COURSE BOOK

COURSE OFFERINGS
2018-2019

JACOBS SCHOOL OF MEDICINE
AND BIOMEDICAL SCIENCES
UNIVERSITY AT BUFFALO
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Module begins July 2

FOURTH YEAR

2018-2019

ACADEMIC YEAR

Match Day, Friday, March 15th

Graduation Day, Friday, May 3, 2019
(tentative, subject to change)
<table>
<thead>
<tr>
<th>Department and Chairperson</th>
<th>Facility, Code and Location Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANE Anesthesiology</td>
<td>Buffalo Psychiatric Center</td>
</tr>
<tr>
<td>Mark J. Lema, M.D., Ph.D.</td>
<td>B 400 Forest Avenue</td>
</tr>
<tr>
<td>BCH Biochemistry</td>
<td>Oishei Children’s Hospital</td>
</tr>
<tr>
<td>Mark O’Brien Ph.D.</td>
<td>C 818 Ellicott Street</td>
</tr>
<tr>
<td>DER Dermatology</td>
<td>The Gateway Building</td>
</tr>
<tr>
<td>Lori Ullman, M.D. (Interim)</td>
<td>D 77 Goodell Street</td>
</tr>
<tr>
<td>EMM Emergency Medicine</td>
<td>Erie County Medical Center</td>
</tr>
<tr>
<td>Robert F. McCormack, M.D.</td>
<td>E 462 Grider Street</td>
</tr>
<tr>
<td>FMD Family Medicine</td>
<td>Buffalo General Medical Center</td>
</tr>
<tr>
<td>Daniel Morelli, M.D.</td>
<td>G 100 High Street</td>
</tr>
<tr>
<td>GYN Obstetrics and Gynecology</td>
<td>Medical Tower Building</td>
</tr>
<tr>
<td>Vanessa Barnabei, M.D., Ph.D.</td>
<td>H 85 High Street</td>
</tr>
<tr>
<td>MED Medicine</td>
<td>Kenmore Mercy Hospital</td>
</tr>
<tr>
<td>Anne Curtis, M.D.</td>
<td>K 2950 Elmwood Avenue</td>
</tr>
<tr>
<td>MIC Microbiology and Immunology</td>
<td>Roswell Park Cancer Institute</td>
</tr>
<tr>
<td>James Bangs, Ph.D.</td>
<td>R Elm and Carlton Streets</td>
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<tr>
<td>NEU Neurology</td>
<td>Sisters Hospital</td>
</tr>
<tr>
<td>Gil I. Wolfe, M.D., FAAN</td>
<td>S 2157 Main Street</td>
</tr>
<tr>
<td>NSR Neurosurgery</td>
<td>Veterans Administration Medical Center</td>
</tr>
<tr>
<td>Elad I. Levy, MD, MBA, FACS, FAANS</td>
<td>V 3495 Bailey Avenue</td>
</tr>
<tr>
<td>NMD Nuclear Medicine</td>
<td>Jacobs School of Medicine and Biomedical Sciences</td>
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<tr>
<td>Robert S. Milewich, M.D., Ph.D. (Interim)</td>
<td>X 955 Main Street</td>
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<tr>
<td>OPH Ophthalmology</td>
<td>Mercy Hospital</td>
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<tr>
<td>James Reynolds, M.D.</td>
<td>Y 585 Abbott Road</td>
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<tr>
<td>ORS Orthopedics</td>
<td>Hauptman Woodward Medical</td>
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<tr>
<td>Leslie Bisson, M.D.</td>
<td>Research Institute</td>
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<tr>
<td>OTO Otolaryngology</td>
<td>585 Abbott Road</td>
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<tr>
<td>Davis Sherris, M.D.</td>
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<tr>
<td>PTH Pathology &amp; Anatomical Sciences</td>
<td>Jacobs School of Medicine and Biomedical Sciences</td>
</tr>
<tr>
<td>John E. Tomaszewski, M.D.</td>
<td>X 955 Main Street</td>
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<tr>
<td>PED Pediatrics</td>
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<tr>
<td>Jamie Wooldridge, M.D. (Interim)</td>
<td>Veterans Administration Medical Center</td>
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<td>PMY Pharmacology</td>
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<tr>
<td>David Dietz, Ph.D. (Interim)</td>
<td>V 3495 Bailey Avenue</td>
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<tr>
<td>PGY Physiology and Biophysics</td>
<td>Jacobs School of Medicine and Biomedical Sciences</td>
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<tr>
<td>Perry Hogan, Ph.D.</td>
<td>X 955 Main Street</td>
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<td>PTY Psychiatry</td>
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<tr>
<td>Steven Dubovsky, M.D.</td>
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<td>RAO Radiation Oncology</td>
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<tr>
<td>Michael Kuettel, M.D.</td>
<td>Mercy Hospital</td>
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<td>RGY Radiology</td>
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<td>Kenneth Pearsen, M.D.</td>
<td>Hauptman Woodward Medical</td>
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<td>STB Structural Biology</td>
<td>Research Institute</td>
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<tr>
<td>Michael G. Malkowski, Ph.D.</td>
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<td>SUR Surgery</td>
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<td>Steven D. Schwatzberg, M.D.</td>
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<td>URO Urology</td>
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<tr>
<td>Gerald Sufrin, M.D.</td>
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Students may pursue a research program in any department, through the designation of a 950 code, with departmental chairman or course coordinator approval.
Clinical Department Course Coordinators:

<table>
<thead>
<tr>
<th>Department</th>
<th>Coordinator</th>
<th>Phone</th>
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<tbody>
<tr>
<td>Anesthesiology</td>
<td>Dr. Mark Lema</td>
<td>829-6102</td>
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<tr>
<td>Dermatology</td>
<td>Dr. Lori Ullman</td>
<td>878-3315</td>
</tr>
<tr>
<td>Dermatology (Buffalo Medical Group)</td>
<td>Dr. Robert Kalb</td>
<td>630-1102</td>
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<tr>
<td>Emergency Medicine</td>
<td>Dr. Samantha Bordonaro</td>
<td>859-1993</td>
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<tr>
<td>Family Medicine</td>
<td>Dr. Andrew Symons</td>
<td>829-2602</td>
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<tr>
<td>Obstetrics &amp; Gynecology</td>
<td>Dr. Faye Justicia-Linde</td>
<td>878-7804</td>
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<tr>
<td>Interdisciplinary Graduate Program</td>
<td>Dr. Richard Rabin</td>
<td>829-3398</td>
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<tr>
<td>Medicine</td>
<td>Dr. Susan Gallagher</td>
<td>859-1262</td>
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<tr>
<td>Medicine/Pediatrics</td>
<td>Dr. Michael Aronica</td>
<td>961-9412</td>
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<tr>
<td>MD/MBA</td>
<td>Dr. David Milling</td>
<td>829-2802</td>
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<tr>
<td>MSTP (MD/PHD joint program)</td>
<td>Dr. Paul Knight</td>
<td>829-3582</td>
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<tr>
<td>Neurology</td>
<td>Dr. Margaret Paroski</td>
<td>859-8831</td>
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<tr>
<td>Neurosurgery</td>
<td>Dr. Renee Reynolds</td>
<td>(ext. 5124) 218-1000</td>
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<tr>
<td>Nuclear Medicine</td>
<td>Dr. Robert S. Miletich</td>
<td>838-5889</td>
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<tr>
<td>Ophthalmology</td>
<td>Dr. James Reynolds</td>
<td>881-7916</td>
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<tr>
<td>Orthopaedic Surgery</td>
<td>Dr. Thomas Duquin</td>
<td>898-4426</td>
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<td>Dr. David Sherris</td>
<td>884-5102</td>
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<td>Pathology &amp; Anatomical Sciences</td>
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<td>829-2846</td>
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<tr>
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<td>323-0140</td>
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<td>898-5896</td>
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<td>Urology</td>
<td>Dr. Gerald Sufrin</td>
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David A. Milling, M.D.
Senior Associate Dean for Student and Academic Affairs
829-2802
## M.D. DEGREE CURRICULUM

### First Year

**Fall Semester**
- Clinical Practice of Medicine – 1
- Gross Human Anatomy
- Fundamentals 1: Molecules, Cells and Molecular Genetics
- Fundamentals 2: Metabolism, Human Genetics and Pharmacology
- Medicine and Society
- Continuing Experience in Clinical Medicine

**Spring Semester**
- Clinical Practice of Medicine – 1
- Host Defenses and Hematology
- Gastrointestinal System
- Urinary Tract and Renal System
- Musculoskeletal System and Integument
- Continuing Experience in Clinical Medicine

### Second Year

**Fall Semester**
- Clinical Practice of Medicine – 2
- Human Cardiovascular System
- Lung and Respiration
- Neuroscience and Behavior I
- Continuing Experience in Clinical Medicine

**Spring Semester**
- Clinical Practice of Medicine – 2
- Neuroscience and Behavior II
- Endocrine and Reproductive Systems
- Continuing Experience in Clinical Medicine
- USMLE – Step 1 – Between Second and Third Year

### Third Year*
- Family Medicine / Psychiatry
- Pediatrics / Obstetrics and Gynecology
- Medicine
- Surgery
- Dilemmas in Medicine
- Core Topics
- Electives (2)

### Fourth Year*
- Basic Neurology
- Advanced Clerkship in Medicine
- Surgical Specialties
- Transition to Residency
- Electives (5)

*Note: If Surgical Specialties and/or Basic Neurology were taken as third year elective, additional electives must be completed during fourth year. A total of 8 rotations must be completed during fourth year.

USMLE – Step 2 Clinical Knowledge (CK) and Step 2 Clinical Skills (CS) are taken during the fourth year (See USMLE section).

*Exact sequence is determined by lottery.*
This compendium of course offerings includes descriptions of required and elective opportunities offered by the School of Medicine and its teaching hospitals during all four years of the medical curriculum. Students are advised by "career advisors" designated by each department, academic staff in the Office of Student and Academic Affairs, (OSAA) and faculty in the pre-clinical program in planning and arranging course offerings. Students are required to record a passing grade in all required courses.

**FIRST AND SECOND YEARS**

The first and second years begin in August and continue through May of the following year. Students participate in a structured curriculum as outlined above. Elective courses are also available for first and second year students. Instructions for registration will be emailed to the student's UB address. Students must report and maintain complete up-to-date home addresses on HUB and in the Office of Medical Education.

**USMLE Step 1**

Students can apply for the Step 1 or 2 exam on-line at nbme.org or usmle.org. Verification signatures need to be obtained by dropping off your application to Dr. Frank Schimpfhauser in Office of Medical Curriculum.

Prior to beginning the third year, students will be required to take Step 1 of the USMLE. The deadline for taking Step 1 will be established each year by the Office of Medical Education. Failure of the USMLE will result in the student being held out of the next clerkship to allow for successful re-examination, which must be completed prior to the beginning of the next block. Students will then be allowed to start pending the examination result. A second failure will require the student to be placed on leave of absence. The student will not be allowed to reenter the curriculum until a passing grade is recorded. Students are allowed three (3) opportunities to pass Step 1 of the USMLE, before a recommendation for a dismissal from the School is made.

**Summer opportunities**

Students seeking liability insurance for summer experiences outside the University must speak with one of the Associate Deans in the Office of Student and Academic Affairs (OSAA).

**THIRD YEAR**

Family Medicine / Psychiatry  
Pediatrics / Obstetrics and Gynecology  
Medicine  
Surgery  
Dilemmas in Medicine  
Core Topics  
Electives (2)

The third year begins with a mandatory orientation day. Students will begin their first clerkship the following Monday. Students are assigned to clinical clerkship groups by a lottery that utilize the facilities of hospitals and practice sites throughout the Western New York area. Instructions for registration will be e-mailed to the student's UB e-mail account; therefore, students must report accurate e-mail addresses to Office of Medical Education, as well as providing current home addresses and phone numbers.

Each student, under direct supervision, will have the opportunity to observe and participate in the care of patients with a wide variety of illnesses and is given progressively more responsibility as his or her skill develops. Educational experiences also include emphasis on lecture demonstrations of clinical problems, small-group problem-solving, conferences, and ward rounds. Increasing emphasis is placed on disease prevention and primary care. Assessment of clinical competence is addressed through multiple mechanisms.

The third year is comprised of four 12-week blocks of clinical instruction plus two weeks of classroom instruction during the intersession period. Core Topics (2 weeks) is an experiential learning course and is scheduled for the intersession period for all students.
The required clinical clerkships consist of:

Four 6-week each clerkships in:
   Pediatrics (PED); Obstetrics and Gynecology (GYN); Family Medicine (FMD); Psychiatry (PTY)

Students may choose to take the 6 week clerkships in any order.

Two 12-weeks total clerkships in:
   Medicine (12 weeks total): inpatient (4 weeks); outpatient (4 weeks); elective (4 weeks)
   Surgery (12 weeks total): inpatient general surgery with night call (4 weeks); surgery preceptorship (4 weeks); elective (4 weeks)

There is a four week elective within the 12-weeks of Medicine and Surgery. Students will be allowed to request whether to do the elective in the first, second, or third 4 week time period within the 12 week block. A list of elective courses will be provided.

**Medicine:** Students must attend the weekly lecture series (Tuesday afternoons) during the entire 12 weeks. During the third year, students are not eligible to take an elective in MICU or critical care, nor can they take the fourth year Advanced Medicine rotation necessary for graduation.

**Surgery:** Students will have two 4-week blocks of general surgery (a hospital-based inpatient service with night call and a surgical preceptorship), and a 4-week elective. During the Surgery elective block, all students are required to attend the core components of the Surgery clerkship (e.g., orientation, lectures, grand rounds and the exam/exit interview).

The required Neurology or Surgical Subspecialties clerkships may be taken during the third year Surgery elective time, or during the third year Medicine elective time, or during the fourth year.

The required Core Topics course, which is given during the intersession period (December/January), is graded P/F only. It is experiential, so that students must be present and actively participate in each session in order to get credit for that activity. The majority of the time will be spent in discussion groups, simulation exercises and workshops. There will be some outside reading and reflective exercises.

There will be two weeks of vacation for all students during the intersession period. The exact dates vary from year-to-year, and all students will be on vacation during this two-week period. Students will not be permitted to take vacation time other than the two-week winter break, and no out of town electives will be allowed during the third year.

**Remediation of third year clerkship failure(s)**

All academic deficiencies from the third-year clerkships and courses must be removed before promotion to the fourth year. A student who fails a clerkship clinically must repeat the entire clerkship; this is done over a 6-8 week period during the first block of the fourth year. A student who passes the clerkship clinically, but fails the examination also requires remediation. In this case, the student can either repeat the entire clerkship (as above, over a 6-8 week period during the first block of the fourth year) or participate in a concentrated remedial experience (four weeks in duration offered in the fourth year). This is available for a single clerkship failure only. Details of the remedial experience are at the discretion of the clerkship director.

Failure of a remedial experience will constitute a second clerkship failure and will make the student subject to dismissal from the School. If a student, who passed the clerkship clinically but elected to repeat the entire clerkship, fails the remediation, this will also count as a second clerkship failure and make the student subject to dismissal from the School.

**USMLE Step 2**

Passing both Step 2 CK and Step 2 CS are requirements for graduation. In order to be eligible to participate in the Match, students must meet the following deadlines:

- Step 2 Clinical Knowledge – must be taken by December 31 of the 4th year.
- Step 2 Clinical Skills – must be taken by December 31 of the 4th year (but the Office of Student and Academic Affairs (OSAA) highly recommends taking Step 2-CS immediately after completion of the third year).
FOURTH YEAR

The curriculum is designed so students may plan, with faculty advisement, a significant part of their educational program. The elective approach to curriculum affords students with different backgrounds and aspirations an individual educational experience. Through the elective program, they are able to try out possible career choices, gain additional clinical experience, embark upon or conclude research work, or re-examine the basic medical sciences. Instructions for registration will be e-mailed to the student's UB e-mail account; therefore students must report and maintain complete up-to-date addresses in the Office of Medical Education.

Fourth-year students are required to take eight (8) four-week modules. Required modules in the fourth year include Neurology (NEU-801), Advanced Clerkship in Medicine (MED-802), Surgical Specialties (SUR-800), and Transition to Residency (IDM-810). All required courses must be taken in Buffalo. The current fourth year (ending with module K) has a total of 11 available modules and affords students three modules of "unscheduled time.” For fourth year students, Module L may only be used to remediate a course failure or if the student’s progress was delayed because of a leave of absence, for example.

Notes:
- Required courses in Medicine, Neurology and Surgery will be determined by lottery. Changes will be made until the Friday after the lottery is held, no exceptions.
- Students must be registered for a module at least 4 weeks prior to the start date of the module.
- A course/elective cannot be taken more than once.
- No more than three courses/electives can be taken in any single department.
- Up to two modules of research can be taken in the fourth year; this is not available to MSTP students.
- No more than four out of town electives are allowed. (See Out of Town Electives below.)
- Only two out of town electives may be taken at any one institution.
- A maximum of one international elective is allowed. An international elective also counts as one of the four out of town electives allowed.
- All drop and add forms must be approved and signed by the course director (not the department chair); it must then be sent to Office of Student and Academic Affairs (OSAA).
- All drop and add forms must be completed and returned to Office of Student and Academic Affairs (OSAA) no later than 4 weeks before the module begins.
- Double registration is not allowed; the only exception is when an out of town elective is pending. Once the out of town elective is confirmed, the other course/elective must be dropped using the drop/add form.
- Any course or elective failure must be made up within 2 modules.
- No retroactive registration is permitted for any course (local or away).

Out of town electives

Only 4th year students in good standing are eligible to take an out of town elective. A current affiliation agreement must be in place between UB and the training institution.

A student wishing to participate in an out-of-town elective must discuss with UB’s appropriate department chairperson or course coordinator the possibility and advisability of taking an out of town rotation in a comparable department. If there is agreement that such an elective is possible and advisable, then the student will communicate directly with the desired program. If he or she is accepted into the elective, the department may request confirming letters and/or program descriptions. The department then notes their approval on the Out of Town Elective Form and forwards it to the Office of Medical Education for final approval/disapproval. A drop/add form must also be completed for registration purposes. Approval of "away” programs are made on an individual basis, taking into account the academic value of the elective and student’s academic status.

Clinical affiliation agreements and student liability insurance

Overview

The purpose of an affiliation agreement between UB and an affiliated institution is to advance UB students’ educational programs in a particular educational discipline.

Why is a written Affiliation Agreement necessary? The State University of New York is considered an agency of the State of New York, and therefore, its liability is the same as the State of New York. The affiliation agreement sets forth the educational
purposes of the arrangement; the responsibilities of each party; allocation of the risks; any insurance covering any risks; duration of the agreement; and how the parties will coordinate the clinical experience. Without an affiliation agreement, no academic credit can be earned and no medical liability coverage is provided.

**SUNY’S insurance for UB Students**

For students who are participating in health-related clinical experiences, especially those with hands on in either patient care or laboratory testing, there is a risk of a lawsuit. Pursuant to the mandates of the policy, UB must have a written agreement between itself and the Host Institution in order to have insurance coverage extended to the student participating in that particular clinical program. Therefore, for health-related student affiliation agreements, SUNY purchases commercial insurance to cover malpractice claims against students. Both defense costs and indemnification in the event of judgment or settlement are covered in the event of a lawsuit being filed naming the student as a Defendant. Without a written Affiliation Agreement in place, the student will not have coverage for either defense costs or indemnification if such a suit is brought by a third party.

A student is **not covered** when he or she shadows or does any type of health related clinical experience with a physician, nurse or any other health care provider who is a friend, relative or neighbor of the student, without a written agreement between UB and the Host Institution. In these cases, the student is solely liable for their actions because the student’s activities are not under authority or consent of UB.

**Policy limits**

The current policy is a typical professional insurance contract with an amount not less than $3 Million aggregate for bodily injury and property damaged combined single limit, the standard of the health care industry as determined by the New York State Health Department.

**Clinical experiences outside of the US**

SUNY’s student liability policy does not cover affiliation agreements outside the continental United States. A student wishing to do a clinical experience outside the US would have to obtain their own policy of insurance, which can be quite expensive. Liability exposure is not limited just to professional liability. Insurance also covers legal defense costs, which can be quite expensive. In the past, SUNY has entered into several affiliation agreements with agencies in Ontario, Canada so long as the Host Institution signs SUNY’s Standard Affiliation Agreement complete with the Exhibits.

**Establishing an affiliation agreement**

Any student who wishes to work in a physician’s office, a research laboratory, or a hospital/clinic must do the following:

1. check in the Office of Student and Academic Affairs (OSAA) to determine if an Affiliation Agreement with the host institution is currently in place.
2. if there is an Agreement in place, see number (4).
3. if currently there is no Affiliation Agreement, obtain and complete a “Student Affiliation form” from Office of Student and Academic Affairs (OSAA) and return it to the Office of Student and Academic Affairs (OSAA) at least 12 weeks before the experience is to begin.
4. if an Affiliation Agreement is currently in place or if a new one has been established, you must register for an appropriate course through appropriate channels.
5. under no circumstances is a student permitted to begin an experience without confirmation of an Affiliation Agreement.

**Program planning**

Advisors and faculty as well as members of the Dean's staff in the Office of Student and Academic Affairs (OSAA) are available to assist third- and fourth-year students in the program-planning process. Requests for special scheduling (such as participation in a program of more than two months in duration or spending more than one month at the same institution) must be brought to the attention of the Office of Student and Academic Affairs (OSAA) and must be approved. When determined to be of educational beneficial for the student, individual programs may be modified by the Office of Student and Academic Affairs (OSAA).

**Graduation honors**
Students may qualify for Latin, research or thesis honors at graduation.

Students have the opportunity to apply for both research and thesis honors prior to graduation. Candidates interested in these honors must write a thesis for review by a special committee. Research honors simply require evidence of continuous research that has resulted in either publication(s) or presentation(s) at national meetings. Additional information and applications for graduation honors are on the UB School of Medicine and Biomedical Sciences webpage: www.smbs.buffalo.edu/ome/ome_academic.htm.

Visiting students

Visiting students from other medical schools within the U.S. must successfully complete an application process in order to take fourth-year clinical electives at any of the School's affiliated hospitals or institutions. The Office of Medical Education administers this program. The tremendous demand for educational experiences by students' trained elsewhere, especially foreign-trained students far exceeds our ability to accommodate them. We have, therefore, established a policy that will keep open visiting student opportunities for domestic medical students only. For information, students should call (716) 829-2802 for instructions on how to apply for visiting courses.

GRADING

Medical School courses, modules and clerkships are graded as shown below:

- H = Honors
- S+ = High Satisfactory
- S = Satisfactory
- U = Unsatisfactory
- I = Incomplete
- W = Withdrawal
- R = Resigned
- P/F = Pass/Fail
- Z = Grade and Credit at End of Year

A student who fails a Phase 2 shelf exam and who is eligible to remEDIATE the clerkship by sitting for the shelf exam a second time will not receive a grade until the shelf exam is retaken. After the result of the shelf exam is returned by the NBME, a final grade will be sent to the Office of Student and Academic Affairs (OSAA) in a memo format for recording on the student's permanent record.

Once given, Unsatisfactory, Withdrawal and Resigned grades will become part of the student’s academic record. Remediation of Unsatisfactory grades will be credited at the next scheduled course offering. (For example: An Unsatisfactory grade in the Fall semester will show the remediation in the Fall of the following year.)

Incomplete grades are to be given only in the event of illness or other individual circumstance, which made it impossible for the student to complete the required course work. Failure to complete course work on time without approved extenuating circumstances requires an Unsatisfactory grade.

Withdrawal grades will become part of the student’s academic record in the event a student fails to pass the USMLE and cannot begin clerkship on time or other individual circumstance, which made it impossible for the student to complete the required course work.

Resigned grades will become part of the student’s academic record in the event a student drops a course after the university date for dropping a course.
JOINT DEGREE PROGRAMS

Medical Scientist Training Program/MSTP

The first two years of training mirrors the syllabus of the medical student. Students are also required to attend a research seminar program to augment their education and reinforce their basic scientific knowledge. During the summer, between the first and second year, students are required to obtain research experience in two to three laboratories in order to acquaint themselves with different programs and departments related to their research interests. This is an important and indispensable exercise for MSTP students; however, our goal is for the student to make a commitment to a Department or a thesis advisor at the beginning of the second year.

After the completion of the second year, students will focus on the Ph.D. department of their choice. Students must qualify in the Ph.D. department of their choice and undergo an admission procedure as that of any other student applying to that program.

The last two years of the MSTP are designed to provide students with the required medical rotations to broaden and strengthen their basic knowledge and skills in clinical medicine. During this period of time, students are also required to attend the MSTP Seminars. The required advanced clinical courses include Advanced Medicine, Surgical Specialties and Neurology. Once all the requirements have been met, students can adjust the remaining time in the program to conform to their individual needs. All elective courses must be approved by the Office of Student and Academic Affairs (OSAA).

MSTP students are expected to remain in good standing both as graduate students and medical students. Performance in the first two years will be evaluated based on Graduate School standards. Students are required a grade of High Satisfactory or better in all Medical School courses.

Summer prior to year 1 – optional work in laboratories
YEAR 1 – All first year medical school courses
Summer after year 1 – Rotations in laboratories
YEAR 2 – All second year medical school courses, laboratory rotations, selection of research
Summer after year 2 – Take Step 1 of the USMLE (passing grade required for entrance into year 3 of medical curriculum)
YEARS 3, 4, 5 – Departmental graduate courses, Ph.D. Thesis Research, integrated clinical work, such as Weekly Grand Rounds in Clinical Program of Choice
YEARS 6 and 7 – All third and fourth year medical school courses. Schedules are determined by lottery.

*Research Seminar is required in all years of study.
*Please note: This 7 year program is presented as an optimal schedule. Depending on your research, it may take more than 7 years.

<table>
<thead>
<tr>
<th>Third Year – Medical Curriculum</th>
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</thead>
<tbody>
<tr>
<td>8 weeks of Medicine and Surgery</td>
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<tr>
<td>6 weeks of Pediatrics, Obstetrics and Gynecology, Psychiatry and Family Medicine</td>
</tr>
<tr>
<td>8 weeks of electives</td>
</tr>
<tr>
<td>Core Topics</td>
</tr>
<tr>
<td>MSTP Research Seminar</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Fourth Year – Medical Curriculum consists of 3 required courses and 5 electives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required courses: 4 weeks of Medicine, Surgery, Neurology</td>
</tr>
<tr>
<td>Transition to Residency</td>
</tr>
<tr>
<td>Electives: Five 4-week elective</td>
</tr>
<tr>
<td>MSTP Research Seminar</td>
</tr>
<tr>
<td><strong>FIRST YEAR</strong></td>
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<tr>
<td><strong>Fall Semester (MD)</strong></td>
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<tr>
<td>Clinical Practice of Medicine – 1</td>
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<tr>
<td>Gross Human Anatomy</td>
</tr>
<tr>
<td>Fundamentals 1: Molecules, Cells and Molecular Genetics</td>
</tr>
<tr>
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<td>Medicine and Society</td>
</tr>
<tr>
<td>Continuing Experience in Clinical Medicine</td>
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<tr>
<td><strong>Spring Semester (MD)</strong></td>
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<tr>
<td>Clinical Practice of Medicine – 1</td>
</tr>
<tr>
<td>Host Defenses and Hematology</td>
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<tr>
<td>Gastrointestinal System</td>
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<tr>
<td>Urinary Tract and Renal System</td>
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<tr>
<td>Musculoskeletal System and Integument</td>
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<tr>
<td>Continuing Experience in Clinical Medicine</td>
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<tr>
<td><strong>Summer Seminar</strong></td>
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<tr>
<td>Ph.D. Laboratory Rotations</td>
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<tr>
<th><strong>THIRD – FIFTH YEAR</strong></th>
<th><strong>SIXTH AND SEVENTH YEAR</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall &amp; Spring Semester (Ph.D.)</strong></td>
<td><strong>Fall &amp; Spring (MD)</strong></td>
</tr>
<tr>
<td>Ph.D. Thesis Research *</td>
<td>Medicine (12 weeks)</td>
</tr>
<tr>
<td>Weekly Grand Rounds in Clinical Program of Choice</td>
<td>Surgery (12 weeks)</td>
</tr>
<tr>
<td>MSTP Research Seminar</td>
<td>Pediatrics (6 weeks)</td>
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<tr>
<td></td>
<td>Family Medicine (6 weeks)</td>
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<tr>
<td></td>
<td>Obstetrics &amp; Gynecology (6 weeks)</td>
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<td></td>
<td>Psychiatry (6 weeks)</td>
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<td></td>
<td>Electives (2) (8 weeks)</td>
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<td></td>
<td>Electives are taken during MED and SUR blocks</td>
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<tr>
<td></td>
<td>Core Topics in Medicine</td>
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<td></td>
<td>Research Seminar</td>
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<td></td>
<td><strong>Fall &amp; Spring (MD)</strong></td>
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<tr>
<td></td>
<td>Basic Neurology</td>
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<td></td>
<td>Advanced Clerkship in Medicine</td>
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<td></td>
<td>Surgical Specialties</td>
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<td></td>
<td>Transition to Residency</td>
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<td></td>
<td>Five Electives**</td>
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<td></td>
<td>Research Seminar</td>
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</tbody>
</table>

*Sixth year if necessary **Electives will be individualized to meet student’s schedule & interests; approval by MSTP Steering Committee and OSAA required.
MD/MBA Dual Degree Program

The MD/MBA Degree requires five years of education. Medical students will complete the first three years of Medical School curriculum. The fourth year will take place within the School of Management (see below). Please note: While you are in the School of Management your financial aid award will be decreased due to the decreased tuition charges. For further information please contact financial aid department. The fifth and sixth year will consist of a modified Medical School curriculum (see below).

The MBA portion of the dual degree program can only be taken after completion of the third year of medical school. Students admitted to medical school under the Early Assurance Program are required to take the GMAT.

### MD/MBA DEGREE CURRICULUM

<table>
<thead>
<tr>
<th>First Year</th>
<th>Second Year</th>
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<tbody>
<tr>
<td><strong>Fall Semester (MD)</strong></td>
<td><strong>Fall Semester (MD)</strong></td>
</tr>
<tr>
<td>Clinical Practice of Medicine – 1</td>
<td>Clinical Practice of Medicine – 2</td>
</tr>
<tr>
<td>Gross Human Anatomy</td>
<td>Human Cardiovascular System</td>
</tr>
<tr>
<td>Fundamentals 1: Molecules, Cells and Molecular Genetics</td>
<td>Lung and Respiration</td>
</tr>
<tr>
<td>Fundamentals 2: Metabolism, Human Genetics and Pharmacology</td>
<td>Neuroscience and Behavior I</td>
</tr>
<tr>
<td>Medicine and Society</td>
<td>Continuing Experience in Clinical Medicine</td>
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<tr>
<td>Continuing Experience in Clinical Medicine</td>
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</tbody>
</table>

| **Spring Semester (MD)** | **Spring Semester (MD)** |
| Host Defenses and Hematology | Clinical Practice of Medicine – 2 |
| Gastrointestinal System | Neuroscience and Behavior II |
| Urinary Tract and Renal System | Endocrine and Reproductive Systems |
| Musculoskeletal System and Integument | Continuing Experience in Clinical Medicine |
| Continuing Experience in Clinical Medicine | |

<table>
<thead>
<tr>
<th>Third Year</th>
<th>Fourth Year</th>
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</thead>
<tbody>
<tr>
<td><strong>Fall and Spring Semesters (MD)</strong></td>
<td>Devoted to the MBA curriculum schedule</td>
</tr>
<tr>
<td>Family Medicine / Psychiatry</td>
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<tr>
<td>Pediatrics / Obstetrics and Gynecology</td>
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<tr>
<td>Medicine</td>
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<tr>
<td>Surgery</td>
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<tr>
<td>Dilemmas in Medicine</td>
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<tr>
<td>Core Topics</td>
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<tr>
<td>Electives (2)</td>
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</table>

<p>| Fourth Year | |
| Devoted to the MBA curriculum schedule | |</p>
<table>
<thead>
<tr>
<th>Fifth Year</th>
<th>Spring Semester (MBA)</th>
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<tbody>
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<td><strong>Fall Semester (MD)</strong></td>
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<tr>
<td>Advanced Clerkship in Medicine</td>
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<tr>
<td>Surgical Specialties*</td>
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<tr>
<td>Transition to Residency</td>
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<tr>
<td>Electives (2 - MD)</td>
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</tr>
<tr>
<td>*If taken as elective during third year, additional elective must be taken.</td>
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</tbody>
</table>
MD/MPH Dual Degree Program

The MD/MPH Degree requires five years of education. Medical students will complete the first two years of Medical School curriculum. Please note: While you are in the School of Public Health your financial aid award will be decreased due to the decreased tuition charges. For further information please contact financial aid department. The fourth year will be your clerkships, and the fifth year will consist of a modified Medical School curriculum (see below).

The MPH portion of the dual degree program can only be taken after successful completion of the second year of medical school. If you were an early assurance medical student, you will be required to take the GRE.

### MD/MPH DEGREE CURRICULUM

<table>
<thead>
<tr>
<th>First Year</th>
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<td>and Pharmacology</td>
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<tr>
<td>Continuing Experience in Clinical Medicine</td>
<td></td>
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</tbody>
</table>

<p>| Third Year                                      | Fourth Year                                       |
| Devoted to the MPH curriculum schedule         | <strong>Fall and Spring Semesters (MD)</strong>                |
|                                                 | Family Medicine / Psychiatry                      |
|                                                 | Pediatrics / Obstetrics and Gynecology            |
|                                                 | Medicine                                          |
|                                                 | Surgery                                           |
|                                                 | Dilemmas in Medicine                              |
|                                                 | Core Topics                                       |
|                                                 | Electives (2)                                     |</p>
<table>
<thead>
<tr>
<th>Fifth Year</th>
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</table>
| **Fall Semester (MD)**  
  Basic Neurology*  
  Advanced Clerkship in Medicine  
  Surgical Specialties*  
  Transition to Residency  
  Electives (2 - MD) |
| **Spring Semester (MPH)**  
  Field Training  
  Integrative Project  
  Electives** |

* If taken as elective during third year, additional electives must be taken.
** Any remaining concentration area courses in the MPH program.
Oral and Maxillofacial Surgery Certificate and M.D./MOMS

Students are accepted to the School of Medicine after already earning their DDS degree. They take a modified schedule in the first year of the program to develop the necessary clinical skills. In the last two years, the program is designed to provide students with the required medical rotations to broaden and strengthen their basic knowledge and skills in clinical medicine. Second and Third year schedules are decided by lottery. See M.D. Degree Curriculum for additional information.

### MD/MOMS DEGREE CURRICULUM

<table>
<thead>
<tr>
<th>First Year</th>
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<tbody>
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<td><strong>Fall Semester</strong></td>
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</tr>
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<td>Clinical Practice of Medicine</td>
<td>Pediatrics / Obstetrics and Gynecology</td>
</tr>
<tr>
<td><strong>Spring Semester</strong></td>
<td>Medicine</td>
</tr>
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<td>Clinical Practice of Medicine</td>
<td>Surgery</td>
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<tr>
<td><strong>Third Year</strong></td>
<td>Dilemmas in Medicine</td>
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<td>Surgical Specialties*</td>
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<tr>
<td>Electives (5)</td>
</tr>
<tr>
<td>Transition to Residency</td>
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</tbody>
</table>

*If taken as elective during third year, additional electives must be taken.
DEPARTMENT OF ANESTHESIOLOGY

The department’s administrative office is located at UB Downtown Gateway Building, 77 Goodell Street, Suite 550. The instructional program utilizes the facilities of the Buffalo General Medical Center, Gates Vascular Institute, Women and Children’s Hospital of Buffalo, Roswell Park Cancer Institute, and the Veterans Administration Medical Center.

Second Year
The staff assists the Department of Pharmacology in teaching the principles of anesthesia and the pharmacology of anesthetic drugs. Integrated with this didactic program, the Anesthesiology Department provides pertinent clinical demonstrations at the affiliated hospitals. Faculty members also lecture as part of the didactic programs in microbiology and physiology.

Also available are ten-week preceptorships in research in the various Anesthesiology Research Labs. These preceptorships are offered during the summer following the second year of medical school.

Third Year
A two-week anesthesiology selective is provided for third or fourth year students within the context of the required Surgery 800 (Surgical Specialties) rotation. This experience is offered at Roswell Park Cancer Institute and Buffalo General Medical Center. The student receives clinical exposure with members of the anesthesiology staff in the operating rooms, recovery rooms, and ICU’s. Practical instruction, preoperative evaluation, preparation of patients for anesthesia, methods of anesthesia, and postoperative care are considered within this integrated rotation.

Also available is a four-week Anesthesiology elective for third year students. The preference is to limit this primarily to the second half of the Junior year and is not an option for students visiting from other universities.

The objectives of this four-week rotation are to provide an opportunity for students to have direct patient management in the several areas touched by clinical anesthesiology and to point out the clinical applications of physiology and pharmacology as they pertain to anesthesiology.

Within this four-week elective, students will be responsible for the preoperative evaluation of patients (including H&P); and the ordering of preoperative medication. They are then allowed to actively participate in the administration of anesthesia in the operating room and are responsible for the postoperative care of the patient. The students will be under the direct supervision of an attending anesthesiologist in a ratio of no more than two students per faculty member.

Fourth Year
The objectives are the same as the four-week anesthesiology elective as described above for Junior students. This rotation is open to fourth year students for both semesters and students visiting from other universities via prior arrangements with the administrative office housed at UB Downtown Gateway Building, 77 Goodell Street, Suite 550.

Research
Third and fourth year students may opt to take an elective in anesthesia research. They must make individual arrangements with the administrative office to participate in the research programs.
Prime interests of the department are related to the effects of anesthetic agents on respiratory and circulatory mechanisms. Studies include: acid-base balance and circulation of anesthetized man during passive hyperventilation, aspiration pneumonitis, cerebral blood flow, ventilation during and post anesthesia, uptake and distribution of inert gases and inhalation anesthetics, clinical investigation of various anesthetic agents and adjuvants, and analysis of NMDA receptors.

Anesthesia Elective at Another University
Senior medical students may elect to do a four-week anesthesia elective at another university by arrangements with the chair’s office at that institution.

ANE-800 SUBINTERNSHIP IN ANESTHESIOLOGY 4 credits. Modules A-K. Prerequisite--Senior medical student or permission of OSAA and instructor. Number of students: 3. Contact departmental office (829-6105) for site location when registering.

The objectives of this rotation are to provide an opportunity for students at the level of a beginning resident for direct patient management in the several areas touched by clinical anesthesiology and to point out the clinical applications of physiology and pharmacology with respect to clinical anesthesiology.


By arrangement with other university and chairman of Department of Anesthesiology.
ANE-950 RESEARCH 4 credits. Prerequisite--Senior medical student or permission of OSAA and instructor. Number of students: 2. Contact departmental office (829-6105) for site location before registering.

Students may have an opportunity to work with a faculty member on a research project.
DEPARTMENT OF DERMATOLOGY

The Department of Dermatology participates in patient care at Buffalo General Medical Center, Veterans Administration Medical Center. In addition to outpatient clinics, the department provides inpatient care, inpatient consultations, dermatopathology services, dermatologic surgery, and clinical and basic science research. Educational programs are available for undergraduate medical students, primary care residents, and continuing education for dermatologists in the community. The Buffalo Rochester Dermatologic Society meets quarterly during the academic year.

Fourth-year elective courses for undergraduate medical students are integrated into the other educational activities of the department. Students will be exposed to common skin disorders such as acne and psoriasis as well as less well known disorders such as mycosis fungoides and the bullous dermatoses. The overall goal of the fourth-year electives is to understand the contribution of the field of dermatology to complete patient care.

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**DER-800 CLINICAL DERMATOLOGY** 4 credits. Contact departmental office for site location. Modules C-H and J-A. Prerequisite—Senior medical student or permission of OSAA and instructor. Dr. Sinha, Coordinator (878-3315). Number of students: 2 Suggested Text: Principles of Dermatology – Lookingbill and Marks.

During this elective, the student will:
(1) become familiar with the anatomy of the skin, adnexal structures, general function, and pathological processes;
(2) learn to describe skin lesions by morphology and distribution;
(3) learn to recognize common skin disorders and understand diagnostic methods and treatment;
(4) understand the contribution of the dermatologist, dermatopathologist, and the dermatologic surgeon in the care of skin disorders.

Students are exposed to adults and children while attending clinics at selected affiliated hospitals based on scheduling. The rotation is solely an ambulatory care experience.

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**DER-800 CLINICAL DERMATOLOGY** 4 credits. Coordinator: Dr. Robert Kalb. Location: 325 Essjay Road, Williamsville, NY 14221. Modules A-M. Prerequisite—Senior medical student or permission of OSAA and instructor. Number of students: 2. Suggested Text: Principles of Dermatology – Lookingbill and Marks.

This is solely an ambulatory care experience. Monday through Friday students see patients in the office on 325 Essjay road. This is a very busy dermatology office and students will examine a large number of patients. During this rotation the student will:
- Learn to describe skin lesions by morphology and distribution
- Learn to diagnose and treat common skin disorders
- Understand the role of the dermatologist, dermatopathologist and dermatologic surgeon in the care of skin disorders

The medical student is given ample autonomy and responsibility in the office. Responsibilities of the student include:
- Taking a relevant history from each patient
- Performing skin exams
- Administering local anesthesia, intramuscular injections, intraloesional therapy, and PPD tests
- Performing skin biopsies, the removal of lesions, liquid nitrogen therapy and other minor surgical procedures with supervision
- Formulating a treatment plan
- Providing patient information regarding their conditions
- Recording the patient’s visit in an electronic medical record (EMR) system
- Contacting patients with their laboratory and biopsy results

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**DER-890 COURSE AT OTHER UNIVERSITY** 4 credits. Contact department before registering. Prerequisite—Senior medical student.

By arrangement with other university and University at Buffalo Department of Dermatology. Contact Dr. Sinha.

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**DER-950 RESEARCH** 4 credits. Prerequisite—Senior medical student or permission of OSAA and instructor. Contact department regarding research possibilities before registering.
DEPARTMENT OF EMERGENCY MEDICINE

EMM-550 INTRODUCTION TO EMERGENCY MEDICINE 2 credits. Fall and Spring semester. First and Second year medical students. Students will meet with their assigned preceptor for 12 hrs. total during the semester (times to be arranged between the student and their preceptor). Clerkship Director: Dr. Samantha Bordonaro. Number of students: 25. Contact course coordinator, Christine Kolek (859-2460) for additional information.

This is an elective course for students who are interested in an emergency department experience that incorporates working with an EM attending at one of the consortium emergency departments. Students will be assigned to a single emergency physician for the entire course. Responsibilities will begin with observation of emergency department patient care. With increased experience, students will have the opportunity to evaluate and present patients to attending emergency physicians. Students will be given the opportunity to perform skills such as IV line placement, catheter insertion, basic suturing, X-ray and EKG interpretation. The student’s grade will be based on participation, ability to assimilate information, ability to perform skills taught, and an ability to interact effectively with patients.

EMM-800 EMERGENCY MEDICINE 4 credits. Modules A-M. Prerequisite: Senior medical student or permission of OSAA and instructor. Clerkship Director: Dr. Samantha Bordonaro. Number of students: 8. Contact course coordinator, Christine Kolek (859-2460) for additional information. Students will be assigned to clinical sites by Christine Kolek.

Students taking the Emergency Medicine rotation in Buffalo will work in one of the affiliated emergency departments under the guidance of emergency medicine faculty. Students will have the opportunity to care for patients with a wide variety of illnesses and conditions. The student will actively participate in the initial evaluation and stabilization of these patients, will learn about the interaction between emergency departments and pre-hospital care providers, will learn the pathophysiology and acute presentations of disease and the appropriate disposition of acutely sick and injured patients. Students will be expected to work in the affiliated emergency department on a variety of shifts (including some weekends and overnights) to learn that patients and their needs sometimes differ according to the time and day of presentation. Students will be expected to attend EM Grand Rounds and the student lecture series.

Upon completion of the course, the student should be able to evaluate and initially manage a variety of medical, surgical and trauma cases. Additionally, the student will learn a variety of skills including minor procedures, acute cardiac care, orthopedics, ultrasound, lumbar puncture, arthrocentesis, intubation, and CPR.

EMM-802 ADVANCED CLERKSHIP IN EMERGENCY MEDICINE 4 credits. Modules A-M. Prerequisite: Senior medical student or permission of OSAA and instructor, and successful completion of EMM-800. Clerkship Director: Dr. Samantha Bordonaro. Number of students: 4. Contact course coordinator, Christine Kolek (859-2460) for additional information. Students will be assigned to clinical sites by Christine Kolek.

During this rotation, students will obtain history, do physical examinations and present cases to attendings/residents and, in consultation, carry out ancillary investigations such as laboratory tests and X-rays. They will be expected to interpret results of such tests and actively participate in treatment. Students will be expected to attend EM Grand Rounds and the student lecture series.

Upon completion of the rotation, students should be able to carry out the initial management of Emergency Room patients; adequate history and physical examinations with reference to the specific problem in the Emergency Room setting; recognize skeletal trauma on X-rays as well as other radiological abnormalities as related to their presenting complaint. They will be able to recognize problems needing specialized management and consult appropriate services. They will develop procedural skills including arterial blood gasses, IV insertion, urinary/nasogastric catheter insertion, incision and drainage of abscesses, appropriate local anesthetics, suturing superficial lacerations, application and removal of plaster casts, surgical dressings and splints.

Students who have successfully completed the EMM800 (Introduction to Emergency Medicine) course will also take part in additional ultrasound activities and become familiar with basic skills in common point of care ultrasound in the emergency department.

EMM-950 EMERGENCY MEDICINE RESEARCH 4 credits. Modules F-I. Prerequisite: Senior medical student or permission of OSAA and instructor. Successful completion of EMM-800. Dr. Samantha Bordonaro, Dr. Brian Clemency, Heather Lindstrom, PhD and Emergency Medicine faculty. Number of students: 4. Contact course coordinator, Christine Kolek (859-2460) before registering.

Students interested in Emergency Medicine Research will have an opportunity to participate in the ongoing research of the department. These areas include, but are not limited to cardiac arrest, stroke care, trauma resuscitation, emergency medical
services (EMS), ultrasound, and acute clinical care. Students are typically paired with a single faculty mentor for the duration of the module. Topics and availability of the course depend on the current research needs of the department. The goal of the course is to teach the student how to approach a research topic, how to conduct that research, and how to prepare information gained for publication. All Students must complete required IRB training prior to beginning the rotation.
The Department of Family Medicine encompasses a large and diverse group of individuals in a variety of settings who share the common goal of providing high quality, comprehensive health care to patients and their families. The department presently includes 21 full-time faculty, 85 volunteer faculty and 47 residents. In addition to utilizing busy academic ambulatory practices and inpatient services at two teaching hospitals (Erie County Medical Center, and Millard Fillmore Suburban), our teaching program relies heavily upon a network of dedicated community-based family physician teachers. Along with our central focus of providing family-centered primary care to individuals of all ages, a variety of special interests are reflected in the clinical activity, research, and educational programs of the department. These include Prevention and Wellness, Maternal and Child Health, Geriatrics, Rural Health Care, Global Health, and Urban Family Medicine (with an emphasis on the health care needs of traditionally underserved populations). Medical student education is given the highest priority in the Department of Family Medicine, with course offerings available in all four years of the curriculum. Clinical training is based on individualized instruction and close one-to-one relationships between attending physicians and students. Classroom work relies primarily on small group discussions, active student participation, problem-based learning, and self-directed study. Emphasis is placed on communication and interviewing skills, the doctor-patient relationship, the bio-psycho-social-spiritual approach to patient care in the context of family and community, continuity and comprehensiveness of care, health promotion and disease prevention, clinical problem solving and rational therapeutics, as well as the diagnosis and management of common illnesses.

**FMD-700 FAMILY MEDICINE CLERKSHIP** Blocks 1-4. Contact departmental office for site location. Prerequisite--Junior medical student. Family Medicine faculty. This is a required six-week junior-year clerkship. Dr. Andrew Symons.

The goals of this course are to teach medical students the basic knowledge, skills, and attitudes involved in the discipline of Family Medicine, primarily in the diagnosis and management of common undifferentiated problems of patients of all ages in the ambulatory setting, and to promote independent learning, critical thinking, and problem-solving skills. The course consists of two components, a clinical preceptorship and small-group teaching sessions. They will have the opportunity to see family medicine patients in various urban, suburban, and rural inpatient and outpatient settings, including home visits, nursing home visits, night call, and the coordination of patient care with community social agencies. The tutorial component consists of problem-based learning and independent study. At an orientation on the first day of the clerkship, each student will receive a detailed syllabus describing clerkship objectives, responsibilities, course curriculum, and student evaluation.

**FMD-800 SUBINTERNSHIP IN FAMILY MEDICINE** 4 credits. Modules A-K. Prerequisite--Senior medical student. Prior approval by Dr. Andrew Symons. Dr. Andrew Symons. Number of students: 2 (Based on availability of preceptors).

Held at Erie County Medical Center, Millard Fillmore Suburban Hospital and Buffalo General Medical Center.

The goal of the subinternship in Family Medicine is to provide students with an intensive experience in the care of hospitalized patients. The subintern will act as the primary physician (under the supervision of Family Medicine residents and faculty) for a panel of patients admitted to the Family Medicine Inpatient Service (FMIS) as well as patients seen in outpatient Family Medicine office settings. The subintern will be responsible for all aspects of the care of his or her patients, including admission history and physical, diagnostic and treatment plan, daily progress notes, discharge planning, family communications, and patient education. The student will participate in all educational activities and conferences and will be expected to present his or her patients at daily attending rounds. In addition to caring for adults with medical illnesses, the subintern may have the opportunity to attend women on labor and delivery, and participate in the care of newborns in the Delivery Room and the Nursery. The number of patients on the service (and in particular the number assigned to the subinterns) is deliberately limited so as to facilitate the teaching functions of the rotation, permit attendance at conferences, and allow adequate time for student-patient interactions and independent study. Topics given particular attention during the subinternship include: history taking and physical examination; differential diagnosis; the pathophysiology of disease; clinical decision making; rational selection and interpretation of diagnostic tests; hospital therapeutics; use of consultants; discharge planning; patient education; and the interaction of illness with psychosocial factors, family, and community environment.

Core Curricular Competencies: [Provide quality medical care for hospitalized patients. Access and manage acute and chronic medical problems. Provide anticipatory health care using education, risk reduction, and health enhancement strategies. Provide and coordinate comprehensive care of complex and severe problems using biomedical, social, personal, economic, and community...](#)
resources, including consultation and referral. Establish effective physician-patient relationships by using appropriate interpersonal communication skills to provide quality health care.

Course Objectives By the completion of the fourth-year Family Medicine Subinternship, the medical student is expected to possess the knowledge, attitudes, and skills needed to:

- Demonstrate a high degree of integrity and excellence in professionalism
- Demonstrate the ability to take an accurate, problem-focused patient history
- Demonstrate the ability to perform a complete and accurate physical examination appropriate to the patient’s complaint
- Demonstrate the ability to give a complete, accurate and organized case presentation of a patient encounter.
- Demonstrate the ability to write accurate, well-organized complete history and physical exam notes and problem-focused progress notes
- Identify acute and chronic illnesses and formulate an adequate assessment and plan for each problem
- Demonstrate adequate comprehension of basic pathophysiology and relate it to patients’ problems
- Demonstrate adequate utilization of lab and other parameters
- Use time in a fairly efficient manner
- Identify and address preventive medicine needs of patients
- Demonstrate the ability to provide patients with health education in terms that can be easily understood
- Demonstrate understanding of whole person health care using the bio-psycho-social-spiritual model
- Develop good rapport with patients and demonstrate empathy toward them
- Develop good rapport and work well with staff and providers
- Demonstrate the use of appropriate interpersonal communication skills
- Accomplish all work expected by the attending and senior resident
- Demonstrate evidence of reading about the problems of patients seen in the hospital and researching answers to questions that arise.
- Demonstrate attention to patient safety issues, including legible handwriting.

FMD-801 CHRONIC PAIN – ASSESSMENT AND TREATMENT 4 credits. Modules A-K. Prerequisite--Senior medical student. Prior approval by Dr. Andrew Symons. Dr. David Holmes. Number of students: 2 (Based on availability of preceptors).

The goal of this course is to use an evidence-based medicine approach to teach medical students how to assess and effectively treat patients with chronic pain. Chronic pain has different causes, methods of diagnoses, and interventions. Effective physicians understand these differences when they assess and manage their patient’s pain. This course will teach students how to make a proper assessment before treatment. Opioid medications are over prescribed for non-cancer, chronic pain patients. As a result more Americans are addicted to prescription medication than to illegal drugs. The use of opioid medication will be addressed, but the focus of this course will be to teach students how to manage chronic pain and increase function without the use of opioids.

Physicians need to understand and work effectively with an inter-disciplinary team of healthcare professionals in order to provide the best possible pain management for their patients. This elective will help students understand how different specialists assess and treat chronic pain and how best to treat the whole patient, not just the pain syndrome.

COURSE OUTLINE

Goals

The goal of this course is to provide an evidenced based overview of the assessment, coordination of care and treatment of the most common sources of chronic pain. Specific goals are to help students understand:

- how to effectively manage and reduce the symptoms of chronic pain syndromes using different treatment techniques with a focus on reducing opioid dependency and negative side-effects.
- how to increase function of patients with chronic pain
- how and when to refer patients with chronic pain to different types of specialists

Objectives

After completing this course participants should be able to:

- Differentiate between acute and chronic pain in the adult and cite the most common examples presenting to primary care clinics.
- Identify common types and causes of chronic pain, especially low back pain
- Describe the factors influencing an individual’s response to pain with a focus on coping mechanisms and functional losses.
- Describe pain assessment tools for acute and chronic pain and their use during assessment and care management.
- Describe the indications and contraindications for the use of opioid treatment with a focus on integration of complimentary interventions to minimize dosage and long term side-effects.
- Describe non-opioid treatments available for patients with chronic pain and differentiate between medication and nonmedication based resources.
- Describe barriers to the effective treatment of chronic pain including but not limited to provider credentials, electronic medical records and reporting and interpretation of pain severity.
- Explain factors to consider when educating patients about their pain management regimen by identifying factors of complementary interventions that indicate potential therapeutic success.
- Describe effects of
common pain syndromes on bodily function and their effects on presenting comorbidities such as heart disease and Type II diabetes. Describe the effects of increased physical function on the management of comorbidities such as heart disease and Type II diabetes.

The following UB SMBS Educational Objectives and Competencies will be addressed by this elective: K3, K4, K6, K7, K8, K9, K10, K12, K14, S1, S2, S4, S5, S8, S9, S10, S11, A1, A2, A3, A4, A5, A7, A9, A10, A11

Methodology

- Preceptorship experiences
- Assigned readings with a focus on peer reviewed medically indexed research
- Discussion of experiences and readings

FMD-820 ADDICTION MEDICINE  4 credits. Modules A-K. Prerequisite--Senior medical student. Prior approval by Dr. Andrew Symons. Arthur Weissman. Number of students: 1 per block. (Based on availability of preceptors).

The goal of the elective is to learn how to care for patients who have addictive disorders. Areas of training include: screening, interventions, detoxification, outpatient and inpatient rehabilitation and monitoring recovery. Clinical time will be spent on: a) inpatient detoxification b) outpatient and inpatient rehab units, c) emergency rooms and d) addiction consult services. Readings, scholarship work, and one-on-one interactive discussions with attending physicians will complement the students’ experiences with direct patient care. Core Curricular Competencies

- Provide addiction care for individuals
- Provide anticipatory health care using education, risk reduction, and health enhancement strategies
- Address the whole person using the bio-psycho-social-spiritual model of care and refer patients to specialists and community resources as needed
- Establish effective physician-patient relationships by using appropriate interpersonal communication skills and cultural sensitivity to provide quality health care.

Course Objectives
By the completion of the Addiction Medicine elective, the medical student is expected to possess the knowledge, attitudes, and skills needed to:

- Demonstrate a high degree of integrity and excellence in professionalism
- Demonstrate the ability to take an accurate, problem-focused patient history
- Demonstrate the ability to perform a complete and accurate physical examination appropriate to the patient’s complaint
- Demonstrate the ability to give a complete, accurate and organized case presentation of a patient encounter
- Demonstrate the ability to write an accurate, well-organized problem-focused progress note
- Demonstrate knowledge and understanding regarding the diagnosis and treatment of patients with addictions
- Demonstrate adequate comprehension of basic pathophysiology and relate it to patients’ problems
- Demonstrate adequate utilization of lab and other parameters
- Use time in a fairly efficient manner
- Identify and manage preventive medicine needs of patients
- Demonstrate the ability to provide patients with health education in terms that can be easily understood
- Demonstrate understanding of whole person health care using the bio-psycho-social-spiritual model
- Develop good rapport with patients and demonstrate empathy toward them
- Develop good rapport and work well with staff and providers
- Demonstrate the use of appropriate interpersonal communication skills
- Accomplish all work expected by the attending
- Demonstrate evidence of reading about the problems of patients seen and researching answers to questions that arise
- Demonstrate attention to patient safety issues, including legible handwriting.

FMD-830 PRIMARY CARE DIAGNOSTIC IMAGING  4 credits. Modules A-K. Prerequisite--Senior medical student. Prior approval by Dr. Andrew Symons. Drs. Serghany, Gerow, and Feld. Number of students: 2 per block. (Based on availability of preceptors)

The scope of this imaging course includes: physics of imaging, processes involved in the use of imaging, image storage, the use of computer-assisted imaging programs, magnetic resonance imaging, computed tomography, myelography, discography, radionuclide imaging, mammography, fluoroscopy and ultrasonography. The principles of x-ray positioning and the effects of ionizing radiation on biological systems will be covered. Practical experience will include evaluation/review of imaging studies and interpretation.

Course Objectives:

Upon completion of this course, the student will be able to:
Identify the value of using imaging technology

Interpret imaging findings
Correlate imaging findings with patient histories, physical examination and relevant laboratory findings
Attribute importance to case management and referral and follow-up for patients experiencing medical pathologies
Demonstrate computer skills in the storage and retrieval of radiographic findings and in the use of computer-assisted Diagnostic programs; and
Develop growing competency in the use of imaging interpretation and mark-up skills.

FMD-850 PRIMARY CARE FOR PEOPLE WITH DISABILITIES 4 credits. Modules A-K. Contact departmental office for site location. Prerequisite--Senior medical student or permission of OSAA and instructor. Dr. Andrew Symons. Prior approval needed.

Students will spend four weeks at various local clinics serving patients with disabilities. The clinical sites are community partners that provide primary care services for patients with disabilities, as well as ancillary services such as physical and occupational therapy. Students will have a precepted experience in the primary care clinic with integrated experience in the interdisciplinary elements of the center. This elective will better prepare medical students to function professionally and appropriately within the medical environment and provide effective and compassionate care to patients with disabilities.

FMD-890-D COURSE AT OTHER UNIVERSITY 4 credits. All Modules. Prerequisite--Senior medical student. Supervising faculty must be Board Certified faculty physicians with faculty appointment in a university Department of Family Medicine. Prior approval by Dr. Andrew Symons. Dr. Andrew Symons.

By arrangement with department chairman, University at Buffalo, or course coordinator. Please note requirements for non-UB faculty member assuming supervisory responsibility for student. It will be the student’s responsibility to provide or obtain needed information regarding the nature of the experience. Credit for required courses cannot be satisfied through this elective.

FMD-890 G CROSS-CULTURAL MEDICINE 4 credits. All Modules. Prerequisite--Senior medical student. Minimum rotation, four weeks. By arrangement with Dr. David Holmes.

This elective will allow senior medical students to work under supervision in selected clinical sites in developing countries. The purpose is to require practice in settings where students must rely on fund of knowledge, history, and examination with minimal technological support. Students will be incorporated into the clinical team and provide, under supervision, a broad range of ambulatory and inpatient care. Students will enhance skills in diagnosis of undifferentiated presenting complaints; improve their judgment with respect to use of diagnostic and therapeutic procedures; develop an appreciation for social, cultural, and economic factors in the presentation, etiology, course, and management of illness; improve their sensitivity to health consequences of public policy and economics; sharpen their understanding of preventive intervention from a public health perspective; increase consciousness of cost implications of clinical decisions.

FMD-899 INDEPENDENT STUDY 4 credits. All modules (by special arrangement with faculty sponsor). Prerequisite--Senior medical student or permission of OSAA and instructor. Prior approval by Dr. Andrew Symons. Number of students: unlimited.

Proposals for independent study must include a detailed written program description including goals and objectives, methods of study, faculty supervision, means of evaluation, and educational rationale. Proposals must be accompanied by a letter of support from the faculty sponsor. Academic credit will generally be contingent upon the completion of a written project. All independent study programs must be approved by the course director prior to the start of the module.

FMD-900 FAITH, MEDICINE AND END-OF-LIFE CARE 4 credits. Modules A-K. Prerequisite--Senior medical student. Prior approval by Dr. Andrew Symons. Dr. David Holmes. Number of students: 2 (Based on availability of preceptors).

The students will work directly with Hospice staff, hospital chaplains, and community physicians who practice whole person health care using the bio-psycho-social-spiritual model. The goal of this course is to provide learning opportunities that will enable students to develop competencies and meet the objectives described below.

Core Curricular Competencies
- Provide primary medical care, using the bio-psycho-social-spiritual model of healthcare, for individuals and families, as the physician of first contact in health as well as in illness.
- Assess and manage acute and chronic medical problems.
- Provide anticipatory health care using education, risk reduction, and health enhancement strategies.
- Provide and
coordinate comprehensive care of complex and severe problems using biomedical, social, personal, economic, and community resources, including consultation and referral.

Course Objectives By the completion of the Cross Cultural Medicine elective, the medical student is expected to possess the knowledge, attitudes, and skills needed to:

- Demonstrate a high degree of integrity and excellence in professionalism
- Demonstrate the ability to take an accurate, problem-focused patient history
- Demonstrate the ability to perform a complete and accurate physical examination appropriate to the patient’s complaint
- Demonstrate the ability to give a complete, accurate and organized case presentation of a patient encounter
- Demonstrate the ability to write an accurate, well-organized problem-focused progress note and complete history and physical exam
- Identify acute and chronic illnesses and formulate an adequate assessment and plan for each problem
- Demonstrate adequate comprehension of basic pathophysiology and relate it to patients’ problems
- Demonstrate adequate utilization of lab and other parameters
- Use time in a fairly efficient manner
- Identify and manage preventive medicine needs of patients
- Demonstrate the ability to provide patients with health education in terms that can be easily understood
- Demonstrate understanding of whole person health care using the bio-psycho-social-spiritual model
- Develop good rapport with patients and demonstrate empathy toward them
- Develop good rapport and work well with physicians, chaplains and staff
- Demonstrate the use of appropriate interpersonal communication skills
- Accomplish all work expected by the preceptor and chaplain
- Demonstrate evidence of reading about the problems of patients seen in the office and researching answers to questions that arise in the office
- Demonstrate attention to patient safety issues, including legible handwriting
- Demonstrate understanding of the role faith plays in one’s health and well-being
- Demonstrate knowledge and understanding of different faiths
- Demonstrate knowledge and understanding of the role of hospital and Hospice chaplains and when to refer patients to them
- Demonstrate knowledge and skills in taking a spiritual history and addressing issues relating to faith
- Demonstrate knowledge and skills in caring for the whole person using the bio-psycho-social-spiritual model
- Demonstrate knowledge and skills regarding end-of-life care

FMD-950 RESEARCH IN FAMILY MEDICINE 4 credits. All modules (by special arrangement with faculty sponsor).

Prerequisite—Senior medical student and permission of OSAA and instructor. Approval by Dr. Andrew Symons. Number of students: unlimited.

Students are encouraged to participate in research activities under the supervision of faculty in the Department of Family Medicine. Students may assist faculty in ongoing projects or may seek faculty sponsorship of student-initiated research. Research rotations may extend from one to several modules according to individual student scheduling needs and within the constraints of Medical School policy. Students wishing to obtain credit for research modules must identify a faculty member willing to serve as their sponsor and submit a proposal and letter of support from their sponsor to the course director for his approval. The proposal must include a written description of the project including goals, objectives, methods, faculty supervision, means of evaluation and educational rationale.
The Department of Obstetrics and Gynecology is concerned with women's health, particularly as it may be affected by childbearing. The program involves clerkships in the Buffalo General, Erie County Medical Center, Children's, Millard Fillmore, Sisters of Charity, and Mercy Hospitals. The gynecologic services of the Roswell Park Cancer Institute are also included.

*GYN-700 CLERKSHIP IN GYNECOLOGY-OBSTETRICS 6 credits. Block 1-4. Contact departmental office for site location. Prerequisite--Junior medical student.

GYN-700 is a required six-week block in the third year. Among the objectives of this clinical clerkship are:
1. Explain sex and gender differences in normal development and pathophysiology as they apply to prevention and management of diseases.
2. Compare differences in biological functions, development, and pharmacologic response in males and females.
3. Discuss the pathophysiology, etiology, differential diagnosis, and treatment options for conditions that are more common, more serious, or have interventions that are different in women.
4. Discuss the pathophysiology, etiology, differential diagnosis, and treatment options for conditions and functions that are specific to women.
5. Effectively communicate with patients, demonstrating awareness of gender and cultural differences.
6. Perform a sex-, gender- and age-appropriate physical examination.
7. Discuss the impact of gender-based societal and cultural roles and context on health care and on women.
8. Identify and assist victims of physical, emotional, and sexual violence and abuse.
9. Assess and counsel women for sex- and gender-appropriate reduction of risk, including lifestyle changes and genetic testing.
10. Discuss the impact of health care delivery systems on populations and individuals receiving health care.
11. Learn about normal and abnormal labor and delivery and complications of pregnancy and other common medical and surgical conditions associated with pregnancy.

This six-week clinical clerkship offers each student an opportunity for personal firsthand experience in the care of both normal and abnormal pregnancy. Experience gained by working with patients is reviewed in group conferences and on ward rounds. Concepts not readily observed during the direct patient contact are emphasized in special conferences.

The student is provided with an opportunity to develop clinical skills under adequate supervision in the areas of history taking, pelvic examination, special diagnostic procedures, differential diagnosis, observation and support of patients in labor, aiding and then conducting actual delivery, and assisting at gynecologic operations. Each student has an opportunity to participate in the active care of patients both in inpatient wards and in the outpatient clinics.

Students who develop an interest in clinical or basic investigation are encouraged to pursue their interests. Four-week elective periods during the fourth year may provide either additional clerkship experience or opportunity to pursue investigative interests.

*GYN-800 SUBINTERNSHIP IN GYNECOLOGY-OBSTETRICS 4 credit. Modules B-J. NOTE: Site: Sister's Hospital. Dr. C. Strittmatter. Number of students: 1 senior or 1 junior. Prerequisite--Successful completion of GYN 700

This clerkship is comprised of predominantly inpatient experience, but participation in the Outpatient Clinic and Emergency Room is available. The clerkship will be part of the health care team comprised of the house staff and the attending staff and will assist in providing general obstetrical and gynecological care.

The student will have numerous opportunities to participate and be part of the 250-plus deliveries per month and assist at the gynecologic surgical procedures and will be able to assume patient care responsibility, depending upon their level of training, interest, and commitment to self-education. The clerkship will serve to enhance diagnostic skills and management formation as well as reinforce experiences learned during the third year. Besides participating in a very active clinical service, there is a significant amount of didactic teaching.

The value of this rotation is that it provides an individual with interest in this discipline as a potential career an opportunity to witness firsthand private practice in a large Catholic community hospital.
GYN-804 SUBINTERNSHIP IN GYNECOLOGY-OBSTETRICS 4 credits. Modules A-J. Contact departmental office for site information. Prerequisite--Senior medical student. Drs. Greene and Wesolowski, Niagara Falls, N.Y. Number of students: 1. Prerequisite--Successful completion of GYN 700.

The main objective of this rotation is to expose the students to a busy private gynecology-obstetrics practice in a fully accredited hospital where there is ample opportunity for the student to observe and participate in the "general practice" of gynecology and obstetrics. The students will assist at major gynecologic surgery as second assistants. They will have a selection of cases to choose from. In addition to cases performed by the instructor, the students will follow patients in labor and assist at deliveries. The student should become familiar with the reading and interpretation of fetal heart tracings. The student may be assigned an independent research project and will be invited to attend all staff Gyn-Ob meetings. The student will also observe some office gynecology.

On completion of the rotation, the students should have acquired experience in evaluating the more common gynecological complaints as they present in a private office. They should have gained some confidence in assisting at major gynecological operations, and should be able to recognize the more common complications that occur in pregnancy and in labor.

THIS COURSE IS NO LONGER OFFERED

GYN-810 GYNECOLOGIC ONCOLOGY 4 credits. Modules A-J. Contact departmental office for site location. Drs. S. Lele, A. Odunsi, and P. Frederick. Number of students: 1 senior or 1 junior. Prerequisite--Successful completion of GYN 700.

The intent of this rotation is to help students gain experience in methods of treatment and diagnosis of patients with gynecologic cancer.

The students will participate in all aspects of diagnosis, problem solving, and treatment of patients with gynecologic cancer admitted to University-affiliated Gyn-Ob units. They will be exposed to pelvic anatomy by scrubbing in radical pelvic surgery, and learn the principles of radiotherapy. Experience with the use of chemotherapy in gynecologic cancer will also be gained.

Upon completion of this rotation, the students should know how to screen the general population for early detection of cancer.

GYN-823 SUB-INTERNSHIP IN MATERNAL-FETAL MEDICINE 4 credits. Modules B-L. A "C" after the module in the Class Schedule indicates Woman & Children's Hospital of Buffalo (Perinatal Center) as the site. Prerequisite--Successful completion of GYN 700. Dr. P. Ogburn. Number of students: 1. Students are encouraged to contact the Instructor prior to starting the rotation.

The Sub-internship in Maternal-Fetal Medicine is designed to provide the fourth year student with experience in complicated pregnancy management. Students committed to a career in Obstetrics and Gynecology will have the additional advantage of enhancing their clinical and technical skills in anticipation of beginning their residency training. The student will be a member of the high risk pregnancy team at the Regional Perinatal Center, and will learn the principles involved in the management of medical & surgical complications of pregnancy, as well as the management of structural, genetic and physiologic fetal disease states. The student will be exposed to basic and advanced obstetrical ultrasound, fetal surveillance techniques, Doppler ultrasound, fetal echocardiography, amniocentesis and invasive fetal procedures. The experience will include inpatient, consultative and outpatient complex pregnancy management. Experience in ambulatory care will take place in the High Risk Pregnancy Clinic and Pregnancy Diabetes Clinic housed in the perinatal center. Attendance at both of these clinics, which take place weekly, is mandatory. Didactic teaching will consist of conferences, rounds, and selected assigned reading. Research opportunities are available for the interested student. At the end of the rotation, students will be able to identify perinatal risk factors and have an appreciation for the medical and technical aspects of complex pregnancy management.

GYN-950 RESEARCH 4 credits. Prerequisite--Senior medical student and permission of OSAA and instructor. Dr. G. Bett. Contact departmental office.

Students may have an opportunity to work with a faculty member on an ongoing research project or a research project of their own.
The following courses are offered under the joint auspices of several of the departments of the School of Medicine. These courses provide the basic medical science and the clinical science faculties with an opportunity for a more collaborative approach to medical education. It is anticipated that this "team-teaching approach" in each course will add depth and breadth to the students' curriculum.

**IDM-530 CONTINUING EXPERIENCE IN RESEARCH** ½ credit. Prerequisite--Currently enrolled in Medical School, with approval of the clinical preceptor and the Office of Medical Education. Faculty: Various. Fall, Spring or Summer. Registration will occur in the Spring semester for work completed during the following summer. Grade: S or U.

This course will enable students to pursue investigation of a suitable research project chosen according to the interest of the student and under the supervision of the faculty. Students will be expected to present a research proposal, participate in appropriate research activities on a full-time basis, and prepare a report of the research activities at the end of the experience.

**IDM-540 CONTINUING EXPERIENCE IN CLINICAL MEDICINE** ½ credit. Prerequisite--Currently enrolled in Medical School, with approval of the clinical preceptor and the Office of Medical Education. Faculty: Various. Fall, Spring or Summer. Registration will occur in the Spring semester for work completed during the following summer. Grade: S or U.

This course will enable students to pursue a suitable clinical experience chosen according to the interest of the student and under the supervision of the faculty. Students will be expected to participate in appropriate clinical activities on a full-time basis and prepare a report of the clinical experience at the end of the experience.

**IDM 560 Health in The Neighborhood** 2 credits. Prerequisite -- Currently enrolled in Medical School. Faculty: David Milling, M.D., Linda F. Pessar, M.D., Henry L. Taylor, Jr., PhD., Kinzer M. Pointer, BSEd, Dennis Lee, Jr., AAS

Health inequities and disparities between Black and White Americans are complex with many relevant factors that include:

- The impact of policies based on systemic structural racism, such as underdeveloped segregated neighborhoods that affect the quality of the physical environment, employment opportunities, and convenient access to superior schools, nutritious foods, and healthcare facilities.
- Doctors’ lack of knowledge and familiarity with life and culture in Black underdeveloped communities, which may limit rapport and treatment planning.
- Healthcare workers’ implicit and explicit biases toward Black patients that influence treatment recommendations.

Health In The Neighborhood is an electronic/experiential pre-clinical medical school elective offered on Wednesday afternoons during the spring semester.

The course is composed of on-line discussions with students and faculty, sessions in The Martin Luther King Neighborhood, and class discussions at the medical school. Course work and class time is designed to require a usual time commitment of three hours per week. Students will keep reflective on-line logs of their weekly experiences. This is a pass/fail course. There are no exams.

At the conclusion of the course, students will have an understanding of the different ways that social forces operate within the country, region, and the profession to sustain health inequities, and disparities, and have thought about methods to counter these trends.

**IDM-630 CONTINUING EXPERIENCE IN RESEARCH** ½ credit. Prerequisite--Currently enrolled in Medical School, with approval of the clinical preceptor and the Office of Medical Education. Faculty: Various. Fall, Spring or Summer. Registration will occur in the Spring semester for work completed during the following summer. Grade: S or U.

This course will enable students to pursue investigation of a suitable research project chosen according to the interest of the student and under the supervision of the faculty. Students will be expected to present a research proposal, participate in appropriate research activities on a full-time basis, and prepare a report of the research activities at the end of the experience.

**IDM-632 MEDICAL SPANISH** 1 credit, Spring semester. Prerequisite--Second year medical student. Karen Gutierrez, RN, FNP. Number of students: 20.
This course is designed for second year medical students. It will provide students with the opportunity to learn basic Spanish and become comfortable with using medical Spanish prior to entering their clinical training. Students will learn enough Spanish to take a patient history, assess the various systems of the body, and discuss issues related to medications, diet, prenatal/postpartum care and diagnostic examinations. Throughout the course, students will be asked to converse with the instructor during each session and therefore participation will play role in students’ assessment. At the end of the session, students will interview “patients” and be evaluated by these individuals.

**IDM-640 CONTINUING EXPERIENCE IN CLINICAL MEDICINE** ½ credit. Prerequisite—Currently enrolled in Medical School, with approval of the clinical preceptor and the Office of Medical Education. Faculty: Various. Fall, Spring or Summer. Registration will occur in the Spring semester for work completed during the following summer. Grade: S or U.

This course will enable students to pursue a suitable clinical experience chosen according to the interest of the student and under the supervision of the faculty. Students will be expected to participate in appropriate clinical activities on a full-time basis and prepare a report of the clinical experience at the end of the experience.

**IDM-701 DILEMMAS IN CLINICAL MEDICINE** 1 credit. All modules. Prerequisite—Junior medical student. Drs. Jack Freer, Stephen Wear, and staff.

The Dilemmas in Clinical Medicine (DCM) course is designed as a year-long experience in addressing human and ethical issues in medicine and the decision-making process. By design, it occurs within the six major clinical clerkships of the third-year curriculum, with each clerkship providing at least one 90 minute session dedicated specifically to these issues. The small group sessions are clinically oriented and usually based upon cases from the students’ experience. Attendance at all sessions is required. In most clerkships, the student is required to identify and summarize one case in which the student has identified an ethical dilemma. In Medicine and Surgery, this must be in the form of a written discussion. Grading is based upon the appropriateness of the case identified, as well as the quality of the discussion. Course evaluations will be completed by each student.

A major objective of the course is to help students develop a sensitivity to the wide range of ethical dilemmas that occur in all medical practice. Many, if not most, clinical cases involve some element of value judgment, or normative behavior (what one “should” or "ought to" do in a given situation). Using such a broad definition of "ethical dilemma" will permit the student to identify dilemmas in each of the clinical clerkships.

**IDM-730 CORE TOPICS** 2 credits, fall and/or spring semester as scheduled. Prerequisite—Third year medical student. Dr. Sheehan and staff. Number of students: 180.

This course will provide students with knowledge, skills, and attitudes that will enhance their ability to provide care to and interact with patients they will encounter during their clinical clerkships and electives.

**IDM-810 TRANSITION TO RESIDENCY**

As students transition from medical school to residency, satisfactory completion of all steps necessary for this transition are fulfilled. For example completing checklists for graduation, ERAS, The Match, Step 2 exams, etc.
INTEGRATED MEDICAL CURRICULUM

The Integrated Medical School Curriculum (IMC) in the first and second years integrates the basic sciences with clinical case discussions and emphasizes self-directed and small group case-based learning as well as interpersonal and communication skills. The case studies emphasize common medical conditions which illustrate important scientific principles.

Gross Human Anatomy (ANA-500), given in the first semester, and the four semester Clinical Practice of Medicine sequence (IDM-520/521 and IDM-620/621) are taught in a more traditional format.

*ANA-500 GROSS HUMAN ANATOMY 6 credits; fall semester. Required course for freshman medical students. Dr. Kolega and staff. Number of students: 180.

This course is designed to examine the nature and organization of the major, grossly visible structural components of the dissected human body.

The course emphasizes the normal functions of the above components, particularly as these functions relate to clinical management of patients. The course is composed of lectures and demonstrations, laboratories, and clinical correlations. Lectures and demonstrations are given by the Gross Anatomy staff. These involve a presentation of anatomical details along with general functions and aspects of clinical relevance. In the laboratory, pairs of students, under the guidance of the faculty, dissect and present the anatomical detail and general organization of assigned regions to the other students at their dissecting table. Additional study aids, such as radiographs, CAT-scans, MRIs, special dissections and cross-section also are made available. Clinical correlations are presented throughout the course to augment the material in each region.

By the end of the course, the gross anatomy of the entire human body will have been surveyed. Experience gained by dissection should permit students to relate the more advanced anatomy of their interests to that of the human body as a whole, and to the interests of their colleagues, as in consultation or in presentation of patients.

*IDM-520/521 CLINICAL PRACTICE OF MEDICINE (CPM-1) 4 credits; fall/spring semesters. Required course for freshman medical students. Dr. Symons and staff. Number of students: 180.

The Clinical Practice of Medicine is a two-year course which is designed to provide you with the fundamental knowledge and skills required in clinical practice. During the first year of this course, you will learn basic skills that are essential for clinical medicine, including medical interviewing, the performance of a physical examination, and the medical write-up. Working in seminar groups and with community-based physicians, students will focus in the fall semester on developing patient-centered communication skills, and the challenges of medical interviewing. In the spring semester, continuing with seminar groups and preceptorships, the focus will be primarily on developing physical examination skills.

At the end of each semester there will be a clinical competency exam where students will demonstrate and confirm skill attainment.

*IDM-620/621 CLINICAL PRACTICE OF MEDICINE (CPM-2) 4 credits; fall/spring semesters. Prerequisite: satisfactory completion of IDM-520/521. Required course for sophomore medical student. Dr. Khan and staff. Number of students: 180.

This course provides students with the basic clinical skills needed for their third-year clinical clerkships. It is a continuation of the first-year CPM course.

The Fall semester course consists of three interrelated components. In a series of lectures, key concepts are presented related to specialized and more advanced aspects of the physical examination, including the gynecologic, urologic, neurologic, dermatologic, ENT, ophthalmologic, orthopedic, abdominal, pulmonary and cardiovascular examinations. Students are also introduced to the basics of medical ethics, cancer screening and medical record. Students, in groups of four, are assigned to clinical preceptors at area hospitals and clinics to allow for individual experience with the medical interview and physical examination. Small group demonstration sessions allow students to polish their skills in specialized aspects of the physical examination.

The Spring semester course consists of five interrelated components. In a series of clinical case presentations, the emphasis is on clinical problem solving, differential diagnosis and interpretation of clinical, laboratory and radiologic features, including hematological peripheral blood smear interpretations. Students receive training and experience in the assessment of patients with disabilities, related to trauma, illness, or advanced age. Students are also exposed to basics of immunizations, healthcare quality, patient safety, physician-patient communication and medico-legal malpractice issues related to clinical practice. They are also introduced to certain basic clinical procedural skills. In addition, the students continue to work with preceptors at clinical sites to practice their clinical skills, under supervision.

Throughout the two semesters, students are introduced ‘hands-on’ to the basics of geriatric medicine.

At the end of the Fall and Spring semesters, students must pass a clinical competency exam, which evaluates their ability to perform a medical interview and physical examination and prepare a written record of their findings. This exam is performed utilizing
standardized patients. At the conclusion of the course, the students should be able to: (1) communicate effectively with patients; (2) obtain a comprehensive medical history; (3) perform a complete physical examination; (4) prepare a written record of the history and physical examination; and (5) present patients orally in a concise manner.

*IMC-500 MEDICINE AND SOCIETY 2 credits; fall semester. Required course for freshman medical students. Dr. Mu and staff.

This foundation course exposes first year medical students to issues regarding the role of the physician in society, followed by issues in the prevention of disease in a population. The student will acquire the lifelong skills to critically appraise and integrate the best evidence into clinical practice through the application of evidence-based medicine and the use of concepts underlying epidemiology and biostatistics, such as sources of error and bias in data, study design, and the use of basic statistical procedures in the understanding of the medical literature.

At the conclusion of the course, students should understand the rationale for and applications of biostatistical analyses and the use of evidence in the practice of evidence-based medicine. This course provides the foundation for critically thinking about how to practice sound medicine. This course prepares the student for subsequent courses by providing the student with the skills to understand and critically evaluate medical studies. The medical student will acquire the skills to apply the results of scientific studies to the practice of clinical medicine.

*IMC-502 FUNDAMENTALS 1: Molecules, Cells and Molecular Genetics 8 credits, fall semester. Required course for freshman medical students. Dr. Alfred S. Ponticelli and staff. Number of students: 180.

This foundation module covers fundamental concepts about the structures and functions of proteins, genes, and membranes along with basic principles of signal transduction in response to hormones and factors which control growth and differentiation. This module also covers histologic types of cells and tissues which provides the basis of histology in the integrated system modules.


This foundation block addresses basic issues of metabolism, human genetics and pharmacology, emphasizing their importance in health and disease. In conjunction with the other courses of the first semester, this course completes the underpinnings of the basic sciences to enable students to begin the integrated system-based curriculum.


This required system-based block integrates the basic sciences into the study of the gastrointestinal system in both health and disease. Basic science topics are incorporated into an integrated body of knowledge utilizing both didactic and self-directed learning methods, and clinical models.


This required system-based block integrates the basic sciences into the study of the urinary tract and renal system in both health and disease. Each of the basic science topics is incorporated into an integrated body of knowledge utilizing both didactic and self-directed learning methods, and clinical models.


This required system-based block integrates the basic sciences into a study of the musculoskeletal system and integument in both health and disease. Each of the basic science topics is incorporated into an integrated body of knowledge utilizing both didactic and self-directed learning methods, and clinical models.
*IMC-516 HOST DEFENSES AND HEMATOLOGY  5 credits, spring semester. Required course for freshman medical students. Drs. Lesse, Heffner, Steinbrenner, Sands, and staff. Number of students: 180.

This required course in hematology and host defenses integrates the basic science knowledge of the blood and hematopoetic systems with basic concepts of immunology, pathology and microbiology.

*IMC-602 THE HUMAN CARDIOVASCULAR SYSTEM  8 credits, fall semester. Required course for sophomore medical students. Drs. Fallavollita and staff. Number of students: 180.

This course provides instruction into the mechanisms of operation of the human cardiovascular system. Emphasis is placed on the integration of relevant principles from anatomy, physiology, biochemistry, pathology, pharmacology and microbiology with respect to the behavior of the normal circulation and its responses to the stress of injury and disease. Both expert-directed and student-directed methodologies will be employed in this module and a select set of clinical cases will be used to guide instruction.

*IMC-604 LUNG AND RESPIRATION  8 credits, fall semester. Required course for sophomore medical students. Drs. Saltzman Lesse and staff. Number of students: 180.

This required system-based block integrates the basic sciences into a study of the pulmonary system in both health and disease. Each of the basic science topics is incorporated into an integrated body of knowledge utilizing both didactic and self-directed learning methods, and clinical models.


This required system-based block integrates the basic sciences into a study of neuroscience and behavior in both health and disease. Each of the basic science topics is incorporated into an integrated body of knowledge covering neuroanatomy, neurophysiology, neurological correlations, neuropharmacology, neuropathology, human behavior and psychiatry, utilizing both didactic and self-directed learning methods and clinical models.


This required system-based block integrates the basic sciences into a study of the endocrine and reproductive systems in both health and disease. Each of the basic science topics is incorporated into an integrated body of knowledge utilizing both didactic and self-directed learning methods, and clinical models.

IMC 820 CAPSTONE: Transition to Internship  4 credits, spring semester. Prerequisite—Senior medical student. Successful completion of all third year clerkships. Instructors: Drs. Clairice Cooper, Jeffrey Brewer, Susan Gallagher, Julia Faller, Karen Zinnerstrom, Daniel Sheehan and Alan Lesse; W. Fritz Sticht, W. Scott Erdley. Number of students 40-60.

This course provides critical content focusing on knowledge, skills, and attitudes needed during the first weeks of residency. The curriculum is case-based, patient-centered and trains students to: be first responders for critically ill or unstable patients; perform emergency and common procedures; order and interpret common tests; manage common and urgent conditions; respond to calls from nurses; order and write prescriptions; safely handover and transition care; collaborate on inter-professional teams; and obtain informed consent. Life skills along with personal and professional development as residents are also covered.
PH.D. PROGRAM IN BIOMEDICAL SCIENCES

BMS-501  CELL BIOLOGY 1  4 credits; fall semester. Prerequisites--Calculus, familiarity with principles of physical chemistry and consent of instructor. Dr. Duffey.

The objective of this lecture/conference course is to acquaint students with basic concepts of cell structure and function. Topics to be covered include cell organelle and membrane structure, permeation through ion channels, carriers and pumps, protein sorting and trafficking and signal transduction (receptors, G-proteins, second messengers).

The course utilizes lectures, problem solving, study of original journal articles, written examinations, and research papers. At the end of the course, students should be able to deal quantitatively with experimental data and/or the scientific literature pertaining to these aspects of cell function.

BMS-503  PRINCIPLES OF BIOCHEMISTRY  4 credits; fall semester. Prerequisites--permission of course coordinator: Dr. Kosman.

The course is designed to provide doctoral students with a comprehensive overview of biochemistry. Topics to be covered include chemical principles, protein structure and stability, enzyme kinetics, mechanism and control of enzyme, metabolic pathways, integration of metabolism, nucleic acid structure and properties, DNA replication, transcription, RNA processing and translation. The course utilizes lectures, problem solving, original journal articles, and written examinations.

BMS-505  DYNAMIC CELL INTERACTIONS  2 credits; first half of spring semester. Prerequisites—calculus, familiarity with principles of physical chemistry and consent of instructor. Dr. Rabin.

The objective of this course is to acquaint students with contemporary issues of communication between cells. The course utilizes lectures, conferences, problem solving, original journal article, and written examinations. Topics to be covered include properties and function of the cellular cytoskeleton, dynamics of cellular motility, structure and function of gap junctions, cell adhesion, leukocyte trafficking.

BMS-506  CELL GROWTH, DIFFERENTIATION AND TRANSFORMATION  2 credits; second half of spring semester. Prerequisites—calculus, familiarity with principles of physical chemistry, and consent of instructor. Dr. Rabin.

The objective of this course is to acquaint students with contemporary issues involved in the growth, differentiation and transformation of cells. The course utilizes lectures, conferences, problem solving, original journal article, and written examinations. Topics to be covered include stem cells apoptosis and cell death, cellular differentiation, angiogenesis, neuronal growth and differentiation.

BMS-511  INTERDISCIPLINARY SEMINAR  2 credits; fall semester. Prerequisite--permission of course coordinator: Dr. Rabin.

Seminars are designed to introduce students to ongoing research and various scientific techniques which will enable them to complete their designated laboratory rotations. Topics include intro/quantitative biology, solutions/acid-base, absorbance/fluorescence, microscopy, chromatography, monoclonal antibodies/applications, electrophoresis, recombinant techniques, PCR and mutagenesis, microarrays, protein-nucleic acid interactions, protein-protein interactions, transgenics, computers in molecular biology and health sciences library search sessions.

BMS 512  INTERDISCIPLINARY SEMINAR  1 credit; spring semester. Prerequisite--permission of course coordinator: Dr. Rabin.

Under the direction of faculty facilitators, students will present current research papers followed by a class discussion.

BMS-650  INDEPENDENT STUDY IN BIOMEDICAL SCIENCES  1-12 credits, spring and fall semester. Prerequisite: First or second year medical student. Permission of Instructor: Dr. Milling.

This course introduces students to disciplines, faculty, techniques and research strategies. Early exposure to the interdisciplinary nature of the life sciences is desirable for medical students. Students participate in ongoing projects with a faculty mentor in the basic science departments.
This course introduces students to disciplines, faculty, techniques and research strategies. Exposure to the interdisciplinary nature of the life sciences is desirable for medical students. Students participate in on-going projects with a faculty mentor in the basic science departments.
GENETICS GENOMICS AND BIOINFORMATICS GRADUATE PROGRAM

The Genetics, Genomics & Bioinformatics graduate program offers instruction in Genetics, Genomics and Bioinformatics to graduate and medical students. Medical students may also elect to take the combined M.D.-Ph.D. program, enrolling for the Ph.D. degree in the department's program. The program offers an extensive program of formal and informal courses through the School of Graduate Studies. Medical students are welcome in these courses. Consult the Graduate School Bulletin for a complete listing, and description of graduate courses. A description of elective courses in Genetics, Genomics & Bioinformatics appears below.

GGB-502 ESSENTIALS OF GENETICS AND GENOMICS 3 credits; fall semester. Prerequisites--permission of course coordinator: Dr. Gronostajski.

The course is organized on the UBlears website and students will be required to login and use this website for the completion of weekly quizzes and general communication. This course is designed to teach the concepts and practices of Genetics and Genomics and is based on the Griffith's textbook but uses Model Organisms more extensively to illustrate these concepts and practices. By the end of the course the students should understand the basic principles underlying Genetics and Genomics as research disciplines and should be familiar with how various Model Organisms are used as research tools. Some historical background will be given so that the students can place current studies in the context of a historical perspective. Learning how a field developed can give us insights into how it could progress in the future.

GGB-505 HUMAN AND MEDICAL GENETICS 3 credits; spring semester. Prerequisites--permission of course coordinator: Drs. Wrabetz and Nowak.

This course will build on the information covered in GGB502. It is designed to teach the concepts and practices of Human and Medical Genetics. By the end of the course students should understand fundamental approaches used in modern day human and medical genetic research, and have an appreciation for how genetic approaches can be integrated with biochemical and molecular techniques.

GGB-512 DEVELOPMENTAL GENOMICS AND STEM CELL BIOLOGY 2 credits; fall semester. Prerequisites--permission of course coordinator: Dr. Gronostajski

Developmental Genomics and Stem Cell Biology will focus on how the spatial and temporal readout of the genome is achieved during development, and conversely on how forced changes in gene expression patterns can affect developmental processes. We also address several aspects of embryonic and adult stem cell biology. The philosophy of the course is that "Development never ends" and thus examples of processes from normal or pathological embryonic, adult and aging systems may be discussed. Each session will focus on one or more fundamental principles of developmental genomics and/or stem cell biology, using papers from the literature to illustrate the principle(s). Every effort will be made to demystify developmental and stem cell biology and discuss state of the art experimental approaches to address questions about the genes required for normal development. While much teaching will be in the form of student presentations from the primary literature, one hour introductions will be given by the course guides on each topic in the Tuesday lecture. The goal of the course is to enable students to read papers in the areas of developmental biology and genomics, to critically evaluate them, and to propose experiments that will answer questions that are raised in the paper.

GGB-519 INTRODUCTION TO BIOINFORMATICS AND COMPUTATIONAL BIOLOGY 3 credits; spring semester. Prerequisites--permission of course coordinator: Dr. Halfon.

This course introduces graduate and medical students to the concepts and practices of bioinformatics, including computational analysis of DNA and protein sequences, analysis of large-scale DNA and protein datasets, statistical analysis of sequence alignments and gene array datasets, proteomics, and RNA and protein structure prediction. This course is taught on Tuesdays and Thursdays from 10:30 am to noon. The Tuesday session is didactic lectures introducing the topic of the week and giving out assignments for completion at or prior to the Thursday lab session. The Thursday lab focuses on practical use of the concepts taught in the Tuesday lecture and is conducted by either the Tuesday lecturer, another faculty member who is expert in the particular analysis being performed or both. Assignments completed by the students for the lab sessions are graded by the appropriate instructor and used to determine the student’s grade in the course.

GGB-701 RESEARCH 1-5 credits; fall or spring semester. Prerequisites--permission of course instructor: various faculty

Research into basic science and clinically relevant aspects of Genetics, Genomics & Bioinformatics can be conducted in laboratories of faculty members. See the GGB website for information on topics being investigated in faculty laboratories.
MEDICAL SCIENTIST TRAINING PROGRAM

The first two years of training mirrors the syllabus of the medical student. Students are also required to attend a research seminar program to augment their education and reinforce their basic scientific knowledge. During the summer, between the first and second year, students are required to obtain research experience in two to three laboratories in order to acquaint themselves with different programs and departments related to their research interests. This is an important and indispensable exercise for MSTP students; however, our goal is for the student to make a commitment to a Department or a thesis advisor at the beginning of the second year.

After the completion of the second year, students will focus on the Ph.D. department of their choice. Students must qualify in the Ph.D. Department of their choice and undergo an admission procedure as that of any other student applying to that program.

The last year and a half of the MSTP are designed to provide students with the required medical rotations to broaden and strengthen their basic knowledge and skills in clinical medicine. During this period of time, students are also required to attend the MSTP Seminars. The required advanced clinical courses include Advanced Medicine, Surgical Specialties and Neurology. Once all the requirements have been met, students can adjust the remaining time in the program to conform to their individual needs. All elective courses must be approved by the OME.

MSTP students are expected to remain in good standing both as graduate students and medical students. Performance in the first two years will be evaluated based on Graduate School standards. Students are required a grade of High Satisfactory or better in all Medical School courses.

MST-601/602 RESEARCH SEMINAR 1 credit; fall and spring semester. Grade: S or U. Required course for all MSTP students.
Dr. Knight and staff.

This course is designed to expose MSTP students to the current advances in basic and clinical research in a variety of biological and medical disciplines. Seminars will be presented biweekly by distinguished faculty of the university. Students in year 1 and 2 of the medical component and all MSTP students in a Ph.D. program are required to enroll.
DEPARTMENT OF MEDICINE

The Department of Medicine brings together faculty members with diverse backgrounds and experiences who share a concern for the teaching and practice of clinical medicine. The fundamental goal of Internal Medicine courses is to provide students with a comprehensive core of the clinical medicine knowledge necessary to become a competent physician. The faculty strive to motivate students and provide them with experience adequate to define and redefine their interests, whether these direct the student to practice clinical medicine or to pursue other disciplines.

The department presently includes 160 full-time and 360 part-time faculty members and 160 house staff, all of whom are utilized as instructors to give the student a broad range of learning opportunities. The department incorporates the medical services of the three major affiliated institutions: the Buffalo General Medical Center, Erie County Medical Center, and Veterans Affairs Medical Center, and employs the resources of Roswell Park Cancer Institute, Sisters of Charity Hospital, Mercy Hospital of Buffalo, and Millard Fillmore Hospital.

MED-521 MEDICAL HUMANITIES: CULTURAL AND SOCIAL DIMENSIONS OF THE PHYSICIAN-PATIENT RELATIONSHIP 2 credits; spring semester. Dr. Bono. Number of students: 15. Prerequisite—first or second year medical student.

This course is a blend of literature, philosophy, anthropology, and the history of medicine. The purpose is to address themes and issues in the thinking and behavior of physicians and patients not usually addressed in other medical school courses.

The principal experience of the course is reading great literature and critically viewing great films, often in association with papers from medical sources. Classes meet to discuss readings, films, and the issues they raise regarding the social, cultural and humanistic dimensions of medicine. Readings vary in obvious relevance to medicine. Some, like stories by William Carlos Williams or Tolstoy, are explicitly medical in content. Others, like Flannery O’Connor’s, “The Lame Shall Enter First”, represent non-medical settings but have themes related to the passions, powers, and responsibilities of physicians. Examples of non-fictional readings from medical sources are Eric Cassell’s “The Nature of Suffering and the Goals of Medicine” and David Hilsfiker’s “Healing the Wounds: A Physician Looks at His Work”. The course will be divided into two units: (1) “Problems of Knowledge and Power: The Physician-Patient Relationship and the Social and Cultural Contexts of Healing” and (2) “Constructing Narratives of Illness: patients’ Stories and the Meanings of Illness, Aging, Death, and Dying”. One or more films will be used to illustrate themes in the course.

At the conclusion of the course, students should have a greater understanding of the personal dilemmas faced by physicians and patients, and of the attributes and values necessary to each. Students should also have the ability to observe, recognize, and respond in appropriate ways to the meanings and life-problems associated with illness for individual patients. A goal of this course is to facilitate thoughtful and lively discussion concerning the non-medical aspects of medicine essential to the ideal physician’s practice.

*MED-700 INTERNAL MEDICINE CLERKSHIP 8 credits. Dr. Gallagher, Clerkship Director; Dr. Mishra, Associate Clerkship Director; Drs. Curtis, Freer, Rados, Hall, Parashar and faculty. Prerequisite – Junior medical student.

The clinical clerkship in Medicine is intended to enable the student to understand the clinical correlation of basic science knowledge and to acquire further medical information and clinical skills necessary for understanding and management of commonly encountered medical problems and diseases of adult patients. Five hospitals and numerous ambulatory sites participate in the clerkship program. The course is composed of both inpatient and outpatient experiences.

For the inpatient rotations, the students are arranged into groups of two or three who work as members of a medical ward team that also includes an attending physician and two or three house officers. In addition to their daily work, they take night and weekend duties. Each student is expected to perform initial evaluation and close follow-up of a limited number of patients. During the early part of the clerkship, the emphasis is placed on patient interview, physical examination, problem identification, write-ups, and case presentations. More direct involvement with patient management and decision making, as well as familiarization with common bedside and lab procedures, is progressively added to their clinical clerkship activities. With diverse roles, the attending physician and house staff actively participate in student teaching.

The ambulatory portion of the clerkship is done under the supervision of a preceptor at one or more outpatient clinics. Students will be expected to perform directed histories and physicals and to write up and discuss the cases seen with the preceptor.

At the outset of the course, each student is provided with a course syllabus describing the objectives, expectations, student’s responsibilities, and outline of the core curriculum with pagination of a most updated medical textbook and other references. Although the students will have ample learning opportunities through their participation in patient workup, daily rounds, case presentations and discussions, teaching conferences, lectures and seminars, their self-learning through reading and effective use of the medical libraries and learning resource centers will be stressed throughout the clerkship. The eventual goal is to develop the skills that will allow each student to continue independent learning and problem solving.
**MED-802 ADVANCED CLERKSHIP IN MEDICINE** 4 credits. Modules A-F and H-K. Dr. Gallagher, Clerkship Director; Dr. Mishra, Associate Clerkship Director; Drs. Curtis, Freer, Rados, Hall, Parashar and faculty. Prerequisite – Senior medical student or permission of OSAA and instructor. Contact departmental office to request site location.

Advanced Clerkship in Medicine is a four-week rotation that will give students an inpatient experience aimed at developing expertise in managing acute illness in the hospital setting. It will stress normal and abnormal physiology, management of fluid and electrolytes, and highlight some of those conditions that are commonly treated by practicing internists. The rotation will be structured around a work team consisting of resident and intern, a fourth-year clerk and a third-year clerk. There will be daily participation in morning report and in scheduled didactic conferences. In addition, there will be a didactic portion specifically geared to the fourth year clerk.

By the end of the rotation the student should feel comfortable with responding quickly to acute medical problems and should be able to develop a reasonable pertinent differential diagnosis for presenting problem and begin to discuss appropriate management. The student will thus be prepared to handle not only acute medical problems, but complications that may result from surgery or that may be seen in patients that are commonly seen within other specialties.

***No out of town interviews may be scheduled during this clerkship. Due to limited number of sites available each module, no student will be permitted to withdraw from this course except under the most unusual circumstances and with the specific permission of Dr. Gallagher.

**MED-803 PRIMARY CARE INTERNAL MEDICINE** 4 credits. Modules A-K. Prerequisites – Senior medical student; successful completion of MED 802 Advanced Medicine Clerkship and approval by either Dr. Gallagher or Dr. Schifeling. Number of students: By request.

The student will be provided experience in ambulatory medicine which approximates that of a practicing academic general internist. The activities of the rotation will include making daily and weekend rounds on the service inpatients; evaluating scheduled and unscheduled ("walk-in") patients in the primary care clinic; researching medical issues arising from the care of these patients; coordinating patient care with nursing staff, patients, and their families; and teaching third-year medical students in the outpatient setting.

Upon completion of this rotation, the student should have gained insight and experience in the routine of an academic general internist, improved physical diagnosis and patient management skills, provided continuity of care for patients going from the outpatient to inpatient service as well as outpatient follow up after hospital discharge.

**MED-804 CARDIOVASCULAR MEDICINE** 4 credits. Modules A-M. Instructors: Dr. Canty and Cardiology faculty. Prerequisite – Junior or Senior medical student. Number of students: maximum 5 per module – 4 senior medical students, 1 junior medical student.

Students will see patients for whom cardiac consultation has been requested and will make daily rounds with the attending, cardiology fellow, and resident. There will be exposure to EKG reading, stress testing, nuclear cardiology, echocardiography, and cardiac catheterization. There also will be opportunities to participate in Cardiology Clinic and observe cardiac catheterizations, interventional cardiology procedures and open-heart surgery. The student will attend weekly University-wide Fellows Conference. On completion, the student will develop an understanding of the pathophysiology, diagnosis, and treatment of a wide variety of cardiac conditions.

**MED-807 UNIVERSITY PROGRAM IN PULMONARY DISEASES** 4 credits. Modules A-M. Instructors; Dr. Sethi and Pulmonary/Critical Care faculty. Prerequisite - Junior or Senior medical student. Number of students: 2.

The objective of this rotation is to teach the clinical and laboratory techniques necessary for diagnosis and management of patients with pulmonary diseases. Students will actively participate in evaluation of patients seen by the pulmonary disease services at the VAMC, and the BGMC/RPCI Campus. This will include pulmonary consultation both in the inpatient and outpatient setting. In addition, daily learning sessions are conducted, covering such fields as pulmonary function interpretation, X-ray diagnosis, and selected clinical topics. Exposure to sleep apnea (VA) and bronchoscopy is also available.

At the end of this rotation, the students should be able to outline a diagnostic and therapeutic program for a patient with pulmonary disease. They should have thorough understanding of pulmonary function studies and be experienced in the interpretation of chest X-rays.
This rotation is designed to afford students the opportunity to acquire necessary skills for the evaluation of patients with renal disease, fluid and electrolyte abnormalities, and hypertension.

The students will be expected to evaluate and follow one to three new inpatients per week. The patient mix will be comprised of those with acute and chronic renal failure, others who are postrenal transplant, and patients referred by other services for a variety of hypertensive or fluid or electrolyte abnormalities. Rounds will be made regularly with an attending physician, the Renal fellow, and house officers assigned to the renal service. The students will attend the Renal Hypertension Clinic, which meets weekly. This will afford the students the opportunity to examine and follow outpatients with renal disease and/or hypertension. The Renal Transplant Clinic meets weekly, and students can have the opportunity to evaluate stable patients who have successfully undergone renal transplant.

Conferences: The students are encouraged to attend morning, report and mortality/morbidity conference at C, the ECMC. Monthly renal biopsy conferences are held on Tuesday afternoons at the ECMC. This meeting is attended by members of the Departments of Pathology and Pediatrics, as well as the members of the University wide nephrology community. The clinical aspects of each biopsy are presented and discussed. A series of lectures are held weekly which review many basic areas of nephrology.

Seminars: Each hospital arranges a schedule under the direction of the Renal fellow and attending physician of a group of topics to be presented and discussed. This affords the student an opportunity to prepare an in-depth review of at least one topic on nephrology during the course of the elective.

At the conclusion of this rotation, students should know the basic approach to evaluation and treatment of the patient with renal disease or hypertension and fundamentals of renal pathophysiology.

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**MED-808 RENAL DISEASES 4 credits. Modules A-M. Instructors: Dr. Quigg and Nephrology faculty. Prerequisite - Junior or Senior medical student. Number of students: 2. NOTE: An "E" after the module in the class schedule indicates the Erie County Medical Center as the site.**

The goal of this program is to familiarize the student with the current diagnosis and management of renal diseases including acute/chronic renal failure, fluid and electrolyte abnormalities, and acute/chronic hypertensive problems.

The student will become a part of a team consisting of attending and resident. This experience includes daily rounds on an active renal service with direct involvement in nephrology consults.

The student is expected to participate actively in the twice-weekly nephrology service conferences and twice monthly medical house staff conferences, renal radiology, and renal pathology. In addition, the student will be assigned selected readings from the nephrology library.

Opportunity is also available to participate in the various dialysis programs revolving around the eight-station hemodialysis facility serving both acute and chronic end-stage renal disease patients. This facility is complemented by self-care training programs in hemodialysis and continuous ambulatory peritoneal dialysis. Exposure to clinical research is available as a result of nephrology division's close association with the Departments of Pharmacokinetics and Neurology.

At the conclusion of this rotation, a student should know the basic approach for evaluation and treatment of the patient with renal disease or hypertension and the fundamentals of renal pathophysiology.

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**MED-808 RENAL DISEASES 4 credits. Modules A-K. Instructor: Dr. George Marinides. Prerequisites – Senior medical student and permission of department. Number of students: 1. NOTE: An "F" after the module in the Class Schedule indicates the Millard Fillmore Suburban as the site.**

This rotation is designed to afford the students the opportunity to acquire necessary skills for the evaluation of patients with renal disease, fluid and electrolyte abnormalities, and hypertension. The students will be expected to evaluate and follow one to three new consultations per week. The patient mix will be comprised of those with acute and chronic renal failure, hypertension, and fluid or electrolyte abnormalities. Rounds will be made regularly with an attending physician, the renal fellow, and house officers assigned to the renal service. The students will attend the renal hypertension clinic, which meets weekly. This will afford the students the opportunity to examine and follow outpatients with renal disease and/or hypertension.

Conferences: The students are encouraged to attend morning report at the VA Medical Center. Monthly renal biopsy conferences, journal clubs, transplant conference, and research conference are held on Tuesday afternoons. A series of lectures and case presentations are held weekly which review many basic areas of nephrology. The students are urged to attend these conferences, which are held on Friday mornings at the VA Medical Center or ECMC.

Combined Conferences: The students are encouraged to attend quarterly grand rounds held at the University at Buffalo.
Seminars: Each hospital arranges a schedule under the direction of the renal fellow and attending physician of a group of topics to be presented and discussed. This gives the student the opportunity to prepare an in-depth review of at least one topic on nephrology during the course of the elective. At the conclusion of this rotation, students should know the basic approach to evaluation and treatment of the patient with renal disease or hypertension and fundamentals of renal pathology.

**MED-809 ALLERGY-CLINICAL IMMUNOLOGY** 4 credits. Modules A-M. Instructors: Dr. Schwartz and Allergy faculty. Prerequisite – Junior or Senior medical student. Contact IM clerkship office for permission before registering. Number of students: 1.

During this rotation students will learn about the diagnosis and management of allergic and immunologic diseases. Particular attention will be directed toward the common respiratory allergies, asthma, food and drug reactions, atopic dermatitis, urticaria, angioedema, hymenoptera sensitivity, autoimmune disorders, and primary and secondary immunodeficiency diseases. The student will attend two pediatric and three adult clinics each week and will also attend weekly teaching sessions, journal club, and research seminars.

Upon completion of this rotation, students will have learned to take a history for allergic and immunologic diseases and to perform appropriate physical examination, skin tests, and simple spirometry. They also will learn to formulate a therapeutic program of environmental control, pharmacotherapy including the use of intravenous gamma globulin, and immunotherapy. Additionally, students will become familiar with the cellular and molecular mechanisms underlying the pathogenesis and treatment of allergic and immunologic diseases.

**MED-810 SLEEP MEDICINE** 4 credits. Modules D-K. Instructors: Dr. Ten Brock and Sleep Medicine faculty. Prerequisite – Senior medical student. Number of students: based on departmental availability.

The fourth year clinical elective in Sleep Medicine will allow the student to become familiar with the various sleep problems people encounter. Such problems include sleep apnea, insomnia, periodic limb movements, parasomnias, and circadian rhythm disturbances. Over the course of four weeks, the student will be exposed to various diagnostic and therapeutic techniques used in the field of Sleep Medicine. The student will attend a few sleep medicine clinics a week. Additionally, instruction and exposure will be given regarding interpreting polysomnographic recordings as well as polysomnogram hookups. The student will attend and partake in multidisciplinary sleep medicine conferences as well as sleep medicine journal club. The medical student is given a sleep rotation schedule and will become familiar with sleep centers in Buffalo and the surrounding area as well as the sleep medicine attendings.

**MED-811 UNIVERSITY PROGRAM IN ENDOCRINOLOGY** 4 credits. Modules A-M. Instructors: Dr. Dandona and Endocrinology faculty (Diabetes-Endocrinology Center of WNY); Drs. Ryan and O'Donnell (VAMC). Prerequisite - Junior or senior medical student. Number of students: 2.

This rotation will give the student a broad-based exposure to endocrine diseases, focusing on diagnosis, pathophysiology, and management. The students will participate in clinics and inpatient consult services. Approximately 60% of the time will be spent in the ambulatory diabetes and general endocrinology clinics where new and established patients are evaluated. Hospital based consults are drawn from a variety of disciplines including Internal Medicine, Surgery, Psychiatry, and Ob-Gyn. Spending part of the rotation in a practitioner's office can be arranged.

The rational use of diagnostic methods and therapy will be stressed during the rotation in clinics, attending rounds, and at the weekly clinical conference. At the end of the experience, the student should have a general understanding of pathophysiology and diagnostic methods in endocrinology.

**MED-812 RHEUMATOLOGY** 4 credits. Modules A-M. Instructors: Dr. Schwartz and Rheumatology faculty. Prerequisite - Junior or Senior medical student. Contact IM clerkship office for permission before registering. Number of students: 1.

This course is a combined program at the Veterans Administration Medical Center and the Erie County Medical Center. Preferences, if any, for principal hospital base will be accommodated. The goal of this rotation is to expose the student to the fundamentals of arthritis and rheumatic diseases.

This course will include the supervised examination of outpatients and inpatients with a wide variety of rheumatic diseases, the participation in the management of such cases, presentation and discussion of cases, and special rounds and seminars. In addition, the student will explore the scope of the field of rheumatology and its interface with immunology, dermatology, physical medicine, orthopedics, and nephrology.
At the conclusion of the rotation, students should have acquired skills in the art of locomotion system examination, the procedure of joint aspiration, techniques of polarizing microscopy of crystals, and therapy and prognosis of acute and chronic rheumatic diseases.

MED-813 INFECTIONOUS DISEASES 4 credits. Modules A-M. Instructors: Dr. Russo and Infectious Disease faculty. Prerequisite - Junior or Senior medical student. Number of students: 5.

This rotation provides a student with an intensive experience in clinical infectious diseases. Students will have the opportunity to evaluate patients initially and present them at daily consult rounds with the attending physician. The experience will include history taking, physical examination, review and interpretation of pertinent laboratory data, case presentation, and reading of pertinent information from the available literature. A syllabus of important original articles and reviews in infectious diseases is provided. Students will be assigned to BGMC (MS4 only), ECMC, RPCI (MS4 only), or VAMC.


The student will spend time in the offices of a variety of practitioners, including the following:

1. MD’s and DO’s with office practices which focus on primary care, ob/gyn, functional medicine, eating disorders, manipulation, acupuncture, and chelation therapy
2. A dentist with expertise in heavy metal toxicology as well as laser treatment for gum disease
3. Nurse practitioners with office practices which include a focus on bioidentical hormone replacement therapy
4. Chiropractors, including one with an office practice focused on nutrition and energy medicine
5. ND’s (those with a 4 year doctor of naturopathy graduate degree)
6. Acupuncturists with Masters of Oriental Medicine degrees
7. A physical therapist with expertise in myofascial release and craniosacral therapy
8. Registered dieticians with a holistic focus, both also certified as personal trainers
9. A quantum energy biofeedback practitioner
10. A practitioner of homeopathy

Didactic content will include a discussion with Dr Regalla regarding relationship-centered care, use of the placebo effect as a therapeutic ally, the role of communication skills and of reassurance when indicated, and the healing powers of the body and the mind. Finally, students will choose a project in collaboration with Dr Regalla.

MED-817 INPATIENT/AMBULATORY CARE OF LEUKEMIA AND LEUKEMIA-RELATED MALIGNANCIES 4 credits. Modules A-M. Number of Students: 3.

NOTE: An “R” after the module in the Class Schedule indicates the Roswell Park Comprehensive Cancer Center and an “E” indicates ECMC as the site.

ECMC Site – HEMATOLOGY/ONCOLOGY - INPATIENT/AMBULATORY
Instructor: Dr. Jaspreet Dhillon. Number of students: 2 per module, 1 senior and one junior medical student. A broad introduction to clinical hematology and oncology. A wide variety of hematologic and oncologic clinical presentations, both in inpatient and outpatient, are encountered. Teaching and first hand clinical encounters are encouraged.

Roswell Park Site- INPATIENT/AMBULATORY CARE OF LEUKEMIA AND LEUKEMIA-RELATED MALIGNANCIES
Instructors: Dr. Wang and Leukemia faculty. Prerequisite – Senior medical student. Number of students: 1.

This is a four-week (one module) rotation for fourth-year medical students on the Leukemia service at Roswell Park Cancer Institute. Students will care for up to two patients receiving treatment on the inpatient service, will participate in daily inpatient rounds with the Leukemia team, and will participate in the evaluation and care of outpatients with leukemias and related disorders in the outpatient setting under the supervision of the attending physicians. In the inpatient setting, the student will become familiar with the evaluation and care of acute leukemia patients, management of neutropenic patients, transfusion therapy, evaluation of medical complications of leukemia patients and organization of high-acuity inpatient care. In the outpatient setting, the student will become familiar with evaluation of abnormal blood counts and management of chronic hematologic disorders including chronic myelogenous leukemia and myelodysplastic syndromes. In both settings, students will gain familiarity with diagnostic evaluation of the bone marrow, including bone marrow aspiration and biopsy, hematopathology, immunophenotyping, cytogenetics and molecular diagnostics.
MED-821 GASTROENTEROLOGY-LIVER 4 credits. Modules A-M. Instructors: Dr. Rivera and Gastroenterology faculty.  
Prerequisite – Junior or Senior medical student. Number of students: 4.

This course is designed to provide an in-depth experience in gastroenterology and hepatology oriented toward gaining an understanding of the pathophysiology, molecular pathogenesis, and clinical management of diseases and an exposure to the current research in the field.  
The student will become part of a team of physicians responsible for the consultation and clinic services. The student will be expected to evaluate new patients, present to an attending physician, and to provide a review of the patient literature. He will have the opportunity to observe diagnostic procedures such as endoscopy, colonoscopy, sigmoidoscopy, ERCP, endoscopic ultrasonound, esophageal motility, liver and small bowel biopsies. The student may also participate in GI grand rounds, journal club, research seminars, endoscopy, GI pathology, radiology and GI pathophysiology conferences. Students may do this course at either the VAMC or ECMC. Hospital choice is on a first-come-first-served basis. All conferences are held jointly at the VAMC.

The student, upon completion of this course, should have gained an appreciation of the pathophysiology and clinical characteristics of the diseases of the GI tract and the liver most commonly encountered in the geographic area. In addition, it is hoped the student will have a better idea of the value and limitations of the diagnostic procedures and therapeutic regimens used in this medical subspecialty.

MED-851 PULMONARY DISEASES-MICU ROTATION 4 credits. Modules A-K. Instructors: Dr. Campbell, Provost and Critical Care faculty. Prerequisite – Senior medical student; “Honors” grade in MED 802 and departmental approval. Number of students: 3.

The MICU rotation will provide students with direct experience in caring for critically ill patients in the Medical Intensive Care Unit. The student will be an active participant in the MICU and have primary patient care responsibility with supervision given by the MICU resident and attending staff regarding daily care of patients in the MICU. A limited caseload will be assigned and daily work rounds and attending rounds with the house staff and MICU attending physicians will be expected. Presentations of recently admitted and existing patients will be performed on a daily basis. Exposure to critical care procedures such as CVPS, arterial lines, and Swan Ganz catheterizations will be available. A limited MICU lecture series and MICU manual will be provided.

Upon completion of the rotation, the student should have a basic understanding of the needs of critically ill patients. A rudimentary knowledge of mechanical ventilation and the types of pharmacologic intervention required in an ICU setting is also expected.

MED-862 INPATIENT/AMBULATORY CARE IN ONCOLOGY 4 credits. Modules A-M. Instructors: Dr. Levine and Medical Oncology faculty. Prerequisite – Junior or Senior medical. Number of students: 2.

This program is an intensive experience directed at learning the natural history, definitive management, and supportive care of outpatients with malignant disease at an internationally renowned cancer institute. The prognostic influence of morphology, immunological and molecular genetic markers, cytogenetics, and patient characteristics will be shared. The student will work with the Medical Oncology fellows and faculty on specific case management of hematologic and solid tumors in the various outpatient clinics and inpatient units of the RPCI. Students will spend two weeks on a solid tumor service and two weeks on a hematology service. The student will complete initial histories and physicals on patients new to the Institute and follow up his or her patients during the four-week rotation. Students will also have the opportunity to see patients who are known to the Medical Oncology staff who present to clinic with acute or emergent conditions. The student will, in addition to his clinic responsibilities, attend patient management conferences, Medical Oncology grand rounds, and the resident/fellow teaching seminar, all of which are held at Roswell Park.

Evaluation of clinical performances and intellectual activity during clinics and conferences will be made by the Medical Oncology senior staff. Upon completion of this rotation, students should have gained an overview of the manifestations of a number of tumors and will have the opportunity to read about and discuss in detail the characteristics of the natural history of some of the more common cancers. They should have learned to develop logical approaches to the diagnosis of cancer. They will also have had an opportunity to learn about the available and appropriate forms of management provided by the modalities of surgery, radiotherapy, chemotherapy, and biomodulation. No night call will be required, but Saturday and/or Sunday coverage may be involved.

MED-870 INTERNATIONAL HEALTH 4 credits. Modules A-M. By special arrangement with faculty preceptor. Prerequisite – senior medical student. Number of students: unlimited.

Students interested in overseas work in developing countries during their fourth year should begin planning their experience no later than the beginning of the third year. The Division of Geographic Medicine has contacts in Africa, Asia, and South America which students should discuss with the staff. Many other opportunities exist. In order to obtain credit for this elective, students must plan their
program with the University at Buffalo staff. Correspondence between supervisory staff at the field site and the faculty of the Division of Geographic Medicine, including evaluation of the student's performance, is mandatory.

Field sites should offer the following: (1) supervision by physicians medically qualified or approved by the country; (2) stable patient care base (outpatient clinic, hospital, mobile outpatient unit); (3) adequate subsistence, safety, and housing.

Students will be expected to keep a log of their clinical activities and to present their experience to students.

NOTE - If you plan to take an alternate course/program, you must send a course description including work schedule & expectations, contact information, web site, and any other applicable information; and it is subject to Dr. Gallagher’s approval.

MED-880 PALLIATIVE MEDICINE | 4 credits. Modules A-K. Instructors: Dr. Freer and faculty. Prerequisite--senior medical student. Number of students: 2.

This rotation is designed to provide the student with a broad-based experience in hospice and palliative medicine. It combines clinical teaching from a variety of sites to give the student an overview of symptomatic therapeutics, communication skills, and interdisciplinary care in a wide range of clinical settings.

The student will spend time at one or more of the following sites: Palliative Care Consultation Services at various Kaleida sites, the Palliative and Pain Management Services at Roswell Park Cancer Institute, and the Palliative Service at the VA Medical Center. The student will also spend part of the rotation at the Center for Hospice and Palliative Care in team meetings, home visits, and the Center’s Palliative Care Unit on the Mitchell Campus in Cheektowaga. Standardized patients will assist in teaching important communication skills.

Upon completion of this rotation, the student should have: (1) developed important attitudes concerning appropriate timing of palliative care, based on accurate prognosis determination and rational goals of medicine, (2) gained a sound knowledge base in symptomatic management of patients with a variety of distressing symptoms, and (3) acquired clinical skills in effective but compassionate communication.

MED-890 COURSE AT OTHER UNIVERSITY | 4 credits. Modules A-M. Prerequisite – Senior medical student; approval of Dr. Gallagher and faculty member at host school. Number of students: unlimited.

This elective will offer the students an opportunity to expose themselves to other hospitals, universities, and their faculty outside of Buffalo in General Internal Medicine or a subspecialty of Internal Medicine. As a general rule, the maximum number of allowable out-of-town rotations in Medicine is two months. Exceptions can be developed for students desiring to pursue specific academic objectives, such as a research-oriented tract in some area of medicine not well represented in Buffalo at the present time. In order to arrange such an elective, a definite program must be set up with the appropriate faculty member of the other school and a letter sent to the student noting the approval along with the course description. The student must then fill out an "Out of Town Elective" card which may be obtained from OSAA at the Medical School. The card and letter must be submitted to Dr. Susan Gallagher for final approval.

MED-900 PRECEPTORSHIP IN MEDICINE | 4 credits. Modules A-M. By student arrangement with faculty preceptor. Prerequisites – Junior or Senior medical student; approval by Dr. Gallagher and the faculty member with whom the student chooses to work. Number of students: unlimited.

This rotation will give the students a broader opportunity to arrange their own preceptorships with any members of the faculty of the Department of Medicine. However, all such programs must be approved by Dr. Susan Gallagher, as well as the faculty member with whom the students choose to work.

Each student will have the opportunity to work closely with a preceptor and become acquainted with diagnostic and therapeutic aspects of patient management in the hospital or office setting either in General Internal Medicine or in one of the subspecialties of Internal Medicine. In addition, they are involved in the initiation of a diagnostic and management plan. They follow the patients throughout their hospital or office course.

These preceptorships include, but are not limited to, General Internal Medicine, Combined Internal Medicine-Pediatrics, Critical Care, Primary Ambulatory Care, Renal Disease, and Hepatology. The preceptorships cannot be used to satisfy specific Medical School requirements for Advanced Medicine (MED 802) and/or experience in Primary Ambulatory Care. To fulfill the requirement as an ambulatory experience, prior approval must be obtained from Dr. Susan Gallagher.

At the conclusion of the preceptorship, the students should have improved their technical skills in obtaining proper histories and doing sound physical examinations. They are also expected to have gained insight about diagnostic modalities rendered by the
attending physician in General Internal Medicine or subspecialties. The student is required to obtain the approval of their selected preceptor before course registration.

**MED-950 RESEARCH IN MEDICINE** 4 credits. Modules A-M. By student arrangement with faculty preceptor. Prerequisites – Junior or Senior medical student; research proposal approval by IM clerkship office. Number of students: unlimited.

Students may, by special arrangement, elect to undertake research experience with any member of the faculty. Rotations may extend for periods of one to several modules as long as the student's schedule will allow. The value of the research, its goals, design, techniques, etc., are to be worked out by the student and his or her faculty preceptor.
The Department of Microbiology and Immunology offers instruction in microbiology and immunology to undergraduate students in nursing, pharmacy, and medical technology, as well as to dental and medical students. In addition, there is an extensive program for the training of graduate students in microbiology and immunology, leading to the M.A. and Ph.D. degrees. Several medical students have elected to take the combined M.D.-Ph.D. program, enrolling for the Ph.D. degree in the department's program. A number of individuals with doctoral degrees come to the department each year from all over the world for postdoctoral training in microbiology.

The department conducts research in all major areas. Research laboratories are designed and equipped for studies in microbial pathogenesis, molecular biology, parasitology, virology, and immunology, and house faculty members, postdoctoral fellows, graduate students, and staff involved in these investigations.

The department offers an extensive program of formal and informal courses through the Division of Graduate and Professional Education. Medical students are welcome in these courses. Consult the Graduate School Bulletin for a complete listing, and description of graduate courses. A description of elective courses in microbiology for medical students appears below.

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<tr>
<th>MIC-950 MICROBIOLOGY RESEARCH</th>
<th>4 credits; fall and spring semesters. Prerequisite--senior medical student or permission of OSAA and instructor. Staff. Number of students: unlimited.</th>
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This course is intended to provide the student with the opportunity to gain insight and experience in microbiologic and immunologic research methods and techniques in established laboratories with active research programs. Specific activities will be arranged by mutual consent of the student and investigator.

Experiences in a wide range of microbiologic and immunologic research techniques and methods will be available.

Following the completion of the course, students should be able to employ specific laboratory procedures, interpret results, and integrate the results within the context of the overall objectives and significance of the project.
The Department of Neurology provides opportunities for the student to acquire basic clinical skill in the analysis and management of neurologic problems and to become familiar with common diseases of the nervous and muscular systems. The work represents an extension into the clinical area of the principles learned in other scientific disciplines during the first and second year.

Fourth-year courses provide the opportunities for repeated practical experience in neurologic problem solving and are available by working with patients on the wards and in the outpatient department under the supervision of experienced neurologists, and by attending conferences dealing with current neurologic problems. Instruction is given at the Buffalo Children's Hospital, the Buffalo General Medical Center, the Erie County Medical Center, the Veterans Administration Medical Center, and the Millard Fillmore Hospital.

NOTE: Contact departmental office for site location before registering.

**NEU-800 SUBINTERNSHIP IN NEUROLOGY** 4 credits. Modules B-L. Contact departmental office for site location before registering. Prerequisite: Senior medical student or permission of OSAA and instructor. Dr. Paroski, Course coordinator. Departmental faculty members. Number of students: 2.

The course is designed to provide an in-depth experience for the student interested in neurology.

The student will work on the Inpatient Neurology Service as part of the treatment team and, under close supervision, will have the responsibility for the primary and continuing care of a reasonable number of patients.

At the end of the course, the student will be able to develop and present a neuroanatomic and differential diagnosis; to select appropriate diagnostic studies with knowledge of the risks and costs to the patient; to prepare a reasonable therapeutic plan for patients with some of the most common neurologic disorders.

**NEU-801 BASIC CLINICAL NEUROLOGY** 4 credits. Modules B-K. Contact departmental office for site location before registering. Prerequisite-Senior medical student or permission of OSAA and instructor. Dr. Paroski, Course coordinator. Departmental faculty members. Number of students: 15

The course is designed to give the student an opportunity to develop basic skills in the analysis and management of common neurological problems. Emphasis is placed on a problem-solving approach to diseases of the nervous system.

Under the supervision of members of the Neurology staff, the student will obtain detailed neurologic histories, perform neurologic examinations, and participate in the diagnostic and therapeutic management of ambulatory and hospitalized patients with neurologic problems.

At the end of the course, the student will be able to elicit a detailed, reproducible, and temporally organized neurologic history; to perform a reproducible neurologic examination; to derive neuroanatomic and general neuropathologic differential diagnosis; to perform and interpret the results of a lumbar puncture; to identify and to analyze significant neurologic symptoms and physical findings in patients presented live, on video tape, or in written protocols.

**NEU-805 ELECTIVE IN ADVANCED NEUROLOGY** 4 credits. Modules C-L. Contact departmental office for site location before registering. Prerequisite: NEU-801. Senior medical student and permission of OSAA and instructor. By arrangement with department head and faculty. Number of students: 2.

The elective in Advanced Neurology is designed for the student with special interest or competence in neurology. It provides an in-depth experience in an area of the student's choice.

This elective may include a limited research experience or a period of concentrated study in the clinical setting.

**NEU-890 COURSE AT OTHER UNIVERSITY** 4 credits. Modules C-K. Contact departmental office for site location before registering. Prerequisite-NEU-801. By arrangement with the other university and Neurology curriculum coordinator. Number of students: 2.

**NEU-950 RESEARCH IN NEUROLOGY** 4 credits. Modules C-L. Senior medical student or permission of OSAA and instructor. Contact departmental office for site location before registering. Number of students: 2.

Students may have an opportunity to work with a faculty member on a research project.
DEPARTMENT OF NEUROSURGERY

The aim of the Department of Neurosurgery is to provide state-of-the-art care to patients with neurosurgical disorders in an academic and teaching environment. All branches of modern neurosurgery, including vascular surgery and pediatric neurosurgery, are practiced in the University-affiliated hospitals. The teaching of undergraduate students emphasizes the recognition of the most common injuries and illnesses of the central nervous system with an elaboration of the appropriate diagnostic workup and the subsequent surgical procedures. The postgraduate education consists of a fully approved seven year neurosurgical residency. Teaching is carried out in each of the affiliated hospitals (Buffalo General Medical Center, Children’s Hospital, Millard Fillmore Suburban Hospital, Erie County Medical Center, Roswell Park Cancer Institute and Sisters of Charity Hospital). There are a number of active research laboratories in the Department, including endovascular, tumor biology, and movement disorders. Opportunities for clinical research exist as well.

SUR-800 SURGICAL SPECIALTIES 4 credits. Blocks 1-4. 3rd or 4th year medical students. Dr. Brewer, Clerkship Director

This module in surgical specialties includes experience in both hospital and clinic based surgery. The clerkship is 4 weeks in length and includes two different 2-week rotations in the choices of Anesthesiology, ENT, Neurosurgery, Ophthalmology, Orthopedic Surgery, or Urology. The goal of this experience is to prepare the learner for the practice of medicine by offering an experience in the scientific basis of surgical practice and exposure to a range of surgical specialties. In this course, the learner will increase their working knowledge of the clinical practice of surgery and surgical subspecialties. The learner will be able to apply this knowledge to the patient’s complaints and design therapeutic plan.

Direct patient contact is through participation in hospital rounds, clinical practice, office practice and participation in seminars. At the onset of the course, each student is provided with a course syllabus describing the objectives and expectations (Goals Statements). Small numbers of students are assigned to the surgical specialty services. The students are expected to attend the surgical conferences at the hospital to which they are assigned. They are expected to reach and master any assigned texts and handouts.

The Student Evaluation and Education Committee assigns the grade according to the academic status policies of the School of Medicine and Biomedical Sciences. Grades for the clerkship are based on completion of defined goals and clinical evaluations.

NSR-800 SUBINTERNSHIP IN NEUROSURGERY: 4 credits. Modules A-L. 4th year medical student, 3rd year Blocks 3 and 4 or permission of OSAA and instructor; basic skill in neurological examination recommended. Dr. Reynolds and staff. Number of students: 4 total including NSR 801 registered at the same time.

The purpose of this rotation is to give medical students who are interested in entering the field of Neurosurgery an opportunity to become a part of the Neurosurgical team, functioning as a “subintern” on the Neurosurgical service. The goal of this subinternship is to familiarize the students with clinical entities of the central nervous system and peripheral nerves that are amenable to surgical treatment. The program includes participation in the clinical activities of the neurosurgical services: evaluation of patients, neurodiagnostics, and surgical operations. During this rotation, students become an integral part of the neurosurgical service managing patients as a “subintern” under the direct supervision of the attendings and senior neurosurgical residents.

Upon completion of the subinternship, the students should be able to recognize standard neurosurgical disease entities; to differentiate between those diseases of the central nervous system that can be treated surgically and those that should be treated by conservative measures; and to recognize signs of increased intracranial pressure, their causes, and potential complications. In addition, the students should be able to develop a sequence of appropriate diagnostic studies leading to a correct diagnosis and be familiar with the basic setup of a neurosurgical operating room and with the basic aspects of a craniotomy, laminectomy, and peripheral nerve exploration.

The students will be expected to present patient histories and physicals, examine patients, and interpret radiographic imaging. They will attend to patients in the clinic setting, Emergency room, operative suites, the NICU, and the wards. The students will be invited to all clinical conferences, journal clubs, and seminars. Outside reading throughout the subinternship is required. Subinterns are required to prepare a presentation and present it during the Neurosurgical Grand Rounds.

NSR-801 NEUROSURGICAL SPECIALTIES 4 credits. Blocks 1-4. Modules A-L. 3rd or 4th year medical students. Dr. Reynolds and
This course is devised for students interested in learning more about the central and peripheral nervous system including the conservative and surgical management of various neurological conditions. The goal of this rotation is to introduce medical students to Neurological Surgery providing experience in both hospital and clinic based arenas. The students will have the opportunity to observe neurological procedures at various hospitals treating different types of neurosurgical patients as well as participating in various clinics. A broad overview of Neurological Surgery will be provided and students will be exposed to many subspecialties of Neurosurgery including pediatrics, brain tumors, functional neurosurgery, spine surgery, endoscopic brain surgery, and vascular neurosurgery. The clerkship is 4 weeks in length. The learner will be taught basic skills in neurological examinations as well as imaging interpretation. This knowledge will be applied to evaluation of neurological patients. Indications of neurological surgical intervention and basic understanding of neurological procedures as well as the pre- and post-operative management of patients will be taught. Direct patient contact is through participation in hospital rounds, clinical practice, office practice and participation in seminars. At the onset of the course, each student is provided with the neurosurgical medical student curriculum as well as a schedule for their rotation. The students are expected to attend the neurosurgical grand rounds conferences and any resident lectures.


Students may wish to perform a Neurosurgical Subinternship at an outside facility. This rotation is arranged through the University of Buffalo Neurosurgical Department with the outside Neurosurgical Department.

NSR-950 RESEARCH IN NEUROSURGERY: 4 credits. 4th year medical student or permission of OSAA and instructor.

Students may have an opportunity to work with a faculty member on a research project either clinical or laboratory based. This elective must be set up in advance so that the student can be paired with a faculty mentor. Please contact Jennifer Keller jkeller@ubns.com 218-1000 x 5124 if you are interested.

** IF YOU HAVE NOT BEEN CONTACTED ONE WEEK PRIOR TO ARRIVAL FOR YOUR ROTATION PLEASE CONTACT JENNIFER KELLER  jkeller@ubns.com 218-1000 x 5124 FOR YOUR INSTRUCTIONS AND SCHEDULE. **
DEPARTMENT OF NUCLEAR MEDICINE

Nuclear medicine is the clinical discipline concerned with the medical uses of radioactive materials. This includes both functional and anatomical imaging of organs and tissues for diagnostic purposes, therapeutic administration of isotopes, and in vitro tests based on competitive binding of radiolabeled compounds. The main activity of nuclear medicine is in vivo imaging. Nuclear medicine utilizes knowledge of physiology in order to image organ function and thereby derive diagnostic information.

In addition to the teaching program at all levels in the Medical School, the department has an active research program which includes development of new instrumentation and radiopharmaceuticals aimed at improving the usefulness of clinical radioisotope procedures. Students are encouraged to contact Department of Nuclear Medicine members concerning the courses listed below or to make less formal arrangements to pursue their interests in nuclear medicine.

The Department of Nuclear Medicine participates in patient care at Mercy Hospital of Buffalo, The Buffalo General Medical Center, VA Medical Center, and Roswell Park Cancer Institute and encompasses a diverse group of individuals in a variety of settings who share the common goal of providing high quality health care to patients.

The primary mission of the Department of Nuclear Medicine is to teach and train students at all levels of education, and to provide the services required to give the best of nuclear imaging techniques to the public in our immediate environment and beyond and to advance the boundaries of knowledge through our research, our scholarship, and creative activity.

In addition to outpatient clinics, the Department of Nuclear Medicine provides inpatient care, inpatient consultations, nuclear medicine imaging services, and clinical research. Educational programs are available for undergraduate medical students, medical and specialty residents, and continuing education for nuclear physicians and imaging practitioners in the community.

Students taking the Nuclear Medicine clinical rotation in Buffalo will work in one of the affiliated nuclear medicine departments under the guidance of one of the nuclear medicine physicians. The student will participate in patient diagnosis and the intellectual challenge presented in assisting in formulating patient diagnoses and treatment wherever indicated. The clinical variety offered and the freedom to conduct research and to make original clinical observations are definite pluses in this specialty.

Fourth Year Elective courses for medical students are integrated into the other educational activities of the Department. The Fourth Year Elective in Nuclear Medicine is one month of training at one of the four hospitals in the integrated residency program. During the Nuclear Medicine Elective, the student is provided practical experience in the clinical setting in the performance and interpretation of common nuclear medicine procedures. The student develops hands-on experience in history taking, physical examination and the evaluation of the request received from the referring physicians, the importance of the application of the nuclear imaging procedure requested, and evaluation of comparative imaging data as well as laboratory data and their importance in the interpretation of nuclear imaging. The student participates in the total management of the patient under the supervision and guidance of a full time faculty member in Nuclear Medicine. In addition, students participate in departmental programs for the residents and the community. The overall goal of the Elective is to understand the contribution of the field of nuclear medicine to complete patient care.

NUCLEAR MEDICINE is the clinical discipline concerned with all medical uses of radioactive materials (with the exception of sealed radiotherapy sources). This includes static and dynamic imaging of organs and tissues for diagnostic purposes, therapeutic administration of isotopes, and in vitro tests based on competitive binding of radiolabeled compounds. Nuclear Medicine combines medicine and basic biological sciences which originally had their roots in the fields of radiology, internal medicine, and pathology. Nuclear Medicine is primarily a clinical diagnostic discipline, it uses physical chemical principles and requires a background in such areas as physiology, biochemistry, mathematics, physics, chemistry, computer sciences, and statistics.

The discipline of Nuclear Medicine uses highly advanced technology in order to perform functional (physiological), rather than anatomical (structural), imaging for patient management. Technological innovations are constantly occurring and rapidly developing in this field.

The field of Nuclear Medicine is an interdisciplinary approach since it interacts with multiple medical specialists. Nuclear physicians are usually University or hospital based, or both.

For more information concerning career and educational opportunities in Nuclear Medicine, contact Dr. Robert S. Miletich, Department of Nuclear Medicine, 105 Parker Hall (South Campus), 3435 Main Street, Buffalo, NY 14214-3007. Tel: 838-5889.

NMD-501/502 BASIC SCIENCE OF NUCLEAR MEDICINE 2 credits per semester; 2 hours/week; 32 weeks (two semesters);
Departmental faculty members. Number of students: unlimited.

The purpose of this course is to help students understand the basic principles of Nuclear Medicine. This lecture course deals with the scientific foundations of Nuclear Medicine which includes radioactive decay, production of isotopes, interaction of radiation and matter, basic nuclear instrumentation, gamma-ray scanners and cameras, health physics and radiation protection. The physiological basis for various radiopharmaceuticals will be discussed as well as the theory and practice of radioimmunoassay.

Upon completing this course, students should have gained an understanding of the physical and chemical foundations of Nuclear Medicine.
NMD-601 INDEPENDENT STUDY 1-4 credits. By arrangement.

Independent study in any selected area of instrumentation, radiopharmaceutical development, or clinical application can be arranged.

NMD-801 CLINICAL NUCLEAR MEDICINE 4 credits. Modules: B-L. Prerequisite--senior medical student or permission of OSAA and instructor. Number of students: 2 per site. R-Roswell Park Cancer Institute, G-Buffalo General Medical Center, Y-Mercy Hospital, V-VA Medical Center. Contact department office for site location before registering.

This rotation serves as an introduction to the medical uses of radioactive materials. Its aim is to provide practical experience in the performance and interpretation of the common nuclear medicine procedures. Exposure to advanced metabolic functional imaging modalities such as positron emission tomography (PET) is available.

Students will follow routine radionuclide procedures from the preparation and administration of the radiopharmaceutical through to the interpretation and reporting of results. Daily imaging reading conferences will provide the framework for discussion of the role of nuclear medicine in clinical practice.

It is expected that by the completion of this rotation, the student will: (a) be familiar with the most commonly prescribed indications for radionuclide procedures; (b) understand the complementary roles of nuclear medicine and diagnostic imaging in solving various diagnostic problems; (c) understand the physiological basis of the common organ visualization and dynamic function tests; and (d) understand the basic principles for safe handling of radioactive materials.

NMD-950 RESEARCH IN NUCLEAR MEDICINE 4 credits. Modules B-L. Prerequisite--senior medical student or by permission of OSAA and instructor. By arrangement.

The Department of Nuclear Medicine is engaged in many areas of research including instrument development, radiopharmaceutical and new technique development, and basic and clinical scientific investigations of disease states using both animal models and human patients.
DEPARTMENT OF OPHTHALMOLOGY

The aims of the Department of Ophthalmology are teaching, research, and patient care. Instruction in clinical ophthalmology, ophthalmic surgery, basic and clinical research is available to medical students, resident physicians, and practicing ophthalmologists.

Chair, Department of Ophthalmology: James D. Reynolds, MD, Professor & Chairman
Director of Medical Student Education in Ophthalmology: Sandra Sieminski, M.D., Clinical Assistant Professor
Program Director: James D. Reynolds, MD, Professor
Associate Program Director: Andrew Reynolds, MD, Clinical Assistant Professor
Department Administrator: Ms. Elaine Taylor
Clinical sites: Children’s Hospital, Buffalo VA Hospital, Ross Eye Institute
Departmental Web Site: medicine.buffalo.edu/departments/ophthalmology

OPH-800 CLINICAL CLERKSHIP IN OPHTHALMOLOGY. 4 credits. Modules A-K. Prerequisite--senior medical student or permission of OSAA and instructor. Course Director: Sandra Sieminski, M.D. Contact Ms. Elaine Taylor for registration and site location(s). Number of students: 3.

This course is specifically designed for the medical student interested in pursuing a career in ophthalmology. The goals of the course are to build a foundation of knowledge about clinical ophthalmology. The course is divided into two parts: the first part is designed to expose the student to adult clinical and surgical ophthalmology, and the second portion is designed to expose the student to pediatric/adolescent ophthalmology (clinical and surgical). The student will attend all weekly departmental conferences and lectures. Each student will be responsible for a case presentation at grand rounds. A required reading list and a monthly departmental schedule will be provided prior to starting the course.

OPH-890 COURSE AT OTHER UNIVERSITY 4 credits. Modules A-K. Contact James Reynolds, MD. prior to registration. Prerequisite--Senior medical student. Number of students: unlimited.

This course is specifically designed for the medical student interested in pursuing a career in ophthalmology. The goals of the course are to build a foundation of knowledge about clinical ophthalmology. Arrangement must be made with the other university, with the School, and with the chairman of the Department of Ophthalmology, University at Buffalo.

OPH-950 RESEARCH IN BASIC OR CLINICAL OPHTHALMOLOGY 4-8 credits. Modules A-K. Prerequisite-Senior medical student or permission of OSAA and instructor. For information regarding ongoing research projects in the department contact Steven Fliesler, Ph.D., Director of Research (Fliesler@buffalo.edu). Students may spend either 4 weeks or 8 weeks; however 8 weeks is preferable. Number of students: 2.

This course is designed to introduce the student to the methods of basic and/or clinical ophthalmic research. Goals of the course are to learn how to develop a research protocol, collect and analyze data, and how to effectively present data. Students will be encouraged to present their completed projects at the annual university research day. Travel funds are available through various departmental sources for presentations at national scientific forums.
DEPARTMENT OF ORTHOPAEDICS

The Department of Orthopaedics administrative offices are based at the Erie County Medical Center. The clinical instructional programs utilize facilities and faculty located at the Buffalo General Hospital, Women and Children’s Hospital of Buffalo, Erie County Medical Center, and the University Orthopaedic clinical offices located on Harlem Road in Amherst. The Orthopaedic Research Laboratory is located in Farber Hall of the UB South Campus. It is our goal to provide an educational environment that instills the appropriate knowledge, skills, and attitudes necessary to care for patients with musculoskeletal conditions. Students of the Department of Orthopaedic Surgery will become knowledgeable regarding the clinical manifestations, anatomy, physiology, and pathology of the common musculoskeletal conditions. Students will be instructed in the musculoskeletal history and physical examination, be able to identify disease, formulate a diagnosis, and initiate a treatment plan. We will foster an appreciation of the complex effect that musculoskeletal disease can have on the overall well-being of patients. The medical student will function as an integral part of the care of patients on our service. They will receive direct supervision by the resident staff as well as the attending surgeons. The orthopaedic service is busy which requires students to be active participants in their own educational experience. Dedication to self-study and reading outside of regular work hours is required to gain the knowledge required to successfully meet the goals of the rotation.

Educational Mission Statement

It has been estimated that approximately 30 percent of all patients seeking a physician do so because of a complaint related to the musculoskeletal system. With an ever increasing activity level and an aging American population, the prevalence of musculoskeletal conditions will continue to increase over time. There is a growing concern that US medical school trained physicians are ill-equipped to properly diagnose and manage the more than 100 million patients affected by musculoskeletal problems in each year. It is our goal to provide an educational environment that instills the appropriate knowledge, skills, and attitudes necessary to care for patients with musculoskeletal conditions. These goals conform with the general educational objectives and competencies of the mission statement of the UB School of Medicine and Biomedical Sciences. Students of the Department of Orthopaedic Surgery will become knowledgeable regarding the clinical manifestations, anatomy, physiology, and pathology of the common musculoskeletal conditions. Students will be instructed in the musculoskeletal history and physical examination, be able to identify disease, formulate a diagnosis, and initiate a treatment plan. We will foster an appreciation of the complex effect that musculoskeletal disease can have on the overall well-being of patients.

The training of students is a complex interaction of didactic education, clinical responsibilities, and research. While our primary focus is the care of the patient, educating the next generation of doctors and surgeons is a responsibility that we accept seriously. The future of our profession rests on our ability to pass on the knowledge we have gained and to foster new thinking among our future colleagues. Although the practice of medicine is associated with service work that is not deemed truly educational, it is an essential part of taking care of our patients. It is our expectation that the care of patients will not interfere with the learning of our students and that the education of students will not compromise the quality of the care we provide to our patients.

ORS-805 ORTHOPAEDIC SURGERY - Sports Medicine 4 credits. Modules B-L. Prerequisites-Senior medical student or permission of OSAA and instructor. Drs. Smolinski, Marzo, Bisson, Fineberg, Wind, Rauh, Bernas Number of students: 2.

Course Objectives: The course is designed to advance the students’ knowledge and skill in diagnosing and management of common musculoskeletal problems related to participation in sports and activities. This elective will build on the students’ previous knowledge gained from the Integrated Study of the Musculoskeletal System, and the third year surgical subspecialty elective in orthopedics.

Method: The elective will be for one month of the fourth year. Students will attend the outpatient office hours of the attending surgeons practicing at the Harlem Road location of University Orthopedics. An evening walk-in clinic provides exposure to acute musculoskeletal problems. Students can spend time in our physical therapy suite, learn musculoskeletal radiology, see athletes in the UB athletic training room, learn about being a team physician, and participate in game/event coverage. Appropriate (and cost efficient) diagnostic workup of various musculoskeletal problems will be learned. Students can also spend time in one of the several outpatient surgical centers utilized by the physicians of University Sports Medicine, where they will participate in arthroscopic, minimally invasive, and open surgical cases.

Evaluation: Faculty and student course critiques will be obtained. The student evaluation will be assessed by oral exam and observation of the students’ skills during the course.

ORS-805 ORTHOPAEDIC SURGERY Pediatric Orthopaedics Women and Children’s Hospital of Buffalo 4 credits. Modules B-L. Prerequisites-Senior medical student or permission of OSAA and instructor. Drs. Galpin, Ferrick Number of students: 2.
Course Objectives: The course is designed to advance the students’ knowledge and skill in diagnosing and management of common musculoskeletal problems related to the pediatric patient. The goal of the elective is to obtain a solid grounding in the evaluation and management of pediatric orthopaedic problems and patients. This elective will build on the students’ previous knowledge gained from the Integrated Study of the Musculoskeletal System, and the third year surgical subspecialty elective in orthopedics.

Evaluation: Faculty and student course critiques will be obtained. The student evaluation will be assessed by oral exam and observation of the students’ skills during the course.

ORS-805 ORTHOPAEDIC SURGERY Adult Orthopaedics and Trauma Erie County Medical Center 4 credits. Modules B-L. Prerequisites-Senior medical student or permission of OSAA and instructor. Drs. Ritter, Stegemann, Anders, Rohrbacher, Duquin, Mutty Number of students: 4.

Course Objectives: The course is designed to advance the students’ knowledge and skill in diagnosing and management of common musculoskeletal problems related to the adult orthopedic patient. A broad based clinical experience, the rotation will include sessions in clinic specific to the subspecialties of trauma, hand surgery, spine, foot and ankle surgery, sports medicine and shoulder surgery. This elective will build on the students’ previous knowledge gained from the Integrated Study of the Musculoskeletal System, and the third year surgical subspecialty elective in orthopedics.

Evaluation: Faculty and student course critiques will be obtained. The student evaluation will be assessed by oral exam and observation of the students’ skills during the course.

ORS-805 ORTHOPAEDIC SURGERY Adult Orthopaedics Buffalo General Hospital 4 credits. Modules B-L. Prerequisites-Senior medical student or permission of OSAA and instructor. Drs. Krackow, Phillips, Rachala, McGrath, Santilli Number of students: 2.

Course Objectives: The course is designed to advance the students’ knowledge and skill in diagnosing and management of common musculoskeletal problems related to the adult orthopedic patient. A broad based clinical experience, the rotation will include sessions in clinic specific to the subspecialties of trauma, spine, adult reconstruction, and musculoskeletal oncology. This elective will build on the students’ previous knowledge gained from the Integrated Study of the Musculoskeletal System, and the third year surgical subspecialty elective in orthopedics.

Evaluation: Faculty and student course critiques will be obtained. The student evaluation will be assessed by oral exam and observation of the students’ skills during the course.

ORS-832 PRIMARY CARE – Sports Medicine 4 credits. Modules B-L. Note: A “X” after the module in the Class Schedule indicates the University Campus as the site. Prerequisite--senior medical student or permission of OSAA and instructor. Drs. Leddy, Jain, Darling. Number of students: 2.

Course Objectives: The course is designed to advance the students’ knowledge and skill in diagnosing and management of outpatient musculoskeletal (m.s.) problems. This elective will build on the students’ previous knowledge gained from ICM and the third year week in orthopaedic surgery. It will enhance students’ ability to diagnose and treat the ambulatory patient with musculoskeletal complaints.

Purpose: It is generally agreed that at least 15 percent of chief complaints of patients presenting to a primary care physician are of the musculoskeletal system. At the present time students at UB Medical School have only one week of introduction to orthopaedic medicine in their third-year surgical rotation. This elective would give students the opportunity to greatly increase their exposure to outpatient orthopaedic medicine. It will be designed for those students planning to go into primary care medicine.

Method: The elective will be for one month of the fourth year. Students will attend the outpatient clinic at the UB Sports Medicine Institute. The Institute treats a wide variety of musculoskeletal and sports medicine problems in athletes and the general population. An evening walk-in clinic provides exposure to acute musculoskeletal problems. Students can spend time in our physical therapy suite, learn musculoskeletal radiology, see athletes in the UB training room, learn about being a team physician, and participate in game/event coverage. Our staff includes sports medicine-trained orthopedic surgeons, sports medicine-trained primary care physicians, and an orthopedic nurse practitioner. Students will be taught important history taking techniques for musculoskeletal problems. They will be taught physical diagnosis of the musculoskeletal system and learn to develop a differential diagnosis of musculoskeletal disease. Appropriate (and cost efficient) diagnostic workup of various musculoskeletal problems will be learned. The students will have the opportunity to see the continuum of orthopaedic treatment. This will give them important knowledge to counsel
their own patients with musculoskeletal problems and have a better understanding of which patients will be better served by getting an orthopaedic consultation. Textbooks on basic physical diagnosis and essentials of orthopedic and sports medicine will be used. Videotapes of the proper way to perform a musculoskeletal physician exam will also be utilized.

Evaluation: Faculty and student course critiques will be obtained. The student evaluation will be assessed by oral exam and observation of the students’ skills during the course.

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ORS-890 ORTHOPAEDIC SURGERY Course at Other University 4 credits. Modules B-L. Prerequisites-Senior medical student, permission of OSAA and Chairman of the Department of Orthopaedics.

Course Objectives: The course is designed to advance the students’ knowledge and skill in diagnosing and management of common musculoskeletal problems related to the pediatric patient. This elective will build on the students’ previous knowledge gained from the Integrated Study of the Musculoskeletal System, and the third year surgical subspecialty elective in orthopedics.

Method:

Evaluation: Faculty and student course critiques will be obtained. The student evaluation will be assessed by oral exam and observation of the students’ skills during the course.

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ORS-950 ORTHOPAEDIC SURGERY Research in Orthopaedics 4 credits Modules B-L. Prerequisites-Senior medical student or permission of OSAA and instructors Number of students: 2. Cathy Buyea, MS; Mark Ehrenberger, PhD

Course objectives: During this four week rotation students will have the opportunity to work on a research project. This project may take place at the Kenneth A Krackow, MD Research Lab or in one the affiliated hospitals. Projects must be determined and clearly outlined prior to attending this session. A completed Orthopaedic Research Project Outline (Department of Orthopaedic Surgery Website) with all required signatures and IRB approval if appropriate are required.

The goal for this four week fourth year medical student elective to teach the student how to approach a research topic, how to conduct that research, and how to prepare information gained for publication. In addition to working on their own project, students will be exposed to a wide range of projects taking place in the lab or the hospital setting. They will be expected to attend Grand Rounds conference as well as monthly lab/clinical meetings. If appropriate, they may present their project at the lab or clinical research meeting. Completed projects will be considered for publication and/or poster presentation.

Evaluation: Grades will be determined by a combination of the written work submitted to the project mentor and the lab/clinical director’s observation of the student.
DEPARTMENT OF OTOLARYNGOLOGY

The Department of Otolaryngology offers courses tailored to meet undergraduate, postgraduate, and continuing education for the primary care physician and practicing otolaryngologist, in comprehensive patient care and in recognizing emergency situations, as well as in understanding the diagnosis and management of the otolaryngologic diseases and trauma, neoplasia, congenital disorders of the head and neck.

The experiences in the outpatient department will provide opportunities for developing skills of information gathering and intensive, detailed regional topographic physical examination, analysis of problems, and satisfactory patient-doctor relationship. The clinical facilities are maintained in each of the following hospitals: Millard Fillmore Gates Circle Hospital, Veterans WNY Healthcare System, Buffalo General Medical Center, Erie County Medical Center and Women and Children’s Hospital.

In addition, the Department of Otolaryngology conducts monthly teaching conferences on all aspects of otolaryngology and head and neck oncology.

Preparation of a paper suitable for publication or presentation of a didactic lecture at an institution is required for granting of honors. Time is allocated in this specialty for third-year students.

NOTE: *Contact the department course coordinator for site location before registering. (Beverly Hurley 362-9585)

OTO-809 CLERKSHIP-OTOLARYNGOLOGY 4 credits. Modules B-L. Contact departmental office for site location before registering. Prerequisite--senior medical student or permission of OSAA and instructor. Children’s Hospital of Buffalo, Millard Fillmore Gates Hospital, Veteran’s WNY Healthcare System. Number of students: 2 (total per module), one at each facility, with permission, may spend two weeks at one facility, two weeks at a second facility. For available locations and preferences please contact the course coordinator: Beverly Hurley (362-9585)

The objective of this rotation is to give a broad spectrum of otolaryngology-head and neck surgery and its related fields. The students will be exposed to techniques of information gathering, physical examinations, analysis of problems, and practical approach to the solution of problems. They will also have direct exposure and clinical experience in physical examination. Students should be able to recognize various disorders and diseases in the field of otolaryngology, and to perform complete otolaryngologic and head and neck examinations. Students will be responsible for direct patient care.

OTO-811 CLERKSHIP IN HEAD AND NECK SURGERY 4 credits. Modules B-L. Contact departmental office for site location before registering. Prerequisite: Senior medical student or permission of OSAA and instructor. Kaleida sites (Buffalo General Medical Center, Children’s Hospital of Buffalo); Veteran’s WNY Healthcare System; Erie County Medical Center; Sister’s Hospital of Buffalo, Roswell Park Cancer Institute. Number of students: 1; not to overlap with students taking OTO-809. Contact course coordinator: Beverly Hurley (362-9585) for site location before registering.

The intent of this rotation is to familiarize the students with neoplasia and reconstructive procedures of the head and neck. Upon completion of the course, the students should be able to diagnose and manage neoplasia in head and neck and be responsible for direct patient care.


The goal of this rotation is to familiarize students with facial plastic and reconstructive surgeries. Upon completion of the course, the student should be able to diagnose and manage a variety of facial plastic and reconstructive type problems and be responsible for direct patient care. This course will include coverage of topics ranging from cosmetic to reconstructive procedures.
OTO-820 PRECEPTORSHIP 4 credits. Modules B-L. Contact departmental office for site location before registering.

Prerequisite—senior medical student or permission of OSAA and instructor. Number of students: 6; not to overlap with OTO-809 or OTO-811. Contact course coordinator: Beverly Hurley (362-9585) for site location before registering.

The goal of this course is to familiarize the student with the more common ENT problems seen in a physician’s office. The objective of this course will be achieved mainly by rotation of the student through the various clinics in the affiliated hospitals as well as the evaluation and examination of patients in the private doctor’s office setting.

Upon completion of the course, the student should be able to perform an adequate head and neck examination. The basic care of the emergencies in this particular specialty will also be covered, namely, the management of acute blood loss and acute airway obstruction.

OTO-890 COURSE AT OTHER UNIVERSITY 4 credits. Modules B-L. Contact departmental office for site location before registering. Prerequisite—senior medical student.

By arrangement with other university and course coordinator or Chair of Department of Otolaryngology. Out of town elective card must be completed and approved prior to scheduling.

OTO-950 RESEARCH IN OTOLARYNGOLOGY 4 credits. Modules B-L. Contact departmental office for site location before registering. Prerequisite—senior medical student or by permission of OSAA and instructor. Satisfactory completion of OTO-809. Otolaryngology faculty. Number of students: 1. Research students are restricted to nonclinical work or clinical work which specifically does not interfere with other students assigned for clinical clerkships or preceptorships at that facility (see OTO-809 and OTO-811) or with that attending (OTO-820).

The objective of the course is to provide a research opportunity for fourth-year medical students to participate in ongoing research projects within the department. The cell culture lab affords an opportunity for basic research, working with in vitro cultures, in vitro chemosensitivity testing for new chemotherapeutic agents, or designing an individual research project. Clinical research is available in a number of forms ranging from head and neck oncology to general otolaryngology, otology, pediatric otolaryngology, and infectious disease and immunology. Any students interested may contact the course coordinator: Beverly Hurley (362-9585).
DEPARTMENT OF PATHOLOGY AND ANATOMICAL SCIENCES

The Department of Pathology and Anatomical Sciences is responsible for introducing the student to the structural and functional alterations in disease and the mechanisms whereby such alterations are produced. The subject represents both an applied science that touches almost every other area of medical knowledge and hospital practice.

The dual aspect of pathology is emphasized in the teaching program. Initially, the fundamental principles of disease, such as inflammation and repair, metabolic and hemodynamic disturbances, and neoplasia are presented parallel to actual base studies based on current autopsies and surgical material. From the beginning, an attempt is made to correlate basic principles, morbid anatomy, and clinical syndromes. Later in the course, specific diseases are studied in detail. The characteristic changes produced by disease, in particular organ systems and their relationship to clinical manifestations, are explored.

Laboratory work involves the study of gross and microscopic specimens and may be supplemented by student attendance at autopsies, as well as by student participation in informal seminars.

The department is also involved in the organization and teaching of several subjects in collaboration with other departments which present to the student an integrated view of normal and abnormal function of selected organ systems.

The department offers a program leading to the PhD in Experimental Pathology which may be adapted to the needs of students who wish to obtain a combined M.D.-Ph.D. as preparation for a career in academic medicine. Such programs are planned on an individual basis.

Members of the staff are engaged in research in immunochemistry, immunopathology, renal pathophysiology, experimental renal disease, experimental endocrinology and hypertension, genitourinary pathology, muscle pathology, perinatal and adult neuropahtology, reticuloendothelial function, biology and neoplasms.

The Division of Anatomy and Cell Biology is organized to provide instruction in all aspects of the structure of the human body. The three major divisions-Histology, Gross Anatomy and Embryology offered in the first year curriculum and for understanding the human organism in health and disease, the study of structure and its correlation with function are of prime importance.

In addition to the teaching program in Medicine, the department is active in a variety of research projects and offers opportunities for advanced study and training toward a career in medical research and teaching.

**PTH-800 HOSPITAL PATHOLOGY** 4 credits. Modules A-K. Prerequisite--senior medical student or permission of OSAA and instructor. **Dr. Lucia Balos.** Number of students 4 (between 3rd and 4th year). NOTE: a “G” after the module in the Class Schedule indicates Kaleida Health Systems/Buffalo General Medical Center as the site.

This rotation provides students with a four-week elective period in hospital pathology, specifically autopsy and surgical pathology, as they relate to patient care. Emphasis is placed on a correlation of pathologic findings and clinical problems.

Students may also have an opportunity to obtain some practical experience in clinical pathology, which includes the areas of microbiology, clinical chemistry, hematology and blood banking. Particularly in this part of the elective, students develop a better understanding of the role of the laboratory in the hospital and of how to best utilize the services of the laboratory.

**PTH-800 HOSPITAL PATHOLOGY** 4 credits. Modules A-K. Prerequisite--senior medical student or permission of OSAA and instructor, **Dr. Paul Bogner.** Number of students: 1-2. NOTE: an “R” after the module in the Class Schedule indicates Roswell Park Cancer Institute as the site.

This rotation allows the medical student to be exposed to oncologic pathology in the Anatomic pathology section of the Department of Pathology and Laboratory Medicine at Roswell Park Cancer Institute. The student may elect a four week period of time for this elective. The emphasis is on Surgical Pathology as well as Cytopathology and may include Flow Cytometry, Cytogenetics, or Molecular Diagnosis. The students will assist in various laboratory procedures and gain expertise in evaluation/diagnosis of tissue specimens from cancer patients. The pathologic findings are correlated with the clinical findings. There is extensive interaction with the pathology faculty, residents, and fellows. Participation in the Institute’s Multidisciplinary Tumor Boards will give the student a unique perspective on the relationship between the pathology diagnosis and patient management. Students have an opportunity to assist in autopsies and are expected to participate in Departmental conferences.
NOT BEING HELD

**PTH-810 FORENSIC PATHOLOGY** 4 credits. Modules A-K  Note: An "E" after the module in the Class Schedule indicates the Erie County Medical Center (Medical Examiner's Office) as the site. Prerequisite--senior medical student or permission of the MEO and instructor. Dr. Tara Mahar. Number of students: 4

This rotation will provide the future physician the following foundations:

a. Determination of the Cause of Death  
b. Determination of the Manner of Death  
c. Type of case referred to Medical Examiner/Coroner  
d. Review of Gross Anatomy

Upon completion of the future physician will be able to:

a. Properly fill out a death certificate  
b. Understand what cases must be referred to the Medical Examiner

**PTH-890 COURSE AT OTHER UNIVERSITY** 4 credits. Modules A-K. fourth year. Prerequisite--senior medical student. By arrangement with other university and department chairman

**PTH-950 RESEARCH IN PATHOLOGY** 4 credits. Modules A-K. Prerequisite--senior medical student or permission of OSAA and instructor. Department chairman and staff.

The goals of this course are to provide students with insight into research and practical experience in a small project. Students will engage in research projects involving one of the current areas of scientific investigation engaged in by department members. These include experimental immunology, transplantation immunology, cytokines, neuroimmunology, experimental hypertension, experimental endocrinology, cell biology of tumors, and neuropathology.

Students must have prior approval of the Department Chair or Investigator and a proposed research project before enrolling for the research course.

At the end of the research course, the students should have developed an appreciation of the investigative approach and practical experience in a small research project.

**ANA-800 SENIOR TEACHING IN THE ANATOMICAL SCIENCES** 4 credits. Modules B through K Prerequisite-Senior medical student, permission of OME. Drs. Cohan, Cotter, and Kolega  NOTE: Module is followed by either “G”, “H” or “N” to denote Gross, Histology, and Neuro courses. Number of students: Neuro 8-16 per module; Gross - 6 per module; Hist - 4 per module.

This course is designed to give seniors an opportunity to assist in the teaching of Gross Anatomy, Histology, or Neuroscience. It will provide an excellent opportunity to understand and teach the basic science concepts on which much of clinical medicine depends.

You will serve as a teacher in laboratory and small group discussions in whichever course is selected. By choosing the appropriate module, you can be registered during the time when a specific body area, tissue, or system is to be studied by the first- or second-year class and which you would prefer to review and teach.

At the completion of this course, you will have had an opportunity to act as a teacher, helping others understand how clinical disorders are related to basic anatomical concepts. You will also be able to appreciate some of the expectations and responsibilities of teaching as a career.

Before registering to teach in Histology or Neuroscience, students must receive permission from the instructor of the course (Histology - Dr. Cotter; Neuroscience - Dr. Cohan). Registration to teach in Gross Anatomy is on a “first come, first served” basis, with a maximum capacity of 6 TAs in each module. Students who add/drop AFTER the registration time period should send their add/drop forms to the attention of the course coordinator at ubpathad@buffalo.edu. Please be advised that this is not the Advanced Dissection course.
ANA-801 ADVANCED CLINICAL MUSCULOSKELETAL ANATOMY 4 credits. Modules I, K. Prerequisite ANA 500, Senior medical student or permission of OSAA and instructor. Dr John Marzo Number of students: 6

This course is designed for the student with an interest in completing a comprehensive anatomical dissection of the musculoskeletal system. Students will personally dissect the limbs and major joints of the upper and lower extremities with an emphasis on the clinically relevant anatomy of these areas. Didactic lectures will present clinically related diagnoses and treatments for conditions of the musculoskeletal system. The course will be particularly relevant for medical students interested in orthopedic surgery, sports medicine, or physical medicine and rehabilitation.

General information

Lectures: Monday, Wednesday 9 AM to 10AM, other times as necessary Jacobs school of Medicine and Biomedical Sciences 955 Main St – Hospital Medical Corridor Campus – Spring ’18

Laboratory: Monday, Thursday 10 AM to 5 PM, other times as necessary

All participants are required to wear scrubs and/or a laboratory coat as well as closed shoes in the laboratory sessions. You must wear latex or vinyl gloves (provided) any time you are dissecting. Protected eye wear is recommended, but not required. All other rules of conduct in Anatomy 500 will be imposed during Anatomy 801.

Limit: 6 students

Faculty: John Marzo, MD

Required Books: Moore and Dalley; Clinically Oriented Anatomy, 8th ed
Grant's Atlas of Anatomy, 14th ed
Grant's Dissector, 16th ed
Bernstein; Musculoskeletal Medicine, 1st ed

Grades will be determined based on written exams (2), a final oral examination, and active participation in the laboratory and didactic lecture sessions. Each of the four measures of student performance will be given equal weight in the final grade. Letter grades will be assigned using the following schedule:

H = Honors (90% or higher)
HS = High Satisfactory (85%-90%)
S = Satisfactory (65%-85%)
U = Unsatisfactory (65% or less)

ANA-805-0 ADVANCED HUMAN DISSECTION 4 credit. Fall or spring semester by arrangement. Prerequisites-ANA-500 and permission of instructor. Drs. Mendel, Cohan and staff. NOTE: Module followed by an “N” denotes the neuroscience module with Dr. Cohan. Number of students: unlimited

This course will enable students, according to their particular needs, to perform a dissection of one particular region to a complete dissection of the human body, using either standard or special techniques of dissection and preparation.

Faculty will be available initially to plan the dissection schedule and procedures, and will thereafter be available for consultation as needed. Some students may only wish an opportunity to personally dissect certain regions not assigned to them during the introductory course. Others may need more detailed study as a preparation for a contemplated career involving either a particular clinical specialty or teaching of gross human anatomy.

Students registering for this course with Dr. Cohan will perform dissection of the human brain. Brain dissection involves review of neuroanatomy in the Brain Museum followed by dissection under supervision of Dr. Cohan.

At the conclusion of this course, students will hopefully have acquired skills and experience in the techniques of dissection and preparation. Students must have instructor permission before enrolling in this course. For information, please contact the course coordinator at ubpathad@buffalo.edu.
DEPARTMENT OF PEDIATRICS

The Department of Pediatrics provides educational experiences at the Oishei Children's Hospital, Mercy Hospital of Buffalo, and affiliated clinics and offices. The departmental faculty represents a broad range of medical expertise with a strong focus in primary care as well as specialists in all major pediatric subspecialty areas. The Department of Pediatrics has a tradition of excellence in clinical teaching and has maintained a commitment to the education of all medical students toward the understanding of major medical and social issues in child health. Students who participate in educational experiences with the Department of Pediatrics will be provided opportunities to study in both inpatient and ambulatory clinical settings. All educational experiences will be closely supervised by full-time faculty members. Students will be provided educational goals and timely feedback on their progress.

At Oishei Children's Hospital, inpatient teaching experiences will include the evaluation of children with a wide range of serious medical problems. Students will be expected to demonstrate proficiency in the performance of appropriate historical and physical examination skills for children of all ages from infancy through adolescence. Students will participate actively in ward teaching rounds and learn not only the pathophysiology of pediatric disease, but also the clinical art of caring for children with medical illnesses. Clinical teaching experiences will include subspecialty services in ambulatory pediatrics, cardiology, endocrinology & diabetes, emergency medicine, critical care, dermatology/allergy/immunology, gastroenterology, hematology/oncology, genetics, infectious disease, neonatology, nephrology, pulmonary disease, and developmental and rehabilitative pediatrics. During pediatric electives and clerkships, students are expected to participate in regularly scheduled departmental and divisional seminars. All departmental educational programs are open to any interested student.

Educational and clinical experiences are also available at Mercy Hospital, which includes studying general pediatrics in the ambulatory setting. Emphasis is placed on continuity of clinical care, growth and development, as well as common pediatric diseases.

Research experiences during the fourth year of medical studies are available for both bench research and patient-related studies. These research opportunities allow students to work directly with senior faculty and to gain insight into the process of conducting biomedical research, analyzing data, and understanding ethical issues related to biomedical research.

*PED-700 PEDIATRIC CLINICAL CLERKSHIP 6 credits. Blocks 1-4. Contact departmental office for site location.
Prerequisite: Junior medical student. Pediatric faculty. This is a required six-week junior-year clerkship. Clerkship director: Wayne Waz, M.D.

The goals of the Pediatric Clerkship are to introduce medical students to the specialty of pediatrics, and to give them the opportunity to acquire knowledge and skills in this field by means of clinical experiences and didactic learning under expert guidance.

Students will work in small groups and will be assigned to a variety of clinical activities at Oishei Children's Hospital and its related facilities, Mercy Hospital of Buffalo, and community-based primary care sites. Students will have the opportunity to see pediatric patients and their families in various inpatient and outpatient settings including pediatric wards, newborn nurseries, pediatric subspecialty clinics, well-child clinics, and community pediatric practices. Throughout this rotation, students will be assigned patients to evaluate and follow, and present them to the teaching staff for comments and evaluation. Emphasis will be placed on having students fully involved in the comprehensive care of pediatric patients for a more thorough understanding of this specialty. Students will perform one shift of weekend duties during this rotation. A clinical problem-based curriculum will enable students to focus on common pediatric problems. This pediatric clerkship includes regularly scheduled seminars, discussions, and lectures, as well as teaching rounds with faculty and resident staff. Pediatric residents and attendings will arrange for talks and seminars related to case material and pertinent subjects. Audiovisual and library facilities are available for self-education.

The clerkship is divided into three separate 2-week blocks: inpatient at Oishei Children's Hospital, outpatient at a primary care pediatric site, and pediatric subspecialty (possible assignment include neonatology, critical care, pediatric emergency medicine, hematology/oncology, nephrology, gastroenterology, pulmonology, diabetes/endocrinology, infectious diseases, and cardiology).

At orientation on the first day of the clerkship, each student will receive detailed online course materials describing clerkship objectives, responsibilities, course curriculum, and student evaluation.

PED-800 SUBINTERNSHIP IN PEDIATRICS 4 credits. Modules A-M. (Modules G-M open to third-year students, who have successfully completed PED-700.) Full time, including nights and weekends. Contact departmental office for availability.
Prerequisite: Senior medical student or third-year student who has successfully completed PED 700. Pediatric faculty are assigned as attendings. Number of students: 2.

The objectives of the rotation are to provide senior students with an intensive experience in inpatient clinical pediatrics with more direct patient responsibility than the junior clerkship so as to improve skills in the diagnosis and management of acute pediatric problems. The subinternship is offered at Oishei Children's Hospital. Inpatient subinternships are available on the general inpatient service as well as the Hematology/Oncology Service.
The subintern will act as the primary physician, caring for the patients under the supervision of the resident and attending staff. The student will be expected to function essentially as an intern; however, closer supervision will be given by the senior residents. Admissions will be assigned to the subintern. Night call will be approximately every fourth night, when the subintern will be the primary caretaker for all the patients on that service, in addition to admitting new patients. A complete history and physical examination will be performed on all patients assigned to the subintern, who will then formulate an assessment and plan of management in conjunction with the senior staff. The student will learn to perform procedures necessary for patient care and will follow patients throughout their hospitalization, writing all orders and daily progress notes in the problem-oriented format.

Upon completion of the subinternship, the student should strengthen basic skills of history taking and physical examination of the pediatric patient as well as becoming more proficient in establishing a problem list and planning and adapting an appropriate course of management throughout the hospital course. Skills in case presentation, seeking consultations, and direct communication with the private physician, family, and all members of the patient-care team should be attained.

**PED-803 DEVELOPMENTAL PEDIATRICS AND PEDIATRIC REHABILITATION 4 credits. Modules A-M. Prerequisite:**
Senior medical student or third-year student who has successfully completed PED 700. Drs. Hoffman, Azaula, Hartley-McAndrew, and Nadler. Number of students: 1

To increase diagnostic management for advocacy skills for children, adolescents, and young adults with developmental disabilities.

Opportunity for fourth-year medical students with interest in developmental disabilities. Clinical experiences include approaches to children with Down's syndrome, spina bifida, Autism Spectrum Disorders, ADHD, feeding disorders, extreme prematurity, limb disorders, birth defects, cerebral palsy, mental retardation, acquired brain injury, and learning and behavior disorders.

Developmental assessment tools for gross and fine motor skills, receptive and expressive language, problem solving, and functional independence will be emphasized. Formulation of developmental diagnosis including determination of genetic and neurologic etiologies will be stressed as well as prioritization of management skills for habilitation, family counseling, and developmental-educational interventions.

Presentation of a clinical topic or review of a clinical management area will be required. Consultation for children in hospital, school, and rehabilitational therapy settings will take place. In addition, opportunities for participation in community outreach efforts include observations at ARC-Heritage, Center for the Handicapped, OLV, New York State School for the Blind, and Bornhava.

By participating in this elective, medical students will better understand the need to combine health, rehabilitation, and advocacy approaches to optimize the outcomes of individuals with disabilities.

**PED-804 PEDIATRIC CARDIOLOGY 4 credits. Modules A-M. Prerequisites:** Senior medical student, or third-year student who has successfully completed PED 700 with a strong consideration of pediatrics as a career goal. Drs. Balluz, McCloud, and Rao. Number of students: 1

The goals of this rotation are to provide a general appreciation for the scope of pediatric cardiology ranging from the critically ill newborn to the office detection of the functional murmur.

The students will participate in the evaluation of patients in ambulatory and in-hospital settings. They will be exposed to both bedside and noninvasive diagnostic techniques including electrocardiography, echocardiography and Doppler flow. The correlation of the physical findings with hemodynamic and angiographic data and the formulation of a management plan will be demonstrated at the catheterization case conference. Clinicopathologic correlations are discussed at regularly scheduled pathology conferences.

This rotation should provide students with substantial gains in the skills of pediatric physical diagnosis. In addition, familiarity with the noninvasive laboratory techniques, the developmental physiology of infancy, hemodynamic and angiographic diagnosis of cardiovascular disease should be acquired on the completion of this elective. Students are excused from on-call responsibilities.

**PED-806 PEDIATRIC DERMATOLOGY-ALLERGY-CLINICAL IMMUNOLOGY 4 credits. Modules A-M. Prerequisites:**
Senior medical student or third-year student who has successfully completed PED 700. Drs. Rothman, and Lehman. Number of students: 1

The rotation is solely an ambulatory care experience. The purpose of this rotation is to give students an opportunity to learn about the diagnosis and management of outpatients with dermatologic as well as allergic and immunologic diseases.

The students will attend three pediatric dermatology clinics per week. (Monday morning, Wednesday morning and Wednesday afternoon). This portion of the rotation will give students an opportunity to learn the evaluation, diagnosis, and management of outpatients with pediatric dermatologic diseases. During this elective, the student will:
(1) become familiar with the anatomy of the skin, adnexal structures, general function, and pathological processes;
(2) learn to describe skin lesions by morphology and distribution;
(3) learn to recognize common and some uncommon skin disorders and understand diagnostic methods and treatment;
(4) understand the contributions of the dermatologist, dermatopathologist, and the dermatologic surgeon in the care of skin disorders.

The students will also attend three pediatric allergy/immunology clinics each week. Particular attention will be devoted to common allergic diseases, asthma and allergies, allergic rhinitis, atopic dermatitis, urticaria and angioedema, hymenoptera sensitivity, food and drug reactions, immune deficiency, and pediatric autoimmune diseases. They will also attend weekly didactic sessions, journal club, and research seminars. Upon completion of this rotation, students will have learned how to take an appropriately detailed history regarding allergic and immunological diseases, to perform appropriate physical examinations, and to perform skin tests and pulmonary function testing. History, physical, and laboratory information should provide an adequate diagnosis and interpretation of the patient’s problem and establish an appropriate program of environmental control, pharmacotherapy, and possible immunotherapy with allergic diseases, and replacement immunoglobulin therapy in patients with immunodeficiency disorders.

**PED-808 CLINICAL PEDIATRIC NEPHROLOGY** 4 credits. Modules A-M. Prerequisite: Senior medical student or third-year student who has successfully completed PED 700. Drs. Waz and Wu. Number of students: 2.

This rotation is designed to enhance the student’s understanding of etiology and pathophysiology of renal diseases in infants and children including fluid and electrolyte disorders, hypertension, glomerulonephritis, nephrotic syndrome and renal failure.

Students will learn to recognize the major signs and symptoms associated with childhood kidney disorders and participate in formulating management plans including dialysis and renal transplantation in both inpatient and outpatient settings.

During this elective, we expect that students will (1) be thoroughly familiar with assigned patients including an understanding of the pathophysiology of their disease processes; (2) achieve proficiency in performing urinalyses and interpreting laboratory studies of renal function; (3) meet with each of the faculty for tutorial sessions; and (4) give a brief (20-30 minute) presentation on a nephrology-related topic of interest to the student.

**PED-810 PEDIATRIC EMERGENCY MEDICINE** 4 credits. Modules A-K. Prerequisites: Senior medical student. Dr. Territo and Emergency Medicine attending faculty. Number of students: 1.

The purpose of this course is to give the student an opportunity to learn about the diagnosis and management of pediatric emergencies. The student will gain an understanding of the relationship between medical, surgical, and intensive care expertise necessary for the management of the pediatric emergency patient. Students will gain expertise with a wide variety of pediatric emergencies including trauma, toxicology, resuscitation, dehydration, acute respiratory disease, and others. Experience with common nonemergent acute pediatric illnesses and injuries will be given. Exposure to the prehospital care system and the Poison Control Center can be arranged.

Most of the student's experience will be gained by acting as the primary physician for patients in the Pediatric Emergency Department as part of the patient care team, along with residents, fellows, and faculty. Students may also spend time in the prehospital care environment, becoming acquainted with both ground and air transport, and in the Western New York Regional Poison Control Center. Lectures and small-group discussion will be offered to the senior student on an ongoing basis by faculty and fellows of the Division of Emergency Medicine, including child abuse, dehydration, trauma, toxicology, bacteremia, otitis media, status asthmaticus, status epilepticus, prehospital care, upper airway obstruction, and resuscitation. *Pediatric Emergency Medicine*, Williams and Williams, S. Ludwig, et al., editors, 1993, will be the primary course textbook and will be made available to the students in the Emergency Department.

By the end of the course, the student will have gained an ability to assess and manage (both cognitive and procedural skills) pediatric emergency patients.

**PED-814 PEDIATRIC HEMATOLOGY-ONCOLOGY** 4 credits. Modules A-M. Prerequisite: Senior medical student or third-year student who has successfully completed PED 700. Dr. Ambrusko and Hematology/Oncology attending faculty. Number of students: 2.

During this rotation, students will learn about the diagnosis and management of common hematological and oncological disorders in children, to interpret blood smears and to have a practical experience in evaluating frequently used hematology laboratory tests.

Students will attend various outpatient hematology/oncology clinics, located at the Roswell Park Comprehensive Cancer Center and Conventus building. The student will participate in general heme/onc clinics as well as multi-disciplinary clinics including
Sickle Cell clinic (qWed), Vascular Anomalies clinic (1 afternoon/month), Neuro-oncology clinic (1Wed/month), Neurofibromatosis clinic (1 Wed/month), and Survivorship clinic. Students will become familiar with outpatient chemotherapy, chronic transfusion therapy, and supportive and integrative therapies. The students will have the option to attend comprehensive pediatric clinic at the Hemophilia Center of WNY. Students have the option to participate in daily inpatient rounds with the attending physician. Students will be required to complete orientation and EMR training at Roswell Park prior to the rotation.

Following completion of the rotation, the students should be able to approach a hematological problem logically and to perform a hematologically oriented history and physical examination. They should be able to examine a blood smear methodically, diagnose morphologic abnormalities and interpret laboratory results for basic disorders. The student should also understand the basic mechanisms behind common laboratory procedures related to blood banking/chronic transfusion, special hematology, coagulation, hemoglobinopathies, and their application to clinical hematology, and understand the multisystem and psychosocial impact of hematological/oncological disorders such as sickle cell disease, hemophilia and leukemia.

**PED-816 GENETICS AND DYSMORPHOLOGY 4 credits. Modules A-M. Prerequisite: Senior medical student or third-year student who has successfully completed PED 700. Dr. Sadler. Number of students: 1.**

The goal of this course is to provide an opportunity for students to learn how the principles of human genetics relate to the diagnosis, management, and genetic counseling of individuals and families directly and indirectly affected by genetic disorders. Students will participate in the genetics outpatient setting where they will see patients with metabolic disorders, birth defects, syndromes, developmental disability as well as a number of other genetic concerns, many of which involve genetic testing/counseling. Trainees will also perform inpatient consults and be involved in the ongoing care of patients with metabolic disorders. A course syllabus is provided listing the monthly schedule, background information, and selected reading materials. In view of the unity of genetics as both a basic science and clinical discipline, this course provides an especially good opportunity to integrate basic science knowledge with clinical skills.

At the end of the course, students should be able to evaluate a genetic concern (e.g., fetal exposure to a possible teratogen or positive family history) or a patient with a birth defect or broader disorder by appropriately accessing the genetic literature and those aspects of the history, physical examination, and laboratory testing most relevant to medical genetics. Students will also gain more insight into the emotional and societal implications of genetic disorders.

**PED-818 SUBINTERNSHIP IN PEDIATRIC INTENSIVE CARE UNIT 4 credits. Modules A-M. Modules I-M open to third-year students. Full time, including nights and weekends. Contact departmental office for availability. Prerequisite: Senior medical student or third-year student who has successfully completed PED 700. Drs. Al-Ibrahim, Breuer, Hassinger, Heard, Hereth, and Kramer. Number of students: 1.**

The purpose of this rotation is to familiarize the student with the recognition and management of a variety of acute problems that present in the pediatric ICU patient.

The student will make initial evaluations of selected patients in the ICU, which will include the history, thorough chart review, physical examination, and discussion with the pediatric attending. He or she will follow these patients daily through their ICU course and be involved in bedside discussions of the pertinent clinical issues. When on call, the student will remain in the Intensive Care Unit overnight.

On completion of this rotation, the student should have developed sufficient diagnostic and management skills to be able to participate in the care of pediatric ICU patients.

**PED-819 PEDIATRIC ENDOCRINOLOGY AND DIABETES 4 credits. Modules A-M. Prerequisites: Senior medical student or third-year student who has successfully completed PED 700. Drs. Bethin, Buchlis, Gartner, Majumdar, and Mastrandrea. Number of students: 2.**

The objectives of this rotation are to give the students a broad experience in clinical pediatric endocrinology and diabetes and to teach them the requisite skills of history taking and physical examination pertaining to this specialty.

Students will participate in the care of patients seen in the two endocrine clinics and two diabetes clinics held each week. In addition to the ambulatory care of children with diabetes mellitus, the student will gain experience in a broad spectrum of endocrine problems, which include growth disorders, thyroid problems, gonadal and adrenal disease. Approximately 40 to 50 ambulatory endocrine patients and 20 to 30 diabetic patients are seen each week. A preclinic chart review is held once weekly with the staff of the Division of Endocrinology. Students will be responsible for assisting in the diagnostic and therapeutic care of all patients admitted by the Endocrine staff in addition to other hospitalized children for whom an endocrine consultation is requested. They will be provided with a bibliography of pertinent references and be assigned additional literature references, depending on the clinical problem. Students will attend clinical conferences and endocrine journal club, which are held weekly.
Upon completion of this rotation, students should have a thorough understanding of the relationship between pathophysiologic mechanisms and the endocrine disorders, which are commonly seen in childhood. These include hypopituitarism, thyroid dysfunction, ambiguous genitalia, early and late sexual maturation, adrenal and gonadal disorders. They also should understand the pathophysiology of insulin-dependent diabetes mellitus and its complications as well as treatment of the disease.

PED-820 AMBULATORY PRECEPTORSHIP IN GENERAL PEDIATRICS 4 credits. Modules A-K. Prerequisite: Senior medical student. Students must identify site before registering. Dr. Waz. Number of students: 5.

The goals of this rotation are to provide the students with exposure to the setting of a private pediatric practice and firsthand experience in providing primary care to pediatric patients.

The student will see well and sick pediatric patients under the direct supervision of a pediatric preceptor. The amount of student responsibility will at least include independently performing histories, physical examinations, and forming assessments of patients seen. The student may make hospital rounds with the pediatric preceptor and will have the opportunity to observe the various functional aspects of a private pediatric practice, e.g., telephone contacts, appointment schedules, the use of consultations, social agencies, etc.

With this rotation, students should gain a greater facility in working with parents and children in the ongoing process of providing care for well and sick children and adolescents. Students should gain some appreciation of the ways in which pediatricians serve patients and the community.

PED-825 SUBINTERNSHIP IN NEONATOLOGY 4 credits. Modules A-K. Contact departmental office for availability. Prerequisite: Senior medical student. Dr. Reynolds and Neonatology attending faculty. Number of students: 1.

The goal of the rotation is to introduce the student to the principles of newborn health care through a structured clinical experience as a subintern in the regional neonatal intensive care unit at Oishei Children’s Hospital.

The student, under constant supervision of Neonatology faculty and fellows, and senior pediatric residents, will function as the primary house staff assigned to a limited number of newborn patients admitted to the NICU. The student will participate in a team approach to the evaluation, diagnostic and therapeutic interventions of new admissions and with the team develop a differential diagnosis and plan of care. Continuing care of these high-risk neonatal patients will include ongoing assessments, nutritional, diagnostic and therapeutic management, discharge planning, communication with parents, consulting and primary care physicians and the entire neonatal health care team. The student will participate in daily attending teaching rounds and attend high-risk deliveries. The subintern will also attend the monthly perinatology, neonatal pathology and neonatal ethics conferences. It is anticipated that the subintern will take call with a neonatal fellow and resident or nurse practitioner every fourth night during the rotation.

The student will become proficient in physical examinations of premature and term high-risk infants and become knowledgeable of the clinical presentation and pathophysiology of common neonatal diseases. A major emphasis is for the student to be able to apply principles of critical care, including drug therapy, nutrition support, fluid and electrolyte therapy and respiratory support, in a team setting. Special skills such as neonatal resuscitation, endotracheal intubation and umbilical vessel catheterization will be acquired if experiences permit.

PED-828 NUTRITION/GASTROENTEROLOGY 4 credits. Modules A-M. Prerequisite: Senior medical student or third-year student who has successfully completed PED 700. Drs. R. Baker, S. Baker, Moya, and Nugent. Number of students: 1.

The objective of this rotation is to provide the student with an opportunity to evaluate gastroenterologic problems in children and adolescents, including specific diseases such as inflammatory bowel disease, brush border enzyme deficiencies, celiac disease, cystic fibrosis, neonatal hepatitis and chronic liver disease.

During this time, students will participate in consultation of patients at Oishei Children’s Hospital and in two outpatient clinic sessions per week. The students will have the opportunity to observe diagnostic procedures like liver and jejunal biopsies, colonoscopies and esophagastroduodenoscopies. The students will be introduced to pediatric problems requiring nutrition support and to the methods of delivering this sort of therapy. Students will participate in the weekly conference schedule including pathology conference, radiology conference and two clinical teaching conferences. They will be exposed to research in the field, to conventional treatment modalities as well as to those on the horizon.

PED-831 PEDIATRIC INFECTIOUS DISEASES 4 credits. Modules A-M. Prerequisite: Senior medical student or third-year student who has successfully completed PED 700. Drs. Gomez, Faden, Hicar, and Islam. Number of students: 1.

The purpose of the rotation in Pediatric Infectious Diseases is to provide an opportunity for students to gain a greater understanding of infectious diseases that occur in children.
The students will participate as members of the consulting team composed of an attending physician and a resident in Pediatrics. The major portion of teaching will emanate from daily rounds. With prior arrangements, this rotation can be tailored to the specific needs and desires of each student. For example, the students may elect to spend the entire time period in the laboratory, either assisting with ongoing research or initiating their own project.

Upon completion of the rotation, the students should be able to recognize and manage many of the infectious problems of children. They will also be better able to interpret laboratory studies that specifically pertain to infectious diseases.

**PED-834 PEDIATRIC PULMONARY DISEASE** 4 credits. Modules A-M. Prerequisite: Senior medical student or third-year student who has successfully completed PED 700. Drs. Sheehan, Goetz, and Wooldridge. Number of students: 1.

This rotation is designed to improve the student’s skills in the diagnosis, treatment, and follow-up of infants and children with acute and chronic pulmonary disease. Particular emphasis will be given to the physiological basis of pulmonary disease and modern diagnostic techniques, quality improvement and interprofessional healthcare delivery for cystic fibrosis, asthma, neuromuscular disease and other acute and chronic pulmonary diseases.

**PED-890 COURSE AT OTHER UNIVERSITY** 4 credits. Modules A-K. Prerequisites: Senior medical student. Prior permission for this elective must be obtained from the director of the medical student program in Pediatrics.

The goal of this rotation is to give students an opportunity to take an elective in Pediatrics at a university of their choosing, to either study a pediatric subspecialty area that is not available in Buffalo, or to participate in a department that they are considering for pediatric residency training. Students are encouraged to discuss plans for out-of-town electives with members of the Pediatric faculty.

**PED-950 RESEARCH IN PEDIATRICS** 4 credits. Modules A-K. Prerequisites: Senior medical student. Students must identify project and preceptor before registering. Number of students: 4. Contact Dr. Mark Hicar for available projects.

The objectives of the course are to give fourth-year students an opportunity to participate in an ongoing research program or perhaps initiate a research project of their own to be completed during the academic year.

Students' research experiences will vary according to the faculty mentor chosen. A spectrum of experiences ranging from laboratory-bench research to patient-centered prospective or retrospective studies are offered.

During the elective, students should acquire knowledge about the planning of a research project, the acquisition of data, the analysis of the data, the preparation of the findings for publication, and the appreciation of ethical issues in biomedical research. Because of the short time allotment, it is essential that students meet with faculty mentors to organize this rotation in advance.
DEPARTMENT OF PHARMACOLOGY AND TOXICOLOGY

The Department of Pharmacology and Toxicology in the School of Medicine and Biomedical Sciences (SMBS) aims to enrich the lives of our students through providing an excellent educational experience in Pharmacology: the science of the mechanism of action of drugs and other biologically active agents on living cells or organisms; and Toxicology: the study of the adverse effects of chemical, physical or biological agents on living organisms and the ecosystem.

The department offers an extensive program of formal and informal courses through the Division of Graduate and Professional Education to provide students with a broad training in basic areas of pharmacology as well as a degree of expertise in a selected research area. The department has four major research strengths: Neuropharmacology, Molecular Signaling and Signal Transduction, Neuroscience, and Toxicology. Consult the Graduate School Bulletin for a complete listing and description of graduate courses. A description of the elective courses in pharmacology and toxicology for medical students appears below.

Research Opportunities
Specific areas of research interest within the department include drug-receptor interactions, signal transduction mechanisms, discovery and synthesis of receptor-selective melatonin ligands for the treatment of circadian sleep disorders, depression, and cancer; behavioral pharmacology of psychoactive drugs; signaling mechanism of cardiac ischemia/reperfusion stress; signaling mechanisms in the induction of glial progenitors and role of in vivo models of central nervous system demyelination/remyelination; biomarkers of exposure to environmental chemicals; toxicology of halogenated aromatic hydrocarbons and organophosphate pesticides; design, synthesis and evaluation of inducers, substrates and inhibitors of drug metabolizing enzymes.

Pmy-601 Honors Pharmacology 2 credits, spring semester. Prerequisite: Permission of Course Director Required.

Course Director: Richard A Rabin, Ph.D. Number of students: open. Time and dates: TBA.

The objective of Honors Pharmacology is to enhance the student’s understanding of the scientific basis for the clinical use of drugs. This course will incorporate and integrate information on major drug classes presented in the preceding three semesters with knowledge of pharmacodynamic (e.g., mechanism of action), pharmacogenomic (i.e., effect of genetic differences in the response to a drug), toxicologic, and pharmacokinetic (e.g., absorption, distribution, metabolism, elimination) properties to explain therapeutic effects, clinical use, adverse effects, and contraindications of a drug. The Socratic method of teaching will be used with the faculty acting as facilitators in addressing the “Why, What, When, and How questions” regarding the use of drugs in a clinical setting.

Pmy 605 Introduction to Bioethics 1 credit, fall semester as scheduled. Prerequisite – First or Second Year Medical Student. Dr. Berman and staff. Number of students: 20.

Introduction to bioethics will employ short didactic lectures followed with Socratic discussion of current and perennial questions in medical bioethics with the goal of highlighting difficult problems in modern medicine. The reading material will come from textbooks, source materials available in medical and philosophy journals, and through the new website of the Center for Medical Humanities. Students will be graded on their participation (50%) and written (50%).

Pmy-650-0 Pharmacology Research 1-4 credits, fall, spring and summer semesters. Prerequisites/First- or second-year medical student and permission of instructor. Staff. Number of students: open.

Original investigation of a suitable research problem to be chosen according to the interest of the student under the supervision of the staff of the department. Descriptions of current research activities are available at http://medicine.buffalo.edu/departments/pharmtox

Pmy-950-0 Pharmacology Research 4 credits, Modules D-L. Prerequisite: Senior medical student or permission of OSAA and instructor. Staff. Number of students: unlimited.

Original investigation of a suitable research problem to be chosen according to the interest of the student under the supervision of the staff of the department. List of faculty and topics are available at http://medicine.buffalo.edu/departments/pharmtox
DEPARTMENT OF PHYSIOLOGY AND BIOPHYSICS

Research and Courses in Biophysics

Biophysical sciences are a group of subdisciplines in the biological sciences which apply the principles of physics, physical chemistry, and mathematics to the study of biological systems. Biophysical sciences encompass experimental biophysics, theoretical biophysics, and clinical biophysics.

Experimental biophysics is best known for its contributions to structural molecular biology (through X-ray and neutron diffraction, nuclear magnetic resonance, and other spectroscopic techniques), to the understanding of subcellular structure and subcellular material transport processes-biological membranes in particular (e.g., through electron microscopy and isotopic tracer methodology), and to the elucidation of the nature of biological sensors (e.g., visual or auditory receptors) and of electrochemical information transfer.

Theoretical biophysics includes a diversity of areas which provide a theoretical background to experimental biophysics. These range from thermodynamics (which are characteristic of living systems), stochastic kinetics (pertinent to detailed enzyme kinetics), modeling of biological systems (e.g., compartmental analysis and regulation and control theory of endocrine systems, communication and network theories of the nerve system), to quantum biochemistry and the theory of evolution of the genetic code.

Clinical biophysics comprises the physicochemical background for the development of different physical procedures and devices used for clinical diagnosis (e.g., X-ray and ultrasonic imaging, thermography, magnetic resonance imaging, electrocardiography, blood flow-rate measurement, or isotopic tracer methodologies). It also covers the background for physical techniques used in therapy (e.g., radiation therapy, laser surgery, extracorporeal electrical stimulation, controlled drug release devices) and quantitative analytical approaches to clinical situations (e.g., cost/benefit and decision analysis in clinical diagnosis). Clinical biophysics is also involved in the application of computers and miniprocessors in clinical procedures to the handling and interpretation of clinical analytical information, to the direct diagnosis of certain disorders, and to real time therapeutic feedback control systems.

The Department conducts active research in most of the areas cited and offers appropriate specialized courses in practically all of them. Graduate programs leading to either an M.S. or Ph.D. degree in Biophysical Sciences or combined M.D.-Ph.D. degrees are offered. They are described in the Graduate School Bulletin.

BPH-600 INDEPENDENT STUDY 1-3 credits, fall and spring semesters. Staff.

This course is tutorial in nature and is designed to meet the needs of the students. Thus, the goals, objectives, and expectations vary depending on the students.

BPH-601/602 BIOPHYSICS SEMINAR 1 credit, fall and spring semesters. Prerequisite-Permission of instructor. Dr. Slaughter and staff. Number of students: 15-30.

This course is intended to enhance graduate student appreciation of the scope of the biophysical sciences. A weekly seminar series is held on topics of current interest in a diversity of areas of biophysics. Seminars are presented by University at Buffalo faculty and prominent scientists from throughout the nation.

The student is expected to become familiar with the experimental protocols and current issues in biophysics.

Research and Courses in Physiology

Departmental research and graduate training interests in Physiology can be grouped into the areas listed below. These are not mutually exclusive; faculty members’ interests often cross these rather arbitrary divisions. Graduate programs leading to either an M.A. or Ph.D. degree in Physiology or combined M.D.-Ph.D. degrees are offered. They are described in the Graduate School Bulletin.

1) Neurobiology: Cytoskeletal involvement in packaging and transport of organelles in neurons and local protein synthesis in axons; Development of synaptic connections and the role of functional activity in formation and stability of connections; electrophysiological, behavioral, and anatomical analysis of visual information processing at cerebral cortical and subcortical levels in anesthetized and awake monkeys; Retinal physiology and synaptic neuroscience; Elucidation of the role of cell signaling molecules in the modulation of electrical properties of cells in the prefrontal cortex and basal ganglia; Elucidation of the mechanisms of neurodegenerative disorders using disease models in transgenic animals and Drosophila.

2) Gastrointestinal Physiology: Regulation of ion channels in intestinal epithelial cell membranes.
(3) **Pulmonary Physiology:** Alveolar gas exchange, tissue respiration, permeability of the lung to solutes and water, neural control of breathing, gas mixing in the lung, diffusion in the gas phase, liquid breathing, responses of the gas transport system to hypoxia, control of smooth muscle tone in pulmonary blood vessels and airways. Study of artificial blood substitutes.

(4) **Cardiovascular Physiology:** Dynamics of regulation of central and peripheral circulation, neural control of the circulatory system, electrical and mechanical activity of single cardiac cells, coronary blood flow, control of blood volume, regulation of cerebral blood flow, neurophysiology of cardiovascular mechano-receptors; Study of cardiac potassium channel function and localization using patch clamp and molecular biology techniques; Study of redox modulation of calcium and potassium channels; Study of stretch activated channels; Modeling of cardiac electrical activity.

(5) **Exercise Physiology:** Transient and steady-state responses of the cardiovascular system to terrestrial and aquatic exercise in man and animals.

(6) **Environmental Physiology:** Physiological and pathophysiological effects of unusual physical environments on cardiovascular, respiratory, and cellular functions. Includes effects of high pressure and immersion as in diving, low pressure and high and low gravitational forces as in flying and space travel, and temperature extremes. Studies are performed in human subjects, animals, and cellular systems. Associated areas of interest are protective gear and man/equipment interactions.

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**PGY-503 ADVANCED TOPICS: PHYSIOLOGY OF AGING** 3 credits; spring semester. Offered alternate years. Cross-listed as ES 555. Prerequisites--Undergraduate courses in anatomy and physiology, or consent of instructor. Course coordinators: Drs. Krasney/Gosselin and staff. Number of students: 50.

This lecture format graduate course will meet twice/week for 1 hour and 20 minutes. Three written exams (two hourly and a final) will be given for a total of 100% of the final grade.

The objectives of this course are to discuss the changes in the biological processes of various organ systems with the passage of time that result in an organism’s (i.e., humans) decreased ability to adapt to the environment. Although no text is required for the course, selected readings from current literature for each area will be assigned.

Topics include theories of aging, metabolism and body composition, cardiovascular function, respiratory function, muscle function, central and peripheral nervous system, sleep, bone, endocrine function, immune function, kidney function/pharmacokinetics, thermal regulation, gastrointestinal function, exercise and fitness, and reproduction.

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**PGY-505 CELL AND MEMBRANE PHYSIOLOGY** 4 credits; spring semester. Cross-listed as PGY-405 Prerequisites – calculus, cell biology (BIO201, BIO205) or consent of instructor. Course coordinator: Dr. Duffey and Parker. Number of students 8.

Basic principles underlying cell and membrane physiology. Emphasis will be placed on membrane excitability, ion channels and their modulation by cell signaling pathways.

This course addresses contemporary issues of biophysical principles underlying membrane physiology and membrane excitability and their modulation by cell signaling pathways. A corollary goal will be to understand experimental methods used in molecular physiology and biophysics. More specifically, students will be expected to understand the structure and function of different voltage-gated ion channels, different cell signaling cascades and how these different pathways modulate the properties of the different ion channels. Students will also be expected to understand the different approaches used to elucidate channel function, including biophysics, molecular biology, mutagenesis and genetics.

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**PGY-514 VISION** 4 credits; spring semester. Prerequisite-Permission of the course director. Dr. Slaughter. Number of students: 10.

This course is aimed at presenting a broad, interdisciplinary description of current topics in the visual sciences.

This is an introductory, wide-ranging course on vision, encompassing the anatomy, biochemistry, biophysics, and physiology of visual pathways in the retina and brain; the psychological analysis of perception; psychophysics; computer modeling of visual processes; and the engineering concepts underlying machine vision. Each topic is presented by a faculty member with research interests in that area.

Upon completion of this course, the student is expected to be familiar with the basic principles and areas of current interest in many fields of vision and be able to relate observations in one field to information obtained in other disciplines.

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**PGY-520/521 APPLICATION OF COMPUTERS TO PHYSIOLOGICAL PROBLEMS** 4 credits; fall and spring semesters. Prerequisite--Consent of instructor. Dr. Olczowka. Number of students: 30.
The course is designed to give the students experience in data acquisition and analysis. The students will have hands-on experience writing data acquisition programs using Hewlett-Packard VEE software as well as Excel macros using the Visual Basic language.

PGY-605/606 ADVANCED TOPICS IN CARDIOVASCULAR PHYSIOLOGY 2 credits; fall and spring semesters. Prerequisites--PGY-502, 551/552 or equivalent, and consent of instructor. Dr. Krasney and staff. Number of students: 20.

The purpose of this course is to provide an opportunity to analyze physiological regulatory processes in selected cardiovascular disease states. Topics for consideration include coronary artery disease, hypertension, congestive heart failure, valvular disorders, and congenital heart disease. The use of exercise as a physiologic stress and as a rehabilitation tool will be discussed.

The course format will involve informal lecture/discussion periods focusing on selected examples of cardiovascular pathophysiology through analysis of basic and clinical hemodynamic data.

At the conclusion of the course, the student should have acquired a broad understanding of cardiovascular mechanisms in health and in disease which will be valuable for an informed approach to cardiovascular medicine and research.

PGY-699 INDEPENDENT STUDY 1-6 credits (variable); by arrangement. Prerequisite--Consent of instructor. Staff. Number of students: 20.

The objective of this course is to give students an opportunity to acquire advanced experience in a specific area of research in physiology, either through original research or library projects. Students will be exposed to methods of research and data analysis and interpretation in a specific area of physiology. Students should gain advanced knowledge of a particular area in physiology, learn to analyze and interpret experimental results, and read the scientific literature critically.
The Department of Psychiatry teaches courses in behavioral science and psychiatry during three years of medical school. The curriculum consists of participation in Neuroscience and Behavior, The Psychiatry Clerkship and electives during the clinical years.

During Neuroscience and Behavior major psychiatric illnesses are taught with an emphasis on their etiologic and clinical presentations.

In the third year, the psychiatric clerkship enables students to expand and integrate psychiatric knowledge within a clinical setting. The clerk gains skills in psychiatric assessment, interviewing, comprehensive treatment planning, psychotherapy, and use of psychotropic drugs. During the clerkship, students gain experience treating patients with psychiatric difficulties in in-patient and out-patient settings.

Electives are offered in a wide variety of subjects, and provide students with intensive experience in selected areas of psychiatry. Fourth year electives enable students to select clinical and research experiences tailored to their particular interests.

The Department of Psychiatry draws upon the clinical facilities of many area hospitals and the expertise of its full-time and volunteer faculty to offer students a breadth of learning experiences.

NOTE: Contact departmental office for site location before registering. Medical students are only allowed to work 80 hours/wk.

**All electives are reserved for senior medical students only. A third year medical student may take an elective with completion of PTY700 and Departmental Permission. Please contact the Department of Psychiatry at 898-5896.**

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**PTY-700 PSYCHIATRY CLINICAL CLERKSHIP** 6 credits. Blocks 1-4. Contact departmental office for site location. Prerequisite: Junior medical student, Dr. Hernandez and staff.

The objectives of this clerkship are to introduce medical students to clinical psychiatry and enable them to acquire knowledge and skills through clinical experiences under faculty guidance.

Students will be assigned to Psychiatric Units at one of the area hospitals. They will be given responsibility for direct patient care under the supervision of attending psychiatrists and staff. In addition, they will gain experience in emergency psychiatry through night and weekend rotations at the CPEP at Erie County Medical Center. This six-week program includes lectures, seminars, and conferences on a variety of psychiatric subjects.

On the first day of each rotation students will receive an orientation to psychiatry and written material pertinent to the course, including lists of objectives and a bibliography of required and suggested readings. At the end of the course, a multiple-choice written examination will be given.

Upon completion of the clerkship, the students should be competent to evaluate and manage patients with major mental illness, should be able to interview patients skillfully, possess basic knowledge of psychopharmacology, be familiar with common problems at the psychiatric-medical interface, and be able to assess psychiatric emergencies.

**PTY-800 SUBINTERNSHIP IN GENERAL PSYCHIATRY** 4 credits. Modules A-M. Contact departmental office for site location. Prerequisite: Senior medical student and completion of PTY-700. Number of students: 2.

This rotation is offered to give students a variety of clinical experiences at Psychiatric Units of affiliated hospitals. It will involve direct patient care under the supervision of attending psychiatrists and residents and close teamwork with multidisciplinary staff. They will participate in all the clinical rounds of the floor and grand rounds of our department. Upon successful completion of this rotation, students should show competency in the following areas: performing psychiatric assessment and formulating a diagnosis and treatment plan, prescribing common psychotropic drugs and drug combinations, conducting supportive psychotherapy working in collaboration with a mental health team and community resources.

**PTY-801 CONSULTATION-LIASON PSYCHIATRY** 4 credits. Modules A-M. Availability varies per module. Prerequisite: Senior medical student and completion of PTY-700. Number of students: 1. Contact Leanne Hatswell, (898-5896) for availability information and registration.

Patients often present to their physician with psychiatric illness or emotional problems complicating their physical condition. The objectives of this course are to familiarize students with management of these patients and to help improve their sensitivity and diagnostic/treatment skills, regardless of practice specialty.

Upon completion, the student should be able to differentiate medical mimics of psychiatric illness, recognize the emotional and the physical components of a patient's condition, be familiar with the emotional reactions to physical illness and role of personality on this reaction, and develop and implement an appropriate treatment plan.
PTY-802 OUTPATIENT PSYCHIATRY 4 credits. Modules A-M. Availability varies per module. Prerequisite: Senior medical student and completion of PTY-700. Number of students: 1. Contact Leanne Hatswell, (898-5896) for availability information and registration.

The objectives of this rotation is to provide students with a more in-depth understanding of psychopathology and increased skill in evaluating and treating patients with a variety of psychiatric diagnoses in various outpatient settings.

This rotation includes time spent in individual sessions, groups, walk-in medication clinic, bipolar clinic, weekly case conference, grand rounds. In addition, there is flexibility in the rotation to include exposure to areas of special interest, including forensics, ACT team research and community mental health. Upon successful completion, students will have improved knowledge and skills in the following areas: (1) evaluating psychiatric patients with appropriate disposition; (2) the outpatient diagnostic interview; (3) psychopathology; (4) psychopharmacological therapy; (5) psychotherapy: individual and group.

PTY-810 EMERGENCY PSYCHIATRY 4 credits. Modules A-M. Prerequisite: Senior medical student and completion of PTY 700. Number of students: 1.

The objectives of this rotation are to teach students the clinical evaluation of patients in crisis, assessment of patients at risk for violence against self or others, and techniques of crisis interventions.

The student will evaluate patients who come to the Comprehensive Psychiatric Emergency Program at ECMC. The student's patient assessment and disposition will be reviewed by an attending psychiatrist. When appropriate, the student will follow patients for crisis intervention.

With successful completion of the course, the student should be able to assess patients in psychiatric crisis in terms of psychiatric diagnosis and contributing psychosocial stressors, assess violence potential, and form late treatment planning. In addition, the student will have mastered basic techniques of crisis intervention.

PTY-820 CLERKSHIP IN CHILD PSYCHIATRY-CLINICAL CHILD PSYCHIATRY 4 credits. Modules A-M. Contact departmental office for site location. Prerequisites: Senior medical student, completion of PTY 700. Number of students: 1

Must contact Leanne Hatswell (898-5896) to register.

The goal of this month is to familiarize students with what a child and adolescent psychiatrist does. This rotation provides a broad exposure to multiple child psychiatric settings.

The core experience involves the student as a participant-observer in a wide variety of in- and out-patient settings, including Children's Hospital, Division of Child and Adolescent Psychiatry (Outpatient Clinic and consult service), Western New York Children's Psychiatric Center, Erie County Medical Center (Adolescent Psychiatric Unit), Renaissance House (substance abuse), and multiple community sites. Students have the opportunity to work with all core faculty in the Division, while seeing a wide variety of patients and families as well as treatment modalities. The month can be tailored to accommodate specific interests of individual students. This should be discussed with Dr. Kaye prior to beginning the rotation. The clinical contact is augmented by scheduled teaching activities. At the completion of the month the student is expected to write a brief essay on a topic of interest.

Upon completion of the clerkship students will have learned what a clinical child and adolescent psychiatrist does on a day-to-day basis. The student will develop their skill in evaluating children/adolescents and will become familiar with current treatment modalities commonly utilized.

PTY-890 COURSE AT OTHER UNIVERSITY 4 credits. Modules A-M. Contact departmental office for site location. Prerequisite-Senior medical student. By permission of Dr. Hernandez (898-5896) and The Office of Medical Education. By arrangement with other university and Dr. Sergio Hernandez, Director of Medical Student Education in Psychiatry.

PTY-950 RESEARCH IN PSYCHIATRY 4 credits. Modules A-M. Contact departmental office for site location. Number of students: 8. 1. Must contact Leanne Hatswell (898-5896) prior to registration.

The goal is to introduce the student to one or several varieties of basic and clinical research and educational research approaches currently being used by departmental faculty members.

The student's experiences will vary with the specific project and faculty member. In general, the student will become directly involved on a continuing basis in a research project under the supervision of the faculty member. Depending on the project, activities may include one or more of the following elements: development of the rationale of the research; literature reviews; design of the study; data collection, reduction, and analysis; interpretation of results; preparation of a written report.

Upon completion, the students should have acquired facility in planning, executing, and integrating research relevant to psychiatry. In most cases, this will enable him or her to be a useful junior member of a research team. He or she should also have acquired an appreciation of the conceptual and technical complexity of rigorous research endeavors in areas of concern to psychiatry. Also open to freshman and sophomore medical students. Interested students should contact Leanne Hatswell 898-5896 for further information.
Fourth year students rotating through Radiation Medicine will be introduced to the principles of radiation physics, radiation biology, and clinical radiation oncology. They will be given exposure to multiple disciplines of oncology including head and neck oncology, thoracic oncology, lymphomas, sarcomas, pediatric malignancies, gastrointestinal cancers, breast cancer, brain tumor, genito-urinary cancers and procedures such as brachytherapy, gamma knife, radiosurgery, and total body irradiation. The student will rotate with different attending physicians and participate in patient evaluation, treatment simulation and planning, and tumor board discussions. The student may be given small assignments and will present a topic to the department. The rotation will be entirely based at Roswell Park Cancer Institute in the Department of Radiation Medicine.

This rotation will allow students to take an elective in Radiation Oncology at a University of their choosing to broaden their experience.

Students will have the opportunity to participate in an ongoing or independent research project with a faculty member in the Department of Radiation Oncology.
DEPARTMENT OF RADIOLOGY

The curriculum in radiology is wholly elective throughout the third and fourth years. Despite this, increasing numbers of students are enrolled in the various course offerings. It is hoped that the quality of the courses will encourage students to continue to elect some time in radiology.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Prerequisites</th>
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<tbody>
<tr>
<td>RGY-800</td>
<td>CLINICAL PRECEPTORSHIP IN DIAGNOSTIC RADIOLOGY</td>
<td>4</td>
<td>Open to third- and fourth-year medical students. Blocks 1a-4c and Modules A-M. Buffalo General Medical Center/Erie County Medical Center/Great Lakes Medical Imaging/Millard Fillmore Suburban/Okseh Children’s Hospital/ Vascular Interventional Associates at Buffalo Vascular Care: Drs. Drumsta, Marshall, and Shah. Roswell Park Cancer Institute: Dr. Laudico. Number of students: 3.</td>
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<tr>
<td>RGY-890</td>
<td>COURSE AT OTHER UNIVERSITY</td>
<td>4</td>
<td>Modules A-M. Contact departmental office to get registered. Prior approval is required. By arrangement with the other facility and the department of radiology. Prerequisite: Senior medical student. Number of students: 10.</td>
</tr>
<tr>
<td>RGY-950</td>
<td>RESEARCH IN RADIOLOGY</td>
<td>4</td>
<td>Modules A-M. Contact departmental office to get registered. Prior approval is required. By Arrangement with the other facility and the department of radiology. Prerequisite: Senior medical student. Number of students: 1.</td>
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Rehabilitation Medicine, also called Physical Medicine and Rehabilitation (PM&R), is the newest American Board of Medical Specialties certified field of medicine, which is concerned with the evaluation and management of patients with significant disabilities (whether they be congenital or acquired later in life) due to injury, chronic disease, or congenital abnormalities. This involves a major emphasis on enhancing the patient's ability to function in each of the various aspects of living. The techniques used include objective physician examination and functional assessment, the prescription and provision of therapy services, medication, injection techniques, adaptive equipment, patient training and modification of the environment. A multidisciplinary approach is used in which the physician works as the leader with a team of allied health professionals from the fields of rehabilitation engineering and durable medical equipment providers, orthotics (braces) and prosthetics makers, rehabilitation nursing, physical therapy, occupational therapy, speech pathology, psychology, social work, and rehabilitation counseling. In addition, community agencies and resources are utilized in an effort to return as many patients as possible to a meaningful and productive life.

Clinical training sites in Rehabilitation Medicine are located at the Erie County Medical Center, Buffalo General Medical Center, Women & Children's Hospital (each part of Great Lakes Health); Sisters Hospital, Kenmore Mercy Hospital, and Mercy Hospital (each part of the Catholic Health System); and the Veterans Administration Medical Center (VAWNY Healthcare System). The department at the Erie County Medical Center includes a multidisciplinary inpatient rehabilitation program which serves the seven counties of Western New York, the region's only Spinal Cord Injury Unit, and a head injury rehabilitation program. Various outpatient training practices exist in the fields of musculoskeletal medicine, pain management, spinal cord injury, brain injury (traumatic and non-traumatic) and pediatric rehabilitation. The preceptors are board-certified in their respective fields of Physical Medicine and Rehabilitation first and the subspecialty second.

Specific courses include a third-year elective (REM-823) and three fourth-year electives (REM-823, REM-890, & REM-950).

REM-823 PRACTICUM IN REHABILITATION MEDICINE 4 credits. Modules A-K. Prerequisite: Junior or Senior medical student. Dr. Thomas Polisoto. Number of students: 1

The goals of this course are: (1) to orient the student to the concept of rehabilitation; (2) to provide clinical experiences in the diagnostic techniques (such as electromyography) and therapeutic approaches utilized in the management of various impairments and functional limitations (such as stroke, head injury, spinal cord injury, loss of a limb, and musculoskeletal injuries to the neck, back, or extremities); and (3) expose students to the fundamentals of performing a neuromusculoskeletal examination.

To accomplish these goals, the students are assigned selected cases at the rotation site. The students work closely with the attending staff physiatrists and allied field therapists. They are required to participate in daily rounds, electrodiagnostic procedures, clinics, clinical case conferences, and weekly lectures in an individual one on one approach. In addition, clinical time is devoted to experience in an ambulatory musculoskeletal medicine practice, pain management practice, and/or pediatric rehabilitation clinic. Depending on the student interests one or more days, up to one week, in a specific field of PM&R practice.

Following completion of this course, each student is expected to be able to handle common physiatric problems at the primary care level and to have acquired proper concepts of various electrodiagnostic and joint, soft tissue and Botox injection procedures.

Specific requests for informal, noncredit shadowing of PM&R physicians in the Buffalo area, in the practice of the various general or subspecialty practices of PM&R, are available by contacting Dr. Polisoto and discussing your specific interest. After analyzing your needs and interests with you on a individual basis, he will then arrange the opportunity for the learner from as little as one half-day to as much as multiple days/weeks of individual one-on-one mentoring/tutoring.

REM-890 COURSE AT OTHER UNIVERSITY 4 credits. Modules: A-K. Prerequisite: Senior medical student. Number of students: 1

By arrangement with other university departments at other ABMS / AAPMR certified PM&R Residency training sites.

REM-950 RESEARCH IN REHABILITATION MEDICINE 4 credits. Modules: A-K. Prerequisite: Senior medical student or permission of OSAA and instructor. Number of students: 1
By arrangement with Dr. Thomas Polisoto. Students will have an opportunity to work with a faculty member mentor on a rehabilitation research project, primarily at the Center for Functional Assessment Research at UDS (Uniform Data Systems at UB), but may be arranged at a major center for rehabilitation research in academic rehabilitation departments at select universities in the United States. Prior research in a formal research project is required with some basic knowledge of research techniques.
**DEPARTMENT OF SURGERY**

The Department of Surgery aims to prepare all students to recognize and manage minor surgical problems, evaluate surgical emergency situations, and understand the presentation and evaluation of the common surgical problems. The experience in the wards, clinics, and operating rooms is designed to allow the learner to master some of the basic clinical skills found in surgery.

The teaching program is carried out in seven hospitals. All surgical services are affiliated with the School of Medicine and Biomedical Sciences. On the clinical services the learner follows individual cases and works with the resident and attending staff. In the senior internships, the learner gains more clinical focus and acumen by engaging in an intensive clinical experience. The learner is assigned responsibility commensurate with his or her knowledge and experience.

*SUR-700 SURGERY AND SURGICAL SPECIALTIES CLERKSHIP 8 credits. Blocks 1-4. Prerequisite--Junior medical student. Dr. Molly Moore, Clerkship Director*

The Department of Surgery will prepare all student-learners to recognize and manage minor surgical problems, evaluate surgical emergency situations, and understand the presentation and evaluation of common surgical problems. The educational experience is designed to allow the learner to master the basic clinical skills found in Surgery.

The clinical education program is carried out in seven hospitals / surgical services affiliated with the School of Medicine and Biomedical Sciences. During the Clerkship in the Surgical Sciences, the student-learner will acquire the basic surgical skills required of any physician. He/she will participate in the student-credentialing program and attend a series of conferences that are designed to emphasize the interplay of anatomic, physiologic, and pathologic factors responsible for surgical disease. On the clinical services, the learner follows individual cases and works with the resident and attending staff. The learner is assigned responsibility commensurate with his/her knowledge and experience.

The didactic experience in surgery is 12 weeks in length and the primary responsibility of students during the entire 12-week module is Surgery. The clinical experiences in General Surgery are offered for eight weeks total: four weeks at one of two inpatient sites (BGMC and ECMC) and four weeks preceptor rotation from the following: BGMC, ECMC, MFSH, MHB, RPCI, SCH, VAWNYHS, and WCHOB. These are intense inpatient experiences with intraoperative experience, ward assignments, ambulatory experience, required night call, student credentialing, and conference attendance. Each site may also have an ambulatory component in which the student learner will participate in the evaluation of patients in the clinic/office setting. The remaining four weeks may be used for Surgery 800 or for another approved elective. Surgery 700 will take priority over any electives. All students will be required to participate in all mandatory surgical activities for the entire 12-week clerkship. These include orientation, skills lab, didactics, case conferences, grand rounds, the surgical conferences at the hospital to which he/she is assigned, testing sessions and the exit interview. In addition, student-learners are expected to read and master the assigned textbook.

The Department assigns a grade according to the academic status policies of the School of Medicine and Biomedical Sciences. Grades are based on completion of the basic, mandatory components including attendance and presentation at the Student Case Conferences, completion of all credentialing documents, completion of required procedures, attendance at all required conferences, clinical evaluations, and testing.

*SUR-800 SURGICAL SPECIALTIES 4 credits. Blocks 1-4/Modules A-K. Prerequisite--Junior or Senior medical student. Dr. Molly Moore, Clerkship Director*

This module in surgical specialties includes experience in both hospital and clinic based surgery. The clerkship is 4 weeks in length and includes two different 2-week rotations in the choices of Anesthesiology, ENT, Neurosurgery, Ophthalmology, Orthopedic Surgery, or Urology. [Note: Ophthalmology is not offered in Blocks/Modules 1a/A or 1b/B as they do not take students those modules.]

The goal of this experience is to prepare the learner for the practice of medicine by offering an experience in the scientific basis of surgical practice and exposure to a range of surgical specialties. In this course, the learner will increase their working knowledge of the clinical practice of surgery and surgical subspecialties. The learner will be able to apply this knowledge to the patient’s complaints and design therapeutic plan.

Direct patient contact is through participation in hospital rounds, clinical practice, office practice and participation in seminars. At the onset of the course, each student is provided with a course syllabus describing the objectives and expectations (Goals Statements). Small numbers of students are assigned to the surgical specialty services. The students are expected to attend the surgical conferences at the hospital to which they are assigned. They are expected to reach and master any assigned texts and handouts.

The Student Evaluation and Education Committee assigns the grade according to the academic status policies of the School of Medicine and Biomedical Sciences. Grades for the clerkship are based on completion of defined goals and clinical evaluations.
SUR-801 SUBINTERNSHIP IN TRAUMATOLOGY 4 credits. Modules A-K. NOTE: An "E" after the module in the Class Schedule indicates the Erie County Medical Center as the site. Prerequisite- Surgery 700. Dr. W. Alan Guo. Number of students: 1

The goals of the rotation are to give students a fundamental background in the principles of management of the patient suffering major trauma. Students will be assigned to a Trauma Team at the Erie County Medical Center and become an integral part of that patient care team. They will be involved in the examination and care of trauma patients from the time of their admission via the Emergency Room throughout their hospital course to discharge and in-clinic follow-up after discharge. After exposure to this course, students should have acquired the perspective concerning the proper priorities in management of major trauma as well as the interpretation of the evidence from clinical and laboratory findings suggesting the proper course of management. All are integrated into the health care team and serve as subinterns with night call responsibilities.

The Student Evaluation and Education Committee assigns the grade according to the academic status policies of the School of Medicine and Biomedical Sciences. Grades for the clerkship are based on completion of defined goals and clinical evaluations.

SUR-803 SUBINTERNSHIP IN PEDIATRIC SURGERY 4 credits. Modules A-K. NOTE: A "C" after the module in the Class Schedule indicates the Women & Children’s Hospital of Buffalo as the site. Prerequisite-Surgery 700. Dr. Kaveh Vali. Number of students: 1

The Subinternship in Pediatric Surgery is designed for students who have a career interest in surgery, pediatrics, pediatric surgery or any other pediatric subspecialty. The goal of this internship is to familiarize students with the management of surgical diseases in children. It is offered at the Women & Children's Hospital of Buffalo. Particular emphasis is placed on pediatric trauma, oncology, and abdominal emergencies. Exposure to the care of children will occur in the wards, emergency rooms, operating room, and clinic. All are integrated into the health care team and serve as subinterns with night call responsibilities. All students are required to attend Department of Surgery Grand Rounds and Pediatric Surgery Grand Rounds. Upon completion of this internship the student will have developed a methodological approach to the diagnosis and treatment of inpatient and outpatient pediatric problems.

The Student Evaluation and Education Committee assigns the grade according to the academic status policies of the School of Medicine and Biomedical Sciences. Grades for the internship are based on completion of defined goals and clinical evaluations.

SUR-805 SUBINTERNSHIP IN VASCULAR SURGERY 4 credits. Modules A-K. Prerequisite-Surgery 700. Dr. Linda Harris. Number of students: 1 (BGMC)

The goal of the Subinternship in Vascular Surgery is to enable the student to develop a proficiency in the approach to and management of many surgical and medical vascular diseases. This internship is designed for a student who has developed a career interest in vascular diseases including the medical management of vascular disease and general or vascular surgery. You will be assigned to one of the participating hospitals. The student will become competent in interpreting angiograms, performing several diagnostic and therapeutic procedures, and managing patients pre- and postoperatively.

Students will workup new patients, participate in consultations, and under-take procedures. All are integrated into the health care team and serve as subinterns with night call responsibilities. Students will assist during noninvasive diagnostic procedures and operations. The student will actively participate in the vascular laboratory and become familiar with noninvasive vascular diagnostic techniques. All students are required to attend Department of Surgery grand rounds and Thursday vascular conference. Each will participate in night call with the health care team.

Upon completion of the internship, the students will have developed a methodological approach to the diagnosis and treatment of a wide range of vascular diseases. The student will feel confident in interpreting invasive and noninvasive diagnostic procedures, carrying out several diagnostic procedures, and understanding a broad spectrum of operative procedures as well as pre- and post-operative care.

The Student Evaluation and Education Committee assigns the grade according to the academic status policies of the School of Medicine and Biomedical Sciences. Grades for the clerkship are based on completion of defined goals and clinical evaluations.


The goal of the Sub-Internship in Minimally Invasive Surgery (MIS) is to enable the student to develop a proficiency in the approach to and perioperative management of advanced GI surgery with a major focus on foregut and bariatrics though other
pathology including endocrine and adrenal are often encountered. It is offered at the Buffalo General Medical Center and the student will be placed on the Gold service but will work with all four principal attendings (Drs. Posner, Hoffman, Butsch, & Schwitzberg) as well as the MIS fellow. This advanced internship is designed for a student who has developed a career interest in surgery, robotics, bariatics, endocrinology or nutrition. It is designed as a tutorial in the strategies of decision making and management of the bariatric patient population as well as surgical diseases of the lower esophagus, hiatus and endocrine organs of the abdomen. The course covers the preoperative assessment, intraoperative techniques and post-operative care of the diverse patient population cared for by the MIS service at BGMC. The students will work closely with the residents, fellow and attending staff. All are integrated into the health care team and serve as sub-interns.

All students are required to attend Department of Surgery grand rounds, M&M conferences, and any multidisciplinary conferences as assigned by the faculty and will include presentations. There is no in house night call requirement but at home call is expected. Upon completion of this sub-internship, the student will have acquired a variety of diagnostic and therapeutic skills as well as the cognitive knowledge to care for a broad range of patients and pathologies cared for by the minimally invasive surgery service at BGMC.

The Student Evaluation and Education Committee assigns the grade according to the academic status policies of the School of Medicine and Biomedical Sciences. Grades for the internship are based on completion of defined goals and clinical evaluations.

**SUR 807 SUBINTERNSHIP IN BREAST OR HEAD AND NECK SURGICAL ONCOLOGY** 4 credits. Modules A-K.

**Prerequisite--4th year Medical Student or Surgery 700.** Dr. Kazuaki Takabe (RPCI Breast [Rb]) or Dr. Megan Lautner (BGMC-Breast [Bb]) / Dr. Hassan Arshad (RPCI Head & Neck [Rh]) or Dr. Mark Burke (ECMC 'Reconstructive Surgery & Head & Neck Cancer' [Eh]). Number of students: 1 (one in each)

The goal of the Subinternship in Surgical Oncology is to enable the student to develop a proficiency in the approach to and management of Breast or Head and Neck disease. This internship is designed for a student who has developed an interest in breast or head and neck disease. It is offered at the Roswell Park Cancer Institute (for RPCI-Breast & RPCI-Head and neck), Buffalo General Medical Center (for BGMC-Breast), and Erie County Medical Center (for ECMC-Head & Neck). The student will become competent in interpreting diagnostic studies, performing several diagnostic and therapeutic procedures, and managing patients pre- and postoperatively. All are integrated into the health care team and serve as subinterns. When feasible students may choose one of two divisions: Breast or Head & Neck Surgery, as well as choosing site when feasible.

Students will work-up new patients, participate in consultations, and undertake procedures. Students will assist during diagnostic procedures and operations. The student will actively participate in various oncology conferences and rounds. Upon completion of the subinternship, the students will have developed a methodological approach to the diagnosis and treatment of a wide range of malignant diseases. The student will feel confident in interpreting diagnostic procedures and understanding a broad spectrum of operative procedures as well as pre- and postoperative care.

The Student Evaluation and Education Committee assigns the grade according to the academic status policies of the School of Medicine and Biomedical Sciences. Grades for the internship are based on completion of defined goals and clinical evaluations.

**SUR 808 SUB-INTERNSHIP IN THORACIC SURGERY.** 4 credits. Modules A-K. **NOTE: Prerequisite--4th year Medical Students.** Dr. Sai Yendamuri. Number of students: 1.

The goal of the Sub-Internship in Thoracic Surgery is to enable the student to develop a proficiency in the approach to and management of Thoracic disease. This internship is designed for a student who has developed an interest in both benign and malignant diseases of the lung, esophagus, mediastinum and thorax. It is offered at the Roswell Park Cancer Institute. The student will become competent in interpreting diagnostic studies, performing several diagnostic and therapeutic procedures, and managing patients pre- and postoperatively. All are integrated into the health care team and serve as subinterns.

Students will work-up new patients, participate in consultations, attend multidisciplinary meetings related to patient care and assist in procedures both in and out of the operating room at the discretion of the faculty. Students will assist during diagnostic procedures and operations. The student will actively participate in various oncology conferences and rounds. Upon completion of the sub-internship, the students will have developed a methodological approach to the diagnosis and treatment of a wide range of malignant diseases. The student will feel confident in interpreting diagnostic procedures and understanding a broad spectrum of operative procedures as well as pre- and postoperative care.

The Student Evaluation and Education Committee assigns the grade according to the academic status policies of the School of Medicine and Biomedical Sciences. Grades for the internship are based on completion of defined goals and clinical evaluations.

The goal of the Sub-Internship in Transplant Surgery is to enable the student to develop a proficiency in the approach to and perioperative management of the solid organ transplant patient population. This advanced internship is designed for a student who has developed a career interest in surgery, transplant, nephrology, endocrinology, medicine or immunology. The course allows the student learner to evaluate renal and pancreatic patients in the pre-transplant assessment clinic, the perioperative area, intraoperative transplantation including donor organ recovery, and the postoperative and long term care of this complicated patient population. Diabetes management, renal failure management including issues related to dialysis and access are all central to the transplant surgery mission. This service involves true multidisciplinary care including pharmacy, nephrology, nutrition, nursing, social work, critical care and more. The students will work closely with the attending staff with few competing learners. They will be integrated into the health care team and serve as sub-interns.

All students are required to attend Department of Surgery grand rounds, M&M conferences, and any multidisciplinary conferences as assigned by the faculty and will include presentations. There is no in house night call requirement but at home call is expected. Upon completion of this sub-internship, the student will have acquired a variety of diagnostic and therapeutic skills as well as the cognitive knowledge to manage the patients and pathologies cared for by the Transplant Surgery Service at ECMC.

The Student Evaluation and Education Committee assigns the grade according to the academic status policies of the School of Medicine and Biomedical Sciences. Grades for the internship are based on completion of defined goals and clinical evaluations.

SUR-818 SUBINTERNSHIP IN SURGICAL INTENSIVE CARE 4 credits. Modules A-K. NOTE: Prerequisite--4th year Medical Students.
Dr. William Flynn. Number of students: 3-4

The goal of the Sub Internship in Surgical Intensive Care is to enable the student to develop a proficiency in the approach to and perioperative management of a variety of surgical diseases. This advanced internship is designed for a student who has developed a career interest in the care of the critically ill patient. It is designed as a tutorial in the strategies of decision making and monitoring of physiology in acutely ill patients. The course covers the principles of nutritional support, fluid resuscitation, mechanical ventilation, and cardiorespiratory support. The students will work closely with the resident and attending staff. All are integrated into the health care team and serve as subinterns with night call responsibilities.

All students are required to attend Department of Surgery grand rounds, Thursday critical care conference, and student case conferences. Each student must submit and present a clinical paper. Each will participate in night call with the health care team. Upon completion of this internship, the student will have acquired a variety of diagnostic and therapeutic skills as well as the cognitive knowledge to care for the critically ill patient.

The Student Evaluation and Education Committee assigns the grade according to the academic status policies of the School of Medicine and Biomedical Sciences. Grades for the internship are based on completion of defined goals and clinical evaluations.

SUR-820 PRECEPTORSHIP IN SURGERY 4 credits. Modules A-K. Contact coordinator with arranged preceptor, location, & goals. Prerequisite-Senior medical student or permission of OSAA and instructor. Requires permission of coordinator to register. Dr. Molly Moore. Number of students: 4

This course is designed to increase a student's clinical experience in surgery. Preceptorships are available in all of the clinical disciplines of surgery. Requests for this elective must be accompanied by a letter of support from a sponsoring faculty member. Students signing up for this course must discuss their faculty assignment and intended program with the department course coordinator in advance of taking the course.

SUR-890 COURSE AT OTHER UNIVERSITY 4 credits. Modules A-K. Contact department prior to registration. Prerequisite-Senior medical student. Dr. Molly Moore. Number of students: unlimited.

Requests for a clinical or research experience in surgery at another university are submitted to the department's course coordinator for the approval of the course director (University at Buffalo). The request should be accompanied by a short description of the proposed course and the identity of the responsible faculty member.

SUR-950 RESEARCH IN SURGERY 4 credits. Modules A-K. Contact coordinator with arranged preceptor, location, & goals. Prerequisite-Senior medical student or permission of OSAA and instructor. Dr. Molly Moore. Number of students: 4

A research experience is available with many different members of the faculty. The purpose of the elective is to introduce the student to the scientific atmosphere of the surgical sciences. There are many different projects available, and each has its specific requirements. However, all of the projects involve the surgical preparation of the research model, the measurement of the
experimental variables, and the assessment of the data. The student has the opportunity to acquire an understanding of experimental design and the methods for evaluation of the experimental data. All requests for this elective must be presented to the course instructor with a letter of support from the sponsoring member of the faculty and a description of the research project. A student requesting a research experience must file all pertinent information with the Department of Surgery's coordinator prior to registering for the course.
DEPARTMENT OF UROLOGY

The Department of Urology conducts a comprehensive program in undergraduate, graduate, and postgraduate medical education. These academic endeavors are directed towards clinical and research activities, emphasizing correlates between basic sciences and clinical problems. Clinical facilities of the following hospitals are utilized for these activities: Buffalo General Medical Center, Women & Children's Hospital of Buffalo, Erie County Medical Center, Millard Fillmore Suburban Hospital, Roswell Park Cancer Institute, and the VA Western New York Health Care System.

The goals of a rotation through Urology are to familiarize students with the principles of diagnosis and management of common Urologic disorders. Students are integrated as fully participating members of the Urology team at the individual institution to which they are assigned. Students, therefore, participate in clinical rounds, the diagnostic evaluation of patients, operative procedures and clinics. It is anticipated that students will develop skills in the evaluation of imaging studies and gain an introduction to the various diagnostic techniques, including endoscopy, sonography, CT scans and MRI.

The common goals of each of the rotations listed below are as follows: Students will be integrated as fully participating members of the Urology team at the institution to which they rotate. Students will participate in clinical rounds, operative procedure, patient evaluations, clinics and post-operative care, and will be expected to attend all departmental-wide teaching and clinical conferences and rounds, as well as those conferences specific to their particular institution. During their rotation, the students are encouraged to correlate clinical with pathologic findings. At the conclusion of the rotation it is anticipated that students will have developed an understanding of the various domains of Urology and to become familiar with at least the initial stages of a Urologic evaluation.

URO-800 SUBINTERNSHIP IN CLINICAL UROLOGY 4 credits. Any Module during 3rd year or Modules B-L. Prerequisite—3rd or 4th year medical student or permission of OSAA and Dr. Danforth. Number of students: 2.

This rotation (Urology 800, Sub internship in Urology) provides diverse experience in all of the domains of adult urology, and reflects the spectrum of urologic conditions.

In order to register, students must enroll in Urology 800 which is based at the Buffalo General Medical Center. Students will be contacted by Dr. Danforth, Program Director, with instructions about their rotation assignments. Please direct questions to Dr. Danforth at danforth@buffalo.edu or by telephone at (716) 859-2212.

URO-890 COURSE AT OTHER UNIVERSITY 4 credits. Modules B-L. Prerequisites--senior medical student.

By arrangement with other university and chairman of Department of Urology.

URO-950 RESEARCH IN UROLOGY 4 credits. Modules B-L. Prerequisites--senior medical student or permission of OSAA and instructor.

Students may have an opportunity to work with a faculty member on a research project.