser and guidance committee

Each student accepted into a degree program is assigned 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 coordinator of the student's program in arranging courses, screening thesis topics (where applicable), guiding research, administering final written and/or oral examinations, evaluating the thesis and other evidence of the candidate's fitness to receive the degree, and recommending the student for graduation.

Subject prerequisites and deficiencies

Gaps in an applicant's academic achievement will be identified by subject and classified either as prerequisites or as subject deficiencies. Applicants lacking certain subject or program prerequisites are not admitted to the master's degree program until the prerequisites are completed (at Loma Linda University or elsewhere), and acceptable grades are reported. However, subject deficiencies do not exclude an applicant from admission or enrollment; but they must be removed as specified by the adviser or dean, usually at the beginning of the graduate experience at this University.

Study plan

The student's adviser should develop with the student a written outline of the complete graduate experience, with time and activity specified as fully as possible. This will serve as a guide to both the student and the adviser as well as to members of the guidance committee when it is selected. The study plan is changed only after careful consultation. The student is ultimately responsible for ensuring both timely registration and completion of required courses.

Time limit

The time allowed from admission to the Graduate School to conferring of the master's degree may not exceed five years. Some consideration may be given to a short extension of time if in the dean's opinion such is merited.

Residence

Students must meet the residence requirements indicated for their particular program (never less than one academic quarter). The master's degree candidate must complete one quarter of full-time study at the University or perform the thesis research at the University. Although students may register for up to 12 units each quarter, a student is considered in full-time residence if registered for at least 8 units.

Grade achievement

The required minimum grade average is B (3.00) with no course grade below C (2.0) 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 grade average on all work accepted for transfer and on all work taken at this University, computed separately.

Research competence

Student skills in languages, investigation, and computation are specified in each program description in this BULLETIN.

Comprehensive and final examinations

The student must take the written and oral examinations prescribed by the program on or before the published dates. Examinations for the master's degree candidate include a final examination not later than a month before the date of program completion.

If a candidate fails to pass the 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.

Thesis

Students writing a thesis must register for at least one unit of thesis credit.

The research and thesis 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 possible. Such approval must be secured before petition is made for candidacy.

The student must register and pay tuition for thesis credit 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, continuous registration is to be maintained until the manuscript has been accepted. This involves a quarterly fee of \$40 (1993-95) paid at the beginning of each quarter.

Candidacy

Admission to the Graduate School or designation of regular graduate standing does not constitute admission of the student to candidacy for a graduate degree. After achieving regular status, admission to candidacy is initiated by a written petition from the student to the dean, on recommendation of the program coordinator and department chairman.

Petition for candidacy for the master's degree must present a satisfactory grade record; include a statement of the proposed thesis or dissertation topic (where applicable) that has been approved by the student's guidance committee; and note any other qualification prescribed by the program. A student is usually advanced to candidacy during the third quarter after entry upon study toward a degree in the Graduate School.

Specific program 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.

Combined degree programs: M.D./M.S. and D.D.S./M.S.

Two combined degree programs are offered, each intended to provide preparation in clinical applications and the biomedical sciences. Both require concurrent admission to the Graduate School and a professional school in the University. These curricula are described in greater detail on page 27 of this BULLETIN.

Religion requirement

All master's degree students are required to take at least one three-unit religion course. Courses (numbered between 500 and 600) in social ethics, bioethics, and philosophy of religion meet this requirement.

THE DOCTOR OF PHILOSOPHY DEGREE

The Doctor of Philosophy degree is awarded for evidence of mature scholarship; productive promise; and active awareness of the history, resources, and demands of a specialized field.

Adviser and guidance committee

Each student on acceptance into a degree program is given an adviser who helps arrange the study program. Subsequently (no later than when applying for candidacy) the student is put under the supervision of a guidance committee. The Graduate School requires advisers for doctoral candidates to have demonstrated consistent research productivity in their chosen discipline. Each program maintains a list of qualified doctoral degree mentors. The guidance committee, usually chaired by the adviser, is responsible to and works with the coordinator of the student's program in arranging course sequences, screening dissertation topics, recommending candidacy, guiding research, administering written and oral examinations, evaluating the dissertation and other evidence of the candidate's fitness to receive the degree, and recommending the student for graduation.

Subject prerequisites and deficiencies

Gaps in an applicant's academic achievement will be identified by subjects and classified as either prerequisites or as subject deficiencies.

Applicants lacking subject or program prerequisites are not admitted to the Ph.D. degree program until the prerequisites are completed (at Loma Linda University or elsewhere) with acceptable grades.

Subject deficiencies do not exclude an applicant from admission or enrollment, but they must be removed as specified by the adviser or dean, usually at the beginning of the graduate experience at this University.

Study plan

The student's adviser should develop with the student a written outline of the complete graduate experience, with time and activity specified as fully as possible. This serves as a guide to both the student and the advisers as well as to members of the guidance committee when it is selected. The study plan is changed only after careful consultation. The student is ultimately responsible for ensuring both timely registration and completion of required courses.

Time limit

Completion of the graduate experience signals currency and competence in the discipline. The dynamic nature of the biological sciences makes dilatory or even leisurely pursuit of the degree unacceptable. Seven years are allowed for completion after admission to the Ph.D. degree program. Extension of time may be granted on petition if recommended by the guidance committee to the dean of the Graduate School.

Course credit allowed toward the doctorate is nullified eight years from the date of course completion. Nullified courses may be revalidated, upon successful petition, through reading, conference, written reports, and always an examination to assure currency in the content.

Residence

The Graduate School requires two years of residency for the Ph.D. degree, spent on the campus of the University after enrollment in a doctoral degree program. During residence, students devote full time to graduate activity in courses, research, or a combination of these. A full load of courses is 8 or more units each quarter; 36 or more clock hours per week is full time in research. Some graduate programs specify the number of academic units for the residence years.

Students may be advised to pursue studies for limited periods at special facilities not available at Loma Linda University. Such time may be considered residence if the arrangement is approved in advance by the dean of the Graduate School.

The spirit and demands of doctoral study require full-time devotion to courses, research, reading, and reflection. But neither the passage of time nor preoccupation with study assures success. Evidence of high scholarship and original contribution to the field form the basis for determining the awarding of the degree.

Grade achievement

Students must maintain a grade point average of at least a B (3.00) to continue in regular standing toward the doctorate. This average is to be computed separately for courses and research. Courses in which a student earns a grade between C (2.0) and B (3.0) may or may not apply toward the degree, at the discretion of the guidance committee. A student submitting transfer credits must earn a B average on all work accepted for transfer credit and on all work taken at this University computed separately.

Research competence

Doctoral students demonstrate research competence by their investigative activities. Expectations and standards of achievement with the tools of investigation – natural and synthetic languages and computers – are specified for each program later in this BULLETIN.

Comprehensive examinations

The doctoral candidate is required to take comprehensive written and oral examinations over the principal areas of study to ascertain capacity for independent, productive, scientific work, and to determine whether further courses are required before the final year of preparation for the doctorate is undertaken. The program coordinator is responsible for arranging preparation and administration of the examination, as well as its evaluation and subsequent reports of results. Success in the comprehensive examination is a prerequisite to candidacy (see below).

Students cannot be admitted to the examination until the following requirements have been met: (a) demonstrated reading knowledge of one foreign language, if applicable; (b) completion of the majority of units required beyond the master's degree or its equivalent.

The final oral examination

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

If a candidate fails to pass this final examination for a graduate degree, the examining committee files with the dean a written analysis of the candidate's status, with recommendations about the student's future relation to the School. The student receives a copy of the committee's recommendation.

Dissertation

All doctoral students must register for at least one unit of dissertation credit. This should be done in the last quarter of registration prior to completion.

The research and 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 possible. Such approval must be secured before petition is made for advancement to candidacy.

Consultation with Graduate School Admissions and Records can preserve the student from embarrassing errors of format that require retyping large sections of manuscript.

Students register and pay tuition for the dissertation 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 dissertation, continuous registration is maintained until the manuscript is accepted. This involves a quarterly fee of \$40 (1993-95) paid during registration each quarter.

Doctoral dissertations are reported to University Microfilms International and to the National Research Council. The Graduate School office provides appropriate information and forms.

Candidacy

Admission to the Graduate School or designation of the status regular graduate standing does not constitute candidacy for a graduate degree. Admission to candidacy is initiated by a written petition (Graduate School Form A) from the student to the dean, with intermediate recommendation of the student's adviser and the program chairman.

The student's petition for candidacy for the Doctor of Philosophy degree will include, in addition, confirmation that comprehensive written and oral examinations have been passed.

Students expecting the award of the doctorate at a June graduation should have achieved candidacy no later than the previous November 15. One full quarter must be allowed between the achievement of candidacy and the quarter of completion.

Specific program requirements

Doctoral programs differ from each other. The unique program requirements appear in the program sections of this BULLETIN and in the program guides available from specific departments.

Combined degree programs: M.D./Ph.D. and D.D.S./Ph.D.

Two combined degree programs are offered, each intended to provide preparation in clinical medicine and the biomedical sciences. Both require concurrent admission to the Graduate School and a professional school in the University. These curricula are described in greater detail in the section Combined Biomedical Science/Professional Degrees.

Religion requirement

All doctoral students take at least one three-unit religion course. Courses (numbered between 500 and 600) in social ethics, bioethics, and in philosophy of religion meet this requirement.

COMBINED BIOMEDICAL SCIENCE/ PROFESSIONAL DEGREES

The Graduate School collaborates with the Schools of Medicine and Dentistry in offering two curricula that lead to the awarding of a professional degree, either the M.D. or D.D.S., and either the M.S. or Ph.D. in a biomedical science. The biomedical sciences available are anatomy, biochemistry, microbiology, pharmacology, and physiology.

The two curricula differ in the point at which students enter the Graduate School and in the first year's sequence of courses. They are similar, however, in the general requirements for the degree, in requiring regular status at admission, and in requiring acceptance into both the Graduate School and one professional school.

Both curricula are fully described in a separate brochure, "Becoming a Medical Scientist at Loma Linda University," available from Admissions, the Graduate School, Loma Linda University, Loma Linda, CA 92350.

The two curricula are described in the following sections.

Combined Degree Program (CDP)

The Combined Degree Program provides opportunity for especially well-qualified and motivated students to pursue professional and graduate education; and to prepare for careers in clinical specialization, teaching, or investigation of problems of health and disease in man.

For admission to the Combined Degree Program, students must have a baccalaureate degree, must qualify for admission to the Graduate School, and must already be admitted to either the School of Medicine or Dentistry. Application may be made at any point in the student's progress in the professional school, though usually during the sophomore year. Students in this curriculum study toward a degree, either the M.S. or Ph.D., in one of the five biomedical science disciplines previously named.

Students interrupt their professional study for two, perhaps more years as needed, for courses and research for the graduate degree sought. Elective time in the professional school may be spent in meeting graduate requirements.

The student's concurrent status is regarded as continuous until the program is completed or until discontinuance is recommended by the Graduate School or the professional school. The usual degree requirements apply.

Medical Scientist Program (MSP)

The Medical Scientist Program has similar degree and career objectives to the Combined Degree Program, but with some differences.

Applicants are admitted who achieve simultaneous regular acceptance in the Graduate School and the School of Medicine prior to enrollment in either school. Study begins in the Graduate School with a one-year sequence in cell and molecular biology, selected courses from the freshman School of Medicine sequence, and clinically related seminars.

During the first years, the MSP coordinator advises the students. Later, when research interest and direction emerge, a program adviser and a thesis or dissertation guidance committee are chosen and recommend advancement to candidacy.

After the first MSP year, students pursue the first two somewhat modified years of their professional curriculum, returning to the Graduate School thereafter to complete and receive the graduate degree. Completion of the professional training follows. Elective time in the professional school may be spent in meeting graduate requirements.

Student Life

Application to and enrollment in the University constitute the student's commitment to honor and abide by the academic and social practices and regulations stated in announcements, bulletins, handbooks, and other published materials; and to maintain a manner that is mature and compatible with the University's function as an institution of higher learning. If students neglect academic or other student duties, if their social conduct is unbecoming, or if their attitudes demonstrate deficiencies such as poor judgment, moral inadequacy, or other forms of immaturity, it is inevitable that they will come under question. The faculty then reviews the case, appraises fitness for a career in the chosen profession, and recommends to the dean appropriate action as to the student's continuance or discontinuance. Potential students who have questions concerning the University's expectations should seek specific information prior to enrollment.

The University was established to provide education in a distinctive environment. No religious test is applied, but students are expected to respect the church standards and the ideals of the University. The prospective student has the freedom to choose or reject these, but that choice must be made before enrollment. The student must then abide by this decision while at Loma Linda University.

FROM UNIVERSITY TO STUDENT

The University regards the student from a cosmopolitan and comprehensive point of view: (a) cosmopolitan in that historically the University's global mission has promoted bonds and opportunities in education and service without regard to sex, national or racial origin, or geographical line; and (b) comprehensive in that the University's concern for the welfare of the student traditionally has been an integrated concern for assisting the student in balanced development of the intellectual, emotional, physical, religious, and societal potentialities.

STUDENT WELFARE

Counseling service

The University provides access to an independent Student Assistance Plan (SAP) which will provide confidential evaluation of a client's needs and will refer him/her to appropriate professionals to address those needs. The official counseling agency for the University provides a service to students who desire help from professional counselors. This service, which is free and is on a voluntary basis, is designed to deal with a wide range of educational, vocational, premarital, marital, or other personal problems. No referral is necessary.

The goal is to assist individuals to make maximum use of their intellectual and personal resources. Counseling is done in the strictest confidence, and no information is released except by the written request of the person counseled.

Physical fitness

Physical fitness is promoted by various recreational interests and by courses in gymnastics, field exercises, body building, and health instruction. An effort is made to interest each student in some recreational and health-building activity that may be carried over to enhance future life.

THE STUDENTS' HEALTH SERVICE PLAN

The health, vitality, and welfare of its students and dependents are of major concern to the University. The prevention of sickness and injury and the maintenance of optimum health are fostered by the health service plan.

The Students' Health Service Plan provides health services to all eligible students. Benefits include:

1. Professional services rendered by Health Service physicians.
2. Referrals by Health Service physicians for laboratory tests and diagnostic x-rays.

3. Referrals to specialists when Health Service physicians deem necessary.

4. Prescriptions at Loma Linda Campus Pharmacy and Loma Linda University Medical Center Pharmacy for a copayment.

When referred by Health Service physicians for illnesses and/or injuries, the Student Health Plan will pay to the limitations in the brochure after any benefits to which the student may be entitled under any medical protection or personal insurance policy have been paid.

All full-time students are automatically covered by the Student Health Service Plan. Part-time students enrolled for fewer than 8 paid units per quarter who desire coverage should contact the Department of Risk Management. No coverage will apply until financial arrangements have been completed.

All covered students may purchase family coverage under the Student Health Service Plan. Eligible dependents are the spouse (residing with the insured student) and unmarried children under 19 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. Dependents' coverage will be effective on the date application and premium are received by the Department of Risk Management.

Benefits for all plans are limited by the terms and conditions set forth in the health plan brochures and do not cover congenital or pre-existing conditions. For further information on all health plans, contact the Department of Risk Management of Loma Linda University.

Policies and General Regulations

Students are responsible for informing themselves of and satisfactorily meeting the policies and regulations pertinent to registration, matriculation, and graduation.

GENERAL 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 Office of University Records and clearing financial arrangements with Student Finance. The course list filed 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 program coordinator/mentor 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 or perform the thesis research work at the University or an approved off-campus location. A student is in full-time residence if registered for at least 8 units. A maximum of 12 units may be taken without special petition.

Extramural study

When a student begins a degree program, it is understood that courses taken must be conducted on a campus of the University unless, upon petition for extramural study, 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 study and, at its completion, recommendation as to credit and grade.

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. One year is the maximum leave time granted. 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, currently \$40 (1993-95).

Administrative withdrawal

Students who fail to make arrangements for a leave of absence and continuing registration may be administratively withdrawn from Graduate School after two quarters of inactivity.

Readmission

A student who has been administratively withdrawn from the Graduate School will be 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 not paying course tuition, a fee of \$40 (1993-95) is charged.

Withdrawal

Formal withdrawal must be arranged at Graduate School Admissions and at the Office of University Records.

Transfer credits

A transfer student who has done acceptable graduate study in an approved institution may transfer credits up to one-fifth of the units required by their program to be applied to their degree at Loma Linda University. Such transfer credits will not be used to offset less than a B average work at this University. This transfer is limited to credits that have not already been applied to a degree and for which a B (3.00) or better has been recorded.

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. In such instances the transfer student is not relieved of residence requirements at this University.

Chapel

Weekly devotional services are held as part of the regular program of the University; and full-time, enrolled students are expected to attend.

Academic probation

Students whose overall grade point average falls below a 3.0 will be placed on academic probation. Students who are on academic probation and fail to make a 3.0 for the next quarter, or fail to have a 3.0 GPA overall after two quarters, may be dismissed from school.

Academic grievance

The student who feels that he/she has an academic grievance may proceed as follows:

1. The student should first discuss the problem or grievance with his/her instructor. If, following discussion with the instructor, the student is not satisfied and continues to believe that he/she has not been fairly dealt with, he/she may discuss the grievance with the chairman of the department involved or with the coordinator of the program in which he/she is enrolled.
2. If the matter is not resolved at this level, the student has recourse to the office of the dean of the Graduate School or the assistant for student academic affairs.
3. As a final appeal the student may request the academic dean of his/her school to appoint a faculty review committee of three members to evaluate the situation and make a recommendation to the dean. This request should be presented in writing and include the pertinent information regarding the situation. The student may request to meet with the review committee for discussion of the case.

Adviser and guidance committee

Each student is assigned an adviser and a guidance committee. These are described fully under each degree description elsewhere in this BULLETIN.

Time limits

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 eight years from the date when the course was completed.

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, seven years are allowed after the date of admission; however, students enrolled in an approved combined degree program may be permitted nine years. A student desiring reinstatement must reapply to the dean. This procedure implies a reevaluation of the student's total program.

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 509 General Statistics, described in the School of Public Health BULLETIN, fulfills the prerequisite requirement; other requirements are specified by program. The course STAT 698 Research Consultation, described in the School of Public Health BULLETIN, provides professional guidance as the individual student initiates and progresses with research project, thesis, or dissertation.

GRADUATION ATTENDANCE

The candidate for a graduate degree taken on the Loma Linda campus is expected to attend 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 only be granted by the president.

SCHOLASTIC STANDING

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

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

The following designations are used to make clear the student's status but not to 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.

PROGRAM PRACTICES

Degree programs specify expectations in this BULLETIN as well as in their own publications. Students should become well acquainted with both sources of guidance.

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 publishable paper, thesis, or dissertation are in the *Handbook for Graduate Students*, available at the Graduate School Admissions Office. Consultation with Graduate School Admissions and Records can preserve the student from embarrassing errors of format that require retyping large sections of manuscript. 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 copies of thesis or dissertation to be deposited in the University library and the appropriate department or school collection. Personal copies are bound at the student's expense.

BULLETIN

When this BULLETIN and any other Graduate School publication or the publication of any other school or any other Graduate School program conflict, this BULLETIN prevails.

Financial Information

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 this University must have been settled.

GENERAL PRACTICES

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 prior to 60 percent of the course meetings, tuition will be refunded on a pro-rata basis rounded to the nearest 10 percent. Students who withdraw from a course or courses after 60 percent of the classes have been offered will not receive a refund. To withdraw students must complete a Change of Program Form or a Total Withdrawal Form and submit it with appropriate signatures to the Office of University Records.

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 Student Finance. An account that is more than thirty days past due is subject to a service charge of .833 percent per month (10 percent per year). Failure to pay scheduled charges or to make proper arrangements, which is reported to the Office of University Records and the Graduate School dean, may be cause for 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; 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. To receive advance payments, the student must contact the Office of University Records at least forty-five days in advance of enrollment.

SCHEDULE OF CHARGES

TUITION, GRADUATE SCHOOL PROGRAMS IN GENERAL

Graduate students pay per unit. For 1993-94, the rate is \$285 per unit.

TUITION, GRADUATE DENTISTRY PROGRAMS

Package rates apply for the School of Dentistry. For 1993-94 these rates are:

\$28,000	Total for 22-month certificate program;
4,000	Per quarter, effective fall quarter 1993.
32,000	Total for 24-month certificate/degree program;
4,000	Per quarter, effective summer quarter 1993.
22,140	Total for 36-month Oral and Maxillofacial Surgery Program;
1,845	Per quarter, effective summer quarter 1993.

SPECIAL CHARGES

\$40	Application fee.
40	Continuous registration fee each quarter for which no tuition is paid.

Tuition and/or fees may change for 1994-95. Students should plan on an annual increase consistent with inflation.

FINANCIAL AID

University fellowships

Some fellowships are awarded annually to students of outstanding promise and performance. In certain programs fellowships may carry stipends and remission of tuition.

Assistantships

A limited number of teaching and research assistantships, with stipends, may be provided by individual programs.

Tuition waiver

Program chairmen and coordinators may recommend partial- or full-tuition waivers for students of demonstrated achievement.

Application

An application for a fellowship or an 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 Student Financial Aid.

Closing date

An application for financial aid of any kind should be made as early as possible but preferably no later than six weeks before the beginning of the effective quarter. Budgets are established in the spring for the following fall.

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 to the Office of Student Financial Aid.

SATISFACTORY PROGRESS

Each degree program has defined "satisfactory progress" as it relates to financial aid. Years in the program and requirements completed are specified. Students should consult their advisers to get copies of the policy.



FACULTY OF RELIGION

Gerald Winslow, Ph.D., Dean

In the configuration of Loma Linda University as a health-sciences university, the role of religion as integrative in each of the programs of the University is mandated and continuously affirmed by the Board of Trustees and the administration of the University.

To assist in this integration, the Faculty of Religion (formerly the School of Religion) was established in July of 1990.

The Faculty of Religion is committed to the following academic tasks, as informed by the teachings and practice of the Seventh-day Adventist tradition and mission:

1. To provide a core teaching program of religion, which consists of subject matter purposely emphasizing the biblical-theological, moral-ethical, and relational (personal, professional, and missions) content of health and wholeness as required by students in each of the health-sciences disciplines.

2. To coordinate the training of faculty and students in the science and art of whole-person care as integral to individual professions and their Christian witness.

3. To foster and support research in the theological, ethical, and relational teaching disciplines.

FACULTY

DALTON D. BALDWIN, Ph.D. Claremont Graduate School
1975

Professor of Foundational Studies

JAMES W. WALTERS, Ph.D. Claremont Graduate School
1979

Professor of Ethical Studies

GERALD WINSLOW, Ph.D. Graduate Theological Union
1981

Professor of Christian Ethics

HENRY LAMBERTON, M.Div. Andrews University 1974;
D.Psy. Candidate, Fuller Theological Seminary
Associate Professor of Relational Studies

DAVID R. LARSON, D.Min. School of Theology at
Claremont 1974; Ph.D. Claremont Graduate School
1982

Associate Professor of Ethical Studies

CLARENCE SCHILT, D.Min. Fuller Theological Seminary
1987

Associate Professor of Relational Studies

GAYLE SAXBY, M.Div. Andrews University 1991
Assistant Professor of Foundational Studies

ADJUNCT FACULTY

EDWIN CHRISTIANSEN, D.D.S. Loma Linda University
1975

Ethical Studies

LARRY CHRISTOFFEL, M.Div. Andrews University 1967
Foundational Studies

M. JERRY DAVIS, Rel.D. School of Theology at Claremont
1967

Relational Studies

CARLA GOBER, M.P.H. Loma Linda University 1984
Relational Studies

FRED KASISCHKE, D.Min. Fuller Theological Seminary
1988

Foundational Studies

ROBERT KIGER, D.D.S. Loma Linda University 1970
Ethical Studies

CHARLES LIU, D.Min. Andrews University 1992
Relational Studies

WILLIAM LOVELESS, Ed.D. University of Maryland 1964
Relational Studies

JEAN MAKI, Ph.D. Michigan State University 1975
Foundational Studies

JOHN REEVES, Ph.D. University of Southern California
1972

RANDALL ROBERTS, M.Div. Andrews University 1985
Relational Studies

RANDALL SKORETZ, M.Div. Andrews University 1983
Foundational Studies

BERNARD A. TAYLOR, Ph.D. Hebrew Union College 1989
Foundational Studies

DAVID VANDENBURGH, M.Div. Andrews University 1972
Foundational Studies

GRADUATE CORE CURRICULUM IN RELIGION

BIBLICAL-THEOLOGICAL

RELB 545 Biblical Archaeology (3-4)

The Bible in its religious, cultural, and political environment as illuminated by discoveries of modern archaeology.

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 Romans (3-4)

An introduction to the book, with an exegesis of its text and consideration of its major theological themes.

RELB 568 Hebrews (3-4)

An introduction to the book, with an exegesis of its text and a consideration of the major theological themes presented.

RELB 699 Directed Study (2-6)

Prerequisite: Consent of the instructor.

RELT 506 Seventh-day Adventist Belief and Life (2-3)

A study of the beliefs and lifestyle in Seventh-day Adventism. Limited to students who are not members of the Seventh-day Adventist church.

RELT 536 Religious Belief and the Modern World (3-4)

Reality and relevance of God for contemporary man.

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 for additional credit to a maximum of 12 units.

Prerequisite: Consent of the instructor.

RELT 615 Seminar in Philosophy of Religion (3-4)

Prerequisite: Consent of the instructor.

MORAL-ETHICAL

RELE 524 Christian Bioethics (3-4)

Designed to give the graduate student an in-depth acquaintance with current bioethical issues such as abortion, mind control, procreation and genetic engineering, and life manipulation.

RELE 534 Ethical Issues in Public Health (3-4)

Theoretical and practical appraisals of the ethical alternatives encountered by public health administrators, educators, and investigators.

RELE 548 Christian Social Ethics (2-4)

An in-depth opportunity for the graduate student to discover what are the implications of Christian belief for selected problems in social ethical theory and practice.

RELE 554 Clinical Intensive in Biomedical Ethics (4-8)
An intensive study of the theories and applications of clinical biomedical ethics.

RELE 577 Theological Ethics (3-4)

Ethical dimensions of theological positions advocated in the twentieth century.

RELE 588 Types of Ethical Theory (3-4)

A critical analysis of the basic theories propounded in philosophical ethics. A study of the writings of major ethical theorists, including Plato, Aristotle, I. Kant, and J. S. Mill. A consideration of philosophical ethics as compared with the Christian faith and Seventh-day Adventism.

RELE 624 Seminar in Christian Ethics (3-4)

Prerequisite: Consent of the instructor.

RELE 674 Reading Tutorial in Christian Ethics (3-4)

Prerequisite: Consent of the instructor.

RELE 698 Thesis in Christian Ethics (4)

RELE 699 Directed Study (2-6)

Prerequisite: Consent of the instructor.

RELATIONAL-INTEGRATIONAL

RELR 524 Clinical Pastoral Education (6-12)

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 enrollment. Credit earned in this course is recognized by the Association for Clinical Pastoral Education, Incorporated.

RELR 527 Crisis Counseling (3-4)

Crisis phenomena, current crisis theory, a Christian model of crisis care, and the dynamics and practices of crisis care.

RELR 564 Religion, Marriage, and the Family (2-3)

The family in historical, theological, and ethical perspectives; Christian assessments of contemporary theories regarding the family; religious and secular resources for preventing and resolving family crises.

RELR 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 as they relate to religious development, including Fowler, Kohlberg, Simons, James, and Sherrill.

RELR 616 Seminar in Religious Experience (3-4)

Information on other courses offered by the Faculty of Religion is found in the Class Schedule published each quarter by the Records Office, or by contacting the Faculty of Religion office in Griggs Hall.

Prerequisite: Consent of the instructor.

II

ANATOMY
 BIOCHEMISTRY
 BIOLOGY
 BIOMEDICAL AND CLINICAL ETHICS
 CLINICAL NUTRITION
 DENTISTRY
 FAMILY LIFE EDUCATION
 MARRIAGE AND FAMILY THERAPY
 MEDICAL SCIENTIST PROGRAM
 MICROBIOLOGY
 NURSING
 PALEONTOLOGY
 PHARMACOLOGY
 PHYSIOLOGY
 SOCIAL WORK
 SPEECH-LANGUAGE PATHOLOGY

At this point in the BULLETIN, the student should 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
 ANTH Anthropology
 BCHM Biochemistry
 BIOL Biology
 CMBL Cell and Molecular Biology
 EDCI Curriculum and Instruction

EDFO Educational Foundations
 ENDN Endodontics
 FMED Family Life Education
 GEOL Geology
 GRDN Graduate Dentistry
 MDCJ Medicine Conjoint
 MFAM Marriage and Family
 MICR Microbiology
 NRSG Nursing
 NUTR Nutrition and Dietetics
 ORBI Oral Biology
 ORDN Orthodontics
 ORIM Oral Implantology
 ORMD Oral Medicine
 ORPA Oral Pathology
 ORSR Oral Surgery
 PATH Pathology
 PERI Periodontics
 PHRM Pharmacology
 PHYS Physiology and Biophysics
 PSYC Psychology
 RELB Religion, Biblical Studies
 RELH Religion, Historical Studies
 RELP Religion, Professional Studies
 RELE Religion, Theological and Ethical Studies
 RELM Religion, Mission Studies
 RELT Religion, Theological Studies
 RLGN Religion, General
 SOCI Sociology
 SOWK Social Work
 SPPA Speech-Language Pathology
 STAT Biostatistics

ANATOMY

ROBERT L. SCHULTZ, Ph.D. University of California, Los Angeles 1957
Acting Chairman; Professor of Anatomy
Electron microscopy, histology, nervous system

PAUL J. McMILLAN, Ph.D. Loma Linda University GS 1960
Program Coordinator; Professor of Anatomy
Bone cell biology, quantitative morphology, and image analysis

The Department of Anatomy, in cooperation with other departments of the University, offers programs leading to the Master of Science and the Doctor of Philosophy degrees in the field of anatomy. The department is an active participant in the systems biology curricula, which consist of interdisciplinary courses and seminars coordinated by the faculties of the Departments of Anatomy and of Physiology and Pharmacology. The degree programs provide opportunities for qualified students to prepare for careers in teaching and research.

The student admitted to the anatomy graduate program will have an undergraduate degree with a strong component of biological sciences, including zoology and comparative vertebrate embryology. Genetics, comparative vertebrate anatomy, and histotechnology may be necessary to complete the program, although these are not required for admission.

Other prerequisites include physics, general chemistry, and organic chemistry. A foreign language and courses in statistics and computer science are encouraged. Applicants with diverse backgrounds are encouraged to apply, since each applicant is considered on an individual basis.

The Department of Anatomy encourages the student to build a career in biomedicine on a solid foundation of basic medical sciences. Three specialty areas are then available for the M.S. degree thesis or Ph.D. degree dissertation research:

1. **NEUROBIOLOGY** is an integrated program with advanced courses in neuroanatomy and neurophysiology. Research emphases include neural systems in the regulation of biorhythms, neurocytology and electron microscopy, and sensory systems in aging and in diabetes.

2. **CELL BIOLOGY** includes advanced study in cell and molecular biology, electron microscopy, histochemistry, tissue culture, and quantitative image analysis. Research emphases are cell-cell communication, regulation and modeling of bone cell activities, receptor biology in development and *in vitro* fertilization, and elucidation of the molecular and cellular basis of developmental anomalies.

3. **RADIATION BIOLOGY** builds on advanced courses in quantitative morphology and cell, molecular, and radiation biology. The proton accelerator at Loma Linda University Medical Center provides a unique opportunity to study functional responses of normal and cancerous tissue to proton and other radiations.

At the doctoral level, teaching experience is required.

FACULTY

WALTER H. B. ROBERTS, M.D. Loma Linda University
SM 1939

Emeritus Professor of Anatomy

Gross anatomy, applied anatomy

JOHN O. ARCHAMBEAU, M.D. Stanford University 1955

Professor of Radiation Biology and of Anatomy

Radiation oncology, radiation biology

PAUL C. ENGEN, D.D.S. University of Southern
California 1949

Professor of Anatomy

Histology, histological techniques, comparative anatomy

WILLIAM H. FLETCHER, Ph.D. University of California,
Berkeley 1972

Professor of Anatomy and of Physiology/Pharmacology

Microanatomy, neuroanatomy, cellular/molecular
endocrinology

DANIEL A. MITCHELL, JR., M.D. Loma Linda University
SM 1947

Professor of Anatomy

Gross anatomy, applied anatomy

SUBRATA SAHA, Ph.D. Stanford University 1973

Professor of Orthopaedic Surgery

Biomechanics of hard tissue

WILLIAM M. HOOKER, Ph.D. Loma Linda University GS
1969

Associate Professor of Anatomy

Neuroanatomy

MICHAEL A. KIRBY, Ph.D. University of California,
Riverside 1984

Associate Professor of Pediatrics and of Anatomy

Neurophysiology, neuroanatomy, developmental
neurobiology

PEDRO B. NAVA, JR., Ph.D. Loma Linda University GS
1974

Associate Professor of Anatomy

Gross anatomy, effects of age and diabetes on PNS, taste
receptors

STEVEN M. YELLON, Ph.D. University of Michigan 1984

Associate Professor of Physiology, of Pediatrics, and of
Anatomy

Neuroendocrinology, reproductive physiology

ASSOCIATE FACULTY

GUY M. HUNT, M.D. Loma Linda University SM 1942;
M.S.-M.Ed. GS 1959

Emeritus Professor of Anatomy and of Neurology

Neuroanatomy

HERBERT W. HENKEN, M.D. Loma Linda University SM
1945

Emeritus Associate Professor of Anatomy and of
Gynecology and Obstetrics

Gross anatomy, applied anatomy

JOHANNAH CORSELLI, Ph.D. University of California,
Riverside 1986

Assistant Professor of Obstetrics and Gynecology and of
Anatomy

Embryology, developmental biology

WILLIAM WAGNER, M.D. Loma Linda University SM
1946

Clinical Assistant Professor of Anatomy

Gross anatomy, applied anatomy

Details of the program in the Department of Anatomy are found in the "Anatomy Program Guide." The following is a summary of these requirements.

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 communication by participating in seminars, writing critical reviews, and reporting the results of research experience either in thesis form or as a publishable paper.

Courses

To qualify for this degree, the student must complete the following courses in anatomy: ANAT 537, 541, 542, 544; 8 units in anatomy research and 1 in thesis; 8 units in other basic science courses; and pass a comprehensive examination in these areas. For each year in residence, the student will complete 1 unit of Integrative Biology Graduate Seminar (ANAT 605).

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. Admission to this program is based upon a demonstration of superior qualifications, either in undergraduate or graduate studies.

Courses

Courses required for this degree are ANAT 537, 541, 542, 544; 1 unit of Integrative Biology Graduate Seminar (ANAT 605) for each year in residence; and 35 quarter units in advanced anatomy courses, cell biology, biochemistry, physiology, and other graduate courses appropriate to the student's goals. The specific course requirements will vary with the student's research emphasis. Final approval of the student's total program will be made by the student's committee in consultation with the anatomy faculty. Approximately 110 units beyond the bachelor's degree are usually completed by the time the Ph.D. degree is awarded.

Comprehensive examination

The written and oral comprehensive examinations are designed to establish that the student has a broad understanding of structure and function. The student's ability to use that knowledge to identify and design experiments to resolve problems is also tested. Familiarity with the scientific literature and the ability to use that literature to defend the dissertation research proposal are important components of the oral examination.

Language requirement

A student's advisory committee may require a demonstration of proficiency in a suitable natural language and/or computer language before advancement to candidacy. Students who have acquired such skills in their undergraduate studies have a distinct advantage.

Advancement to candidacy

The student may apply for admission to doctoral candidacy after (a) passing the comprehensive examination, (b) passing any other examinations such as demonstrated proficiency in the use of computers and statistics required by the department, and (c) securing the support of his/her advisory committee.

Dissertation

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

General requirements

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

Combined M.D./Ph.D. or D.D.S./Ph.D.

Combined programs allow qualified students to work on combined M.D./Ph.D. or D.D.S./Ph.D. degrees. Details are provided in the section Programs and Degrees.

COURSES**ANAT 504 Oral Histology and Development SD (2)**

Study of development, eruption, and microanatomy of the odontogenic apparatus. Fall.

Engen.

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

Detailed dissection of the head and neck. Demonstration and lecture. Offered on demand.

Prerequisite: ANAT 541 or equivalent.

Staff.

ANAT 534 Histological Techniques (3)

Theory and practice in the preparation of tissue sections for microscope study using routine and specialized stains. Spring odd years or by independent study.

Staff.

ANAT 537 Neuroscience (8)

An integrated approach to the fundamentals of neuroanatomy and neurophysiology, with applications to clinical neurology. Winter.

Staff.

ANAT 541 Gross Anatomy (10)

Anatomy of the head, neck, locomotor system, thorax, abdomen, pelvis, and perineum. Correlated with radiology, applied features, and embryological development. Summer, 4 units; fall, 6 units.

Staff.

ANAT 542 Cell, Tissue, and Organ Biology (5)

The microscopic structure of cells, tissues, and organs of the human body. Summer, 2 units; fall, 3 units.

Schultz.

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. Fall.

Staff.

ANAT 545 Advanced Neuroanatomy (3)

Detailed study and dissection of the human nervous system. Spring even years.

Prerequisite: ANAT 537.

Kirby.

ANAT 546 Electron Microscopy (3)

Designed to train the student to use the electron microscope. Basic theory, operational techniques, and tissue preparation. As needed.

Prerequisite: Histotechnique or equivalent.

Staff.

ANAT 547 Histochemistry (3)

The theoretical and practical aspects of histochemical methods as applied to tissue sections. One lecture and two three-hour laboratories/conferences weekly. Summer even years.

Prerequisite: A course in biochemistry; ANAT 542 or equivalent.

McMillan.

ANAT 548 Advanced and Molecular Cytology (3)

A study of the ultrastructural and cytochemical analysis of a variety of differentiated cells. Spring odd years.

Staff.

ANAT 549 Seminar: Topographical Chemistry (2)

The qualitative and quantitative distribution of enzymes and other chemically defined components of organs. Students will be responsible for one oral and one written report. On demand.

McMillan.

ANAT 554 Techniques in Experimental Morphology (2)

An introduction to selected methods used in the morphological analysis of organ and cellular function. Spring odd years.

Nava.

ANAT 594 Special Topics in Anatomy (arranged)

Intensive study of a selected topic approved by the chairman of the department. Individual guidance by a staff member.

Staff.

ANAT 605 Integrative Biology Graduate Seminar (1)

This seminar, coordinated by the Departments of Anatomy and of Pharmacology and Physiology, consists of reports from current literature and the presentation of student and faculty research on various aspects of regulatory and integrative biology as applied to cells, tissues, organs, and systems. Both students and faculty are expected to participate in a discussion and critical evaluation of the presentation.

Faculties of Anatomy, Pharmacology and Physiology.

ANAT 697 Research (1-25)**ANAT 698 Thesis (1-3)****ANAT 699 Dissertation (1-5)**

BIOCHEMISTRY

CHARLES W. SLATTERY, Ph.D. University of Nebraska 1965
 Chairman and Program Coordinator; Professor of Biochemistry and of Pediatrics
 Physical chemistry of macromolecules

The Department of Biochemistry offers study programs leading to the Master of Science and the Doctor of Philosophy degrees. Tailored to individual interest, the programs provide a broad biochemical background yet allow the student to develop fully 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 intending to pursue careers as research technicians. The Doctor of Philosophy degree program is designed to prepare the graduate for a career in independent research and teaching. In addition to these options, additional combined-degree programs — M.S.P., M.D./M.S., D.D.S./M.S., M.D./Ph.D., and D.D.S./Ph.D. — are offered in conjunction with the School of Medicine and the School of Dentistry. 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.

FACULTY

RICHARD E. BELTZ, Ph.D. University of Southern California 1955

Professor of Biochemistry
 Experimental oncology, mechanisms in the chemotherapy of cancer

GEORGE T. JAVOR, Ph.D. Columbia University 1967

Professor of Biochemistry and of Microbiology
 Cellular responses to reductive stress, control of porphyrin synthesis, mechanism of procaryotic cell division

GEORGE M. LESSARD, Ph.D. University of California, Riverside 1973

Professor of Biochemistry
 Oral biochemistry

W. BARTON RIPPON, Ph.D. Newcastle University 1969

Professor of Biochemistry (on leave; Dean, Graduate School)
 Physical biochemistry of macromolecular structure and function

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

Professor of Biochemistry
 Biochemistry of the endocrine system, hormone-dependent carcinogenesis

JAMES W. BLANKENSHIP, Ph.D. University of Wyoming 1969

Associate Professor of Biochemistry and Professor of Nutrition
 Dietary influences on connective tissue structure, prostaglandin metabolism

E. CLIFFORD HERRMANN, Ph.D. Virginia Polytechnic Institute 1970

Associate Professor of Biochemistry
 Enzymes of blood coagulation and casein phosphorylation

KELVIN A. W. HILL, Ph.D. University of Notre Dame 1986

Assistant Professor of Biochemistry
 Protein design/engineering, tRNA binding domains, gamma carboxy-glutamic acid domains of protein C, recombinant DNA techniques

ASSOCIATE FACULTY

DAVID J. BAYLINK, M.D. Loma Linda University 1957
Distinguished Professor of Biochemistry and of Medicine
Basic and clinical mineral metabolism, biochemistry of
regulatory mitogens from bone matrix

U. D. REGISTER, Ph.D. University of Wisconsin 1950
Emeritus Professor of Nutrition and of Biochemistry
Biochemistry of nutrition

ROLAND C. ALOIA, Ph.D. University of California,
Riverside 1970

Professor of Biochemistry and of Anesthesiology
AIDS virus membrane, hibernation, and membrane
anesthetic effects

DAVID A. HESSINGER, Ph.D. University of Miami 1970
Professor of Physiology, of Pharmacology, and of
Biochemistry

Structure and function of cell membranes, marine
toxicology

JOHN J. ROSSI, Ph.D. University of Connecticut 1976
Adjunct Research Professor of Microbiology and of
Biochemistry

Use of synthetic oligonucleotides in studies of gene
expression

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

Professor of Biochemistry and of Microbiology
Mechanism of oxygen chemoreceptors, bacterial
chemotaxis

LAWRENCE B. SANDBERG, M.D., Ph.D. University of
Oregon 1957, 1966

Research Professor of Biochemistry and of Pathology
Connective tissue proteins

CONRAD M. VAN GENT, Ph.D. University of Leiden,
Leiden, the Netherlands 1954

Research Professor of Medicine and of Biochemistry
Lipids, lipoproteins, connective tissue of arteries

ANTHONY ZUCCARELLI, Ph.D. California Institute of
Technology 1974

Professor of Microbiology and of Biochemistry
Molecular genetics, bacterial plasmids, bacteriophage
biology

JOHN R. FARLEY, Ph.D. University of California, Davis
1977

Associate Research Professor of Biochemistry and of
Medicine

Biochemical mechanisms of bone volume regulation and
enzyme kinetics of mineral metabolism

RICHARD W. HUBBARD, Ph.D. Purdue University 1961
Associate Research Professor of Pathology

Clinical chemistry, amino acid metabolism

THOMAS A. LINKHART, Ph.D. University of California,
Davis 1975

Associate Professor of Biochemistry and Associate
Research Professor of Pediatrics

Cellular and molecular mechanisms of bone growth,
resorption, and repletion

DONNA D. STRONG, Ph.D. University of California, Los
Angeles 1977

Associate Research Professor of Biochemistry and of
Medicine

Cloning and expression of bone-related growth factors
and matrix proteins

SUBBURAMAN MOHAN, Ph.D. Bangalore University,
India 1978

Associate Research Professor of Biochemistry, of
Medicine, and of Physiology

KIN-HING WILLIAM LAU, Ph.D. Iowa State University
1982

Associate Research Professor of Biochemistry and of
Medicine

Enzymology of bone metabolism

JON E. WERGEDAL, Ph.D. University of Wisconsin 1963

Associate Research Professor of Biochemistry and of
Medicine

Bone metabolism

SATISH M. SOOD, Ph.D. Punjabi University, Patida, India
1978

Assistant Research Professor of Biochemistry
Structure and functions of milk proteins, soya proteins

A. RESEARCH MASTER OF SCIENCE

Under this plan the student completes 20 units
of course work in biochemistry beyond the
introductory course and carries out research
leading to the preparation and successful defense of
a thesis or publishable paper reporting on the
research.

B. COURSE WORK MASTER OF SCIENCE

Under this plan the student completes 20 units
of course work in biochemistry beyond the
introductory course and additional courses in
related fields to complete 40 quarter units. The
student must also pass a comprehensive examina-
tion 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 beyond the introductory course and
at least 10 units in related fields. Students entering
the Ph.D. degree program will choose a laboratory
and are expected to participate in research during
their first year. They must pass both written and
oral comprehensive examinations. Opportunity is
given to acquire teaching experience. Doctoral
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 program are given in
the Student Guide published by the Department of
Biochemistry.

COMBINED PROGRAM

A combination of academic and professional
degrees is described on page 26 of this BULLETIN.

PREREQUISITES

In the list below, the first four courses are program prerequisites. Lack of one or more of the remaining three courses would be considered a deficiency, and the time allowed for completion would be extended by the time required to make up the deficiency.

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

Standardized ACS (American Chemical Society) examinations in organic and physical chemistry are administered to students at appropriate times after admission to the program unless there is evidence of adequate performance on these examinations during the course of undergraduate education.

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. Prerequisites must be completed before the applicant is accepted into regular status and before the student registers for advanced didactic biochemistry courses numbered above 540.

GENERAL INFORMATION

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

COURSES**BCHM 504 Introduction to Biochemistry (5)**

Chemistry and metabolism of proteins, carbohydrates, lipids, and nucleic acids. Enzymes, vitamins and minerals, bioenergetics. Replication, transcription, translation, and regulation of cell function. Special topics in biochemistry related to nutrition. Lecture and demonstration.

BCHM 505 Seminar in Biochemistry (1)**BCHM 506 Seminar Presentation in Biochemistry (1)****BCHM 514 Problem-based Learning in Medical Biochemistry (1)**

Acid-base equilibria, quantitative analysis of blood, case-based tutorials in medical biochemistry, clinical applications of biochemistry to accompany BCHM 515, 516.

BCHM 515, 516 Principles of Medical Biochemistry (3, 5)

Chemistry of amino acids and proteins. Enzyme properties and mechanisms. Bioenergetics. 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.

BCHM 523 Introduction to Physical Biochemistry (3)

Introduction to biochemical thermodynamics, proteins and protein physical chemistry, enzyme kinetics and mechanisms, and bioenergetics.

Prerequisite: BCHM 516 or equivalent.

BCHM 525 Metabolic Interrelationships and Control (5)

Structure, function, and control of enzymes. Control of energy metabolism. Cellular mechanisms of hormone action.

Prerequisite: BCHM 516 or equivalent.

BCHM 534 Techniques of Biochemistry (5)

Intensive integrated laboratory experience in protein chemistry, and the physical characterization of macromolecules. Writing of scientific papers.

BCHM 539 Molecular Biology of Prokaryotes and Recombinant DNA (4)

Bacterial viruses, transposable genetic elements, plasmids, modes of DNA transfer, recombination, mutation and repair, molecular cloning, DNA sequencing and directed mutagenesis. Identical to CMBL 538.

Prerequisite: BCHM 516 or equivalent.

BCHM 544 Advanced Topics in Biochemistry (2-4)

Recommended for the Ph.D. (2+2+2).

Examples: membrane biochemistry, transport and bioenergetics, physical methods in biochemistry, metabolic regulation, protein structure, hormonal regulation of metabolism.

BCHM 545 Molecular Biology of Eucaryotes and Gene Regulation (4)

Characteristics of promoters, operons, infectious agents, eucaryotic gene structure, RNA splicing, chromosome structure, transcriptional and posttranscriptional regulation of gene expression, cell proliferation, oncogenes. Identical to CMBL 539.

Prerequisite: BCHM 539.

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 and of Paleontology

Animal behavior, mammalogy, paleontology

DAVID L. COWLES, Ph.D. University of California, Santa Barbara 1987

Program Coordinator; Assistant Professor of Biology

Physiological ecology, marine biology

The Department of Natural Sciences offers programs leading to the Master of Science and Doctor of Philosophy degrees in biology. These programs of study provide a broad and unified approach to the life sciences; and also specialization, as evidenced by the conduct of significant, original research and in the selection of courses related to the area of research interest. Study in various areas, ranging from molecular biology to natural history, is available to the student seeking preparation for teaching or for research in modern biology. Some areas of specialization are: animal behavior, animal physiology, biosystematics, cell and molecular biology, physiological ecology, genetics, mammalogy, marine biology, microbiology, paleontology.

FACULTY

H. PAUL BUCHHEIM, Ph.D. University of

Wyoming 1978

Professor of Geology

Sedimentology, paleolimnology, paleoecology

RONALD L. CARTER, Ph.D. Loma Linda University 1977

Professor of Biology

Genetics, systematics

H. THOMAS GOODWIN, Ph.D. University of Kansas 1990

Assistant Professor of Paleontology

Vertebrate paleontology, biogeography

ASSOCIATE FACULTY

LEONARD R. BULLAS, Ph.D. Montana State University
1963

Professor of Microbiology

Bacterial genetics

DAVID A. HESSINGER, Ph.D. University of Miami 1970

Professor of Physiology, of Pharmacology, and of

Biochemistry, Marine toxins, cellular and molecular
biology

BENJAMIN H. S. LAU, Ph.D. University of Kentucky

1966; M.D. Loma Linda University SM 1980

Professor of Microbiology

Immunology, medical bacteriology, mycology

MARVIN A. PETERS, Ph.D. University of Iowa 1969

Professor of Physiology and of Pharmacology

Drug metabolism

ARIEL A. ROTH, Ph.D. University of Michigan 1955

Professor of Biology

Invertebrate zoology

ROBERT W. TEEL, Ph.D. Loma Linda University GS 1972

Professor of Physiology

Cell physiology, differentiated cells in vitro

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

Professor of Biochemistry

Biochemistry of the endocrine system, hormone-
dependent carcinogenesis

ANTHONY J. ZUCCARELLI, Ph.D. California

Institute of Technology 1974

Professor of Microbiology

Molecular genetics, microbiology

ROLAND C. ALOIA, Ph.D. University of California,
Riverside 1970

Associate Professor of Biochemistry and of Medicine

Effects of anesthetic agents on biological membrane
function

ELWOOD S. McCLUSKEY, Ph.D. Stanford University
1959

Associate Professor of Physiology

Comparative physiology, entomology

JUN-ICHI RYU, Ph.D. Tokyo Metropolitan University
1978

Associate Professor of Microbiology

Molecular genetics

Facilities

Research and teaching laboratories and research equipment for use by graduate students in biology are available in the department. Other specialized equipment is also available for use by biology students by arrangement with associate faculty.

Field station

In cooperation with the Walla Walla College Marine Station in Anacortes, Washington, facilities are available for marine courses and research by graduate students of this department.

Student aid

Fellowships offered by agencies such as the National Science Foundation and the National Institutes of Health are tenable at this University. Research and teaching assistantships are available from the department on a competitive basis. Further information can be obtained from the chairman of the department.

General requirements

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

MASTER OF SCIENCE**Admission**

Applicants must meet the general admission requirements of the Graduate School (as outlined in the current Graduate School BULLETIN). Expected undergraduate preparation includes a bachelor's degree from an accredited college or university, with a biology major or equivalent; two quarters of college mathematics (calculus recommended), and one year of general chemistry; and at least 20 quarter units from two or more of the following: organic chemistry, biochemistry, general physics, geology.

Curriculum

The following constitutes the curriculum for the Master of Science degree in biology: a minimum of 48 quarter units of academic credit, 30 units in biology and cognate science subjects (as approved by the guidance committee), including 15 at or above the 500 level (exclusive of research).

Philosophy of Science (BIOL 558)

Genetics and Speciation (BIOL 545)

Two of the following during the graduate program:

A course in organismal biology or paleontology

A course in ecology or environmental science

A course in cell or molecular biology

Research Methods I, II (BIOL 616, 617).

Seminar Presentation in Biology (BIOL 605), 1 unit.

Seminar in Biology (BIOL 607), 2 units.

Research, at least 4 units.

Thesis, 1-2 units.

Religion, 3 units.

Additional courses as may be required by the student's guidance committee.

Demonstrated proficiency in using a computer operating system, a database, a spreadsheet, or a programming language.

Final oral examination and defense of thesis.

More specific information on these requirements is outlined in a department checklist.

A reading knowledge of one foreign language is recommended for students planning to enter a Doctor of Philosophy degree program.

DOCTOR OF PHILOSOPHY**Admission**

The successful applicant must meet the general admissions requirements of the Graduate School as outlined in the current Graduate School BULLETIN. Undergraduate preparation should include general biology (or the equivalent) and at least one course each in animal physiology, cell and molecular biology (or one year of biochemistry), and genetics. Required cognate courses are two quarters of college mathematics (calculus recommended), one year each of general physics; general chemistry, organic chemistry, and a foreign language.

Required courses

Registration in courses, seminars, or research for a total of 72 quarter units beyond the master's degree (or 120 units beyond the baccalaureate degree) is required.

Philosophy of Science (BIOL 558).

Genetics and Speciation (BIOL 545).

One of the following at this University:

Paleontology

Biogeography (BIOL 515)

Field Interpretations of Historical Geology (GEOL 548)

At least two additional courses in the Department of Natural Sciences.

The following courses are required at some time in the student's academic career, during either the undergraduate or the graduate program:

Biology of at least one animal taxon (of at least the class level)

Botany

Developmental biology

Ecology or environmental science

Advanced genetics

Biochemistry

Biostatistics

Research Methods I, II (BIOL 616, 617).

Seminar Presentation in Biology (BIOL 605), 14 units.

Seminar in Biology (BIOL 607), 2 units.

Attendance at all departmental seminars is required while in residence at Loma Linda University.

Research.

Dissertation, 2 units.

Additional courses as may be required by the student's guidance committee.

A 3-unit course in religion (beyond the master's degree level) is required. Teaching is recommended during at least one quarter. This experience may be obtained in the laboratory or it may involve presenting part of the lectures for a course.

Comprehensive examination

A written and oral comprehensive examination is given following completion of the formal course work to measure the student's knowledge of the various fields of biology, philosophy of biology, and preparation for research. These examinations should be completed by the beginning of the third year of study.

Computer proficiency

The student must demonstrate proficiency in using a computer operating system, plus a database, a spreadsheet, or a programming language.

Advancement to candidacy

The student may apply for advancement to doctoral candidacy after (1) meeting the computer proficiency requirement, (2) passing the comprehensive examination, and (3) being recommended by the department faculty.

Dissertation

The written dissertation must demonstrate the completion of significant, original research.

Defense of dissertation.

An oral presentation and defense of the dissertation is required.

PALEONTOLOGY EMPHASIS

The Department of Natural Sciences offers graduate study in paleontology through both the program in paleontology and the program in biology. The Master of Science degree in paleontology emphasizes the study of fossils and the sedimentary rocks in which they are found (see description in Paleontology section of this BULLETIN). A paleontology emphasis in biology focuses on biological aspects of paleontology such as systematics, morphology, speciation, biogeography, and ecology of ancient organisms. A student may pursue research at both the M.S. and Ph.D. degree levels. At the Ph.D. degree level there is a formal emphasis in paleontology. The prerequisites and course requirements for these programs are as outlined in the foregoing, except as modified in the Ph.D. degree description below.

DOCTOR OF PHILOSOPHY—**Biology with Paleontology Emphasis**

Requirements are the same as for the Doctor of Philosophy degree in biology, with the exceptions noted below.

Admission

Expected undergraduate preparation in biology includes general biology (or the equivalent), genetics, botany, physiology, cell and molecular biology (or equivalent), and general ecology. Expected undergraduate preparation in cognate subjects and geology includes two quarters of college mathematics (calculus recommended), one year each of general physics and general chemistry, at least one quarter of organic chemistry (additional organic chemistry recommended), and physical geology. One year of undergraduate foreign language study is expected.

Required courses

Philosophy of Science (GEOL 558).
Genetics and Speciation (BIOL 545).

One of the following:

Biogeography (BIOL 515)

Field Interpretations of Historical Geology (GEOL 548)

Additional courses as required by the student's guidance committee.

The following courses are required at some time during either the undergraduate or the graduate program:

Biostatistics

Biology of at least two taxa (of at least the class level)

Historical Geology (GEOL 405)

Sedimentology (GEOL 427)

Stratigraphy (GEOL 429)

Three advanced paleontology courses (at least two at this University)

Cell physiology, or cell and molecular biology, or one year of biochemistry

Research Methods I, II (GEOL 616, 617).

Seminar, teaching, computer, religion, research, and dissertation requirements are the same as for the biology degree without the paleontology emphasis.

Comprehensive examination

The comprehensive examination will be oriented toward the integration of biological and geological phenomena for the interpretation of earth history. It assumes a knowledge and an understanding of such fields as are listed in the foregoing.

COMBINED DEGREES**Combined M.D./Ph.D. or D.D.S./Ph.D.**

For students selecting 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. degree earned in biology, the following modifications of requirements may apply:

As many as 30 units of credit for basic science courses and up to 30 units of research and/or graduate courses, but not more than 36 units, done as part of the electives of the professional curriculum may be applied to the Ph.D. degree program.

The animal physiology and the biostatistics requirements would be met by the professional curriculum.

Combined M.D./M.S. or D.D.S./M.S.

For students selecting a combined program with the Master of Science degree earned in biology or paleontology, up to 12 units of credit for basic science courses 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 degree program.

Biology minor

At times, students in other University departments will seek a biology minor. A biology minor for students majoring in other departments may include any courses listed under the Department of Natural Sciences except those also 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 Natural Sciences: BIOL 504 to 589.

In addition to the primary offerings of the department, the student may take courses in other departments as part of the graduate work, according to special interests and needs. Some of these courses of special interest to biology students are listed below. See the Departments of Microbiology, Physiology, Anatomy, and Biochemistry for additional courses.

COURSES**BIOL 495 Undergraduate Research (1-4)**

Original investigation and/or literature study pursued under the direction of a faculty member. May be repeated for additional credit.

Prerequisite: Consent of the instructor.

BIOL 504 Biology of Marine Invertebrates (4)

Behavior, physiology, ecology, morphology, and systematics of marine invertebrates, with emphasis on morphology and systematics. Three class hours per week, one-day field trip alternate weeks, or the equivalent.

BIOL 509 Mammalogy (4)

A study of the mammals of the world, with emphasis on North America. Includes classroom and field study of systematics, distribution, behavior, and ecology. Three class hours, one three-hour laboratory per week.

BIOL 515 Biogeography (3)

Present and past distribution and migrations of the natural populations of organisms. Offered alternate years.

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

BIOL 517 Ecological Physiology (4)

A study of the interface between the individual and the environment, with emphasis on unusual environments to explore the limits of physiological systems. Three class hours and one three-hour laboratory per week. Offered alternate years.

BIOL 518 Readings in Ecology (2)

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

Prerequisite: A course in ecology or consent of the instructor.

BIOL 526 Principles and Methods of Systematics (3)

A study of the principles and methods of modern systematic biology with focus on the assumptions, concepts, and computerized methods of phylogeny reconstruction.

BIOL 535 Animal Behavior (4)

Behavioral mechanisms of animals and their role in survival. Lectures and projects.

BIOL 536 Readings 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.

BIOL 537 Advances in Sociobiology (3)

A study of current concepts and ideas relating to the origin and structure of social behavior of animals. Special attention focused on the adaptive significance of species-specific behavior in a wide variety of environments.

BIOL 538 Behavior Genetics (4)

A study of the interaction of genotype and phenotype as it relates to animal behavior. The primary focus of the course is at the molecular and physiological level of behavior. A modern understanding of the nature/nurture debate is extended to topics which include biological determinism and ethics.

BIOL 545 Genetics and Speciation (4)

Comparative analysis of species concepts, mechanisms of speciation, and analysis of micro- and macro-evolution. Offered alternate years.

Prerequisite: A course in genetics and philosophy of science.

BIOL 547 Molecular Biosystematics (4)

Analysis of genetic events at the molecular level that underlie speciation. Laboratory work integrated with lecture, demonstrating basic molecular genetic research tools applicable to molecular biosystematics studies.

Prerequisite: Genetics and speciation or molecular genetics, and philosophy of science.

BIOL 558 Philosophy of Science (4)

Study of selected topics in the history and philosophy of science, and the application of these principles in analyzing contemporary scientific trends. Offered alternate years.

BIOL 588 Current Topics in Biology (1-5)

Reviews of current interest in specific areas of biological science, offered at the discretion of the department. Different sections of the course may be repeated for additional credit.

Prerequisite: Consent of the instructor.

BIOL 589 Readings in Biology (1-4)**BIOL 605 Seminar Presentation in Biology (1)**

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

BIOL 607 Seminar in Biology (0.5)

Selected topics dealing with recent developments. Student attends seminar; no presentation required.

BIOL 616 Research Methods in Biology I (1)

Concepts and methods used in biological research, including scientific writing and literature. Offered each fall quarter.

BIOL 617 Research Methods in Biology II (2)

Techniques and technology for the analysis and presentation of data. Offered alternate winter quarters.

BIOL 695 Special Projects in Biology (1-4)

Responsibility for a special research project in the field, laboratory, museum, or library. May be repeated for additional credit.

BIOL 697 Research (1-8)

See department checklist for recommended number of units.

BIOL 698 Thesis (1-2)

Credit for the writing of the master's thesis.

BIOL 699 Dissertation (1-2)

Credit for the writing of the doctoral dissertation.

UPPER DIVISION COURSES APPLICABLE TO GRADUATE PROGRAM

ROSARIO BEACH SUMMER COURSES**BIOL 459 Marine Invertebrates**

Study of the biology of selected groups of marine invertebrates.

BIOL 455 Comparative Physiology

Comparative study of the physiology and life process of animals, with emphasis on invertebrates.

Prerequisite: Cell biology.

BIOL 460 Marine Ecology

Study of interspecific, intraspecific, and community relationships demonstrated by marine organisms.

BIOL 463 Marine Botany

Systematic study of plants found in Puget Sound with a survey of marine plants from other areas.

BIOL 462 Ichthyology

Systematic study of the fishes found in Puget Sound, with a survey of the fishes of other waters.

BIOL 508 Physiology of Algae

A comparative study of the physiology of representative members of the major algal groups. Collection and growth of cultures of single-celled forms and related metabolic processes, nutritional factors, light requirements, synchronization, and growth will be emphasized. Offered every three to five years.

BIOL 516 Behavior of Marine Organisms

A study of inter- and intraspecific behaviors of marine animals and their behavioral responses to the physical environment. The course involves laboratory experiences, field observations, and a research project.

Prerequisite: A background in organismal biology and permission of the instructor. Offered every three to five years.

PALEONTOLOGY COURSES

Course descriptions for the following courses can be found in the Paleontology section of this BULLETIN.

GEOL 405 Historical Geology (4)**GEOL 424 Structural Geology (3)****GEOL 425 Field Methods of Geologic Mapping (4)****GEOL 427 Sedimentology (4)****GEOL 429 Stratigraphy (4)****GEOL 524 Paleobotany (4)****GEOL 525 Palynology (4)****GEOL 534 Invertebrate Paleontology (4)****GEOL 544 Vertebrate Paleontology (5)****GEOL 545 Taphonomy (3)****GEOL 546 Ichnology (2)****GEOL 548 Field Interpretations in Historical Geology (4)****GEOL 554 Paleolimnology (4)****GEOL 556 Paleoenvironments (4)****BASIC MEDICAL SCIENCE COURSES**

Numerous courses offered by the basic medical science departments are available to graduate students. Some are listed here and their course descriptions may be found elsewhere in this bulletin.

ANAT 546 Electron Microscopy (3)**ANAT 548 Advanced and Molecular Cytology (3)****ANAT 554 Techniques in Experimental Morphology (3)****BCHM 301, 302 Basics of Biochemistry (3, 2)****BCHM 515, 516 Principles of Medical Biochemistry (4, 6)****BCHM 523 Introduction to Physical Biochemistry (3)****BCHM 525 Metabolic Interrelationships and Control (5)****BCHM 534 Techniques in Biochemistry (5)****ENVH 566 Air Quality and Human Health (2-4)****ENVH 568 Water Quality Assurance (3)****ENVH 569 Environmental Sampling and Analysis (4)****ENVH 586 Environmental Health Administration (3)****MICR 521 Medical Microbiology (8)****MICR 535 Molecular Biology of Prokaryotes and Recombinant DNA (4)****MICR 538 Mol Biology of Eukaryotes and Gene Regulation (4)****MICR 555 Microbial Genetics (3)****MICR 565 Virology (3)****MICR 566 Cell Culture (3)****MICR 568 Laboratory Techniques in Virology (3)****MICR 594 Medical Mycology (3)****PHSL 535 Comparative Physiology (5)****PHSL 541 Cell and Molecular Biology (4)****PHSL 596 Readings in Comparative Physiology (1)****STAT 521 Biostatistics I (4)****STAT 522 Biostatistics II (4)****STAT 523 Biostatistics III (4)****STAT 549 Analytical Application of SPSS/PC (2)****STAT 568 Data Analysis (2-3)**

BIOMEDICAL AND CLINICAL ETHICS

GERALD WINSLOW, Ph.D. Graduate Theological Union 1981

Dean; Professor of Christian Ethics

Christian ethics

DAVID R LARSON, D.Min. School of Theology at Claremont 1973; Ph.D. Claremont Graduate School 1982

Program Coordinator; Associate Professor of Christian Ethics; Co-Director, Center for Christian Bioethics
Theological and philosophical ethics, biomedical ethics, sexual ethics

The purpose of the course of graduate study leading to a Master of Arts degree in biomedical and clinical ethics is to prepare qualified persons to engage in education, research, and service pertinent to the moral challenges posed by and experienced within the various forms of medical inquiry and therapy.

Upon the completion of this degree, many students will turn or return to one of the medical professions. Some will pursue doctoral degrees in biomedical and clinical ethics. Some will seek advanced degrees in law, social work, ministry, psychology, and related fields. A few may find part-time or full-time employment as ethics consultants and educators in health-care institutions or agencies. All will proceed to their next academic or professional assignments with a thorough understanding of Christian ethical points of view and their pertinence to medical care, research, and education.

The Program in Biomedical and Clinical Ethics is administered by the Faculty of Religion through the Graduate School. It thereby draws upon resources in many sectors of the campus. In addition to the five professional schools within Loma Linda University, and a number of departments within Loma Linda University Medical Center and Loma Linda University Children's Hospital, these resources include the Center for Health Promotion, the Center for Christian Bioethics, and the Behavioral Medicine Center.

The Program in Biomedical and Clinical Ethics is supported by the Center for Christian Bioethics in a variety of ways. The center's Thompson Library, a constantly growing collection with approximately 1,000 volumes to date, aims to become one of the most comprehensive libraries of materials in biomedical and clinical ethics on the Pacific Slope. These materials, which are an especially valuable resource for graduate students, supplement the related holdings in the primary libraries of LLU and nearby institutions.

FACULTY

JACK W. PROVONSHA, M.D. Loma Linda University
1953;
Ph.D. Claremont Graduate School 1967
Emeritus Professor of Philosophy of Religion and
Christian Ethics
Philosophy of religion, theology, biomedical ethics,
clinical ethics

JAMES W. WALTERS, Ph.D. Claremont Graduate School
1979
Professor of Christian Ethics
Theological and philosophical ethics, biomedical ethics,
ethics and aging populations

LEIGH BISHOP, M.D. University of Texas, Galveston
1980
M.A. University of California, Riverside 1992
Associate Professor of Psychiatry
Moral philosophy, philosophy of mind, philosophy of
religion

ROBERT D. ORR, M.D. McGill University 1966
Associate Professor of Family Medicine
Director of Clinical Ethics, Loma Linda University
Medical Center;
Co-director, Center for Christian Bioethics
Clinical ethics

ASSOCIATE FACULTY

ROY BRANSON, Ph.D. Harvard University 1968
Adjunct Professor of Christian Ethics
Theological and philosophical ethics, biomedical ethics,
religion and society

CHARLES W. TEEL, Jr., Ph.D. Boston University 1972
Adjunct Professor of Christian Ethics
Sociology of religion, social ethics, international service
and advocacy

LOIS VAN CLEVE, Ph.D. Claremont Graduate School
1985
Professor of Nursing
Ethics in nursing

GERALD R. WINSLOW, Ph.D. Graduate Theological
Union 1979
Adjunct Professor of Christian Ethics
Theological and philosophical ethics, biomedical ethics,
distributive justice

CLINICAL FACULTY

DENNIS DELEON, M.D. University of Tennessee,
Memphis 1985
Assistant Professor of Family Medicine
Clinical ethicist, Loma Linda University Medical Center
Clinical ethics

STEVEN B. HARDIN, M.D. Loma Linda University 1985
Assistant Professor of Medicine
Clinical ethics

ADMISSION

In addition to meeting admission requirements for the Graduate School, applicants to the Program in Biomedical and Clinical Ethics must:

1. Propose clear personal and professional goals and ways in which the Program in Biomedical and Clinical Ethics may facilitate their realization; and
2. Persuade the admissions committee by previous accomplishments that he or she is able and willing to reach these goals and to make a distinguished contribution to the field.

Course requirements

In order to receive the Master of Arts degree in biomedical and clinical ethics from Loma Linda University:

1. Each student will complete a minimum of 48 units of course work as herein specified with an overall grade point average of B or better, with no grade lower than a C, and with no grade in a required course lower than a B-. At least 32 units must be in approved courses numbered 500-699 or their equivalent. The required curriculum will be as follows:

- RELE 504 Research Methods (4)
- RELE 524 Christian Bioethics (4)
- RELE 548 Christian Social Ethics (4)
- RELE 554 Clinical Intensive in Biomedical Ethics I (4)
- RELE 555 Clinical Intensive in Biomedical Ethics III (4)
- RELE 577 Theological Ethics (4)
- RELE 588 Types of Ethical Theory (4)
- RELE 697 Independent Research (8) plus
- RELE 698 Thesis (4) or
Approved electives (12)

48 units

2. Students are able to transfer up to 8 units of approved courses from other institutions into LLU's Program in Biomedical and Clinical Ethics. Such opportunities are available at nearby institutions such as La Sierra University, Redlands University, University of California at Riverside, School of Theology at Claremont, and Fuller Theological Seminary. In addition, prior or current students in LLU's other postbaccalaureate degree programs will be able to petition for credit in this curriculum for up to 12 units of courses completed in their professional studies that are directly related to biomedical and clinical ethics. An illustrative list of such courses will be made available upon request.

Comprehensive Examination

Each student must pass five comprehensive written examinations within a single week. These examinations will test the student's ability to integrate and apply knowledge from the following areas: (1) philosophical ethics, (2) theological ethics, (3) social ethics, (4) biomedical ethics, and (5) clinical ethics. These examinations must be successfully completed before the student defends a thesis or its approved substitutes.

Thesis or Project

Each student must either prepare a thesis while registered for RELE 697 and RELE 698 or prepare three major papers of publishable quality in courses approved as substitutes by the guidance committee. The student must provide an oral defense of a thesis or three major papers that analyze specific issues, cases, dilemmas or themes in biomedical and clinical ethics. Students must declare whether they intend to write a thesis by the time they complete 12 quarter units in the program.

COURSES

RELP 504 Research Methods (4)

Presuppositions and procedures for research in the humanities and sciences pertinent to specialists in ethics; the use of libraries as research centers; advanced methods of expository and persuasive writing; ways and means of preparing and presenting term papers, theses, and scholarly articles.

RELE 524 Christian Bioethics (3-4)

A discussion of current bioethical controversies such as abortion, euthanasia, allocating scarce medical resources, mind and behavior control, and artificial methods of human procreation. Analysis of a variety of Christian and non-Christian interpretations of these and related issues. Alternative understandings of Christianity's distinctive contributions to bioethical inquiry.

RELE 534 Ethical Issues in Public Health (3-4)

Theoretical and practical appraisals of the ethical alternatives encountered by public health administrators, educators, and researchers.

RELE 548 Christian Social Ethics (3-4)

An in-depth opportunity for the graduate student to discover the implications of Christian belief for selected problems in social ethical theory and practice.

RELE 554 Clinical Intensive in Biomedical Ethics I (4)

An intensive study of the theories and applications of clinical biomedical ethics. Discussion of classic and current case studies in the field. Supervised participation in ethics consultation in acute care medical centers.

RELE 555 Clinical Intensive in Biomedical Ethics II (4)
Continuation of RELE 554.

RELE 577 Theological Ethics (3-4)

Ethical dimensions of theological positions advocated in the twentieth century.

RELE 588 Types of Ethical Theory (3-4)

A critical analysis of basic theories propounded in philosophical ethics and their relevance to bioethical decision-making. A study of the writings of major ethical theorists, including Plato, Aristotle, Immanuel Kant, and J. S. Mill. A consideration of philosophical ethics as compared with the Christian faith.

RELE 624 Seminar in Christian Ethics (3-4)

RELE 674 Reading Tutorial (3-4)

RELE 697 Independent Research (1-8)

RELE 698 Thesis (4)

RELE 699 Directed Study (2-6)



BIOMEDICAL SCIENCES CERTIFICATE PROGRAM

RAMON R. GONZALEZ, Jr., Ph.D. Wake Forrest University 1973

Program Coordinator; Associate Professor of Physiology
Cardiovascular physiology, control of circulation

The Biomedical Sciences Certificate Program provides an opportunity for qualified students to register for selected graduate-level courses in the biomedical sciences. These courses are identical to those taken by students in our master's and doctoral degree programs; however, the certificate program enables students to complete their studies with one academic year of full-time commitment. The program is intended to provide postbaccalaureate experience in the rapidly changing area of biomedical sciences. As such it will either augment other career choices — such as high school teaching, patent law, biotechnology management — or improve the preparation for professional training in medicine or dentistry.

Faculty for the program will be drawn from the graduate faculty associated with basic science departments of the School of Medicine and the natural sciences department of the Graduate School.

Admission

Students entering the program will have completed a baccalaureate degree (or its equivalent) meeting the criteria outlined under the Admission Information section of this BULLETIN. Students who have not taken the Graduate Record Examination may be considered if they have a Medical College Acceptance Test with no score less than 6 and an aggregate score greater than 20. A Dental Aptitude Test score greater than 15 would also be acceptable.

Course of study

Students will be required to complete 28 units selected from courses offered through the Graduate School. These courses will include three units of religion with the remaining 25 units selected, in consultation with the program coordinator, from offerings in the biological sciences. The program may include one unit of appropriate seminar and up to six units of research. Since many of the courses offered in the basic medical sciences are sequenced or anticipate specific undergraduate experiences, students will be required to meet all course prerequisites.

Students may choose to select course sequences that could be applied to one of the Master of Science degree programs that the Graduate School offers in the biological sciences. Course work at the B (3.00) or better level would be transferred to such a Master of Science degree program upon presentation of a petition for academic variance to the dean of the Graduate School.

Although several of the courses may share lecture experience and tests with the School of Medicine doctoral degree program, such courses will not be transferred to the School of Medicine; and the student who subsequently was admitted to the M.D. degree program should expect to take, and pay for, the normal medical school curriculum.

CLINICAL NUTRITION

PATRICIA K. JOHNSTON, Dr.P.H. University of California, Los Angeles 1987
Chairman; Program Coordinator, Associate Professor of Nutrition
 Public health nutrition, maternal and child nutrition, nutrition and aging, minerals

The curriculum leading to the Master of Science degree in clinical nutrition is offered by the School of Public Health's Department of Nutrition through the Graduate School. This program prepares qualified persons to practice as chief clinical dietitians in acute care facilities; as managers of free standing outpatient clinics, treatment centers, or wellness centers; as sports team nutritionists; and as research dietitians. It provides specialized training in clinical dietetics for advanced-level practice as advocated by the American Dietetic Association in the areas of renal nutrition, pediatric nutrition, and metabolic nutrition care. It also provides advanced training in clinical nutrition for physicians. The program gives particular emphasis to the relationship of vegetarian diets as they impact disease states. The program is interdisciplinary in its support and requires a research project and thesis.

FACULTY

U.D. REGISTER, Ph.D. University of Wisconsin 1950
 Emeritus Professor of Nutrition

KATHLEEN K. ZOLBER, Ph.D. University of Wisconsin 1968
 Emeritus Professor of Nutrition

JAMES W. BLANKENSHIP, Ph.D. University of Wyoming 1969
 Professor of Nutrition
 Lipids

JAMES PETERS, M.D. Loma Linda University 1986,
 Dr.P.H. Loma Linda University 1978
 Associate Professor of Nutrition
 Preventive medicine, pulmonary disease

JOAN SABATE, M.D. Universidad Autonoma de Barcelona,
 Spain 1977, Dr.P.H. Loma Linda University 1989
 Associate Professor of Nutrition, of Epidemiology, and of
 Biostatistics
 Nutritional epidemiology, methods of nutrition research,
 nutritional assessment

ASSOCIATE FACULTY

KENNETH I. BURKE, Ph.D. Florida State University 1973
 Professor of Nutrition and Dietetics
 Food science

BERTRUM C. CONNELL, Ph.D. University of Missouri-
 Columbia 1981
 Professor of Nutrition and Dietetics
 Food systems management

JONI PAGGENKAMPER, M.S. Texas Woman's University 1988
 Assistant Professor of Nutrition and Dietetics
 Renal disease

CRYSTAL WHITTEN, M.S. Loma Linda University 1985
 Instructor in Nutrition and Dietetics
 Hyperlipidemias

CLINICAL FACULTY

ZAIDA CORDERO-MACINTYRE, M.S. Loma Linda
 University 1974

Clinical Assistant Professor of Nutrition
 Drug-nutrient interactions, clinical nutrition

GEORGE GUTHRIE, M.D. Loma Linda University 1984
 Clinical Assistant Professor of Nutrition
 Diabetes, nutrition and chronic disease

ELLA HADDAD, Dr.P.H. Loma Linda University 1979
 Clinical Assistant Professor of Nutrition
 Advanced nutrition, public health nutrition, nutrition
 assessment

GEORGIA HODGKIN, Ed.D. Loma Linda University 1991
 Clinical Assistant Professor of Nutrition
 Nutrition care management

CINDY KOSCH, M.S. Loma Linda University 1986
 Clinical Assistant Professor of Nutrition
 Metabolic nutrition care

Admission

Applicants must meet the general Graduate School admission requirements as well as those specific to the program in clinical nutrition as stated below.

General requirements

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

Prerequisites

Applicants must hold a baccalaureate degree and be a registered dietitian, physician, or AP4 eligible. Others may be considered individually on the basis of appropriate course work and experience, but must meet the didactic program in dietetics (DPD) requirements during their program, in addition to the M.S. degree requirements. Specific courses required as prerequisites are microbiology, physiology, and 16 units of chemistry. Applicants must have an overall GPA of 3.0 or better in their undergraduate course work and must provide acceptable scores on the general test of the Graduate Record Examination, as well as a clear statement of personal and professional goals. Evidence of computer literacy must be provided; however, computer requirements may be taken concurrently and in addition to the required courses.

Curriculum

NUTR 504	Nutritional Metabolism (5)
PHSL 533	Physiology I (4)
PHSL 534	Physiology II (3)
NUTR 517	Advanced Nutrition I (4)
NUTR 518	Advanced Nutrition II (4)
NUTR 554	Critical Care Nutrition I (4)
NUTR 555	Critical Care Nutrition II (4)
NUTR 597	Special Topics in Clinical Nutrition (1,1)
NUTR 577	Nutrition Care Management (3)
NUTR 539	Research Methods in Nutrition (2)
NUTR 694	Research (7)
NUTR 695	Thesis (2)
REL_ ____	Religion (3)
STAT 521	Biostatistics I (4)

Approved electives (9)

Total units required: 56

In addition to the course work, students are required to attend grand rounds, and nutritional services conferences, and pass a comprehensive examination and an oral defense of their thesis.

Other programs in nutrition

Professional programs leading to the Master of Public Health and the Doctor of Public Health degrees are offered through the School of Public Health and are described in the BULLETIN of that school.

COURSES**NUTR 504 Nutritional Metabolism (5)**

Study of the static and dynamic aspects of the metabolism of carbohydrates, lipids, amino acids, proteins, nucleic acids, cations, anions, enzyme kinetics, hormones, vitamins, and minerals in the normal healthy human.

NUTR 509 Public Health Nutrition (3)

An introduction to the concepts of nutrition as related to public health. Includes life-cycle issues as well as discussion of major nutrition-related diseases and their prevention. Not applicable toward a major in nutrition.

NUTR 510 Advanced Public Health Nutrition (3)

Study of the applied and preventive aspects of nutrition as related to public health.

Prerequisite: NUTR 504.

NUTR 517 Advanced Nutrition I:**Carbohydrates and Lipids (4)**

Advanced study of the nutrition, metabolism, and function of carbohydrates and lipids as related to health and disease.

Prerequisite: NUTR 504.

NUTR 518 Advanced Nutrition II:**Proteins, Vitamins, and Minerals (4)**

Advanced study of the nutrition, metabolism, and function of proteins, vitamins, and minerals as related to health and disease.

Prerequisite: NUTR 504.

NUTR 525 Nutrition Policy, Programs, and Services (3)

Development of professional skills in management of nutrition programs. Includes legislative advocacy and analysis of current nutrition programs at local, state, and federal levels. Laboratory included.

NUTR 527 Assessment of Nutritional Status (2)

Designed to acquaint students with techniques of individual and community nutrition assessment: dietary intake and evaluation, use and evaluation of computer software, anthropometric measurements, biochemical and clinical evaluation. Laboratory included.

Prerequisite: Basic nutrition or consent of instructor.

NUTR 528 Symposium:**Adventist Philosophy of Nutrition (1)**

The science of nutrition as related to the Seventh-day Adventist philosophy of health.

Prerequisite: NUTR 509 or consent of instructor.

NUTR 534 Maternal and Child Nutrition (3)

Role of nutrition in human growth and development, with emphasis on prenatal, infancy, preschool, school age, and adolescence.

Prerequisite: Basic nutrition, NUTR 509, or consent of instructor.

NUTR 536 Nutrition and Aging (2)

Biochemical and physiological basis for nutrient requirements in aging. Effect of nutrition on aging and chronic degenerative diseases, and their effects on nutrient requirement. Epidemiologic basis for setting of dietary goals.

Prerequisite: Basic nutrition, NUTR 509, or consent of instructor.

NUTR 537 Community Programs Laboratory (1)

Supervised experience in program planning and evaluation techniques in a community setting (industry, schools, health care facilities, churches). Opportunity to apply program planning skills in a practical setting. May be repeated for credit. Concurrent registration for HPRO 536 or 538 required.

Prerequisite: HPRO 509.

NUTR 543 Concepts in Nutritional Epidemiology (3)

Designed to prepare students for conducting research relating diet to health/disease outcomes. Review of methodological issues related to dietary assessment for clinical/metabolic and epidemiological research. Topics include: variation in diet, measurement error and correction for its effects, advantages and limitations of different diet assessment techniques, design and development of a food-frequency instrument, total energy intake in analyses.

Prerequisite: STAT 521, EPDM 509, NUTR 527 or consent of instructor.

NUTR 545 Clinical Nutrition (4)

Diet therapy and care for a variety of clinical disorders with nutritional implications. Principles and practice of dietary counseling and patient education. Laboratory included.

Prerequisite: Basic nutrition, physiology or equivalent.

NUTR 554 Critical Care Nutrition I (3)

Current issues related to the nutritional needs of patients with diabetes, heart disease, and renal disease. Drug-nutrient interactions, laboratory values, treatment modalities, and their effect on nutrition in the critical care of these patients. Counseling strategies for each.

Prerequisite: RD, RD eligible with appropriate experience, M.D., or consent of instructors.

NUTR 555 Critical Care Nutrition II (3)

Current issues related to the nutritional needs of the preterm neonate, oncology, AIDS, and COPD patient. In-depth study of enteral/parenteral feeding products and their administration. Counseling strategies for the client and/or caregiver in each instance.

Prerequisite: RD, RD eligible with appropriate experience, M.D., or consent of instructor.

NUTR 575 Food Systems Management (3)

Development of administrative skills in effective management of food systems. Qualitative and quantitative standards, budget development and analysis, labor-management relations, computer-assisted information system.

Prerequisite: HADM 509 or equivalent.

NUTR 577 Nutrition Care Management (3)

Translation of institutional mission into goals, objectives, and standards of care. Application of operations analysis, financial management, quantitative decision making, and productivity management techniques to enhance the delivery of nutrition care. Ethical and legal behavior. Staff recruitment, selection, development, and retention. Development of quality assurance indicators. Skills in managing the human and technological resources available to the registered dietitian.

Prerequisite: Registered dietitian.

NUTR 597 Special Topics in Clinical Nutrition (1)

Investigation and discussion of current topics in clinical nutrition; may be repeated for credit.

Prerequisite: Critical-Care Nutrition I and II.

NUTR 539 Research Methods in Nutrition**NUTR 604 Seminar in Nutrition (1)**

Individual reports and discussion dealing with recent developments in nutrition and related areas. May be repeated for additional credit.

Prerequisite: Five graduate units in nutrition or consent of instructor.

NUTR 605 Seminar in Public Health Nutrition (1)

Designed to explore current major issues in public health nutrition. Students choose and research a topic or problem and discuss their findings in class. Written report required. May be repeated for additional credit.

Prerequisite: Five graduate units in nutrition or consent of instructor.

NUTR 694 Research (1-12)

Independent research for doctoral degree candidates and qualified master's degree students on problems currently receiving study in the department. Research program arranged with faculty member(s) involved. Minimum of thirty hours required for each unit of credit. Written report required. Limited to doctoral degree candidates and qualified master's degree students.

Prerequisite: Consent of instructor responsible for supervision and the program adviser.

NUTR 695 Thesis (2)

Individual guided experimental research study in nutrition under direct faculty supervision. Limited to graduate students whose thesis project has been approved by their research committee.

NUTR 696 Directed Study/Special Project (1-4)

Individual arrangements for advanced students to study under the guidance of a program faculty member. May include readings, literature reviews, or other special projects. Minimum of thirty hours required for each unit of credit. A maximum of 4 units applicable to any master's degree program.

DENTISTRY

JUDSON KLOOSTER, D.D.S. University of the Pacific 1947; M.M.S. Tulane University 1968
Dean; Professor of Restorative Dentistry
 Restorative dentistry

LEIF K. BAKLAND, D.D.S. Loma Linda University SD 1962
Coordinator, graduate programs in dentistry
 Professor of Endodontics
 Endodontics

Graduate study leading to the Master of Science degree or a specialty certificate in dentistry is offered in the following areas: endodontics, oral implantology, oral and maxillofacial surgery, orthodontics, and periodontics. 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, where applicable, meet the requirements of the respective specialty boards.

FACULTY

LEIF K. BAKLAND, D.D.S. Loma Linda University SD
 1963
 Professor of Endodontics
 Endodontics

PHILIP J. BOYNE, D.M.D. Tufts University 1947; M.S.
 Georgetown University 1961
 Professor of Oral and Maxillofacial Surgery
 Oral and maxillofacial surgery

BERNARD C. BYRD, D.D.S. Emory University 1953; M.S.
 University of Southern California 1964
 Professor of Oral and Maxillofacial Surgery
 Oral and maxillofacial surgery

ROBERT JAMES, D.D.S. University of Southern
 California 1960; M.S. Loma Linda University GS 1972
 Professor of Restorative Dentistry
 Oral implantology

JOHN E. PETERSON, JR., D.D.S. Loma Linda University
 SD 1970; M.S. GS 1978
 Professor of Orthodontics and Pediatric Dentistry
 Orthodontics and pediatric dentistry

JAMES H. SIMON, D.D.S. Temple University 1961
 Professor of Endodontics
 Endodontics

MAHMOUD TORABINEJAD, D.M.D. University of Tehran
 1971; M.S.D. University of Washington 1976
 Professor of Endodontics
 Endodontics

ROLAND D. WALTERS, D.D.S. Loma Linda University
 SD 1957; M.S. GS 1967
 Professor of Orthodontics
 Orthodontics

DAVID ANDERSON, D.D.S. Loma Linda University SD
 1970

Associate Professor of Dental Anesthesiology
 Dental anesthesiology

LOGAN W. BARNARD, Ph.D. University of Utah 1971
 Associate Professor of Orthodontics
 Orthodontics

RALEIGH R. CUMMINGS, D.D.S. Loma Linda University
 SD 1966; M.S. GS 1970
 Associate Professor of Endodontics
 Endodontics

LLOYD E. GAUNT, D.D.S. Loma Linda University SD
 1963; M.S. GS 1965
 Associate Professor of Orthodontics
 Orthodontics

DOUGLAS J. MCKENDRY, D.D.S. University of Alberta
 1983; M.S.D. University of Washington 1986
 Associate Professor of Endodontics
 Endodontics

ARTHUR J. MORGAN, D.D.S. Loma Linda University SD
 1960; M.S. GS 1963
 Associate Professor of Orthodontics
 Orthodontics

STEVE G. MORROW, D.D.S. Loma Linda University SD
 1960
 Associate Professor of Endodontics
 Endodontics

GORDON M. RICK, D.D.S. Loma Linda University SD
 1968; M.S. GS 1972
 Associate Professor of Oral Pathology
 Oral pathology

ULF M. E. WIKESJO, D.D.S. University of Lund 1973;
M.S. GS 1987,
Ph.D. University of Lund 1991
Associate Professor of Periodontics
Periodontics

JAMES R. WISE, D.D.S. Loma Linda University SD 1967;
M.S. GS 1971
Associate Professor of Orthodontics
Orthodontics

NORMAN S. CARTER, D.D.S. Loma Linda University SD
1973; M.S. GS 1975
Assistant Professor of Orthodontics
Orthodontics

JOSEPH M. CARUSO, D.D.S. Loma Linda University SD
1973; M.S. GS 1975; M.P.H. SPH 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

CLELAN G. EHRLER, D.D.S. Loma Linda University SD
1968; M.S. GS 1971
Assistant Professor of Orthodontics
Orthodontics

ROBERT J. FRANK, D.D.S. Ohio State University 1972
Assistant Professor of Endodontics
Endodontics

M. TOUFIC JEIROUDI, D.D.S. University of Damascus
1978; M.S. Loma Linda University GS 1982
Assistant Professor of Orthodontics
Orthodontics

JAIME L. LOZADA D.D.S. University of Puebla, Mexico
1983
Assistant Professor of Restorative Dentistry
Oral implantology

LAWRENCE E. McEWEN, D.D.S. Loma Linda University
SD 1963
Assistant Professor of Orthodontics
Orthodontics

THOMAS L. ROBERTSON, D.D.S. Marquette University
1959; M.S. Loma Linda University GS 1968
Assistant Professor of Orthodontics
Orthodontics

R. DAVID RYNEARSON, D.D.S. Loma Linda University
SD 1971; M.S. GS 1987
Assistant Professor of Orthodontics
Orthodontics

WILLIS L. SCHLENKER, D.D.S. Loma Linda University
SD 1957
Assistant Professor of Orthodontics
Orthodontics

ASSOCIATE FACULTY

A. DURWIN H. CHAMBERLAIN, D.D.S. University of
Maryland 1969; M.P.H. Loma Linda University SPH
1975; M.S. Loma Linda University GS 1982
Professor of Periodontics
Periodontics

MAX CRIGGER, D.D.S. Ohio State University 1965; M.S.
University of Rochester 1972
Professor of Periodontics
Periodontics

JAN H. EGELBERG, L.D.S. University of Lund 1960;
ODONT.DR University of Lund 1967
Professor of Periodontics
Dental research

J. STEVEN GARRETT, D.D.S. Northwestern University
1971; M.S. Loma Linda University GS 1976
Professor of Periodontics
Periodontics

W. EUGENE RATHBUN, D.D.S. Loma Linda University SD
1965; PH.D. University of California, Los Angeles
1970
Professor of Periodontics
Periodontics

ROBERT M. RICKETTS, D.D.S. Indiana University 1945;
M.S. University of Illinois 1950
Professor of Orthodontics
Orthodontics

GARLAND E. SCOTT, Ph.D. North Carolina State
University 1972
Professor of Orthodontics
Orthodontics

RICHARD A. SIMMS, D.D.S. Howard University 1953;
M.S. Loma Linda University GS 1963
Professor of Orthodontics
Orthodontics

JOHN L. TOMLINSON, Ph.D. University of Wisconsin
1967
Professor of Orthodontics
Materials engineering

W. HOWARD DAVIS, D.D.S. University of Southern
California 1948
Associate Professor of Oral Surgery
Oral and maxillofacial surgery

JOHN P. DEVINCENZO, D.D.S. Loma Linda University SD
1964; M.S. GS 1967
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

RONALD M. KAMINISHI, D.D.S. Northwestern University
1968

Assistant Professor of Oral Surgery
Oral and maxillofacial surgery

ANTHONY B. LIER, D.D.S. Loma Linda University SD
1975; M.S. GS 1981

Assistant Professor of Orthodontics
Orthodontics

ROBERT D. MITCHELL, D.D.S. Loma Linda University
SD 1978; M.S. GS 1985

Assistant Professor of Orthodontics
Orthodontics

RAYMOND M. SUGIYAMA, D.D.S. Western Reserve
University 1964; M.S. Loma Linda University GS 1968

Assistant Professor of Orthodontics
Orthodontics

GUY D. TAYLOR, D.D.S. West Virginia University 1967;
M.S. 1971

Assistant Professor of Orthodontics
Orthodontics

CLINICAL FACULTY

ALFRED L. FRANK, D.D.S. University of Southern
California 1945

Professor of Endodontics
Endodontics

JOHN WHITTAKER, D.D.S. Otago University, New
Zealand 1967

Associate Professor of International Dentistry Program
International Dentist Program

MILOS BOSKOVIC, D.D.S. University of Southern
California 1984

Assistant Professor of Restorative Dentistry
Oral implantology

GUNTHER BLASEIO, D.D.S. Erlangen University 1977;
M.S. GS 1986

Lecturer in Orthodontics
Orthodontics

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 October 1 for the programs in orthodontics; October 15 for the programs in endodontics, oral implantology, and periodontics; and November 15 for the oral and maxillofacial surgery program.

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 2.0. 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 fewer than three members is named by the Graduate Council.

Thesis

The student is required to pursue a problem in basic or clinical research, the results of which are presented in thesis form according to standards set by the Graduate Council. Oral defense of the thesis may be required.

General requirements

For information about requirements and practices to which all graduate students are subject, the student should consult the Policies and General Regulations section of the Graduate School BULLETIN. In addition students should consult the booklet Graduate, Advanced and Postgraduate Dental Education Programs published by the School of Dentistry along with syllabi that are published by the various programs.

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 relationships 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 before applying is required.

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. Both programs fulfill the requirements for eligibility for certification by the American Board of Endodontics.

Required courses

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
GRDN 509	General Statistics
GRDN 531	Applied Surgical Anatomy
GRDN 601	Practice Management
GRDN 604	Topics in Medicine and Hospital Protocol
GRDN 607	General Research Methods
GRDN 609	Professional Ethics
GRDN 622	Biomedical Science I
GRDN 623	Biomedical Science II
ORPA 533	Radiology
RLGN —	Religion (3)

ORAL IMPLANTOLOGY

The graduate program in oral implantology leads to a certificate in oral implantology or a Master of Science degree combined with a certificate in oral implantology. It is designed to prepare the student for the practice of oral implantology and to provide the foundation for the continued acquisition of knowledge and skill in this demanding area. It is recognized that the demands of this area of endeavor are multidisciplinary and that the student working in this field must acquire advanced knowledge and skills, generally obtained only by advanced training in recognized dental specialty programs. Specifically, oral implantology broadly interfaces with the dental specialties of oral and maxillofacial surgery, prosthodontics, and periodontology; the oral implantology student will be expected to achieve advanced knowledge and skills in certain aspects of all of these dental specialties.

A minimum of twenty-seven months in residence is required for the certificate program, and a minimum of three calendar years in residence is required for the Master of Science degree program. The first six months of each program are spent in a general anesthesiology rotation. The student is expected to become certified in advanced cardiac life support during that period.

Required courses

ANES 321	Principles of Medicine, Physical Diagnosis, Hospital Protocol
ANES 346	General Anesthesia
ANES 547	Anesthesia Grand Rounds
GRDN 309	General Statistics
GRDN 531	Applied Surgical Anatomy
GRDN 607	General Research Methods
GRDN 622	Biomedical Science I
GRDN 623	Biomedical Science II
ORIM 321	Gnathology and Instrumentation
ORIM 348	Seminar in Oral Implantology
ORIM 561	Oral Implant Materials Science and Engineering
ORIM 601	Literature Review in Oral Implantology
ORIM 604	Current Literature Review in Oral Implantology
ORIM 625	Clinical Practice in Oral Implantology
ORIM 631	Oral Implant Surgery
ORIM 634	Clinical Conference in Implantology
ORIM 637	Peri-implant Histopathology
ORIM 654	Practice Teaching in Oral Implantology
ORIM 697	Research in Oral Implantology
ORIM 698	Thesis
ORPA 533	Radiology
ORSR 532	Oral and Maxillofacial Surgery II, Section II
ORSR 604	Literature Review in Oral and Maxillofacial Surgery
PERI 601	Periodontal Therapy
PERI 604	Current Periodontal Literature
PERI 611	Introduction to Periodontics
PERI 625	Clinical Practice in Periodontics, Section II
PERI 634	Clinical Conference in Periodontics
PRDN 522	Removable Partial Dentures
PRDN 604	Literature Review in Prosthodontics
PRDN 625	Clinical Practice in Prosthodontics
PRDN 631	Complete Dentures
RESD 625	Clinical Practice in Fixed Prosthodontics
RLGN —	A 3-unit course in religion

ORAL AND MAXILLOFACIAL SURGERY

The graduate resident program in oral and maxillofacial surgery is designed to prepare the student for the practice of this surgical specialty and to provide the foundation for the continued acquisition of knowledge and skills. Clinical surgical health-care delivery is emphasized. 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 oral and maxillofacial surgery specialty board. A license to practice in California is required.

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

Required courses

ANES 521	Principles of Medicine, Physical Diagnosis, and Hospital Protocol
ANES 346	General Anesthesia
ANES 547	Anesthesia Grand Rounds
GRDN 531	Applied Surgical Anatomy
GRDN 601	Practice Management
GRDN 622	Biomedical Sciences I
GRDN 623	Biomedical Sciences II
ORDN 521	Applied Cephalometrics for Oral and Maxillofacial Surgeons
ORSR 331	Oral and Maxillofacial Surgery I
ORSR 532	Oral and Maxillofacial Surgery II
ORSR 533	Oral and Maxillofacial Surgery III
ORSR 534	Oral and Maxillofacial Surgery IV
ORSR 604	Literature Review in Oral and Maxillofacial Surgery
ORSR 641	Applied Orthognathic Surgery
ORSR 654	Practice Teaching in Oral and Maxillofacial Surgery
ORSR 697	Research
ORSR 698	Thesis
RLGN —	Religion (3)

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.

Two programs are available:

1. The certificate program requires a minimum of twenty-four months in residence, beginning in June.

2. Master's degree programs require a minimum of twenty-four months in residence, beginning in June. Specific programs may require additional time, depending on the research selected.

Required courses

GRDN 509	General Statistics
GRDN 525	Applied Anatomy
GRDN 601	Practice Management
GRDN 607	General Research Methods
GRDN 609	Professional Ethics
ORBI 522	Cell Biology
ORBI 531	Physiology of Bone
ORDN 521	Applied Cephalometrics for Oral and Maxillofacial Surgeons
ORDN 524	Introduction to Graduate Orthodontics, Lecture
ORDN 524L	Introduction to Graduate Orthodontics, Laboratory
ORDN 525	Materials Science and Mechanics
ORDN 527	Clinical Photography
ORDN 531	Clinical Oral Pathology
ORDN 535	Advanced Cephalometrics
ORDN 536	Concepts of Physical Anthropology
ORDN 545	Growth and Development
ORDN 546	Fundamentals of Occlusion
ORDN 554	Physiology and Pathology of Speech
ORDN 571	Diagnosis and Treatment Planning I
ORDN 574	Diagnosis and Treatment Planning II
ORDN 584	Current Orthodontic Literature I
ORDN 591	Current Orthodontic Literature II
ORDN 597	Orthognathic Surgery, Theory, and Literature Review
ORDN 604	Seminar in Orthodontics
ORDN 605	Advanced Seminar in Orthodontics
ORDN 606	Craniofacial Genetics
ORDN 607	Advanced Physiology and Pathology of Speech
ORDN 609	Temporomandibular Joint Diagnosis and Treatment
ORDN 625	Clinical Practice in Orthodontics
ORDN 634	Orthodontic Clinical Conference
ORDN 635	Finishing Mechanics I
ORDN 636	Finishing Mechanics II
ORDN 654	Practice Teaching in Orthodontics
ORDN 655	Temporomandibular Function and Dysfunction
ORDN 657	Orthodontic Board Preparation
ORDN 697	Research
ORDN 698	Thesis
ORSR 641	The Application of Surgical Principles to Orthodontic Therapy
RLGN —	Religion (3)

PERIODONTICS

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

The three-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 degree 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 degree program prepares the residents for academic careers in periodontal research and teaching.

A minimum of thirty-six months in residence is required, beginning with the first-year summer quarter. These programs fulfill the requirements for eligibility for certification by the American Board of Periodontology.

Required courses

- GRDN 509 General Statistics
- GRDN 531 Applied Surgical Anatomy
- GRDN 604 Topics in Medicine and Hospital Protocol
- GRDN 607 General Research Methods
- GRDN 609 Professional Ethics
- GRDN 622 Biomedical Sciences I
- GRDN 623 Biomedical Sciences II
- ORIM 601 Literature Review in Oral Implantology
- ORIM 604 Current Literature Review in Oral Implantology
- ORIM 611 Introduction to Oral Implantology
- ORIM 625 Clinical Practice in Oral Implantology
- ORPA 533 Radiology
- PERI 524 The Periodontium
- PERI 531 Periodontal Histopathology
- PERI 601 Periodontal Therapy
- PERI 604 Current Periodontal Literature
- PERI 611 Introduction to Periodontics
- PERI 625 Clinical Practice in Periodontics
- PERI 634 Clinical Conference in Periodontics
- PERI 654 Practice Teaching in Periodontics
- PERI 697 Research
- PERI 698 Thesis
- RLGN ____ Religion (3)

CORE COURSES

- GRDN 509 General Statistics (3)**
- GRDN 526 Applied Anatomy (2)**
Fundamentals of anatomy as they apply to a special region or application.
- GRDN 531 Applied Surgical Anatomy (2)**
Surgical approach to anatomy as it relates to special anatomic regions.

GRDN 601 Practice Management (2)

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

GRDN 604 Topics in Medicine and Hospital Protocol

Topics presented in internal medicine and physical evaluation, with emphasis on diseases and physical conditions relating to dental treatment. Overview given on hospital utilization and local anesthesia; inhalation and intravenous sedation techniques reviewed.

GRDN 607 General Research Methods (3)

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.

GRDN 609 Professional Ethics (2)

Designed to provide students with a theological and philosophical framework for professional ethics. Topics include individual rights, autonomy, informed consent, and responsibilities of the professional person in the dental field, as well as in society as a whole.

GRDN 622 Biomedical Science I (2,2)

This two-quarter course is offered every other year (alternating with Biomedical Science II) during the fall and winter quarters. The course content is applied oral bacteriology, immunology, topics in oral medicine and applied pharmacology. Course participants are expected to have basic knowledge in the various topic areas since this course is constructed on an advanced level of understanding.

GRDN 623 Biomedical Science II (2,2)

This two-quarter course is offered every other year (alternating with Biomedical Science I) during the fall and winter quarters. The course content is applied oral pathology, biology of hard tissues, physiology, and biochemistry. Course participants are expected to have basic knowledge in the various topic areas since this course is constructed on an advanced level of understanding.

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 531 Physiology of Bone (2)

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

ORBI 534 Special Topics in Oral Biology (arranged)

Various topics presented where appropriate needs are identified.

ORPA 533 Radiology (2)

Utilization of the physical nature of x-rays to better understand image production, biological effects of x-rays, radiation safety, application of principles of radiographic techniques. Risk estimation and radiographic interpretation.

DEPARTMENTAL COURSES

ENDODONTICS

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. Clinical conferences scheduled in oral pathology.

ENDN 601 Principles of Endodontics (2, 2, 2)

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)

Supervised teaching in the endodontic preclinical laboratory and predoctoral clinic. Lectures and table clinics included in the program.

ENDN 697 Research (arranged)**ENDN 698 Thesis (arranged)**

ORAL IMPLANTOLOGY

ORIM 521 Gnathology and Instrumentation (1, 1, 1)

The geometry of mandibular movements and the effects its variations have on the anterior and posterior oclusal morphology.

ORIM 548 Seminar in Oral Implantology (1)**ORIM 561 Oral Implant Material Science and Engineering (2, 2, 2)**

A study of structures and properties of dental implant materials.

ORIM 601 Literature Review in Oral Implantology (1, 1, 1, 1, 1)

A review and discussion of oral implant literature.

ORIM 604 Current Literature Review in Oral Implantology (1, 1)

Designed to give the postdoctoral student in oral implantology a deeper understanding of the research and literature currently available.

ORIM 625 Clinical Practice in Oral Implantology (1760 clock hours)

Experience in the clinical diagnosis and treatment of patients who may benefit from oral implant therapy.

ORIM 631 Oral Implant Surgery (1, 1)

Techniques and principles of oral implant surgery.

ORIM 634 Clinical Conferences in Oral Implantology (1 unit each quarter)

Presentations of treatment plans, problems, and completed results of patients seen by students.

ORIM 637 Peri-Implant Histopathology (1, 1)

Designed to give the postdoctoral student in oral implantology a better understanding of the changes which take place in the tissues surrounding dental implants following their placement.

ORIM 654 Practice Teaching in Oral Implantology (1)

ORAL AND MAXILLOFACIAL SURGERY

ORSR 531 Oral and Maxillofacial Surgery I (first year of residence) (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 procedure; assisting on staff hospital cases; and attendance at specified seminars, conferences, and special lectures in the Medical Center.

ORSR 532 Oral and Maxillofacial Surgery II (second year of 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 and Maxillofacial Surgery III (third year of 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 posttraumatic 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 534 Oral and Maxillofacial Surgery IV (fourth year of residence) (arranged)

Opportunity afforded for research and advanced clinical training in subspecialty areas of oral and maxillofacial surgery, as well as training through off-service rotations with plastic and reconstructive surgery.

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

Critical review of present and past literature dealing with pertinent oral and maxillofacial surgical problems.

ORSR 641 Applied Orthognathic Surgery (1, 1, 1, 1, 1, 1)

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 and Maxillofacial Surgery (2)**ORSR 697 Research (arranged)****ORSR 698 Thesis (arranged)**

ORTHODONTICS

ORDN 521 Applied Cephalometrics for Oral and Maxillofacial 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 (12)

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 524L Introduction to Graduate Orthodontics, Laboratory (6)

Selected laboratory projects to enhance the didactic portion of the course.

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 527 Clinical Photography (1)

Clinical proficiency in intra-oral and extra-oral photography. Discussion and use of photographic equipment and techniques on orthodontic patients. Camera, lens, and flash required.

ORDN 531 Clinical Oral Pathology (2, 2)

Emphasis on oral manifestations of disease. Diagnosis, prognosis, and treatment of various oral neoplasms.

ORDN 535 Advanced Cephalometrics (2)

Construction of progress cephalometric tracings and use of superimposition to evaluate and revise treatment plan; students' presentation and evaluation of the progress of their clinical patients.

ORDN 536 Concepts of Physical Anthropology (2)

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

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 571 Diagnosis and Treatment Planning I (2)

Diagnosis and treatment of assigned patients; minimum of four patients with major dentofacial handicaps.

ORDN 574 Diagnosis and Treatment Planning II (2)

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

ORDN 584 Current Orthodontics Literature I (2)

Presentation of current papers in various disciplines of orthodontics.

ORDN 591 Current Orthodontics Literature II (2)

Presentation of current papers in various disciplines of orthodontics.

ORDN 597 Orthognathic Surgery Theory and Literature Review (2)

Presentation of current papers in various disciplines of orthodontics, with primary emphasis on surgical orthodontics.

ORDN 604 Seminar in Orthodontics (1, 1, 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 606 Craniofacial Genetics (2)

Basic genetics; introduction to craniofacial clinic.

ORDN 607 Advanced Physiology and Pathology of Speech (1)

Concentration on and in-depth study of specific areas of oral myofunctional disorders which influence the occlusion.

ORDN 609 Temporomandibular Joint Diagnosis and Treatment (1)

Temporomandibular joint diagnosis and treatment planning, and fabrication of treatment appliances.

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 (2)

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

ORDN 635 Finishing Mechanics I (2)

Orthodontic treatment modalities, with emphasis on finishing mechanics for the patient.

ORDN 636 Finishing Mechanics II (1)

A seminar course created for first-year graduate orthodontic students to expose them to alternate treatment philosophies and modalities. Guest orthodontists present the main portion of the course and demonstrate their treatment concepts in finishing orthodontic cases.

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

Experience in teaching the undergraduate dentistry student

ORDN 655 Temporomandibular Function and Dysfunction

The temporomandibular joint in function and dysfunction, in health and disease. Diagnosis, treatment planning, and treatment of the temporomandibular joint, with emphasis on the integration of orthodontics and temporomandibular joint treatment.

ORDN 657 Orthodontic Board Preparation (1, 1, 1, 2)

Presentation of finished orthodontic cases to faculty and residents. Preparation for the American Board of Orthodontics.

ORDN 697 Research (arranged)

ORDN 698 Thesis (arranged)

PERIODONTICS

PERI 524 The Periodontium (2)

Review of the literature concerning the anatomy (macro-, micro-, and ultrastructural) and the physiology of the periodontal tissues.

PERI 531 Periodontal Histopathology (2)

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

Must be repeated for a total of 10 units.

PERI 601 Periodontal Therapy (2)

Study of the literature which forms the basis for current concepts of the treatment of periodontal diseases. Must be repeated for a total of 12 units.

PERI 604 Current Periodontal Literature (2)

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

Must be repeated for a total of 16 units.

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 (1500 clock hours)

Clinical experience in the diagnosis and treatment of periodontal diseases.

The two-year program requires 1500 clock hours; the three-year program requires 2002 clock hours.

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.

Must be repeated for a total of 6 units.

PERI 654 Practice Teaching in Periodontics (1)

Experience in teaching the undergraduate dentistry student.

Must be repeated for a total of 4 units.

PERI 697 Research (arranged)

PERI 698 Thesis (arranged)



FAMILY LIFE EDUCATION

MASTER'S DEGREE PROGRAM CLOSED TO ADMISSIONS 1993-94

RONALD G. HUSTON, Ph.D. United States International University 1981
Acting Chairman; Associate Professor of Marriage and Family Therapy
 Family life education, marriage and family therapy, child and adolescent therapy;
 AAMFT-approved supervisor

The Family Life Education Program leads to a Master of Arts degree or a certificate in family life education. The 50-unit Master of Arts degree provides the student with an understanding of the structure and functioning of the family as a social institution from a systems and theological perspective.

The program is designed to train individuals at the postbaccalaureate level to develop, implement, and evaluate family life programs for schools, community, and church populations. In addition to providing church- and school-related job opportunities, this training prepares students for employment as community family agency administrators, Headstart administrators, extension specialists, family service and life researchers, family specialists, human development specialists, administrative assistants for community relations, community services representatives, probation advisers, social service workers, mental health workers, vocational counselors, and volunteer services coordinators.

The certificate program in family life education is designed for those who wish to acquire the basic requirements for the Family Life Education Certification of the National Council on Family Relations but who do not desire the Master of Arts degree. Ministers, teachers, school counselors, social services workers, and others who wish to become family life educators are attracted to the certificate program.

Both the Master of Arts degree program and the certificate program in family life education meet the requirements of the National Council on Family Relations for certification as a family life educator.

FACULTY

ANTONIUS D. BRANDON, Ph.D. United States International University 1980
 Professor of Marriage and Family Therapy
 Family life education, marriage and family therapy, brief therapy, sex therapy, AAMFT-approved supervisor

IAN P. CHAND, Ph.D., Pennsylvania State University 1980
 Professor of Marriage and Family Therapy
 Family life education, marriage and family therapy, biofeedback, sociology

CHERYL J. SIMPSON, Ph.D. University of Oregon 1980
 Professor of Counseling and Family Sciences
 Credentialed School Counselor/Psychologist; Licensed Education Psychologist
 Counseling psychology and educational psychology

Deficiencies

An introductory statistics course is required for a master's degree but not the certificate program. This course may either be part of the baccalaureate program or be considered a deficiency that must be taken after admission to the program.

Degree requirements

Essential to fulfilling the requirements for the Master of Arts degree are:

1. A minimum of 50 units of graduate credit in family life education, as outlined in the BULLETIN.
2. Satisfactory performance on a written comprehensive examination, or the completion of a thesis.

General requirements

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

CERTIFICATE IN FAMILY LIFE EDUCATION**Requirements**

1. Completion of at least an undergraduate degree or its equivalent for admission.
2. A minimum of 28 units of graduate credit in family life education as outlined in this BULLETIN. Students may transfer up to 9 units of graduate credit earned at an approved institution toward the certificate.

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

DEGREE AND CERTIFICATE COURSES**CORE REQUIREMENTS (9 UNITS)**

- MFAM 515** Crisis Intervention Counseling (3)
MFAM 568 Group Process Theory and Procedures: Theories in MFAM Therapy (3)
RELR 564 Religion, Marriage, and the Family (3)

SPECIALIZATION REQUIREMENTS**(26 UNITS)**

Completion of this section meets the requirements for the certificate in family life education issued by the Graduate School.

1. FAMILIES IN SOCIETY:
FMED 514 Crosscultural Counseling Family Values (3)
2. THE INTERNAL DYNAMICS OF FAMILIES:
MFAM 453/553 Family Systems Theory (3)
3. HUMAN GROWTH AND DEVELOPMENT:
MFAM 558 Advanced Human Growth and Development (3)
4. HUMAN SEXUALITY:
MFAM 669 Human Sexual Behavior (3)
5. INTERPERSONAL RELATIONSHIPS:
FMED 614 Therapeutic Communication (3)
6. FAMILY RESOURCE MANAGEMENT:
SOCI 444 Family Resource Management (2)
7. PARENT EDUCATION AND GUIDANCE:
FMED 528 Parenting (2)
8. THE FAMILY, THE LAW, AND PUBLIC POLICY:
MFAM 614 Law and Ethics (3)
9. ETHICS
RELE 524 Christian Bioethics (2)
10. FAMILY LIFE PROGRAMS AND IMPLEMENTATION:
FMED 529 Family Life Education (2)

RESEARCH REQUIREMENT (9 UNITS)

- FMED 505** Social Research Methods I (3)
FMED 506 Social Research Methods II (3)
FMED 697 Project (3)

OR

- FMED 698** Thesis (3)

PRACTICUM REQUIREMENT (3 UNITS)

- FMED 577** Family Life Workshop (2)
FMED 695 Internship in Family Life Education (1-4)

ELECTIVES (3 UNITS SELECTED FROM BELOW)

- MFAM 545** Gender Perspectives(2)
MFAM 644 Family Therapy and Child Abuse (2)
MFAM 635 Single Adult in Family and Society (3)
MFAM 638 Family Therapy and Chemical Abuse (2)
MFAM 694 Directed Study: Family Life Education (1-3)
RELE 455 Christian Understanding of Sexuality (2-3)
SOCI 414 Sociology of the Family (2)

GRADUATE COURSES

FMED 505 Social Research Methods I (3)
Analysis of current social research methods. Practice in the use of techniques. Scientific method.

Prerequisite: An introductory course in statistics.

FMED 506 Social Research Methods II (3)
Use of computer. Statistical analysis. Writing research report.

Prerequisite: FMED 505.

FMED 514 Crosscultural Counseling Family Values (3)
Structure and function, changing patterns, future in urban society. Relationship of changes in society to widespread family problems. Familiarity with a wide range of social and ethnic backgrounds including but not limited to people of color, Asians, Native Americans, and Hispanics.

FMED 528 Parenting (2)
Principles and practices relating to parent-child relationships. Emphasis on family roles, communication, conflict resolution, value development, and parenting skill development.

FMED 529 Family Life Education (2)
Systematic comparative analysis of the historical development, theoretical perspectives, types of programs, and research in family life studies.

FMED 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.

FMED 614 Therapeutic Communication (3)
The theoretical foundations of human communication; the therapeutic techniques of major communication theorists in marital and family therapy.

FMED 635 Single Adult in Family and Society (3)
Perceptions, needs, challenges, and opportunities during the periods of adult singleness in the life cycle.

FMED 694 Directed Study: Family Life Education (1-3)

FMED 695 Internship in Family Life Education (1-4)

FMED 697 Project (3)

FMED 698 Thesis (3)



MARRIAGE AND FAMILY THERAPY

RONALD G. HUSTON, Ph.D. United States International University 1981
Acting Chairman, Program Coordinator; Associate Professor of Marriage and Family Therapy
Marriage and family therapy, family life education, child and adolescent therapy; AAMFT-
approved supervisor

DIANNA LYNNE CONNORS, M.A. Western Michigan University 1978
Program Coordinator, Canadian Union College campus; Clinical Instructor of Marriage and
Family Therapy

The Marriage and Family Therapy program leads to the Master of Science degree and is designed to give the student a broad academic background for understanding individuals, couples, or families. The program has a Christian emphasis.

Marriage, family, and child counseling is 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. The master's degree program at Loma Linda University meets California licensing standards according to Business and Professions Code 4980.38 and has the following objectives:

1. To develop skilled professionals in marriage and family therapy;
2. To expose students to available content material in the field;
3. To provide supervised clinical training toward the development of clinical skills and competence;
4. To provide specialized training in one of the family therapy modalities that will qualify graduates for licensure as marriage and family therapists;
5. To prepare students to be familiar with sociocultural issues;
6. To prepare marriage and family therapy students for professional practice with specialized training in the delivery of services in private practice and institutional settings.

The American Association for Marriage and Family Therapy (AAMFT), with headquarters in Washington, D.C., functions on a national basis to ensure that academic and clinical training programs adhere to the standards of the profession. The program offered by Loma Linda University is a fully accredited program.

FACULTY

ANTONIUS D. BRANDON, Ph.D. United States International University 1980
 Professor of Marriage and Family Therapy
 Marriage and family therapy, family life education, brief therapy, sex therapy, AAMFT-approved supervisor

IAN P. CHAND, Ph.D. Pennsylvania State University 1980
 Director of Clinical Training
 Professor of Marriage and Family Therapy
 Marriage and family therapy, biofeedback, family life education, sociology

ASSOCIATE FACULTY

CHERYL J. SIMPSON, Ph.D. University of Oregon 1980
 Professor of Counseling and Family Sciences
 Credentialed School Counselor/Psychologist;
 Licensed Educational Psychologist
 Counseling psychology and educational psychology

M. JERRY DAVIS, Rel.D. School of Theology at Claremont 1967
 Associate Professor of Religion and Pastoral Counseling
 Religion and pastoral counseling; AAMFT-approved supervisor

KENNETH M. AUSTIN, Ph.D. California Western University 1975
 Instructor in Marriage and Family Therapy
 Clinical psychology, law and ethics

MARSHALL JUNG, D.S.W. University of Pennsylvania 1974
 Instructor in Marriage and Family Therapy
 Structural family therapy; licensed clinical social worker

CLINICAL FACULTY

DIANNA LYNNE CONNORS, M.A. Western Michigan University 1978
 Director of Clinical Training, Canadian Union College campus
 Clinical Instructor in Marriage and Family Therapy

**MARRIAGE AND FAMILY THERAPY
 COURSE REQUIREMENTS**

**THEORETICAL FOUNDATIONS OF MARITAL AND
 FAMILY THERAPY (9 UNITS)**

- MFAM 551 Family Therapy:
 Theory and Practice (3)
- MFAM 552 Marital Therapy:
 Theory and Practice (3)
- MFAM 553 Family Systems Theory (3)

**ASSESSMENT AND TREATMENT IN MARITAL AND
 FAMILY THERAPY (18 UNITS)**

- FMED 614 Therapeutic Communication (3)
- MFAM 515 Crisis Intervention Counseling (3)
- MFAM 568 Group Process Theory and Procedures:
 Theories in MFAM Therapy (3)
- MFAM 624 Personality, Marital and Family
 Assessment (3)
- MFAM 638 Family Therapy and Chemical Abuse (2)
- MFAM 644 Family Therapy and Child Abuse (2)
- MFAM 665 Structural Family Therapy (2)

**HUMAN DEVELOPMENT AND FAMILY
 STUDIES (16 UNITS)**

- FMED 514 Crosscultural Counseling Family
 Values (3)
- MFAM 545 Gender Perspectives (2)
- MFAM 556 Psychopathology and Diagnostic
 Procedures (3)
- MFAM 558 Advanced Human Growth and
 Development (3)
- MFAM 584 Treatment of Child and Adolescent
 Problems (2)
- MFAM 669 Human Sexual Behavior (3)

**ETHICS AND PROFESSIONAL STUDIES
 (6 UNITS)**

- MFAM 535 Case Presentation and Professional
 Studies (3)
- MFAM 614 Law and Ethics (3)

RESEARCH (6 UNITS)

- MFAM 501 Research Tools and Methodology I (3)
- MFAM 502 Research Tools and Methodology II (3)

**SUPERVISED CLINICAL PRACTICE
 (12 UNITS)**

- MFAM 536,537 Case Presentation Seminar (2, 2)
- MFAM 635, 636, 637 Case Presentation Seminar
 (3, 3, 2).
- MFAM 534 Clinical Training (180 hours total)
- MFAM 634 Advanced Clinical Training
 (320 hours total)

RELIGION (3 UNITS)

- RELRL 564 Religion, Marriage, and the Family (3)

ELECTIVES (4 UNITS)

- FMED 528 Parenting (2)
- FMED 529 Family Life Education (2)
- MFAM 516 Play Therapy (2)
- MFAM 557 Object Relations in Family Therapy (2)
- MFAM 605 Gestalt Therapy (2)
- MFAM 657 Setting up a Private Practice in
 Family Therapy (2)
- MFAM 658 Reality Family Therapy (2)
- MFAM 663 Brief Family Therapy (2)
- MFAM 664 Experiential Family Therapy (2)
- MFAM 670 Seminar in Sex Therapy (2)
- MFAM 675 Clinical Problems in Marriage and
 Family Therapy (2)
- MFAM 694 Directed Study: Marriage and Family
 (1-4)
- MFAM 695 Research Problems:
 Marriage and Family (1-4)
- SOCI 444 Family Resource Management (2)

POSTGRADUATE

- MFAM 651 AAMFT-Approved Supervisor
 Training (2)
- MFAM 744 Clinical Internship (1)

Admission

Applicants to both the Loma Linda University and the Canadian Union College programs must meet the Graduate School admission requirements outlined in this BULLETIN and give evidence of academic ability, emotional stability, and maturity.

In addition to completing the required application forms, providing character and academic references, and Graduate Record Examination (GRE) scores, the prospective student should also arrange for a personal interview with two of the program faculty.

Prerequisites

Although no particular undergraduate major is specified as preparation for the marriage and family therapy program, undergraduate courses in each of the following are required for entrance into the program: abnormal psychology, personality theories, and introductory statistics. A course in interviewing and counseling is preferred for nonbehavioral science majors. In addition, the student is required to take an MMPI II (Multi-Minnesota Personality Inventory II) and have the results sent to the program.

This program offers options for full-time and part-time studies. The Graduate School policy allows approved students to take up to 12 units as a nondegree student.

Degree requirements

Requirements for the Master of Science degree for both the Loma Linda University and the Canadian Union College campuses include the following:

1. Residence of at least two academic years.
2. A minimum of 74 quarter units of graduate work, which includes credit received for core courses, electives, and one 3-unit religion course.
3. Practicum in marriage and family counseling (minimum of 500 hours) inclusive of clinical training (MFAM 534, 634). A minimum of 250 hours must be specifically marital or family cases. Clinical training as defined by the Commission on Accreditation for Marriage and Family Therapy includes twelve continuous months in a clinical internship.
4. Successful completion of a written comprehensive examination (taken before advancement to candidacy) and an oral examination (taken at the end of the program).

Clinical services

The program operates a marriage and family therapy clinic to provide counseling services to individuals, couples, and families; and to give opportunity for clinical practice for students and interns. Part of the student's field experience and internship may be taken at other clinics in the Riverside, San Bernardino, and Orange County areas. Paid internships may be available.

General requirements

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

Curriculum

The following is a list of the required and elective courses which total 74 quarter units. There are eight major areas of study.

COURSES

GRADUATE COURSES

MFAM 501 Research Tools and Methodology I (3)
Current social research methods, practice in the use of techniques, consideration of the philosophy of the scientific method, and familiarization with MFAM test instruments.

Prerequisite: An introductory course in statistics.

MFAM 502 Research Tools and Methodology II (3)
Qualitative methodology. This course is designed to prepare students to undertake research projects using the intensive interview method of qualitative research. Practical and epistemological issues and problems in qualitative research will be explored in a workshop format.

Prerequisite: MFAM 501 or consent of the instructor.

MFAM 515 Crisis Intervention Counseling (3)
Theory, techniques, and practices of crisis intervention, with special attention to the development of the basic communication skills of counseling. Areas included which are intended to contribute to the development of a professional attitude and identity are: confidentiality, interprofessional cooperation, professional socialization and organization.

MFAM 516 Play Therapy (2)

An experiential course designed for practitioners and graduate students to learn how to apply play therapy techniques in dealing with childhood problems such as molestation, physical abuse, depression, trauma, and family conflict.

MFAM 534 Clinical Training (180 total clock hours)

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 at least 180 clock hours.

MFAM 535 Case Presentation and Professional Studies (3)

Formal presentation of ongoing individual, marital, and family cases by clinical interns; taping, video playbacks, and verbatim reports with faculty and clinical peers; exploration of the interfacing between MFCCs and other professionals; examination of licensure procedures, applying to professional organizations (AAMFT, etc.), development of professional attitude and identity. Limited to students in clinical training.

MFAM 536, 537 Case Presentation Seminar (2, 2)

Formal presentation of ongoing individual, marital, and family cases by clinical interns; taping, video playbacks, and verbatim reports with faculty and clinical peers; examination and training in applied psychotherapeutic techniques, assessment, diagnosis, prognosis, and treatment of premarital, couple, family, and child relationships; dysfunctional and functional aspects are examined, including health promotion and illness prevention. Limited to students in clinical training.

MFAM 545 Gender Perspectives (2)

Explores the identities, roles, and relationships of women and men in light of social, cultural, and historical perspectives. Implications for the family therapist are explored.

MFAM 551 Family Therapy: Theory and Practice (3)

Overview of the major theories in marriage and family therapy. Systems theory concepts are explored in light of the major models of family therapy.

Prerequisite: A course in personality theories.

MFAM 552 Marital Therapy: Theory and Practice (3)

Designed to provide an overview of the marital therapy literature, with a focus on clinical theory and techniques.

MFAM 553 Family Systems Theory (3)

A review of Bowen theory, theory of family systems, and an introduction to family psychotherapy as an outgrowth of the theory. Students will examine their own families of origin.

MFAM 556 Psychopathology and Diagnostic Procedures (3)

Designed to explore the history and development of psychopathology and how it relates to current clinical practice in general and marriage and family therapy in particular. Course will utilize the multiaxial classifications of the DSM III-R as a practical basis for diagnostics.

Prerequisite: A course in abnormal psychology.

MFAM 557 Object Relations Family Therapy (2)

Designed in a seminar form to acquaint the students in marriage and family therapy with the basics of object relations theory. Special emphasis is given to the unique properties of object relations systems theory in bridging intrapsychic and environmental forces.

MFAM 558 Advanced Human Growth and Development (3)

Human biological, psychological, and social development from conception to death including, but not limited to, childbirth, child rearing, childhood, adolescence, adulthood, marriage, divorce, blended families, stepparenting, and geropsychology. Overview of concepts, theories, and research relevant to human development. Emphasis on development over the life span in the context of family interaction and its impact on family therapy.

MFAM 568 Group Process, Theory, and Procedures: Theories in MFAM Therapy (3)

Major theoretical approaches surveyed include individual theories, marital groups, network, and family therapy groups. Group laboratory experience is provided wherein students apply theory to practice and develop group leadership skills.

MFAM 584 Treatment of Child and Adolescent Problems (2)

The psychodynamics involved in child and adolescent problems with respect to the family relationship. Demonstration of a variety of counseling approaches to the treatment of children and adolescents.

MFAM 605 Gestalt Family 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 with systems theory.

MFAM 614 Law and Ethics (3)

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 (AAMFT), ethical relations with other professions, legal responsibilities, liabilities, and confidentiality. Current legal patterns and trends in the mental health profession. Exploration between the practitioner's sense of self and human values and his or her professional behavior and ethics.

MFAM 624 Personality, Marital and Family Assessment (3)

Application of psychological testing methods in the diagnostic assessment of individual, family, and group behavioral dynamics as encountered in marriage and family counseling. Observations and/or laboratory experience.

MFAM 634 Advanced Clinical Training (320 total clock hours)

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 a total of at least 320 clock hours.

MFAM 635, 636, 637 Case Presentation Seminar (3, 3, 2)

Formal presentation of ongoing individual, marital, and family cases by clinical interns. Taping, video playbacks, and verbatim reports with faculty and clinical peers. Limited to students enrolled in clinical training.

MFAM 638 Family Therapy and Chemical Abuse (2)

Current theories and treatment of chemical dependencies, emphasis on family therapy, assessment techniques, understanding of how chemicals affect the mental and biological systems.

MFAM 644 Family Therapy and Child Abuse (2)

Definition of physical and emotional abuse, neglect, sexual molestation, and their incidence; family dynamics; offender and nonoffender characteristics; treatment of children, adolescents, the family, and adults abused as children; treatment modalities, including individual, group, and family therapy; ethical and legal issues; referral sources; assessment; interview techniques; and confidentiality. Minimum of 20 contact hours.

MFAM 651 AAMFT- Approved Supervisor Training (2)

Postgraduate: A course designed to offer the didactic component requirement for AAMFT-approved supervisor designation.

MFAM 657 Setting Up a Private Practice in Family Therapy (2)

The legal, ethical, and economic aspects of developing and maintaining a private practice. Development of professional attitude and identity of professional organizations such as AAMFT.

MFAM 658 Reality Family Therapy (2)

A clinically oriented seminar in which students learn the theory of reality therapy and how to integrate it into the practice of marriage and family therapy. Emphasis on the practice and therapeutic skills associated with the use of reality therapy with clients.

MFAM 663 Brief Family Therapy (2)

Examines the area of brief therapy in general and forms of brief family therapy in particular. In-depth study made of brief family therapy.

MFAM 664 Experiential Family Therapy (2)

Examination of various experiential family theories. Laboratory experience included.

MFAM 665 Structural Family Therapy (2)

Designed to enhance observational, conceptual, planning, and intervention skills; increase ability to understand verbal and nonverbal communication; and broaden understanding of structural family therapy.

MFAM 669 Human Sexual Behavior (3)

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, integration of systems theory. A minimum of 40 contact hours.

MFAM 670 Seminar in Sex Therapy (2)

Discussion of the major male and female sexual dysfunctions and therapeutic processes of treatment. Prerequisite: MFAM 669.

MFAM 675 Clinical Problems in Marriage and Family Therapy (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 (1-4)

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

MFAM 695 Research Problems: Marriage and Family (1-4)

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

Prerequisite: MFAM 501 or concurrent registration with the consent of the coordinator.

MFAM 744 Clinical Internship (1)

Postgraduate: Supervised clinical counseling of individuals, couples, families, and children. One hour of individual supervision per week. Postgraduates only. Approved by internship coordinator.

MEDICAL SCIENTIST PROGRAM

ANTHONY J. ZUCCARELLI, Ph.D., Director

The faculty that participate in this program come from the biomedical science programs of the Graduate School, from the clinical departments of the School of Medicine at Loma Linda University, and from research laboratories outside of Loma Linda University.

The Medical Scientist Program integrates the education programs leading to the M.D. and Ph.D. degrees. The foundation course in the program is a sequence that explores the biochemical, molecular, and cellular functions of living systems within the context of the biomedical sciences. Through correlative seminars, this basic material is extended to include organ systems and is applied to the study of human diseases. Subsequent courses in the curriculum include specialized areas of biomedical and clinical sciences. Research and dissertation are supervised by graduate faculty of the basic biomedical sciences. An application to the School of Medicine, processed through the American Medical College Application Service (AMCAS), should be completed by November of the year prior to admission. A separate application to the Graduate School, directed to the Medical Scientist Program, should be submitted by February of the year of admission.

Admission

Applicants submit complete applications (with fees) to both the Graduate School and to the School of Medicine during the senior undergraduate year. The applications are considered concurrently by two separate admissions committees. Applicants must be accepted into both the Graduate School and the School of Medicine to participate in the program. The Medical Scientist Program admissions committee bases its recommendations upon academic criteria, personal interviews, GRE and MCAT scores, and other measures of analytical potential, creativity, compassion, and initiative. Accepted applicants are invited to participate in ongoing research in one of the biomedical science departments during the summer preceding their matriculation.

Curriculum

The curriculum is innovative in content and sequence. It includes courses that provide a pervasive research perspective, as well as those that provide basic instruction in clinical sciences. A three-quarter course sequence in biochemistry, molecular biology, cell biology, and immunology taken during the first year emphasizes analytical thinking and problem-solving as a foundation for a

research-oriented approach to biomedical science and clinical medicine. Weekly seminar sessions merge research and clinical approaches to medical problems and expand the perspective of the program to include organ systems and disease processes.

The sequence of courses in the curriculum is outlined below.

First Year: Biochemistry, molecular biology, cell biology/immunology, genetics, gross anatomy/embryology, histology, clinical correlates, introduction to research, research rotations

First Summer: Research

Second Year: Modification of School of Medicine freshman year, clinical correlates; may also include medical microbiology or physiology

Second Summer: Research

Third Year: Modification of School of Medicine sophomore year, clinical correlates; board examination (USMLE I)

Research Years: Two or more years to complete research, graduate course work, and graduate degree

Junior Year, School of Medicine

Senior Year, School of Medicine

Advisement

Admitted students are classified as medical scientists on both the School of Medicine and Graduate School rosters and are advised by the Medical Scientist Program coordinator. During the second year, students choose a basic science program (anatomy, biochemistry, microbiology, pharmacology, or physiology) in which they will pursue their subsequent research and graduate course work. After making that selection they will be guided by the coordinator for that graduate program and by a guidance committee.

Time Limits

Limits apply to the time allotted for the completion of graduate degrees. Four years (between the sophomore and junior years of the School of Medicine curriculum) are allowed for the completion of a Ph.D. degree; two years are allowed for the M.S. degree. Completion within these limits is required to retain eligibility for further tuition waivers for School of Medicine course work, as described under Financial Assistance.

Reentry into the School of Medicine for the junior year does not require completion of a graduate degree. However, no additional financial aid will be provided until the graduate degree is completed.

Financial Assistance

Financial assistance to students in the Medical Scientist Program may provide:

1. Stipends during those periods in which they are most directly involved in graduate education — the first year and the research years. The amount of the stipend is similar to that available to Ph.D. degree students in the biomedical science graduate programs.
2. A tuition waiver for all Graduate School course work.
3. Tuition deferment for the freshman and sophomore years of the School of Medicine curriculum. When a student completes an M.S. or Ph.D. degree, tuition deferred from the freshman and sophomore years is canceled.
4. A tuition waiver for two quarters of tuition during the junior or senior years in the School of Medicine curriculum, when the student has completed an M.S. degree.
5. Tuition waiver for both the junior and senior years of the School of Medicine curriculum, when the student has completed a Ph.D. degree.

Completion of the M.D. degree terminates the student's participation in the Medical Scientist Program and ends the availability of tuition waiver. Tuition deferrals convert to a loan obligation at that time.

COURSES**CMBL 501 Steady State Cell (8)**

The generalized cell. Its structural and functional integrity in a thermodynamically hostile environment. Biochemical concepts of the flow of biological information and of free energy. Emphasis on the interplay of information and energy, the integrating role of compartmentalization, and regulation of metabolic pathways. Fall quarter.

CMBL 502 The Cell in Transition (8)

The content of this course is described under its two components, CMBL 538 and CMBL 539.

CMBL 503 The Differentiated Cell (10)

Biological membranes and cell fibrillar systems as a basis for studying specialized structures and functions of selected differentiated cell types. The role of cell-cell interactions in specialized tasks. Emphasis on underlying molecular mechanisms of specialized cell function. Spring quarter.

CMBL 511, 512, 513 Clinical Correlates (1, 1, 1)

A three-quarter companion sequence to CMBL 501, 502, 503 that utilizes the topics of cell functions presented in the major sequence as a basis for discussion of clinical problems arising from abnormalities in those functions. Fall, winter, spring quarters.

CMBL 537 Introduction to Human Genetics (1)

Introduction to medical genetics, human chromosomal abnormalities, Mendelian inheritance, multifactorial inheritance, prenatal diagnosis, newborn screening, and genetic counseling. Winter quarter.

CMBL 538 Molecular Biology of Prokaryotes and Recombinant DNA (4)

Study of the principles and tools of molecular biology in the context of current research with prokaryotic organisms. Topics include the characteristics of mobile genetic elements, bacteriophages and plasmids, genetic recombination, DNA-modifying enzymes, cloning vehicles, directed mutagenesis, and nucleotide sequencing. Winter quarter.

CMBL 539 Molecular Biology of Eukaryotes and Gene Regulation (4)

Surveys current concepts of gene regulation, with emphasis on eukaryotic systems. Topics include the structure and function of bacterial operons, molecular biology of selected eukaryotic viruses, eukaryotic gene structure, RNA splicing, chromosome organization, regulation of cell proliferation, transcriptional and posttranscriptional regulation of gene expression, oncogenes. Winter quarter.

CMBL 541 Cellular Structural Elements (4)

A comprehensive description of biological membranes and cytoskeletal fibrillar systems that will form a basis for elucidating the functions of specialized cells. Spring quarter.

CMBL 542 Signal Transduction and Regulation (3)

A comprehensive description of signal transduction pathways and other cellular regulatory mechanisms that form the basis of receptor-response phenomena.

CMBL 543 Cell-Cell Interactions (3)

Discussion of the role of cell-cell interactions and the mechanism for cellular specialization, emphasizing the immune system. Spring quarter.

MICROBIOLOGY

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

Chairman; Professor of Microbiology and of Biochemistry

Microbial physiology, mechanism of oxygen chemoreceptors, bacterial chemotaxis

JAMES D. KETTERING, Ph.D. Loma Linda University 1974

Program Coordinator; Professor of Microbiology

Virology, tumor immunology, medical bacteriology

The Department of Microbiology offers programs leading to the Master of Science and the Doctor of Philosophy degrees. The programs include a core curriculum that provides a broad background in medical microbiology, bacterial physiology, immunology, and molecular biology. Advanced courses allow the student to develop fully an area of interest. The department is developing strengths in molecular genetics and the applications of recombinant DNA technologies, in microbial physiology, in bacterial chemotaxis, and in immunology, including transplant and cancer immunology. A research or thesis Master of Science degree provides training for persons who will become technicians involved in biomedical research, for individuals who will follow a career in the biotechnology industry, or for medical technologists seeking specialized research training. A course work Master of Science degree provides content appropriate for medical technologists preparing for the specialist in microbiology certification, and for secondary teachers seeking advanced training in areas such as molecular biology, immunology, or microbiology. The Doctor of Philosophy degree is designed to prepare for a career of independent research and teaching. In addition to these programs, combined M.D./M.S., M.D./Ph.D., D.D.S./M.S., D.D.S./Ph.D. degrees are offered. (See sections on Combined Science/Professional Degrees and Medical Scientist Training program.) The combined M.S./professional degree is designed to provide additional content or research experience as a background for postgraduate medical or dental education. The combined Ph.D./professional degree program prepares for a career in academic medicine or dentistry, combining research, teaching, and clinical practice.

FACULTY

LEONARD R. BULLAS, Ph.D. Montana State University
1963

Professor of Microbiology
Microbial and molecular genetics, bacteriology

BENJAMIN H. S. LAU, Ph.D. University of Kentucky
1966; M.D. Loma Linda University SM 1980

Professor of Microbiology and of Surgery (urology)
Cellular and tumor immunology, medical bacteriology,
mycology

GEORGE T. JAVOR, Ph.D. Columbia University 1967
Professor of Microbiology and of Biochemistry
Bacterial physiology

JOHN E. LEWIS, Ph. D. Loma Linda University 1969
Professor of Microbiology, of Pathology, and of Medicine
Immunology, medical bacteriology

SANDRA L. NEHLSSEN-CANNARELLA, Ph.D. National
Institute for Medical Research, London 1971
Professor of Microbiology and of Surgery
Research Professor of Pathology
Transplantation immunology, reproductive immunology,
autoimmunity

JOHN J. ROSSI, Ph.D. University of Connecticut 1976
Adjunct Research Professor of Microbiology and of
Biochemistry
Molecular biology, use of synthetic oligonucleotides in
studies of gene expression

ANTHONY J. ZUCCARELLI, Ph.D. California Institute of
Technology 1974
Professor of Microbiology and of Biochemistry
Molecular genetics, bacteriophage biology, bacterial
plasmids

DAILA S. GRIDLEY, Ph.D. Loma Linda University 1978
Associate Professor of Microbiology
Immunology, virology

GIUSEPPE A. MOLINARO, M.D. Naples University 1960
Associate Research Professor of Microbiology and of
Pathology Immunology

JUN-ICHI RYU, Ph.D. Tokyo Metropolitan University
1978

Associate Professor of Microbiology
Molecular genetics

DONNA D. STRONG, Ph.D. University of California, Los
Angeles 1977

Associate Professor of Microbiology, of Biochemistry, and
of Medicine
Molecular biology and recombinant DNA

LORA GREEN, Ph.D. University of California, Riverside
1987

Assistant Professor of Microbiology
Immunology

WENDY HAGGREN, Ph.D. University of Texas Health
Science Center, San Antonio, 1989

Assistant Research Professor of Microbiology
Molecular biology

MARK S. JOHNSON, Ph.D. University of Utah 1984

Assistant Research Professor of Microbiology
Microbial biochemistry, intracellular signaling in
microorganisms

JOHN SANDS, Ph.D. University of California, Davis 1986

Assistant Professor of Microbiology
Molecular biology, immunology

ASSOCIATE FACULTY

KEIICHI ITAKURA, Ph.D. Tokyo College of Pharmacy,
1970

Visiting Professor
Molecular genetics

IRA ROY, Ph.D. Ohio State University 1965

Associate Professor of Microbiology
Diagnostic mycology, bacteriology, antimicrobial agents

Master of Science

The student completes courses that constitute a core sequence for microbiology graduate programs: Medical Microbiology (MICR 521), Molecular Biology of Prokaryotes and Recombinant DNA (MICR 535), Basic Immunology (MICR 520), and Introduction to Graduate Immunology (MICR 530). In addition, 3 units of religion and 3 units of seminar are required. Other requirements depend on the program selected. A minimum of 48 units is required for graduation.

A. Research Master of Science

In addition to the core sequence, 14 units of additional course work in elective microbiology and cognates are required. This may include 5.0 units of a minor such as biochemistry or human physiology. Biochemistry is required if a biochemistry course has not been taken. The candidate is required to complete 9 units of research and 3 units of thesis, leading to the presentation of a thesis or publishable paper.

B. Course work Master of Science

This is a terminal degree. From 4 to 8 units of laboratory experience and 4 to 8 units of additional course work replace the research and thesis requirements of the research Master of Science degree. The laboratory experience involves a formal practicum in the clinical laboratory of Loma Linda University Medical Center, laboratory courses, or a research project. Mature students may be granted credit for work experience. The student must also pass a comprehensive examination covering three areas of microbiology.

Doctor of Philosophy

The student who has completed a bachelor's degree with a superior academic record may apply directly for admission to the Doctor of Philosophy degree program. This is a full-time program which can be completed by most candidates in four or five years. The core curriculum includes MICR 538 Molecular Biology of the Eukaryotes and Gene Regulation and MICR 536 Advanced Molecular Genetics Laboratory, in addition to the core courses required for the Master of Science degree. Two elective microbiology courses (5-7 units) selected from MICR 520, MICR 537, MICR 543, MICR 546, MICR 555, MICR 565, MICR 594, or similar didactic courses; and 16 units of cognate electives are required. Biochemistry is recommended as a cognate course and is required for students who have not completed an approved course in biochemistry. For combined degree students, the cognate requirements are satisfied by courses in their professional program (M.D. or D.D.S.). In addition to religion (3 units), seminar (3 units), and dissertation (3 units), the primary requirement for the Ph.D. degree is the completion of a significant, original contribution to microbiological research. Candidates for the Doctor of Philosophy degree are assigned to laboratories and are expected to participate in research during the

first year of their graduate program. They must pass a written comprehensive examination in three of five selected areas of microbiology and an oral comprehensive examination of a written research proposal. A minimum of one quarter of teaching experience is required for each student. After passing the written and oral examinations, the student applies for admission to candidacy. The candidacy period is spent in full-time research. On completion of the research and the writing of the dissertation, the dissertation is publicly defended at an oral examination.

Details of the graduate program are given in the Student Guide supplied by the Department of Microbiology.

Microbiology minor

A minor in the department consists of a minimum of 9 units of microbiology course work.

Combined degree programs

Information about the M.D./M.S., M.D./Ph.D., D.D.S./M.S. and D.D.S./Ph.D. programs offered in conjunction with the Department of Microbiology are to be found in the sections Programs and Degrees and Medical Scientist Program.

Prerequisites

The minimum science prerequisites for admission to the graduate programs are (quarter units):

- General biology (12)
- General chemistry (12)
- Organic chemistry (12)
- General physics (12)
- Microbiology (strongly recommended)
- Biochemistry (8) (strongly recommended)

Waiver of any one of these requirements is only by departmental consent, which must be obtained before admission into the program.

General information

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

COURSES

MICR 520 Basic Immunology (2)

The study of cellular and molecular aspects of the immune system, immune responses associated with host defense and disease processes, cellular interaction, and modern immunologic technology. Identical to the immunology section of MDCJ 513.

Prerequisite: Permission of department.

Lewis.

MICR 521 Medical Microbiology (8)

A systematic study of bacteria, fungi, viruses, and animal parasites of medical importance, pathogenic mechanisms, methods of identification and prevention, and clinical correlations. Crosslisting to MICR 511.

Lau, Staff.

MICR 530 Introduction to Graduate Immunology (2)
Introduces students to topics of modern immunology that are of importance to graduate students.

Prerequisite: MICR 520 or concurrent enrollment in MDJC 513.

Molinaro.

MICR 531 Biological Membranes (3)

A comprehensive description of biological membranes, oxidative phosphorylation, active transport, and signal transduction. Identical to the membranes, transport and signal transduction sections of CMBL 503.

Prerequisite: A course in biochemistry.

Hessinger, Taylor.

MICR 534 Microbial Physiology (3)

Provides in-depth coverage of microbial nutrition and growth kinetics; structure and function; bioenergetics and metabolism; nutrient transport; and special bacterial groups and processes unique to microorganisms.

Prerequisite: MICR 521 and a course in biochemistry.

Taylor.

MICR 535 Molecular Biology of Prokaryotes and Recombinant DNA (4)

A study of the principles and tools of molecular biology in the context of current research with prokaryotic organisms. Topics include the characteristics of mobile genetic elements, bacteriophages and plasmids, genetic recombination, DNA modifying enzymes, cloning vehicles, directed mutagenesis, and nucleotide sequencing. Crosslistings CMBL 538, BIOL 546, BCHM 539.

Prerequisite: BCHM 511, CMBL 501 or equivalent.

Zuccarelli.

MICR 536 Advanced Molecular Genetics Laboratory (4)

Laboratory exercises which provide practical experience in current techniques for gene manipulation, including DNA isolation, gene cloning, DNA hybridization, and DNA sequencing.

Prerequisite: MICR 535 or equivalent, or concurrent enrollment in CMBL 502.

Ryu.

MICR 537 Selected Topics in Molecular Genetics (2)

Emphasizes advanced knowledge of current subjects in molecular genetics, with extensive discussions and the assignment of a selected topic.

Prerequisite: MICR 535 (CMBL 538).

Ryu.

MICR 538 Molecular Biology of Eukaryotes and Gene Regulation (4)

Surveys current concepts of gene regulation, with emphasis on eukaryotic systems. Topics include the structure and function of bacterial operons, molecular biology of selected eukaryotic viruses, eukaryotic gene structure, RNA splicing, chromosome organization, regulation of cell proliferation, transcriptional and posttranscriptional regulation of gene expression, oncogenes. Crosslistings: CMBL 539, BCHM 545.

Prerequisite: MICR 535 (CMBL 538).

Zuccarelli.

MICR 543 Cancer Biology and Immunology (2-3)

Critically reviews current literature on etiology, genesis, and progression of cancer with emphasis on immunological approaches used in the diagnosis, treatment and prevention of neoplasia. Students will also be exposed to immunological techniques used in cancer research. A mini-project of library or laboratory research is required for those registering for 3 units.

Lau.

MICR 546 Advanced Immunology (4)

Emerging concepts of immunology are first discussed by the class and then reviewed by guest speakers on a weekly schedule.

Prerequisite: MICR 530 or permission of the instructor.

Molinaro.

MICR 555 Microbial Genetics (3)

Genetic processes of bacteria and viruses. The contribution that an understanding of the genetic processes of microorganisms has made to the understanding of the nature of the genetic material and the mechanism of its action.

Bullas.

MICR 565 Virology (3)

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

Prerequisite: MICR 521 (MICR 511) or permission of instructor.

Kettering.

MICR 566 Cell Culture (3)

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

Gridley.

MICR 594 Medical Mycology (3)

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

Prerequisite: MICR 521 (MICR 511).

Roy.

MICR 604 Seminar in Microbiology (1)

MICR 605 Colloquium (1)

A seminar series designed for graduate students. Presentations by peers on a topic selected and directed by a graduate faculty member. All students are required to attend the colloquium. Students who are registered for colloquium are required to give a presentation.

Staff.

MICR 624 Special Problems in Microbiology (2-4)

Designed primarily for students enrolled in a course work M.S. degree program who elect to work on a research problem

Staff.

MICR 625 Independent Study in Microbiology Literature (2-4)

Students will explore, in depth, a specific topic, selected in consultation with the mentor, such as the antecedents for theses or dissertation research. A formal proposal for the scope and evaluation of the independent study must be approved by the faculty prior to enrollment in this course. This does not satisfy an elective requirement in the microbiology program.

MICR 626 Special Topics in Microbiology (2-4)

Critically evaluates current progress in a specific research area, including recently published papers and unpublished manuscripts. Each course is taught by a resident or a visiting scientist who is a recognized authority in the research area under discussion.

Students may register for multiple courses under this designation.

MICR 634 Clinical Microbiology Practicum (4)

Rotations through the clinical microbiology laboratory at Loma Linda University Medical Center. Includes exposure to all aspects of testing procedures necessary for the identification of microorganisms isolated from patient specimens. Instrumentation, automation, and rapid testing identification methods included with "hands-on" experience. Rotation to include TB and mycology, anaerobic bacteriology, blood, special microbiology, parasitology, and general bacteriology.

Prerequisite: Consent of instructor.

Lewis.

MICR 697 Research (1-4)

MICR 698 Thesis (1-3)

MICR 699 Dissertation (arranged)



NURSING

HELEN E. KING, Ph.D. Boston University 1973

Dean; Professor of Nursing

Medical/surgical nursing

LOIS VAN CLEVE, Ph.D. Claremont Graduate School 1985

Program Coordinator; Professor of Nursing

Parent/child nursing

A curriculum leading to a Master of Science degree with a clinical nursing major or a nursing administration major is offered through the Graduate School of Loma Linda University.

In graduate education the student has opportunity for the intense pursuit of knowledge in a chosen field of interest. The teaching-learning focus is on the attainment of knowledge and the development of advanced intellectual, clinical, leadership, and investigative skills.

The CLINICAL MAJOR can be pursued in either the Adult and Aging Family or the Growing Family. The following areas of emphasis are available:

- The Adult and Aging Family Clinical Nurse Specialist
- Adult Critical-Care Clinical Nurse Specialist
- The Growing Family Clinical Nurse Specialist
- Neonatal Critical-Care Clinical Nurse Specialist/Practitioner
- Pediatric Critical-Care Clinical Nurse Specialist/Practitioner
- School Nursing Specialist

The NURSING ADMINISTRATION MAJOR prepares nurses for leadership in a variety of organizational settings. The curriculum draws from the practice of nursing, management, and related fields and includes administrative, research, and clinical components.

Convenient scheduling of classes allows one to complete the program on a full-time or part-time basis. Required nursing courses are scheduled in late afternoons to accommodate working nurses. Applications may be initiated throughout the year.

A minimum of 52-57 quarter units is required to complete the program. The five-quarter sequence ideally begins in the fall quarter; however, students may commence their studies any term during the year, and part-time study is available.

FACULTY

PATRICIA S. JONES, Ph.D. Vanderbilt University,
Peabody College 1977

Professor of Nursing
Medical/surgical nursing

ELIZABETH A. BOSSERT, D.N.S., University of
California, San Francisco, 1990

Associate Professor of Nursing
Parent/Child Nursing

KAREN L. CARRIGG, Ed.D., Loma Linda University SE
1988

Associate Professor of Nursing
Psychiatric/mental health nursing

FRANCES P. MILLER, Ph.D., University of California,
Riverside 1985

Associate Professor of Nursing
Community health nursing

JOYCE PEABODY, M.D. Boston University 1972

Associate Professor of Pediatrics SM
Neonatal critical care

RONALD M. PERKIN, M.D. University of South Florida
1976

Associate Professor of Pediatrics SM
Pediatric critical care

RUTH S. WEBER, Ed.D., Loma Linda University,
Riverside SE 1991

Associate Professor of Nursing

ASSOCIATE FACULTY

MARGARET A. BURNS, D.N.Sc., Catholic University of
America 1985

Associate Professor of Nursing
Medical/surgical nursing

MICHAEL E. GALBRAITH, Ph.D., Claremont Graduate
School 1989

Associate Professor of Nursing
Psychiatric/mental health nursing

EVA G. MILLER, M.S., Loma Linda University 1975

Associate Professor of Nursing
Community health nursing, school nursing

DAVED W. VAN STRALEN, M.D. University of California,
Irvine 1984

Instructor in Pediatrics SM
Pediatric critical care

CLINICAL FACULTY

TAMMY L. EICHEM, M.S., University of Kansas 1990

Assistant Clinical Professor of Nursing
Pediatric critical care

JEAN NEWBOLD, M.S., Loma Linda University 1985

Assistant Clinical Professor of Nursing
Neonatal critical care

ADMISSION TO THE GRADUATE PROGRAM**Admission**

The following criteria are considered for admission to the graduate program in nursing:

- A baccalaureate degree in nursing from a college or university accredited by the National League for Nursing (or its equivalent).
- An undergraduate record with a grade average of B (3.00), both cumulative and in the nursing major.
- Applicants with an A.S. degree or diploma in nursing from an NLN-accredited program and who have a B.S. or B.A. degree in another field can qualify for admission to the graduate program in nursing by taking 20-24 quarter units of approved, upper division clinical nursing that includes at least 8 quarter units of community health nursing (with field experience).
- A combined score of 1500 for the verbal, quantitative, and analytic sections of the Graduate Record Examination.
- Current California registered nurse license before enrollment in clinical nursing courses.
- The applicant is encouraged to have nursing experience in the area of the desired clinical major before beginning graduate study. One year of experience as a registered nurse is required to enter the nursing administration major.
- A minimum of one year of experience in critical-care nursing is a prerequisite to beginning the sequence of specialty courses in adult critical care, neonatal critical care, and pediatric critical care.
- Prerequisite courses include:
General statistics (descriptive and beginning inferential), 3 quarter units.
Introduction to research methods, 2-3 quarter units.

PROGRAM REQUIREMENTS**Grades**

A minimum grade point average of 3.00 must be maintained in all work taken for the degree and in the nursing major.

Thesis option

The student has the option of completing a thesis within the curriculum for the master's degree. The decision is made in consultation with the student's adviser.

Candidacy

Students are eligible for candidacy after completing 16 and before completing 24 units of required graduate course work.

Examination

A comprehensive written and oral examination is required. The examination must be taken before enrolling in the last 8 units of the program.

Curriculum change

To maintain quality education, the curriculum 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.

General requirements

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

PROGRAM REQUIREMENTS

For the Master of Science degree in nursing, the student must complete 52-57 quarter units. Elective courses are selected in consultation with the student's adviser. The following core courses are required of all students:

NRSG 507 Theory Development (3)
 NRSG 510 Political Process and Professional Issues (2)
 NRSG 604 Nursing in Family Systems (3)
 NRSG 681, 682 Research Methods I, II (3, 2)
 STAT 514 Intermediate Statistics for Health Science Data (3)
 _____ Religion (3)

Students who choose the thesis option take:

NRSG 697 Research (3)
 NRSG 698 Thesis in Nursing (2)

Total 19-22

CLINICAL MAJORS

The CLINICAL MAJOR in nursing prepares nurse specialists who have advanced nursing knowledge, clinical expertise, and functional preparation. Clinical majors are offered in the following areas.

**THE ADULT AND AGING FAMILY
CLINICAL NURSE SPECIALIST**

The CLINICAL MAJOR in *The Adult and Aging Family* prepares students for a variety of leadership roles in nursing, including clinical specialization and teaching. Clinical and theoretical content focuses on adult and aging clients and families. The program offers opportunities to develop knowledge and expertise for advanced practice in oncology nursing, coronary-care nursing, and gerontological nursing. The curriculum includes preparation for certification by the American Nurses Association as a clinical specialist in either medical-surgical nursing or gerontological nursing after completing the required practice hours.

NURSING MAJOR

NRSG 616 Life Cycle Development (3)
 NRSG 624 The Adult and Aging Family I (3)
 NRSG 626 The Adult and Aging Family II (3)
 NRSG 628 Clinical Practicum: Adult and Aging Family (3)
 NRSG 547 Management: Principles and Practices (3)

Required Cognate

PHSL 533 Physiology I (4)

TEACHING

EDCI 515 Curriculum Development in Higher Education (3)
 NRSG 544 Teaching and Learning Theory (4)
 NRSG 545 Teaching Practicum (3)

**ADULT CRITICAL-CARE CLINICAL
NURSE SPECIALIST****NURSING MAJOR**

NRSG 624 Adult and Aging Family I (3)
 NRSG 631 Adult Critical Care I (4)
 NRSG 632 Adult Critical Care II (6)
 NRSG 633 Adult Critical Care III: Practicum (6)
 NRSG 547 Management: Principles and Practices (3)

Required Cognate

PHSL 533 Physiology I (4)

**THE GROWING FAMILY CLINICAL
NURSE SPECIALIST**

The CLINICAL MAJOR in *The Growing Family* prepares students for a variety of leadership roles in nursing, including clinical specialization and teaching. The curriculum offers opportunity for the student to choose an emphasis on providing advanced nursing care to families in the early phase of childbearing or care of children. The curriculum includes preparation for certification by the American Nurses Association as a child and adolescent nurse specialist or as a maternal-child health nurse specialist after completing the required practice hours.

NURSING MAJOR

NRSG 614 The Childbearing Family (3)
 NRSG 615 The Childrearing Family (3)
 NRSG 616 Life Cycle Development (3)
 NRSG 617 Clinical Practicum: Growing Family (3)
 NRSG 547 Management: Principles and Practices (3)

TEACHING

EDCI 515 Curriculum Development in Higher Education (3)
 NRSG 544 Teaching and Learning Theory (4)
 NRSG 545 Teaching Practicum (3)

Required Cognate

PHSL 533 Physiology I (4)

**NEONATAL CRITICAL-CARE CLINICAL
NURSE SPECIALIST/PRACTITIONER**

Within the CLINICAL MAJOR *The Growing Family*, students in the Neonatal Critical-Care Clinical Nurse Specialist/Practitioner Program specialize in the theory and practice of neonatal intensive-care nursing. The curriculum prepares the nurse to exercise independent judgment in assessment, supervision, and management of sick newborns with consultation, collaboration, and general supervision of neonatologists and nursing faculty. In working with families, the nurse will fill the role of consultant and educator. The curriculum prepares the student to be certified by the state of California as a nurse practitioner.

NURSING MAJOR

- NRSG 614 The Childbearing Family (2)
 NRSG 619 Neonatal Critical Care I (4)
 NRSG 620 Neonatal Critical Care II (6)
 NRSG 621 Neonatal Critical Care III (6)
 NRSG 622 Neonatal Critical Care IV: Practicum (13)

Required Cognate

- PHSL 533 Physiology I (4)

PEDIATRIC CRITICAL-CARE CLINICAL NURSE SPECIALIST/PRACTITIONER

Within the CLINICAL MAJOR *The Growing Family*, students in the Pediatric Critical-Care Clinical Nurse Specialist/Practitioner Program specialize in the theory and practice of pediatric intensive-care nursing. The curriculum prepares the nurse to exercise independent judgment in assessment, supervision, and management of sick children with consultation, collaboration, and supervision by pediatric intensivists and nursing faculty. In working with families the nurse will fill the role of consultant and educator. The curriculum prepares the student to be certified by the state of California as a nurse practitioner.

NURSING MAJOR

- NRSG 614 The Childbearing Family (2)
 NRSG 641 Pediatric Critical Care I (6)
 NRSG 642 Pediatric Critical Care II (4)
 NRSG 643 Pediatric Critical Care III (6)
 NRSG 644 Pediatric Critical Care IV: Practicum (13)

Required Cognate

- PHSL 533 Physiology I (4)

POST-MASTER'S CERTIFICATE IN NEONATAL OR PEDIATRIC CRITICAL-CARE NURSE PRACTITIONER

The post-master's certificate is a 31-unit program designed to prepare the nurse with a master's degree in parent/child nursing (or equivalent to the LLU Growing Family major) to become certified by the Board of Registered Nursing (BRN) as a nurse practitioner in the state of California.

Admission Requirements

1. Completion of a master's degree with a clinical major in parent/child nursing or its equivalent from a National League for Nursing-approved program.
2. Current California nurse licensure.
3. Minimum of one year full-time experience in a tertiary level neonatal intensive care or pediatric intensive-care unit. Each applicant's clinical experience will be individually evaluated.

Required Courses

- Neonatal Critical-Care Nurse Practitioner Certificate
 NRSG 614 The Childbearing Family (2)
 NRSG 619 Neonatal Critical Care I (4)
 NRSG 620 Neonatal Critical Care II (6)
 NRSG 621 Neonatal Critical Care III (6)
 NRSG 619 Neonatal Critical Care IV: Practicum (13)

Fourteen units of credit from the previous M.S. degree will meet the total BRN requirements of 45 quarter units to qualify as a nurse practitioner.

Pediatric Critical Care Nurse Practitioner Certificate

- NRSG 614 The Childbearing Family (2)
 NRSG 641 Pediatric Critical Care I (4)
 NRSG 642 Pediatric Critical Care II (6)
 NRSG 643 Pediatric Critical Care III (6)
 NRSG 644 Pediatric Critical Care IV: Practicum (13)

Fourteen units of credits from the previous M.S. degree will meet the total BRN requirements of 45 quarter units to qualify as a nurse practitioner in California.

SCHOOL NURSING SPECIALIST

This GROWING FAMILY MAJOR in School Nursing prepares students to meet both the requirements for a health services (school nurse) credential issued by the state of California and a Master of Science degree. It builds on the content of the baccalaureate degree and has a strong emphasis in advanced nursing theories, cultural and behavioral concepts, research, and nursing issues. The role of the school nurse encompasses a broad range of activities, including health-promotion education, illness prevention and detection, counseling and guidance, and providing specialized health services to students and their families.

NURSING MAJOR

- NRSG 512 School Nursing Services (6)
 NRSG 544 Teaching and Learning Theory (4)
 NRSG 614 The Childbearing Family (3)
 NRSG 615 The Childrearing Family (3)
 NRSG 616 Life Cycle Development (3)
 NRSG 547 Management: Principles and Practices (3)

Required Cognates

- EDCI 515 Curriculum Development in Higher Education (3)
 EDPC 460 Exceptional Child (or equivalent) (3)

NURSING ADMINISTRATION MAJOR

The NURSING ADMINISTRATION MAJOR prepares nurses for leadership in a variety of organizational settings. The curriculum draws from the practice of nursing, management, and related fields, and includes administration, research, and clinical components.

MAJOR

- NRSG ____ Clinical course (3)
 NRSG 541 Nursing Administration Practicum I (3)
 NRSG 542 Nursing Administration Practicum II (3)
 NRSG 543 Nursing Administration (3)
 HADM 541,542 Financial Accounting of Health Care Organizations I, II (3,3)
 MGMT 534 Human Resources Management or equivalent (4)
 HADM 528 Organizational Behavior in Health Care (3)

POSTBACCALAUREATE CERTIFICATE PROGRAM IN NURSING MANAGEMENT

The Postbaccalaureate Certificate Program in Nursing Management is a 24-quarter unit program designed for the nurse with a baccalaureate degree who is interested in a career in nursing management.

Admission requirements

The following are admission requirements for the program:

1. Current employment in a first-level or middle-management position, or employment in a nursing management position for at least two of the last five years.
2. Current California nurse licensure.
3. Baccalaureate degree with a major in nursing, with cumulative G.P.A. of 3.0.

Required courses

NRSNG 507 Theory Development (3)
 NRSNG 510 Political Process and Professional Issues (2)
 NRSNG 543 Nursing Administration (3)
 HADM 541,542 Financial Accounting of Health Care Organizations I, II (3,3)
 MGMT 534 Human Resources Management or equivalent (4)
 HADM 528 Organizational Behavior in Health Care (3)
 Management Electives (4)

Total 24 quarter units

Upon completion of the certificate program, the student may apply for acceptance to the M.S. degree program in nursing administration. The Graduate Record Examination is required. Courses completed with a grade of B or better will apply toward the M.S. degree.

COURSES

NRSNG 507 Theory Development (3)

Studies the components of theory and the process and progress of theory development in nursing. Explores the relationship of theory to nursing practice and research. Examines conceptual models in nursing for their application and value in practice.

NRSNG 509 Guided Study (1-6)

Opportunity for study in a particular area of nursing under faculty direction.

NRSNG 510 Political Process and Professional Issues (2)

Analysis of historical, political, and legislative processes as regulatory forces that influence the health care and the practice of nursing. Examines the impact of the sociopolitical system; current trends and issues affecting the changing profession of nursing, and the impact nursing can have on these systems in the workplace, government, professional organizations, and community.

NRSNG 512 School Nursing Services (4-6)

The role of the school nurse and the administrative styles in school health programs are explored. School health program planning; methods of implementation and evaluation are examined within the context of the school systems, family systems and health-care delivery systems. Students registered for 5 or 6 units are involved in clinical experience designed to develop competencies in school nursing. Offered every other year.

NRSNG 541, 542 Nursing Administration Practicum I, II (3, 3)

Observation and practice in selected levels of nursing administration.

Prerequisite: NRSNG 543, HADM 528 or equivalent; 6 quarter units of clinical nursing.

NRSNG 543 Nursing Administration (3)

Study, application, and evaluation of principles of management as they apply to nursing leadership.

Prerequisite: NRSNG 507, NRSNG 604, HADM 528.

NRSNG 544 Teaching and Learning Theory (4)

Exploration of the components of the teaching-learning process. Opportunity provided for students to practice specific teaching strategies. Offered every other year.

NRSNG 545 Teaching Practicum (3)

Designed to assist the student in developing the ability to teach nursing in the clinical area of choice. Emphasis on the nurse-teacher as facilitator of learning. Integration of knowledge and skills related to educational methodology and clinical nursing. Practice in teaching students in clinical and classroom settings.

Prerequisite or concurrent: EDCI 515, NRSNG 544, and 12 quarter units of clinical nursing.

NRSNG 604 Nursing in Family Systems (3)

Concepts and theories guiding advanced nursing practice to families, including systems; stress and coping; role; change; family assessment models. Clinical experience concurrent.

Prerequisite or concurrent: NRSNG 507.

NRSNG 606 The Family in the Community (2-3)

Study given to the assessment and organization of families and special populations within the community system. Nursing process used in the identification of health care needs and the promotion of health within the macrosystem. Clinical experience concurrent with 3 units.

NRSNG 614 The Childbearing Family (2-3)

Study of the family system during childbearing. Discussion of social, cultural, physiological, and psychological factors influencing the family's changing roles and relationships. Exploration of theories and research findings dealing with the evolving parent/child relationship. Clinical experience concurrent.

Prerequisite: NRSNG 507, NRSNG 604.

NRSNG 615 The Childrearing Family (2-3)

Focus on understanding the adaptation of the family system during the childrearing years. Study of common health problems of childhood, including illness and hospitalization. Emphasis on the nursing role in minimizing trauma and promoting normal development. Clinical experience concurrent.

Prerequisite: NRSNG 614.

NRSNG 616 Life-Cycle Development (3)

Review of selected concepts; theories and research findings about human development during childhood, adolescence, adulthood, and old age. Personality development/change, cognition, moral development, and socialization. Offered every other year.

NRSNG 617 Clinical Practicum: Growing Family (3)

Designed to assist the student in developing expertise as a clinical specialist in a selected area of nursing practice of the growing family. Includes intensive clinical practice under the guidance of a preceptor.

Prerequisite: NRSNG 507, 604, 614, 615

NRSNG 619 Neonatal Critical Care I (4)

Focuses on maternal conditions that effect the fetus/newborn during the perinatal period. Concepts and principles of genetics, embryology, growth and development, psychosocial aspects, and physiology/pathophysiology as they relate to the care-giver role of the clinical nurse specialist/practitioner. Offered every other year.

Prerequisite: NRSNG 507, 604, 614.

NRSNG 620 Neonatal Critical Care II (6)

Focuses on the physiology of the well neonate and pathophysiology of the critically ill neonate. Concepts and principles of neonatal disease entities and disorders studied as they relate to clinical management strategies and the care-giver role of the clinical nurse specialist/practitioner. Offered every other year.

Prerequisite: NRSNG 619.

NRSNG 621 Neonatal Critical Care III (6)

Prepares students for their management role as practitioner and clinical specialist, utilizing the theories and principles of nursing and medical management, problem solving, record keeping, and role definition. Offered every other year.

Prerequisite: NRSNG 619, 620.

NRSNG 622 Neonatal Critical Care IV: Practicum (13)

Synthesizes concepts, principles, theories, knowledge, and skills from the preceding advanced neonatal critical-care nursing courses to the practice setting. Offered every other year.

Prerequisite: NRSNG 619, 620, 621.

NRSNG 624 The Adult and Aging Family I (2-3)

Addresses concepts and theories relevant to nursing practice with adults who are experiencing/responding to health-related problems associated with an acute or chronic illness, or the aging process. Focuses on promoting effective individual and family coping. Clinical experience concurrent.

Prerequisite: NRSNG 507, 604.

NRSNG 626 The Adult and Aging Family II (2-3)

Focuses on the aging adult in the context of family and contemporary society. Issues related to the needs and care of elderly individuals, factors affecting their well-being, and the role of the nurse in promoting wellness both for the client and family. Clinical experience concurrent.

Prerequisite: NRSNG 624.

NRSNG 628 Clinical Practicum: Adult and Aging Family (3)

Designed to assist the student in developing expertise as a clinical specialist in a selected area of The Adult and Aging Family major. Includes intensive clinical practice under the guidance of a preceptor.

Prerequisite: NRSNG 507, 604, 624, 626.

NRSNG 631 Adult Critical Care I (4)

Study of pathophysiologic phenomena commonly encountered in nursing care of the critically ill adult. Provides a foundation for advanced nursing practice by emphasizing nursing judgment in (1) anticipating alterations in clinical status related to pathophysiological changes, and (2) identification of appropriate nursing interventions. Offered every other year.

Prerequisite: NRSNG 507, 604, 624; PHSL 533.

NRSNG 632 Adult Critical Care II (6)

Focuses on selected concepts related to nursing management of critically ill adults. Subroles of the clinical nurse specialist addressed. Concurrent clinical practice provides opportunity for increasing expertise as a clinical specialist in adult critical care. Offered every other year.

Prerequisite: NRSNG 631.

NRSNG 633 Adult Critical Care III: Practicum (6)

Designed for implementation of the clinical nurse specialist role in an adult critical-care setting. Students practice in a selected agency with a CNS preceptor role model focusing on experiencing the subroles of expert clinician, educator, consultant, and researcher. Offered every other year.

Prerequisite: NRSNG 632.

NRSNG 641 Pediatric Critical Care I (6)

Focuses on the physiology of the well infant/child and pathophysiology of the critically ill infant/child. Disease entities and disorders studied as they relate to clinical management strategies and the caregiver role of the clinical nurse specialist/practitioner. Offered every other year.

Prerequisite: NRSNG 507, 604, 614.

NRSNG 642 Pediatric Critical Care II (4)

Nursing assessment and clinical management strategies for children with critical illness and trauma. Emphasis placed on understanding principles of pathophysiology, pharmacology, and nutrition; and the effect of critical illness on the family system.

Prerequisite: NRSNG 641.

NRSNG 643 Pediatric Critical Care III (6)

Prepares students for the roles of their practice domain: care giver, educator, consultant, and researcher. Principles of nursing and medical management, problem solving, and record keeping will be applied. Opportunity for increasing clinical skill. Offered every other year.

Prerequisite: NRSNG 642.

NRSNG 644 Pediatric Critical Care IV: Practicum (13)

A synthesis and application of concepts, principles, theories, knowledge, and skills from the preceding pediatric critical-care nursing courses to the practice setting. Opportunity to experience all aspects of the CNS/practitioner role.

Prerequisite: NRSNG 643.

NRSG 681 Research Methods I (3)

Guides the student in understanding scientific thinking and research methods beyond the introductory level. Research literature in nursing and related fields is used to illustrate the application of principles of research. Development of a research area of interest by identifying a research problem and reviewing the relevant literature.

Prerequisite: STAT 414, 514, NRSG 498, 507, 604.

NRSG 682 Research Methods II (2)

Application of research concepts in the completion of a research proposal. Focuses on design issues and management and analysis of data.

Prerequisite: NRSG 681.

NRSG 697 Research (3)

NRSG 698 Thesis (2)



PALEONTOLOGY

H. PAUL BUCHHEIM, Ph.D. University of Wyoming 1978
Program Coordinator; Professor of Geology
 Sedimentology, paleolimnology, paleoecology

The Department of Natural Sciences offers a program leading to the degree of Master of Science in paleontology. Faculty research in this program focuses on two general areas. The first emphasizes paleoenvironmental reconstruction, paleoecology, and taphonomy. Students interested in this focus will be given broad training in sedimentary geology as well as paleontology. The second area of research involves the systematics and biogeography of fossil organisms, and students with this focus will be given training in relevant areas of biology as well as paleontology. Research in paleontology may also be pursued through the M.S. and Ph.D. degree programs in biology.

FACULTY

LEONARD R. BRAND, Ph.D. Cornell
 University 1970
 Professor of Biology and Paleontology
 Vertebrate zoology and paleontology

H. THOMAS GOODWIN, Ph.D. University of
 Kansas 1990
 Assistant Professor of Paleontology
 Vertebrate paleontology and biogeography

ASSOCIATE FACULTY

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

CLYDE L. WEBSTER, Ph.D. Colorado State University
 1972
 Professor of Chemistry
 Geochemistry, mass spectroscopy, trace element
 modeling

BEN CLAUSEN, Ph.D. University of Colorado 1987
 Assistant Professor of Geophysics
 Nuclear physics, geophysics

Admission

Applicants must meet the general Graduate School admission requirements. Acceptable undergraduate preparation includes a bachelor's degree and must include: physical geology, mathematics, and one-year courses in biology, chemistry, and physics. Students wishing to pursue research in areas of paleontology that depend on a strong foundation in geology must also have courses in petrology and structural geology. Students wishing to pursue research in the biological aspects of paleontology must have courses in genetics and ecology. Students lacking some of these courses may make up the deficiencies while enrolled at the University.

Curriculum

A minimum of 48 quarter units, including 28 at or above the 500 level, constitutes the curriculum for the Master of Science degree in paleontology. In addition to the general Graduate School requirements, the following courses are required:

Research Methods (GEOL 616, 617)

Sedimentology (GEOL 427)

Stratigraphy (GEOL 429)

Historical Geology (GEOL 405)

Philosophy of Science (GEOL 558)

Seminar in Geology (GEOL 605, 1 unit;
 GEOL 607, 2 units)

One of the following:

Field Interpretations in Historical Geology
 (GEOL 548)

Genetics and Speciation (BIOL 545)

Invertebrate Paleontology (GEOL 534)

Two of the following:

Paleobotany (GEOL 524)

Taphonomy (GEOL 545)

Vertebrate Paleontology (GEOL 544)

Research (at least 2 units)

Thesis (1-2 units)

Religion (3 units)

Demonstrated proficiency in using a computer operating system, plus a database, a spreadsheet, or a programming language.

The remainder of the student's program will be planned in consultation with the major professor and graduate advisory committee. In addition to course work, students are expected to attend all program seminars, fulfill research and thesis expectations, and successfully pass a final oral examination.

COURSES

UPPER DIVISION COURSES

GEOL 304 Physical Geology (4)

An introductory geology course providing the student with a broad picture of geological processes operating on and within the earth. Includes an introduction to minerals, sedimentary and igneous rocks, and fossils. Processes such as weathering, earthquakes, volcanism, erosion and sedimentation, and mountain building are presented.

GEOL 315 Mineralogy and Petrology (4)

The most important basics of mineralogy and petrology (rocks and their origin) are presented in this course. Intended to cover critical material presented in more complete courses in mineralogy and petrology. Offered alternate years.

GEOL 405 Historical Geology (3)

Study of the history of the earth, with an in-depth look at vertical paleontologic and lithologic changes of the geologic column. Emphasis placed on concepts of interpretation and in particular the causes of mass extinctions within the context of their accompanying sedimentologic variations. Offered alternate years.

GEOL 424 Structural Geology (3)

Study of rock deformation (folds, faults, etc.) in framework of plate tectonics. Includes actual problems and applications. Three class hours per week, with required full-day and half-day field trips. Offered alternate years.

Prerequisite: GEOL 304.

GEOL 425 Field Methods of Geologic Mapping (4)

Advanced geologic mapping of complex areas with interpretation of their history, including mapping of igneous, metamorphic, and sedimentary rocks. Experience in preparation of geologic reports of each mapped locality. Offered alternate years.

Prerequisite: GEOL 315.

GEOL 427 Sedimentology (4)

Study of sediments, sedimentary rocks, and the stratigraphic context of those rocks. Emphasis on sedimentary processes, primary sedimentary structures, and environments of deposition. Includes description, classification, origin, and interpretation of sediments and sedimentary rocks. Lithofacies analysis and other stratigraphic techniques studied. Four class hours, one three-hour laboratory or field trip per week. Includes several weekend field trips. Offered alternate years.

Prerequisite: GEOL 304, 315 recommended.

GEOL 429 Stratigraphy (4)

Study of the principles of litho-, bio-, and chronostratigraphy and methods of correlation of sedimentary rocks. Three class hours, one laboratory or field trip per week.

Prerequisite: Petrology and sedimentology, or consent of the instructor.

GEOL 431 Geochemistry (4)

Chemical concepts and their geochemical applications in areas of interest in elementary geology.

Prerequisite: CHEM 111, 112, 113; GEOL 304 or consent of the instructor.

GEOL 496 Workshops in the Earth Sciences (1-4)

Concentrated participation-oriented study sessions for professional geologists, teachers, and students. Topics will emphasize current subjects relevant to professional geology or teaching earth science.

GEOL 497 Undergraduate Research (1-4)

Original investigation and/or literature study pursued under the direction of a faculty member. May be repeated for additional credit.

Prerequisite: consent of the instructor.

GEOL 499 Directed Study (1-4)

Experimental, field, or library study of a problem of restricted scope, under the direction of a staff member. May be repeated for additional credit.

Prerequisite: Consent of a staff member to direct the project.

BIOL 400 + LEVEL COURSES

(as approved by guidance committee)

GRADUATE COURSES

GEOL 524 Paleobotany (4)

The study of fossil plants; their morphology, paleoecology, taphonomy, classification, and stratigraphic distribution. Analysis of floral trends in the fossil record. Three class hours, one three-hour laboratory or field trip per week.

Prerequisite: BIOL 106 and a course in botany or consent of the instructor.

GEOL 534 Invertebrate Paleontology (5)

Study of the structure, classification, ecology, and distribution of selected fossil invertebrate groups. Principles and methods involved in the study and analysis of invertebrate fossils considered. Four class hours, one three-hour laboratory per week. Offered alternate years.

Prerequisite: BIOL 106 or consent of the instructor.

GEOL 544 Vertebrate Paleontology (4)

Study of fossil vertebrates with an emphasis on the origins of major groups. Topics covered will include the systematics, biology, and biogeography of ancient vertebrates. Three class hours, one three-hour laboratory per week. Offered alternate years.

Prerequisite: BIOL 106 or consent of the instructor.

GEOL 545 Taphonomy (3)

Study of the processes that affect an organism from death until its final burial and fossilization, and the utilization of this information in reconstructing ancient assemblages of organisms. Three class hours per week.

GEOL 546 Ichnology (2)

Study of fossilized traces produced by animal activity, such as tracks, burrows, feeding traces, etc. Two class hours per week.

GEOL 548 Field Interpretations in Historical Geology (4)

Analysis of the fossil and stratigraphic record, and comparison to theories of origin. Fieldwork at specific sites in the western United States. Summer only.

Prerequisite: GEOL 405 or consent of the instructor.

GEOL 554 Paleolimnology (4)

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. Offered alternate years.

Prerequisite: GEOL 304 or consent of the instructor.

GEOL 556 Paleoenvironments (4)

Application of paleontologic, sedimentologic, and geochemical data and methods to the interpretation of past sedimentary environments, with emphasis on organism-sediment relationships. Processes, sediments, and organisms in modern depositional environments compared as analogs. Three class hours, one laboratory or field trip per week. Offered alternate years.

Prerequisite: GEOL 456 or consent of the instructor.

GEOL 558 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. Offered alternate years.

Prerequisite: GEOL 405 or consent of the instructor.

GEOL 588 Topics in Geology (1-4)

Review of current knowledge in specified areas of the earth sciences. Registration should indicate the specific topic to be studied. May be repeated for additional credit. Offered on demand.

Prerequisite: Consent of the instructor.

GEOL 589 Readings in Paleontology (1-4)**GEOL 595 Lacustrine Readings (1)**

Readings and analysis of current and classic scientific literature dealing with modern and ancient lake environments, including geochemistry, sedimentology, biology and paleontology, and related subjects. Activities include student presentations of papers, discussion, and research proposals and reports. Occasional field trips will be arranged.

GEOL 605 Seminar Presentation in Geology (1)

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

GEOL 607 Seminar in Geology (1)

Selected topics dealing with recent developments. Student attends seminar; no presentation required.

GEOL 616 Research Methods I (1)

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

GEOL 617 Research Methods II (2)

Techniques and technology for the analysis and presentation of data.

GEOL 695 Special Projects in Geology (1-4)

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

Prerequisite: Consent of the instructor.

GEOL 697 Research (1-4)**GEOL 698 Thesis (1-2)****BIOLOGY COURSES APPLICABLE TO PALEONTOLOGY PROGRAM**

Course descriptions for these courses can be found in the Program in Biology section of this BULLETIN.

BIOL 504 Biology of Marine Invertebrates (4)

BIOL 509 Mammalogy (4)

BIOL 515 Biogeography (3)

BIOL 518 Readings in Ecology (2)

BIOL 526 Principles and Methods of Systematics

BIOL 545 Genetics and Speciation (4)

BIOL 588 Marine Biology

ROSARIO BEACH SUMMER COURSES

BIOL 454 Introduction to Oceanography (5)

BIOL 459 Marine Invertebrates (5)

BIOL 460 Marine Ecology (5)

BIOL 462 Ichthyology (5)

BIOL 463 Marine Botany (5)

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

Program Coordinator; Professor of Pharmacology
Drug metabolism, biochemical pharmacology, neuropharmacology

The Program in Pharmacology, in cooperation with other departments of the University, offers an interdisciplinary program with emphasis in cellular and molecular pharmacology or in systems pharmacology leading to the Doctor of Philosophy, concurrent D.D.S./Ph.D., or concurrent M.D./Ph.D. degree. The student may choose to emphasize either a cell or molecular pharmacology curriculum with selected interdisciplinary courses and seminars coordinated by the faculties in the Departments of Pharmacology, Biochemistry, and Microbiology; or a systems pharmacology curriculum with selected interdisciplinary courses and seminars coordinated by the faculties in the Departments of Pharmacology, Anatomy, and Physiology. These degree programs provide opportunities for qualified students to prepare for careers in teaching and research.

FACULTY

ALLEN STROTHER, Ph.D. Texas A and M University
1963

Professor of Pharmacology
Drug metabolism, biochemical pharmacology, nutrition

DAVID A. HESSINGER, Ph.D. University of Miami 1970

Professor of Physiology/Pharmacology
Cell biology, sensory transduction, marine toxicology

ROBERT W. TEEL, Ph.D. Loma Linda University GS
1972

Professor of Physiology/Pharmacology
Carcinogen metabolism, chemoprevention of cancer

C. RAYMOND CRESS, Ph.D. Oregon State University
1970

Associate Professor of Pharmacology
Toxicology

RAMON GONZALEZ, JR., Ph.D. Wake Forest University
1973

Associate Professor of Physiology/Pharmacology
Cardiovascular physiology, control of circulation

WILLIAM J. PEARCE, Ph.D. University of Michigan 1979

Associate Professor of Physiology/Pharmacology
Cardiovascular physiology, control of cerebral circulation

JOHN BUCHHOLZ, Ph.D. Loma Linda University 1989

Assistant Professor of Pharmacology
Drug metabolism

ASSOCIATE FACULTY

RALPH E. CUTLER, M.D. University of California, Los
Angeles 1956

Professor of Pharmacology, Chief, Clinical Pharmacology
Section

Clinical pharmacology

BEATRIZ J. VASQUEZ, Ph.D. University of San Luis,
Argentina 1968

Associate Research Professor of Pharmacology
Psychobiology, neuropharmacology

MASTER OF SCIENCE

The incoming students 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 a baccalaureate degree with 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 deficiencies 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.

Applicants having completed a master's degree elsewhere may receive up to 48 quarter units of academic credit toward the doctoral degree. The amount of credit given will depend on the course work taken during the master's degree program.

DOCTOR OF PHILOSOPHY

A student may be admitted to a program of study toward the Doctor of Philosophy degree in pharmacology after having completed an undergraduate program as specified above or after successfully completing a master's degree in one of the natural sciences.

Incoming students will not be accepted into the program with the intent of completing a master's degree only. However, if a student pursuing a Ph.D. degree finds it impossible or undesirable to continue, a terminal master's degree may be awarded providing s/he has completed a minimum of 48 quarter units. Of this total, 30 units must be in pharmacology. The student may select 18 units of cognate courses in consultation with the departmental adviser. A maximum of 12 of the 30 units of pharmacology may be in research leading to the preparation and successful oral defense of a formal thesis, or the results may be in the form of a publishable scientific paper.

A student pursuing the Ph.D. degree will be required to take a minimum of four academic years of full-time work (approximately 100 quarter units). A minimum of 30 units of course work must be in the major field of study, with an additional 26 to 43 units of course work in selected cognates. An additional 20 to 30 units of research, 4 units of seminar, and 3 to 4 units for writing and defense of the dissertation will also be 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 the Graduate School 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.

General requirements

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

COURSES**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. Offered on demand.

Fraser, Staff.

PHRM 535 Clinical Pharmacology (3)

Lectures, discussions, ward rounds, and/or laboratory exercises dealing with therapeutic problems related to common medicinal agents. Offered on demand.

Cutler, 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. Offered on demand.

Fraser, Staff.

PHRM 545 Laboratory in Advanced Pharmacology (1-2)

Experimental studies illustrating the didactic material presented in PHRM 544. Offered on demand.

Fraser, Staff.

PHRM 554 Neuropharmacology (4)

Systematic discussion of drugs that affect primarily the nervous system, with major emphasis on mechanism of action.

Peters, Staff.

PHRM 555 Laboratory in Neuropharmacology (1)

Experimental studies illustrating the didactic material presented in PHRM 554.

Peters, 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. Offered on demand.

Cutler, Staff.

PHRM 565 Laboratory in Cardiovascular and Renal Pharmacology (1)

Experimental studies illustrating the didactic material presented in PHRM 564. Offered on demand.

Cutler, 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. Offered on demand.

Fraser, Staff.

PHRM 575 Laboratory in Chemotherapy (1)

Experimental studies illustrating the didactic material presented in PHRM 574. Offered on demand.

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. Offered on demand.

Cress, Staff.

PHRM 605 Integrative Biology Graduate Seminar (1)

This seminar, coordinated by the Departments of Anatomy and of Pharmacology and Physiology, consists of reports from current literature and the presentation of student and faculty research on various aspects of regulatory and integrative biology as applied to cells, tissues, organs, and systems. Both students and faculty are expected to participate in a discussion and critical evaluation of the presentation.

PHRM 684 Special Problems in Pharmacology (2-6)

Assignments in literature reviews and/or laboratory exercises.

PHRM 697 Research (1-6)

PHRM 698 Thesis (1-6)

PHRM 699 Dissertation (1-6)



PHYSIOLOGY

JOHN LEONORA, Ph.D. University of Wisconsin 1957
Cochairman; Program Coordinator; Professor of Physiology
 Endocrinology

The graduate program in physiology provides a Christian environment in which Ph.D. degree candidates may pursue curricula oriented to their specific interests. Individual attention is assured by maintenance of a small student/faculty ratio.

Research opportunities are available in cell biology, cardiovascular, respiratory, neuro, reproductive, endocrine, exercise, bone, and neonatal physiology.

FACULTY

W. ROSS ADEY, M.D. University of Adelaide, Australia
 1949

Distinguished Professor of Physiology
 Neurophysiology

LAWRENCE D. LONGO, M.D. Loma Linda University SM
 1954

Distinguished Professor of Gynecology/Obstetrics and of
 Physiology
 Placental exchange, fetal physiology

RAYMOND D. GILBERT, Ph.D. University of Florida,
 Gainesville 1971

Professor of Physiology
 Fetal cardiovascular physiology

DAVID A. HESSINGER, Ph.D. University of Miami 1970
 Professor of Physiology/Pharmacology

Cell biology, sensory transduction, marine toxicology

SANDRA L. NEHLSEN-CANNARELLA, Ph.D. National
 Institute for Medical Research, Medical Research
 Council, London, England 1971

Professor of Surgery and of Microbiology; Research
 Professor of Pathology and Immunology

GORDON G. POWER, M.D. University of Pennsylvania
 1961

Professor of Gynecology/Obstetrics and of Physiology
 Placental exchange, fetal physiology

ROBERT W. TEEL, Ph.D. Loma Linda University GS
 1972

Professor of Physiology
 Carcinogen metabolism, chemoprevention of cancer

RAMON R. GONZALEZ, Jr., Ph.D. Wake Forest University
 1973

Associate Professor of Physiology
 Cardiovascular physiology, control of circulation

RAYMOND G. HALL, Jr., Ph.D. Loma Linda University
 GS 1968

Associate Professor of Physiology
 Cell physiology

ELWOOD S. McCLUSKEY, Ph.D. Stanford University
 1959

Associate Professor of Physiology
 Comparative physiology

CHARLES A. DUCSAY, Ph.D. University of Florida 1980
 Associate Professor of Physiology and of Pediatrics
 Reproductive physiology, endocrinology

WILLIAM J. PEARCE, Ph.D. University of Michigan 1979
 Associate Professor of Physiology/Pharmacology
 Cardiovascular physiology, control of cerebral circulation

STEVEN M. YELLON, Ph.D. University of Connecticut
 1981

Associate Professor of Physiology and of Pediatrics
 Reproductive endocrinology, neuroendocrinology, and
 biological rhythms

GEORGE MAEDA, Ph.D. Loma Linda University GS 1976
 Assistant Professor of Physiology

Neurophysiology

JEAN-MARC TIECHE, Ph.D. Loma Linda University 1979
 Assistant Research Professor of Physiology
 Endocrinology

ASSOCIATE FACULTY

MURRAY E. BRANDSTATER, M.B.B.S. Melbourne
 University, Australia 1957; Ph.D. University of
 Minnesota, 1972

Professor of Rehabilitation Medicine
 Neuromuscular physiology

WILLIAM H. FLETCHER, Ph.D. University of California,
 Berkeley 1972

Professor of Anatomy and of Physiology
 Neurophysiology

SUZANNE M. BAWIN, Ph.D. University of California, Los
 Angeles 1972

Associate Research Professor of Physiology and of
 Neurosurgery

Electrophysiological studies of epileptiform activity

SUBBURAMAN MOHAN, Ph.D. University of Bangalore, India 1978

Associate Professor of Physiology, of Medicine, and of Periodontics

Bone matrix proteins and growth factors

LORA M. GREEN, Ph.D. University of California, Riverside, 1987

Assistant Professor of Microbiology and of Physiology
Cell and molecular biology

PHILIP J. ROOS, M.D. Loma Linda University SM 1976
Assistant Professor of Medicine and of Physiology
Pulmonary physiology

JEFFREY M. TOSK, Ph.D. Loma Linda University 1989
Assistant Research Professor of Psychiatry and of Physiology
Neurobiology

THE PROGRAM

Prerequisites

The equivalent of a major in one field of science or mathematics and a minor in another is prerequisite. Undergraduate courses should include zoology, chemistry through physical chemistry, and general physics. Mathematics through calculus is highly recommended.

Applicants having completed a master's degree elsewhere may receive up to 48 quarter units of academic credit toward the doctoral degree. The amount of credit given will depend on the course work taken during the master's degree program.

Doctor of Philosophy

A student may be admitted to a program of study toward the Doctor of Philosophy degree, in either systems or cell physiology, after having completed an undergraduate program as specified above or after successfully completing a master's degree in one of the natural sciences.

Incoming students will not usually be accepted into the program with the intent of completing a master's degree only. However, if a student pursuing a Ph.D. degree finds it impossible or undesirable to continue, a terminal master's degree may be awarded providing s/he has completed a minimum of 48 quarter units. Of this total, 30 units must be in physiology. The student may select 18 units of cognate courses in consultation with the departmental adviser. A maximum of 12 of the 30 units of physiology may be in research leading to the preparation and successful oral defense of a formal thesis, or the results may be in the form of a publishable scientific paper.

A student pursuing the Ph.D. degree will be required to take a minimum of four academic years of full-time work (approximately 100 quarter units). A minimum of 30 units of course work must be in the major field of study, with an additional 26 to 43 units of course work in selected cognates. An additional 20 to 30 units of research, 4 units of seminar, and 3 to 4 units for writing and defense of the dissertation will also be required.

The candidate must take a comprehensive written examination in all the major areas of

physiology. In addition the student must take an oral examination over his/her area of special interest and related areas; and prepare an acceptable dissertation based on the research program, as stated in section I of this BULLETIN.

The program in physiology, in cooperation with other departments of the University, offers an interdisciplinary program with emphasis in systems physiology leading to the Doctor of Philosophy, concurrent D.D.S./Ph.D., or concurrent M.D./Ph.D. degree. The systems physiology curriculum includes selected interdisciplinary courses and seminars coordinated by the faculties in the Departments of Physiology, Anatomy, and Pharmacology.

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 program in physiology 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.

General requirements

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

COURSES

PHSL 501 Neurophysiology (3 units)

A basic lecture course on function of the nervous system primarily designed for dental students and others requiring a rudimentary understanding of nervous processes. Beginning with the electrical activity of neurons, topics including communication between cells, skeletal muscle function, sensory systems, control of motor activity, and higher functions such as sleep and brain electrical activity are discussed.

Prerequisite: ANAT 505 Neuroanatomy or consent of the instructor.

Maeda.

PHSL 511, 512 Medical Physiology I, II (6, 3)

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.

Staff.

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. Offered alternate years; 1989-90.

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

Hall, McCluskey.

PHSL 537 Neuroscience (8)

An integrated approach to the fundamentals of neuroanatomy and neurophysiology, with applications to clinical neurology.

Staff.

PHSL 541 Cell and Molecular Biology (4)

Life processes fundamental to animal, plant, and microorganism; a graduate-level introduction. Lecture 3 units, laboratory 1 unit each term. Offered alternate years.

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

Hall, McCluskey.

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. Offered alternate years.

Prerequisite: Consent of the instructor.

Maeda.

PHSL 553 Applied Electronics for the Basic Sciences (4)

An introduction to basic electronics from an applications viewpoint, with lectures and laboratories aimed at enhancing the use of research instrumentation in the biological sciences. Using integrated circuits and other components, students will design, build, and test some simple circuits which are often part of the overall equipment in their laboratory. Offered alternate years.

Prerequisite: General physics and calculus.

Maeda.

PHSL 555 Biology of Cancer (lecture) (3)

An interdisciplinary approach to the study of the causation, characterization, and prevention of cancer. Offered alternate years.

Teel, Hall.

PHSL 556 Biology of Cancer (laboratory) (2)

An introduction to techniques essential to research investigations in cancer. Offered alternate years.

Teel, 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. Offered alternate years.

Prerequisite: Medical physiology.

Hall.

PHSL 567 Respiratory Physiology (3)

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. Offered alternate years.

Longo, Power.

PHSL 569 Oxygenation of the Fetus and Newborn (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. Offered alternate years.

Longo.

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 consent of the instructor. Offered alternate years.

Gonzalez.

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 is the role of the peripheral vasculature in the control of cardiac output and blood flow to special regions such as the brain, heart, skeletal muscle, etc. Offered alternate years.

Prerequisite: An advanced physiology course or permission of the instructor.

Gilbert.

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.

Maeda.

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. Offered alternate years.

Leonora.

PHSL 587 Physiology of Reproduction (2)

A study of the development of the male and female reproductive systems, neural and hormonal control of reproductive function, fetal development, and parturition. Offered alternate years.

Yellon, Ducsay.

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 repeated for additional credit. Offered alternate years.

Prerequisite: A course in physiology.

McCluskey.

PHSL 597 Great Books in Physiology (1)

Critical and descriptive reports (written and oral) of books on a graduate reading list.

McCluskey.

PHSL 604 Perinatal Biology Graduate Seminar (1)
Longo.

PHSL 605 Integrative Biology Graduate Seminar (1)

This seminar, coordinated by the Departments of Anatomy and of Pharmacology and Physiology, consists of reports from current literature and the presentation of student and faculty research on various aspects of regulatory and integrative biology as applied to cells, tissues, organs, and systems. Both students and faculty are expected to participate in a discussion and critical evaluation of the presentation.

PHSL 694 Special Problems in Physiology (arranged)

PHSL 697 Research (1-18)

PHSL 698 Thesis (1)

PHSL 699 Dissertation (2)



MASTER OF SOCIAL WORK

BEVERLY J. BUCKLES, D.S.W. Adelphi University 1989

Chairperson and Program Coordinator; Associate Professor of Social Work

Social policy analysis and administration, research design and implementation, and social welfare history.

The profession of social work centers on the improvement of the quality of life for people and the enhancement of human potential for full productive participation in society. With this philosophy at its foundation, the master's degree program emphasizes ecological systems, a perspective that focuses on the interaction of a person or system in relation to their environment. Supporting this stance is Loma Linda University's philosophy "To Make Man Whole" and its heritage as an international leader in the delivery of services in health care and related facilities. It is the combination of these influences that has guided the development of the foundation curriculum, professional concentrations, and selection of practicum sites for the Master of Social Work program.

FACULTY

CRAIG R. JACKSON, M.S.W., Wayne State University
1976; J.D. Western State University College of Law
1993

Associate Professor of Social Work
Social services and the legal system, human behavior,
and hospital social work policy and administration

SHELLY PERRY, M.S.W., State University of New York
1983

Director of Field Instruction; Assistant Professor of Social
Work
Hospital medical social work and human behavior

CURRICULUM

The foundation curriculum

In order to fulfill degree requirements, all students take required courses in five foundation areas: Social Work Practice, Human Behavior in the Social Environment, Social Welfare Policy and Services, Research, and Field Practice. These five areas are furthered by the integration of values, ethics, and knowledge of special populations (issues of gender, race, class, disability, and oppression) to provide the essence of the first-year curriculum and the foundation of all social work education and practice.

Professional concentrations

The Loma Linda University Master of Social Work program offers two concentrations for professional practice which provide the focus of the second year of study: Social Policy, Planning, and Administration; and Advanced Clinical Practice. Both concentrations build on the foundation curriculum and integrate advanced concepts from each area into the second year of study.

Social policy, planning, and administration concentration

The social policy, planning, and administration concentration is a specialized program of study designed to prepare students for leadership roles in policy analysis, and the planning, design and management of health and human services. The second-year courses supporting this concentration center around advanced policy analysis and political action; program planning; development and evaluation; community and organizational theories and analysis; human resource development; and managerial concepts and skill development.

Advanced clinical practice concentration

The concentration in advanced clinical practice includes mastery of clinical theory and practice. Second-year courses supporting this concentration include advanced clinical practice theories, skills, and techniques for working with individuals and small groups. By a selection of electives and advanced practicum sites, students may further focus on advanced practice with children or the aged.

Field practice

The field practice experience offers an opportunity to integrate and apply theoretical and research knowledge with social work practice and intervention skill in an institutional or agency setting under the supervision of a qualified field instructor. First-year (first-level) placements focus on developing foundation practice skills and knowledge; whereas second-year (second-level) placements emphasize the development of advanced skills and scholarly practice in the area of concentration selected. Because of the emphasis and orientation of Loma Linda University, the majority of practicum sites will be in health and mental health institutions and agencies.

Research and thesis

Research, required of all master's degree students, consists of an independent research study which aims to develop knowledge for the advancement of social work practice and to provide guided experience in the conduct of research. The thesis is regarded as an important vehicle for integration of learning from the program as a whole and for consolidation of identity as a social work professional. The thesis also provides the research foundation to seek future advanced degrees.

Drawing upon knowledge obtained in the first-year foundation research courses, the thesis is undertaken during the second year with the guidance of a research adviser. Guidelines for the thesis are provided by the Graduate School department.

Comprehensive examinations

At the end of the first year, or completion of 40 units, each student is required to complete a written qualifying examination as a basis for consideration of advancement to the second-year (second-level) course work. Based upon the results of the qualifying examination, an evaluation will be made by the Academic Program Committee of the student's performance with recommendation for the following year. The intent of the qualifying examination process is to assist the faculty and the student in assessment of strengths and areas for improvement; provide feedback; foster an environment of self-evaluation; and heighten participation in individualized academic development.

When the student has completed all but the last 12 units of credit, the student is eligible to take the comprehensive final examination. This examination is both written and oral. Students are allowed to take the final comprehensive examination twice before additional course work is required. The final examination process is viewed as the capstone of the student's academic experience, facilitating the final stage of reflection and review of the development of a scholar-practitioner.

Advanced standing placement

A student graduating within the last three years from an accredited Bachelor of Social Work program in social work is eligible for advanced standing of up to 24 units of course work and 6 units of field practicum. Advanced standing is evaluated through a portfolio process whereby the student's completion of foundation course work is reviewed on a course-by-course basis. Evaluation of advanced standing in practicum will be independent of course work and will be contingent on evidence of practice maturity. The Admissions Committee makes the final evaluation to the amount of advanced standing granted.

Transfer students

Students transferring from other accredited M.S.W. programs may transfer units in accordance with University policy. Course work completed more than eight years prior to admission will not be accepted for transfer.

Accreditation

The Master of Social Work Program is in process for receipt of accreditation from the Council on Social Work Education. Information concerning the status of accreditation is readily available through the department. Questions should be directed to the department chair.

Courses

Course descriptions and numbers are available from the department of social work.

SPEECH-LANGUAGE PATHOLOGY

JEAN E. MAKI, Ph.D. Michigan State University 1975

Chairman and Program Coordinator; Associate Professor of Speech-Language Pathology and Audiology
Speech and hearing science, deafness

The purposes of this graduate program are to offer preparation for careers in the professional practice of speech-language pathology, 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 Departments of Speech-Language Pathology and of Audiology, the Loma Linda University Medical Center, and of affiliated facilities 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 in the professional schools of the University and in the Graduate School.

FACULTY

JEAN B. LOWRY, Ph.D. Kent State University 1973
Professor of Speech-Language Pathology and Audiology
Adult aphasia, phonology

KEIKO I. KHOO, M.S., M.A. Loma Linda University GS
1979

Associate Professor of Speech-Language Pathology and
Audiology
Diagnostic and rehabilitative audiology

PAIGE S. HINERMAN, Ph.D. University of Utah 1985
Assistant Professor of Speech-Language Pathology and
Audiology
Aphasia, traumatic brain injury, multicultural studies

ASSOCIATE FACULTY

MARCIA C. HILL, M.A. Western Michigan University
1984

Assistant Professor of Speech-Language Pathology and
Audiology
Stroke, traumatic brain injury

CLINICAL FACULTY

MARJORIE M. AKAMINE, M.S. University of Redlands
1983

Clinical Instructor in Speech-Language Pathology and
Audiology
Pediatrics, stroke, dysphagia

GEORGIANA ANDERSON, M.A. California State
University, Fullerton 1985

Clinical Instructor in Speech-Language Pathology and
Audiology
Pediatrics, stroke, TBI, adult language

MELISSA K. BACKSTROM, M.S. University of Redlands
1987

Clinical Instructor in Speech-Language Pathology and
Audiology
Stroke, dysphagia

JULI A. BAER, M.S. University of Redlands 1976

Clinical Instructor in Speech-Language Pathology and
Audiology

Stroke, traumatic brain injury, laryngectomy

DOROTHY BERNDT, M.A. Northwestern University 1984

Clinical Instructor in Speech-Language Pathology and
Audiology

Voice disorders, dysphagia

LINDA M. DYE, M.A. Ohio University 1984

Clinical Instructor in Speech-Language Pathology and
Audiology

Diagnostic audiology, aural rehabilitation, cochlear
implants

MAUREEN B. HALL-KATZ, M.A. California State
University, Los Angeles 1984

Clinical Instructor in Speech-Language Pathology and
Audiology

Pediatrics, traumatic brain injury, dysphagia

- AMY M. KLOKE, M.S. Utah State University 1989
Clinical Instructor in Speech-Language Pathology
Diagnostic audiology
- GARY A. LUCAS, M.S. Vanderbilt University 1974
Clinical Instructor in Speech-Language Pathology and
Audiology
Traumatic brain injury, voice
- DAVID G. MCGANN, M.S. Colorado State University 1973
Clinical Instructor in Speech-Language Pathology and
Audiology
Diagnostic audiology
- ELIZABETH A. PIOLI, M.A. Indiana University 1973
Clinical Instructor in Speech-Language Pathology and
Audiology
Stroke, traumatic brain injury
- JANE E. ROGAN, M.S.P.A. University of Washington,
Seattle 1983
Clinical Instructor in Speech-Language Pathology and
Audiology
Diagnostic audiology, aural rehabilitation
- HELEN M. SHARP, M.S. University of Pittsburgh 1992
Clinical Instructor in Speech-Language Pathology and
Audiology
Pediatrics, craniofacial
- JULIA SHULER, M.A. University of Washington 1989
Clinical Instructor in Speech-Language Pathology and
Audiology
Traumatic brain injury, augmentative communication,
voice
- LISA R. STERLING, M.S. University of Wisconsin-
Madison 1988
Assistant Professor of Speech-Language Pathology and
Audiology
Child language disorders, diagnostics
- KELLY TANNER, M.A. California State University,
Northridge 1988
Clinical Instructor in Speech-Language Pathology and
Audiology
Diagnostic audiology

MASTER OF SCIENCE

Admission

Acceptable undergraduate preparation includes a bachelor's degree in speech-language pathology and audiology or communicative disorders. Applicants having an undergraduate degree from another discipline are admitted for the first year of prerequisites through the School of Allied Health Professions.

Program

Graduate study in speech-language pathology leads to the Master of Science degree. 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 (b) to prepare for doctoral study or careers in related fields.

The program does not offer a master's degree in audiology. Courses and clinical practicum are available for students wishing to increase their breadth of knowledge and experience in audiology.

The speech-language pathology program is accredited by the Educational Standards Board of The American Speech-Language and Hearing Association. The program is approved by the Commission for Teacher Credentialing to prepare students for a California Clinical Rehabilitative Services Credential in Language, Speech, and Hearing. This credential is a requirement for working as a speech, language, and hearing specialist in California public schools. Course requirements for the credential vary from those listed for the degree. Credential requirements may be obtained by contacting the department. Students may elect to complete requirements for the credential only. The student's undergraduate course work must be evaluated in accordance with state of California credential requirements.

The program of study consists of completing (a) required graduate-level courses, (b) supervised clinical practice, and (c) research or comprehensive examinations.

Students completing both the degree and requirements for the California Clinical Rehabilitative Services Credential will complete 45 academic units, 6 units of student teaching and sufficient clinical units (typically 4-5 units) to complete certification requirements of the American Speech-Language-Hearing Association.

DEGREE REQUIREMENTS

The following are requirements for the Master of Science degree specific to this program:

1. A minimum of one quarter in residence as a graduate student.
2. A minimum of 48 quarter units of graduate credit, including: SPPA 524, 535, 544, 564, 576, 577, 585, 586, 587, 596, 598, 684, 685, 687, 688, religion (one course for a minimum of 3 units).
3. Evidence that the student has completed 350 clock hours of supervised clinical practice, including 250 clock hours at the graduate level. Transfer students who have met the clinical experience requirements for certification must complete an additional 50 clock hours of practicum.
4. Master's thesis/project or comprehensive examinations.
5. Students who choose to do a thesis or project must demonstrate a working knowledge of statistics or pass a graduate statistics course.

Option A: Research

Option A requires completion of 1-6 units of SPPA 698 Thesis, and an oral examination; or completion of 2-4 units of SPPA 697 Research and an oral presentation of research. Typically a student will complete a total of 6 units of thesis and/or research.

Option B: Comprehensive Examinations

Option B requires completion of written comprehensive examinations.

General requirements

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

COURSES**GRADUATE COURSES****SPPA 524 Language Disorders of Children, Advanced (3)**

Lectures and discussions dealing with assessment and management of the preschool, primary, and adolescent school-age child with language disabilities. A study of the classic and contemporary literature relating to differential diagnosis and therapeutic procedures. Consideration given to language disabilities of childhood, learning disabilities, autism, and mental retardation.

SPAA 535 Voice Disorders (3)

Lecture and discussion of diagnosis and intervention techniques used with children and adults displaying a variety of voice disorders. Includes demonstration and use of instrumentation used for physiological and acoustic analysis of abnormal voice production.

SPAA 544 Cleft Palate (2)

Focuses primarily on diagnostic and intervention techniques used by the speech language pathologist. Emphasis is given to the functioning of a craniofacial team and the interaction of professionals in the areas of medicine, surgery, orthodontia, prosthetics, genetics, dentistry, social work, psychology, and speech-language pathology.

SPPA 564 Aural Rehabilitation and Hearing Aids (3)

Study of the mechanisms for achieving hearing rehabilitation, including amplification, speech reading, auditory training, hearing aid orientation, and speech conservation. Consideration given to hearing aid function and philosophies of rehabilitation for the hearing impaired (e.g., auditory, aural, manual, and total communication).

SPPA 567 Clinical Practice in Speech-Language Pathology/Audiology, Advanced (1-6)

Supervised practice in diagnosis and therapy. Thirty clock hours required for each unit of credit. Maximum of 6 units of clinical practicum apply toward a major in speech-language pathology and audiology.

Consent of the supervisor.

SPAA 568 Clinical Practice in Speech-Language Pathology Diagnostics (1-3)

Supervised practice in diagnostics; study of the principles of diagnostics applicable to communication.

SPPA 576 Instrumentation in Communication Disorders (4)

Lecture, discussion, and laboratory experience in the areas of speech acoustics, speech production and perception, psychoacoustics, and speech and hearing physiology.

SPPA 577 Applied Psycholinguistics (3)

Mental processes underlying the acquisition and use of language; structure and meaning of language; perception and cognition.

SPPA 585 Professional Aspects of Speech-Language Pathology and Audiology (3)

Study of the ethical, business, and legal considerations in organizing and administering programs, including accountability, record keeping, case selection, case load, supervision, staffing, budgeting, and interagency cooperation in schools, clinics, and private practice.

SPPA 586 Advanced Diagnostics in Speech-Language Pathology (3)

Exploration of the theory underlying clinical evaluation and diagnosis of speech-language pathology. Issues regarding formal/informal evaluation measures, observations, and test interpretation will be addressed.

SPPA 587 Counseling in Communication Disorders (3)

Explores the counseling role and approaches of the speech-language pathologist when working with communication-disordered patients and their families

SPPA 588 Directed Teaching in Speech-Language Pathology (3-6)

Supervised therapy on the elementary and/or secondary level and/or in a classroom for the severely language-handicapped child. Not more than 6 units of clinical practicum are applicable toward the master's degree. This includes directed teaching.

SPPA 596 Workshop in Speech-Language Pathology/Audiology (1-4)

May be repeated with new content for additional credit.

SPPA 598 Research Methods and Professional Literature in Speech-Language Pathology (3)

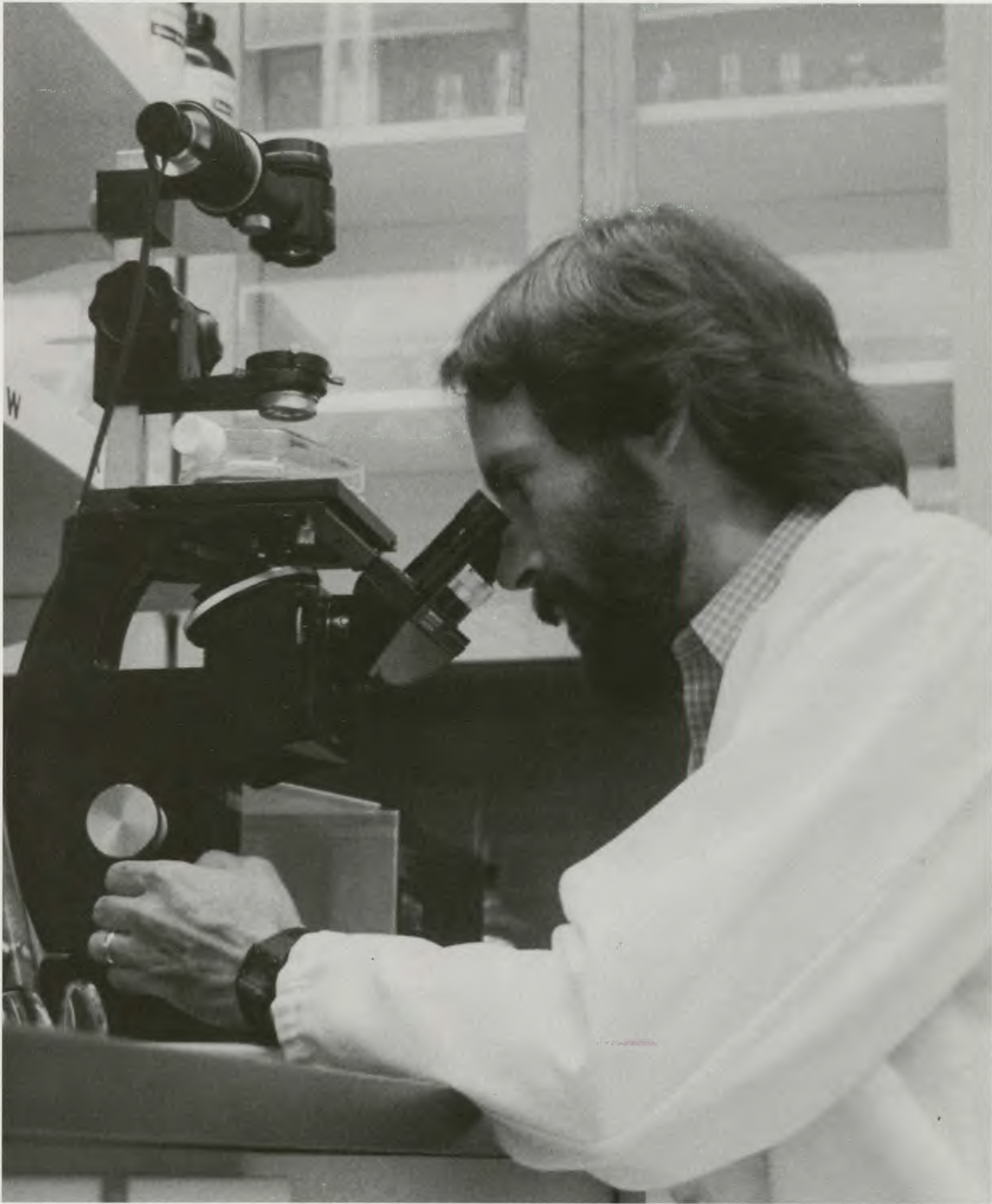
Lecture and discussion designed to facilitate the student's ability to read and interpret professional literature, develop research ideas, and develop professional writing skills.

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 684 Seminar: Adult Language Disorders (3)**SPPA 685 Seminar: Stuttering (3)****SPPA 687 Seminar: Open Seminar (2-3)****SPPA 688 Seminar: Articulation (3)****SPPA 697 Research (2-4)****SPPA 698 Thesis (1-6)****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

DIVISION OF GENERAL STUDIES

The Division of General Studies within the Graduate School coordinates the offering of courses that apply to the Associate in Arts and Bachelor of Science degree programs in nursing, dentistry, and allied health professions. These courses contribute to the fulfillment of the general studies requirements adopted by the University in 1989. The University is revising the requirements (Spring 1993), and students entering for the 1995-96 school year should look for revised guidelines.

GENERAL EDUCATION CURRICULUM — BACHELOR OF SCIENCE DEGREE — (TOTAL 65-73 QUARTER UNITS PLUS THREE ACTIVITIES COURSES)

HUMANITIES — 16 UNITS

Courses to be selected from at least two of the following areas: civilization/history, literature, fine arts, modern language, philosophy. Eight units of religious studies in the areas of ethics or history may be counted towards both the 16 units in humanities and religious studies requirement.

COMMUNICATION SKILLS — 13 UNITS

Written skills: must include a complete sequence in freshman English. Oral skills: public address, critical thinking or persuasion, or computer skills (course in computer information systems).

RELIGIOUS STUDIES — 16 UNITS

Such areas as biblical studies; Christian ethics; clinical ministry; comparative religions; doctrinal, historical, and systematic theology. Four of these units may be a course dealing with the religious, moral, and ethical questions of health care. Students transferring from other than Seventh-day Adventist colleges are required to take 4 units of religion for each year they attend Loma Linda University.

SOCIAL SCIENCE — 12 UNITS

Anthropology, economics, geography, psychology, sociology, and political science. Must include courses from at least two of the areas listed.

NATURAL SCIENCE, MATHEMATICS, AND HEALTH — 16 UNITS

Biology, chemistry, geology, mathematics, physics, and health. Students who have not taken a health class on the secondary level (with a grade of C or better) are required to take a health class. The following limitations apply: only one course in health and only one course in math may be counted, and no more than 6 units in any other area.

PHYSICAL EDUCATION —

Three 0.5 unit activity courses or equivalent.

COURSES

ACCT 221 Principles of Accounting (4)

Modern accounting and analysis. Business transactions and accounting analysis.

ACCT 507 Financial Accounting (4)

Accounting for business organization entities. Analysis of business transactions and preparation of financial statements.

ANTH 315 Cultural Anthropology (4)

Nature of culture, with special reference to such features as technology, economic activities, community, kinship and marriage, social control, magic and religion, the arts, and other forms of cultural behavior. Wide array of examples from societies around the world.

ANTH 448 Medical Anthropology (4)

Sickness and health as universal factors in the human condition. World view as an explanatory system for behavior; ethnographic examples of curing systems and coping mechanisms; crosscultural communication of health principles and practices.

ARTA 205 The Language of Art (2-4)

Basic concepts, materials, and history of the visual arts which will enable the nonart major to develop an art vocabulary and gain insight into the creative process.

BIOL 107 Human Biology (4)

Man as an integrated organism: systems of the body; the basis of healthful living. Four class hours per week.

EDFO 305 Psychological Foundations of Education (4)

A study of psychological development as it relates to the learning process and evaluation techniques as they relate to learners in the elementary and secondary schools. Prerequisite to EDCI 430 or 457.

Prerequisite: PSYC 104.

EDPC 404 Standardized Testing in Education (3)

The development of competencies and understandings for selecting, administering, and interpreting the major types of standardized tests and inventories used in education and counseling. Theoretical principles and issues presented together with hands-on applications. Practicum required.

EDPC 460 The Exceptional Child (3)

A study of the determinants, characteristics, problems, and adjustments of children who deviate markedly from the norm in their mental, physical, emotional, or social aptitudes, traits, and tendencies. Emphasis on educational methods and adaptation.

ENGL 206 Introduction to Literature (4)

An introduction to the reading and analysis of the major literary genres: poetry, drama, short story, and essay.

ENGL 225 American Literature 1860 to Present (4)**ENGL 246 Literary Forms and Ideas (4)**

Varied content from quarter to quarter, with specific areas listed in the class schedule (such as drama; the short story; contemporary literature; women in literature; C. S. Lewis).

ENGL 477 General Linguistics (4)

A study of language: phonology, morphology, syntax, semantics, and the acquisition of language. Identical to LING 477.

ENGL 499 Directed Study (1-4)**MUHL 205 Introduction to Music (4)**

Basic music literature, with some attention to other arts.

PEAC 110 Independent Activities (0.5-1)**PSYC 224 Developmental Psychology:****Childhood and Adolescence (3-4)**

The physical, mental, emotional, social, and religious/moral development occurring within the family context from conception through adolescence.

PSYC 225 Developmental Psychology:**Adulthood and Aging (3-4)**

The physical, mental, emotional, social, and religious/moral development of adults occurring within the family and social context. Changes which occur from young adulthood through middle age, old age, and death.

PSYC 226 Life-span Development (4)

A life-span course emphasizing the physical, mental, emotional, social and religious/moral development from conception through adulthood, aging, and death.

PSYC 334 Orientation to Field Practicum (1)

An introduction to the various types of field placements that are available to students, orienting them to the procedures and policies that students will encounter in their placements. Introduction to legal and ethical issues surrounding field and agency work.

PSYC 405 Psychology of Human Relations (3-4)

Topics include the effective use of human resources; group management and leadership skills; interviewing, counseling, and conference techniques. Skills emphasized include expression, listening, participation, self-awareness, and group dynamics.

PSYC 414 Interviewing and Counseling (4)

Procedures, methods, and problems in the collection of personal data in a professional interview situation. Theories and techniques of academic, vocational, and therapeutic counseling in various settings designed to improve intra- and interpersonal behavioral patterns for more effective living. Consideration given to clinical, educational, and crisis-intervention counseling applications.

PSYC 479 Human Neuropsychology (4)

Introduction to brain behavior relationships, including cerebral asymmetry, disconnection syndromes, disorders of memory and language, biological substrates of affective behavior, motor and perceptual dysfunction, and drug actions.

Prerequisite: BIOL 114 or 131 or consent of the instructor.

PSYC 499 Directed Study (1-4)**STAT 251 Introduction to Statistics (4)**

Basic concepts of probability, descriptive statistics, normal distribution, hypothesis testing applied to means, power, chi-square, introduction to correlation and regression, and simple analysis of variance.

Prerequisite: Secondary school algebra.

SOCI 104 Introduction to Sociology (4)

The science of society: social norms, social processes, social change, and social structure.

SOCI 414 Sociology of the Family (2)

A study of the structure, function, and changing patterns of families in society; and the relationships between changes in society, family problems, and their impact on children.

SOCI 444 Family Resource Management (2)

Principles of home management in relation to needs and resources of individuals and families.

SOCI 513 Human Resource Management (4)

A basic course relating to managerial decision making with respect to the acquisition, development, reward, and maintenance of human resources.

Additional courses may be taken at La Sierra University through the affiliation agreement. Course descriptions for these courses appear in the Catalog of La Sierra University and will appear on the transcript as Loma Linda University courses taken in affiliation with La Sierra University.

IV

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THE TRUSTEES

Officers

Chairman	Calvin B. Rock
Vice Chairman	Alfred C. McClure
Secretary	Richard A. James

UNIVERSITY ADMINISTRATION

OFFICERS OF THE UNIVERSITY

President	B. Lyn Behrens, M.B., B.S.	
Vice President	Academic and Research Affairs	Ian M. Fraser, Ph.D.
Vice President	Advancement	Donald G. Prior, ED.S.
Vice President	Medical Affairs	David B. Hinshaw, Sr., M.D.
Vice President	Financial Affairs	Donald G. Pursley, D.B.A.
Vice President	Public Affairs	W. Augustus Cheatham, M.S.W.

LOMA LINDA UNIVERSITY

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 Cyril Miller
 The Honorable Shirley Pettis-Roberson
 Ted Ramirez
 Humberto Rasi
 Leroy A. Reese
 G. Ralph Thompson
 Joel O. Tompkins
 Hubert C. Watkins
 Neal C. Wilson
 Ronald M. Wisbey
 Patrick Wong
 Tom Zapara

THE GRADUATE SCHOOL

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 budgets or overall University policy are subject to review by the Administrative Committee.

W. BARTON RIPPON, Ph.D., Dean

GRADUATE SCHOOL COUNCIL

Leif K. Bakland
 Viroj Boonyaratanakornkit
 H. Paul Buchheim
 Beverly J. Buckles
 David L. Cowles
 Ramon R. Gonzalez
 Daila S. Gridley
 Ronald G. Huston
 Patricia K. Johnston
 Lisa Joseph
 James D. Kettering
 Keiko I. Khoo
 David R. Larson
 John Leonora
 Paul J. McMillan
 Jean E. Maki
 Marvin A. Peters
 Janelle Pyke
 Charles W. Slattery
 Lois Van Cleve
 Ulf Wikesjo
 Bruce R. Wilcox
 Anthony J. Zuccarelli

THE FACULTY, ASSOCIATE FACULTY, AND CLINICAL FACULTY

Faculty, associate faculty, and clinical faculty are listed below. Code letters are shown after each name indicating program(s) of appointment.

ANAT	Anatomy	
BCHM	Biochemistry	
BIOL	Biology	
BMCE	Biomedical and Clinical Ethics	
DENT	Dentistry	
FMED	Family Life Education	
MFAM	Marriage and Family Therapy	
MICR	Microbiology	
MSTP	Medical Scientist Training Program	
NRSNG	Nursing	
NUTR	Nutrition	
PHRM	Pharmacology	
PHSL	Physiology	
PLNT	Paleontology	
SOWK	Social Work	
SPPA	Speech-Language Pathology	
Adey, W. Ross		PHSL
Akamine, Marjorie M.		SPPA
Aloia, Roland C.	BCHM, BIOL	
Anderson, David		DENT
Anderson, Georgiana		SPPA
Archambeau, John		ANAT
Austin, Kenneth M.		MFAM
Backstrom, Melissa K.		SPPA
Baer, Juli A.		SPPA
Bakland, Leif K.		DENT
Bakland, Thor C.		DENT
Barnard, Logan W.		DENT
Bawin, Suzanne M.		PHSL
Baylink, David J.		BCHM
Beltz, Richard E.		BCHM
Berndt, Dorothy		SPPA
Bishop, Leigh		BMCE
Blankenship, James W.	BCHM, NUTR	
Blaseio, Gunther		DENT
Boskovic, Milos		DENT
Bossert, Elizabeth A.		NRSNG
Boyne, Philip J.		DENT
Brand, Leonard R.		BIOL, PLNT
Brandon, Antonius D.	FMED, MFAM	
Brandstater, Murray E.		PHSL
Branson, Roy		BMCE
Buchheim, H. Paul		BIOL, PLNT
Buchholz, John		PHRM
Buckles, Beverly J.		SOWK
Bullas, Leonard R.		BIOL, MICR
Burke, Kenneth I.		NUTR
Burns, Margaret A.		NRSNG
Byrd, Bernard C.		DENT
Carrigg, Karen L.		NRSNG
Carter, Norman S.		DENT
Carter, Ronald L.		BIOL
Caruso, Joseph M.		DENT
Chamberlain, A. Durwin H.		DENT
Chand, Ian P.	FMED, MFAM	

Clausen, Benjamin L.		PLNT
Connell, Bertrum C.		NUTR
Connors, Dianna L.		MFAM
Cordero-MacIntyre, Zaida		NUTR
Corselli, Johannah		ANAT
Cowles, David L.		BIOL
Crane, Earl R.		DENT
Cress, C. Raymond		PHRM
Crigger, Max		DENT
Cummings, Raleigh R.		DENT
Cutler, Ralph E.		PHRM
Davis, M. Jerry		MFAM
Davis, W. Howard		DENT
DeLeon, Dennis		BMCE
DeVincenzo, John P.		DENT
Ducsay, Charles A.		PHSL
Dye, Linda M.		SPPA
Eby, William C.		MICR
Egbert, Robert D.		MFAM
Egelberg, Jan H.		DENT
Ehrler, Clelan G.		DENT
Eichem, Tammy L.		NRSNG
Engen, Paul C.		ANAT
Farley, John R.		BCHM
Fletcher, William H.	ANAT, PHSL	
Frank, Alfred L.		DENT
Frank, Robert J.		DENT
Fraser, Ian M.		PHRM
Galbraith, Michael E.		NRSNG
Garrett, J. Steven		DENT
Gauntt, Lloyd E.		DENT
Genesen, Leigh B.		BMCE
Gilbert, Raymond D.		PHSL
Gonzalez, Ramon R., Jr.	PHRM, PHSL	
Goodwin, H. Thomas		BIOL, PLNT
Green, Lora		MICR, PHSL
Gridley, Daila S.		MICR
Guthrie, George		NUTR
Haddad, Ella		NUTR
Haggren, Wendy		MICR
Hall, Raymond G.		PHSL
Hall-Katz, Maureen B.		SPPA
Hardin, Steven B.		BMCE
Henken, Herbert W.		ANAT
Herrmann, E. Clifford		BCHM
Hessinger, David A.	BCHM, BIOL, PHRM, PHSL	
Hill, Kelvin A. W.		BCHM
Hill, Marcia C.		SPPA
Hinerman, Paige		SPPA
Hodgkin, Georgia		NUTR
Hooker, William M.		ANAT
Hubbard, Richard W.	BCHM, NUTR	
Hunt, Guy M.		ANAT
Huston, Ronald G.	FMED, MFAM	
Itakura, Keiichi		MICR
Jackson, Craig R.		SOWK

James, Robert		DENT	Provonsha, Jack W.	BMCE
Javor, George T.	BCHM,	MICR		
Jeiroudi, M. Toufic		DENT	Rathbun, W. Eugene	DENT
Johnson, Mark S.		MICR	Register, U. D.	BCHM, NUTR
Johnston, Patricia K.		NUTR	Rick, Gordon M.	DENT
Jones, Patricia S.		NRSG	Ricketts, Robert M.	DENT
Jung, Marshall		MFAM	Rippon, W. Barton	BCHM, MSTP
			Roberts, Walter H. B.	ANAT
Kaminishi, Ronald M.		DENT	Robertson, Thomas L.	DENT
Kettering, James D.		MICR	Rogan, Jane E.	SPPA
Khoo, Keiko I.		SPPA	Roos, Philip J.	PHSL
King, Helen Emori		NRSG	Rossi, John	BCHM, MICR
Kirby, Michael A.		ANAT	Roth, Ariel A.	BIOL, PLNT
Klooster, Judson		DENT	Roy, Ira	MICR
Kloke, Amy M.		SPPA	Rynearson, R. David	DENT
Kosch, Cindy		NUTR	Ryu, Jun-ichi	BIOL, MICR
Larson, David R.		BMCE	Sabate, Joan	NUTR
Lau, Benjamin H. S.	BIOL,	MICR	Saha, Subrata	ANAT
Lau, Kin-Hing W.		BCHM	Sandberg, Lawrence B.	BCHM
Leonora, John		PHSL	Sands, John	MICR
Lessard, George M.		BCHM	Schlenker, Willis L.	DENT
Lewis, John E.		MICR	Schultz, Robert L.	ANAT
Lier, Anthony B.		DENT	Scott, Garland E.	DENT
Linkhart, Thomas A.		BCHM	Sharp, Helen M.	SPPA
Longo, Lawrence D.		PHSL	Shuler, Julie F.	SPPA
Lowry, Jean B.		SPPA	Simms, Richard A.	DENT
Lozada, Jaime L.		DENT	Simon, James	DENT
Lucas, Gary A.		SPPA		
			Simpson, Cheryl J	FMED, MFAM
Maeda, George		PHSL	Slattery, Charles W.	BCHM
Maki, Jean E.		SPPA	Sood, Satish M.	BCHM
McCluskey, Elwood S.	BIOL,	PHSL	Sterling, Lisa R.	SPPA
McEwen, Lawrence E.		DENT	Strong, Donna D.	BCHM, MICR
McGann, David G.		SPPA	Strother, Allen	PHRM
McKendry, Douglas		DENT	Sugiyama, Raymond M.	DENT
McMillan, Paul J.		ANAT		
Miller, Eva G.		NRSG	Tanner, Kelly	SPPA
Miller, Frances P.		NRSG	Taylor, Barry L.	BCHM, MICR
Mitchell, Daniel A., Jr.		ANAT	Taylor, Guy D.	DENT
Mitchell, Robert D.		DENT	Teel, Charles W.	BMCE
Mohan, Subburaman	BCHM,	PHSL	Teel, Robert W.	BIOL, PHRM, PHSL
Molinaro, Guiseppe A.		MICR	Tieche, Jean-Marc	PHSL
Morgan, Arthur J.		DENT	Tomlinson, John L.	DENT
Morrow, Steve G.		DENT	Torabinejad, Mahmoud	DENT
			Tosk, Jeffrey M.	PHYS
Nava, P. Benigno		ANAT		
Nehlsen-Cannarella, Sandra L.	MICR,	PHSL	Van Cleve, Lois	BMCE, NRSG
Newbold, Jean		NRSG	VanGent, Conrad	BCHM
			van Stralen, Daved W.	NRSG
Orr, Robert D.		BMCE	Vasquez, Beatriz J	PHRM
Paggenkamper, Joni		NUTR	Wagner, William	ANAT
Peabody, Joyce		NRSG	Walters, James W.	BMCE
Pearce, William J.	PHRM,	PHYS	Walters, Roland D.	DENT
Pearson, John K.		DENT	Weber, Ruth S.	NRSG
Perkin, Ronald M.		NRSG	Webster, Clyde L.	PLNT
Perry, Shelly		SOWK	Wergedal, Jon E.	BCHM
Peters, James		NUTR	Whittaker, John	DENT
Peters, Marvin A.	BIOL,	PHRM	Whitten, Crystal	NUTR
Peterson, John E.		DENT	Wikesjo, Ulf	DENT
Pioli, Elizabeth A.		SPPA	Wilcox, R. Bruce	BCHM, BIOL
Power, Gordon G.		PHSL	Winslow, Gerald R.	BMCE

Wise, James R.
Woodward, Clarice W.

DENT
NRSB

Yellon, Steven M.
Zolber, Kathleen K.
Zuccarelli, Anthony

ANAT, PHSL
NUTR
BCHM, BIOL, MICR, MSTP

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 curricula 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 Federation 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.

INSTRUCTIONAL RESOURCES

LIBRARY

The Del E. Webb Memorial Library is the central library of Loma Linda University. Its historical roots go back to 1907, when a small library collection was started in a room of the old Loma Linda Sanitarium. In 1953 the growing collection was moved to its own building and a new structure was added in

1981. At the present time, the total library space is 87,670 square feet. As of June 1990, the Library housed 277,355 volumes, including 175,540 books and 101,815 bound journals. The collection also contains 64,606 audiovisual items and 2,808 current periodical subscriptions.

The purpose of the Library is to stimulate and support the informational needs of the University's instructional, research, and service programs. To this end the Library provides a full range of information support services, including, but not limited to, reference, circulation, reserve, access through online searches to hundreds of computerized databases, access to databases available locally

in CD-ROM disk format, selective dissemination of information services (SDI), data-base end user training programs, library orientations, interlibrary loans, photocopy services, a microcomputer laboratory, a learning resource center, library research classes, and support for off-campus academic programs.

The Library provides access to other collections nationwide through computerized telecommunications. It also participates in a number of national and regional networks. One of these is the National Network of the Libraries of Medicine, founded by the National Library of Medicine. This structure is divided into eight regional sections, one of these being the Pacific Southwest Regional Medical Library Service. The Del E. Webb Memorial Library belongs to this region and is the designated medical resource library for San Bernardino and Riverside counties. Local library cooperatives include the IEALC (Inland Empire Academic Library Cooperative) and SIRCULS (San Bernardino, Inyo, Riverside Counties United Library Services). Membership in these cooperatives gives our students, faculty, and staff access to other library collections.

The Department of Archives and Special Collections holds information on the history of Loma Linda University, the health sciences, and a major collection on Adventism. In addition to print materials which include rare books, theses, and dissertations, there are microforms, sound recordings, and several thousand photographs; plus 14,000 linear feet of archival materials, which include papers of various denominational and University officials, as well as the congressional papers of the Honorable Jerry and Shirley Pettis. Also located in the department is the Ellen G. White Estate Branch office. It contains some 60,000 typewritten pages of Ellen White's letters and manuscripts, 4,600 of her published articles, and several different files of materials pertaining to various aspects of the life and ministry of Ellen White. A computerized concordance to her published writings is available to researchers.

ACCREDITATION

The University

Founded as College of Evangelists 1905-06. Chartered as College of Medical Evangelists by the state of California December 13, 1909. Accredited by Northwest Association of Secondary and Higher Schools April 7, 1937. Accredited by Western Association of Schools and Colleges (prior to January 1962, Western College Association) February 24, 1960. Became Loma Linda University July 1, 1961. Professional curriculums started and approved as indicated.

THE GRADUATE SCHOOL: Started in 1954. Accredited through University accreditation.

The Professions

CYTOTECHNOLOGY: Started in 1982. Initial approval by the Committee on Allied Health Education and Accreditation in collaboration with the Cytotechnology Programs Review Committee January 20, 1983.

DENTAL HYGIENE: Started in 1959. Approved by the Council on Dental Education of the American Dental Association since September 7, 1961.

DENTISTRY: Started in 1953. Approved by the Council on Dental Education of the American Dental Association since May 23, 1957.

HEALTH: Started in 1948; reorganized in 1964. Approved by the American Public Health Association June 23, 1967.

HEALTH INFORMATION ADMINISTRATION: Started as medical record administration in 1963. Approved by the Council on Medical Education of the American Medical Association since December 1, 1963. Currently approved by the Committee on Allied Health Education and Accreditation in collaboration with the American Medical Record Association.

MEDICAL RADIOGRAPHY: Started in 1941 as radiological technology. Approved by the Council on Medical Education of the American Medical Association November 19, 1944. Currently approved by the Committee on Allied Health Education and Accreditation in collaboration with the Joint Review Committee on Education in Radiologic Technology.

MEDICAL SONOGRAPHY: Started in 1976 as diagnostic medical sonography. Approved by the Committee on Allied Health Education and Accreditation in collaboration with the Joint Review Committee on Education in Diagnostic Medical Sonography October 24, 1985.

MEDICAL TECHNOLOGY: Started in 1937. Approved by the Council on Medical Education of the American Medical Association since August 28, 1937. Currently approved by the Committee on Allied Health Education and Accreditation in collaboration with the National Accrediting Agency for Clinical Laboratory Sciences.

MEDICINE: Started in 1909. Approved by the Association of American Medical Colleges and the Council on Medical Education of the American Medical Association since November 16, 1922.

NUCLEAR MEDICINE: Approved by the Council on Medical Education of the American Medical Association June 23, 1973. Currently approved by the Committee on Allied Health Education and Accreditation in collaboration with the Joint Review Committee on Educational Programs in Nuclear Medicine Technology.

NURSING: Hospital school started at Loma Linda in 1905. Hospital school added at Los Angeles in 1924.

Degree school organized in 1948. Accredited by the National Nursing Accrediting Service December 10, 1951, with approval continuing under the National League for Nursing. Initial 1917 approval of the California State Board of Health extended until college program approved July 1, 1952, by the California Board of Registered Nursing. California Board of Registered Nursing approval since 1952. Public Health Nursing preparation recognized 1959.

NUTRITION AND DIETETICS: Started in 1922 as a certificate program; baccalaureate degree conferred 1932-54; graduate program offered since 1954. Internship program continuously approved by The American Dietetic Association from 1957 through 1974; reestablishment of baccalaureate program authorized October 1971. Coordinated undergraduate program accredited by The American Dietetic Association since 1974.

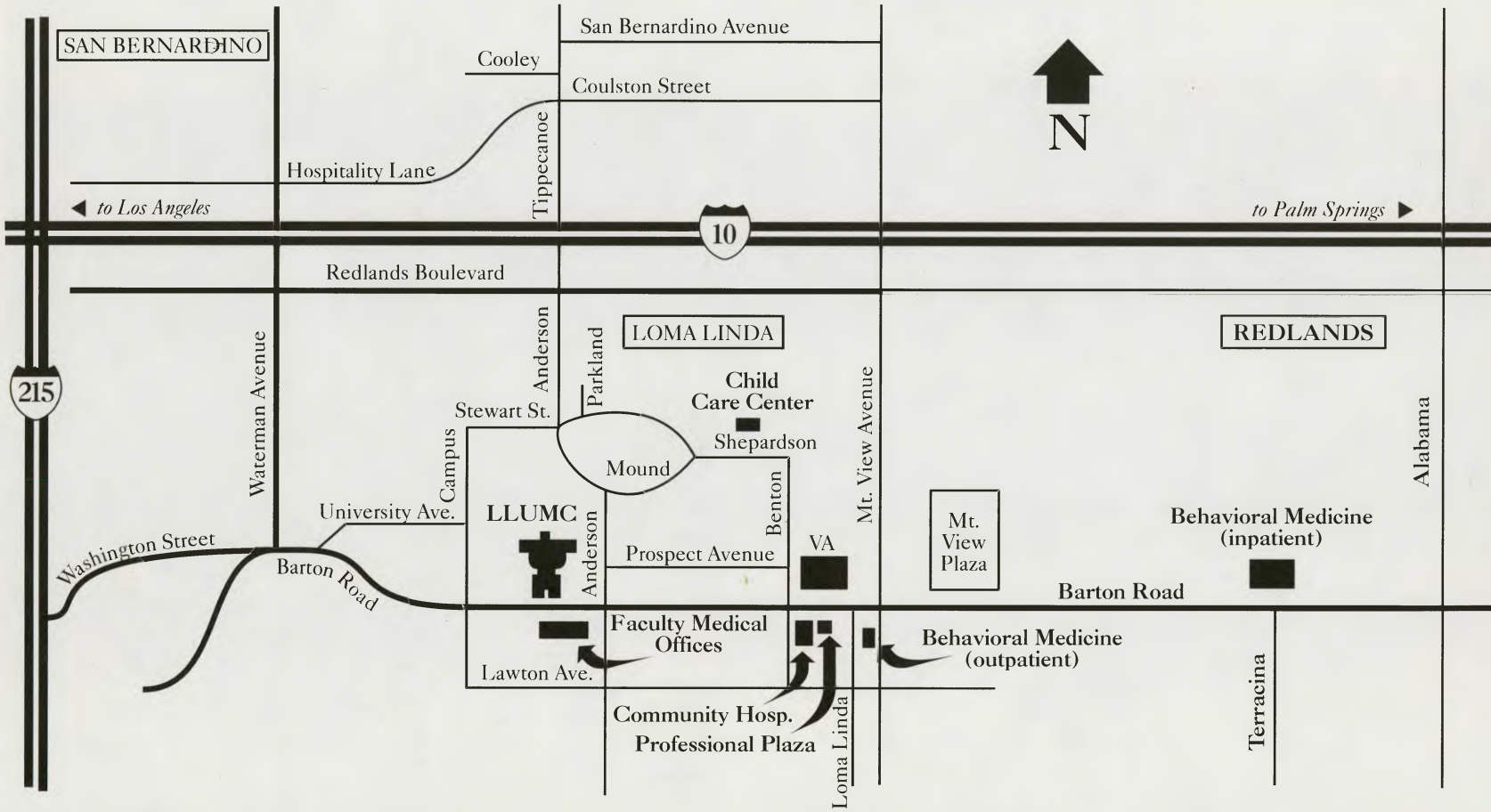
OCCUPATIONAL THERAPY: Started in 1959. Initial approval by the Council on Medical Education of the American Medical Association June 10, 1960. Full approval March 30, 1962. Currently approved by the Committee on Allied Health Education and Accreditation in collaboration with the American Occupational Therapy Association.

PHYSICAL THERAPY: Started in 1941. Initial approval by the Council on Medical Education of the American Medical Association June 6, 1942. Currently approved by the American Physical Therapy Association.

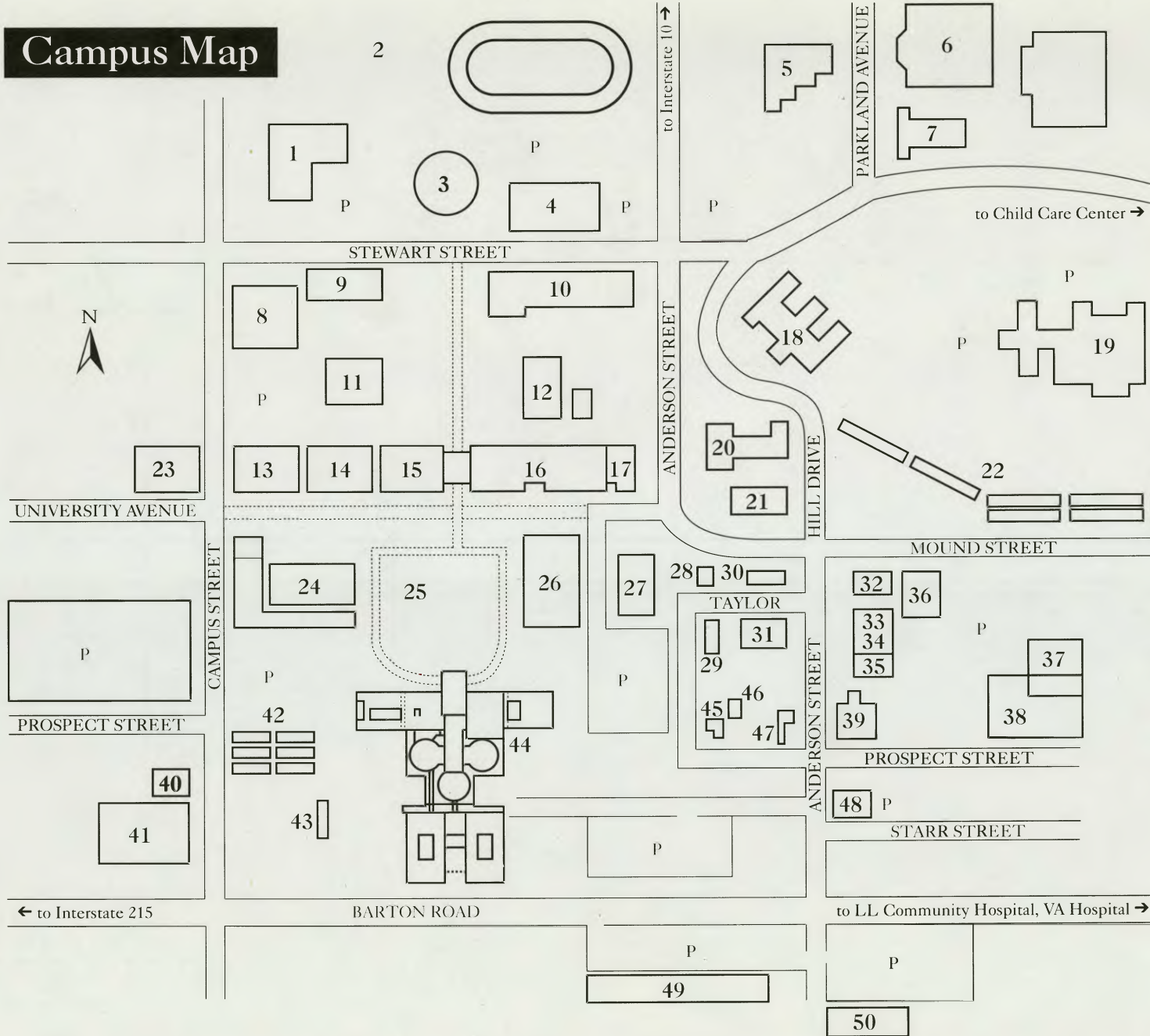
RADIATION THERAPY: Approved by the Council on Medical Education of the American Medical Association December 1, 1974. Currently approved by the Committee on Allied Health Education and Accreditation in collaboration with the Joint Review Committee on Education in Radiologic Technology.

RESPIRATORY THERAPY: Started in 1971. Initial approval by the Council on Medical Education of the American Medical Association September 1972. Full approval June 1973. Currently approved by the Committee on Allied Health Education and Accreditation in collaboration with the Joint Review Committee for Respiratory Therapy Education.

Area Map



Campus Map



NUMERICAL LEGEND

1. Tennis courts
2. Recreational field
3. Gentry Gym
4. Media Services
5. Construction/Housekeeping
6. Campus Engineering/Housekeeping
7. University Purchasing
8. Alumni Hall for Basic Sciences: Pathology/Microbiology
9. Shyrock Hall: Anatomy
10. Evans Hall: Center for Health Promotion/Cutler Amphitheater
11. Risley Hall: Physiology/Pharmacology
12. Burden Hall: Academic Publications/University Relations
13. Mortensen Hall: Biochemistry
14. Griggs Hall: Biology/Faculty of Religion/Graduate School
15. Magan Hall: University Administration/Geoscience Research Institute
16. University Library
17. Randall Visitors Center: Jorgensen Learning Resource Center (computers)
18. Lindsay Hall (women's residence)
19. Nichol Hall: School of Allied Health Professions/School of Public Health
20. Campus Hill Church
21. Linda Hall: Welfare Center, Campus Hill Church
22. Daniells Residence
23. Security
24. University Church: Campus Chapel/Fellowship Hall
25. The Mall
26. Prince Hall: School of Dentistry/Jorgensen Memorial Library
27. Power Plant
28. Dentistry Faculty Endodontics
29. Dentistry Faculty offices
30. Medical Center Information Systems
31. University Arts Building: Design Center/Medical Center Payroll/Medical Center Personnel/Medical Center Purchasing/University Personnel/University Printing Services
32. La Loma Credit Union
33. Student Services: Admissions and Records/International Student Services/Student Accounting/Student Life/Student Financial Aid/University Computing
34. Business offices/Foundation/University Payroll
35. U.S. Post Office
36. Campus Cafeteria
37. Risk Management
38. Campus Store/Loma Linda Market/Patio Pantry
39. Security Pacific National Bank
40. Parent-Child Education Center
41. West Hall: School of Nursing/Pediatrics, School of Medicine
42. Medical Center offices
43. Employee/Student Health Services
44. Medical Center: School of Medicine
45. Medical Center Collections
46. General Conference Auditors
47. Counseling Center
48. Alumni Center: Nursing Staff
49. Faculty Medical Officer
50. University Kidney Center (dialysis)

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University Information

General University Interests	The President's Office
Student welfare, housing, visas	Student Affairs Office
Student finance	Student Aid and Finance Office
Records	Office of University Records
Area Code	#909
Mail:	Loma Linda California 92350
Telephone:	1/800/422-4LLU (information only) or 1/800/548-7114 (Canada)
Campus Operator	824-4300
School of Dentistry	796-0141 Redlands 824-0030 Riverside, San Bernardino
All other Schools	796-3741 Redlands 824-4300 Riverside, San Bernardino
School of Allied Health Professions	Dean 824-4599
CLINICAL LABORATORY SCIENCE	824-4966
HEALTH INFORMATION ADMINISTRATION	824-4976
NUTRITION AND DIETETICS	824-4593
OCCUPATIONAL THERAPY	824-4628
OCCUPATIONAL THERAPY ASSISTANT	824-4948
PHYSICAL THERAPY	824-4632
PHYSICAL THERAPY ASSISTANT	824-4634
RADIATION TECHNOLOGY	824-4931
RESPIRATORY THERAPY	824-4932
SPEECH PATHOLOGY	824-4998
FAX	824-4809
School of Dentistry	Dean 824-4683
DENTISTRY	
DENTAL HYGIENE	
School of Public Health	Dean 824-4578
FAX	824-4087
School of Medicine	Dean 824-4462
School of Nursing	Dean 824-4360
Faculty of Religion	Dean 824-4536
The Graduate School	Dean 824-4528
ADMISSIONS AND RECORDS	824-4529
FAX	824-4859

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