THE COLLEGE OF MEDICINE CATALOG

1986-1987

THE UNIVERSITY OF ARIZONA
TUCSON, ARIZONA

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MEDICAL SCHOOL ACADEMIC CALENDAR 1986-1987
(TENTATIVE)

Year I

Orientation ........................................... Wednesday, July 30-Friday, August 1, 1986
Classes Begin ........................................... Monday, August 4, 1986
Labor Day (holiday) ..................................... Monday, September 1, 1986
Last Day of Registration ................................ Tuesday, September 2, 1986
Year I Retreat ........................................... Tuesday and Wednesday, September 23 and 24, 1986
Fall Recess .............................................. Thursday, September 25-Sunday, September 28, 1986
Veterans' Day (holiday) ................................... Tuesday, November 11, 1986
Thanksgiving (holiday) ................................... Thursday, November 27-Sunday, November 30, 1986
Winter Break ............................................. Friday, December 19, 1986-Sunday, January 4, 1987
Classes Resume ........................................... Monday, January 5, 1987
Last Day of Registration ................................... Thursday, January 22, 1987
Rodeo Day (holiday) ....................................... Thursday, February 26, 1987
Spring Recess ............................................. Saturday, March 14-Sunday, March 22, 1987
Memorial Day (holiday) ..................................... Monday, May 25, 1987
End of Year I ............................................... Wednesday, June 3, 1987
Summer Vacation .......................................... Thursday, June 4-Sunday, August 2, 1987

Year II

Classes Begin ........................................... Monday, August 4, 1986
Labor Day (holiday) ....................................... Monday, September 1, 1986
Last Day of Registration ................................ Tuesday, September 2, 1986
Fall Recess .............................................. Saturday, September 20-Sunday, September 28, 1986
Veterans' Day (holiday) ................................... Tuesday, November 11, 1986
Thanksgiving (holiday) ................................... Thursday, November 27-Sunday, November 30, 1986
Winter Break ............................................. Saturday, December 20, 1986-Sunday, January 4, 1987
Classes Resume ........................................... Monday, January 5, 1987
Last Day of Registration ................................... Thursday, January 22, 1987
Rodeo Day (holiday) ....................................... Thursday, February 26, 1987
Spring Recess ............................................. Saturday, March 14-Sunday, March 22, 1987
End of Basic Science Classes ............................. Friday, May 8, 1987
NBME Board Study ....................................... Saturday, May 9-Monday, June 8, 1987
Memorial Day (holiday) .................................... Monday, May 25, 1987
NBME Part I ............................................... Tuesday, June 9-Wednesday, June 10, 1987
Summer Vacation ........................................... Thursday, June 11-Sunday, June 21, 1987
MEDICAL SCHOOL ACADEMIC CALENDAR 1986-1987
(TENTATIVE)

Year III

Classes Begin ................................................................. Monday, June 16, 1986
Period 1 ................................................................. Monday, June 16-Saturday, July 26, 1986
Independence Day (holiday) .................................................. Friday, July 4, 1986
Last Day of Registration .................................................. Tuesday, September 2, 1986
Period 2 ................................................................. Monday, July 28-Saturday, September 6, 1986
Labor Day (holiday) .......................................................... Monday, September 1, 1986
NBME, Part I (repeat) ....................................................... Wednesday, September 3-Thursday, September 4, 1986
Period 3 ................................................................. Monday, September 8-Saturday, October 18, 1986
Period 4 ................................................................. Monday, October 20-Saturday, November 29, 1986
Veterans' Day (holiday) ..................................................... Tuesday, November 11, 1986
Thanksgiving Day (holiday) ................................................ Thursday, November 27, 1986
Period 5 ................................................................. Monday, December 1, 1986-Saturday, January 24, 1987
Winter Break ............................................................... Saturday, December 20, 1986-Sunday, January 4, 1987
Last Day of Registration .................................................... Thursday, January 22, 1987
Period 6 ................................................................. Monday, January 26-Saturday, March 7, 1987
Rodeo Day (holiday) ........................................................ Thursday, February 26, 1987
Spring Recess ............................................................... Saturday, March 7-Sunday, March 22, 1987
Period 7 ................................................................. Monday, March 23-Saturday, May 2, 1987
Period 8 ................................................................. Monday, May 4-Saturday, June 13, 1987
Memorial Day (holiday) ....................................................... Monday, May 25, 1987

Year IV*

Classes Begin ................................................................. Monday, June 16, 1986
Independence Day (holiday) .................................................. Friday, July 4, 1986
Labor Day (holiday) .......................................................... Monday, September 1, 1986
Last Day of Registration .................................................. Tuesday, September 2, 1986
NBME, Part II ............................................................... Tuesday, September 23-Wednesday, September 24, 1986
Veterans' Day (holiday) ..................................................... Tuesday, November 11, 1986
Thanksgiving (holiday) ....................................................... Thursday, November 27, 1986
Winter Break ............................................................... Saturday, December 20, 1986-Sunday, January 4, 1987
Last Day of Registration .................................................... Thursday, January 22, 1987
Rodeo Day (holiday) ........................................................ Thursday, February 26, 1987
NBME, Part II (repeat) ...................................................... Tuesday, April 7-Wednesday, April 8, 1987
Convocation ................................................................. Friday, May 15, 1987
Graduation ................................................................. Saturday, May 16, 1987
Elective Periods ........................................................... See Electives Manual

*Year IV Students do not have Spring Break. They may, however, schedule vacations as explained in the text of the Electives Manual, available in Office of Student Records.
MEDICAL SCHOOL ACADEMIC CALENDAR 1987-1988
(TENTATIVE)

Year I

Orientation .................................................. Wednesday, July 29-Friday, July 31, 1987
Classes Begin ............................................... Monday, August 3, 1987
Labor Day (holiday) ....................................... Monday, September 7, 1987
Last Day of Registration .............................. Monday, August 31, 1987
Fall Recess ............................................. Thursday, September 24-Sunday, September 27, 1987
Veterans' Day (holiday) ............................. Wednesday, November 11, 1987
Thanksgiving (holiday) ........................... Thursday, November 26-Sunday, November 29, 1987
Winter Break ........................................ Wednesday, December 23, 1987-Sunday, January 3, 1988
Classes Resume ........................................... Monday, January 4, 1988
Last Day of Registration ......................... Thursday, January 21, 1988
Rodeo Day (holiday) ................................. Thursday, February 25, 1988
Spring Recess ........................................ Saturday, March 12-Sunday, March 20, 1988
Memorial Day (holiday) ......................... Monday, May 30, 1988
End of Year I ........................................... Wednesday, June 1, 1988
Summer Vacation ..................................... Thursday, June 2-Sunday, July 31, 1988

Year II

Classes Begin ........................................ Monday, August 3, 1987
Labor Day (holiday) ................................. Monday, September 7, 1987
Last Day of Registration .............................. Monday, August 31, 1987
Fall Recess ........................................ Saturday, September 19-Sunday, September 27, 1987
Veterans' Day (holiday) .......................... Wednesday, November 11, 1987
Thanksgiving (holiday) ........................... Thursday, November 26-Sunday, November 29, 1987
Winter Break ........................................ Saturday, December 19, 1987-Sunday, January 3, 1988
Classes Resume ........................................... Monday, January 4, 1988
Last Day of Registration ......................... Thursday, January 21, 1988
Rodeo Day (holiday) ................................. Thursday, February 25, 1988
Spring Recess ........................................ Saturday, March 12-Sunday, March 20, 1988
End of Basic Science Classes .................. Friday, May 6, 1988
NBME Board Study .................................. Saturday, May 7-Monday, June 13, 1988
NBME Part I ........................................... Tuesday, June 14-Wednesday, June 15, 1988
Summer Vacation ..................................... Thursday, June 16-Sunday, June 19, 1988
MEDICAL SCHOOL ACADEMIC CALENDAR 1987-1988
(TENTATIVE)

Year III

Classes Begin ................................................................. Monday, June 22, 1987
Period 1 ................................................................. Monday, June 15-Saturday, July 25, 1987
Independence Day (holiday) ........................................ Thursday, July 3, 1987
Labor Day (holiday) ....................................................... Monday, September 7, 1987
Last Day of Registration ........................................ Monday, August 31, 1987
Period 2 ................................................................. Monday, July 27-Saturday, September 5, 1987
NBME, Part I (repeat) ..................................................... Wednesday, September 9-Thursday, September 10, 1987
Period 3 ................................................................. Monday, September 7-Saturday, October 17, 1987
Period 4 ................................................................. Monday, October 19-Saturday, November 28, 1987
Veterans' Day (holiday) ........................................ Wednesday, November 11, 1987
Thursday, November 26, 1987
Period 5 ................................................................. Monday, November 30, 1987-Thursday, January 29, 1988
Winter Break ................................................................. Tuesday, December 19-January 10, 1988
Last Day of Registration ........................................ Thursday, January 21, 1988
Period 6 ................................................................. Monday, February 1-March 12, 1988
Rodeo Day (holiday) ...................................................... Thursday, February 25, 1988
Spring Recess ............................................................... Saturday, March 12-Sunday, March 27, 1988
Period 7 ................................................................. Monday, March 28-Saturday, May 7, 1988
Period 8 ................................................................. Monday, May 9-Saturday, June 18, 1988
Memorial Day (holiday) .................................................. Monday, May 30, 1988

Year IV*

Classes Begin ................................................................. Monday, June 22, 1987
Independence Day (holiday) ........................................ Thursday, July 3, 1987
Labor Day (holiday) ....................................................... Monday, September 7, 1987
Last Day of Registration ........................................ Monday, August 31, 1987
NBME, Part II ............................................................... Tuesday, September 29-Wednesday, September 30, 1987
Veterans' Day (holiday) ........................................ Wednesday, November 11, 1987
Thanksgiving (holiday) ................................................ Thursday, November 26, 1987
Winter Break ................................................................. Tuesday, December 19-January 10, 1988
Last Day of Registration ........................................ Thursday, January 21, 1988
Rodeo Day (holiday) ...................................................... Thursday, February 25, 1988
NBME, Part II (repeat) ................................................... Tuesday, April 12-Wednesday, April 13, 1988
Convocation ............................................................... Friday, May 13, 1988
Graduation ................................................................. Saturday, May 14, 1988

Elective Periods ............................................................. See Electives Manual

*Year IV Students do not have Spring Break. They may, however, schedule vacations as explained in the text of the Electives Manual, available in Office of Student Records.
The University of Arizona is one of three publicly-supported institutions of higher learning in Arizona under the jurisdiction of the Arizona Board of Regents. It was established in 1885 as a land grant institution 27 years before Arizona was admitted to the Union as the 48th state. During its colorful history it has developed into one of the great universities of the southwestern United States with 10 colleges, four faculties, six schools, 119 academic subdivisions and departments, and 39 divisions of research and special service.

Commensurate with the rapid growth of the state during the past two decades, the University has grown to its present enrollment of over 30,374 students, 7,263 of whom are enrolled in graduate studies. The bachelor’s degree is offered in 139 programs, the master’s degree in 156, and the doctorate in 92, plus other degrees available in nine fields. The University offers nearly 400 fields of study. Its more than 200,000 active alumni are represented in every community in Arizona, all of the United States, and in many foreign countries.

The University is located about one mile from the downtown area in Tucson, the center of a rapidly growing metropolitan area with a population of more than 650,000.
THE COLLEGE OF MEDICINE

In 1962, the Arizona Board of Regents granted authorization to the University of Arizona to develop a College of Medicine. Ground was broken in May 1966 for the Basic Sciences Building which was completed in September 1967 and occupied that same month by the 32 students of the first class.

A second class of 32 students entered the College in the fall of 1968, and the first full class of 64 students was enrolled in September 1969. In May 1971, the M.D. degree was granted to the members of the first graduating class and to date more than 1,000 students have been graduated. Since 1976 the size of the entering class has been 88 students. The College of Medicine presently has an enrollment of more than 350 full-time medical students.

Through the sale of self-liquidating bonds and additional matching funds from the United States Public Health Services, planning was completed for the Clinical Science Building and 275-bed University Hospital (now called University Medical Center). Construction was begun in the summer of 1968 and completed in July 1971.

Physical Facilities

The University of Arizona Health Sciences Center complex consists of four interconnected buildings, situated on a 30-acre site just north of the main campus of the University. These include the Basic Sciences Building, Clinical Sciences Building, Outpatient Clinic and University Medical Center. In close proximity are the College of Nursing and the College of Pharmacy, located just south of the Basic Sciences Building.

A student wing of the Basic Sciences Building houses the multidisciplinary laboratories, lecture rooms, student lounge, and support facilities. Centralized animal quarters, administrative services, and part or all of the seven basic science departments (Anatomy, Biochemistry, Microbiology and Immunology, Molecular and Cellular Biology, Pathology, Pharmacology, and Physiology) are also housed in this building.
Library

The Health Sciences Center Library was one of the earliest units planned for the Center, and opened its doors in September 1967, when the first College of Medicine class began studies. Occupying 32,000 square feet of space, the library currently houses approximately 145,000 bound volumes, 3,200 media titles, and subscribes to 3,500 journals.

As part of the nationwide medical library network sponsored by the National Library of Medicine, the Health Sciences Center Library is the subregional library serving Arizona for the Pacific Southwest Regional Medical Library Service. Its resources are available not only to students and faculty of the University, but also to all health care providers throughout
Arizona. Experienced reference librarians are on duty weekdays and Saturdays to assist patrons in the use of the collection and to explain all of the services offered by the library.

Special services and features of the library include: (1) Computer-based on-line information retrieval services in medicine and the health-related sciences. (2) A computer-based on-line cataloging system accessing catalog records from a central data base. (3) A computer-based on-line circulation system. (4) A media department including over 3,000 titles (audiotapes, videotapes, slide/sound programs, and models), one large viewing room, models room, and eight study carrels especially equipped to accommodate all media formats. (5) A Field Librarian providing reference services and consultation services to health workers and health sciences libraries throughout Arizona. (6) A Microcomputer Learning Center housing seven microcomputers for the support of student instruction in the College of Medicine. All training programs are coordinated by the Office of Medical Education. (7) Twenty-four hour access, except for two holidays each year, Christmas Day and New Year's Day.

The Health Sciences Center Library offers special orientation classes in medical bibliography and information retrieval. These are included in the College of Medicine curriculum as part of introductory course work. Individual assistance and group instruction are also offered.

Clinical Facilities

University Medical Center is the primary hospital for the education of medical students, but clinical education also takes place in a variety of other settings. University Medical Center (UMC) is a private, non-profit hospital with a Board of Directors separate from, but appointed by the Board of Regents. There is an agreement between the Board of Regents and UMC that the educational and research functions must be preserved. This management arrangement reflects the changes in medical and hospital practice which are necessary to meet the challenges of modern medical financing and practice.

UMC is a 275-bed hospital, with extensive out-patient and ancillary service facilities located within the complex. A newly constructed Cancer Center is in place and plans are underway to add a lithotriptor facility for sonic destruction of renal stones, a magnetic resonance capability, and other modern diagnostic and therapeutic units. This up-to-date hospital complex subserves the educational, patient care and clinical research needs, and activities of a productive faculty and student body.

Additional educational programs are conducted in part, or wholly, at other health care facilities including: The Tucson Veterans Administration Medical Center, Tucson Medical Center, Kino Community Hospital, Palo Verde Hospital, the Crippled Children's Clinic, El Rio - Santa Cruz Neighborhood Health Center, and a variety of other Tucson locations. In Phoenix, the Maricopa Medical Center, Phoenix Children's Hospital, Good Samaritan Medical Center, St. Joseph's Hospital, Phoenix Veterans Administration Medical Center, and the Barrows' Neurologic Institute are just a few of the facilities in which portions of our clinical educational, clinical research and basic research programs are conducted. Faculty of the College conduct and supervise the educational activities at all of these sites.

Educational Program and Philosophy

The curriculum of the College of Medicine is determined by the faculty with consideration given to student evaluations, national needs and priorities, and internal evaluations conducted at regular intervals. It is not a static program but is altered, as is appropriate, after adequate study and reflection, to match the changing and educational needs of students. The overall purpose of the educational program is to provide our students with the capacity to learn medicine for the rest of their professional careers. This is accomplished by supplying them the opportunity to learn what is currently known and unknown; with study habits which permit continuous acquisition of new knowledge and modification of formerly acquired information; with skills to conduct patient care activities and with professional at-
udes consonant with their charge to care for those persons for whom they provide preventive and curative advice and treatment.

Biologic, cultural, psychosocial, economic, and sociologic concepts and data are provided in the core curriculum. Students are encouraged to add to this core by their continuous clinical experiences. Increasing emphasis is placed on problem-solving ability, beginning with initial instruction and carried through to graduation. Excellence in performance is encouraged and facilitated. Awareness of the milieu in which medicine is practiced is also encouraged. The core curriculum comprises three years of required studies and one year of elective rotations. Half of the curriculum deals with the basic sciences critical to modern medical understanding and practice, and the other half to practical, patient-contact, clinical instruction.

The learning environment encompasses lectures, small group instruction, independent study, clinical clerkships, practicums in physical diagnosis, computer-based instruction and variety of other modes for the learner. Students learn in the classroom, conference room, laboratory, clinic and physician's office, bed units of hospitals, special sites for diagnostic and therapeutic maneuvers, University Medical Center and a rich variety of community inpatient and outpatient settings. The elective portion of the curriculum permits experiences within and beyond the above described educational system, to include programs abroad as well as those closer to home. Students are encouraged to learn from individual patient contacts, from family settings, from groups as small as neighborhoods to communities as large as the state of Arizona. Exposure is available to individual physicians in a one-to-one relationship, to groups of physicians, to large health maintenance organizations, to public health facilities and other governmental health care systems.

Full-time faculty, primary and specialty care physicians and scientists, community physicians, and resident physicians in a variety of health care delivery models comprise the faculty which facilitates student learning. The concept of the physician as an integral part of a complex health care delivery team is emphasized in these clinical exposures.

Upon completion of the first four years of study, the graduate of our system is prepared to enter the next phase of medical education, the residency of their choice. Graduate medical education (residency training) is available in University of Arizona based programs in all of the traditional disciplines from primary care to the specialties. The faculty assists the
students in applying for and successfully competing for residency programs in Arizona and throughout the United States. Our graduates have been praised by programs throughout the country for their preparation and professional attitudes. A number of graduates have become local practitioners in the State of Arizona and others have joined the faculty at the University of Arizona College of Medicine and other medical colleges.

Our graduates are also prepared to continue the process of life-long learning, having achieved a framework of knowledge and the tools to adapt that knowledge to practice, and to add to and modify it as the dynamic discipline of medicine adds to its core of concepts and information. Continuing educational programs are provided at the College and many of our alumni return to continue this process of education throughout their professional careers.

The Curriculum

ORIENTATION:

Orientation to the medical school is provided to each incoming class during several days prior to the start of the initial semester. Students are introduced to the educational philosophy of the College, to the curricular elements, to methods for achieving optimal learning, to basic computer skills and to interpersonal relationships and self-management skills. The advisory system, financial aid, student governance and other topics are also introduced at this orientation.

BASIC SCIENCES:

During the first year, anatomy, biochemistry, physiology and neurosciences are taught in tandem with a course designed to introduce the student to clinical skills, Preparation for Clinical Medicine. To ensure that global and humanistic concerns are integrated into the phase in which biologic knowledge is being learned, the course on Human Behavior and Development begins in the spring semester and introduces a wide variety of broad topics that influence medical care and its delivery.
In the second year, the basic sciences of pathology, microbiology and pharmacology are introduced and more sophisticated experiences are provided in the Preparation for Clinical Medicine Course.

This sequence in the first two years ensures that the biologic framework of the human body is grasped by the student and that this knowledge is placed into the whole of human medicine. The student learns the structure and function of the cells, tissues and organs in health and in disease, the influence that the environment has on the human organism, and the effect of medication and drugs. At the same time, the psychosocial influences are incorporated into this framework and the student begins the process of acquiring those skills and attitudes essential to the practice of medicine.

In addition to the required curricular elements, a wide variety of Enrichment Electives are offered each year. These electives are designed to augment student experiences. A list of such Enrichment Electives is published and distributed each year.

CLINICAL SCIENCES:

The third year of our curriculum is devoted to clinical clerkships, during which the student learns, under faculty supervision, by daily patient contact in the various disciplines of medicine. There are 48 weeks of required rotations as follows: Internal Medicine (12 weeks); Pediatrics (6 weeks); Obstetrics and Gynecology (6 weeks); Psychiatry (6 weeks); Family Medicine (6 weeks); General Surgery (6 weeks); Specialty Surgery (3 weeks); Neurology (3 weeks). The Specialty Surgery (3 weeks) may be taken in the fourth year, in which case the student can select an additional rotation of 3 weeks in length. For students who select the specialty Surgery (3 weeks) rotation in the third year, at least 33 weeks of electives are required in the fourth year. For students taking the Specialty Surgery (3 weeks) in the fourth year, 30 weeks of electives are required in the fourth year.

The fourth year curriculum is comprised solely of elective rotations. This year is planned in concert with a faculty advisor taking into account the student's career goals, educational needs and preferences. Clinical and non-clinical electives are available in a wide variety of disciplines; available electives are published and distributed to students each year. Upon approval of the faculty advisor and the corresponding department at the College of Medicine, students can take up to 15 weeks of electives in approved programs outside of the college of Medicine.

As indicated earlier, facilities other than University Medical Center (UMC) are used in the educational programs. Students can expect that at least a portion of the required curriculum in the clinical years may take place outside of UMC, including sites outside of Tucson.

See pages 16-17 for the Outline of the Curriculum.

CURRICULUM POLICIES:

University policy expects students to be regular and punctual in class attendance and authors that students themselves are primarily responsible for attendance. Each instructor will provide students with a written statement of his or her policy in respect to absences.

Students wishing to petition for exemption from basic science courses may do so by writing requests to the departments. Such requests will be considered on an individual basis according to departmental policies and will be granted only in exceptional cases. Students in the basic science portion of the curriculum may enroll in various elective courses which they meet the prerequisites and as they have available time. These electives may be used to fulfill clinical science or elective year requirements with prior permission of the Curriculum Committee.

As part of their education, all students will be required to participate in laboratory experiments in which experimental animals will be used.

OFFICE OF MEDICAL EDUCATION:

The Office of Medical Education assists the faculty in all aspects of the medical education process. The range of educational assistance includes: course development; teaching ef-
fectiveness documentation; faculty teaching improvement; test development and scoring medical education research; ongoing assessment of the college curriculum and its impact on students. The members of the Office contribute to the Curriculum Committee, curriculum subcommittees, and administrative educational committees.

**Student Research Opportunities**

Students are encouraged to participate in research activities. Under a five-year grant from the National Institutes of Health, research experiences with stipends will be offered to qualified medical students. In addition, extracurricular experiences (i.e., course in research methodology, clinical research correlation seminars, a student research club and a research mentor-career advisor system) will be offered to such students. Student research is also funded through the Dean’s Office in the form of summer stipends, supply monies and travel support to encourage students to present their results at scientific meetings.

**Graduate Education**

**Basic Sciences**

A formal program leading to the granting of the combined M.D./Ph.D. degrees is available. Students wishing to pursue studies leading to the combined degrees must first be admitted to the College of Medicine. They may then apply for acceptance into the following degree programs leading to the Ph.D.: Anatomy, Biochemistry, Microbiology and Immunology, Molecular and Cellular Biology, Pharmacology and Physiology. Both degrees are awarded concurrently. Ph.D. degrees in other disciplines may be arranged on an individual basis. Certain courses taken in the regular medical curriculum are applicable to the Ph.D. program requirements. The combined degree program usually requires a 6-7 year period for completion.

**Residency Training**

Specialty training in the clinical disciplines is provided by Anesthesiology, Dermatology, Emergency Medicine, Family Practice, General Surgery, Internal Medicine, Neurology, Nuclear Medicine, Obstetrics and Gynecology, Occupational Medicine, Orthopedics, Otolaryngology, Pathology, Pediatrics, Preventive Medicine, Psychiatry, Radiology Diagnostic, Radiology Therapeutic, Radiology with Special Competence in Nuclear Radiology, Thoracic Surgery, Urology and Vascular Surgery. Further information concerning these programs may be obtained by contacting the program director in each instance.

**Postgraduate Education**

The Office of Continuing Medical Education and Outreach serves as a central resource for the coordination, integration and facilitation of continuing medical education and outreach for the faculty and the physicians of Arizona. The goals and objectives of the office include the initiation of effective continuing medical education programs appropriate to the needs of Arizona physicians. Furthermore, the office strives to make these programs available to physicians regardless of the location of their practice. The office is responsible for the development and coordination of programs for practicing physicians and, in so doing, reinforces the concept of medical education as being one of lifelong learning. The office provides programs in continuing medical education that identify and utilize areas of excellence within the University of Arizona College of Medicine, thereby benefiting not only physicians within the state of Arizona, but also physicians, teachers, and researchers at a national and international level.

One such program is the Mini-Residency. In this program the physician leaves his practice and returns to the academic environment for an individually tailored schedule which
utilizes ongoing conferences, rounds, undergraduate and graduate teaching programs, audiovisual and self-instruction programs and a full spectrum of ongoing education programs at the College of Medicine.

For information on specific programs, please contact the Office of Continuing Medical Education and Outreach, University of Arizona College of Medicine, Tucson, Arizona, 85724, Telephone: (602) 626-6173.
CURRICULUM OUTLINE
Basic Sciences

<table>
<thead>
<tr>
<th>YEAR I</th>
<th>YEAR II</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall Semester</strong></td>
<td><strong>Fall Semester</strong></td>
</tr>
<tr>
<td>GROSS ANATOMY</td>
<td>PATHOLOGY</td>
</tr>
<tr>
<td>180 hours</td>
<td>152 hours</td>
</tr>
<tr>
<td><strong>Spring Semester</strong></td>
<td><strong>Spring Semester</strong></td>
</tr>
<tr>
<td>NEUROSCIENCES</td>
<td>PATHOLOGY</td>
</tr>
<tr>
<td>102 hours</td>
<td>157 hours</td>
</tr>
</tbody>
</table>

| **Fall Semester** | **Fall Semester** |
| BIOCHEMISTRY | PHYSIOLOGY |
| 96 hours | 227 hours |
| or INTERMEDIATE BIOCHEMISTRY | |
| 88 hours | |

| **PREPARATION FOR CLINICAL MEDICINE** | **PCM** |
| 55 hours | 101.5 hours plus three field trips |

| **Fall Semester** | **Spring Semester** |
| MICROANATOMY | HUMAN BEHAVIOR AND DEVELOPMENT |
| 83 hours | 80 hours |

| **Fall Semester** | **Spring Recess** |
| PHARMACOLOGY | MICROBIOLOGY |
| 100 hours | 123 hours |

| **Fall Semester** | **Spring Recess** |
| PCM | PCM |
| 106 hours | 110.5 hours (course) |

| **Fall Recess** | **Spring Recess** |
| Orientation | Christmas/New Year's Recess |
| Christmas/New Year's Recess | Two-Month Vacation |
| Two-Month Vacation | Christmas/New Year's Recess |
| Christmas/New Year's Recess | Practica |

● Important events
○ Breaks
## CURRICULUM OUTLINE
### Clinical Sciences

### Year III

<table>
<thead>
<tr>
<th>Summer</th>
<th>Summer</th>
</tr>
</thead>
</table>

#### Clerkships

- **48 weeks required**

#### Internal Medicine

- 12 weeks required

#### General Surgery

- 6 weeks required

#### Specialty Surgery*

- *In Year III or Year IV

#### Pediatrics

- 6 weeks required

#### Obstetrics/Gynecology

- 6 weeks required

#### Family Medicine

- 6 weeks required

#### Psychiatry

- 6 weeks required

#### Neurology

- 3 weeks required

### Year IV

<table>
<thead>
<tr>
<th>Summer</th>
<th>Late Spring</th>
</tr>
</thead>
</table>

#### Electives

- **33 weeks required**

#### Department Offerings

- **ANATOMY**: 5
- **ANESTHESIOLOGY**: 5
- **BIOCHEMISTRY**: 2
- **FAMILY & COMMUNITY MEDICINE**: 27
- **INTERNAL MEDICINE**: 41
- **MICROBIOLOGY**: 2
- **NEUROLOGY**: 6
- **OBSTETRICS/GYNECOLOGY**: 5
- **OPHTHALMOLOGY**: 3
- **PATHOLOGY**: 4
- **PEDIATRICS**: 24
- **PHARMACOLOGY**: 3
- **PHYSIOLOGY**: 2
- **PSYCHIATRY**: 6
- **RADIOLOGY**: 4
- **SURGERY**: 25

#### Seminars

- 10

(See Electives Manual for course details)

Twelve weeks of unscheduled time during the two Clinical Sciences years are available for vacations and interviews.
ADMISSIONS

Admission to the First-Year Class

GENERAL: The University of Arizona College of Medicine follows the recommended application and acceptance procedures of the Association of American Medical Colleges (AAMC). These may be found in the most recent copy of the Medical School Admission Requirements book, published annually by the AAMC. Everyone interested in attending medical school should consult this book, as it contains a great deal of useful information. The most recent copy may be obtained for $8.50 by writing to the AAMC (address on page 25).

Acceptance to the University of Arizona College of Medicine is based upon an assessment of the applicant's intellectual and personal traits, fulfillment of certain prerequisite outlined below, and consideration of the applicant's state of residence. All applicants who wish to be considered must be U.S. citizens or have permanent resident visas. Preference is given first to residents of Arizona and next to a few highly qualified applicants who are residents of Alaska, Montana and Wyoming, and are certified and will receive full an uninterrupted funding by the Western Interstate Commission for Higher Education (WICHE). Applicants from states other than these cannot be considered. In evaluating applicants, the Admissions Committee considers ability and scholarship as indicated by the entire academic record, the results of the Medical College Admission Test (MCAT), personal statement, college preprofessional committee evaluations (or letters of recommendation), and personal interviews. Also considered is breadth of the undergraduate education, whether in the humanities, social sciences, natural sciences, etc. No preference is given to any particular kind of undergraduate major. (See below under Admission Process.)

PREREQUISITES: The College of Medicine encourages applications from all interested students irrespective of their college major. However, each applicant must meet the following minimum requirements prior to matriculation:

1. Successful completion of three full years of study at an accredited college or university, including 30 semester hours (45 quarter hours) of upper division courses. This is considered equivalent to 90 semester hours or 135 quarter hours.
2. Successful completion of two full semesters (or three quarters), or equivalent, in each of the following areas: general chemistry, organic chemistry, physics, general biology or zoology, and English.
3. Provide MCAT scores from Series 15, given in April 1984, or completion of the MCAT within two years of application. Note that the University of Arizona College of Medicine is a participant in the MCAT Essay Pilot Project and will use the MCAT essays in making decisions about applicants (see Admission Process).

APPLICATION PROCEDURE: The University of Arizona College of Medicine participates in the American Medical College Application Service (AMCAS). Persons seeking admission to the entering class must process their applications through AMCAS, even if this is the only school to which they apply. Those wishing to make application for the class entering in 1987 should follow the steps outlined on the following page:
Arrange to take the Medical College Admission Test (MCAT), preferably in the Spring prior to application, by writing to the American College Testing Program (address on page 25).

WEEN JUNE 1 AND NOVEMBER 1, 1986

Obtain an AMCAS application packet. An application may be obtained either by using an AMCAS Application Request Card, available from any participating medical school or the AMCAS application packet itself which is available from most preprofessional advisors.

Complete and return the AMCAS application. Follow instructions in the application packet and return the completed application to the AMCAS office. (Please do not send this material to the medical school.) You must request that the registrar of every junior college, college and university you have attended forward official transcripts directly to the AMCAS office by November 1st. *All transcripts should arrive before* your application reaches the AMCAS office to eliminate any delay in processing your materials. In your instructions to AMCAS, you designate the medical schools to which you wish to apply and pay a fee based on the number of those schools. Even if you have previously applied to this school, or any other school under AMCAS, you must submit an entirely new application and transcripts each year.

Return AMCAS application by November 1, 1986. The deadline for your application to the University of Arizona College of Medicine is November 1, 1986. Your AMCAS application and all transcripts must be received in Washington by this date. Please allow sufficient time for mail delivery since applications received in Washington after this date cannot be considered by this college.

Await notification of receipt of application. You will receive notice first from AMCAS and later from this college that your application has been received. The AMCAS application constitutes the preliminary application to this College of Medicine.

Initial screening of applications. After an initial screening to determine your state residency, you will be notified as to the disposition of your preliminary application. Those who will not be considered further are notified as soon as possible so they may concentrate their efforts on other schools.

Receipt of supplementary materials. Those who pass the initial screening process will receive a packet of supplementary materials that are specific to the University of Arizona College of Medicine. Instructions are provided with the packet, and all materials should be returned directly to the Admissions Office, College of Medicine, University of Arizona, Tucson, Arizona, 85724. (Please do not send any of this material to AMCAS.)

Invitation to appear for personal interview. All applicants receiving supplementary materials will be invited to appear for a personal interview at the College of Medicine. All appointments are made by the Admissions Office. Since the personal interview is an integral part of the admission process, no applicant can be considered without it. At the time of the interview, you will have an opportunity to meet with a medical student and tour the Health Sciences Center. Interviews take place between October and January. Interviews are conducted over the Christmas holiday period primarily for those applicants attending schools outside Arizona. However, where travel to Tucson would result in an undue financial burden, it may be possible to arrange for interview summaries to be sent from other schools where the applicant has been interviewed. Such requests may be made at the time you are invited for your interview.

Notification that file is complete. After all your materials have been received and you have had your interview, you will be notified that your application is complete. The Admissions Office will periodically review all files and notify you if any materials are still missing. However, we strongly recommend that you complete your file prior to December 31, 1986, since notification of Admissions Committee actions take place between January and March of 1987.
10. Notification of action by the Admissions Committee. In early December 1986, the Admissions Committee will begin to take action on all applicants whose files are complete. Letters of acceptance will be sent on January 15, February 15 and March 15, 1987 (or the first working day thereafter). Notification of rejection or alternate status will be sent out on March 15, 1987.

11. Accepted applicants must submit a letter of intent within two weeks, to retain their place in the class. No deposit is required. Accepted students are encouraged to withdraw their application from medical schools of lower preference. Many well-qualified students are Alternates each year. It is the obligation of each accepted applicant to withdraw upon making a decision to go elsewhere, in order to give those not yet selected the opportunity to compete for a vacancy in the class.

AFTER MARCH 15, 1987

12. An applicant holding a position on the Alternate List may receive an acceptance at any time, if a place becomes available.

13. Final acceptance for enrollment for all accepted applicants is contingent upon a continued satisfactory level of academic and personal performance, completion of required course work prior to July 15, 1987, and all other requirements. Certified WICHE acceptees (Alaska, Montana, and Wyoming) must provide evidence of full and uninterrupted funding from their state of origin. Failure to meet these conditions will be cause for withdrawal of the acceptance.

14. Any student accepted for enrollment who wishes to be exempted from any medical school course may petition the appropriate department to be relieved of the necessity of taking the department’s formal course. The decision rests with the individual department and is based on the merits of each request.

Admission Process

Applicants apply directly to the American Medical College Application Service (AMCAS). The application will be reproduced and sent to all the schools to which the applicant wishes to apply. When AMCAS applications are received at the College of Medicine, they undergo an initial screening. All Arizona residents are sent additional materials and invited for personal interviews. A few highly qualified WICHE certified and funded applicants from Alaska, Montana and Wyoming, who have passed the initial screening, are sent additional materials and invited for a personal interview. All applicants who are residents of any other state are automatically sent a letter informing them they are not eligible. The deadline for applications is November 1, 1986.

The Admissions Committee uses five major criteria in the selection of students: academic record, Medical College Admission Test (MCAT) scores, personal statement, college preprofessional committee evaluations (or letters of recommendation), and results of personal interviews. Consideration of the academic record includes not only grades, but trends in the grade point average, course loads, work experience while going to school, breadth of the undergraduate education, extent of extracurricular interests and pursuits, and other factors which might directly or indirectly influence the individual’s total academic performance. The MCAT scores provide a national comparison of each student with all those seeking admission to medical school. As part of the MCAT Essay Pilot Project, the Admissions Committee will include the MCAT essays in their selection decisions. Applicants are asked to have letters of recommendation submitted from either a Preprofessional Committee at their university or from three individual faculty members. Use of the Committee at your school is very strongly recommended. If individual letters are submitted, they should be from two science faculty members and one nonscience faculty member. All must be from professors under whom you have taken courses. Each applicant will be inter-
viewed by three College of Medicine faculty members and one practicing physician. The interviews are on a one-to-one basis. The interviewers are asked to evaluate the applicant's ability to relate to another individual in the interview situation and to ascertain, from the interview, their impression of the applicant's overall desirability as a future physician. The interviewers also attempt to gain some insight into the applicant's family background, outside interests, and the duration and depth of interest in medicine. The interviewers have no prior information about the applicant. They forward their impressions to the Admissions Committee, which has access to all other data.

The Admissions Committee reviews all completed applications. All facets of the record are considered. The amount of consideration given to the academic record, MCAT scores, MCAT essay, personal statement, preprofessional evaluation (or letters of recommendation), and results of the personal interviews, depends on each individual on the Committee. At Admissions Committee meetings, each applicant's file is reviewed and discussed by the members of the Committee. The vote of the Committee determines who is accepted. Acceptances are based on the evaluation by the members of the Admissions Committee regarding each applicant and the relationship of each applicant to every other applicant. In this way, an attempt is made to be as fair as possible to all persons applying to medical school by utilizing all the information available to the Committee.

The Committee selects sufficient applicants for acceptance to fill the class and a reasonable number to be placed on the Alternate List. All other applicants are notified that their applications are not competitive and, therefore, they are no longer under consideration.

Minority Applicants

The College of Medicine has an active program dedicated to the recruitment, admission, education, and graduation of an increased number of individuals from ethnic minority groups. Faculty members participate in all aspects of the program.
Rural Arizonans

Special consideration will be given to individuals who have lived half their lives in rural Arizona communities outside the state's major metropolitan areas and who desire to return to such an area to practice medicine. A form requesting this special consideration will be included with the supplementary materials.

Admission by Transfer

Applications for transfer to the College of Medicine are welcomed from students who satisfy the conditions outlined below. Applicants are treated as competitors for any available places. Positions become available only through attrition.

1. Applications will be considered from residents of the several states in the following order of preference:
   a) Arizona residents matriculated in foreign medical schools (WHO-listed) or two-year U.S. medical schools.
   b) Residents of Alaska, Montana and Wyoming (who are WICHE certified and will receive full and uninterrupted funding) matriculated in foreign medical schools (WHO-listed) or two-year U.S. medical schools.
   c) Arizona residents matriculated in four-year U.S. medical schools or U.S. schools of osteopathy.

2. Applicants must meet the following academic criteria:
   a) Successful completion of a minimum of three full years of premedical study (90 semester units or 135 quarter units) at an accredited college or university, with 30 units at the upper division level.
   b) Successful completion of two full semesters (or three quarters) in each of the following areas: general chemistry, organic chemistry, physics, general biology or zoology, and English.
   c) Must have taken the MCAT.
   d) Must have completed all of the basic sciences as a matriculant in a LCME accredited U.S. or Canadian, osteopathic, or WHO-listed foreign medical school and provide evidence (an official transcript is required) of having successfully completed a course of study which includes the content of the following courses: anatomy, biochemistry, microbiology, pathology, pharmacology, physiology, and behavioral sciences.

3. Where adequate training in history-taking and physical examination is not apparent from the applicant's record, at the discretion of the Admissions Committee, the applicant will be required to participate in an especially prepared course of study in these areas.

4. Applicants whose credentials indicate deficiencies in other areas of study covered during the basic science curriculum will be held responsible for this material through self-study and will be expected to perform at the same level as the students who have completed the first two years here at the University of Arizona College of Medicine.

5. All applicants matriculated in non-LCME accredited medical schools must take the Medical Sciences Knowledge Profile (MSKP) examination prior to being considered by the Admissions Committee. Please contact the AAMC for registration materials and deadlines (see page 25 for address). Applicants who are enrolled in LCME accredited medical schools must take Part I of the National Board Examination.

6. Applicants who are on an official leave of absence of not more than one year will be considered. A letter substantiating this leave must be submitted from the applicant's school of medicine.

7. All accepted transfers will be required to take Parts I and II of National Boards in order to graduate.

8. All applicants who meet the listed criteria and are under consideration will be interviewed at the College of Medicine.
9. All applicants must have official transcripts submitted from all undergraduate and graduate schools.

0. Applicants must have letters of recommendation sent directly to the Admissions Office from professors under whom they have taken courses, or from physicians under whom they have done clerkships or externships. A minimum of three letters is required. If you are attending a U.S. medical school, a letter from the Dean of the school is also required, stating that you are currently enrolled and a student in good standing.

1. Applicants are advised that, if accepted, they will enter into the third year of our program and will be required to complete all of the last two years of our curriculum.

2. Applicants must apply directly to this College of Medicine. Applications will be available after November 1st - deadline for receipt of application and domicile affidavit is March 31st.

**Participation in Supervised Clinical Experience (Fifth Pathway)**

Individuals who are presently and were Arizona residents at the time of their initial application to medical school and are currently attending a medical school located outside of the U.S., Puerto Rico and Canada are invited to apply for admission as participants in the Fifth Pathway Program at the College of Medicine. This program consists of 48 weeks of required clerkships which will include twelve weeks of Internal Medicine, nine weeks of Surgery and six weeks of each of the following: Pediatrics, Obstetrics-Gynecology, Psychiatry, Family Medicine; and three weeks of Neurology.

Successful completion of the program will be measured by the guidelines and evaluation procedures used for our students (see section on Student Progress). Participants successfully completing the program will receive a letter from the Dean of the College of Medicine recognizing this achievement.

Applicants for admission to this program must meet the following criteria:

1. Are currently, and were at the time of entrance into the foreign medical school, a resident of Arizona.
2. Have studied medicine at a medical school located outside the United States, Puerto Rico and Canada, which is listed by the World Health Organization. The medical school must require the student to complete an internship and/or social service before awarding the M.D. degree. If your school does not have this requirement, you are not eligible for the Fifth Pathway Program.

3. Have successfully completed all the formal requirements of the foreign medical school except the above mentioned internship and/or social service. An official transcript must be provided to indicate successful completion of those requirements.

4. Have successfully completed, in an accredited U.S. college or university, the minimum undergraduate premedical work of the quality required of all students entering the University of Arizona College of Medicine. These are:
   a) Successful completion of three full years of study at an accredited U.S. college or university, including 30 semester hours (45 quarter hours) which must be upper division. This is considered equivalent to 90 semester hours or 135 quarter hours.
   b) Successful completion of two full semesters (or three quarters) in each of the following areas: general chemistry, organic chemistry, physics, general biology or zoology, and English.
   c) Provide MCAT scores.

5. Have taken the Basic Medical Science and Clinical Science components of the examination given by the Educational Commission for Foreign Medical Graduates (FMGEMS) prior to admission (address listed below). Preference will be given to those who have achieved a passing score (75).

6. Be interviewed at the College of Medicine.

7. Although the MSKP examination is not required, the results may be taken into consideration by the Admissions Committee.

8. Provide letters of evaluation from all clinical experience during the last two years of medical school.

9. The application deadline for January participation is September 1st. The application deadline for June participation is February 1st.

Selected participants will begin the program as close to July 1, 1986 and January 1, 1987 as possible, but may start at other times under special arrangement.
List of Important Addresses

University of Arizona College of Medicine
Tucson, Arizona 85724
Admissions Office 626-6214 or 6215
Student Affairs 626-6216

Association of American Medical Colleges (AAMC)
Suite 200
One Dupont Circle, N.W.
Washington, D.C. 20036

American Medical College Application Service (AMCAS)
Association of American Medical Colleges
Division of Student Services
Suite 301
1776 Massachusetts Avenue, N.W.
Washington, D.C. 20036-1989

National Board of Medical Examiners (NBME)
3930 Chestnut Street
Philadelphia, Pennsylvania 19104

New Medical College Admission Test (MCAT)
c/o American College Testing Program
Box 414
Iowa City, Iowa 52243

Educational Commission for Foreign Medical Graduates (ECFMG)
3624 Market Street
Philadelphia, Pennsylvania 19104

Medical Sciences Knowledge Profile (MSKP)
Association of American Medical Colleges
Suite 301
1776 Massachusetts Avenue N.W.
Washington, D.C. 20036-1989
STUDENT AFFAIRS

Orientation

Orientation occurs on the three days prior to the start of classes. Its purpose is to acquaint the student with classmates, upperclassmen, members of the administration, faculty and staff. Activities will include registration and the procedural matters related to enrollment. Information and schedules of activities are sent to entering students during the preceding spring and summer.

Housing

Medical students must assume the responsibility for making their own living arrangements. However, assistance in finding accommodations in University housing is available from the Director of Residence Life. Rooms in the University residence halls are available through the Department of Residence Life for unmarried students on a space available basis, according to date of application.

Married students may apply for a unit at the University of Arizona's Family Housing Project. The project consists of 420 one-story apartments, either furnished or unfurnished, located in northeast Tucson about fifteen minutes' drive from the Health Sciences Center. Students may have their names placed on the waiting list immediately after being accepted by the College of Medicine. Further information concerning married student rental units may be obtained by contacting the Family Housing Office, University of Arizona, 3401 North Columbus Boulevard, Tucson, Arizona, 85712.

For additional information relevant to housing, consult the two daily Tucson newspapers and the daily student newspaper. The Associated Students' Office in the Student Union Memorial also maintains a list of available housing.
Student Health Service

All students matriculated in the College of Medicine are eligible for care at the University of Arizona Student Health Service. If an illness requires other than routine care, or the services of an outside physician or consultant (major injury, complicated medical illness, major fractures or extraordinary services), the cost of such services must be borne by the student. For this reason, some form of health insurance is strongly advised. Such supplemental insurance may be purchased at the time of registration. For a more complete description of the services available at the Student Health Center, the student is advised to consult the General Catalog of the University.

Students enrolled in the College of Medicine are required to submit proof of a tuberculosis skin test within six months of admission. Thereafter, repeat chest x-rays and skin tests will be done when deemed appropriate. Students must also submit proof of having had measles (rubeola) or been vaccinated against it. Hospital policy mandates immunity to rubella and students will be screened for serologically documented antibody titers. Those with no titer will receive live rubella virus vaccine irrespective of age. Certain types of vaccinations, such as Hepatitis B, will be available to students at cost. In all instances, these tests and vaccinations will be provided by the Student Health Service and their cost will be borne by each student involved.

The Code of Scholastic Conduct

Students who enter the College of Medicine find themselves in the company of scholars, each of whom is working to expand his or her own knowledge, to extend the boundaries of man's knowledge, and to apply knowledge in service to fellowman. The faculty and students of the College of Medicine require that a man or woman shall act honorably in all relations and phases of student life, and therefore, all work is conducted under an honor system. The essence of the system is that a student's word can be accepted without question to truth and any violation of a student's word is an offense against the entire student body. The fundamental demand that the honor system makes on the individual is that each resist less than honorable means to attain a desired end. The honor system is not an end itself but is a framework for behavior and a means of inculcating a spirit of integrity which could sustain the student throughout his or her lifetime.

All scholastic behavior in the College of Medicine is regulated by a Code of Scholastic Conduct. Each accepted student, before matriculating, is required to read and sign a statement that he/she will abide by the Code. The Code of Scholastic Conduct shall be read to entering students at Orientation.

Counseling and Advising

The Office of Student Affairs coordinates the advising and counseling functions for medical students. Students may request faculty advisors when they enter medical school and will have clinical advisors available to work with them throughout their medical school training. These advisors help students with academic decisions, provide guidance about professional behavior and career choices, and in general, help the student in the process of coming a physician. In addition to advisors, counseling about academic, personal and career problems is available to students through the Office of Student Affairs.

Student Representatives

Students may actively participate in the College of Medicine affairs in a number of important and constructive ways. On a formal level, each class elects two representatives who are members of the College of Medicine Student Council. All other elected student representatives to other committees are also members of this body. This group meets regularly with the Dean's staff to discuss issues of mutual concern. In addition, the Medical
Student Council supervises the selection of student representatives to various faculty-student committees. Examples of these are the Curriculum Committee, Student Progress Committee, Committee of Nine, Honors and Awards Committee, and various subcommittees of these. A number of departments actively seek student representation for various departmental decision-making and advisory groups.

The formal election of representatives in no way prevents a student from discussing with any member of the faculty or administration issues of concern to that student. All students are encouraged to participate in college affairs to the extent of their time, interest and inclination.
## FINANCIAL INFORMATION

### Expenses

In considering the cost of attending medical school, the student must take into account not only educational expenditures but also subsistence and personal obligations such as dependents. The basic yearly budget for a single student is approximately:

<table>
<thead>
<tr>
<th>4-year Curriculum</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tuition and fees</strong>*</td>
</tr>
<tr>
<td>Resident</td>
</tr>
<tr>
<td>$4,267</td>
</tr>
<tr>
<td>Books and Supplies</td>
</tr>
<tr>
<td>1,000</td>
</tr>
<tr>
<td>(microscopes provided)</td>
</tr>
<tr>
<td>Room and Board (estimated)</td>
</tr>
<tr>
<td>4,112</td>
</tr>
<tr>
<td>Miscellaneous</td>
</tr>
<tr>
<td>3,021</td>
</tr>
<tr>
<td>(including transportation, etc.)</td>
</tr>
<tr>
<td>Hepatitis Vaccine</td>
</tr>
<tr>
<td>140</td>
</tr>
<tr>
<td>Approximate total:</td>
</tr>
<tr>
<td>resident</td>
</tr>
<tr>
<td>12,540</td>
</tr>
</tbody>
</table>

*Subject to change

Clearance of Accounts - All candidates for the M.D., or M.D./Ph.D. degree are required to clear any indebtedness to the University before a certificate of completion of degree requirements or diploma will be released.

### Financial Assistance

The College of Medicine is fortunate in that many individuals and organizations have contributed scholarship and loan funds specifically designated for medical students. Among the many persons and organizations to whom we owe our sincere thanks are:

**SCHOLARSHIPS**

Robert F. Allen Memorial Award in Cancer  
John A. Noon and Helen Noon Anderson Memorial Scholarship  
Arizona Medical Association Scholarship Program  
Associates in Laboratory Medicine, P.C. Scholarship  
Dr. Henry G. Atha and Grace L. M. Atha Memorial Scholarship  
Berkley Scholarship  
Nelson C. Bledsoe Scholarship  
Earl Bluestein Scholarship Fund  
Louis Cobb Memorial Scholarship  
Coconino County Medical Society Scholarship
Joseph Collins Memorial Scholarship
Anne Babbitt Cordasco, M.D., Memorial Scholarship
Herman E. Demund Memorial Scholarship
Duncan Dietrich Medical Scholarship
E. Blois du Bois Foundation, Inc.
Eddie and Madelyn Earl Memorial Scholarship
Leon and Helen Feinberg Scholarship
Nicholas W. Genematas Foundation Scholarship
Greater Tucson Area Foundation Scholarship
Howard Melville Hanna Memorial Scholarship
The Haskell Book Scholarship
Dr. Cruz M. Hernandez Scholarship Fund
Benjamin S. and Estella C. Hill Foundation
Josephine Madara Memorial Scholarship
Dr. Ruth Mahnken Memorial Fund
Marshall Foundation for Arizona Women
George Martin Memorial Scholarship
Salvador Mazza Scholarship
Fred C. McCormick Scholarship
Medical Alumni Fund
Medical Student Relief Fund
Metzger Scholarship Fund
Elizabeth Lee Morton Memorial Scholarship
John A. Mulcahy Scholarship
National Hispanic Scholarship Fund
National Medical Fellowships, Inc.
Otitis Media Scholarship
Arthur J. Present Scholarship
Dr. George D. Reay Memorial Scholarship
Duncan Reid Memorial Scholarship
Francis A. Roy and Dorothy Roy Memorial Scholarship in Medicine
M.A. and Greta Schuele Scholarship
Delbert L. Secrist, Sr., Memorial Scholarship
Milton L. Shifman Scholarship
Bernice P. Simon Memorial Scholarship
Mary Woodman Smith Memorial Scholarship in Medicine
George F. Spaulding Scholarship
Special Assistance Fund-College of Medicine
Special Medical Student Scholarship for Minorities
Carla and Oliver Springer Scholarship Fund
William B. “Bill” and Dr. H. H. Varner Scholarship
Hans and Julia Voight Memorial Scholarship
Dr. Samuel Humes Watson Medical Scholarship
Clara Seippel Webster Memorial Scholarship
Alma L. Wilson Memorial Scholarship
Dr. Boris Zemsky Memorial Fund-Psychiatry

A number of other scholarships have been donated anonymously.

LOANS

Arizona Medical Association Auxiliary Loan Fund
State of Arizona Medical Student Loans
Josephine F. Bennett Foundation Loan Fund
College of Medicine Emergency Loan Fund
Dougherty Foundation, Inc.
Dr. Paul S. Gaddis Memorial Loan Fund
Health Professions Student Loan Fund
Elizabeth Banes Mann Loan Fund
Marshall Revolving Loan Fund
Charles W. Sechrist Emergency Loan Fund
University Medical Center Auxiliary Emergency Loan Fund
Joy Whitehead Memorial Fund

AWARDS

American Medical Women's Association Awards
Arizona Foundation Award
The Arizona Medical Association Prize
The Arizona Medical Association Travel Awards
Brayton Memorial Family Practice Award
Marshall Brucer Award in Radiation Medicine
Siba Award for Community Service
Probe Award in Family Practice
Robert Wood Johnson Health Policy Fellowships
The Roy Killingsworth Award for Psychiatry
The Alvin T. Kirkse Memorial Prize in Obstetrics
Mosby-Lange Book Awards
Bernard Revsin Memorial Scholarship Award
Jpjohn Award
Allocations of financial assistance are made solely on the basis of need and according to the availability of funds with the exception of several awards which are given for academic achievement. Only those students whose personal savings, earnings, and aid from family sources are inadequate to meet their needs can be considered for financial assistance. Such determinations are made only after an applicant has been accepted to the College of Medicine.

Generally, the resources of the College of Medicine are insufficient to meet the total needs of the students. Outside sources must then be employed. Additional loans are available to Arizona medical students through Guaranteed Student Loans, Health Education Assistance Loans, and Auxiliary Guaranteed Loans. The American Medical Student Association and the National Association of Residents and Interns offers loans to senior medical students. The Army, Navy and Air Force, as well as the Arizona Student Loan Board, offer financial assistance in return for service commitments. Applications may be obtained from the Student Financial Aid Office of the College of Medicine.

For emergency situations, special short-term loans can be obtained from the Student Financial Aid Office.
STUDENT PROGRESS

General

Student progress, in its broadest sense, includes not only the system used to evaluate academic performance, but also the guidelines for academic and nonacademic performance, the procedures used to monitor student progress, as well as the structure of the student counseling and advising systems. The faculty and administration of the College of Medicine continually review all aspects of student progress. From these reviews over the years, several basic features have become apparent. First, the grading and evaluation system must be fair and informative to both faculty and students and should minimize competition between students while encouraging the acquisition of skills and knowledge. Second, it is essential to identify, as early as possible, those students with potential academic or nonacademic problems and to provide appropriate constructive remedies. Third, mechanisms must be available to insure that only qualified candidates receive the M.D. degree. Finally, it is necessary to provide a fair and impartial method of appeal for those students against whom there is adverse action for academic or nonacademic reasons. Within this broad framework, information pertaining to each area is set forth below. This information represents a compilation from several source documents, which are on file and may be reviewed in the Dean's Office.

Evaluation System

The College of Medicine utilizes an Honors-Pass-Fail grading system augmented by narrative evaluations of student performance in each medical school course or clerkship. Specific grades that may be awarded include:

- **S** = Honors; High performance based on individual course standards
- **P** = Pass; Satisfactory completion of course
- **F** = Fail; Unsatisfactory completion of course
- **I** = Incomplete; Awarded at the end of a course when a small portion of a student's work is incomplete and when the student would be required to complete only that portion to earn a passing grade. This grade reverts to a Fail if not completed within one year.
- **W** = Approved withdrawal
- **K** = Course in progress

Prior to a specified time, which is approximately one-third of the way through each course, or ten days after the mid-term examination, a student will receive the grade of W, upon withdrawing from a course. After this time, however, the grade of W may be awarded only if the work is at a passing level; otherwise, the grade of F is recorded.

Any student whose performance is marginal or failing at any point during a course will be so notified in writing. The notification is intended to alert the student of potential problems and to encourage the use of tutorial or other appropriate assistance.

Written, narrative evaluations for each student are submitted to the Student Records Office at the conclusion of each course, along with the specific grade. These narrative valuations detail individual strengths and weaknesses of performance and are intended to provide feedback to the student, data for the Student Progress Committee and information...
for the Dean's letters of recommendation. All students may request to see their own evaluations by contacting the personnel in the Student Records Office. Any student with questions about an evaluation may contact the course coordinator directly or consult with the Associate Dean for Student Affairs.

Under this system, no attempt is made to determine specific class standing. However, the College of Medicine Honors and Awards Committee reviews all written evaluations in order to identify outstanding student performance. Students so selected may receive an award at graduation and/or may be elected to Alpha Omega Alpha, the medical honor society.

**Student Progress Guidelines**

The Student Progress Committee is given the responsibility to monitor and evaluate student performance and to make decisions appropriate to each individual case. This committee consists of eight elected faculty members and one student from each class. The Committee is charged with reviewing the record of each student at least once each year. The purpose of such a review is: First, to identify performance problems sufficiently early to recommend appropriate action for the prevention of future problems and; second, to recommend actions for those who fail a course (or courses).

The academic guidelines utilized by the Student Progress Committee include the following:

1. To be academically qualified for graduation, a student must pass all required course and the requisite number of elective courses, as well as take Part I and Part II of the National Board of Medical Examiners examination.
2. Continued enrollment in the College shall be contingent on satisfactory academic performance as defined below.
3. The Student Progress Committee shall order dismissal in any case where a student fails one course for a second time or where a student fails three (or more) courses in medical school. A failure will be counted as such even if the student has subsequently passed the course.
4. In cases where a student fails a course not requiring an order of dismissal, the Student Progress Committee may recommend whatever action is deemed appropriate to the particular situation, including dismissal, although the latter would occur only under exceptional circumstances.
5. Transfer students. In the case of students who transfer to the College of Medicine for the clinical sciences portion of the curriculum, the Student Progress Committee shall order dismissal in any case when a student fails one course for the second time or when a student fails two (or more) courses in medical school. (For purposes of this paragraph, a failure will be counted as such even if the student has subsequently passed the course. Failures incurred prior to transfer will not be considered. Other academic guidelines apply, unaltered, to transfer students.
6. Fifth Pathway participants. The Student Progress Committee shall order dismissal in any case when a participant fails one course for a second time or when a participant fails two (or more) courses in the curriculum. (For purposes of this paragraph, a failure will be counted as such even if the participant has subsequently passed the course.) Failure incurred prior to participation in the Fifth Pathway Program will not be considered. Other Student Progress Committee guidelines apply, unaltered, to Fifth Pathway participants.

There are certain time constraints on student progress, although these are intended to be sufficiently flexible to accommodate those students who choose to take advantage of educational experiences beyond the confines of the curriculum. These time constraints are as follows:

1. An entering student will normally take two years to complete the work in the basic sciences. Extended courses of study will be reviewed by the Student Progress Committee.
2. Students will normally be expected to register for a full course load. A student may schedule up to 12 weeks of free time during the clinical sciences.

3. Students desiring more or longer periods away from school may petition the Student Progress Committee for a formal leave of absence. Such leaves shall normally not exceed one year.

4. Students may take electives, for which they meet the prerequisites, prior to completion of the basic science years. However, these electives may be used to fulfill clinical science or elective requirements for graduation only with prior permission of the Curriculum Committee.

In addition to academic factors, satisfactory student progress also includes other factors. Those which may be considered as disqualifying for the M.D. degree include:

1. Chronic, disabling physical or emotional illness
2. Unethical conduct
3. Dishonest scholastic work (see The Code of Scholastic Conduct, page 27).

Other factors may be considered if, in the opinion of the Student Progress Committee, they would make it inappropriate to award the M.D. degree.

**Appeals**

Any student has the right to appeal an adverse decision of the Student Progress Committee to a separate faculty body, the Student Appeals Committee. This group consists of one appointed representative from each academic department in the College. The student may present to this Committee any information deemed pertinent to the case. The Student Appeals Committee will review charges, hear evidence, and consider mitigating circumstances before rendering a decision. Such decisions may affirm, modify or reverse the original action of the Student Progress Committee, although the penalty, if any, may not be increased. Such decisions are binding within the College and may not be appealed further at that level.
KEY TO COURSE LISTINGS

Most medical students will find that registration in medical school is a relatively simple process. The basic curriculum for medical students is outlined on pages 16-17. However, for the information of the faculty and others concerned with scheduling and course numbering, this section explains the course numbering system used in the College of Medicine.

This catalog contains listings of courses offered by College of Medicine departments for advanced undergraduates and graduate students as well as courses offered for medical students.

The number by which a course is designated indicates the level of the course.

Courses numbered:

400-499 inclusive: Advanced-level courses. Acceptable for graduate credit with the prior approval of the Graduate College (except 400-level individual studies course 491, 493, 494, or 499, with or without subscripts).

500-599 inclusive: Graduate courses. Open to exceptionally well-qualified seniors with the prior written approval of the course instructor and the Graduate College.

600-699 inclusive: Graduate courses. Not open to undergraduate students.

700-799 inclusive: Graduate courses limited to doctoral students.

800-899 inclusive: Courses limited to students working toward degrees offered by the College of Medicine or the College of Pharmacy. Not available for credit toward any other degrees.


The following is a list of definitions of the University-wide “house-numbered” courses available to the College of Medicine departments as well as other departments throughout the University.

Colloquium (courses numbered 495, 595, 695, 795, 895): The exchange of scholarly information and/or secondary research, usually in a small group setting. The exchange of ideas may involve written as well as oral communication. Research projects need not be required of course registrants.

Proseminar (496) and Seminar (courses numbered 596, 696, 796, 896): The development and exchange of scholarly information, usually in a small group setting. The scope of work shall consist of research by course registrants, with the exchange of the results of such research through discussion, reports, and/or papers.

Note: The above listing does not include all “house-numbered” courses, as other “house-numbered” courses are generally not used by the College of Medicine. For further information regarding these listings, please refer to the current University of Arizona General Catalog.
The definitions listed below are general categories of courses offered within the College of Medicine.

Clinical Clerkship (803): Closely supervised clinical activities designed to teach basic clinical skills within a discipline to Year III medical students.

Specialty Clerkship (807): In addition to general surgery each student is required to have exposure to a Surgery Specialty Clerkship (as assigned by the Surgery Department). (Please note: this course applies to the Department of Surgery only.)

Clerkship (810): Elective courses designed to develop and refine the clinical skills of medical students. Often allow the opportunity to apply basic skills in a new location or to a special population while continuing to focus on the broad objectives of a discipline.

Subinternship (811): Elective allowing medical students to experience general subinternship roles of patient care in clinics and hospital wards under the direct supervision of a faculty member.

Subspecialty (815): Electives allowing advanced medical students the opportunity to explore subspecialty areas within a department.

Supplementary Registration (830): For students who are extending their curriculum in order to spend a year, or less, doing research relevant to their medical education.

Receptorship (891): Specialized advanced work on an individual basis, consisting of instruction and practice in actual service in a department, program or discipline.

Independent Study (599, 799, 899): Qualified students work on an individual basis with professors who have agreed to supervise such work.

Research (800/900): Individual research by medical (800) or graduate (900) students, not related to a thesis or dissertation.

Thesis (910): Research for the master's thesis (whether library research, laboratory or field observation or research, artistic creation, or thesis writing).

Dissertation (920): Research for the doctoral dissertation (whether library research, laboratory or field observation or research, artistic creation, or dissertation writing).

Supplementary Registration (930): For students who have completed all course requirements for their advanced degree programs. May be used concurrently with other enrollments to bring the total number of units to the required minimum.
Key to Symbols

The standard course description includes a variety of symbols indicative of essential information. The following is a standard course description with the individual symbols explained in the order in which they appear in that description.

401. Ethics of Medicine (3) [Rpt.] GC I, II, 1986-1987, Yr. Jones


401..............................Number of course.
Ethics of Medicine..................Title of course.
(3).................................Number of units of course.
[Rpt.]..............................May be repeated for credit. A restriction regarding the number of times a course may be repeated for credit or the total number of units of credit permitted for a course may be designated. [Rpt./] indicates that the course may be repeated for credit a maximum of two times; [Rpt./6 units] means that the course may be repeated until the student has received a total of six units of credit.
GC.................................Graduate credit available. Applies to 400 level courses only.
I, II...............................Semester offered. I indicates Fall semester; II, Spring semester.
1986-1987............................Year in which course is offered. If no year designation is given, the course is offered each year.
Yr.................................Course offered throughout the year for various lengths of time other than semester(s).
Jones...............................Professor in charge of course. If "Staff" is listed, then the departmental staff is in charge of the course.
A review of current topics pertaining to the ethics of medicine..................Description of course.
P.................................Prerequisite(s).
CR.................................Concurrent Registration.
(Identical with Family and Community Medicine 401). Other departments which give credit in their department for the same course. If no course description appears please consult the crosslisted department.

Note: Not all of the above information may be noted in any individual course.

Elective Courses at the College of Medicine are listed and described in the Elective Manual, an in-house publication of elective offerings designed primarily for Year IV medical students. The Electives Manual is available each February.
INTERDEPARTMENTAL COURSES

195. Colloquium (2-4)  
   a. Introduction to the Neurosciences I (2) GC  
      Staff  
      An introductory overview of mammalian neural structure and function. Neuroanatomical and neurophysiological principles are emphasized. P, permission of instructor. (Identical with Anat. 495a and Psio. 495a.)
   b. Introduction to the Neurosciences II (2) GC  
      Staff  
      An introductory overview of clinical conditions that affect the human nervous system. P, 495a or permission of the instructor. (Identical with Neur. 495b, Psio. 495b and Psy. 495b.)

196. Seminar (1-3) Yr. (See Electives Manual)  
     Staff  
     These seminars are designed principally for medical students during the elective portion of their curriculum. Basic biological or behavioral science principles and their application in the medical setting are emphasized, with student participation in discussion and group leadership encouraged. Seminars may be combined with other part-time clinical or nonclinical electives to constitute a full-time academic load. An Electives Manual is available yearly in the Student Records Office, College of Medicine, and details specific course titles, numbers, prerequisites, and descriptions for that academic year.

101. Preparation for Clinical Medicine (PCM) (1-12) I,II  
     Rutala-Staff  
     Preparation for Clinical Medicine (PCM) is the clinical companion course to the basic sciences. The course begins the first week of medical school and continues until the beginning of the first clinical rotation. The overall objective is to provide students with skills, behavioral traits, attitudes and knowledge necessary to enter clinical clerkships. PCM is divided into three main course segments: 1. Patient evaluation, including physical examination, clinical interviewing, specialty examinations and write-ups. During this segment students interact with patient instructors and also spend one semester interacting with a physician preceptor; 2. Clinical correlations (clinical problem solving) with basic sciences courses; and 3. Free-standing course segments, including introduction to psychiatry and psychopathology, clinical decision making (biostatistics and logic), community-oriented primary care, emergency medicine, introduction to nuclear medicine, patient care skills workshop and radiology practicum. At the completion of PCM, students will have achieved a prescribed level of skill in data collection, definition of clinical problems and a logical approach to differential diagnosis.

02. Human Behavior and Development (HB&D) (6)  
     Fahey-Pollock-Staff  
     This course is an interdepartmental, required course which is taught as part of the basic science curriculum. In the same way that the traditional basic sciences serve as the background for understanding clinical medicine, HB&D serves as the "basic science" for understanding the psychosocial and emotional aspects of clinical medicine. The student will gain knowledge and understanding of the individual as a "total person," and of biological, environmental, social and psychological factors which influence that person as a patient. Also explored are the principal age-specific life events, environmental stresses, biological processes and social behaviors which contribute to normal human development and to individual sickness. Panel discussions, lectures, patient interviews, field trips, etc., are utilized in this interdisciplinary course to achieve the objectives. Some of the topics included in the course are the doctor-patient relationship, major health problems for children and adults, substance abuse, issues in human sexuality, coping with chronic illness, health care and the elderly, death and dying, ethical issues in medicine and legal aspects of medical care.
DEPARTMENTAL COURSES

ANATOMY

Professors: Douglas G. Stuart, Acting Head [Professor, Physiology, Arizona Research Laboratories], Jay B. Angervine, Jr. [Lecturer, Neurology], Joseph T. Bagnara, Bryant Benson, C. Donald Christian [Professor & Head, Obstetrics & Gynecology], Mac Eugene Hadley [Molecular & Cellular Biology], Philip H. Krutzsch, Donald P. Speer [Surgery]

Associate Professors: David E. Blask, C. Ward Kischer, Albert V. LeBouton

Assistant Professors: Gail D. Burd [Molecular and Cellular Biology], Mary J. C. Hendrix, Christopher A. Leadem

Lecturers: William D. Barber, Norman E. Koelling

Adjunct Professor: James C. Dunn

Research Professor: Robert B. Chiasson [Professor, Veterinary Sciences]

Research Associate Professor: Mary E. Morbeck [Associate Professor, Anthropology]

Research Assistant Professors: Elizabeth G. Crichton, Brenda V. Dawson [Adjunct Assistant Professor, Veterinary Sciences], Pushpa Deshmukh

Visiting Professor: Lynn W. Oliphant

Associate: Harry R. Claypool [Lecturer, Radiology]

Anatomy has central responsibility for the teaching of morphological systems. Its contributions occur at the gross, microscopic, and ultrastructural levels and have exerted strong influence on many areas of biology and medicine over the years. It is the desire and purpose of the Department of Anatomy to express a meaningful picture of the discipline and its relationship to the synthesis of chemical, physical, and biological facts in a challenging and responsible program.

The Department of Anatomy offers a program of graduate study which leads primarily to the Doctor of Philosophy degree; a degree of Master of Science is awarded only in rare instances. The requirements for these degrees are those outlined by the Graduate College. Candidates for graduate work in anatomy are expected to possess a significant knowledge of mathematics, statistics, and the physical sciences, as well as of biology, in order to meet the demands of a growing discipline. Course work possibilities span the continuum of morphological investigation from ultrastructure (electron microscopy) to gross human structure. Graduate study in anatomy primarily offers the candidate an opportunity to become proficient in research in areas such as: histochemistry, histophysiology, endocrinology, reproductive biology, neuroendocrinology, embryology, cancer cell biology, comparative neuroanatomy, neurophysiology, and so on. A large number of possibilities exist regarding the minor subject in the doctoral program. A broad range of departmental facilities exist including laboratories for microscopy, analytical chemistry, cell culture, electrophysiology and radioimmunoassay.

For detailed information concerning graduate programs in the Department of Anatomy, consult the catalog of the Graduate College and the departmental Graduate Advisor.
Course Descriptions

401. Human Gross Anatomy (3) II  
Koelling  
Survey of the gross structure of the human body. 1R, 6L. Open to pharmacy students only (Identical with PCOL 401).

406. Principles of Neuroanatomy (4) GCII  
Angevine  

415. Vertebrate Reproductive Biology (2) I  
Hadley  
Vertebrate reproductive biology. Structure, function, and control of the vertebrate reproductive system.

456. Developmental Biology (4) GC I  
Bagnara  
Descriptive aspects of development. P, MCB 103 (Identical with MCB 456, which is home).  

457. Experiments in Developmental Biology (4) GC II  
Bagnara  
Experimental analysis of the principles of development. P, 456, Chem. 241b (Identical with MCB 457, which is home).

467R. Endocrinology (3) GCII  
Hadley  

467L. Endocrinology (1) GCII  
Hadley  

495. Colloquium  
a. Introduction to the Neurosciences I (2) GC  
Staff  
An introductory overview of mammalian neural structure and function. Neuroanatomical and neurophysiological principles are emphasized. P, permission of instructor. (Identical with Interdept. 495a, which is home.)

550. Topics in Pigment Cell Biology (2) I  
Bagnara-Hadley  
Selected topics on the development, function, and control of normal and abnormal pigment cells in various pigmentary phenomena. (Identical with M.C.B. 550).
555. Cancer Biology (3) II, Alternate Year, 1985, Bowden-Gerner
(Identical with M. Mic. 555, which is home)

558. Advanced Subjects in Endocrinology (2) [Rpt.] I Hadley
Selected topics in vertebrate and invertebrate endocrinology. P, 467R. (Identical with M.C.B.
558).

599. Independent Study (1-6) I, II Staff
Individual or independent work, directed reading, or special problems under the supervision of
member of the faculty.

601. Human Gross Anatomy (8) I Blask-Staff
103b, 104b, 243b, 245b; Phys. 102b; G. Bio. 101b.

602. Microscopic Anatomy (5) I Hendrix-LeBouton-Staff
Essentials of microscopic human anatomy. P, Chem. 103b, 104b, 243b, 245b; Phys. 102b; G. Bio.
101b, and permission of department.

603. Microscopic Structure (1-3) II Staff
Selected concepts of structural organization at light and electron microscopic levels of the
anatomy and development of the cells, tissues and organs of vertebrates. P, 601, 602.

604. Gross Human Anatomy (2-6) [Rpt.] II Krutzsch-Staff
Study in depth of the gross human anatomy of selected areas or systems. P, 601, 602.

605. Neurosciences (6) II Barber-Angevine-Stuart
Essentials of mammalian neural development, structure and function. P, Chem. 103b, 104b,
243b, 245b; Phys. 102b; G. Bio. 101b; Cell. 410. (Identical with Psio. 605.) Consult department
before enrolling.

606. Advanced Vertebrate Neuroanatomy (4) I, II Angevine
Structure of the central nervous system in selected vertebrates. P, 605.

610a. Anatomical Techniques (1-4, 1-4) I,II LeBouton-Staff
Introduction of special techniques and procedures of analytical anatomy. P, 601, 602, and con-
sent of department.

616. Introduction to Anatomical Literature (1) I, II Staff
A problem-oriented, bibliographic approach to basic anatomical references. Primarily for thos
students planning a career in anatomy and wishing to prepare themselves for further graduate
study.3L.

696. Seminar (1) II Staff
103b, 104b, 243b, 245b; Phys. 102b; G. Bio. 101b.

801. Human Gross Anatomy (8) I Blask-Staff
See 601 description.

802. Microscopic Anatomy (5) I Hendrix-LeBouton-Staff
See 602 description.

805. Neurosciences (6) II Barber-Angevine-Stuart
See 605 description. (Identical with Psio. 605.)

891. Preceptorship, Yr. Staff
a. Anatomy (3-12)
   See Electives Manual for course descriptions.

899. Independent Study (1-6) I, II Staff
See Electives Manual for course descriptions.

900. Research (1-8) I, II Staff
Individual research not related to a thesis or dissertation for an advanced degree.

910. Thesis (1-8) I, II Staff
Research for the master's thesis.

920. Dissertation (1-9) I, II Staff
Research for the doctoral dissertation.

930. Supplementary Registration (1-6) I, II Staff
The Department of Anesthesiology provides the clinical clerks with theoretic and practical instruction in the following areas: 1) management of surgical and obstetric anesthesia; 2) acute clinical pharmacology and physiology; 3) resuscitation and management of the comatose patient; 4) treatment of intractable pain; 5) management of the patient in the intensive care unit. The concepts taught are germane to acute therapy and catastrophic illness that may be encountered by the future physician regardless of field of practice.

Course Descriptions

100. Research (1-6) [Rpt./1] Yr. Staff
See Electives Manual for course description.

110. Clerkship, Yr. Brown-Staff
a. Anesthesiology (4)
   Students participate in anesthesiology at University Medical Center and Veterans Administration Medical Center. See Electives Manual for course description.

115. Subspecialty, Yr. Otto-Staff
p. Critical Care Medicine (6) Yr.

191. Preceptorship, Yr. Staff
a. Anesthesiology and Subspecialties (3-18)
   See Electives Manual for course description.
UNIVERSITY DEPARTMENT OF BIOCHEMISTRY
(COLLEGES OF AGRICULTURE AND MEDICINE
AND THE FACULTY OF SCIENCE)

Professors: John H. Law, Head [Professor, Arizona Research Laboratories], Herbert E. Carte, Michael A. Cusanovich [Chemistry], Leslie S. Forster [Chemistry], Darrell E. Goll [Nutrition & Food Science], Richard B. Hallick [Molecular & Cellular Biology], David J. Hartshorne [Nutrition & Food Science], Mark R. Haussler, Associate Head, John Hildebrand [Molecular & Cellular Biology; Head, Division of Neurobiology], Victor Hruby [Chemistry], Richard G. Jensen [Plant Science], Henry Koffler [Microbiology & Immunology; Molecular & Cellular Biology; President, University of Arizona], David W. Mount [Molecular & Cellular Biology], John A. Rupley [Chemistry], Gordon Tollis [Chemistry], Michael A. Wells, Henry I. Yamamura [Pharmacology, Arizona Research Laboratories; Associate Professor, Psychiatry]

Associate Professors: Hans J. Bohnert [Molecular & Cellular Biology], Don P. Bourque [Agriculture, Molecular & Cellular Biology], Wah Chiu [Molecular & Cellular Biology], James F. Deatherage [Assistant Professor, Molecular & Cellular Biology], William Grimes [Molecular & Cellular Biology], John W. Little [Assistant Professor, Molecular & Cellular Biology], Marc E. Tischler [Physiology]

Assistant Professors: Danny L. Brower [Molecular & Cellular Biology], Carol L. Dieckmann [Molecular & Cellular Biology], Nancy W. Downer, Ivan Rayment, Elizabeth Vierling [Molecular & Cellular Biology]

Research Associate Professors: Terrance E. Meyer, John Wesley Pike

Research Assistant Professors: Jo Holt Hazzard, Tzyy-Wen Jeng, Robert Eric Johnson, Michael Kaling, Michael C. Little, David Morgan, Robert O. Ryan


Visiting Professor: Carl S. Vestling

Research in biochemistry is carried out principally in Biosciences West and Arizona Health Sciences Center, while teaching is carried out at various campus locations. The above listed faculty members constitute the University Department of Biochemistry, which is responsible for instruction in biochemistry in the Colleges of Agriculture, Liberal Arts, and Medicine.

The University Department of Biochemistry offers the Bachelor of Science, Bachelor of Arts, Master of Science and Doctor of Philosophy degrees. Except in unusual circumstances, however, the Department will only admit graduate students whose stated objective is the Doctor of Philosophy degree.

Research areas in which graduate studies may be pursued include nucleic acid biochemistry, regulation of gene expression, enzymology, lipid metabolism and chemistry, membrane structure and function, amino acid metabolism, complex polysaccharides, mammalian cell culture, mechanism of hormone action, biochemistry of vitamins and coenzymes, protein structure and function, bioenergetics, muscle metabolism, biological oxidations, photosynthesis, rapid reaction kinetics, visual processes, plant biochemistry, biochemistry and genetics of cell organelles, insect biochemistry.

For detailed information, consult the catalog of the Graduate College.
### Course Descriptions

**460. General Biochemistry (5) GC I**

Staff


**462a-462b. Biochemistry (4-3) GC**

Staff

Introduction to the properties and metabolism of proteins, nucleic acids, enzymes, carbohydrates and lipids. Designed primarily for majors and minors in chem, bioc, and biol. P, Chem. 241b, 325. Bioc. 462a is a prerequisite to 462b. (Identical with Chem. 462a-462b and Tox. 462a-462b.)

**463. Biochemistry Laboratory (2) GC II**

Staff

Introduction to experimentation with biochemical systems, processes, and compounds of biochemical importance. 1R, 5L. P, Bioc. 460 or CR 462a-462b.

**494. Practicum (3) I, II**

Staff

Senior research experience in the labs of individual faculty members. P, CR 462a-462b.

**496. Proseminar (1) [Rpt./1] I, II**

Staff

a. Biochemistry

Open to majors only. Consult department before enrolling. P, 462a or CR.

**501/801. Medical Biochemistry (5) I**

Staff

Comprehensive treatment of general biochemistry, oriented towards human biology, with emphasis on basic concepts. Protein and nucleic acid chemistry and metabolism, enzymology, metabolism of lipids and carbohydrates, metabolic regulation and closely related topics are covered. Open only to medical students except by permission. P, Chem. 103b, 104b, 241b, 245b; Phys. 102b.

**504/804. Intermediate Medical Biochemistry (5) I**

Haussler

An intermediate treatment of several areas of general biochemistry including metabolism and nutrition, genetics and membranes. Designed to build on the student's prior knowledge of biochemistry. Bioc. 804 open to medical students only; others consult department before enrolling. P, 462a-462b.

**555. Molecular Mechanisms of Development (3) II**

Brower

Detailed examination of molecular, genetic and cellular approaches to selected problems in developmental biology. P, consult department before enrolling. (Identical with M.C.B. 555, which is home.)

**561a-561b. Introduction to Biochemical Literature (1-1)**

Staff

A discussion of the biochemical literature aimed at helping the student evaluate and report the published literature. Primarily for first-year graduate students planning a career in biochemistry and desiring to prepare themselves for continued study. P, CR 462a-462b. 561a is not prerequisite to 561b. (Identical with Chem. 561a-561b.)

**565. Enzymes (3) (II) 1986-87**

Staff

Advanced consideration of enzyme structure and function. Course to be taught alternate years beginning 2nd semester 1986/87 academic year. P, 462a, Chem. 480b. (Identical with Chem. 565.)

**568a-568b. Nucleic Acids (3-3) (II) 1986-87**

Staff

Chemistry, structure, and function of nucleic acids; replication, transcription, translation, gene organization, regulation of gene expression and organelle nucleic acids. Both procaryotic and eucaryotic systems will be considered. P, 462b (Identical with M.C.B. 568a-568b, and N.F.S. 568a-568b.)

**570. Molecular Biology of the Cell Membrane (3) I 1986-87**

Staff

Cell membrane functions including biosynthesis, structures of membrane components; importance of cell communication, differentiation, adhesion, immune response, and cancer. Discussions on the use of monoclonal antibodies, recombinant DNA technology, and DNA transfections in studies on the biology of the cell membrane. (Identical with Chem. 570 and Cell. 570.)

**572. Metabolic and Hormonal Control of Cell Function (3) I 1986-87**

Staff

Advanced treatment of the biochemical aspects of metabolic regulation and hormone action. P, 462a-462b. (Identical with Chem. 572.)

**599. Independent Study (1.5) I, II**

Staff

Open to students who wish to pursue topics not covered in regularly scheduled courses. Arrangements must be made with the appropriate staff member and the biochemistry program chairman before registration.
665. **Chemistry of Food Proteins (3) II 1987-88**

The chemical and physical properties of proteins important to their use as food; analysis and purification of proteins; biochemical properties of proteins in muscle, milk, eggs, cereals, and other foods. P, Bioc. 462a preferred. Bioc. 460 or N.F.S. 406a-406b acceptable (Identical with N.F.S. 665, which is home.)

681. **Introduction to Biochemical Research (1-2) I, II**

Supervised research experiences in the laboratories of individual faculty members. Required for all first-year graduate students in biochemistry and open only to these students. 3 or 6 L.

696. **Seminar (1-3) I, II**

Student reports on current research topics. Participation required for all graduate students in biochemistry but registration not required in all semesters.

a. Biochemistry I (1-3) I
b. Biochemistry II (1-3) II

799. **Independent Study (1-5) I, II**

Open to graduate students seeking a Ph.D. in Biochemistry.

800. **Research (1-16) Yr.**

See Electives Manual for course description.

891. **Preceptorship, Yr**


900. **Research (1-5) I, II**

Individual research by graduate students, not related to a thesis or dissertation; the student will write for an advanced degree.

910. **Thesis (1-5, max. total 8) I, II**

Research for the master’s thesis.

920. **Dissertation (1-9) I, II**

Research for the doctoral dissertation.

930. **Supplementary Registration (1-6) I, II**

Staff
FAMILY AND COMMUNITY MEDICINE

Professors: Anthony F. Vuturo, Head, Herbert K. Abrams, John T. Boyer [Internal Medicine; Director, Division of Restorative Medicine], George D. Comerci [Pediatrics], Eric P. Gall [Internal Medicine, Surgery], Melvin H. Goodwin, Jr., Andrew W. Nichols, James R. Shaw, William A. Stini [Anthropology], Hugh C. Thompson [Pediatrics]

Associate Professors: Peter J. Attarian, Associate Head, [Assistant Professor, Psychiatry], Gail G. Harrison [Pediatrics, Nutrition & Food Science, Anthropology], Daniel O. Levinson, Ronald E. Pust [Clinical Director, St. Elizabeth of Hungary], Arthur B. Sanders [Surgery; Assistant Professor, Internal Medicine]

Assistant Professors: Peter J. Attarian, Associate Head, [Assistant Professor, Psychiatry], Gail G. Harrison [Pediatrics, Nutrition & Food Science, Anthropology], Daniel O. Levinson, Ronald E. Pust [Clinical Director, St. Elizabeth of Hungary], Arthur B. Sanders [Surgery; Assistant Professor, Internal Medicine]


Clinical Professors: Pedro Luis Escobar [Internal Medicine; Director, Rehabilitation Services; Chief of Physical Medicine & Rehabilitation, Division of Restorative Medicine], Augusto Ortiz

Clinical Associate Professor: Lawrence M. Moher

Clinical Assistant Professors: Kay A. Bauman, Anthony P. Catinella, Mark R. Dambro, Raymond C. Grossman, Jonathan C. Hake [Surgery], Evan W. Kligman, J. Kristin Olson-Garewal, Joseph L. Rea, Robert G. Rhode [Lecturer, Psychiatry], Randolph E. Soo Hoo

Clinical Instructors: Wayne F. Peate

Search Professors: Barton R. Burkhalter, Frank L. Meyskens, Jr. [Professor, Internal Medicine; Associate Professor, Molecular & Cellular Biology], Thomas E. Moon [Internal Medicine; Assistant Director, Cancer Center Division]

Search Associate Professors: Paul A. Nutting, Jr., Cheryl K. Ritenbaugh [Adjunct Associate Professor, Anthropology], Ronald R. Watson [Research Specialist, Cancer Center Division]

Search Assistant Professors: Alan Ackerman, George H. Adams, Barry R. Bainton, Jay Christensen-Szalanski, Barbara R. Hartmann [Director, Navy Alcohol Drug Safety Action Program], Janet H. Senf, Lee Sennott-Miller
The Department emphasizes the values of family and community orientation to medical practice. By means of preceptorships, seminars, projects, lectures, community assignments and clinics, in collaboration with other departments, students learn family medical practice, clinical preventive medicine and the elements of epidemiology, public health and medical care organization.

A primary focus of activity is the development of clinical teaching service resources in the rural and urban underserved areas of the state. This is reflected in programs of preceptorships and clerkships and other educational experiences for the students and residents. Many private family physicians in the community constitute a major teaching resource and a variety of health-related institutions and programs enrich the student’s experience. The Department also collaborates with the Colleges of Agriculture, Business and Public Administration, Nursing, Pharmacy, and the School of Health Related Professions in a variety of educational, research, and service efforts.

By participation in such varied programs and experiences, the medical students and residents are encouraged to enter family practice and to set up practices in areas of need. Special emphasis is given to knowledge, and achievement of comprehensive high quality medical care.

In addition to the specific courses listed below, the Department participates in the interdepartmental course, Preparation for Clinical Medicine, (which includes physical diagnosis, interviewing, primary care problems, and selected seminars) and in a number of elective interdepartmental courses, many of which are open to graduate students (see Electives Manual or members of the Department).
The Department has approved residencies in Family Practice, General Preventive Medicine/Public Health and Occupational Medicine. Combined Residency programs in Family Practice and Preventive Medicine/Occupational Medicine are available. There is an ongoing program of continuing education for community physicians, developed in collaboration with the Arizona Academy of Family Physicians.

Course Descriptions

87. Poverty and Health (3) II GC
   Study of the relationship between poverty and health. Concepts and theories from anthropology, psychology and sociology will be used to analyze problems associated with poverty. P, 6 units of Social Science. (Identical with Nurs. 487, which is home.)

00/ Research (2-16) [Rpt./2] Yr. Departmental Curriculum Coordinator

00. Individual research not related to a thesis for an advanced degree. P, Completion of basic science courses. See Electives Manual for course descriptions.

88. Clinical Anthropology (3) II
   Application of principles from anthropological theory to the actual practice of patient care, with emphasis on culture content of groups living in the greater Southwest. P, 9 units of Behavioral Science. (Identical with Nurs. 588, which is home.)

96. Seminar I, II
   a. International Health (3) S Open to health majors only.
   b. Epidemiologic Methods (1-3)
   cc. Community and International Nutrition (2)
   g. Occupational Disease (1) II
   h. Prevention and Control of Disease (1) I
   k. Nutrition in Disease (2) [Rpt./1] P, Bioc. 501/801, Psio. 601/801
   l. Alternative Strategies for Coping With Illness: A Cross-culture View (2) II
   m. Practice of Community-Oriented Medicine in Rural Areas (2) II
   q. Occupational and Environmental Health (3) S
   ss. Tropical Disease Problems (2-3)
   u. Current Issues in Health Services (2)
   yy. Basic Principles of Epidemiology (3)

96. Seminar I, II
   a. International Health (3) S
   b. Epidemiologic Methods (1-3) P, 896yy
   c. Approaches to Managing Behavior Problems in Children and Adolescents (2)
   cc. Community and International Nutrition (2)
   d. Wholistic Health (2) II
   f. The Doctor-Patient Relationship (2)
   k. Nutrition in Disease (2) [Rpt./1] P, Bioc 501/801, Psio 601/801
   l. Alternative Strategies for Coping With Illness: A Cross-culture View (2) II
   m. Practice of Community-Oriented Medicine in Rural Areas (2) II
   q. Occupational and Environmental Health (3) S
   ss. Tropical Disease Problems (2-3)
   u. Current Issues in Health Services (2)
   yy. Basic Principles of Epidemiology (3)

999/ Independent Study (1-12) I,II Nichols-Magill-Staff

999. In-depth studies of clinical and nonclinical topics.

803. Clinical Clerkship (6-9) Yr. Pust-Staff
   Students will develop and refine problem-solving skills in the ambulatory setting. Emphasis will be on the diagnosis and management of the illnesses presented to primary care facilities. The student will be taught to effectively use the health care team in patient assessment, and to incorporate the principles of preventive and prospective medicine into clinical practice. A life-style curriculum is integrated into the didactic presentations. This clerkship is a required course for third year medical students.

811. Subinternship
   a. Family Medicine (4-12) [Rpt./3] Yr.
   See Electives Manual for course description.

815. Subspecialty, Yr.
   a. The Dying Patient (3-6) [Rpt./1] Yr.
   b. Alcoholism: A Community Health Problem (3-6) [Rpt./1] I, II
   c. Community Health Problems (3-12) [Rpt./4]
   d. Community Geriatrics (3-12) [Rpt./12 units]
   g. Community Geriatrics (3-12) [Rpt./12 units]
   Consult department before enrolling. See Electives Manual for course descriptions.
891. **Preceptorship, Yr.**

A variety of Family Practice sites throughout the state and country are approved for preceptorship training. These include solo, group, community clinic and hospital-based practices in locations representative of Arizona's cultural, economic and geographic diversity. See Electives Manual for course descriptions.

a. Primary Care (4-12)
b. Family Medicine Subinternship (3-12)
c. Epidemiology at CDC (3)
d. Preceptorship in Rural Care (4-12)
f. Clinical Preceptorship in International Health (6-12)
Professors: Rubin Bressler, Head [Professor, Pharmacology; Chief, Clinical Pharmacology], David S. Alberts [Pharmacology], F. Paul Alepa, Robert A. Barbee, John T. Boyer [Family & Community Medicine; Director, Division of Restorative Medicine], Benjamin Burrows [Chief, Pulmonary Diseases Section; Director, Division of Respiratory Sciences], William F. Denny, Brian G. M. Durie [Research Associate, Cancer Center Division], David L. Earnest [Chief, Gastroenterology Section], Gordon A. Ewy [Chief, Cardiology Section; Director, Cardiology Diagnostic Laboratory; Assistant Director, Physiological Testing; Acting Director, Cardiac Catherization Services], Eric P. Gall [Family & Community Medicine, Surgery; Chief, Rheumatology, Allergy, & Immunology Section], David G. Johnson [Pharmacology; Chief, Endocrinology Section], Murray A. Katz, Louis J. Kettel [Dean, College of Medicine], Ronald J. Knudson [Associate Director, Division of Respiratory Sciences], Michael D. Lebowitz [Associate Director, Environmental Programs, Division of Respiratory Sciences], Peter J. Lynch, Associate Head [Chief, Dermatology Section], Frank I. Marcus [Assistant Director, ECG Lab], Frank L. Meyskens, Jr., [Associate Professor, Molecular & Cellular Biology; Research Professor, Family & Community Medicine], Eugene Morkin [Pharmacology], Charles A. Nugent, Jr., David A. Ogden [Chief, Renal Section], William R. Roeske [Associate Professor, Pharmacology], Sydney E. Salmon [Director, Cancer Center Division; Lecturer, Pediatrics], Jay W. Smith [Chief, General Medicine Section], Lawrence Z. Stern

Associate Professors: Thomas W. Boyden, Sammy C. Campbell, Kenneth A. Conrad [Phar-

Assistant Professors: Frederick R. Ahmann, Neil M. Ampel, John W. Bloom [Research Associate, Division of Respiratory Sciences], Marlene Bluestein [Chief of Inpatient Geriatrics], Samuel M. Butman, Keith A. Comess, William S. Dalton, Irene E. (Libby) Edwards, Timothy C. Fagan [Pharmacology], Harinder S. Garewal, Michael Habib, Shoei-Kuen Huang, Murray Korc, Thomas P. Miller [Research Associate, Cancer Center Division], John D. Palmer [Associate Professor, Pharmacology; Director, Multidiscipline Laboratories], Stuart F. Quan, Paul J. Rutala [Coordinator, Preparation for Clinical Medicine], Arthur B. Sanders [Associate Professor, Family & Community Medicine, Surgery], Gayle A. Traver [Associate Professor, College of Nursing], David B. Van Wyck [Surgery]

Instructors: Anthony E. Camilli [Research Associate, Division of Respiratory Sciences], Richard G. Gay, Karl B. Kern, Laryenth D. Lancaster, Joy L. Logan

Lecturers: Benjamin Burbank, Lloyd A. Coaker, John G. Corcoran, James J. Corrigan [Professor, Pediatrics], David N. Flieger, Gerald B. Goldstein, Craig L. McClure, [Assistant Professor, Family & Community Medicine], Arnold B. Merin, Ulrich F. Michael, Milan V. Novak [Coordinator, Human Subjects in Research], Gail E. Riggs [Associate Director of Administration, Division of Restorative Medicine], Brian Y. Shon,

Adjunct Professor: Avery A. Sandberg

Clinical Professors: Robert O. Brandenburg, Pedro Luis Escobar [Family & Community Medicine; Director, Rehabilitation Services; Chief of Physical Medicine & Rehabilitation, Division of Restorative Medicine], John W. Heaton, Jr., William J. Howard, Brendan P. Phibbs, David Rikkind, Robert A. Sanoewski


Clinical Assistant Professors: E. Charles Blanck, Robert J. Brooks, Charlene Carroll, Michael Darragh, Donald C. Doll, James F. Fiastro, Kathleen L. Fielder, Mary L. Fine, Oscar S. Gluck, Gerald N. Goldberg [Associate, Pediatrics], R. Scott Gorman [Research Associate, Family & Community Medicine], Michael Grossman, Paul F. Howard, Jeffrey P. Jaffe, Peter C. Kelly, Antoinette Korc, Sharon L. Larkin, Margaret M. Miller, John C. Moseley, William S. Nevin, David A. Saltzman, Steven J. Schaffme, David S. Shimm [Assistant Professor, Radiation Oncology], John R.P. Tesser, Michael R. Tripp, Terence D. Valenzuela

Research Professor: Thomas E. Moon [Family & Community Medicine; Assistant Director, Cancer Center Division]

Research Associate Professors: Marilyn J. Halonen [Research Associate, Division of Respiratory Sciences], Jeffrey M. Trent [Associate Professor, Radiation Oncology; Director, Basic Science Research, Cancer Center Division]

Research Assistant Professors: Joseph J. Bahl, Marvin D. Bregman [Research Associate, Cancer Center Division], Robert T. Dorr [Research Associate, Cancer Center Division], Irwin L. Flink, Bruce E. Markham, Yei-Mei Peng [Research Associate, Cancer Center Division], Janet L. Ramstack [Research Associate, Cancer Center Division], Donald Slymen [Cancer Center Division]

Research Associates: Ellen M. Chase [Cancer Center Division], Hussain Ghorab, Christine L. Hanson, E.E. Ho [Family & Community Medicine], Mitsuo Ikebe [Research Assistant Professor, Nutrition & Food Science], John K. Kawooya [Biochemistry], Albert Leibovitz [Cancer Center Division], Rosa H. Liu [Cancer Center Division], Geraldine C. Meinke [Adjunct Assistant Professor, Microbiology & Immunology], Richard W.
The Department of Internal Medicine has developed a program designed to introduce undergraduate medical students to the responsibility of care of the patient. Together with the staff, students will interview and examine patients, explore what is known of the pathophysiology of the various disorders, and observe the effect of appropriate therapeutic modalities.

**Course Descriptions**

00. Research (6-24) [Rpt./3] Yr.  
   **Staff**

55. Cancer Biology (3) II, Alternate Year, 1985  
   Bowden-Gerner-Magun  
   (Identical with M. Mic. 555, which is home.)

96. Seminar (2) II  
   **Galgiani**  
   a. Pathophysiology and Immunology of the Clinical Manifestations of Coccidioidomycosis  
   See Electives Manual for course description.

99. Independent Study (3-6) I, II  
   **Staff**  
   See Electives Manual for course description.

03. Clinical Clerkship (12) Yr.  
   **Barbee-Staff**  
   Required of all students during their first clinical year. Assignment is made to the inpatient medical wards at AHSC, Tucson Veterans Administration Medical Center, and selected hospitals in Phoenix. Emphasis is placed upon the development of clinical skills and problem solving. Students are expected to obtain and record the complete medical histories, perform physical examinations, develop appropriate differential diagnoses, and monitor the progress of assigned patients. They will participate in diagnostic and therapeutic procedures with other members of the patient care team, and attend required departmental conferences and seminars.
810. Clerkship, Yr.  
   b. Ambulatory Diagnosis and Therapeutics (6) Yr.  
   c. Geriatrics and General Medicine Extended Care (4)  
   d. Ambulatory Geriatrics (3-12) Yr. P, 803  
   Students are offered three to twelve week elective clerkships in hospitals in Tucson and Phoenix. See Electives Manual for course descriptions.

811. Subinternship, Yr.  
   a. Internal Medicine (4-12) Yr.  
   c. Coronary Care Unit (4) Yr.  
   m. General Medicine (4) Yr.  
   See Electives Manual for course descriptions.

815. Subspecialty, Yr.  
   a. Clinical Cardiology (4)  
   b. Clinical Dermatology (3)  
   c. Endocrinology (4-12)  
   d. Clinical Gastroenterology (4-8)  
   e. Hematology-Oncoology (6)  
   f. Immunology, Arthritis and Allergy (6)  
   g. Infectious Diseases (4-12)  
   h. Pulmonary Diseases (4)  
   j. Pulmonary Laboratory and Consultation Service (3-6)  
   k. Nephrology, Renal Disease (3-6)  
   l. Clinical Allergy (4-6) P, 803 (Identical with Ped. 8151)  
   m. Medical Subspecialties (3-6) [Rpt./1] Yr.  
   n. Physical Medicine and Rehabilitation (3-6) [Rpt./1] Yr.  
   p. Critical Care Medicine (4-6) (Identical with Anes. 815p, which is home.)  
   q. Cardiology Consultation (4) Yr.  
   r. Neurological and Neuromuscular Disorders (3-6) P, 803.  
   s. Rheumatology (4-6) P, 803.  
   t. Nephrology (4) Yr.  
   See Electives Manual for course descriptions.

891. Preceptorship  
   a. General Medicine and/or Subspecialties (3-12) [Rpt./2]  
   b. Ambulatory Internal Medicine: Clinical Problems (6) Yr.  
   See Electives Manual for course descriptions.

896. Seminar (2) II  
   a. Pathophysiology and Immunology of the Clinical Manifestations of Coccidioidomycosis  
   See Electives Manual for course description.

899. Independent Study (1-18) I, II  
   See Electives Manual for course description.
Graduate study in Microbiology and Immunology is concerned primarily with microbial structures and functions, as well as the nature of immune systems. Areas of current research emphasis are virology, microbial genetics, immunology, bacterial pathogenesis, and environmental microbiology. Course programs are drawn from offerings in biochemistry, biological sciences, chemistry, mathematics, microbiology, molecular biology, anatomy, pharmacology, genetics, and others.

Master of Science and Doctor of Philosophy degrees with a major in microbiology and immunology are offered by a program whose faculty includes members of the Department of Microbiology and Immunology and other departments in the University.

Some limitations of enrollments may be necessary. Medical students will be given preference in those courses that are required for the M.D. degree. All other students must obtain the permission of the instructor before enrolling.

Course Descriptions

428R. **Advanced Microbial Genetics (3) GC II** Mendelson
Modern concepts of microbial genetics; basic genetic theory, the molecular architecture, biosynthesis and genetic regulation of bacterial cell structure, control of growth and cell division. P, 103, Micr. 328, G.Bio. 320 or 321. (Identical with M.C.B. 428R)

428L. **Advanced Microbial Genetics Laboratory (2) GC II** Mendelson
Individual research projects within the framework of microbial genetics, with emphasis on the genetic system of Bacillus subtilis. P, CR 428R. (Identical with M.C.B. 428L)

501/801. **Medical Microbiology (6) I** Staff
The biological characteristics of microorganisms of importance in human health and disease; the reaction of the host to infectious agents and the mechanisms of host defense; diagnosis and management of infectious disease. Lectures, discussions, demonstrations, and laboratory experiments. P, G. Bio. 101b; Chem. 241b, 243b; Bioc. 501.

530. **Biophysical Theory (2) II I** Staff
Physical concepts and theories describing biomolecular structure and function, molecular evolution, limits to structure, symmetry, oligomer and virus structure, organelle structure and function. (Identical with Phys. 530)
550. Molecular Mechanisms of Microbial Pathogenesis (3) I
1986-87  Friedman
Review of current concepts in specific areas of microbial pathogenesis, including actions
of exo- and endotoxins, cell surface interactions, phagocytosis and host microbicidal func-
tions. P, Bioc. 460 (Identical with Micr. 550.).

551. Environmental Carcinogenesis (3) II
Gerner
Physical and chemical carcinogenesis. Special emphasis will be upon molecular aspects of the
interaction of the carcinogenic agents with mammalian cells and the subsequent mutagenic
and metabolic consequences of such interactions. Topics of metabolic activation of chemical
carcinogens will be emphasized as well as biological and biochemical aspects of tumor initia-
tion and promotion. Carcinogen testing and risk-benefit analysis in relationship to the
human environment.

555. Cancer Biology (3) II
Gerner
Fundamental biological aspects of neoplastic growth at the organ, cellular and molecular
levels. Emphasis on the etiology, behavior and therapy of neoplasms. (Identical with R.Onc.
555)

560. Structure and Function
of the Immunoglobulins (3) II I
Kibler-G. Meinke
Immunoochemical characterization of the isotypic, allotypic and idiotypic specificities of the
immunoglobulins and their relationships to biological function. P, Bioc. 462a-462b.

561. Immunobiology (3) I 1986-87
Lucas
Cells and cellular events involved in humoral and cell-mediated immune responses; mor-
phologic, physiologic and biochemical characterizations of the lymphoreticular system. P,
Bioc. 462a-462b.

570. Molecular Genetics (3) I 1987-88
Mount-H. Bernstein
Molecular genetics and biology of the bacterial viruses; molecular mechanisms of gene
regulation, DNA replication, DNA repair, mutation and genetic recombination; current
research in bacterial genetics (lysogeny, transduction, conjugation, use of transposons and
gene fusions in genetic analysis and transformation); introduction to gene cloning and its
uses in analysis of gene structure and regulation.

571. Molecular Gene Cloning (3) II 1986-87
Mount-Bernstein
Current gene cloning technology; restriction endonucleases, cloning vehicles (plasmid vec-
tors, bacteriophage vectors, and single-stranded phage vectors), gene amplification and ex-
pression of cloned genes.

580. Molecular Virology (3) II 1987-88
W. Meinke
The current status of basic research in virology at the molecular level. P, Chem. 460.

595. Colloquium I
Staff
a. Molecular Biology (1) I [Rpt./2]

596. Seminar
Staff
a. Current Problems in Molecular Biophysics (1) I, II (Identical with Phys. 596a, which is
home.)
h. Control of Proliferation in Animal Cells (1-2) I (Identical with R.Onc. 596b, which is
home.)

630. Immunology (4) II 1986-87 I
Olson
Immunological and immunochemical concepts and techniques. 2R, 6L. P, twelve units of
micr., Chem. 460 or N.F.S. 406a.

695. Colloquium
Staff
a. Readings in Microbiology (1][Rpt.] I, II
b. Immunopathology (1) II  Lucas

891. Preceptorship, Yr. [Rpt./3]
Staff
a. Microbiology and Immunology (3-12)
See Electives Manual for course description.

899. Independent Study (6-12) I, II
Staff

900. Research (1-8) I, II  Staff

910. Thesis (1-8, max. total 8) I, II  Staff

920. Dissertation (1-9) I, II  Staff

930. Supplementary Registration (1-6) I, II  Staff
professors: H. Vasken Aposhian [Pharmacology], Wayne R. Ferris, Mac Eugene Hadley [Anatomy], Richard B. Hallick [Biochemistry], John Hildebrand [Biochemistry; Head, Division of Neurobiology], Konrad Keck, Henry Koffler [Biochemistry, Microbiology & Immunology; President, University of Arizona], Neil H. Mendelson [Microbiology & Immunology], David W. Mount [Biochemistry], James W. O'Leary [Research Horticulturist, Environmental Research Laboratory], Peter E. Pickens, Diane H. Russell [Pharmacology; Research Associate, Internal Medicine], Nobuyoshi Shimizu

Associate Professors: Thomas J. Lindell [Pharmacology], Acting Head, Hans J. Bohnert [Biochemistry], Don P. Bourque [Biochemistry, Agriculture], Wah Chiu [Biochemistry], William J. Grimes [Biochemistry], Jennifer D. Hall, Martinez J. Hewlett, Kaoru Matsuda [Associate Research Scientist, Plant Science, Agricultural Experiment Station], Frank L. Meyskens, Jr. [Professor, Internal Medicine; Research Professor, Family & Community Medicine]

Assistant Professors: Danny L. Brower [Biochemistry], Gail D. Burd [Anatomy], James L. Deatherage [Associate Professor, Biochemistry], Carol L. Dieckmann [Biochemistry], John W. Little [Associate Professor, Biochemistry], Elizabeth Vierling [Biochemistry]

The Department of Molecular and Cellular Biology is a research-oriented department in which students may receive advanced training in all aspects of research which employ cellular, molecular, biochemical, and genetic approaches. The department offers programs leading to the Master of Science and the Doctor of Philosophy degrees with majors in Molecular and Cellular Biology.

Applicants for admission should be prepared in chemistry, physics, and mathematics and must submit scores on the aptitude test of the Graduate Record Examination. Applicants should communicate directly with the department regarding other admission requirements. The deadline for completion of all application files for admission to the programs beginning with the fall semester is April 1 (March 15 for applicants desiring financial assistance).

Students are expected to specialize in areas of interest to the faculty. These include viral oncology, regulation of gene expression, neurobiology of simple systems, cellular ultrastructure and function, structure and function of nucleic acids, developmental biology of higher plants, plant molecular biology, molecular genetics, invertebrate developmental biology, environmental plant physiology, and gene transfer systems for mammalian cells. A listing of the faculty of the department and their research interests can be obtained from the department on request. A thesis is required for the Master's degree.

Course Descriptions

04. Contemporary Biology and Human Affairs (3) GC II
   Aposhian
   Advances in biomedical research will be reviewed and their ethical, social, and legal implications discussed. P, one course in bioc. or bio; botany not acceptable.

10a. Advanced Cell Biology (3-3) GC
   Ferris-Staff
   Regulation at the cellular and molecular levels; gene expression; nature, function, and integration of organelles and ultrastructural components of the cell. P, 103 (for majors), Chem. 243a or 480a.

12. Radioisotopes in Biology (3) GC I
   Keck
   Advanced techniques in the application of radioactive tracers to problems of molecular biology; kinetics of labeling, fractionation procedures; detection systems and processing of data. 2R, 3L. P, Chem. 103b, 104b, Phys. 102a-102b.
413. **Advanced Cell Biology Laboratory (2) GC I**  
Shimizu  
Modern lab techniques for genetic and molecular analyses of mammalian cells in culture. 6L P, CR 415.

415. **Somatic Cell Genetics (2) GC I**  
Shimizu  
Modern concepts of eucaryotic cell genetics and molecular mechanisms of cell growth control. P, 102, 103, 104, 320, Chem. 241a-241b, 243a-243b.

416. **Physical Methods in Cell Biology (3) GC II**  
Keck  
Physical principles underlying the characterization of subcellular structures and macromolecules. P, Math. 125b.

417. **Biophysics Data Analysis (3) GC I**  
Keck  

428R. **Advanced Microbial Genetics (3) GC II**  
Mendelson  
Modern concepts of microbial genetics; basic genetic theory, the molecular architecture, biosynthesis and genetic regulation of bacterial cell structure, control of growth and cell division. P, 103, Micr. 328, G.Bio. 320 or 321. (Identical with Micr. 428R)

428L. **Advanced Microbial Genetics Laboratory (2) GC I**  
Mendelson  
Individual research projects within the framework of microbial genetics, with emphasis on the genetic system of Bacillus subtilis. (Identical with Micr. 428L)

456. **Developmental Biology (4) GC I**  
Bagnara  
Descriptive aspects of development. 3R, 3L. P, 103. (Identical with Anat. 456)

457. **Experiments in Developmental Biology (4) GC II**  
Bagnara  
Experimental analysis of the principles of development. 2R, 6L. P, 456, Chem. 241b. (Identical with Anat. 457)

460. **Plant Physiology (4) GC I**  
Matsuda  
Introduction to water relations, photosynthesis, respiration, growth and development of higher plants. 3R, 3L. P, Chem. 241a. 243a. (Identical with Ecol. 460)

462. **Neurobiology Laboratory (1) GC I**  
Pickens  

463. **Introduction to Neurobiology (3) GC I**  
Pickens  
Physiology and anatomy of invertebrate and vertebrate nervous systems. P, eight units of bio.

464aR. **Human Physiology (3-3) GC**  
Staff  
(Identical with Ecol. 464aR-464bR)

464bR. **Human Physiology Laboratory (1-1) GC**  
Staff  
(Identical with Ecol. 464aL-464bL)
5. **Advanced Neurobiology (2) GC II.**
   Selected topics in current neuroethological research on vertebrate and invertebrate nervous systems. P, 463 or consult department before enrolling.

7R. **Endocrinology (3) GC II**
   (Identical with Anatomy 467R, which is home.)

7L. **Endocrinology Laboratory (1) GC II**
   (Identical with Anatomy 467L, which is home.)

9. **Developmental Neurobiology (2) GC II**
   Development of the nervous systems of invertebrates and vertebrates from embryonic stages to the adult. P, 8 units of bio.

3. **Recombinant DNA Techniques (3) GC II**
   Relevant techniques for the isolation, purification, and cloning of genes in E. Coli hosts. Cloned DNA will be characterized by restriction mapping and hybridization techniques. Consult department before enrolling. P, Bioc. 462a, M.C.B. 410b. (Identical with Bioc. 473.)

4. **Supramolecular Structure (2) II 1986-87**
   Application of diffraction techniques in the study of structure and function of biological macromolecules.

0. **Current Topics in Eucaryotic Gene Expression (3) II 1986-87**
   Detailed examination of current literature in selected areas of eucaryotic molecular biology. P, 568b or consult dept. before enrolling.

0. **Advances in Mammalian Cell Biology (2) [Rpt./2] II**
   Selected topics in mammalian cell structure and functions and its genetic control. P, 415 or consult dept. before enrolling.

0. **Topics in Pigment Cell Biology (2) I**
   (Identical with Anatomy 550.)

5. **Molecular Mechanisms of Development (3) II**
   Detailed examination of molecular, genetic and cellular approaches to selected problems in developmental biology. P, consult department before enrolling. (Identical with Bioc. 555, Gene. 555.)

8. **Advanced Subjects in Endocrinology (2) [Rpt.] I**
   Selected topics in vertebrate and invertebrate endocrinology. P, 467R. (Identical with Anatomy 558.)

2. **Plant Intermediary Metabolism (3) II 1986-87**
   Selected topics in plant metabolism and photosynthesis. P, 460. (Identical with PIS. 562.)

3. **Plant-Water Relations (3) II**
   Analytic approach to the study of water movement into and through plants; development of internal water deficits and their significance to physiological processes. P, 460. (Identical with Ws.M. 563.)

0. **Molecular Biology of the Cell Membrane (3) I 1986-87**
   (Identical with Bioc. 570.)

5a. **Colloquium (1) [Rpt.] II**
   Topics of interest in molecular and cellular biology. Open to majors only.

2. **Principles of Electron Microscopy (4) I**
   Principles and practice of electron microscopy, specimen preparation, micrograph interpretation, and operation and maintenance of electron microscopes. 2R, 6L.

6. **Seminar (1) [Rpt.] I, II**
   Staff

1. **Methods in Molecular and Cellular Biology (3) I,II**
   Current techniques for qualitative and quantitative studies. 9L. Open to majors only.
NEUROLOGY

Professors: Peggy C. Ferry [Professor & Associate Head, Pediatrics; Chief, Pediatric Neurology Section], William A. Sibley
Associate Professors: Colin R. Bamford, Acting Head; Jose F. Laguna
Assistant Professors: William Feinberg, Enrique L. Labadie
Lecturers: Jay B. Angevine, Jr. [Professor, Anatomy], Robert H. Hamilton, Juan C. Lerman
Adjunct Professor: Harvey W. Buchsbaum
Adjunct Assistant Professors: Robert A. Foote, William H. Lawrence, Francisco R. Valdivia
Clinical Associate Professor: Michael S. Smith
Clinical Assistant Professor: Kalarickal J. Oommen
Clinical Scientist: Stuart R. Snider
Research Associates: Katherine P. Clark, Joan E. Laguna

Neurology is that discipline of medicine responsible for the diagnosis and possible treatment of diseases of the human nervous system. Courses are offered which are designed to teach students to interpret evidence of normal or abnormal neurologic functioning. Students have a three-week required clerkship and a 6 week elective in neurology. Students receive an introduction to neurology during lectures in the neuroscience course during the basic science years.

A continuing neuroscience seminar series is presented by residents, physicians, and graduate students in the Department of Neurology throughout the year. This series is offered to medical students as well as to postgraduate trainees and students in allied areas.
Course Descriptions

5. Colloquium
   b. Introduction to the Neurosciences II (2) GC
      An introductory overview of clinical conditions that affect the human nervous system. P, 495a or permission of the instructor. (Identical with Interdept. 495b, which is home).

10. Research (6-24) [Rpt./3] Yr.

10. Research (6-24) [Rpt./3] Yr.

13. Clinical Clerkship (3-6) Yr.
   A three-week required course on the neurological wards at University Medical Center, the Tucson Medical Center Hospital, the Tucson Veterans Administration Medical Center, Kino Community Hospital and the Barrow Neurological Institute in Phoenix. Cases are presented to members of the neurological staff and discussed in detail. Weekly teaching conferences are given by the neurology faculty.

10. Clerkship, Yr.
   a. Neurology (3-6) Yr.
      This three, four, or six-week clerkship is offered on the neurology wards at Arizona Health Sciences Center, the Tucson Medical Center Hospital, the Tucson Veterans' Administration Medical Center, and Kino Community Hospital. Students work closely with the attending and resident staff in an effort to become proficient in the techniques of the neurological examination and management of neurological disorders. P, 803.

15. Subspecialty, Yr.
   r. Neurological and Neuromuscular Disorders (3-6) P, I.Med. 803. (Identical with Internal Medicine 815r, which is home.) See Electives Manual for course description.

91. Preceptorship, [Rpt./2] Yr.
   a. Neurology (4-6) [Rpt./2] Yr.
      See Electives Manual for course description.
OBSTETRICS AND GYNECOLOGY

Professors: C. Donald Christian, Head [Professor, Anatomy], John R. Davis [Pathology], Jack W. Pearson, Lewis S. Shenker
Associate Professors: Diane S. Fordney [Psychiatry], William C. Scott, Louis Weinstein [Director, Perinatology Section]
Assistant Professors: Silvio A. Aristizabal [Associate Professor, Radiation Oncology], Herbert E. Pollock [Co-Coordinator, Human Behavior & Development, Medical Administration], Kathryn L. Reed, Sheldon A. Weiner
Instructor: Steven E. Calvin
Lecturer: Caroline F. Anderson
Adjunct Professors: Walter B. Cherny, John V. Kelly, Tawfik H. Rizkallah
Adjunct Associate Professor: Gregory J. Maciulla
Adjunct Assistant Professor: David S. Grosso
Clinical Associate Professors: B. Douglas Lecher, Earl A. Surwit
Clinical Assistant Professors: H. Alan Collier, Glen A. Hiss, Frederick A. Kreuzer, Vinson Cleo Thompson
Clinical Associate: Gerriet A. Janssen [Adjunct Instructor, Radiology; Physician, Student Health Service]
Genetic Counselor and Coordinator: Lynn Hauck

Obstetrics and Gynecology is that discipline of medicine which encompasses reproductive biology and the ultimate application thereof to human reproduction. In the natural evolution of medical care in the United States the obstetrician-gynecologist has come to be the primary physician for women. The courses of study available in Obstetrics and Gynecology are designed to provide a clinical substrate for the medical student in this branch of medicine. The means to this end are by precept and example of patient diagnosis, care and therapeusis as well as didactic and tutorial sessions.

Course Descriptions

800. Research (1-18) [Rpt./1] Yr. Christian-Staff
   Experience in each of the research areas listed below is available with programs up to six weeks in length individually designed. P, Ob.G. 803.
   1. Reproductive Pharmacology
   2. Diagnostic Ultrasound
   3. Endocrine Laboratory
   4. Perinatal Medicine
   5. Gynecologic Oncology
   6. Infertility/Fertility Control
   7. Gynecology/Obstetrics

803. Clinical Clerkship (6-9) Yr. Christian-Staff
   Medical students will be assigned to outpatient clinics and hospital wards to become members, along with the attending physician, of the team responsible for the patient's care.

810. Clerkship, Yr. Christian-Staff
   a. Preparation for Practice (4-6)
   This elective course for Year IV students will essentially be an externship in a Phoenix or Tucson hospital to include exposure to the full gamut of obstetrical and gynecological care, conducted under direct supervision of a faculty member. The elective period may be for three or six weeks. P, 803.

815. Subspecialty, Yr. Staff
   a. Clinical Infertility (4-6) Yr. See Electives Manual for course description.

891. Preceptorship (3-12) Yr. Staff
   a. Obstetrics and Gynecology (3-6)
   b. Gynecology-Endocrinology (3-6)
   See Electives Manual for course descriptions.
Ophthalmology, the College of Medicine's newest department, offers two electives for medical students. One is a research elective in which experience in laboratory research in ophthalmology will be obtained with programs of a minimum of six weeks in duration. The other is a clinical elective in which medical students will be assigned to outpatient clinics and inpatient wards and surgery which will give them an overview as to how the ophthalmologist relates to his patient population.

The graduate program in Ophthalmology offers residents extensive inpatient and outpatient experiences at the University Medical Center, the Tucson Veterans Administration Medical Center, and Kino Community Hospital.

Course Descriptions

0. Research (6-18) I, II
   See Electives Manual for course description.

15. Subspecialty, Yr. [Rpt. /3]
   a. Ophthalmology (3-6) Yr.
      See Electives Manual for course description.

91. Preceptorship I, II
PATHOLOGY


Associate Professors: James M. Byers III, Anna R. Graham, Thomas M. Grogan, Mary Jane Hicks, Douglas H. McKelvie [Lecturer, Radiology; Veterinarian, Division of Animal Resources; Adjunct Associate Professor, Veterinary Science], Richard E. Sobonya

Assistant Professors: Ronald B. Schifman, Catherine M. Spier, Karen K. Steinbronn

Lecturers: Louis Hirsch, Paula F. Lowe, Claire M. Payne

Clinical Professor: David C. White

Clinical Assistant Professors: Jerry L. Bangert, Thomas E. Henry, Allen M. Jones, Mariel Paquin

Research Associate: A. Duane Anderson [Medical Administration]


The Department of Pathology has responsibility for both anatomical and clinical pathology. The objective of the study of pathology is to gain increased understanding of disease—the causes, mechanisms, and secondary alterations which occur in body structure and function—exploiting whatever methods will provide the physician with a solid body of facts from which to reason, deduce, and prognosticate.

Course Descriptions

489. Introduction to Forensic Sciences: Pathology, Anthropology, Toxicology and Law (2) GC I, II
   Froede-Birkby-Jones-Henry
   The course provides opportunity for the criminal investigator and attorney with a background in forensic pathology to better understand the end results of trauma, toxic substances and environmental catastrophes.

801. General and Systemic Pathology (10) I, II
   Layton-Staff
   Lectures, conferences, demonstrations, and laboratory investigations relating to disease. Use of current autopsy, biopsy, and clinical pathology material. P, Anat. 801, 802, 805; Biochem. 501/801; Physiol. 601/801; M. Mic. 801 (medical) or CR; Phcl. 501/801 or CR; Med. 801 or CR.

810. Clerkship, Yr.
   a. Anatomic Pathology (4-6) Yr.
   An intern type program with students participating in surgical pathology, autopsies, and cytopathology. Instruction is strongly clinically oriented. P, Path. 801 and twelve weeks of clinical clerkships.
   b. Clinical Pathology (4) Yr.
   An interpretive approach to the evaluation of laboratory data in the diagnosis and management of clinical disorders. Topics include bacteriology, blood component therapy, body fluid analysis, clinical chemistry, coagulation, hematology, immunohematology, mycology, toxicology, urinalysis and virology. P, Path. 801 and twelve weeks of clinical clerkships.
   c. Special Topics (3-18) [Rpt.] Yr.
   Opportunities for intensive studies during a six-week period in one of the following fields: computer use, cytopathology, cytogenetics, immunohematology, immunopathology, microbiology-virology, neuropathology, pulmonary pathology, hematopathology, clinical chemistry, and oncology. May be taken more than once for credit. P, Path. 801, and prior arrangement and approval by the department.

891. Preceptorship, Yr.
   a. Pathology (3-18) [Rpt./2]
The unique concerns of pediatrics as a medical discipline are 1) the period of life between conception and the first month of life, loosely termed perinatology; 2) the fact that children are growing and developing constantly, which results in unique physiological, biochemical, pathological, and psychosocial considerations; and 3) the period of life known as adolescence, with its characteristic physiologic and psychologic changes. The objectives of the department are to provide all students of medicine, from freshmen in medical school to the accomplished physician, an opportunity to learn of our best understanding of health and disorders in relation to the above concerns. We also have as a goal the contribution of new knowledge by appropriate research activities and the application of all available knowledge by models of health care. These objectives are achieved by the courses listed below, by active participation in regular postgraduate programs, and by the research and clinical activities in the department.
Course Descriptions

300. **Research (4-6) Yr.**

303. **Clinical Clerkship (6-9) Yr.**
    Williams-Ruggill
    This six week clerkship is required of all students in their initial clinical year; an additional
    three weeks may be selected. Stress is placed upon acquisition and refinement of basic data
    collection, upon problem solving and accumulation of factual knowledge, and achieving
    those attitudes associated with being a physician.

810. **Clerkship, Yr.**
    a. Externship in Inpatient Pediatrics (4-6)
    c. Inpatient Pediatrics (4) Yr.
    Students are offered four or six-week elective clerkships in hospitals in Tucson and

311. **Subinternship, Yr.**
    a. Ambulatory Pediatrics (3-6) Yr.
    d. Adolescent Medicine (4-6)

315. **Subspecialty, Yr.**
    a. Advanced Neonatology (4-6) Yr.
    b. Pediatric Infectious Diseases (4-6) Yr.
    c. Neurodevelopmental Follow-up of High Risk Infants (4) Yr.
    d. Cardiac Ultrasound Echo & Doppler (4-6) Yr.
    e. Pediatric Cardiology (4-6) Yr.
    f. Pediatric Neurology (4-6) Yr.
    g. Pediatric Hematology/Oncology (4-6) Yr.
    h. Poison Center (4-12) Yr.
    k. Pediatric Clinical Pharmacology (4-6) Yr.
    l. Clinical Allergy (4-6) Yr. (Ident. with I. Med. 8151, which is home.)
    p. Pediatric Endocrinology (4-6) Yr.
    r. Pediatric Clinical Research in a Cross-Cultural Setting (4) Yr.
    These four to twelve-week elective courses are organized by various staff and sections of the

891. **Preceptorships, Yr.**
    Hutter-Staff
    a. Pediatrics (4-6) Yr.

899. **Independent Study (3-18) Yr.**
    See Electives Manual for course description.
PHARMACOLOGY

Professors: Thomas F. Burks II, Head [Associate Dean, Research, Medical Administration], David S. Alberts [Internal Medicine], H. Vasken Aposhian [Molecular & Cellular Biology], Klaus Brendel, Rubin Bressler [Professor & Head, Internal Medicine; Chief, Clinical Pharmacology], Burnell R. Brown, Jr. [Professor & Head, Anesthesiology], Ryan J. Huxtable, David G. Johnson [Internal Medicine], Eugene Morkin [Internal Medicine], Charles W. Putnam [Surgery], Diane H. Russell [Molecular & Cellular Biology; Research Associate, Internal Medicine], I. Glenn Sipes [Anesthesiology, Professor & Head Pharmacology & Toxicology], Henry I. Yamamura [Biochemistry, Arizona Research Laboratories; Associate Professor, Psychiatry]

Associate Professors: Dean E. Carter [Pharmacology & Toxicology], Kenneth A. Conrad [Internal Medicine], David L. Kreulen, Thomas J. Lindell [Acting Head, Molecular & Cellular Biology], John D. Palmer [Director, Multidiscipline Laboratories; Assistant Professor, Internal Medicine], William R. Roeske [Professor, Internal Medicine]

Assistant Professors: William Banner, Jr. [Pediatrics; Adjunct Assistant Professor, Pharmacy Practice], Thomas P. Davis, Timothy C. Fagan [Internal Medicine], A. Jay Gandolfi [Anesthesiology; Research Assistant Professor, Pharmacology & Toxicology], Frank Porreca

Instructors: Alan D. Barreuther [Clinical Associate Professor, Pharmacology & Toxicology], William L. Fritz [Assistant Dean, College of Pharmacy; Adjunct Assistant Professor, Pharmacy Practice]

Adjunct Assistant Professor: Siraj I. Mufti [Research Associate, Pharmacology & Toxicology]

Research Associate Professors: Raymond C. Duhamel, Thomas L. Smith

Research Assistant Professors: John J. Duffy [Radiation Oncology], Ronald J. Lukas

Research Associates: Deborah A. Fox, Karoly Gulya, Ramesh C. Gupta, Rajash Handa, Omar D. Hottenstein, Kathleen Keef, Mariangela Serra, Shoichiro Shindo, Jennifer Shook, Jian-Xin Wang, Mark Watson [Internal Medicine]

Visiting Professor: Bernard B. Brodie

Visiting Scientist: Takaaki Obata

Pharmacology is a broad discipline involving the investigation of the actions of chemicals upon living material at all levels of organization. The discipline occupies an important interface between the basic medical sciences and the clinical sciences, drawing strongly upon the former for its contribution to the latter. In the health professions pharmacologic knowledge is applied to the diagnosis, prevention, cure or relief of symptoms of disease, and in the promotion of optimal health. The basic pharmacologic principles are emphasized in both the medical and graduate student teaching. This will permit the student to develop techniques of problem solving to keep abreast of advances in pharmacology through his/her professional career.

Course Descriptions

501/801. The Pharmacological Basis of Therapeutics (6) II Palmer
Action of chemical agents upon living material at all levels of organization, with emphasis on mechanisms of action of prototype drugs. Foundation for a rational approach to human therapeutics and toxicology. P, Psio. 601; Bioc. 501/801. (Identical with Tox. 501.)

520. Clinical Pharmacology (2) I Johnson-Palmer
50. **Drug Disposition and Metabolism (2) II**  
Brendel-Gandolfi  
Principles of absorption, distribution and excretion of drugs, with particular emphasis on mechanisms of drug metabolism and pharmacokinetics. P, 462a, b, or 501, Bioc. 501/801, Tox 602a. (Identical with Tox. 550.)

51. **Molecular Biology of Pharmacological Agents (3) I**  
1987-88, Alternate Year  
Lindell-Russell  
The molecular mechanism of drugs and toxins at the cellular and subcellular levels, including effects on control mechanisms, cell-cell interactions, organelles, and nucleic acid and protein synthesis. P, 501, 550, 561b, Bioc. 501/801. (Identical with Tox. 551.)

54. **Cardiovascular Pharmacology (3) I**  
Huxtable  

61a. **Introduction to Pharmacological and Toxicological Literature (1-1)**  
Yamamura  
Designed to broaden the background of students in pharmacology and toxicology, and to improve scientific communication skills. P, 501 (Identical with Pcol. 561a-561b.)

66. **Environmental Toxicology (3) I**  
Staff  
Toxicity of natural toxins and of agricultural and industrial chemicals with emphasis on air and water pollutants; decision-making in environmental issues. P, 6 units of bio. and organic chem.; Chem. 325, 326. (Identical with Tox. 576, which is home.)

71. **Analytical Toxicology (2-3) I**  
Carter-Davis  
Lecture and lab in the qualitative and quantitative determination of toxic substances in body fluids. Modern instrumental techniques will be employed whenever appropriate. Lecture may be taken separately by non-majors. 2R, 4L. P, Chem. 400a. (Ident. with Tox. 601, which is home.)

72. **Biotoxicology (2-3) II**  
Sipes-Staff  
Lecture and lab emphasizes the mechanisms of organ directed toxicities in animals. Included are chemical carcinogenesis, teratogenesis and mutagenesis. Lecture may be taken separately by non-majors. 2R, 4L. P, two semesters of gen. bio. (Ident. with Tox. 602, which is home.)

73. **Neuropharmacology (2) II 1986-87, Alternate Year**  
Laird-Yamamura  
Role of various neurochemicals in the autonomic and central nervous systems and the effect of drugs on the nervous system, including their influence on synthesis, storage, and release of neurochemicals. P, 501/801, or Pcol. 471b, 561a, 596. (Identical with Pcol. 653, which is home.)

99. **Independent Study (1-5) I, II**  
Staff  
See Electives Manual for course description.

101. **Research (1-6) Yr.**  
Staff  
See Electives Manual for course description.

115. **Subspecialty, Yr.**  
Staff  

a. **Clinical Pharmacology (3) P, Phcl. 801.**  
Staff  
See Electives Manual for course description.

91. **Preceptorship, Yr.**  
Staff  

a. **Pharmacology (3-12)**  
Staff  
See Electives Manual for course description.

100. **Research (1-5) I, II**  
Staff  
Individual or independent work, directed reading, or special problems under the supervision of a member of the faculty with whom specific arrangements have been made. Must be taken for graduate credit by Pharmacology and Toxicology graduate students.

110. **Thesis (1-8) I, II**  
Staff

20. **Dissertation (1-9) I, II**  
Staff

30. **Supplementary Registration (1-6) I, II**  
Staff
The Department of Physiology teaches and does scholarly work on physiological mechanisms of significance to medicine. In both teaching and research, the orientation of the Department is broad, encompassing single cell, organ, and total body function.

The Department of Physiology offers graduate instruction leading to the Doctor of Philosophy degree. The requirements for this degree are those outlined in the catalog of the Graduate College. An M.S. degree is offered only in rare instances when individuals qualified to study for the Doctor of Philosophy are forced to terminate their graduate education.

Applicants for the Ph.D. program must hold a bachelor's degree in the physical or life sciences, engineering or mathematics and must have completed one year of physics (including laboratory), mathematics through calculus (two semesters) plus courses in statistics and chemistry through organic chemistry and familiarity with microcomputers and BASIC language. Physical chemistry and differential equations are not required but are highly desirable and strongly recommended. An introductory course or readings in biology or zoology is deemed advisable for physical science majors. The Graduate Record Examination and three letters of recommendation are required to assist in evaluation of applicants.

Research training is an integral part of the Ph.D. program. There are laboratories for research on dynamics and control of the microcirculation, contraction of muscle and its membrane phenomena, reflex regulation of muscle activity, comparative renal tubule transport and water balance, cellular aspects of transport, reproductive endocrinology and hormone action, development of gastrointestinal functions, cellular and membrane aspects of cardiac function, and the dynamics of respiratory function. In special circumstances, the dissertation research may be done outside the department.

The specialized nature of the material and equipment required for courses given in the College of Medicine may necessitate some limitation of enrollment. Medical students will receive preference in courses required for the M.D. degree. All other students must obtain
permission of the instructor before enrolling. Graduate students already enrolled in the College of Medicine departments will be given preference.

For further information, consult the catalog of the Graduate College.

**Course Descriptions**

499. Independent Study (1-5) I, II  
Staff

601. Human Physiology (8) II  
Staff

Principles of physiology with emphasis on that of the human. P, Chem. 103b, 104b, 241b, 243b; Phys. 102b. Consult department before enrolling.

505. Neurosciences (6) II  
Angevine-Barber-Hasan

(Identical with Anatomy 605/805, which is home.)

**Courses Primarily for Graduate Students**

418. Physiology for Engineers (4) GC I  
Braun

Designed to bring to engineering students awareness of the structure and function of whole organisms, their component organs and organ systems. Open to nonmajors only. (Identical with A.M.E. 418, Ch.E. 418 and E.C.E. 418.)

419. Physiology Laboratory (2) GC I  
Braun

Lab experiments in physiology intended to provide experience with organ systems and measurement techniques. Designed for engineering students enrolled in the clinical engineering and biomedical engineering options. 6L. Open to nonmajors only. P, 418 or CR. (Identical with A.M.E. 419, Ch.E. 419 and E.C.E. 419.)

480. Human Physiology (4) GC II  
Wright

Principles of physiology, with emphasis on the human; designed primarily for students in pharmacy and health related sciences. Open to pharmacy majors; others consult department before enrolling. P, Chem. 243b, Math. 123, Phys. 102b, CR 481. (Identical with Tox. 480.)

481. Physiology Laboratory (1) GC II  
Wright

Experiments intended to reinforce principles of physiological phenomena; designed primarily for students in pharmacy and health related sciences. Open to pharmacy majors; others consult department before enrolling. P, Chem. 243b, Math. 123, Phys. 102b, CR 480 (Identical with Tox. 481.)

495. Colloquium  
Staff

a. Introduction to the Neurosciences I (2) GC  
An introductory overview of mammalian neural structure and function. Neuroanatomical and neurophysiological principles are emphasized. P, permission of instructor. (Ident. with Interdept. 495a, which is home.)

b. Introduction to the Neurosciences II (2) GC  
An introductory overview of clinical conditions that affect the human nervous system. P, 495a or consent of department. (Ident. with Interdept. 495b, which is home.)

600. Mathematical Techniques in Physiology (3) I  
Secomb

The application of quantitative and analytical mathematical techniques to selected areas of physiology; introduction to mathematical approaches commonly used in physiology. Open to majors and minors, others consult department before enrolling. P, Math. 125a-125b, 160.

602. Readings in Physiology (2) II  
Staff

Designed to provide students with more detailed consideration of various organ systems than can be provided in 601. Open to majors and minors only. P, Chem. 103b, 104b, 241b, 243b, Phys. 102b, CR 601.

606. Readings in Neuroscience (2) II  
Hasan

Essentials of mammalian neural structure and function. This course is not recommended for students whose major interests lie in the neurosciences. Open to majors and minors only.

610. Research Methods in Physiology (1-3) [Rpt.] I, II  
Staff

A lab course stressing the principles of physiological research.

696. Seminar (1-4) I, II  
Staff

a. Advanced Mammalian Physiology (1-4) [Rpt.] I, II  
Open to majors and minors only. P, 600, 601, 602; 606 or Anat. 605.

b. Literature (1) [Rpt.] I, II  
Open to majors only. P, 600, 601, 602, 606 or Anat. 605.
Individual Studies

699. Independent Study (1-5) I, II
891. Preceptorship, Yr.
   a. Physiology (3-12)
      See Electives Manual for course description.
899. Independent Study (1-6) I, II
      See Electives Manual for course description.
900. Research (1-6) I, II
      Individual research not related to a thesis or dissertation for advanced degree.
920. Dissertation (1-9) I, II
      Research for the doctoral dissertation.
930. Supplementary Registration (1-6)
Professors: Alan I. Levenson, Head, Allan Beigel [on leave of absence; Psychology; Vice President, University Relations & Development], Larry E. Beutler [Psychology; Chief, Clinical Psychology Section], Henry W. Brosin, John C. Racy, Stephen C. Scheiber, Alayne Yates [Associate Professor, Pediatrics; Chief, Child Psychiatry Section]

Associate Professors: Diane S. Fordney [Obstetrics & Gynecology], Alfred W. Kaszniaik [Adjunct Associate Professor, Psychology], Henry I. Yamamura [Professor, Pharmacology, Biochemistry, Arizona Research Laboratories]

Assistant Professors: Peter J. Attarian [Associate Professor, Family & Community Medicine], Shirley Nickols Fahey [Associate Dean, Admissions; Director, Division of Social Perspectives in Medicine; Co-Coordinator, Human Behavior & Development], Milton Frank [Chief Social Worker, Psychiatry], Russell D. Martin [Associate Chief for Education, Veterans Administration Medical Center], Rebecca L. Potter


Adjunct Professor: Elliott M. Heiman [Family & Community Medicine]

Adjunct Associate Professors: Herman P. Gladstone, Gabriel O. Manasse, Ronald G. Nathan

Adjunct Assistant Professors: Michael R. Berren, Murray M. DeArmond [Family & Community Medicine; Lecturer, Psychology; Director, Student Health Service], Hayward M. Fox [Associate, Psychology], Robert W. Garrett [Family & Community Medicine; Pharmacy Practice], Kenneth F. Marsh [Head, Mental Health, Student Health Service; Associate, Psychology], Bernard M. Morenz III, Joan B. Rosenblatt, Herschel D. Rosenzweig

Clinical Associate Professors: JoAnn B. Fineman [Pediatrics], John J. Misiaszek, Catherine M. Shisslak [Adjunct Assistant Professor, Psychology]

Clinical Assistant Professors: James Allender, Martha P. Fankhauser [Pharmacy Practice], Janet Kinney [Pharmacy Practice], David L. Stoker, Betty Jo Tricou

Clinical Instructor: Raymond K. Lederman

Research Associates: G. Maureen Chaissen, David E. Engle, Elizabeth B. Yost [Associate Professor, Counseling & Guidance]

Education Specialist: Elizabethe M. Segerstrom

Associates: Harold S. Arkowitz [Associate Professor, Psychology], Thomas E. Bittker, David S. Burgoyne, James M. Campbell, Thomas J. Cox, Stuart I. Holtzman, Ivan D. McCrum, James B. McLoone, Anne J. Miller [Family & Community Medicine; Visiting Assistant Professor, Educational Psychology], Larry M. Nahmias, Iris Pearlman,
Theodore J. Radomski, Leland K. Reeck, David A. Ruben, Martin E. Sodomsky, Margaret S. St. John [Family & Community Medicine], Shelley Uram, Hubert E. Wuesthoff

The program of the Department of Psychiatry is designed to help students develop an understanding of the variety, range, and determinants of both normal and abnormal forms of human behavior. In addition, the student is helped to develop those skills that are needed in recognizing and dealing with mental disorder, whether primary or secondary to other illness.

To meet these goals, both didactic courses and clinical instruction are offered in the College of Medicine curriculum. After students have been introduced to normal personality functions and to abnormal processes which form the basis of psychopathology, they are given an opportunity to work directly with patients in a variety of clinical settings, both psychiatric and medical.

In addition to clinical training, the students are helped to develop an understanding of the current social, economic, and legal issues relevant to the organization and delivery of mental health services.

**Course Descriptions**

495. Colloquium
   b. Introduction to the Neurosciences II (2) GC

An introductory overview of clinical conditions that affect the human nervous system. P, 495a or permission of the instructor. (Identical with Interdept. 495b, which is home.)

599. Independent Study (1-6) I, II

See Electives Manual for course description.

800. Research (1-12) I, II

See Electives Manual for course description.

803. Clinical Clerkship (6-9) Yr.

Students are assigned patients in inpatient clinical settings. They obtain and record a complete history, mental status, and physical examination. The students are expected to study the course of their patients and record their observations in daily progress notes. They work closely with clinical staff in the diagnosis, specific treatment, ward management, and discharge planning involving their patients. In addition, they are introduced to community and legal services for the chronically ill, the suicidal, and the violent patient. Those students wishing to take an additional three- or six-week clerkship in psychiatry may elect to do so. (See 810 description.)

810. Clerkship, Yr.
   a. Clinical and Community Psychiatry (6) Yr.
   b. Child Psychiatry (6) Yr.

See Electives Manual for course descriptions.

815. Subspecialty, Yr.
   a. Consultation Psychiatry (6)


891. Preceptorship I, II
   a. Psychiatry (6) [Rpt./2] I, II


899. Independent Study (1-18) I, II

See Electives Manual for course description.
Radiation Oncology is that discipline of medicine concerned with the application of radiation in the treatment of patients, the majority of whom have benign and malignant neoplasms. The discipline is also concerned with the interactions and modifiers of radiation in tissues, as well as subcellular, cellular and organ effect of such treatment. The department consists of four (4) Divisions including the Division of Cancer Biology, Division of Physics, Division of Biostatistics and Clinical Division. The department is also active in research and clinical application of hyperthermia for patients with malignant disease.

Course Description

501. Radiation Biology (3) II

Basic principles of radiation effects in mammalian cell and tissue systems with emphasis on biochemical aspects, such as DNA damage and DNA repair, and cellular responses, such as cell kinetics defects and radiation repair and recovery; radiation and chemical (especially radiomimetic drugs) carcinogenesis. P, intro. bio. and chem.

Gerner

555. Cancer Biology (3) II

(Ident. with Micr. 555, which is home.)

Gerner

596. Seminar (See 896)

See Electives Manual for course description.

815. Subspecialty, Yr.

a. Introduction to Radiation Oncology (6) Yr.

See Electives Manual for course description.
896. **Seminar**  
   h. Control of Proliferation in Animal Cells (1-2) II  
      P, consent of department. (Ident. with Micr. 596h/896h.)  
      See Electives Manual for course description.

899. **Independent Study (1-12) I, II**  
      See Electives Manual for course description.
Professors: M. Paul Capp, Head, John Amberg, Harrison H. Barrett [Optical Sciences], Theodore Bowen [Physics], Kai Haber [Assistant Director, Clinical Radiology], Bruce J. Hillman, Theron W. Ovitt [Chief, Diagnostic Radiology], Dennis D. Patton [Optical Sciences; Chief, Nuclear Medicine Section], Michael J. Pitt [Surgery], Arthur J. Present [Emeritus], Joachim F. Seeger, William L. Wolfe, Jr. [Optical Sciences], James M. Woolfenden

Associate Professors: John C. Bjelland, William J. Dallas, Robert E. Henry, Tim B. Hunter, Gerald D. Pond, Bryan R. Westerman [Director, Radiation Safety]

Assistant Professors: Raymond F. Carmody, Mark M. Chernin, John D. Newell, Peter J. Yang

Instructor: Jason L. Stemmer

Lecturers: Harry R. Claypool [Associate, Anatomy], Jack N. Hall, Joseph Vilani

Adjunct Associate Professors: Theodore Ditchek, Walter T. Hileman, Norman N. Komar


Clinical Associate Professor: James R. Standen

Clinical Assistant Professors: Avi Ben-Ora, Harris J. Finberg, Bertram Sosnow, Cary J. Stegman, Richard D. Wachter

Clinical Instructor: Carl S. Freeman

Research Associate Professor: Hans Roehrig
Research Assistant Professors: H. Bradford Barber, Kyle J. Myers, George W. Seeley [Research Associate, Optical Sciences], Warren E. Smith
Research Specialist: Kevin M. McNeill
Research Associates: Robert E. Hastings, Jr. [Clinical Assistant Professor, Surgery]

The Department of Radiology includes the University Medical Center Divisions of Diagnostic Radiology, and Nuclear Medicine.

Course Descriptions

800. Research (1-6) [Rpt./1]  Staff
     See Electives Manual for course description.

815. Subspecialty, Yr.  Staff
     b. Nuclear Medicine (6) Yr.
        See Electives Manual for course descriptions.

891. Preceptorship, Yr.  Staff
     a. Radiology (6) [Rpt./1] Yr.

899. Independent Study (1-12) I, II  Staff
     See Electives Manual for course description.
SURGERY

Professors: Stephen L. Wangensteen, Head [Chief, General Surgery Section], Victor M. Bernhard [Chief, Vascular Surgery Section], Milos Chvapil [Chief, Surgical Biology Section], Jack G. Copeland [Chief, Cardiovascular & Thoracic Surgery Section], Stanley W. Coulthard [Chief, Otohinolaryngology Section], George W. Drach, Associate Head [Chief, Urology Section], Alan S. Fleischer [Chief, Neurosurgery Section], Eric P. Gall [Internal Medicine, Family & Community Medicine], Theodore J. Olarte [Speech & Hearing Sciences], William R. Hodgson [Speech & Hearing Sciences], Douglas Lindsey, Noel D. Matkin [Speech & Hearing Sciences], Leonard F. Peltier, Michael J. Pitt [Radiology], Charles W. Putnam [Pharmacology], Donald P. Spear [Anatomy], Hugo V. Villar, Robert G. Volz [Chief, Orthopedic Surgery Section], Charles L. Witte, Marlys H. Witte, Charles F. Zukoski III

Associate Professors: Robert M. Anderson [Associate Dean, Continuing Medical Education & Outreach], Charles F. Koopmann, Jr., James M. Malone, Harvey W. Meislin [Chief, Emergency Medicine Section], Edward C. Percy [Physical Education], Arthur B. Sanders [Family & Community Medicine; Assistant Professor, Internal Medicine], Thomas H. Stanisic

Assistant Professors: Janis M. Burt [Physiology], Gary L. Dunnington, Robert B. Dzioba, Robert W. Emery, Jr., J. David Gibeault, Robert P. Iacono, Kenneth V. Iserson, Steven M. Joyce, Mark M. Levinson, Kenneth E. McIntyre [Director, Trauma Services], Jerry D. Mohr, Del V. Steinbronn [Radiation Oncology], John B. Sullivan, Jr. [Adjunct Assistant Professor, Pharmacology & Toxicology], David B. Van Wyck [Internal Medicine]

Instructor: James B. Benjamin

Lecturers: Michael A. Buldra, Janice A. Copeland, Bob T. Foster, Anthony C. Guzauskas, Ann Kerwin, Kath琳 V. Kintner, Joseph M. Leal, Donald B. Lewis, John D. Lewis, Mary Jean McAleer, David G. Poedel, Thomas C. Rotkis, Ruth L. Smothers [Associate, Internal Medicine], Holly J. Tyson, Walter P. Work

Adjunct Professors: Floyd E. Anderson, Henry A. Perlmutter

Adjunct Associate Professors: Donald W. DeYoung [Veterinary Sciences; Surgical Veterinarian, Animal Resources Division], Jacob B. Redekop

Adjunct Assistant Professors: Bradley S. Litin, Vincent P. Russo

Clinical Professors: Merril W. Brown, Robert B. Gilsdorf, Donald M. Gleason, Stanley I. Glickman, John R. Green, Harry W. Hale, Jr., Alfred Heiblbrunn [Associate Dean, Veteran Affairs], George H. Mertz, Eric G. Ramsay, Robert F. Spetzler, Richard A. Walsh, Peter J. Whitney, MacDonald Wood

Clinical Associate Professors: Lloyd S. Anderson, David P. Campbell [Associate, Pediatrics], L. Philip Carter, C. Peter Crowe, Jr. [Associate, Pediatrics], C. Herbert Fredell, Frederick A. Greenwood, Lawrence J. Koep, John W. Magee, Jr., Hal W. Pittman, Harold L. Rekate, Volker K. H. Sonntag, John M. Stein, Thomas L. Wachtel, Frank L. Zwemer

Clinical Instructor: William J. Quinlan
Research Professors: A. Norman Guthkelch, Jonathan Herschler
Research Associate Professors: Cleamond D. Eskelson [College of Pharmacy], Ronald L. Misiorowski
Research Assistant Professors: Stephen Harkins, Brian Hunter, Judith E. Riley
Research Specialists: Linda K. Houtkooper [Lecturer, Exercise and Sport Science], Alan K. Reeter
Cardiothoracic Cardiopulmonary Perfusionists: John P. Duffy, Raymond L. Ramirez
Health Care Associates: Sharon G. Kujawa, Janette D. LeBouton
Visiting Associate Professor: John C. Sutherland
The Department of Surgery provides a broad general exposure to surgery during a 6 week basic clinical clerkship and a 3 week specialty clerkship. The specialty clerkship requirement can also be met by registering for Surgery 807 in Year IV. The basic clerkship stresses preoperative evaluation, proper operating room conduct, and postoperative management. Basic operative skills are practiced in the animal laboratory. An awareness of the nature and management of surgical disease is developed by lectures and rounds and weekly conferences. The surgery Specialty Clerkship reinforces these basic skills by application to specialty areas such as urology, orthopedics, neurosurgery, cardiothoracic surgery and otorhinolaryngology.

Elective courses in general and specialty surgery and various aspects of surgical biology are offered. Increased clinical responsibility is assured on hospital services by assigning the elective student to the patient care team. Special courses designed around specific clinical activities and research programs in the Department of Surgery and other departments are available on an individual basis.

The graduate program in surgical sciences includes hospital training in general and specialty surgery with a strong emphasis upon the five-year graduate program. It emphasizes training of the clinical surgeon but encourages elective surgical study for future community, academic or research surgery.
Course Descriptions

800. Research (1-12) Yr. Staff
See Electives Manual for course description.

803. Clinical Clerkship (6-9) Yr. Lindsey-Staff
Introduction to clinical surgery through hospital clerkship on surgical wards.

807. Specialty Clerkship (3) Yr. Lindsey-Staff
Introduction to clinical surgery through exposure to a surgery Specialty Clerkship (as assigned by the Surgery Department.)

810. Clerkship, Yr. Zukoski-Staff
a. General Surgery (4-8) Yr.
   See Electives Manual for course description.

811. Subinternship, Yr. Sanders
a. Emergency Medicine (4-6) Yr.
   See Electives Manual for course description.

815. Subspecialty, Yr. [Rpt./3] Zukoski-Staff
a. Urinary Stone Disease (6) Yr.
b. Cardiothoracic Surgery (4-12) Yr.
c. Neurosurgery (3-6) Yr.
d. Surgical and Medical Problems in Fluid and Electrolyte Balance (3) [Rpt./1] Yr.
e. Urology (4-6) Yr.
f. Orthopedics (3) Yr.
g. Cardiovascular Physiology and Research (6-12) Yr.
h. Lymphvascular System in Health and Disease (6-12) Yr.
i. Otorhinolaryngology (3) Yr.
j. Sports Medicine (Section of Orthopedic Surgery) (3-8) [Rpt./1] Yr.
k. Orthopedic Bioengineering (3-6)
m. Trauma (3-6)

891. Preceptorships, [Rpt./3] Yr. Zukoski-Staff
a. Surgery and Subspecialities (4-12) [Rpt./3] Yr.

896. Seminar (1-18) [Rpt./1] Yr. Witte-Staff
a. Medical ignorance (2)
   P, Completion of Sophomore Year. See Electives Manual for course description.
DIVISIONS

DIVISION OF ANIMAL RESOURCES

Susan E. Wilson, D.V.M., Acting Director

The Division of Animal Resources was established, within the College of Medicine, to provide a centralized facility for the maintenance of animals for use in research and teaching. Inherent with this function is the responsibility to maintain animal welfare standards exceeding those required by law.

The Division not only provides space for the holding of animals, but also the feeding, cleaning and handling of those animals. In addition, three veterinarians and a staff of trained laboratory animal technologists and technicians provide high quality animal care. The Division of Animal Resources staff and faculty are available to train and assist investigators, research technicians and students on the proper methods of animal handling and use. Expertise in the use of specific animal models is provided to investigators, thus eliminating unnecessary use of animals.

Federal and local policy requires that all research, teaching and/or testing Protocols involving the use of animals must be reviewed and approved by the University Laboratory Animal Care Committee (ULACC) prior to initiation of the project. The ULACC as well as the staff of the Division of Animal Resources is involved in the assurance that all laboratory animals receive humane treatment. Concern for the welfare of animals, plus recognition of the need for quality biomedical research are the primary objectives of the Division of Animal Resources.
DIVISION OF BIOMEDICAL COMMUNICATIONS

William T. Harrison, Ph.D., Director
Richard A. McNeely, M.A., Associate Director

The Division of Biomedical Communications is an academic support unit providing comprehensive communications media planning and production services for the Arizona Health Sciences Center. A professional staff provides medical photography, illustration, television, instructional materials design and development, and media utilization services in support of the teaching, in-service training, research, and public service programs of the College of Medicine.

A primary goal of the Division is to provide timely, creative, innovative and cost-effective resources for the instructional communication needs of the faculty, staff and students.

CANCER CENTER DIVISION

Sydney E. Salmon, M.D., Director

The Arizona Cancer Center was established in 1976 with an overall goal to significantly contribute to research related to the understanding and treatment of cancer. To attain its goal, the Cancer Center pursues the following objectives:

1) serve as a major geographic resource identified as a Cancer Research Center,
2) promote excellence in clinical and laboratory cancer research, patient care and education,
3) facilitate and coordinate cancer-related programs at the University of Arizona,
4) develop an outreach program to serve the State of Arizona.

The Cancer Center has been involved with planning educational, clinical and scientific activities. The Center's commitments have included educational programs for medical and graduate students as well as teaching of practitioners and allied health professionals at local and national continuing medical education programs. Medical Student Cancer Programs have been awarded to students to work in cancer-related projects with faculty throughout the College of Medicine and other health professionals throughout the state. The monthly Tumor Board at the University Medical Center is open to all interested persons and discusses aspects of cancer patient management and cancer prevention. As part of the required curricula of medical students, individual lectures in cancer education are presented in the Departments of Biochemistry, Microbiology and Immunology, and Pharmacology.

The clinical oncology and clinical research programs of the Cancer Center have continued to draw an increasing cancer patient volume to the Arizona Health Sciences Center which is now the acknowledged leading resource for provision of cancer care in the state.

Multidisciplinary cancer research expertise is continually developed and expanded in numerous clinical and laboratory programs that include basic research studies on oncogenes and on carcinogenesis; the study of heat, radiation and drugs in cancer therapy; the interaction of Vitamin A and its synthetic derivatives with pre-neoplastic and neoplastic states; the definition of the pathophysiology of clonal growth of human tumors; clinical pharmacology of anticancer drugs; tissue kinetics; tumor virology; cellular and molecular biology; medical imaging of cancer; cancer prevention; cytogenetics; and carrying out clinical trials of promising approaches to cancer prevention, diagnosis and treatment.
The Health Sciences Center Library was one of the earliest units planned for the center, and opened its doors in September 1967, when the first College of Medicine class began studies. Occupying 32,000 square feet of space, the library currently houses approximately 145,000 bound volumes, 3,200 media titles, and subscribes to 3,500 journals.

As part of the nationwide medical library network sponsored by the National Library of Medicine, the Health Sciences Center Library is the subregional library serving Arizona for the Pacific Southwest Regional Medical Library Services. Its resources are available not only to students and faculty of the University, but also to all health care providers throughout Arizona. Experienced reference librarians are on duty weekdays and Saturdays to assist patrons in the use of the collection and to explain all of the services offered by the library.

Special services and features of the library include: (1) Computer-based on-line information retrieval services in medicine and the health-related sciences. (2) A computer-based on-line cataloging system accessing catalog records from a central data base. (3) A computer-based on-line circulation system. (4) A media department including over 3,000 titles (audiotapes, videotapes, slide/sound programs, and models), one large viewing room, models room, and eight study carrels especially equipped to accommodate all media formats. (5) A Field Librarian providing reference services and consultation services to health workers and health sciences libraries throughout Arizona. (6) A Microcomputer Learning Center housing seven microcomputers for the support of student instruction in the College of Medicine. All training programs are coordinated by the Office of Medical Education. (7) Twenty-four hour access, except for two holidays each year, Christmas Day and New Year’s Day.

The Health Sciences Center Library offers special orientation classes in medical bibliography and information retrieval. These are included in the College of Medicine curriculum as part of introductory course work. Individual assistance and group instruction are also offered.
DIVISION OF MULTIDISCIPLINE LABORATORIES

John D. Palmer, Ph.D., M.D., Director

The University of Arizona College of Medicine utilizes multidiscipline laboratories for the teaching of the laboratory aspects of the basic science courses. In contrast to the more traditional medical schools wherein each of the six basic science departments has its own teaching facility, this institution uses a central teaching facility which serves as the home base for the students enrolled in the preclinical years of the curriculum. Thus, instead of the students coming to the faculty, the faculty comes to the students in the multidiscipline laboratories. The student laboratory wing of the Basic Sciences Building also includes the lecture halls used by the medical students. In a single wing of the building, the medical students receive the majority of their preclinical education.

The Multidisciplinary Laboratories also provide educational support for all activities. This includes audiovisual services, including television production and display. Additional audiovisual resources are available for the research activities of the basic science faculty. These are coordinated through the Division of Biomedical Communications.

DIVISION OF RESPIRATORY SCIENCES
(CHEST-ALLERGY CENTER)

Benjamin Burrows, M.D., Director
Ronald J. Knudson, M.D., Associate Director
Michael D. Lebowitz, Ph.D., Associate Director, Environmental Programs
Lynn M. Taussig, M.D., Assistant Director

The Division of Respiratory Sciences has members from many different academic departments of the University. It has responsibility for interdisciplinary pulmonary-allergy programs in research, training, and clinical services. It operates the St. Luke's Adult-Pediatric Chest-Allergy Clinic and the University Medical Center's Department of Respiratory Services, including the Respiratory Therapy Service, the Adult and Pediatric Pulmonary Function Laboratories, and the Blood Gas Laboratory. The Division is also responsible for collaborative postdoctoral training programs in Adult and Pediatric Pulmonary Medicine.

A major function of the Division is to coordinate multidisciplinary research programs in pulmonary disease. It is responsible for the Specialized Center of Research (SCOR) in Obstructive Airways Diseases established at the College of Medicine with funding from the National Institutes of Health. Many of the research programs of the Division are carried out in the Westend Laboratories, which are included in a "Chest Center" addition to the Clinical Sciences Building which opened in 1975. While the Division carries out a wide variety of research programs, its largest programs are a longitudinal study of a representative sample of the Tucson population (Tucson Epidemiological Study of Obstructive Lung Diseases) and a longitudinal study of newborns and their parents (the Tucson Children's Respiratory Study).
DIVISION OF RESTORATIVE MEDICINE

John T. Boyer, M.D., Director

The Division of Restorative Medicine, a collaborative and coordinating unit established in 1984 within the University of Arizona's College of Medicine, brings research, education, and service emphases to the increasingly important problems of geriatrics, rehabilitation, and chronic conditions. The Division has a special role in the development of multidisciplinary programs involving college faculty, allied health professionals, university scientists and health administrators in the public sector.

The Division operates geriatric assessment and care management clinics under the direction of John T. Boyer, M.D., where difficult geriatric cases are referred. The Division is also responsible for the direction of a physical medicine and rehabilitation unit headed by Pedro L. Escobar, M.D. Both are located at University Medical Center.

The Division provides comprehensive geriatric and rehabilitation education to medical students, residents, and fellows at the University. Statewide training opportunities in geriatrics and rehabilitation are available for community health professionals. Medical forums on "Coping with Chronic Conditions," presented by Arizona Health Services Center faculty under the coordination of the Division, are conducted in the spring and fall for the public, patients and families, and interested health professionals.

DIVISION OF SOCIAL PERSPECTIVES IN MEDICINE

Shirley Nickols Fahey, Ph.D., Director

The Division of Social Perspectives in Medicine was established within the College of Medicine in recognition of the increasingly complicated cultural, social, economic, legal and ethical influences affecting the institution of medicine in American society. The efforts of this Division are aimed at expanding and exciting the thinking of medical students and faculty in the area of human values and the role of medicine in contemporary society.

The activities of the Division include symposia, seminars and workshops on such topics as: cultural and economic factors in health and disease, ethical issues in medicine, medical jurisprudence, health needs of the elderly, care for the terminally ill, holistic medicine, innovations in medical education, and other current issues. Local and national authorities are invited to participate in these programs from such fields as psychology, law, politics, sociology, anthropology, economics, theology, and philosophy in addition to medicine.

The Division also sponsors Kenneth A. Hill Visiting Scholars who spend time at the College of Medicine and share their perspectives on modern medicine with both students and faculty in a variety of academic and clinical settings.
THE ARIZONA BOARD OF REGENTS

Ex-Officio

Bruce E. Babbitt, J.D.........................................................Governor of Arizona
Carolyn P. Warner.......................................................State Superintendent of Public Instruction

Appointed

Nora A. Colton, B.S.,.....................................................May, 1986
Donald Pitt, J.D., President.................................................January, 1986
Esther N. Capin, M.Ed.....................................................January, 1986
Tio A. Tachias................................................................January, 1988
William P. Reilly, Treasurer................................................January, 1988
Donald G. Shropshire, B.S., Secretary.................................January, 1990
A. Jack Pfister, LL.B., President Elect.................................January, 1990
Edith S. Auslander, Ph.D..................................................January, 1992
Herman Chanen, Assistant Secretary....................................January, 1992

Assistants

Molly C. Broad, M.A..........................................................Executive Director
Odus Elliott, Ph.D..........................................................Associate Director, Academic Programs
Robert Lawless, M.S............................................................Associate Director for Finance
Jacqueline Schneider, J.D....................................................Counsel
Glen Brockman, J.D..........................................................Associate Counsel
Shari Lewis........................................................................Assistant Director for Personnel
Virginia Benge.........................................................Assistant to the Executive Director and Secretary to the Board of Regents
Arthur Ashton, Ph.D..........................................................Assistant to the Executive Director
Jose Sena........................................................................Coordinator of Affirmative Action
OFFICERS OF THE UNIVERSITY

Henry Koffler, Ph.D.......................................................President of the University

Vils Hasselmo, Ph.D........................................Senior Vice President for Academic Affairs & Provost

Ben J. Tuchi, Ph.D....................................................Senior Vice President for Administration & Finance

Laurel L. Wilkening, Ph.D........................................Vice President for Research

George R. Cunningham, M.P.A............................Vice President for Administrative Services

Dudley B. Woodard, Jr., Ph.D.................................Vice President for Student Affairs

Allan Beigel, M.D..................................................Vice President of University Relations & Development

George H. Davis, Ph.D........................................Vice Provost for Academic Affairs

Celestino Fernandez, Ph.D.................................Associate Vice President for Academic Affairs

William R. Noyes, Ph.D.................................Associate Vice President for Academic Affairs

Bill J. Varney, B.S.............................................Associate Vice President for Administration Services

Sarah A. Blake, B.S., C.P.A.................................Associate Vice President for Finance

John A. Monnier, M.B.A., C.P.A.........................Associate Vice President, Center for Computing & Information Technology

Charles H. Peyton, A.B.F.T...............................Associate Vice President for Research

Jane H. Underwood, Ph.D................................Assistant Vice President for Research

James T. Wheeler, M.B.A.................................Assistant Vice President for Research

Doris J. Ford, Ph.D...............................................Assistant Vice President for Academic Affairs
RECIPIENTS OF FACULTY TEACHING AWARDS
April 15, 1985

BASIC SCIENCES

Basic Sciences Educator of the Year:  
Ruthann Kibler, Ph.D.

Dean’s List for Excellence in Teaching in the Basic Sciences:  
William D. Barber, D.V.M., Ph.D.
Thomas F. Burks II, Ph.D.
Richard L. Stouffer, Ph.D.

Outstanding Achievement in Teaching in the Basic Sciences:  
Department of Pathology

CLINICAL SCIENCES

Clinical Sciences Educator of the Year:  
John C. Racy, M.D.

House Officer Educator of the Year:  
Diana B. McNeill, M.D.

Dean’s List for Excellence in Teaching by a House Officer:  
J. Kenneth Braun, M.D.
S. Ann Callison, M.D.
Jordan W. Tappero, M.D.

Dean’s List for Excellence in Teaching of the Clinical Sciences:  
Douglas H. Lindsey, M.D., M.P.H., Dr. P.H.
Jay W. Smith, M.D.
Peter J. Lynch, M.D.

Outstanding Achievement in Teaching in the Clinical Sciences:  
Department of Pediatrics

FOUNDER’S DAY LECTURESHIPS

Henry I. Yamamura, Ph.D.  
November 16, 1979
David J. Sahn, M.D.  
November 17, 1980
Mark R. Haussler, Ph.D.  
November 17, 1981
Diane H. Russell, Ph.D.  
November 17, 1982
Robert G. Volz, M.D.  
November 17, 1983
Benjamin Burrows, M.D.  
November 16, 1984
M. Paul Capp, M.D.  
November 15, 1985
Dean Louis J. Kettel

COLLEGE OF MEDICINE FACULTY

ADMINISTRATION

(Year of first appointment to faculty in parentheses after each name.)

KETTEL, LOUIS J. (1968) Dean; Professor, Internal Medicine
B.S., 1951, Purdue University; M.D., 1954, M.S., 1958, Northwestern University

FULGINITI, VINCENT A. (1969) Vice Dean; Professor, Pediatrics
A.B., 1953, M.D., 1957, M.S., 1961, Temple University

HEINS, MARILYN J. (1979) Vice Dean; Associate Professor, Pediatrics
A.B., 1951, Radcliffe College; M.D., 1955, College of Physicians and Surgeons, Columbia University

ANDERSON, ROBERT M. (1962) Associate Dean, Continuing Medical Education & Outreach; Associate Professor, Surgery
M.D., 1946, Marquette University

BURKS, THOMAS F., II (1977) Associate Dean, Research; Professor and Head, Pharmacology
B.S., 1962, M.S., 1964, University of Texas, Austin; Ph.D., 1967, University of Iowa

FAHEY, SHIRLEY NICKOLS (1970) Associate Dean, Admissions; Director, Division of Social Perspectives in Medicine; Co-Coordinator, Human Behavior & Development; Assistant Professor, Psychiatry
B.A., 1957, Vanderbilt University; M.A., 1963, Ph.D., 1964, University of Florida

GOLDNER, ANDREW M. (1975) Associate Dean, Student Affairs; Director of Alumni Affairs; Associate Professor, Physiology
B.A., 1956, Oberlin College; M.A., 1957, Stanford University; Ph.D., 1966, George Washington University

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HEILBRUNN, ALFRED (1977)  Associate Dean, Veteran Affairs; Clinical Professor, Surgery
B.S., 1952, University of Missouri; M.D., 1954, University of Kansas

SEILS, GEORGE W. (1974)  Assistant Dean, Medical Administration
Ph.B., 1948, M.B.A., 1950, University of Chicago

BOYER, JOHN T. (1968)  Director, Division of Restorative Medicine, Professor, Internal Medicine, Family & Community Medicine
B.S., 1951, Denison University; M.D., 1955, Harvard University

BURROWS, BENJAMIN (1968)  Director, Division of Respiratory Sciences; Professor, Internal Medicine; Chief, Pulmonary Diseases Section
M.D., 1949, Johns Hopkins University

HARRISON, WILLIAM T. (1972)  Director, Division of Biomedical Communications
B.A., 1965, M.A., 1966, Michigan State University; Ph.D., 1974, Ohio State University

HIGDON, THOMAS D. (1975)  Director, Arizona Health Sciences Center Library
B.A., 1957, University of Oklahoma; M.S.L.S., 1958, Columbia University

KOFF, THEODORE H. (1981)  Director, Long Term Care Gerontology Center
B.S., 1950, City College of New York; M.S., 1953, Columbia University; Ed.D., 1971, University of Arizona

PALMER, JOHN D. (1966)  Director, Multidiscipline Laboratories; Associate Professor, Pharmacology; Assistant Professor, Internal Medicine
B.S., 1954, M.S., 1955, University of Colorado; Ph.D., 1961, M.D., 1962, University of Minnesota

RUBECK, ROBERT F. (1978)  Director, Office of Medical Education

SALMON, SYDNEY E. (1972)  Director, Cancer Center Division; Professor, Internal Medicine; Lecturer, Pediatrics
B.A., 1958, University of Arizona; M.D., 1962, Washington University

WILSON, SUSAN E. (1973)  Acting Director, Animal Resources; Associate, Internal Medicine; Research Specialist, Veterinary Pathology; Adjunct Research Specialist, Veterinary Science
FACULTY

ABRAHAM, MARILYN M. (1975)  Associate, Internal Medicine, College of Nursing
    B.S., 1954, University of Cincinnati; M.S., 1962, Case Western Reserve University

ABRAMS, HERBERT K. (1968)  Professor, Family & Community Medicine
    B.S., 1936, Northwestern University; M.S., M.D., 1940, University of Illinois; M.P.H., 1947, Johns Hopkins University

ACKERMAN, ALAN (1983)  Research Assistant Professor, Family & Community Medicine
    B.A., 1970, Clark University, Worcester, Massachusetts; Ph.D., 1974, Massachusetts Institute of Technology, Cambridge

    B.A., 1970, St. Olaf College, Northfield, Minnesota; M.D., 1974, University of Minnesota

ADAMS, GEORGE H. (1984)  Research Assistant Professor, Family & Community Medicine
    B.S., 1953, U.S. Naval Academy, Annapolis; Ph.D., 1966, M.D., 1963, University of Pennsylvania

ADLER, LAWRENCE (1972)  Associate, Anesthesiology; Adjunct Assistant Professor, Electrical Engineering
    B.S., 1958, M.D., 1962, University of Pittsburgh

AGUILAR, ERNESTO L. (1976)  Associate, Internal Medicine
    B.S., 1968, M.D., 1973, University of Arizona

AHL, NORMAN C. (1980)  Clinical Assistant Professor, Ophthalmology
    B.S., 1965, University of Arizona; M.D., 1969, University of California, Los Angeles

AHMANN, FREDERICK R. (1980)  Assistant Professor, Internal Medicine
    B.A., 1970, Duke University; M.D., 1974, University of Missouri School of Medicine

AHRENS, WALTER E. (1969)  Associate, Pediatrics
    B.S., 1949, Swarthmore College; M.D., 1954, Boston University

ALBERTS, DAVID S. (1975)  Professor, Internal Medicine, Pharmacology
    B.S., 1962, Trinity College; M.D., 1966, University of Virginia

ALCORN, ESTHER E. (1976)  Lecturer, Family & Community Medicine
    B.A., 1948, University of California, Berkeley; M.D., 1955, University of California Medical School, San Francisco

ALEPA, F. PAUL (1979)  Professor, Internal Medicine
    B.S., 1954, Lebanon Valley College; M.D., 1958, Georgetown University

ALFARO, ARMANDO J., JR. (1983)  Associate, Surgery
    B.S., 1972, Arizona State University; M.D., 1976, University of Arizona

ALLANSON, JUDITH E. (1984)  Associate, Internal Medicine
    B.S., M.D., 1977, United Kingdom, Liverpool Medical School

ALLEN, HUGH D. (1973)  Professor, Assistant Head, Pediatrics; Assistant Director, Echo-Phone Lab
    B.A., B.S., 1962, Otterbein College; M.D., 1966, University of Cincinnati

ALLENDE, James (1985)  Clinical Assistant Professor, Psychiatry
    B.A., 1975, Stanford University; M.A., 1982, University of New Mexico; Ph.D., 1984, University of New Mexico

ALMGREN, RONALD C. (1970)  Associate, Pediatrics
    B.A., 1951, M.D., 1955, University of Louisville

ALTSCHULER, GERALD (1974)  Associate, Internal Medicine
    B.S., 1959, Wagner College; M.D., 1954, Albany Medical College of Union University

ALY, HEKMAT EL-SAYED (1983)  Associate, Family & Community Medicine
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Surgery
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Internal Medicine
Internal Medicine
Dermatology
Internal Medicine
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Radiation Oncology
Preventive Medicine
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Cardiology
Family Practice
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Radiology-Diagnostic
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Temple University School of Medicine, M.D., 1968  
Faculty Development
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<tr>
<th>Name</th>
<th>Institution, Year of Graduation</th>
<th>Specialty</th>
</tr>
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<tbody>
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<td>Radiology-Diagnostic</td>
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<td>CLEMENTS, JUNE A.</td>
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<td>CLEMENTS, JR., NEIL C.</td>
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<td>CLINGER, NEAL J.</td>
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<td>CLOUSE, LAWRENCE H.</td>
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University of Arizona College of Medicine, M.D., 1983

DURHAM, JOSEPH R.
Tulane University School of Medicine, M.D., 1979

Dwyer, Daniel C.
Georgetown University School of Medicine, M.D., 1977

Economou, Vasiliki
University of Thessalonki, Greece, M.D., 1972

Edelstein, Jeffrey P.
University of Wisconsin Medical School, M.D., 1981

Engelken, Michael K.
University of Kansas School of Medicine, M.D., 1982

Escobar, Carlos E.
National University of San Carlos, Mexico, M.D., 1976

Facter, Kenneth H.
University of California Davis School of Medicine, M.D., 1982

Fajarado, Laurie L.
University of Chicago Pritzker School of Medicine, M.D., 1984

Fassler, Eric N.
University of Arizona College of Medicine, M.D., 1984

Ferencz, Gerald J.
Medical College of Pennsylvania, M.D., 1980

Fillmore, David J.
Yale University School of Medicine, M.D., 1984

Flaming, Michael B.
University of Oregon School of Medicine, M.D., 1982

Fox, Kenneth A.
University of Maryland School of Medicine, M.D., 1980

Franks, Joan M.
University of Arizona College of Medicine, M.D., 1984

Frink, Jr., Edward J.
University of Chicago Pritzker School of Medicine, M.D., 1984

Gabrielsen, Jr., Alvin A.
Michigan State University College of Human Medicine, M.D., 1984

Gelfand, William M.
University of Colorado School of Medicine, M.D., 1983

Gelman, Lois M.
University of Arizona College of Medicine, M.D., 1984

George, Kelley W.
University of Nevada School of Medicine, M.D., 1985

German, Michael S.
University of Texas Southwestern Medical School at Dallas, M.D., 1983

Gibbs, Dwayne L.
University of New Mexico School of Medicine, M.D., 1983

Gibby, Wendell A.
University of Utah College of Medicine, M.D., 1983

Gililand, Jr., John L.
University of Arizona College of Medicine, M.D., 1982

Gluudemans, Mary E.
University of Wisconsin Medical School, M.D., 1985

Goldberg, Ronald K.
University of Arizona College of Medicine, M.D., 1982

Golden, Samuel E.
Southern Illinois University School of Medicine, M.D., 1981

Goldner, Alan P.
University of Minnesota Medical School, M.D., 1984

Gonzales, Carlos R.
University of Arizona College of Medicine, M.D., 1981

Dermatology
Vascular Surgery
Dermatology
Neurology
Ophthalmology
Family Practice
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Radiology-Diagnostic
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Infectious Diseases
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Faculty Development
GONZALEZ, GREGORY J.
  Oregon Health Sciences University School of Medicine, M.D., 1984

GONZALEZ, RENE
  Universidad Autonoma de Ciudad Juarez School of Medicine,
  Mexico, M.D., 1980

GRAD, RONI
  Boston University School of Medicine, M.D., 1982

GRANT, RONALD S.
  University of Wisconsin Medical School, M.D., 1984

GRIFFITH, ROBERT F.
  Washington University School of Medicine, M.D., 1982

GUISTO, JOHN A.
  University of Nevada School of Medicine, M.D., 1984

JURIN, JOANNE B.
  State University of New York Downstate Medical Center, M.D., 1982

AGERTY, BRIAN P.
  Ohio State University College of Medicine, M.D., 1983

HALL, SHANNA D.
  University of Colorado School of Medicine, M.D., 1984

HANCOCK III, VIRGIL I.
  University of California, San Francisco School of Medicine, M.D., 1983

HANLON, TERESA L.
  University of Utah College of Medicine, M.D., 1985

HARARI, PAUL M.
  University of Virginia School of Medicine, M.D., 1984

HARGREAVES, RAY M.
  Vanderbilt University School of Medicine, M.D., 1985

HARTSOUGH, ANN B.
  Indiana University School of Medicine, M.D., 1984

HAUPTMAN, MONICA M.
  University of California, Davis School of Medicine, M.D., 1981

HAWKINS, JR., ROBERT L.
  University of California, Los Angeles School of Medicine, M.D., 1982

HEALEY, WALTER J.
  University of Medicine and Dentistry of New Jersey, M.D., 1983

HENDRICKSON, KARL A.
  University of Arizona College of Medicine, M.D., 1983

HERRELLA, JOSE M.
  University of Texas Southwestern Medical School, M.D., 1983

HIATT, KARL B.
  Duke University School of Medicine, M.D., 1983

HIGHKIN, DANIEL J.
  University of California, San Francisco School of Medicine, M.D., 1984

HITT, JOHN M.
  University of Arizona College of Medicine, M.D., 1983

HIXSON, LEE J.
  University of Utah College of Medicine, M.D., 1980

HOENECKE, JR., HEINZ R.
  University of Arizona College of Medicine, M.D., 1983

HOLMES, GERARD
  Medical College of Georgia School of Medicine, M.D., 1983

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  Universidad Autonoma de Juarez School of Medicine, Mexico, M.D., 1980

HOYT, JR., ROBERT H.
  University of Iowa College of Medicine, M.D., 1983

HUANG, CHARNING-MING
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HUBER, PAULA W.
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Pediatrics

Child Psychiatry

Pediatric-Pulmonary

Pediatrics

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Occupational Medicine

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Orthopedic Surgery

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University of Arizona College of Medicine, M.D., 1983

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University of Wisconsin Medical School, M.D., 1982

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IKEDA, SHARON K.
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ILIZALITURRI, LINDA J.
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JAFFE, PHILIP E.
Albert Einstein College of Medicine of Yeshiva University, M.D., 1985

JEWETT, TAMISON
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Northwestern University Medical School, M.D., 1985

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JUSTICE, DIANE
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Khyber Medical College, M.D., 1981

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Medical College of Wisconsin, M.D., 1979

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University of Pittsburgh School of Medicine, M.D., 1982

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WOON-YUEN, POW FAH
King's College Hospital, London, M.D., 1978

ADIN, DANIEL A.
University of Michigan Medical School, M.D., 1984

ALKA, STEPHEN G.
University of Rochester School of Medicine and Dentistry, M.D., 1980

LAM, KIT S.
Stanford University School of Medicine, M.D., 1984 University of Wisconsin Medical School, Ph.D., 1980

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University of Arizona College of Medicine, M.D., 1975

LA WALL, JOHN S.
University of Arizona College of Medicine, M.D., 1971

LAWLESS, REGINA
Georgetown University School of Medicine, M.D., 1980

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Southern Illinois University School of Medicine, M.D., 1985

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Universidad Autonoma de Juarez, School of Medicine, Mexico, M.D., 1984

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University of Arizona College of Medicine, M.D., 1984

LEE, RICHARD W.
Hahnemann Medical College and Hospital, M.D., 1981

LEMMCE, DAWN P.
University of Arizona College of Medicine, M.D., 1985

LEVIN, TEDD
Northwestern University Medical School, M.D., 1982

LEVINE, ALENE S.
Emilio Aguinaldo College of Medicine, Philippines, M.D., 1984

UPPMAN, SCOTT M.
John Hopkins University School of Medicine, M.D., 1981

LITTLE, TIMOTHY E.
University of Southern California School of Medicine, M.D., 1983

LITWIN, CHITNE M.
Washington University School of Medicine, M.D., 1985

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LOEBER, CLEO P.
University of Arizona College of Medicine, M.D., 1984

LYTHE, JR., JOHN P.
University of Michigan Medical School, M.D., 1977

MACDONALD, JAMES
Oregon Health Sciences University, M.D., 1983

MACIULLA, JAMES E.
University of Arizona College of Medicine, M.D., 1985

MADUR, SHANTHADEVI
J.J.M. Medical College, India, M.B.B.S., 1978

MADRID, EDWARD J.
University of California, San Diego School of Medicine, M.D., 1984

MARTIN, JULIA L.
Baylor College of Medicine, M.D., 1957

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Anesthesiology
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MARTINEZ, MICHAEL R.
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Pediatrics

MARTINEZ-CELAYA, JOSE C.
Universidad Nacional Autonoma de Mexico, School of Medicine, Mexico, M.D., 1973
Child Psychiatry

MASLEY, STEVEN C.
University of Washington School of Medicine, M.D., 1984
Family Practice

MAYES, GRETCHEN A.
University of Arizona College of Medicine, M.D., 1985
Anesthesiology

MC NEILL, DIANA B.
Duke University School of Medicine, M.D., 1982
Internal Medicine

MC RILL, CHERYL L.
University of Washington School of Medicine, M.D., 1984
Family Practice

MEEHAN, JULIE A.
University of Texas Medical Branch at Galveston, M.D., 1984
Internal Medicine

MEYER, CAROLE A.
Loyola University of Chicago Stritch School of Medicine, M.D., 1985
Pediatrics

MICHALOWSKI, ELLEN E.
University of Arizona College of Medicine, M.D., 1985
Obstetrics-Gynecology

MIKOLAJ, DOROTHEA M.
Rheinische Frederick Wilhelm Universitat, Germany, M.D., 1979
Pathology

MILLER, LEON
Duke University School of Medicine, M.D., 1983
Surgery

MINKLEY, RICHARD E.
University of Wisconsin Medical School, M.D., 1983
Gastroenterology

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University of Colorado School of Medicine, M.D., 1983
Pathology

MOLLOY, THOMAS A.
Dartmouth Medical School, M.D., 1981
Surgery

MOORE, FRANCES L.
University of Louisville School of Medicine, M.D., 1985
Internal Medicine

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University of Alabama School of Medicine, M.D., 1981
Internal Medicine

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Washington University School of Medicine, M.D., 1983
Radiology-Diagnostic

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University of New Mexico School of Medicine, M.D., 1984
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Loyola University of Chicago Stritch School of Medicine, M.D., 1980
Thoracic Surgery

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Internal Medicine

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New Jersey School of Osteopathic Medicine, D.O., 1982
Pulmonary

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<td>University of Illinois College of Medicine, M.D.</td>
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<td>Karolinska Institute, Sweden, M.D.</td>
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<td>Vanderbilt University School of Medicine, M.D.</td>
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<td>University of Arizona College of Medicine, M.D.</td>
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<td>University of Texas Medical School at Houston, M.D.</td>
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<td>University of Arizona College of Medicine, M.D.</td>
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<td>University of Utah College of Medicine, M.D.</td>
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<td>University of Arizona College of Medicine, M.D.</td>
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**Specialties:**
- Orthopedic Surgery
- Surgery
- Internal Medicine
- Psychiatry
- Surgery
- Internal Medicine
- Otolaryngology
- Surgery
- Pathology
- Internal Medicine
- Surgery
- Pediatrics
- Family Practice
- Pediatrics
- Pediatrics
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- Surgery
- Dermatology
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<td>Dermatology</td>
<td>Washington University School of Medicine, M.D., 1968</td>
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<td>RUIZ, FRANCISCO E.</td>
<td>Obstetrics-Gynecology</td>
<td>Universidad Autonoma de Guadalajara, School of Medicine,</td>
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<td>Mexico, M.D., 1982</td>
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<td>Ophthalmology</td>
<td>Universidad National Autonoma de Mexico, School of Medicine, Mexico, M.D., 1980</td>
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<td>RYAN, KEVIN J.</td>
<td>Obstetrics-Gynecology</td>
<td>University of California, Davis School of Medicine, M.D., 1982</td>
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<td>RYAN, MAGGIE A.</td>
<td>Psychiatry</td>
<td>University of Arizona College of Medicine, M.D., 1985</td>
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<td>ST. RAYMOND, PHILIP A.</td>
<td>Urology</td>
<td>Vanderbilt University School of Medicine, M.D., 1982</td>
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<td>SALAZAR, VICTOR H.</td>
<td>Psychiatry</td>
<td>Universidad Nacional Federico Villarreal, Peru, M.D., 1979</td>
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<td>SAMESHIMA, JAMES L.</td>
<td>Internal Medicine</td>
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<td>SAND, PATRICIA O.</td>
<td>Pediatrics</td>
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<td>SCHIANO, FRANK J.</td>
<td>Nuclear Medicine</td>
<td>Universidad Autonoma de Guerrero, School of Medicine, Mexico, M.D., 1980</td>
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<td>Surgery</td>
<td>University of Kansas School of Medicine, M.D., 1984</td>
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<td>Anesthesiology</td>
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<td>Pediatrics</td>
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<td>Pediatric-Pulmonary</td>
<td>Mayo Medical School, M.D., 1976</td>
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<td>Pathology</td>
<td>University of Arizona College of Medicine, M.D., 1982</td>
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<td>Orthopedic Surgery</td>
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STEINER, JOYCE J.  
University of Arizona College of Medicine, M.D., 1978

STILSON, MICHAEL R.  
University of Colorado School of Medicine, M.D., 1985

STOCKER, JR., FREDERICK J.  
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TAPPERO, JORDAN W.  
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WAITE, GLENN R.  
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WHEELER, MARK D.  
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Psychiatry
Pediatrics
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<td>University of California, San Francisco School of Medicine, M.D., 1977</td>
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<td>Loyola University of Chicago Stritch School of Medicine, M.D., 1980</td>
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<td>University of Miami School of Medicine, M.D., 1980</td>
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<td>University of Michigan Medical School, M.D., 1984</td>
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<td>Boston University School of Medicine, M.D., 1981</td>
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<td>Emory University School of Medicine, M.D., 1983</td>
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<td>University of Southern California School of Medicine, M.D., 1981</td>
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<td>Universidad Autonoma de Chihuahua, School of Medicine, Mexico, M.D., 1984</td>
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<td>Yuhasz, Mark S.</td>
<td>University of Pennsylvania School of Medicine, M.D., 1983</td>
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Anesthesiology
Psychiatry
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Pathology
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Internal Medicine
Radiation Oncology
Anesthesiology
Pediatrics
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Pediatrics
Radiology-Diagnostic
Internal Medicine
Radiology-Diagnostic
Pediatrics
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<td>Abeshaus, Michael</td>
<td>Texas Tech University Affiliated Hospitals, Lubbock, TX 79403</td>
<td>Orthopedic Surgery</td>
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<td>Atlas, Matthew</td>
<td>University of Arizona Affiliated Hospitals, Tucson, AZ 85724</td>
<td>Anesthesiology</td>
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<td>Faulkner Hospital, Boston, MA 02130</td>
<td>Internal Medicine</td>
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<td>Tucson Hospitals Medical Education Program, Tucson, AZ 85733</td>
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<td>Blake, Charles Gregory</td>
<td>University of Arizona Affiliated Hospitals, Tucson, AZ 85724</td>
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<td>Loyola University Medical Center, Maywood, IL 60153</td>
<td>Surgery</td>
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<td>Surgery</td>
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<td>University of Arizona Affiliated Hospitals, Tucson, AZ 85724</td>
<td>Obstetrics/Gynecology</td>
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<td>Cardon, Stephan Brian</td>
<td>Good Samaritan Hospital, Phoenix, AZ 85006</td>
<td>Internal Medicine</td>
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<td>Carter, Bart Jay</td>
<td>Phoenix Integrated Surgical Residency Program, Phoenix, AZ 85012</td>
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<td>University of Arizona Affiliated Hospitals, Tucson, AZ 85724</td>
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<td>Valley Medical Center, Fresno, CA 93702</td>
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<td>Stanford University Hospital, Stanford, CA 94305</td>
<td>Otolaryngology</td>
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<td>Pediatrics</td>
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<td>St. Joseph's Hospital, Phoenix, AZ 85001</td>
<td>Internal Medicine</td>
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<td>Middlesex Memorial Hospital, Middletown, CT 06457</td>
<td>Surgery</td>
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Psychiatry

Anesthesiology

Internal Medicine

Family Practice

Obstetrics/Gynecology

Internal Medicine

Internal Medicine

Emergency Medicine

Transitional

Neurology

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Anesthesiology

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Physical Medicine/Rehabilitation

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Obstetrics/Gynecology

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<td>Rhode Island Hospital, Providence, RI 02902</td>
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<td>University of California San Diego Medical Center, San Diego, CA 92103</td>
<td>Pediatrics</td>
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<td>Thomas Jefferson University, Philadelphia, PA 19107</td>
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<td>University of Virginia Medical Center, Charlottesville, VA 22908</td>
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<td>Good Samaritan Medical Center, Phoenix, AZ 85006</td>
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<td>Maricopa Medical Center, Phoenix, AZ 85010</td>
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<td>University of Arizona Affiliated Hospitals, Tucson, AZ 85724</td>
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<td>STEPHENS, JOHN JOSEPH</td>
<td>Bridgeport Hospital, Bridgeport, CT 06610</td>
<td>Internal Medicine</td>
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<td>STRUTHERS-PEATE</td>
<td>St. Joseph’s Hospital, Phoenix, AZ 85001</td>
<td>Medicine/Pediatrics</td>
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<td>Barnes Hospital, St. Louis, MO 63110</td>
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<td>St. Joseph’s Hospital, Phoenix, AZ 85001</td>
<td>Diagnostic Radiology</td>
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<td>University of California Hospitals, San Francisco, CA 94143</td>
<td>Family Practice</td>
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<td>Maricopa Medical Center, Phoenix, AZ 85010</td>
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<td>Case Western Reserve University/Mount Sinai, Cleveland, OH 44106</td>
<td>Neurology</td>
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<td>WILLIAMS, CHARLES LEE</td>
<td>Medical College of Virginia, Richmond, VA 23298</td>
<td>Surgery</td>
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WILLS, TRISHA ANN  
White Memorial Medical Center, Los Angeles, CA 90033  
Transitional

WILSON, JOHN ROBERT  
University of Arizona Affiliated Hospitals, Tucson, AZ 85724  
Surgery

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CLASS OF 1987

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Marino, Vincent Anthony, Scottsdale, Arizona
Martinez, Albert Paul, Tempe, Arizona
Masters, Sally Ruth, Coolidge, Arizona
McClain, Dawn Elizabeth, Tucson, Arizona
McGhee, Angela Murphy, Lakeside, Arizona
McNeal, Lori Lee, Tempe, Arizona
Miller, Judith Carol, Tucson, Arizona
Miller II, Troy Lee, Phoenix, Arizona
Nattell, Daniel Francis, Tucson, Arizona
Noonan, Laura Kathrine, Tucson, Arizona
Olson, Jerold James, Sierra Vista, Arizona
Orendac, Catherine Ann, Phoenix, Arizona
Patterson, J. R., Edward Lee, Tucson, Arizona
Pearson-Webb, Margaret Ann (Peggy), Tucson, Arizona
Pittman, Janet Elaine, Phoenix, Arizona
Rayle, Steven Matthew, Tucson, Arizona
Reed, Laurie Cindy, Tucson, Arizona
Reed, Mark Henry, Tucson, Arizona
Reidy, Bernadette Marie, Phoenix, Arizona
Rifley III, William John, Phoenix, Arizona
Rogers, James Norman, Mesa, Arizona
Rosales, Eduardo Roberto, Douglas, Arizona
Schootter, Mary Ellen, Ajo, Arizona
Seaver, Laurie Heron, Tempe, Arizona
Shadle, Kathleen Sue, Tempe, Arizona
Smith, Roger Allan, Phoenix, Arizona
Spencer, Margaret Ruth, Flagstaff, Arizona
Spiegel, Renee Ann, Phoenix, Arizona
Stanley, Rebecca Jean, Mesa, Arizona
Stockhouse, Bruce Claar, Riverton, Wyoming
Stott, Dale Gerald, Tucson, Arizona
Struthers, William Burton, Tucson, Arizona
Sweeney, Michael William, Tucson, Arizona
Thomson, Stephen Paul, Tucson, Arizona
Thorpe-Swenson, Amy Jo, Phoenix, Arizona
Turner, Raymond Mark, Tucson, Arizona
Van Der Werf, Guy Peter, Phoenix, Arizona
Verdi, Christopher John, Phoenix, Arizona
Webb, Mark Gerard, Scottsdale, Arizona
Wellish, Kent Lewis, Paradise Valley, Arizona
Wissing, Marcia Lea, Tucson, Arizona
Wolfson, Martin Alan, Tucson, Arizona
Woods, Robert Hall, Tucson, Arizona
Wyman, Christopher Kent, Phoenix, Arizona
Yost, David Alan, Phoenix, Arizona
Zuschke, Eva Maria, Phoenix, Arizona

kere, Barbara Joanne, Prescott, Arizona
thur, Ansermo Lester, Sierra Vista, Arizona
ger, Scott Miner, Phoenix, Arizona
neider, Marvin, Sierra Vista, Arizona
ester, Peter Edward, Tucson, Arizona
ess, J. David, Helena, Montana
s, Christopher Thomas, Phoenix, Arizona
ten, Susan Kunesh, Scottsdale, Arizona
lton, Gregrey Seth, Tucson, Arizona
ons, Gregory G., Safford, California
ven, Robert William, Phoenix, Arizona
nberg, Dale Dennis, Tucson, Arizona
am, Mary Ellen, Mesa, Arizona
amb, Michael Paul, Flagstaff, Arizona
yle, Thomas Philip, Tucson, Arizona
gan, Michael Crawford, Phoenix, Arizona
shee, Curtis John, Tucson, Arizona
han, Martin Phan, Scottsdale, Arizona
ans, Ronald Alan, Yuma, Arizona
ld, Dean Arden, Scottsdale, Arizona
man, James Richard, Phoenix, Arizona
eland-Hyde, Bernadette, Window Rock, Arizona
oodheart, Thomas A., Phoenix, Arizona
ove, Gary Arthur, Phoenix, Arizona
chey, Ruth Ann, Tucson, Arizona
as, Kathryn Lou, Tucson, Arizona
over, Steven Lewis, Tempe, Arizona
witch, Carrie Ann, Scottsdale, Arizona
owell, Jr., Thomas George, Tempe, Arizona
hn, Stephen Lawrence, Tucson, Arizona
urtle, John Steven, Tucson, Arizona
ins, Ty Wilson, Tempe, Arizona
nez, Rose Marie, Tucson, Arizona
son, Brent Edward, Tucson, Arizona
ner, Michael Joseph, Tucson, Arizona
pley, David Joseph, Tucson, Arizona
nell, Todd William, Phoenix, Arizona
am, David Alan, Tempe, Arizona
pfenster, Kathryn J., Tucson, Arizona
ft, Anita Hunt, Flagstaff, Arizona
etz, Michael Louis, Phoenix, Arizona
ith, Elizabeth Helen, Tucson, Arizona
nt, Keith Linton, Sun City West, Arizona
es, Mark Estes, Tucson, Arizona
all, Michael Scott, Scottsdale, Arizona
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Ahern, Denise Anne, Phoenix, Arizona
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