

# School of Medicine

## Welcome to the IU School of Medicine

### Health Professions Programs Bulletin!

The Indiana University School of Medicine Health Professions Programs offer degrees and course work in the following areas:

Clinical Laboratory Science, B.S.  
Cytotechnology, B.S.  
Emergency Medical Services+  
Histotechnology, Certificate & A.S.  
Medical Imaging Technology, B.S.  
Nuclear Medicine Technology, B.S.  
Paramedic Science, A.S.  
Radiation Therapy, B.S.  
Radiography, A.S.  
Respiratory Therapy, B.S.

+EMT-Basic Course Open to all IUPUI students

These programs are housed within appropriate clinical departments in the Indiana University School of Medicine but are collectively called the Health Professions Programs (HPP).

The IU School of Medicine Health Professions Programs are committed to the excellent quality preparation of health personnel who have a concern for the well-being of the people they serve. The programs integrate teaching, research, and service through the efforts of their faculty and student. This integration results in high-quality programs that have a significant positive impact on health care.

### Health Professions Programs (A.S. and B.S. Programs)

Medical Library/Research Building (IB)  
Ruth Lilly Medical Library, IB 310  
975 W Walnut  
Indianapolis, IN 46202

(317) 278-4752

[askhpp@iupui.edu](mailto:askhpp@iupui.edu)  
<http://medicine.iu.edu/hpp>

For information regarding other degree programs within the IU School of Medicine:

### Medical School Admissions (M.D. Program)

Fesler Hall, Room 213  
1120 South Drive  
Indianapolis, IN 46202

(317) 274-3772

[inmedadm@iupui.edu](mailto:inmedadm@iupui.edu)  
<http://medicine.iu.edu/admissions>

### IU School of Medicine Graduate Division (M.S. and Ph.D. Programs)

Van Nuys Medical Science, Room 207  
635 Barnhill Drive  
Indianapolis, IN 46202

(317) 274-3441

[biomed@iupui.edu](mailto:biomed@iupui.edu)

<http://grad.medicine.iu.edu>

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## Overview

The Indiana University School of Medicine Health Professions Programs offer degrees and course work in clinical laboratory science, cytotechnology, emergency medical services, histotechnology, medical imaging technology, nuclear medicine technology, radiation therapy, radiography, and respiratory therapy. These programs are housed within appropriate clinical departments in the School of Medicine but are collectively called the Health Professions Programs (HPP). Other degrees in the health professions are offered on the IUPUI campus through the IU School of Dentistry, IU School of Nursing, and the IU School of Health and Rehabilitation Sciences.

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## Directory

### Health Professions Programs Administrative Office

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### Department of Pathology and Laboratory Medicine

#### Clinical Laboratory Science (B.S.)

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Indianapolis, IN 46202-4108

### Department of Radiation Oncology

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### Department of Radiology & Imaging Sciences

#### Radiography (A.S.) Medical Imaging Technology (B.S.) Nuclear Medicine Technology (B.S.)

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### Division of Pulmonary and Critical Care Medicine

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## Vision & Mission

**Vision** The vision of the Indiana University School of Medicine Health Professions Programs is to be a nationally recognized leader in health professions education, research, and service, while preparing an array of high-quality health care professionals in Indiana.

**Mission** The Indiana University School of Medicine Health Professions Programs have a long tradition of academic excellence. The major purpose of the Health Professions Programs is to provide quality degree programs in the health professions to meet the needs of the people of the state of Indiana. In fulfilling their fundamental purpose, the Health Professions Programs seek to develop and maintain a scholarly and competent faculty capable of achieving the following goals:

- To build upon sound principles of general education by preparing students to communicate effectively, exhibit quantitative skills, think critically, integrate and apply knowledge, exhibit intellectual depth and breadth, be intellectually adaptive, appreciate societal and cultural diversity, and apply ethical standards and values to professional practice.
- To provide undergraduate degree programs that offer education related to the provision and management of health services by the various health professions.
- To contribute to the advancement of knowledge through research.
- To provide continuing education for health professions practitioners wishing to further their career development.
- To foster the development of lifelong habits of scholarship and service among faculty and students.

In addition to the mission of the collective programs, each program has its own mission statement, which can be found on the web site devoted to the program or in the brochures produced by individual programs. Please see the appropriate web site or contact individual programs for further information.

Last Updated: February 6, 2012

## Purpose & Philosophy

### Purpose

The Indiana University School of Medicine Health Professions Programs are charged with providing undergraduate health professions education on the Indiana University Purdue University campus in Indianapolis (IUPUI). These programs prepare health professionals to provide diagnostic and therapeutic patient care. As part of a major university, the programs accept and fulfill four major responsibilities, by providing (1) opportunities to acquire a sound basic education in the undergraduate health programs offered through the School of Medicine and to foster the development of lifelong habits of scholarship and service; (2) advancement of knowledge through research; (3) continuing education programs aimed at maintaining and improving the competence of those health professionals engaged in patient care or supportive health services; and (4) multiple services to the people of the state of Indiana in these health professions.

### Philosophy

The Indiana University School of Medicine Health Professions Programs are committed to the excellent quality preparation of health personnel who have a concern for the well-being of the people they serve. The programs integrate teaching, research, and service through the efforts of their faculty and students. This

integration results in high quality programs that have a significant positive impact on health care.

Each program offered provides the health professions student with an opportunity to develop expertise, scientific knowledge, and professional attitudes that will enable the student to contribute to the health of society and obtain career satisfaction. The programs adhere to specific professional guidelines or standards and are designed in collaboration with the appropriate accrediting bodies. All curricula are based upon a foundation in the liberal arts and sciences, which is essential for an informed and productive life.

The faculty believe that the education of health professions personnel follows a coordinated and logical interdisciplinary process based on a core body of knowledge germane to health professions practice. By sharing experiences related to a variety of activities, the student is introduced to others who have both common and unique educational interests. Appreciation of the contribution of each health discipline and interaction with peers and scholars in different health professions encourage the coordination of health planning, health services, disease prevention, and health promotion.

Education is perceived by the faculty as an evolving and continuing process toward an increased ability to think, reason, and judge that leads to a satisfying and self-disciplined life. Effective education allows for individual difference and is provided in a participative atmosphere. The faculty believe that freedom of choice and meaningful assimilation of facts nurture the development of the students, enhance their understanding of patients' problems, and promote a dedication to lifelong self-evaluation and self-education.

Faculty of the School of Medicine Health Professions Programs are fully qualified in their fields of expertise and hold appropriate degrees and certification or licensure. In implementing the objectives of their academic programs, they strive to keep their professional and teaching competencies current. The faculty are committed to preparing uniquely qualified personnel who must meet the challenges of the complex and ever-changing health care needs of society.

The graduates of Health Professions Programs should be prepared to apply the knowledge they have attained in their selected discipline. Graduates have a responsibility to maintain competency through formal and informal continuing education and to contribute to new knowledge in their discipline. Graduates have legal, moral, and ethical responsibilities to their employers, patients, and the public and are expected to participate in community and professional activities.

This statement of philosophy forms the core of values from which the Health Professions Programs vision, mission, objectives, policies, and procedures are derived.

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## History of Current Degree Programs

All Indiana University School of Medicine Health Professions Programs were formerly part of the IU School of Allied Health Sciences. On July 1, 2002, eight programs were moved back to the IU School of Medicine as part of a restructuring of the new IU School of Health and

Rehabilitation Sciences, which moved toward a graduate school model. One additional undergraduate program moved on January 1, 2004, to complete the restructuring of the undergraduate programs.

The former IU School of Allied Health Sciences was first established as a division in 1959 by action of the Trustees of Indiana University. In 1960, the trustees conferred upon the faculty of the IU School of Medicine the responsibility and authority to grant the Bachelor of Science degree to those students successfully completing the prescribed curriculum in four allied health programs that had been offered long before the establishment of the division. Since that time, additional degree programs were approved and initiated. In June 2003, the IU School of Allied Health Sciences was renamed the IU School of Health and Rehabilitation Sciences.

**History of the IU School of Medicine** The Indiana University School of Medicine (IUSM) was founded in 1903, and its first students were enrolled on the Bloomington campus. It was the fourth medical school in the United States, after Johns Hopkins, Harvard, and Western Reserve, to require two or more years of collegiate work for admission. The school awarded the Doctor of Medicine (M.D.) degree to its first class of 25 in 1907. Following the union in 1908 of all medical schools in the state within Indiana University, the General Assembly of the State of Indiana, mandated, in 1909, that Indiana University assume the responsibility for medical education in the state.

Initially, students had the opportunity to take the first two years of their medical school work in either Bloomington or Indianapolis. In 1912, all students entered through the Bloomington program and moved to Indianapolis for their second-, third-, and fourth-year courses. This system remained in effect until 1958, when the work of the Bloomington division was transferred to Indianapolis. Excellent facilities for the teaching of the basic medical sciences and a strong nucleus of basic science faculty members remained in Bloomington. Consequently, in 1959 an experimental program of medical education was started in Bloomington in cooperation with the College of Arts and Sciences and the Graduate School. This program, the Medical Sciences Program, included studies that could lead to the combined M.D./M.S. and M.D./Ph.D. degrees. In 1965, a School of Medicine faculty committee recommended the adoption of a comprehensive plan for medical education throughout the state of Indiana. The plan involved the use of regional facilities in addition to those of the Medical Center in Indianapolis. The plan would coordinate and utilize elective programs in community hospitals, preceptorships with practicing physicians, internship and residency programs, and continuing medical education programs throughout the state.

The plan also resulted in the formation, within existing educational institutions, of "centers for medical education" for teaching basic medical science courses to first-year medical students. In 1971 the General Assembly of the State of Indiana unanimously authorized legislation establishing the Indiana Statewide Medical Education System. This legislation mandated that the Indiana University School of Medicine be responsible for selection, admission, and assignment of students; for curricular development; and for evaluation and accreditation of the

system. Further development of the Indiana Statewide Medical Education System was approved in the 1979 Indiana General Assembly. Approval for planning and funding for a second year of medical study at each of the centers for medical education was passed, and second-year students were first appointed to all centers except Fort Wayne in the fall 1980 semester. Funding for second-year students at the Fort Wayne campus began in fall 1990. The School of Medicine currently has eight centers for medical education, located in Bloomington, Evansville, Fort Wayne, Gary, Muncie, South Bend, Terre Haute, and West Lafayette.

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## Accreditation

The Indiana University School of Medicine Health Professions Programs share with the other schools of the University the accreditation accorded Indiana University as a member of the North Central Association of Colleges and Schools.

In addition, the professional programs are individually accredited by appropriate governing agencies within the discipline. See program-specific sections.

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## Facilities

The Indiana University Medical Center (IUMC) campus covers some 85 acres within one mile of the center of Indianapolis. About half of the first- and second-year classes are on the IUMC campus; the other students are at one of other eight centers for medical education. The School of Medicine's enrollment in 2011-2012 consisted of 1,255 M.D. students, 234 Ph.D. students, 124 M.S. students, 46 joint M.D./Ph.D. students, and 259 undergraduate students. In addition to opportunities at the centers for medical education, M.D. students may participate in clinical and elective rotations in physician offices and hospitals throughout the state and nation. Students may study or serve abroad during their medical school careers.

The School of Medicine includes several facilities on the IUMC campus, including Fesler Hall, VanNuys Medical Sciences Building, Indiana Cancer Pavilion, IU Cancer Research Institute, Research Institutes II and III, the Rotary Building, and Emerson Hall. The William H. Coleman Hospital, Robert W. Long Hospital, and the Willis D. Gatch Clinical Building have been renovated to provide research and administrative offices at IUSM. Approximately one mile east of the IUMC campus, along the historic canal, sits the Medical Information Science Building, the IU Health Pathology Building, the Radiology Education and Research Institute, and Fairbanks Hall.

Hospitals that are staffed by faculty and provide residency training programs include Wishard Memorial Hospital (a city-county hospital recently listed among the top 100 U.S. public hospitals), Roudebush VA Medical Center, Riley Hospital for Children, Indiana University Hospital and Outpatient Center, and LaRue Carter Psychiatric Hospital (which is state owned and located about five minutes from campus). Riley and IU Hospital separated from the School of Medicine in 1997 to join Methodist Hospital of Indiana which are now part of IU Health. IU Health is committed to supporting the school's mission of advancing education,

research, and patient care. Located approximately two miles from IUMC, Methodist Hospital provides additional significant educational opportunities to IU students and residents. The two "campuses" are linked by a people mover for the convenience of both staff and patients. Midway on the people mover is the new (2006) IU Health Pathology Building that houses the majority of hospital laboratories for Riley, IU and Methodist hospitals and also the educational programs in Clinical Laboratory Science, Cytotechnology, and Histotechnology.

IU Health's hospitals - Riley Hospital for Children, IU Hospital, and Methodist Hospital of Indiana - currently record approximately 1 million in- and out-patient visits per year. The affiliated hospitals - Wishard, Roudebush, and LaRue Carter - together handle another 1 million patient visits each year. This enormous patient base provides a broad range of superb clinical educational opportunities. The hospitals host 71 residency and fellowship programs with 992 residents and fellows and provide clinical experiences in both inpatient and outpatient facilities to second- through fourth-year students. IUSM's nearly 800 teaching faculty members staff all the hospitals. In addition, the hospitals host educational programs for nursing, dentistry, and health professions students as well as Purdue University pharmacy doctoral students.

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## Admission

Applicants seeking admission to any of the IU School of Medicine Health Professions Programs must be enrolled as a degree-seeking student on the IUPUI campus or admitted to the campus for the appropriate term of entry.

In addition, applicants must also submit a completed application packet to the specific program's admissions committee by the program's application deadline. Please see program specific requirements in the "Degree Programs" section of this publication. The program specific application can be found in the admissions section of the Health Professions Programs website (<http://medicine.iu.edu/hpp>).

Applicants should also be aware of the following additional details:

### Preadmission Status

Enrollment at Indiana University does not guarantee admission to any of the health professions programs. To be eligible for admission to one of the health professions programs, students must adhere to the academic regulations of the academic unit in which they are enrolled and meet School of Medicine Health Professions Programs and individual program preadmission requirements as stipulated in the general education and program sections of this bulletin. Admission to many programs is competitive; therefore, completion of the prerequisites does not guarantee admission to the program. In some instances a student may be admitted to the School of Medicine as a preprofessional student; however, this status is for academic advising purposes only and in no way influences admission into a professional program.

### Change of Educational Objective for Preprofessional Students

Changing one's educational objective to a health professions program does not guarantee admission to the program. Students considering a change in their educational objective should consult with a counselor on their respective campuses before initiating the change. Pre-health professions students in University College, the School of Medicine, or other Indiana University schools or divisions must follow that academic unit's procedures for changing the educational objective. All students must meet School and individual program admission requirements in order to be admitted to a professional program. Each Health Professions Program requires students to complete an application for admission to the specific program. Please see program-specific sections for the individual program admission deadlines.

### Transfer Credit

Acceptance of credit from a regionally accredited college or university for transfer to Indiana University will be determined by the campus admissions office.

While the grades from course work completed at Indiana University and all other colleges and universities are used to calculate the admission grade point average, only grades of C (2.00) or above will be considered for transfer. The university does not accept the transfer of special credit by examination awarded by another college or university. The transfer of credit earned through a regionally accredited junior college or a community college is normally limited to the equivalent of two years of academic work toward a baccalaureate degree and one year of academic work toward an associate degree. The School retains the right to determine the acceptability of transfer credit to meet degree requirements.

### Correspondence Courses

All credit to be applied to an Health Professions Programs degree earned through IU's Independent Study Program, correspondence study, or other nontraditional methods must be validated and approved by the faculty of the program to which the student is applying.

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## Admission Policies

The admission policies of individual programs within the Indiana University School of Medicine Health Professions Programs comply with the following standards:

**Prerequisite Course Work** Applicants must complete prerequisite courses at an accredited high school (or GED equivalent), college, or university. Individual programs determine the specific courses and the minimum grade that must be achieved in any course (see specific program information); therefore, program-specific requirements may differ. Pass/fail grades are not acceptable in prerequisite courses unless pre-approved by the specific program. Students are eligible to apply for admission to an associate or baccalaureate program when their academic progress shows reasonable probability that entry-level requirements can be completed before the beginning date of the next class entering the professional program. Applicants should read the admission policies and program descriptions in the school and program sections of this bulletin for specific entry-level requirements.

**Grade Requirements** Without exception, applicants to a degree program must have a cumulative grade point

average of at least 2.00 on a 4.00 scale for all course work completed at Indiana University and/or any other college or university. Some programs have established a minimum grade point average higher than 2.00 on a 4.00 scale. Some programs also use a component of the overall grade point average (for example, math/science grade point average). See specific program information. Only completed course work and the resultant grade point average are evaluated. Radiography Program applicants may have the high school record evaluated. In these instances only academic course work taken during high school will be used in calculating the admission grade point average. Students applying for a degree program may not be admitted to, hold a position in, or begin a program if they would be on probation as a student in any of the Health Professions Programs. Students are placed on probation within the School when the cumulative and/or most recently completed semester grade point average falls below 2.00 on a 4.00 scale. The applicant must also maintain the minimum grade point average as established by the program. The applicant's grade point average will be the major consideration (51 percent or greater) for admission. (See specific program information.)

**Repeated Courses** Applicants whose cumulative grade point average is at least 2.00 on a 4.00 scale and who have repeated courses may petition to have their admission grade point average recalculated. The recalculation will use the most recent grade of the repeated course. This repeat option includes the use of the Indiana University FX option and is applied with the following restrictions: It can be used for a total of no more than 15 credits; the grade will be deleted not more than twice for a given course; each attempt will count toward the 15-credit-hour limit; and a W cannot be used to replace a grade and will not count toward the 15 credit hours. If more than 15 credit hours are repeated, the applicant will determine which of the repeated courses are to be deleted. The petition must be attached to the application. The effective date is the beginning of the 1996 fall semester. Any course being used to replace an earlier course grade must be taken in the fall of 1996 or later.

**Academic Bankruptcy** Applicants whose cumulative grade point average is at least 2.00 on a 4.00 scale may petition the program for up to one year (fall, spring, and summer) of academic bankruptcy based on compelling nonacademic reasons. The bankrupted semesters must be consecutive. Academic bankruptcy is for admission purposes only and in no way affects the university's official grade point average. Course work completed in a semester that has been bankrupted for admission purposes cannot be used for the fulfillment of program prerequisites or counted as credit hours toward the degree. The petition must be attached to the application.

**Fresh Start** Applicants whose cumulative grade point average is at least 2.00 on a 4.00 scale may petition the program for Fresh Start (forgiveness) based on compelling nonacademic reasons. This forgiveness will eliminate, for the purpose of calculating program specific admission grade point average(s), all courses and grades earned by the applicant during the requested period. The forgiveness period begins with the applicant's first academic enrollment period (at any college or university) and ends after the academic term designated by the applicant. Course work completed in a semester that has

been bankrupted for admission purposes cannot be used for the fulfillment of program prerequisites or counted as credit hours toward the degree. The petition must be attached to the application and must include the beginning and ending dates of the forgiveness period.

To invoke this policy, the student must meet the following three conditions:

1. *Including* all course work taken during the requested academic forgiveness period, applicants must have at least a 2.00 cumulative grade point average (on a 4.00 scale).
2. *After* the designated forgiveness period, applicants must complete the following minimum number of graded course hours based on the degree level of their program of interest - Bachelor's Degree - 50 credit hours of graded course work or Associate Degree\* - 12 credit hours of graded course work.
3. Meet all other program-specific admission requirements.

Applicants may include in-progress course work at the time of the specific program's application deadline toward the minimum number of graded course work required after the designated forgiveness period.

\*Applicants to the Radiography Program must complete at least one math/science course as part of the 12 credit hours of graded course work completed after the academic forgiveness period.

*NOTE: Fresh Start will not be granted for professional Radiologic Sciences courses for those applying to the Medical Imaging Technology Program.*

**Credit by Examination** Applicants to any of the Health Professions Programs who have received credit by examination from Indiana University in a course that meets a program prerequisite will be viewed as meeting this specified requirement. Application of this policy for math/science prerequisites will be determined at the program level. Any credit by examination hours received by the student must be transferred onto the student's university transcript before it can be considered as meeting a program's admissions prerequisite.

At IUPUI, credit by examination can be earned from the following sources: Advance Placement (AP), the College Level Examination Program (CLEP), the Defense Activity for Non-Traditional Education Support (DANTES), and Indiana University departmental examinations. See IUPUI Admissions for required documents and procedures on receiving credit. Students at Indiana University whose standardized test scores (ACT or SAT) are high enough to have course content waived by a particular academic unit may request the specific program's admissions committee to accept this waiver.

**Undistributed Credit** Upon admission to any of the Indiana University campuses, students with course work completed previously at accredited colleges or universities are awarded the appropriate transfer credit for this prior education. Transfer credits are either matched to the appropriate course equivalent (e.g., ENG-W 131) on that IU campus or transferred as undistributed credit (e.g., ENG-UN 100). Some campuses have policies that limit the number of credits that students may receive for their prior education.

When transfer credits are designated as 'undistributed,' this simply means that the transfer credit analyst for the specific campus did not find an equivalent course at that IU campus. These credits can still be applied for use towards any of the School's degree programs.

When a student has been given 'undistributed' credits, it is the student's responsibility to contact the School's Administrative Office to determine how these credits will be accepted by the admission committee of the student's program of interest. Such a request should be made in writing (preferably via email) to a member of the administrative staff. The request will then be forwarded to the appropriate admissions committee for consideration.

**Testing** Applicants may be required to complete testing as designated by the program. Testing results may be used as a component of the admissions decision unless their use would violate state or federal law.

**Interview** Applicants may be required to complete a personal interview. The interview may be a component of the admission decision. Some programs limit the number of interviews granted based on the number of applications received.

#### **Technical Standards for Admission and Retention**

Because a degree in a health professions discipline attests to the mastery of knowledge and skills, graduates must possess the essential knowledge and skills to function in a broad variety of clinical situations and render a wide spectrum of patient care in a safe and effective manner.

The School of Medicine Health Professions Programs faculty has therefore specified nonacademic criteria, Technical Standards for Admission and Retention, that all applicants and students are expected to meet in order to participate in a health professions program. These criteria include the following five categories: (1) observation; (2) communication; (3) motor function; (4) intellectual-conceptual, integrative, and quantitative abilities; and (5) behavioral and social attributes. All accepted students will be required to sign a statement certifying that they can meet the technical standards that apply to the program to which they have been admitted.

A copy of the technical standards will be sent to each applicant with an offer of admission. Additionally, a copy may be obtained from the program of interest or the Health Professions Programs Administrative Office.

**Preference to In-State Residents** Preference is given to applicants who are Indiana residents and to applicants who complete the majority of applicable course work at a public college or university in Indiana. Each program's admissions committee determines how the preference policy shall be weighted in their admissions policies.

**Equal Opportunity/Affirmative Action Policy** Indiana University pledges to continue its commitment to the achievement of equal opportunity within the university and throughout American society. In this regard, Indiana University will recruit, hire, promote, educate, and provide services to persons based upon their individual qualifications. Indiana University prohibits discrimination based on arbitrary consideration of such characteristics as age, color, disability, ethnicity, gender, marital status, national origin, race, religion, sexual orientation, or

veteran status. Indiana University shall take affirmative action, positive and extraordinary, to overcome the discriminatory effects of traditional policies and procedures with regard to the disabled, minorities, women, and Vietnam-era veterans. An office on each campus monitors the university's policies and assists individuals who have questions or problems related to discrimination.

**Policy Changes Health Professions Programs Admissions Committees** are charged with setting the minimum standards for entry into their specific program. These policies build upon the School's *Undergraduate Degree Requirements* including both the minimum degree requirements and basic general education areas. The School and Program criteria for admission include, but are not limited to the minimum grade point average for admission, specific prerequisite courses required for entry, and minimum number of credit hours needed at program entry. Minimum grade point averages can include both cumulative, specific (e.g. math & sciences course), and minimum grade required in each prerequisite course.

When a change to any School or Program criterion is made, it will become effective for applicants who apply for admission during the specific program's application deadline immediately following the announced change.

Any changes in a specific program's requirements will be announced on the School's website and in advising materials made available to students. Changes will also be distributed to university counselors and constituents who work with pre-health professions students state-wide.

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## Admission Procedures

1. In addition to the general admission requirements, applicants must read the program-specific sections in the bulletin for additional admission requirements and deadlines.
2. Individuals seeking admission to a professional program must submit a complete IU School of Medicine Health Professions Programs application before the individual program's application deadline. When applying to more than one program, separate applications must be completed. Admission to the professional program is competitive; application for admission to the school does not constitute automatic admission to a program.
3. Applicants who are not Indiana University students must also file an Indiana University application and pay the application fee before the program application deadline. Applications for admission to Indiana University–Purdue University Indianapolis can be obtained from the IUPUI Office of Admissions at (317) 274-4591 or apply@iupui.edu. This application process can also be completed online at <http://enroll.iupui.edu/admissions/>. Students seeking a second baccalaureate degree from Indiana University must also submit an application to the IUPUI Office of Admissions. Returning students who have been inactive for more than one year may also be required to contact the IUPUI Office of Admissions to reactivate their university enrollment status. Students applying from other regional IU campuses must complete the inter-campus transfer application.

4. All complete applications are reviewed by the program's admission committee. The selection of a class is based on school and program admission criteria. All applicants receive written notification of their admission status.
5. Each program's admissions committee reserves the right to correct any mistake made in the calculation of an applicant's eligibility to be considered for an interview or for admission to the program.
6. Applicants may appeal any admission decision except the minimum GPA required by the specific program's admissions committee. Copies of the policies and procedures governing the appeals process are available on request from the Health Professions Programs Administrative Office.
7. Individuals interested in being admitted to one of the School's programs should contact the program of interest annually for an update on admission criteria. For more information visit the admissions section of the School's website at <http://medicine.iu.edu/hpp>.
8. The Health Professions Programs application is revised each summer. Applicants must obtain an application for the year in which they wish to apply.
9. Applicants should check the current School application for the deadlines for submission.
10. Students who have been convicted of a felony may be unable to obtain appropriate credentials to practice in some disciplines. Contact the program director for further information. Disclosure of an applicant's past criminal history is required at the time of application. Applicants must disclose all criminal offenses, i.e., felonies and misdemeanors, as well as non-criminal offenses. In addition, applicants who have been arrested for or convicted of any violation of the law or who have charges pending against them at the time of application must disclose this information to the School at the time of application. If applicable, please see the application instructions for more details.
11. A student whose name appears on the Indiana Sex and Violent Offender Registry will not be allowed to pursue admission to any program in the School. Some educational programs follow IU Health's more restrictive background check policy and additional criminal convictions will disqualify an applicant from entering those programs. Falsification of an applicant's background is also grounds for disqualification. For more information on this issue, please contact the HPP Administrative Office.
12. Grades earned in remedial courses may be used differently by different programs to calculate the competitive grade point average. See the program-specific sections.

Last Updated: March 2, 2012

## Health Professions Programs

Degree programs and course offerings exist in the following areas. For specific information, select your program of choice from the left-hand menu.

**Department of Emergency Medicine** Paramedic Science, A.S.

Emergency Medical Technician - Basic

**Department of Pathology and Laboratory Medicine**

Clinical Laboratory Science, B.S.  
Cytotechnology, B.S.  
Histotechnology, Certificate and A.S.

**Division of Pulmonary and Critical Care Medicine**

Respiratory Therapy, B.S.

**Department of Radiation Oncology** Radiation Therapy,  
B.S.

**Department of Radiology & Imaging Sciences**

Radiography, A.S.  
Medical Imaging Technology, B.S.  
Nuclear Medicine Technology, B.S.

Last Updated: March 2, 2012

## Undergraduate Degree Requirements

The Indiana University School of Medicine Health Professions Programs faculty will recommend for degrees only those students who have been admitted to Indiana University and are students in good standing in the School and the professional program. Candidates for degrees are eligible for graduation upon completion of all program requirements in effect when the student first enrolls in professional course work, provided requirements are met within five years.

The academic program's faculty reserve the right to require students whose program course of study is interrupted for any reason to meet requirements as specified by the director of the program and the Dean of the IU School of Medicine or the dean's designee. Changes in the student's original program may be necessary when, for example, a curriculum has been revised, offerings are no longer available, significant changes in curriculum content have occurred, or repetition of material is deemed essential to assure continuity of clinical competency.

Academic counseling and guidance are available for students. Students are responsible for seeking such counseling and guidance and for planning courses of study to meet degree requirements.

**Program Prerequisites**

Each program has additional specific course requirements. Refer to the program of interest in this bulletin for specific information.

Last Updated: March 2, 2012

## General Undergraduate Requirements

**Minimum Degree Requirements**

- Based upon earned Indiana University credits, a minimum cumulative grade point average of 2.000 (on a 4.000 scale) must be maintained.
- A minimum of thirty (30) credit hours of program or program-related course work must be completed in residence at Indiana University. Special credit awarded by any program's credit for credential or credit by experience cannot be used towards the thirty (30) credit hour minimum.

- Additional general requirements must be completed for the bachelor's degree or associate degree as listed below:

**Bachelor's Degree**

- Minimum of 122 credit hours.
- School's baccalaureate degree general education requirements.
- Minimum of 30 credit hours in courses at the 300-400 (junior-senior) level.

**Associate Degree**

- Minimum of 60 credit hours.
- School's associate degree general education requirements.

Students must complete the prescribed course of study, meeting program academic, professional, and technical standards requirements, which may exceed the requirements stated above. Program professional standards consist of ethics and proper health care practices to which students must adhere. Program faculty will distribute these standards when appropriate.

The student is responsible for submitting an intent-to-graduate form by no later than January in the year that they intend to graduate. The Health Professions Programs Administrative Office will contact each potential graduate regarding this issue.

Work for a degree must be completed within five years from the time the student first enrolls in the professional program. Under unusual circumstances, the program director may recommend granting a waiver of this requirement.

Degrees are granted during the academic year in December, May, June, and August; however, Commencement exercises are held only in May.

Last Updated: March 2, 2012

## Basic General Education Areas

**A.S. Degree**

- Written communication, one course
- Verbal communication, one course

At least one course from any two of the following categories:

- College-level mathematics
- Social/behavioral sciences
- Basic life/physical sciences
- Humanities (Classical studies, literature, English, film studies, folklore, foreign language, history, journalism, philosophy, religion, speech communication, minority studies, visual and performing arts)

**B.S. Degree**

- Written communication, three courses - Requirement can be satisfied with any combination of prerequisites or professional program courses, see program section for specific content emphasis
- Verbal communication, one course
- Humanities, one course\* (Classical studies, literature, English, film studies, folklore, foreign

language, history, journalism, philosophy, religion, speech communication, minority studies, visual and performing arts)

- College-level mathematics, one course
- Social/behavioral sciences, two courses\*
- Basic life/physical sciences, two courses

\*Some programs may allow a student to substitute a second humanities course for one of the two required social-behavioral science courses. Please see program specific prerequisites for additional information on programs where this substitution will be allowed.

In addition to the above general education requirements, students are strongly encouraged to learn to do word processing, use e-mail, and navigate the Internet before the beginning of the professional program. See program-specific sections for program requirements.

Last Updated: March 2, 2012

### Professional Program Requirements

An outline of the professional program is in the program-specific information in this bulletin.

**Clinical Rotation Requirements** During an educational program in the Health Professions Programs, students complete clinical rotations in several hospitals or other clinical sites in the central Indiana and/or the Indianapolis metropolitan area. Criminal background checks for students in these programs may be required for entry in these clinical sites and/or hospital settings. Students must be advised that should a hospital request a background check your history may interfere with the ability of the program to place you in clinical activities. In the circumstance where the education program is unable to place a student in the appropriate clinical setting to meet degree requirements, there is the possibility that a student may be unable to complete the degree program. Students should also be advised that a clinical site may also require the student to pass a drug screen.

Last Updated: March 2, 2012

### Clinical Laboratory Science

The educational program in clinical laboratory science through the IU School of Medicine Department of Pathology and Laboratory Medicine is located on the Indiana University–Purdue University Indianapolis campus at the IU Health Pathology Laboratory Building.

**Mission Statement** The mission of the Clinical Laboratory Science Program at Indiana University–Purdue University Indianapolis is to provide a quality education in the knowledge, skills, and professional attitudes required to follow good laboratory practice in providing quality testing for the diagnosis, monitoring, and treatment of disease.

**Goal Statements** The goals of the Clinical Laboratory Science Program are to prepare graduates who:

1. Have the knowledge and skills needed to provide health care professionals with accurate and timely diagnostic and therapeutic laboratory data and participate as effective members of the health care team.
2. Demonstrate professionalism through honesty and integrity in reporting results, respect for patient confidentiality, and a desire for life-long learning

through continuing education, scholarship, service, and participation in professional organizations.

3. Successfully complete the national certification examination.

To accomplish these goals, the program faculty foster the development of critical thinking and life long learning skills and evaluate overall program effectiveness through outcomes assessment.

**Description of the Profession** Clinical laboratory science is a diverse, science-based profession aimed at accurate performance of clinical laboratory procedures on biologic samples from patients. Physicians use the results from these procedures in diagnosing, monitoring, and treating diseases. Some of the tasks that clinical laboratory scientists perform are listed below:

- Analysis of simple/complex chemical components of body fluids
- Evaluation of cellular components of blood
- Identification of microorganisms and their antibiotic susceptibilities
- Preparation of blood components for patient therapy
- Molecular detection of diseases
- Evaluation of new techniques, procedures, and instruments

Laboratory personnel continually evaluate the quality of the results from procedures and instruments and solve any problems that relate to inconsistencies. Excellent communication skills are required to interact with other members of the health care team, to teach, and to manage individuals under their supervision.

Clinical laboratory scientists typically work in laboratories located in hospitals, clinics, physician group practices, blood centers, medical research facilities, or medically oriented industries.

**Graduates of the Program** Students who successfully complete the senior/professional year of the clinical laboratory science program and have a baccalaureate degree are eligible to take national certification examinations. Nationally recognized certification is a requirement for employment in many settings.

**Credentials Required to Practice** MLS(ASCP), Medical Laboratory Scientist

**Licensure Requirements to Practice** There is no state licensure in Indiana; however, some states require licensure in addition to or instead of national certification.

**Scholarships** A limited number of scholarships is available for accepted students. Contact the program staff when notified of admission.

**For further information, contact:**

Linda M. Marler, M.S. Phone: (317) 491-6219 E-mail: <a href="mailto:lmmarler@iupui.edu">lmmarler@iupui.edu</a>	-or-	Diane Leland, Ph.D. Phone: (317) 491-6646 E-mail: <a href="mailto:dleland@iupui.edu">dleland@iupui.edu</a>
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CLS Office Phone: (317) 491-6969

**Mailing Address:**  
Indiana University Clinical Laboratory Science Program

IU Health Pathology Laboratory, Room 6002  
350 W 11th Street  
Indianapolis, IN 46202-4108  
Last Updated: February 20, 2012

## Educational Program

### Bachelor of Science in Clinical Laboratory Science at IUPUI

- **Medical Director:** Professor Eble
- **Program Director:** Associate Professor Marler and Professor Leland
- **Professors:** Rodak

**Length of Program** Clinical laboratory science is a four-year baccalaureate degree program that is typically full-time. The program is structured in a 3 + 1 arrangement, in which three years are spent in regular college courses in order to complete prerequisite courses and the fourth year is the senior/professional year. The professional year includes both didactic and supervised clinical education experiences. Applicants with bachelor's degrees who have completed all of their prerequisites may also apply to this program. Upon completion of the professional year, the student will earn a second bachelors degree.

**Additional Cost** In addition to regular university tuition and fees, the student should expect to pay for program-related expenses. Contact program administrators for current cost estimate sheet.

**Description of Program Facilities** The Clinical Laboratory Science Program has program offices, a classroom, and a student laboratory located in the IU Health Pathology Laboratory Building.

**Location of Clinical Education Sites** Facilities utilized for clinical experiences include Indiana University Hospital, Methodist Hospital, Riley Hospital, Wishard Memorial Hospital, and Richard Roudebush Veterans Administration Medical Center.

**Opportunity for Students to Work** Students who work should limit employment hours to 8–10 hours a week, if possible.

**Accreditation** The Clinical Laboratory Science Program at Indiana University-Purdue University Indianapolis is fully accredited by the National Accrediting Agency for Clinical Laboratory Sciences, 5600 N. River Rd, Suite 720, Rosemont, IL 60018, Phone (847) 939-3597.

Last Updated: February 20, 2012

## Admission

**General Information** Students accepted into the program must complete all program admission requirements by July 1. Admission to the professional program is competitive; therefore, completion of the prerequisites does not guarantee admission to the program.

**Criteria Used for Selection of Class** Cumulative and science/math grade point average, essay, interview, and motivation factors.

**Class Size** Program is accredited for 24 students; however, current arrangements limit class size to 12 students.

**Specific Requirements** In addition to the Health Professions Programs' admission policies and procedures

found at the beginning of this section of the bulletin, the following admission policies apply to the Clinical Laboratory Science Program at IUPUI:

**Application Deadline** December 1 of the year before desired entry into the senior/professional year.

**Total Number of Prerequisite Credit Hours** 90 by start of program classes.

**Distribution of Credit Hours in Specific Areas** Applicants must complete at least 18 credit hours in the biological sciences and 18 credit hours in chemistry. See prerequisite list.

**Limitations of Course Work** At least one course in chemistry (upper level), microbiology, and immunology must have been completed within the previous six years.

**Minimum Cumulative Grade Point Average** 2.50 on a 4.00 scale. This requirement is applied at the time of program application and must be maintained. Grades from remedial courses are not used in this calculation.

**Minimum Specific Grade Point Average** 2.50 on a 4.00 scale in science and mathematics courses. This requirement is applied at the time of program application and must be maintained. Grades from remedial courses are not used in this calculation.

*NOTE: Applicants whose Cumulative and/or Specific GPAs are at or only slightly above 2.50 (on a 4.00 scale) are unlikely to be competitive for admission.*

**Minimum Grade in a Stated Prerequisite Course** C (2.00 on a 4.00 scale) in all required courses.

**Interview** Applicants must complete the interview process. Interviews are scheduled from October to December.

**Technical Standards** See Health Professions Programs policy.

**Indiana Residents Preference Policy** See Health Professions Programs policy.

**Volunteer Experience** Volunteer experience is not required, but may be very helpful to the applicant in making a career choice.

Last Updated: February 20, 2012

## Prerequisites

Before entering the program, students must complete the minimum prerequisites listed below. Students should consult with their academic advisors for appropriate courses and semester sequence in order to complete prerequisites. Prerequisites may be taken at any accredited college or university. The code "G" indicates a course that meets the school's general-education requirements.

Written communication (G)	2 courses
Verbal communications (G)	1 course
Humanities (G)*	1 course
Social/Behavioral science (G)*	2 courses

\*Students can request to substitute a second humanities course for one of the social-behavioral science electives.

**Biological Sciences** Applicant must complete, by entry date, at least 18 credit hours or the equivalent of biology, to include the following courses:

Introductory Human Biology (G)	1 course
Microbiology (wet lab)	1 course
Human Genetics	1 course
Human Physiology	1 course
Immunology	1 course

**Chemistry** Applicant must complete, by entry date, at least 18 credit hours or the equivalent of chemistry, to include the following courses:

Introductory Chemistry (with lab) (G) (Course must be appropriate for science majors)	2 semesters
Organic I (with lab)*	1 course (w/lab)
Advanced Chemistry Elective*	1 course

\*Effective for entry in fall 2013, admitted students must complete Organic I and Advanced Chemistry Elective by July 1.

<i>Suggested Chemistry Electives</i>	
Biochemistry	
Organic II	
Analytical Chemistry	

**Mathematics** Applicant must complete, by entry date, the following courses:

College Algebra and Trigonometry or higher content (G)*	1-2 courses
Statistics	1 course

\* Two semesters are required for Algebra/Trigonometry sequence. One semester is required for Trigonometry level (or higher) courses.

**Suggested Electives** While not inclusive or mandatory, the following is a list of suggested elective areas: human anatomy, molecular biology, medical terminology, and medical microbiology.

### Sample Plan of Study

<b>Freshman</b>	
<i>Fall</i>	<i>Credits</i>
Elementary Composition I	3.0
College Algebra and Trigonometry I	3.0
Introductory Biology I (Plants)	5.0
Principles of Chemistry I w/ lab	5.0
Total	16.0
<i>Spring</i>	<i>Credits</i>

Speech Communication or Interpersonal Communication	3.0
College Algebra and Trigonometry II	3.0
Introductory Biology II (Animals)	5.0
Principles of Chemistry II w/ lab	5.0
Total	16.0

### Sophomore

<i>Fall</i>	<i>Credits</i>
Organic Chemistry I	3.0
Organic Chemistry I Lab	2.0
Human Anatomy (as elective)	5.0
Social-Behavioral Science Elective I	3.0
Electives	3.0
Total	16.0
<i>Spring</i>	<i>Credits</i>
Upper-Level Chemistry Elective	3.0
Microbiology w/lab	3.0-4.0
Human Physiology	5.0
Humanities Elective	3.0
Total	14.0-15.0

### Junior

<i>Fall</i>	<i>Credits</i>
Immunology	3.0
Genetics	3.0
Electives	7.0
Total	13.0
<i>Spring</i>	<i>Credits</i>
Statistics	3.0
Written Communication II	3.0
Social-Behavioral Science Elective II	3.0
Elective	5.0-6.0
Total	14.0-15.0

Last Updated: February 20, 2012

## Professional Program

Courses in the professional program are sequential and must be taken in the order specified by the program faculty. Transfer credits, course substitutions, or "testing out" are not permitted for any professional year course.

### Senior

<i>Fall</i>	<i>Credits</i>
Hematology (PATH-C 407)	3.0
Principles of Immunohematology (PATH-C 408)	1.0
Serology (PATH-C 409)	1.0
Diagnostic Medical Microbiology (PATH-C 411)	4.0

Diagnostic Microbiology Laboratory (PATH-C 421)	2.0
Hematologic Techniques and Procedures (PATH-C 427)	3.0
Techniques in Immunohematology (PATH-C 428)	1.0
Serology Laboratory (PATH-C 429)	1.0
<b>Total</b>	<b>16.0</b>
<i>Spring Credits</i>	
Hemostasis (PATH-C 404)	1.0
Clinical Chemistry (PATH-C 406)	4.0
Urine Analysis (PATH-C 410)	2.0
Mycology/Parasitology (PATH-C 420)	2.0
Clinical Chemistry Instrumentation and Methodologies (PATH-C 426)	2.0
General Externship I (PATH-C 401)	2.0
General Externship II (PATH-C 402)	2.0
<b>Total</b>	<b>15.0</b>
<i>Summer Credits</i>	
General Externship III (PATH-C 403)	2.0
General Externship IV (PATH-C 405)	2.0
Topics in Medical Technology (PATH-C 412)	3.0
<b>Total</b>	<b>7.0</b>

**Awards** Based on their academic performance, students will be recommended by the program faculty for degrees with distinction in accordance with the School's honors criteria.

**Graduation Requirements** Satisfactory completion of at least 128 credit hours, to include at least 90 credit hours of prerequisite and general-education courses and 38 credits of professional courses. All course work must be completed in compliance with the Program's and School's academic and professional policies.

Last Updated: February 20, 2012

## Cytotechnology

The educational program in cytotechnology through the Indiana University School of Medicine Department of Pathology and Laboratory Medicine is located on the Indiana University–Purdue University Indianapolis campus at the IU Health Pathology Laboratory Building.

**Description of the Profession** Cytotechnology is a medical laboratory specialty in which microscopic studies of exfoliated, abraded, and aspirated cells from the human body are performed. The cytotechnologist studies cell samples from various body sites to detect

cellular changes indicative of cancer. In providing a means of early detection, cytology makes possible the early diagnosis of cancer, thus increasing the chances of a cure. Cytology also serves as a prognostic tool during the course of cancer treatment programs. In addition, it aids in establishing the diagnosis of benign disease processes, such as endocrine disorders, and in detecting some pathogenic microorganisms.

**Graduates of the Program** The Cytotechnology Program is designed to provide its graduates with a comprehensive, fundamental knowledge of clinical cytology that will enable them to function as competent Cytotechnologists and will provide a basis for continuing education and professional growth. Graduates will be eligible for the certification examination administered by the Board of Certification leading to certification and registration in Cytotechnology with the American Society for Clinical Pathology. Graduates should be prepared for management, supervisory, and educational responsibilities and should seek ways to contribute to the growing body of knowledge in clinical cytology. The program is designed to prepare graduates to realize their position in the total health care structure and understand their legal, ethical, and moral responsibilities to the employers and communities they serve. Cytotechnologists normally practice in hospitals, laboratories, or research laboratories.

**Credential Required to Practice** B.S.; CT(ASCP), Cytotechnology certification by the Board of Certification: American Society for Clinical Pathology.

**Scholarships** Students interested in scholarship information for the professional year should contact the program office.

**For further information, contact:** William Crabtree, Ph.D., SCT(ASCP), Director  
Phone: (317) 491-6221  
E-mail: [wcrabtre@iupui.edu](mailto:wcrabtre@iupui.edu)

**Mailing Address:** Cytotechnology Program  
IU Health Pathology Laboratory, Room 6002J  
350 W 11th Street  
Indianapolis, IN 46202-4108

Last Updated: February 14, 2012

## Educational Program

### Bachelor of Science in Cytotechnology at IUPUI

- **Medical Director:** Associate Professor H. Cramer
- **Program Director:** Associate Professor W. Crabtree
- **Clinical Assistant Professor:** B. McGahey Frain

**Length of the Program** Four years, including three years (90 semester hours) of prerequisite course work plus 12 months (37 semester hours) of professional course work.

**Structure of the Program** The prerequisites may be taken on a part-time basis; the professional program is presented in a full-time, day format only.

**Design of the Professional Curriculum** An integral relationship between the program and the cytology service laboratory provides students with maximum exposure to a functioning cytology laboratory. The learning process follows a structured, logical sequence for the presentation of essential concepts and skills.

Individual instruction, demonstrations, lectures, and conferences are all used as methods of instruction. Student inquiry and research that will foster greater understanding and possible revision of presented material are encouraged. Opportunity is provided for the student to pursue special interests in the field of cytology.

**Location of Clinicals** All clinical sites for the program are located within the Indianapolis area.

**Additional Cost** In addition to regular university fees, the student should expect to pay for program-related expenses. Contact program for current cost sheet.

**Opportunity for Students to Work** Some students have part-time jobs.

**Program Facilities** The Cytotechnology Program is offered at the IUPUI campus, which has modern educational and medical facilities. Dedicated program space is located in the IU Health Pathology Laboratory Building. Cytology laboratories located in the IU Health Pathology Laboratory, Wishard Memorial Hospital, Methodist Hospital, and the Veterans Administration Hospital are also used.

**Accreditation** The curriculum of the Cytotechnology Program is fully accredited by the Commission on Accreditation of Allied Health Education Programs ([www.caahep.org](http://www.caahep.org)).

Last Updated: March 13, 2012

## Admission

**General Information** As grade point average is a reflection of self-motivation, self-discipline, and the desire to achieve, favorable consideration is given to applicants with high grade point averages. In addition, applicants must demonstrate proficiency in biological and physical sciences. Candidates for this program should work well with others, have a genuine desire to improve the health of humanity, and be willing to accept the responsibilities of providing health care service. Students accepted into the program must complete the school's and the program's admission requirements listed below before the first day of classes. Admission to the professional program is competitive; therefore, completion of the prerequisites does not guarantee admission to the program.

**Criteria Used for Selection of Class** Cumulative grade point average, biology grade point average, interview.

**Class Size** Eight each fall semester.

**Specific Requirements** In addition to the Health Professions Programs admission policies and procedures found at the beginning of this section of the bulletin, the following admission policies apply to the Cytotechnology Program:

**Application Deadline** December 1 of the year before anticipated entry.

**Total Number of Prerequisite Credit Hours** 90

**Distribution of Credits in Specific Areas** 25 credit hours in biology

**Limitations of Course Work** Biology credits earned more than seven years before application must be updated by taking 3 additional credit hours related to

cell biology within a period of time not to exceed 12 months before admission. Remedial courses will not fulfill prerequisite hours.

**Minimum Cumulative Grade Point Average** 2.50 on a 4.00 scale. This requirement is applied at the time of program application and must be maintained.

**Minimum Specific Grade Point Average** Biology grade point average of 2.50 on a 4.00 scale. This requirement is applied at the time of program application and must be maintained.

**Minimum Grade Requirement in a Stated Prerequisite Course** C (2.00 on a 4.00 scale).

**Interview** All qualified applicants must participate in an interview. Interviews start the second week of January.

**Technical Standards** See Health Professions Programs policy.

**Medical Requirements** Students accepted into the professional program must complete a health form, immunization card, chest X ray, and eye examination before classes begin.

**Indiana Residents Preference Policy** See Health Professions Programs policy.

**Volunteer Experience** While volunteer experience is not required, it is very helpful in making a career choice.

Last Updated: March 13, 2012

## Prerequisites

Before entering the program, students must complete the minimum prerequisites listed below. Students should consult with their academic advisors for appropriate courses and semester sequence in order to complete prerequisites. Prerequisites may be taken at any accredited college or university. The code "G" indicates a course that meets the school's general-education requirements. Courses taken via correspondence will not be accepted as fulfilling stated prerequisites. No more than 15 semester hours of correspondence course work will be counted toward the degree.

Written Communications (G)	2 courses
Verbal Communications (G)	3 cr.
Humanities (G)*	3 cr.
College Algebra (G)	3 cr.
Social/Behavioral Science (G)*	6 cr.
Introductory Biology (G)	4-5 cr.
Chemistry I (with lab) (for science majors)	4-5 cr.
Chemistry-Sequential Course(s) (for science majors beyond above)	4 cr. Minimum; 5-8 cr. Preferred
Human Anatomy and Physiology	5-10 cr.
Advanced Biological Sciences	3 courses

In addition to introductory biology and human anatomy & physiology, students must also take **three** upper-level

biology courses to bring the total minimum credit hours in biology to 25.

*Recommended Courses* microbiology with laboratory, developmental anatomy or embryology with laboratory, genetics with laboratory, molecular or cellular biology, histology, and immunology. Questions regarding alternative biology courses should be directed to the Cytotechnology Program faculty.

\*Students can request to substitute a second humanities course for one of the social-behavioral science electives.

*Suggested Electives* It is recommended that the following courses be taken electives: microbiology, embryology, genetics, animal cell physiology, and immunology. While not inclusive or mandatory, the following is a list of suggested elective areas: medical microbiology, endocrinology, parasitology, virology, cytogenetics, computer science, management, organic chemistry, biochemistry, physics, advanced mathematics, statistics and art appreciation.

*Suggested Plan of Study* The following is a suggested three-year plan of the prerequisites. Students can adjust this schedule. Students should check with their advisors to make sure all requirements are met.

### Freshman

<i>Fall</i>	<i>Credits</i>
Elementary Composition I	3.0
College Algebra and Trigonometry	3.0
Introduction to BiologyI ( <i>Plants</i> )	5.0
Elementary or Principles of Chemistry I w/lab	5.0
<b>Total</b>	<b>16.0</b>
<i>Spring</i>	<i>Credits</i>
Speech Communication or Interpersonal Communication	3.0
Introduction to BiologyI ( <i>Animals</i> )	5.0
Elementary or Principles of Chemistry II w/lab	5.0
Elective	3.0
<b>Total</b>	<b>16.0</b>

### Sophomore

<i>Fall</i>	<i>Credits</i>
Humanities Elective	3.0
Social-Behavioral Science Elective I	3.0
Human Anatomy	5.0
Elective	3.0
<b>Total</b>	<b>14.0</b>
<i>Spring</i>	<i>Credits</i>
Elementary Composition II or Professional Writing	3.0
Human Physiology	5.0
Upper-Level Biology Elective I	3.0

Social-Behavioral Science Elective II	3.0
<b>Total</b>	<b>14.0</b>

### Junior

<i>Fall</i>	<i>Credits</i>
Upper-Level Biology Elective II	3.0
Electives	12.0
<b>Total</b>	<b>15.0</b>
<i>Spring</i>	<i>Credits</i>
Upper-Level Biology Elective III	3.0
Electives	12.0
<b>Total</b>	<b>15.0</b>

Last Updated: March 13, 2012

## Professional Program

Courses in the professional program are sequential and must be taken in the order specified by the program faculty.

### Senior

<i>Fall</i>	<i>Credits</i>
Gynecologic Cytology, Normal (PATH-A 412)	3.0
Gynecologic Cytology, Abnormal (PATH-A 422)	3.0
Pulmonary Cytology (PATH-A 432)	3.0
Techniques in Medical Cytology (PATH-A 462)	2.0
Certification Internship I (PATH-A 465)	2.0
Seminar in Cytology I (PATH-A 470)	3.0
<b>Total</b>	<b>16.0</b>
<i>Spring</i>	<i>Credits</i>
Cytology of Body Fluids (PATH-A 442)	2.0
Cytology of the Gastrointestinal Tract (PATH-A 453)	2.0
Urinary Tract Cytology (PATH-A 454)	2.0
Certification Internship II (PATH-A 465)	6.0
Seminar in Cytology II (PATH-A 470)	2.0
<b>Total</b>	<b>14.0</b>
<i>Summer</i>	<i>Credits</i>
Cytology of Fine Needle Aspiration (PATH-A 455)	2.0
Certification Internship II (PATH-A 465)	3.0
Investigations in Cytopathology (PATH-A 490)	2.0
<b>Total</b>	<b>7.0</b>

**Awards** Recommendations for degrees awarded with distinction are based upon superior academic performance. The Cytotechnology Program recognizes superior academic and professional conduct with the Liang-Che Tao Outstanding Student Award, which is awarded to a graduating senior.

**Graduation Requirements** Satisfactory completion of 127 credit hours, to include 90 credit hours of prerequisite and general-education courses and 37 credit hours of professional courses. All course work must be completed in compliance with the program's and school's academic and professional policies.

Last Updated: March 13, 2012

## Associate of Science

### Associate of Science in Paramedic Science at IUPUI

- **Department Chair:** Professor R. McGrath
- **Medical Director:** Adjunct Clinical Assistant Professor E. Bartkus
- **Program Director:** Assistant Clinical Professor L. Bell
- **Adjunct Faculty:** Lecturers D. Bignell, D. Ervin, K. Gona, J. Hallam, G Hedeem, P. Hutchinson, J. Hively, M. Mangrum, A. Michaels, J. Scheiderer, D. Seketa, M. Thralls, B. Tilton

**Completion of the Course Work/ Graduates of the Program** The associate degree in paramedic science is open to students of the university who have completed the prerequisites for admission. A student completing the course work is prepared to work as an EMT-Paramedic to deliver emergency patient care in the out-of-hospital setting. The paramedic must be a confident leader who can accept the challenge and high degree of responsibility entailed in the position. The paramedic provides the most extensive pre-hospital care and may work for fire departments, private ambulance services, police departments, or hospitals. Response times are dependent upon nature of call.

**Credential Required to Practice** EMT-Paramedic (Emergency Medical Technician- Paramedic)

**Licensure Required to Practice** Graduates of the paramedic program must pass a state-administered certification examination before credentialing. The certification examination in Indiana is the National Advanced Level Certification Examination for EMT-Paramedics and is administered by the National Registry of EMTs on behalf of the Indiana EMS Commission. The EMS Commission is the regulating body that certifies paramedics in Indiana.

### EDUCATIONAL PROGRAM

**Description of the Profession** Paramedics have fulfilled prescribed requirements by a credentialing agency to practice the art and science of out-of-hospital medicine in conjunction with medical direction. Through performing of assessments and providing medical care, their goal is to prevent and reduce mortality and morbidity due to illness and injury. Paramedics primarily provide care to emergency patients in an out-of-hospital setting.

Paramedics possess the knowledge, skills, and attitudes consistent with the expectations of the public and the

profession. Paramedics recognize that they are an essential component of the continuum of care and serve as linkages among health resources.

Paramedics strive to maintain high-quality, reasonably priced health care by delivering patients directly to appropriate facilities. As an advocate for patients, paramedics seek to be proactive in affecting long-term health care by working in conjunction with other provider agencies, networks, and organizations. The emerging roles and responsibilities of the paramedic include public education, health promotion, and participation in injury- and illness-prevention programs. As the scope of service continues to expand, the paramedic will function as a facilitator of access to care, as well as an initial treatment provider.

Paramedics are responsible and accountable to medical direction, the public, and their peers. Paramedics recognize the importance of research and actively participate in the design, development, evaluation, and publication of research. Paramedics seek to take part in lifelong professional development and peer evaluation and assume an active role in professional and community organizations.

### Program Goals

The Associate of Science in Paramedic Science Program intends to:

- Enable the student to perform as a paramedic.
- Provide didactic instruction in the body of paramedic knowledge that will lead a student to hold competencies that will guide the student in lifelong learning as a health care professional.
- Provide clinical instruction that will provide the student with mastery of clinical competencies necessary to perform as a paramedic and will guide the student in lifelong learning as a health care professional.
- Provide a field internship that will develop a student's ability to apply mastered competencies, guided by mentors in real-time situations.
- Develop values that will prepare the student to be sensitive to the cultural needs of all patients.
- Develop knowledge, competency, and awareness of one's abilities and limitations; the ability to relate to people; and a capacity for calm and reasoned judgment while under stress.
- Develop values that will prepare the student to independently process information to make critical decisions.

### Program Objectives

- The paramedic student will be able to establish and/or maintain a patent airway and oxygenate and ventilate patients.
- The paramedic student will be able to take a proper history and perform a comprehensive physical exam on any patient and communicate the findings to others.
- The paramedic student will be able to integrate pathophysiological principles and assessment findings to formulate a field impression and implement the treatment plan for trauma and medical patients, including neonatal, pediatric, and geriatric

patients; patients of diverse backgrounds; chronically ill patients; and patients with common complaints.

- The paramedic student will be able to safely manage the scene of an emergency.

At the completion of the general course of study,

- The student must demonstrate the ability to safely administer medications.
- The student must demonstrate the ability to safely perform endotracheal intubation.
- The student must demonstrate the ability to safely gain venous access in patients of all age groups.
- The student must demonstrate the ability to effectively ventilate un-intubated patients of all age groups.
- The student must demonstrate the ability to perform a comprehensive assessment on pediatric, adult, geriatric, obstetric, trauma, and psychiatric patients.
- The student must demonstrate the ability to perform a comprehensive assessment and formulate and implement a treatment plan for patients with chest pain.
- The student must demonstrate the ability to perform a comprehensive assessment and formulate and implement a treatment plan for patients with dyspnea/respiratory distress.
- The student must demonstrate the ability to perform a comprehensive assessment and formulate and implement a treatment plan for patients with syncope.
- The student must demonstrate the ability to perform a comprehensive assessment and formulate and implement a treatment plan for patients with abdominal complaints.
- The student must demonstrate the ability to perform a comprehensive assessment and formulate and implement a treatment plan for patients with altered mental status.

**Length of the Program** Two years; one year (24-26 credit hours) of prerequisite work plus 12 months of professional course work (42 credit hours).

**Structure of the Professional Program** The prerequisites may be taken on a part-time basis; the professional program is a full-time program conducted primarily during the day. Students can enter in either the spring or fall semester. Clinical activities occur during the evening or on weekends.

**Design of the Professional Curriculum** The curriculum is a competency-based education program of clinical, didactic, and practical instruction integrated with a field internship in advanced emergency care and services.

This program will serve students seeking careers in emergency medical services. It will serve students entering the program immediately after high school as well as nontraditional students. The majority of students are nontraditional in that they have begun to pursue a career in the emergency medical services field on a part-time, full-time, or volunteer basis before deciding on a full-time role in emergency medicine as an EMT-P.

The program follows guidelines established by the Indiana Emergency Medical Services Commission, integrating general-education course work and paramedic science

course work leading to an associate of science degree. The degree program will build on resources established in the largest and most comprehensive EMT-Paramedic Program in Indiana, the program at Wishard Hospital. In addition to classroom and laboratory facilities located on the Indiana University-Purdue University Indianapolis campus, area health care facilities involved in the preparation of EMT-paramedics in this program include Wishard Hospital, Wishard Ambulance Service, Avon Fire Department, and Riley Hospital for Children.

**Location of Clinicals** The primary locations of the clinical rotations are in Indianapolis. A few rotations may be required elsewhere in central Indiana.

**Additional Costs** In addition to regular university fees, students will need to purchase a personal stethoscope, EKG caliper, and uniform for the clinical rotation. Contact the program for a current cost sheet.

**Opportunity for Students to Work** Some students have part-time jobs while completing the professional course work.

**Description of Facilities** The program offices are located at 3930 Georgetown Road (northwest Indianapolis) through Wishard Memorial Hospital's Emergency Medical Services Division. The classroom and laboratory are located on that Wishard campus. The primary clinical site is at Wishard Hospital. The primary field site is the Wishard Ambulance Service. Other clinical and field sites are available in central Indiana.

**Accreditation** The associate degree program in paramedic science received its initial accreditation through the Committee on Accreditation of Educational Programs for the EMS Professions, 4101 W. Green Oaks Blvd., Suite 305-599, Arlington, TX 76016, (817) 330-0080, [www.coaemsp.org](http://www.coaemsp.org).

Last Update: March 13, 2012

### Admission

**General Information** Students accepted into the program must complete the school's and the program's admission requirements before the first day of classes. Admission to the professional program is competitive; therefore, completion of the prerequisites does not guarantee admission to the program.

**Criteria Used for Selection of Class** Grade point average, personal interview, and EMT experience.

**Proposed Class Size** Ten each cohort entering either spring or fall semester.

**Specific Requirements** In addition to the IU School of Medicine Health Professions Programs admission policies and procedures found at the beginning of this section of the bulletin, the following requirements apply to the paramedic science degree program.

**Application Deadline** October 1 of the year before anticipated entry for spring semester or February 1 of the year before anticipated entry for fall semester.

**Total Number of Prerequisite Credit Hours** 24–26.

**Distribution of Credit Hours in Specific Areas** See prerequisites.

**Limitations of Course Work** Remedial courses will not fulfill prerequisites or count as credit hours toward the degree.

**Minimum Cumulative Grade Point Average** 2.30 on a 4.00 scale. This requirement is applied at the time of program application and must be maintained.

**Minimum Grade Requirement in a Stated Prerequisite Course** C (2.00 on a 4.00 scale).

**Interview** All qualified applicants must participate in an interview. Interviews are generally conducted in December for the spring cohort and March for the fall cohort.

**Technical Standards** See School of Medicine Health Professions Programs policy.

**Medical Requirements** Documentation must include a current immunization record that indicates immunization in hepatitis B, rubella, rubeola, mumps, PPD, tetanus, and chicken pox.

**Student Health Insurance** All School of Medicine Health Professions Programs students are required to show proof of coverage under a health insurance plan. This is consistent with requirements for other health science students on the IUPUI campus. Additional information regarding health insurance coverage options and all the immunizations required before the start of the program is also enclosed. Proof of health insurance and immunizations is due on the first day of classes.

**Indiana Residents Preference Policy** See School of Medicine Health Professions Programs policy.

**Volunteer Experience** While volunteer experience is not required, it is helpful in making a career choice.

**Accreditation** The curriculum of the Paramedic Science Program is accredited by the Committee on Accreditation for EMS Programs.

Last Updated: March 13, 2012

**Prerequisites**

Students should consult with their academic advisors for appropriate courses and semester sequence in order to complete prerequisites. Prerequisites may be taken at any accredited college or university. The code "G" indicates a course that meets the school's general-education requirements. Correspondence courses will not be accepted for any of the prerequisite course work.

English Composition (G)	3 cr.
Speech (G)	3 cr.
Intermediate Algebra	4 cr.
Psychology (G)	3 cr.
Sociology	3 cr.
Human Anatomy (G)	4-5 cr.
Human Physiology	4-5 cr.

**EMT-Basic Requirement/Patient Care Activity** In addition to the above prerequisites, each applicant must currently be certified in Indiana as an EMT and have a minimum of 20 hours of patient care activity as an EMT in the patient care area of an ambulance.

*Suggested Plan of Study (EMT–basic certification not complete)*

<b>Freshman</b>	
<i>Fall</i>	<i>Credits</i>
EMT-Basic	6.0
Human Anatomy or Human Biology (with lab)	4.0-5.0
English Composition	3.0
Total	13.0-15.0
<i>Spring</i>	<i>Credits</i>
Human Physiology or Human Biology (with lab)	4.0-5.0
Intermediate Algebra	3.0
Speech or Interpersonal Communication	3.0
Psychology or Sociology	3.0
Total	13.0-15.0
<i>Summer</i>	<i>Credits</i>
Psychology or Sociology	3.0
Total	3.0

*Alternative Suggested Plan of Study (EMT–basic certification )*

<b>Freshman</b>	
<i>Fall</i>	<i>Credits</i>
Human Anatomy or Human Biology (with lab)	4.0-5.0
English Composition	3.0
Intermediate Algebra	4.0
Psychology or Sociology	3.0
Total	14.0-15.0
<i>Spring</i>	<i>Credits</i>
Human Physiology or Human Biology (with lab)	4.0-5.0
Speech or Interpersonal Communication	3.0
Psychology or Sociology	3.0
Elective ( <i>if needed</i> )	3.0
Total	10.0-15.0

Last Updated: March 13, 2012

**Professional Program**

Students are admitted into a fall or spring cohort. Courses in the professional program are sequential and must be taken in the order specified by the program faculty. Both cohorts are shown below.

<b>Sophomore</b>	
<i>Entering in Fall</i>	<i>Credits</i>
The Paramedic and Pulmonology (EMER-E 210)	3.0
Paramedic as Team Member (EMER-E 213)	4.0
Introduction to Paramedic Practice (EMER-E 214)	3.0
Pharmacology for the Paramedic (EMER-E 215)	6.0
Total	16.0
<i>Spring</i>	<i>Credits</i>

The Paramedic and Medical Matters (EMER-E 220)	5.0
The Paramedic and Trauma (EMER-E 221)	3.0
Paramedic as Team Player (EMER-E 223)	5.0
The Paramedic and Cardiology (EMER-E 226)	3.0
<b>Total</b>	<b>16.0</b>
<i>Summer I &amp; II</i>	<i>Credits</i>
Paramedic as Team Leader (EMER E233)	2.0
Paramedic Professions Progress (EMER E243)	4.0
Comtemporany EMS Issues (EMER E246)	3.0
<b>Total</b>	<b>9.0</b>

### Sophomore

<i>Entering in Spring</i>	<i>Credits</i>
The Paramedic and Pulmonology (EMER-E 210)	3.0
Paramedic as Team Member (EMER-E 213)	4.0
Introduction to Paramedic Practice (EMER-E 214)	3.0
Pharmacology for the Paramedic (EMER-E 215)	6.0
<b>Total</b>	<b>16.0</b>
<i>Summer</i>	<i>Credits</i>
The Paramedic and Medical Matters (EMER-E 220)	5.0
Paramedic as Team Player (EMER-E 223)	5.0
The Paramedic and Cardiology (EMER-E 226)	3.0
<b>Total</b>	<b>13.0</b>
<i>Fall</i>	<i>Credits</i>
The Paramedic and Trauma (EMER-E 221)	3.0
Paramedic as Team Leader (EMER E233)	2.0
Paramedic Professions Progress (EMER E243)	4.0
Comtemporany EMS Issues (EMER E246)	3.0
<b>Total</b>	<b>12.0</b>

**Awards** Based on academic performance or clinical performance and excellence, the program faculty will recommend students for degrees awarded with distinction in accordance with the school's honors criteria.

**Graduation Requirements** Satisfactory completion of all prerequisites (24-26 credit hours) and 41 credit hours of professional course work. All course work must be completed in compliance with the program's and school's academic and professional policies. All professional courses (EMER-E courses) must be completed within 24 months after beginning the professional program.

Last Updated: March 13, 2012

## Emergency Medical Services

An educational program in Emergency Medical Technician—Basic and Paramedic Science is located on the Indiana University—Purdue University Indianapolis campus and is offered through the IU School of Medicine Department of Emergency Medicine in conjunction with Wishard Memorial Hospital Division of Emergency Medical Services.

**Scholarships** Scholarship opportunities may be available through the Office of Scholarships and Financial Aid.

**For further information, contact:** Leon Bell, M.S.  
Director  
Emergency Medical Services  
3930 Georgetown Rd.  
Indianapolis, IN 46245

Phone: (317) 630-7614

E-mail: [lbell1@iupui.edu](mailto:lbell1@iupui.edu)

Last Updated: March 13, 2012

## Emergency Medical Technician-Basic (EMT-B)

### Emergency Medical Technician-Basic at IUPUI

- **Department Chair:** Professor R. McGrath
- **Medical Director:** Adjunct Clinical Assistant Professor E. Bartkus
- **Program Director:** Assistant Clinical Professor L. Bell
- **Adjunct Faculty:** Lecturers D. Bignell, D. Ervin, K. Gona, J. Hallam, G Hedeem, P. Hutchinson, J. Hively, M. Mangrum, A. Michaels, J. Scheiderer, D. Seketa, M. Thralls, B. Tilson

**Completion of the Course Work/Graduates of the Program** The EMT-Basic Program is a regular university course of study open to all students. A student completing the course work is prepared to work as an EMT to deliver emergency patient care in the pre-hospital setting. Graduates of both the EMT-Basic and the Paramedic Science Program primarily provide emergency care in ambulance, fire services, or athletic training venues at their level of training. Nontraditional areas of employment are available in hospitals and industry.

**Credential Required to Practice** EMT-B, (Emergency Medical Technician-Basic)

**Licensure Required to Practice** Graduates of either the EMT-Basic or the Paramedic Science Program must pass a state-administered certification examination before credentialing. The certification examination may vary from state to state. The EMT-basic exam in Indiana is the written and skill exam from the Indiana Department of Homeland Security.

### EDUCATIONAL PROGRAM

#### Description of the Profession and Career

**Requirements** Emergency medical technicians respond to emergency calls to provide efficient and immediate care to the critically ill and injured, and they transport patients to medical facilities. After receiving the call from the dispatcher, the EMT-basic drives the ambulance to

the address or location given, using the most expeditious route, depending on traffic and weather conditions. The EMT-basic observes traffic ordinances and regulations concerning emergency vehicle operation, and upon arrival at the scene of crash or illness, parks the ambulance in a safe location to avoid additional injury. Before initiating patient care, the EMT-basic also sizes up the scene to determine that the scene is safe, to identify the mechanism of injury or nature of illness and total number of patients, and to request additional help if necessary. In the absence of law enforcement, the EMT-basic creates a safe traffic environment, through such means as the placement of road flares, removal of debris, and redirection of traffic for the protection of the injured and those assisting in emergency care. The EMT-basic determines the nature and extent of illness or injury and establishes priority for required emergency care. Based on assessment findings, the EMT-basic renders emergency medical care to medical and trauma patients. Duties include, but are not limited to, opening and maintaining an airway; ventilating patients; cardiopulmonary resuscitation, including use of automated external defibrillators; and providing pre-hospital emergency medical care of simple and multiple system trauma, such as controlling hemorrhage, treating shock (hypo-perfusion), bandaging wounds, and immobilizing of painful, swollen, or deformed extremities. Other duties include assisting in childbirth; management of respiratory, cardiac, diabetic, allergic, behavioral, and environmental emergencies; and dealing with suspected poisonings. The EMT-basic searches for medical identification emblems as clues in providing emergency care. Additional care, including administering medications, is provided based upon assessing patients and obtaining historical information.

When a patient must be extricated from entrapment, the EMT-basic assesses the extent of injury and gives all possible emergency care and protection to the entrapped patient and uses the prescribed techniques and appliances for safe removal, including contact dispatchers for additional help or special rescue and/or utility services. The EMT-basic provides simple rescue service if an ambulance has not been accompanied by a specialized unit. The EMT-basic complies with regulations on handling victims of fatalities. Other duties include lifting, securing, and removing stretchers. From the knowledge of the condition of patients, the extent of injuries, and the relative locations and staffing of emergency hospital facilities, the EMT-basic determines the most appropriate facility to which a patient will be transported and communicates effectively with emergency departments and communications centers. The EMT-basic also identifies assessment findings that may require communication with medical personnel.

The EMT-basic provides assistance to receiving facility staff upon request and ensures that ambulances are kept in optimal condition. Members of the profession must maintain familiarity with specialized equipment and attend continuing education and refresher training programs as required by employers, medical direction, and licensing or certifying agencies. They must also meet qualifications within the functional job analysis.

**Length of Program** One semester; a new course begins each fall and spring semester.

**Additional Costs** Students are encouraged to purchase their own stethoscopes.

## ADMISSIONS

**General Information** No application is required. Students from the university at large are eligible to attend. Students must complete program prerequisites before the first day of classes.

**Prerequisite** Current credential in Health Care Provider CPR.

**Approximate Class Size** 38 each semester.

**Technical Standards** See School of Medicine Health Profession Programs technical standards.

## CURRICULUM

**Prerequisite** Students must hold current credential in Health Care Provider-level CPR.

### Required Course

<i>Fall and/or Spring</i>	Credits
Emergency Medical Technician - Basic (EMER-E 201)	6.0 cr

Last Updated: March 13, 2012

## Histotechnology

An educational program in histotechnology through the IU School of Medicine Department of Pathology and Laboratory Medicine is located on the Indiana University–Purdue University Indianapolis campus. Courses are taught via distance education to students in qualifying histology laboratories around the United States.

### [Student Consumer Information About this Program](#)

- Indiana University is sharing this information about Certificate Program in compliance with Federal Regulations required by the US Department of Education.

### Program Goals

The program's goals have been developed within the mission of the Health Professions Programs in the School of Medicine. In an effort to provide theoretical background and the development of a high degree of occupational competence, the program has established the following goals:

- To provide students with the educational experiences necessary to enter a career as a histologic technician, to include entry-level competence and eligibility for the ASCP Board of Registry Histotechnician examination.
- To provide the nationwide health care community with individuals competent to conduct high-quality histologic procedures.
- To provide a curriculum containing a balance between technical knowledge and clinical competence gained in the histology laboratory setting.
- To assist students in reaching their goals by providing academic and occupational advising.

- To instill in students a lifelong desire to achieve professional and academic excellence.

### Program Objectives

Upon successful completion of all standard academic requirements established for this program, the graduate is entitled to receive a Certificate in Histotechnology from Indiana University. By virtue of the standards required by this program, the graduate is eligible to take the Histotechnician Certification Examination administered by the American Society for Clinical Pathology's Board of Registry. The didactic and practical experience provided by the course of instruction should enable the graduate to accomplish the following objectives:

#### A. Technical Skill

1. Perform procedures of basic histologic laboratory techniques, instrumentation, and problem solving at entry-level competency.
2. Demonstrate knowledge of general and specific histologic methodology.
3. Perform procedures with accuracy and precision.
4. Monitor internal and external quality assurance measures.
5. Demonstrate knowledge of operational principles of commonly used laboratory instruments, to include the ability to perform daily preventative maintenance and correct simple malfunctions.
6. Exercise independent judgment regarding choice of procedure and evaluation of results.
7. Organize tasks to cope with volume of work and unexpected demands.

#### B. Communication

1. Communicate effectively with the clinical education supervisor and program director regarding curriculum and training courses.
2. Effectively organize and present information both in written assignments and oral communication.
3. Communicate effectively with other laboratory and health care providers.

#### C. Professional Behavior

1. Display an attitude reflecting pride and professionalism in daily laboratory duties.
2. Demonstrate adaptability, integrity, initiative, neatness, maturity, stability, and a desire for excellence.

**Scholarships** The American Society for Clinical Pathology, the National Society for Histotechnology, and several states' histology professional organizations sponsor scholarships for students in histotechnology. Other scholarship and financial aid opportunities may be available through the IUPUI Office of Scholarships and Financial Aid.

**For further information, contact:** Debra Wood, M.S., Director  
Phone: (317) 491-6311  
E-mail: [demwood@iupui.edu](mailto:demwood@iupui.edu)

**Mailing Address:** IU School of Medicine Histotechnology Program  
IU Health Pathology Laboratory, Room 6002A

350 W 11th Street  
Indianapolis, IN 46202-4108

Program Office Phone: (317) 491-6311

Last Updated: February 23, 2012

## Certificate

### Certificate in Histotechnology at IUPUI

- **Medical Director:** T. Ulbright
- **Program Director:** Clinical Assistant Professor D. Wood

### EDUCATIONAL PROGRAM

**Length of the Program** Ten months of professional course work beginning with fall semester. The course of study consists of eight courses (24 credit hours), including four didactic courses and four practicum courses.

**Structure of the Program** Histotechnology didactic course lectures are recorded and available online. Weekly review sessions are held once per week during the day via web and tele-conferencing; practicum course work is performed at qualified clinical sites in the student's laboratory.

**Design of Professional Curriculum** Students who are employed in laboratories that qualify as clinical affiliate sites are accepted into the Histotechnology Program to begin the course of study in the fall semester. The curriculum consists of didactic and practicum courses delivered by distance learning to students pursuing on-the-job training in histology laboratories. Lectures are recorded using Adobe Presenter and are available weekly. The 60-minute interactive audio/video web-conference review sessions are held once per week using Adobe Connect and are accompanied by related assignments that require approximately 3.5 hours per week for completion. The practicum course modules are designed to be accomplished in approximately 16 hours per week; however, as part of on-the-job training, it is assumed that students in the program receive full-time technical training at their place of employment.

The Histotechnology Program is designed to

- Provide educational and clinical experiences in all area of histologic technology to prepare students for beginning a career as a histologic technician.
- Provide medical communities nationwide with individuals qualified to effectively carry out the functions of the histotechnology discipline.
- Assist affiliate sites' histology trainers in meeting the student's needs in accomplishing the course work.
- Assist students in reaching their goals by providing academic, occupational, and personal guidance.

**Program Facilities** The Histotechnology Program office is located in the IU Health Pathology Laboratory Building at Indiana University-Purdue University Indianapolis (IUPUI). "Classrooms" for delivery of teleconferences, as well as practical training sites, are located in institutions throughout the United States that qualify as clinical affiliates where students are located. Clinical affiliate sites may vary from year to year, as training needs change.

**Additional Costs of the Program** In addition to tuition and course fees, students are required to purchase books. Completion of course requirements may necessitate the

purchase of laboratory supplies not ordinarily used at the student's training facility laboratory. Clinical training laboratories may cover some expenses for laboratory supplies and mailing costs for submission of assignments to the program office. Additional training costs to student and/or laboratory are estimated at \$400.00 per year.

**Feasibility of Work for Students** Since the program is designed with the on-the-job student in mind, full-time employment in a histology laboratory is assumed.

**Accreditation** The Histotechnology Program (certificate level) at Indiana University-Purdue University Indianapolis is fully accredited by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS), Chicago, Illinois; (312) 714-8880.

Last Updated: March 13, 2012

### Admission

**Criteria Used for Selection of Class** For admission, students need a high school diploma (or equivalent), completion of prerequisite courses, employment in or appropriate access to a qualified training laboratory, and completion of all application requirements.

The Histotechnology Program is designed to reach students in all parts of the nation. However, preference for admissions is ranked as follows: (1) students in laboratories with multiple noncertified students; (2) students in laboratories with one noncertified student. Other applicants will be admitted as class capacity allows.

**Class Size** Enrollment in the certificate program is not limited; therefore, most qualified applicants are admitted. In the event, however, that enrollment exceeds program resources, applicants who are residents of Indiana are given preference for admission before out-of-state applicants.

Affiliate sites may accommodate more than one student, depending on the laboratory's capacity for training, or the training facility may accommodate students from additional local sites for web-conferences. Average class size is 45 students.

**Specific Requirements** In addition to the Health Professions Programs admission policies and procedures found at the beginning of this section of the bulletin, the admission policies below apply to the Histotechnology Program.

**Application Deadline** May 1 of the year of anticipated entry.

**Minimum Academic Requirements** High school graduation or equivalent. A minimum of 2.00 on a 4.00 scale in prerequisite courses is required for admission and must be maintained in professional courses. See prerequisites.

**Technical Standards** See Health Professions Programs technical standards.

**Volunteer Experience** Although volunteer experience is not required of applicants, it is highly recommended that students with no histology laboratory experience spend time in a histology laboratory to assure serious interest before proceeding with application to the program.

Last Updated: March 12, 2012

### Curriculum

**Prerequisites** Students are required to have completed college courses in chemistry, biology, and mathematics with a course specific grade point average of 2.0 on a 4.00 scale (C). High school chemistry, biology and mathematics courses with a course specific grade point average of 2.00 on a 4.00 scale (C) are acceptable if completed within 10 years before admission date. All prerequisite courses must be completed before admission into the program.

**Professional Program** Paired didactic and practicum courses must be taken concurrently. Courses are offered and must be completed in sequence. Students are registered for classes in each term as follows:

<i>Fall</i>	<i>Credits</i>
Histotechnology I (PATH-H 101)	3.0
Histotechnology Practicum I (PATH-H 181)	3.0
Histotechnology II (PATH-H 102)	3.0
Histotechnology Practicum II (PATH-H 182)	3.0
Total	12.0
<i>Spring</i>	<i>Credits</i>
Histotechnology III (PATH-H 103)	3.0
Histotechnology Practicum III (PATH-H 183)	3.0
Histotechnology IV (PATH-H 104)	3.0
Histotechnology Practicum IV (PATH-H 184)	3.0
Total	12.0

**Program Completion Requirements** Satisfactory completion of 24 credit hours of professional courses. All course work must be completed in compliance with the program's and school's academic and professional policies.

Last Updated: March 13, 2012

### Associate of Science

#### Associate of Science in Histotechnology at IUPUI

- **Medical Director:** T. Ulbright
- **Program Director:** Clinical Assistant Professor D.Wood

#### EDUCATIONAL PROGRAM

**Length of Program** One year of full-time certificate-level course work, or prior certification by the Board of Registry of the American Society for Clinical Pathology, plus additional time for completion of degree requirements. Students should aim to complete the course work in no more than five years from the time they first enroll in the program.

**Structure of Program** Designed for the employed histologist, the professional course work is offered by distance education. General-education courses may be completed at Indiana University or at other accredited colleges or universities.

**Design of Professional Curriculum** Completion of the certificate-level course work (24 credit hours) is required before pursuit of the associate degree. Alternately, the previously certified HT(ASCP) may apply for special credit in lieu of completion of the certificate course work. Required general-education courses may be transferred from any accredited college or university, in accordance with university and school policy, or completed through the Indiana University School of Continuing Studies independent study courses. A minimum of 30 credit hours must be completed at Indiana University. The histotechnology capstone course, offered by distance education via Adobe Presenter and Adobe Connect web-conferencing, will be taken as the student nears degree completion.

**Program Facilities** The Histotechnology program office is in the IU Health Pathology Laboratory Building at Indiana University-Purdue University Indianapolis. Students access accredited course work by attendance at IUPUI or another college or university or through distance education offerings.

**Opportunity to Work** The program is designed with the employed histologist in mind; full- or part-time employment is assumed.

Last Updated: March 13, 2012

### Admission

**General Information** Students accepted into the program must complete the following program admission requirements before the first day of classes. Enrollment in the associate degree program is not limited; therefore, most qualified applicants are admitted. In the event, however, that enrollment exceeds program resources, applicants who are residents of Indiana are given preference for admission before out-of-state applicants.

**Criteria Used for Selection of Class** Successful completion of the certificate-level course work. Alternately, prior certification by the American Society for Clinical Pathology Board of Registry as an HT or HTL and application for the program's special credit option.

**Specific Requirements** In addition to the Health Professions Programs admission policies and procedures found at the beginning of this bulletin, the admission policies below apply to the Associate of Science in Histotechnology degree.

**Application Deadline** Applications are accepted year round. Capstone course (PATH-H 201) is typically only offered in the spring term.

**Minimum Academic Requirements** High school diploma or equivalent. A minimum grade point average of 2.00 on a 4.00 scale (C) is required for admission and must be maintained in all courses throughout the program.

**Minimum Cumulative Grade Point Average** 2.00 on a 4.00 scale (C). This requirement is applied at admission and must be maintained. Grades earned in remedial courses are not used to calculate the cumulative grade point average.

**Technical Standards** See Health Professions Programs policy.

Last Updated: March 13, 2012

### Curriculum

**Prerequisites** Completion of the Certificate in Histotechnology or prior certification by the American Society for Clinical Pathology as a histotechnician (HT) or histotechnologist (HTL).

### Professional Program

Indiana University offers online courses through various campuses, as well as independent study courses, please contact Histotechnology Program Director for available options. Courses may be completed elsewhere and transferred to IUPUI. Please see below minimum number of hours that must be completed within the IU system to meet graduation requirements. General-education courses may be completed, for the most part, in any sequence. The Histotechnology Program capstone course is designed to be taken near the completion of the associate degree; the student must complete the technical writing course requirement before registering for the capstone courses.

**Degree Completion Courses** The following courses must be satisfactorily completed for the associate degree. The code "G" indicates a course that meets the school's general-education requirements.

Elementary Composition (G)	3 cr.
Professional (Technical) Writing Skills	3 cr.
Interpersonal Communication (G)	3 cr.
College Precalculus Math (G)	3 cr.
Introductory Psychology (G)	3 cr.
Introduction to Sociology	3 cr.
Contemporary Biology	3 cr.
Human Anatomy	3 cr.
Elementary Chemistry	3 cr.
Medical Terminology	2 cr.
Histotechnology Capstone (PATH-H 201)	6 cr.

**Special Credit Policy** Practicing histologists certified by ASCP (HT or HTL) may apply for special credit courses PATH-H 105 (*Histotechnology Credential Theory*) and PATH-H 185 (*Histotechnology Credential*), in lieu of taking certificate-level courses, when working toward the associate degree at IUPUI. Special credit courses PATH-H 105 and PATH-H 185 are normally not transferable to other colleges or universities.

**Graduation Requirements** Satisfactory completion of 30 credit hours, to include 30 credit hours of general-education courses and 30 credit hours of professional courses. If needed, elective hours can be used to bring the student's general-education courses to 30 credit hours as long as all content areas have been completed.

All course work must be completed in compliance with the program's and school's academic and professional policies. Minimum of 30 credits hours must be completed at Indiana University; special credit (PATH-H 105 and 185) courses do not qualify.

Last Updated: March 13, 2012

## Medical Imaging Technology

An educational program in medical imaging technology is located on the Indiana University-Purdue University Indianapolis campus and housed in the IU School of Medicine Department of Radiology and Imaging Sciences. This program is an advanced program for the registered radiographers, nuclear medicine or radiation therapy technologists.

**Description of the Profession** The medical imaging technologist in radiologic sciences is a skilled radiographer imaging professional qualified to provide patient service in interventional procedures (IR), computed tomography (CT), sonography (US), and magnetic resonance imaging (MRI). Medical imaging technologists use principles of radiation protection as they determine exposure factors and position patients for a variety of examinations. Many of the patient examinations are highly specific, using computers or computerized equipment. Medical imaging technologists are also capable of assessing the technical quality of the image, and providing basic patient care. The technologist must function as a member of the health care team.

**Graduates of the Program** Graduates receive a Bachelor of Science degree and are eligible to take specialty examinations depending on their major area of concentration.

**Credentials Required to Practice** RT(R) or RT (T) or RT (N) or RDMS or MMTCB (ARRT). Advanced qualification credentials are available and may be required by employers. Currently, depending on the clinical major completed, graduates may be eligible for one or more of the following credentials in addition to the RT(R) (ARRT) required for entry into the program: from the ARRT, cardiovascular-interventional technology (CV), computed tomography (CT), mammography (M), magnetic resonance imaging (MR), and ultrasound (U); from the ARDMS, medical sonography (RDMS) and vascular technology (RVT).

**Indiana Requirements to Practice** A State license is required to operate an X-ray machine. The State accepts ARRT credentials to satisfy educational requirements.

If you hold one of these credential contact Linda Cox. If you do not hold one of these credentials, contact the Health Professions Programs office.

Linda Cox, Coordinator, Medical Imaging Technology Program  
IU Radiologic and Imaging Sciences  
541 N. Clinical Drive, CL 120  
Indianapolis, IN 46202-5111

Phone: (317) 274-5188  
E-mail: [lcx1@iupui.edu](mailto:lcx1@iupui.edu)

Last Updated: February 14, 2012

## Educational Program

### Bachelor of Science in Medical Imaging Technology at IUPUI

- **Medical Director:** Professor Jackson
- **Program Director:** Associate Professor Long
- **Coordinator:** Clinical Associate Professor Cox

**Clinical Tracks for Magnetic Resonance Imaging (MRI), Computed Tomography (CT), Interventional Procedures (IR) and Sonography (US)** This program is designed to prepare qualified medical imaging technologists. The principal aim of the major is to provide students with educational experiences that will permit them to develop the competencies required to function effectively as advanced imaging technologists. Theory and clinical experiences are provided in interventional procedures, computed tomography and magnetic resonance imaging, and ultrasound. Students receive theory in all areas and select one major for clinical experiences.

**Non-Clinical Track** Students may also select a non-clinical curriculum receiving theory in all areas of Medical Imaging. (Students would not be eligible to sit for advanced certification examinations unless they received the clinical components through their employer.) Students who seek this track may be interested in a BS degree for personal fulfillment, initial employment (such as medical sales) or job advancement (such as a management or education position).

**Non-Clinical Track Requirements** The non-clinical track in Medical Imaging Technology (MIT) is directed toward professionals in the field of Medical Imaging who are seeking a Bachelor degree in their field, but do not require or desire clinical experience in one of the modality tracks offered (CT/MRI/IR/US) in MIT.

- Non-clinical track professional curriculum is 32 credit hours.
- Minimum of 30 credit hours in residence at Indiana University.
- Minimum of 122 credit hours total must be done to receive a Bachelor's degree in Medical Imaging Technology.
- 12 credit hours of the non-clinical track professional curriculum may be taken outside of the Radiologic and Imaging Sciences Programs, but the credit hours must be relevant (must meet with MIT Coordinator for approval of outside credit hours) to the field of Medical Imaging. All credit hours within the non-clinical track professional curriculum must be 300 or 400 level courses.
- The non-clinical track can be done part-time or full-time.
- Most of the professional curriculum for non-clinical track is independent study with only a small commitment of time needed on campus per semester.

### Special Credit for Post-Primary Certification for those seeking the Non-clinical track BS

- Students may apply for special credit (12 credit hours) for holding a **post-primary** certification related to Medical Imaging (ARDM, CT, MRI, Mammography, Nuclear Medicine, etc.)
- If special credit is awarded, all remaining courses must be taken within the non-clinical track professional curriculum in the Medical Imaging Technology Program.
- Special credit hours do not apply toward the minimum of 30 credit hours in residence at Indiana University.

**Length of the Program MRI, CT, and IR (10.5 months)**

A new class begins with summer session II each year and continues through the end of the spring semester the next year.

**US**(16 months) A new class begins with summer session II and continues through the end of the fall semester the next year.

**Non-clinical track (10.5 months)** The Non-clinical track may be started during any semester after application has been made. A new class begins with summer session II each year and continues through the end of the spring semester the next year. However, students may choose to go part-time in this track, which would lengthen the program of study.

**Structure of the Program** Students have classes, labs, or clinical experiences from 8 a.m. to 4 p.m., Monday through Friday. Some evening hours may be required. For the non-clinical track, students are in classes on Tuesday or Thursday during the Summer semester and on Friday during the Fall and Spring semesters. Students will be able to complete a significant portion of the curriculum without attending traditional classes.

**Opportunity for Students to Work** Employment as a part-time radiographer may be available at one of the area hospitals.

**Additional Cost** In addition to regular university tuition and fees, students should expect to pay for program-related expenses such as books, uniforms, etc. Consult the HPP website advising section for a current cost sheet.

**Program Facilities** The Medical Imaging Technology Program is offered in Indianapolis at the Indiana University Medical Center. The offices, classrooms, and laboratory facilities are located on the first floor of the Gatch Hall (Clinical Building). Clinical education sites are in the Indianapolis metropolitan area. Students are responsible for their transportation to these sites.

Last Updated: February 14, 2012

## Admission

### General Information

Admission to the professional program is competitive; therefore, completion of the prerequisites does not guarantee admission to the program.

**Criteria Used for Selection of Class** Previous academic record, evidence of registration in radiography by the American Registry of Radiologic Technologists (ARRT), and availability of major clinical concentration (clinical tracks only).

**Class Size** Varies yearly based on the availability of clinical education sites for each major area and number of students in the non-clinical track.

**Specific Requirements** In addition to the Health Professions Programs' admission policies and procedures found at the beginning of this section of the bulletin, the admission policies below apply to the Medical Imaging Technology Program.

**Application Deadline** November 15 of the year before anticipated entry. Non-clinical track applicants can apply year round.

**Total Number of Prerequisite Credit Hours** 73.

**Minimum Cumulative Grade Point Average** 2.80 on a 4.00 scale at the time of application. All college courses taken, including remedial courses and courses that do not meet prerequisite requirements, are considered when calculating the minimum cumulative grade point average.

**Minimum Specific Grade Point Average\*** Cumulative 2.50 on a 4.00 scale for all math, biological, and physical science course work. All college math, biological, and physical sciences courses taken, including remedial courses and courses that do not meet prerequisite requirements, are considered when calculating the minimum life and physical science grade point average.

\*Achievement of minimum grade point averages is a condition of application eligibility only and does not guarantee acceptance into the MIT program.

**Minimum Grade Requirement in a Stated Prerequisite Course** C (2.00 on a 4.00 scale).

**Interview** An interview is not required.

**Technical Standards** See the Health Professions Programs' policy.

**Indiana Residents Preference Policy** See the Health Professions Programs' policy.

**Experience** While radiography experience beyond the initial radiography program is not required, it is helpful.

Last Update: March 13, 2012

## Prerequisites

Before entering the program, students must complete the following minimum prerequisites. Students should consult with their academic advisors for appropriate courses and semester sequence in order to complete prerequisites. Equivalent prerequisites may be taken at any accredited college or university. The code "G" indicates a course that meets the school's general-education requirements.

**NOTE: Students entering in summer 2013 or after must complete requirements by the end of the prior spring term.**

### General Education Areas

Verbal communication (G)	2-3 cr.
2-3 cr.	
Written communication (G)	2-3 cr.
Introductory psychology (G)	3 cr.
College algebra, trigonometry, or calculus (G)	3-5 cr.
Biological and Physical Sciences (The following courses must be included):	15 cr.
-General Physics	
-Anatomy and Physiology I or Human Biology I (with lab)*	
-Anatomy and Physiology II or Human Biology II (with lab)*	
Humanities elective (G)+	3 cr.
Social/behavioral science elective (G)+	3 cr.

+Courses are required for graduation and can be completed during the professional program (*if necessary*). Students can also request to substitute a second humanities course for the social-behavioral science elective.

**Radiography** This area is complete for applicants who have earned 40 college credit hours in radiography.

Students who received their radiography education without transferable university credit and who have full credentials in radiography (ARRT) may be awarded credit for their credentials and experience and/or may petition to test out of professional radiography courses. A copy of the Special Credit Policy is available upon request. Each applicant will be evaluated individually.

Students must select additional courses in radiography or in areas that support, complement, or extend their radiography background if they lack 40 semester hours of earned college credit in radiography.

*Suggested Elective* (If necessary) A total of 73.0 credit hours are needed before entering the Bachelor of Science in Medical Imaging Technology Program. It is unlikely that a student applying to this program will need any elective credits. Courses from a university based radiography program and special credit awarded by credential/experience will be used to meet the minimum hour's requirement. Students need a total of 122-133.0 credit hours, depending on major track, for graduation.

Last Updated: March 13, 2012

### Professional Program

Courses in the professional program are sequential and therefore must be taken in the order specified by the program faculty.

Students are admitted into three different tracks, MR/CT/IR, Ultrasound, or Non-Clinical. There are differences in the total number of credit hour required for each track in addition to other curricular differences.

#### Senior (MR/CT/IR)

<i>Summer II</i>	<i>Credits</i>
Sectional Imaging Anatomy (RADI-R 404)	3.0 cr
Introduction to Medical Imaging Technology Projects (RADI-R 455)	2.0 cr
Medical Imaging Technology Clinical Observation (RADI-R 480)	1.0 cr
<b>Total</b>	<b>6.0 cr</b>
<i>Fall</i>	<i>Credits</i>
Essential Radiology for the Imaging Technologist I (RADI-R 415)	2.0 cr
Medical Imaging Theory (RADI-R 451)	3.0 cr

Medical Imaging Technology Project I (RADI-R 456)	2.0 cr
Clinical Practicum (Select from RADI-R 481, 482, 483)	6.0 cr
<b>Total</b>	<b>13.0 cr</b>
<i>Spring</i>	<i>Credits</i>
Essential Radiology for the Imaging Technologist II (RADI-R 416)	1.0 cr
Medical Imaging Technology Physics Review (RADI-R 428) <b>or</b> Magnetic Resonance Imaging Physics (RADI-R 429)	1.0 cr
Medical Imaging Applications (RADI-R 452)	3.0 cr
Medical Imaging Technology Project II (RADI-R 457)	2.0 cr
Clinical Practicum (Select from RADI-R 481, 482, 483)	6.0 cr
<b>Total</b>	<b>13.0 cr</b>
<b>MR/CT/IR Program Total</b>	<b>32.0 cr</b>

#### Senior (Ultrasound)

<b>Year One</b>	
<i>Summer Session II</i>	<i>Credits</i>
Sectional Imaging Anatomy (RADI-R 404)	3.0 cr
Introduction to Medical Imaging Technology Projects (RADI-R 455)	2.0 cr
Medical Imaging Technology Clinical Observation (RADI-R 480)	1.0 cr
<b>Total</b>	<b>6.0 cr</b>
<i>Fall</i>	<i>Credits</i>
Ultrasound Physics I (RADI-R 434)	3.0 cr
Medical Imaging Theory (RADI-R 451)	3.0 cr
Medical Imaging Technology Project I (RADI-R 456)	2.0 cr
Clinical Practicum (RADI-R 484)	6.0 cr
<b>Total</b>	<b>14.0 cr</b>
<i>Spring</i>	<i>Credits</i>
Ultrasound Physics II (RADI-R 435)	3.0 cr
Medical Imaging Applications (RADI-R 452)	3.0 cr
Medical Imaging Technology Project II (RADI-R 457)	2.0 cr
Clinical Practicum (RADI-R 484)	6.0 cr
<b>Total</b>	<b>14.0 cr</b>

<b>Year Two</b>	
<i>Summer Session II</i>	
Clinical Practicum (RADI-R 484)	Credits 4.0 cr
Total	4.0 cr
<i>Fall</i>	
Clinical Practicum (RADI-R 484)	Credits 8.0
Total	8.0
<b>Ultrasound Program Total</b>	<b>46.0 cr</b>

**Senior (Non-Clinical)**

<i>Summer Session II</i>	
Sectional Imaging Anatomy (RADI-R 404)	Credits 3.0 cr
Introduction to Medical Imaging Technology Projects (RADI-R 455)	3.0 cr
Total	6.0 cr
<i>Fall</i>	
Essential Radiology for the Imaging Technologist I (RADI-R 415)	Credits 2.0 cr
Medical Imaging Theory (RADI-R 451)	3.0 cr
Medical Imaging Technology Project I (RADI-R 456)	2.0 cr
Special Credit <b>or</b> Upper-Level Electives	6.0 cr
Total	13.0 cr
<i>Spring</i>	
Essential Radiology for the Imaging Technologist II (RADI-R 416)	Credits 1.0 cr
Medical Imaging Technology Physics Review (RADI-R 428) <b>or</b> Magnetic Resonance Imaging Physics (RADI-R 429)	1.0 cr
Medical Imaging Applications (RADI-R 452)	3.0 cr
Medical Imaging Technology Project II (RADI-R 457)	2.0 cr
Special Credit <b>or</b> Upper-Level Electives	6.0 cr
Total	13.0 cr
<b>Non-Clinical Program Total*</b>	<b>32.0 cr</b>
<b>*Alternate schedules available, please contact program coordinator.</b>	

**Non-Clinical Track Special Credit** Contact Program Coordinator to see program's special credit policy.

**Non-Clinical Track Electives** Contact Program Coordinator for a list of the approved upper-level electives that can be taken to fulfill this requirement.

**Awards** The program faculty recommend to the university graduating students with superior academic performance for degrees awarded with distinction. Also, students with outstanding academic and clinical achievement during their professional program may be recognized by the program at the time of graduation.

**Graduation Requirements** Satisfactory completion of 121-133 credit hours. All course work must be completed in compliance with the program's and school's academic and professional policies.

Last Updated: March 13, 2012

## Nuclear Medicine Technology

An educational program in nuclear medicine technology is located on the Indiana University–Purdue University Indianapolis campus and housed in the IU School of Medicine Department of Radiology and Imaging Sciences, section on nuclear medicine.

**Description of the Profession** The graduate nuclear medicine technologist is qualified to provide patient diagnostic and therapeutic services using ionizing radiation in the form of gamma rays, X rays, and beta rays. These radiations emanate from radioactive materials. Nuclear medicine technologists perform patient organ imaging procedures, radioactive analysis of biological specimens (blood, urine), and some therapeutic applications of radioactive materials. Effective nuclear medicine technologists use principles of radiation protection as they prepare and administer radioactive materials for a variety of examinations. They are capable of performing quality control procedures on the instrumentation and radioactive materials. Nuclear medicine technologists also assist physicians in clinical procedures, give intravenous injections, draw blood, assess the technical quality of the studies, and provide basic patient care. The nuclear medicine technologist must function as a member of the health care team.

**Graduates of the Program** Graduates receive a Bachelor of Science degree from Indiana University and are eligible to take the certification examination of the American Registry of Radiologic Technologists (ARRT) and the Nuclear Medicine Technology Certification Board (NMTCB) to become certified as a nuclear medicine technologist, R.T.(N) or C.N.M.T.

**Credentials Required to Practice** R.T.(N) (ARRT), Registered Nuclear Medicine Technologist, or C.N.M.T. (NMTCB), Certified Nuclear Medicine Technologist.

**For further information, contact:** Judith E. Kosegi, Program Director, Nuclear Medicine Technology Program  
IU Radiologic and Imaging Sciences  
541 Clinical Drive, CL 120  
Indianapolis, IN 46202

Phone: (317) 274-7431  
E-mail: [jkosegi@iupui.edu](mailto:jkosegi@iupui.edu)

Last Updated: March 13, 2012

## Educational Program

### Bachelor of Science in Nuclear Medicine Technology at IUPUI

- **Medical Advisor:** Professor Fletcher
- **Program Director:** Associate Professor Kosegi
- **Assistant Professors:** Richard
- **Lecturers:** Byrne, Clift, Dick, Duncan-Weatherman, Giger, Hardesty, Lewis, Lomax, Spilker, Wade

**Length of the Program** A new class begins summer session II each year and continues for 22 months.

**Structure of the Professional Program** The curriculum is designed for persons with no previous experience in nuclear medicine, although experienced technologists may apply for admission. During the junior year, students have classes on Monday, Wednesday, and Friday, plus up to eight hours of clinical practicum on each Tuesday and Thursday and four hours on Friday mornings. Senior students have up to eight hours of clinical practicum on each Monday, Wednesday, and Friday, plus classes on Tuesday and Thursday.

**Design of the Professional Curriculum** This degree is designed to prepare qualified nuclear medicine technologists. The principal aim of the degree is to provide students with educational experiences that will permit them to develop the competencies required to function effectively as nuclear medicine technologists. The curriculum integrates theory and clinical experience.

**Opportunity for Students to Work** Some part-time employment may be available in the radiology departments at the Indiana University Medical Center. There are no restrictions on the number of hours a student may work during the program, as long as work does not interfere with program requirements. The student must, however, recognize that the professional curriculum requires approximately 25 to 35 hours per week of on-campus participation in classroom, laboratory, and clinical course work. Study time and completion of general education courses must also be considered. While most of the professional course activities are scheduled during daytime hours Monday through Friday, there are some clinical experiences that may require student participation during evenings or other off hours. Please contact the program for more information.

**Additional Cost** In addition to regular university tuition and fees, students should expect to pay program-related expenses such as books, uniforms, etc. Contact the program for a current cost sheet.

**Program Facilities** The nuclear medicine technology program is offered in Indianapolis at the Indiana University Medical Center. The offices, classrooms, and library are located on the first floor of the Gatch Hall (Clinical Building). Students obtain clinical experience in the nuclear medicine areas of radiology departments located in University, Riley, Wishard, and Veterans Administration hospitals, plus the PET/CT facilities on campus. Three other clinical education sites in the Indianapolis area are also used.

**Accreditation** The bachelor's degree in nuclear medicine technology is fully accredited by the Joint Review

Committee on Educational Programs in Nuclear Medicine Technology.

Last Updated: February 15, 2012

## Admission

**General Information** Admission to the professional program is competitive; therefore, completion of the prerequisites does not guarantee admission to the program.

**Class Size** Seven students are admitted to begin the program in summer session II (late June) each year.

**Specific Requirements** In addition to the School of Medicine Health Professions Programs' admission policies and procedures found at the beginning of this section of the bulletin, the policies below apply to the Nuclear Medicine Technology Program.

**Application Deadline** November 15 of the year before anticipated entry.

**Total Number of Prerequisite Credit Hours** 60

**Minimum Cumulative Grade Point Average** 2.80 on a 4.00 scale. This requirement is applied at the time of program application and must be maintained. The grades from all college courses taken, including remedial courses and courses that do not meet prerequisite requirements, are considered when calculating the minimum cumulative grade point average.

**Minimum Specific Grade Point Average** 2.50 on a 4.00 scale for all life and physical science course work. This requirement is applied at the time of program application and must be maintained. The grades from all college life and physical sciences courses taken, including remedial courses and courses that do not meet prerequisite requirements, are considered when calculating the minimum specific grade point average.

**Minimum Grade Requirement in a Stated Prerequisite Course** C (2.00 on a 4.00 scale).

**Interview** Qualified applicants must participate in an interview. Interviews are conducted in early to mid February.

**Technical Standards** See School of Medicine Health Professions Programs' policy.

**Indiana Residents Preference Policy** See School of Medicine Health Professions Programs' policy.

**Volunteer Experience** Volunteer experience is not required. Applicants are expected to observe in a nuclear medicine facility before the admission interview.

Last Updated: February 15, 2012

## Prerequisites

Before entering the program, students must complete the minimum prerequisites listed below. Students should consult with their academic advisors for appropriate courses and semester sequence in order to complete prerequisites. Prerequisites may be taken at any accredited college or university. The code "G" indicates a course that meets the School's general-education requirements.

**NOTE: Students entering in summer 2013 or after must complete requirements by the end of the prior spring term.**

### General Education

Written Communications, two courses (G) (Prefer the second writing course focus on writing a research paper.)	4-6 cr.
Verbal Communications (G)	2-3 cr.
Psychology (G)	3 cr.
Biological and Physical Sciences (G)	20-25 cr.

The following courses must be included:

-Elementary Chemistry I (with lab)	
-Elementary Chemistry II (with lab)	
-General Physics	
-Anatomy and Physiology I or Human Biology I (with lab)*	
-Anatomy and Physiology II or Human Biology II (with lab)*	
College Algebra, Trigonometry, or Calculus (G)	5-6 cr.**
Statistics	3 cr.

### Other Graduation Requirements and Electives\*\*\*

Humanities Elective (G)+	3 cr.
Social/Behavioral Science Elective (G)+	3 cr.
Medical Terminology	1 cr.
General Electives - As needed to meet minimum hours requirements	
Total (minimum)	60 cr.

\*Individual Anatomy and Physiology courses (with labs) may be used.

\*\*Or 4 credits of 200 level or higher college calculus.

\*\*\*Students must enter with a minimum of 60 credit hours at program entrance may take up to 9 credit hours of the other graduation requirements during the program.

+Students can request to substitute a second humanities course for the social-behavioral science elective.

### A Suggested Plan of Study

#### Freshman

<i>Fall</i>	<i>Credits</i>
English Composition I	3.0
Verbal Communication	3.0
College Algebra	3.0
Chemistry I (with lab)	5.0
Total	14.0
<i>Spring</i>	<i>Credits</i>
English Composition II	3.0
Psychology	3.0
Trigonometry or Calculus	3.0
Chemistry II (with lab)	5.0
Total	14.0

#### Sophomore

<i>Fall</i>	<i>Credits</i>
Anatomy and Physiology I	4.0-5.0
General Physics	4.0-5.0
Humanities Elective	3.0
Medical Terminology	1.0
General Electives	2.0-4.0
Total	16.0
<i>Spring</i>	<i>Credits</i>
Anatomy and Physiology II	4.0-5.0
Statistics	3.0
Social/Behavioral Science Elective	3.0
General Electives	3.0
Total	16.0

Last Updated: March 13, 2012

### Professional Program

Courses in the professional program are sequential and therefore must be taken in the order specified by the program faculty.

The 65 professional credits listed below are obtained within a 22-month period and fulfill eligibility requirements for the registry examination in nuclear medicine technology. Some electives may be taken (as shown below) during the 22-month program.

#### Junior

<i>Summer Session II</i>	<i>Credits</i>
Introduction to Radiography (RADI-R 110)	3.0
Patient Care I (RADI-R112)	3.0
Total	6.0
<i>Fall Semester</i>	<i>Credits</i>
Projects in Nuclear Medicine Technology I (RADI-R 410)	1.0
Physics and Instrumentation of Nuc Med I (RADI-R 412)	2.0
Applications of Radionuclides I (RADI-R 432)	3.0
Radiation Protection in Nuclear Medicine (RADI-R 437)	1.0
Clinical Nuclear Medicine Practicum I (RADI-R 445)	6.0

Elective if needed for Graduation	3.0
Total	13.0-16.0
<i>Spring Semester</i>	<i>Credits</i>
Projects in Nuclear Medicine Technology II (RADI-R 411)	2.0
Physics and Instrumentation of Nuc Med II (RADI-R 417)	2.0
Radionuclide Measurement (RADI-R 422)	2.0
Nuclear Medicine In-Service I (RADI-R 423)	1.0
Clinical Nuclear Medicine Practicum I (RADI-R 445)	5.0
Elective if needed for Graduation	3.0
Total	12.0-15.0
<b>Senior</b>	
<i>Summer Session I &amp; II</i>	<i>Credits</i>
Patient Care II (RADI-R 212) 12 wks/SS I & II	1.0
Sectional Imaging Anatomy (RADI-R 404) 6 wks/SS II	3.0
Clinical Nuclear Medicine Practicum II (RADI-R 446) 12 wks SS I & II	5.0
Elective if needed for Graduation	3.0
Total	9.0-12.0
<i>Fall Semester</i>	<i>Credits</i>
Nuclear Medicine In-Service II (RADI-R 424)	1.0
Radiopharmaceuticals (RADI-R 427)	2.0
Essential Radiology I (RADI-R 438)	1.0
Nuclear Medicine Management (RADI-R 441)	1.0
Clinical Nuclear Medicine Practicum III (RADI-R 447)	6.0
Medical Imaging Theory for NMTs (RADI-R 449)	2.0
Elective if needed for Graduation	3.0
Total	13.0-16.0
<i>Spring Semester</i>	<i>Credits</i>
Projects in Nuclear Medicine Technology III( RADI-R 413)	2.0
Nuclear Medicine In-Service III (RADI-R 425)	1.0
Applications of Radionuclides II (RADI-R 433)	2.0
Essential Radiology II (RADI-R 439)	2.0
Clinical Nuclear Medicine Practicum III (RADI-R 447)	5.0
Elective if needed for Graduation	3.0

Total	12.0-15.0
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**Awards** The faculty will recommend to the university, graduating students with superior academic performance for degrees awarded with distinction according to the university's policy. Also, students with outstanding academic and clinical achievement during their professional program may be recognized by the program at the time of graduation.

**Graduation Requirements** Satisfactory completion of a minimum of 125 credit hours. All course work must be completed in compliance with the program's and school's academic and professional policies.

Last Updated: February 15, 2012

## Radiation Therapy

The educational program in Radiation Therapy through the IU Department of Radiation Oncology is located on the Indiana University–Purdue University Indianapolis campus, Indiana University Medical Center.

**Mission Statement** The Radiation Therapy Program, sponsored by the School of Medicine on the Indiana University-Purdue University Indianapolis campus, is designed to provide academic and clinical education to prepare qualified radiation therapists. The major purpose of the program is to provide a quality baccalaureate degree program in radiation therapy dedicated to the health and welfare of the patient through treatment of disease.

### Program Goals

1. Students will be clinically competent.

#### *Student Learning Outcomes:*

- Students will demonstrate the appropriate knowledge of radiation therapy procedures.
- Students will apply principles of radiation protection for patient, self, and others.
- Students will perform basic radiation therapy dose calculations and access treatment plans.
- Students will be able to perform radiation therapy treatments as prescribed by a radiation oncologist.
- Students will be able to perform radiation therapy simulation competencies.
- Students will evaluate patients for effects, reactions, and therapeutic responses.

2. Students will communicate effectively.

#### *Student Learning Outcomes:*

- Students will demonstrate effective oral communication skills.
- Students will demonstrate effective written communication skills.

3. Students will think critically and apply problem solving skills in the healthcare environment.

#### *Student Learning Outcomes:*

- Students will develop a solution to a scenario.
- *Students will perform challenge exams.*
- Students will apply research methods to the senior research project.

4. Students will have knowledge of the value of professional development and growth.

#### *Student Learning Outcomes:*

- Students will attend professional meetings.
- Students will be knowledgeable of the importance of professional development and life-long learning.
- Students will formulate methods for pursuit of life-long learning
- Students will participate in one service learning activity.

5. Graduates/Students will graduate and will be qualified to work as entry level radiation therapists.

**Program Outcomes:**

- Employers will be satisfied with the graduate's performance.
- Graduates will achieve a 90% or greater first attempt credentialing pass rate over the past five years.
- Graduates job placement rate will be 90% or greater within 6 months of graduation during the past five years.
- Graduates will pass the AART national exam on the first attempt.
- Students will complete the program within 20 months for radiographers and 22 months for non-radiographers.
- Students will be satisfied with their education.
- Of those pursuing employment, graduates will be employed within 6 months of graduation.

**Description of the Profession** Radiation therapy involves the use of different forms of ionizing radiation for the treatment of benign and malignant tumors. Radiation therapists administer the prescribed dose of ionizing radiation to specific sites of the patient's body as directed by the physician. They operate varied types of equipment, including high-energy linear accelerators, and work with radioactive materials. In addition, radiation therapists observe the clinical progress of the patient undergoing radiation therapy, observe the first signs of any complication, and determine when treatment should be withheld until a physician may be consulted.

**Graduates of the Program** The Radiation Therapy Program is designed to prepare graduates to meet the scope of practice standards for radiation therapy. Upon completion of the program, graduates are eligible to take the radiation therapy certification examination given by the American Registry of Radiologic Technologists (ARRT). Having passed this exam, certificate holders are classified as registered radiation therapists, R.T.(T)(ARRT).

**Licensure Required to Practice** Licensure of radiation therapists is required in Indiana.

**Scholarships** Some hospitals and employers offer financial assistance for students pursuing radiation therapy.

**For further information, contact:** Judith Schneider, Director  
Radiation Therapy Program  
Indiana Cancer Care Pavilion  
535 Barnhill Drive, RT 107B  
Indianapolis, IN 46202-5289

Phone: (317) 948-7945  
E-mail: [jmschnei@iupui.edu](mailto:jmschnei@iupui.edu)

Last Updated: February 8, 2012

## Educational Program

### Bachelor of Science in Radiation Therapy at IUPUI

- **Program Director:** Assistant Professor Schneider
- **Clinical Coordinator:** Assistant Professor Schneider

**Length of the Program** The radiation therapy program is a four-year baccalaureate degree program and has two tracks: one for the nonradiographer and one for the radiographer. For the nonradiographer, the program is composed of 51 credit hours of prerequisite and general-education requirements and a 22-month professional core in the junior and senior years. For the radiographer, the program includes general-education requirements and a 20-month professional core.

**Structure of the Program** The classroom and clinical experiences are Monday through Friday from 8 a.m. to 4:30 p.m., with continuous enrollment during the professional core.

**Opportunity for Students to Work** Students often seek employment in part-time positions outside the program, which must be balanced with evening study.

**Additional Cost** In addition to regular university tuition and fees, students should expect to pay program-related expenses. Contact the program for a current cost sheet.

**Program Facilities** The Radiation Therapy Program offices are located on the IU Medical Center campus. Classrooms and laboratories are located in radiation oncology departments of area hospitals and in other buildings on the Indiana University-Purdue University Indianapolis campus.

**Location of Clinicals** The clinical practicums are provided at a variety of clinical sites located within a 75-mile radius of Indianapolis.

**Accreditation** The program is accredited by the Joint Review Committee on Education in Radiologic Technology, 20 N. Wacker Drive, Suite 2850, Chicago, IL 60606-3182.

Last Updated: February 8, 2012

## Admission

### NONRADIOGRAPHER - [RADIOGRAPHER]

#### General Information

Admission into the School of Medicine Health Professions Programs radiation therapy program is based on an admission index that is composed of a cumulative grade point average, the mathematics and science grade point average, prerequisite courses grade point average, and an interview.

#### Specific Requirements

In addition to the School of Medicine Health Professions Programs admission policies and procedures found at the beginning of this bulletin, the following admission policies apply to the radiation therapy program.

**Application Deadline** December 1 of the year before desired entry into the program.

**Minimum Number of Prerequisite Credit Hours** 51.

**Minimum Cumulative Grade Point Average** 2.50 on a 4.00 scale. This requirement is applied at the time of program application. Grades from remedial courses are not calculated in the grade point average of the prerequisite courses to determine the admission index.

**Minimum Specific Grade Point Average** Science and math grade point average of 2.30 and a 2.50 grade point average in stated prerequisite courses (on a 4.00 scale). This requirement is applied at the time of program application and must be maintained. Grades from remedial courses are not calculated in the mathematics and science grade point average to determine the admission index.

**Minimum Grade Requirement in a Prerequisite Course** C (2.00 on a 4.00 scale).

**Interview** A personal interview is required. If, however, the number of applications to the program far exceeds the number of positions available, the program's admissions committee reserves the right to limit the number of applicants to be interviewed to twice the number of positions available in the class. Interviews are conducted in February.

**Technical Standards** See School of Medicine Health Professions Programs policy.

**Medical Requirements** All required immunizations must be completed before the start of the program. Verification of immunizations and the health form must be submitted during orientation.

**Indiana Residents Preference Policy** See School of Medicine Health Professions Programs policy.

**Volunteer Experience** The student must observe in a radiation oncology facility before applying to the program.

## RADIOGRAPHER

### Specific Requirements

In addition to the School of Medicine Health Professions Programs admission policies and procedures found at the beginning of this section of the bulletin, the following admission policies apply to the radiation therapy program.

**Application Deadline** December 1 of the year before desired entry into the program.

### Minimum Number of Prerequisite Credit

**Hours** Satisfactory completion of general-education and technical-specialty requirements.

**Minimum Cumulative Grade Point Average** 2.50 on a 4.00 scale; this requirement is applied at the time of program application. Grades from remedial courses are not calculated into the grade point average of the prerequisite courses to determine the admission index.

**Minimum Specific Grade Point Average** Science or mathematics grade point average of 2.30 and a 2.50 grade point average in stated prerequisite courses (on a 4.00 scale); this requirement is applied at the time of program application and must be maintained. Students must attain a cumulative grade point average of 2.30 for all radiography courses. Grades from remedial courses are not calculated into the mathematics and science grade point average to determine the admission index.

**Minimum Grade Requirement in a Stated Prerequisite Course** C (2.00 on a 4.00 scale).

**Interview** A personal interview is required. However, if the number of applications to the program far exceeds the number of positions available, the program's admissions committee reserves the right to limit the number of applicants to be interviewed to two times the number of positions available in the class. Interviews are conducted in February.

**Technical Standards** See School of Medicine Health Professions Programs policy.

**Medical Requirements** All required immunizations must be completed before the start of the program. Verification of immunizations and the health form must be submitted during orientation.

**Indiana Residents Preference Policy** See School of Medicine Health Professions Programs policy.

**Volunteer Experience** Students must observe in a radiation oncology facility before applying to the program.

Last Updated: February 8, 2012

## Prerequisites

### NON-RADIOGRAPHER - [RADIOGRAPHER]

#### Prerequisites

The following prerequisite course of study must be completed to be eligible for admission into the professional program. Students should consult with their academic advisors for appropriate courses and semester sequence.

Prerequisites may be taken at any accredited college or university. The code "G" indicates a course that meets the school's general-education requirements.

#### General Education

Verbal Communication (G)	2-3 cr.
Written communication (two courses) (G)	6 cr.
<i>(Second writing course must focus on research and professional writing skills)</i>	
Humanities elective (G)	3 cr.
Social/behavioral science elective (G)	3 cr.
Introductory Psychology (G)	3 cr.
College Algebra and Trigonometry (G)	5-6 cr.
Statistics	3 cr.
General Physics (with lab) (G)	4-5 cr.
Human Anatomy (with lab)	4-5 cr.
Human Physiology	4-5 cr.
Medical Terminology	1 cr.
Introduction to Computers	2-3 cr.
Business electives	6 cr.

**Suggested Electives** (To bring total credits up to 51.) The number of elective courses differs among students but must bring the student's total prerequisite course work to at least 51 credit hours. Additional electives may be required, before or during the professional program, to

complete a minimum of 122 credit hours of academic course work for graduation.

*Suggested Plan of Study - Based on IUPUI Course Offerings*

**Freshman**

<i>Fall</i>	<i>Credits</i>
Elementary Composition	3.0
Humanities	3.0
Algebra and Trigonometry	3.0
Human Anatomy	4.0-5.0
<b>Total</b>	<b>13.0-14.0</b>
<i>Spring</i>	<i>Credits</i>
Speech Communications or Interpersonal Communication	3.0
Algebra and Trigonometry	3.0
Introductory Psychology	3.0
Human Physiology	4.0-5.0
<b>Total</b>	<b>13.0-14.0</b>

**Sophomore**

<i>Fall</i>	<i>Credits</i>
Elementary Composition II or Professional Writing Skills	3.0
General Physics (with lab)	4.0-5.0
Introduction to Computers	3.0
Statistics	3.0
<b>Total</b>	<b>13.0-14.0</b>
<i>Spring</i>	<i>Credits</i>
Social/Behavioral Science Elective	3.0
Business Electives	3.0
Medical Terminology	1.0-2.0
Elective ( <i>If Necessary</i> )	1.0
<b>Total</b>	<b>8.0-12.0</b>

**RADIOGRAPHER**

**Prerequisites**

The following prerequisite course of study must be completed for students to be eligible for admission into the professional program. Students should consult with their academic advisors for appropriate courses and semester sequence in order to complete prerequisites. Prerequisites may be taken at any accredited college or university. The code "G" indicates a course that meets the school's general-education requirements.

**General Education**

Verbal Communication (G)	2-3 cr.
Written communication (two courses) (G) ( <i>Second writing course must focus on research and professional writing skills</i> )	6 cr.
Humanities elective (G)	3 cr.
Social/behavioral science elective (G)	3 cr.
Introductory Psychology (G)	3 cr.

College Algebra and Trigonometry (G)	5-6 cr.
Statistics	3 cr.
General Physics (with lab) (G)	4-5 cr.
Human Anatomy (with lab)	4-5 cr.
Human Physiology	4-5 cr.
Medical Terminology	1 cr.
Introduction to Computers	2-3 cr.
Business electives	6 cr.
<i>(Second course can be taken during fall semester in professional program if necessary)</i>	

**Technology Specialty** Applicants must supply evidence of registration in radiography by the ARRT or completion of a radiography program accredited by the Joint Review Committee on Education in Radiologic Technology.

The technical-specialty area is complete for applicants who have completed an associate or baccalaureate bachelor's degree in radiography.

Students who received their technical training in non-credit-awarding programs and who have full credentials in radiography (ARRT) may be awarded credit for their credentials and experiences and/or petition to test out of technical-specialty courses.

Last Updated: February 8, 2012

**Professional Program**  
**NON-RADIOGRAPHER - [RADIOGRAPHER]**

Courses in the professional program are sequential and must be taken in the order specified by the program faculty.

**Junior**

<i>Summer Session II</i>	<i>Credits</i>
Introduction to Radiography (RADI-R 110)	3.0
Patient Care I (RADI-R 112)	3.0
<b>Total</b>	<b>6.0</b>
<i>Fall</i>	<i>Credits</i>
Principles of Radiography I (RADI-R 118)	3.0
Simulation/Treatment Procedures (RAON-J 300)	6.0
Clinical Dosimetry I (RAON-J 305)	2.0
Medical Imaging and Processing in Radiation Oncology (RAON-J 307)	2.0
Clinical Experience: Basic (RAON-J 350)	3.0
<b>Total</b>	<b>16.0</b>
<i>Spring</i>	<i>Credits</i>
Radiation Oncology Techniques I (RAON-J 302)	3.0
Radiation Oncology Patient Care (RAON-J 304)	2.0

Clinical Dosimetry II (RAON- J 306)	2.0
Clinical Practicum I (RAON- J 351)	3.0
Quality Management in Radiation Oncology (RAON- J 404)	3.0
<b>Total</b>	<b>13.0</b>
<i>Summer Session I</i>	<i>Credits</i>
Clinical Practicum II (RAON- J 450)	3.0
<b>Total</b>	<b>3.0</b>
<b>Senior</b>	
<i>Summer Session II</i>	<i>Credits</i>
Sectional Anatomy (RADI-R 404)	3.0
Radiation Oncology Techniques II (RAON-J 402)	3.0
Clinical Practicum III (RAON-J 451)	2.0
<b>Total</b>	<b>8.0</b>
<i>Fall</i>	<i>Credits</i>
Clinical Oncology I (RAON- J 303)	3.0
Physics of Radiation Oncology I (RAON-J 400)	2.0
Senior Project in Radiation Oncology (RAON-J 409)	3.0
Clinical Practicum IV (RAON-J 452)	5.0
<b>Total</b>	<b>13.0</b>
<i>Spring</i>	<i>Credits</i>
Physics of Radiation Oncology II (RAON-J 401)	2.0
Clinical Oncology II (RAON- J 403)	3.0
Radiation and Cancer Biology (RAON-J 406)	2.0
Clinical Practicum V (RAON-J 453)	5.0
<b>Total</b>	<b>12.0</b>

**Graduation Requirements for Baccalaureate Degree**

To be eligible for graduation with a baccalaureate degree, students must successfully complete the general-education requirements (51 cr hrs minimum) and professional core in radiation therapy (71 cr hrs minimum). They must also achieve clinical competency in each area identified in the clinical manual requirements.

**RADIOGRAPHER**

Courses in the professional program are sequential and must be taken in the order specified by the program faculty.

<b>Junior</b>	
<i>Fall</i>	<i>Credits</i>
Orientation to Radiation Oncology (RAON-J 301)	4.0
Clinical Dosimetry I (RAON- J 305)	2.0

Clinical Experience: Basic (RAON-J 350)	3.0
Business elective ( <i>If Necessary</i> )	3.0
<b>Total</b>	<b>9.0-12.0</b>
<i>Spring</i>	<i>Credits</i>
Radiation Oncology Techniques I (RAON-J 302)	3.0
Radiation Oncology Patient Care (RAON-J 304)	2.0
Clinical Dosimetry II (RAON- J 306)	2.0
Clinical Practicum I (RAON- J 351)	3.0
Quality Management in Radiation Oncology (RAON- J 404)	3.0
<b>Total</b>	<b>13.0</b>
<i>Summer Session I</i>	<i>Credits</i>
Clinical Practicum II (RAON- J 450)	3.0
<b>Total</b>	<b>3.0</b>
<b>Senior</b>	
<i>Summer Session II</i>	<i>Credits</i>
Sectional Anatomy (RADI-R 404)	3.0
Radiation Oncology Techniques II (RAON-J 402)	3.0
Clinical Practicum III (RAON-J 451)	2.0
<b>Total</b>	<b>8.0</b>
<i>Fall</i>	<i>Credits</i>
Clinical Oncology I (RAON- J 303)	3.0
Physics of Radiation Oncology I (RAON-J 400)	2.0
Senior Project in Radiation Oncology (RAON-J 409)	3.0
Clinical Practicum IV (RAON- J 452)	5.0
<b>Total</b>	<b>13.0</b>
<i>Spring</i>	<i>Credits</i>
Physics of Radiation Oncology II (RAON J401)	2.0
Clinical Oncology II (RAON J403)	3.0
Radiation and Cancer Biology (RAON-J 406)	2.0
Clinical Practicum V (RAON J453)	5.0
<b>Total</b>	<b>12.0</b>

**Graduation Requirements for Baccalaureate Degree**

To be eligible for graduation with a baccalaureate degree, students must successfully complete the general-education requirements (51 cr hrs minimum), technical specialty (radiographers), and professional core in radiation therapy (62 cr hrs minimum). They must also achieve clinical competency in each area identified in the clinical manual requirements.

Last Updated: February 8, 2012

## Radiography

An educational program in radiography is located on the Indiana University- Purdue University Indianapolis campus and housed in the IU School of Medicine Department of Radiology and Imaging Sciences.

**Description of the Profession** Radiology is a science involving the medical use of X rays in the diagnosis of disease. A radiologist is a physician specializing in this science, and a radiographer (or radiologic technologist) produces radiographic images under the direction of the radiologist. Radiographers make up the largest group of imaging professionals. Their principal duties consist of performing diagnostic x-ray procedures of patients, with the lowest amount of radiation exposure possible. They also assist in fluoroscopic examinations and in special radiographic procedures. Other tasks performed by radiographers vary. Radiographers must be able to handle seriously ill and injured patients to obtain the maximum amount of information without injury to the patient and with the least amount of pain and discomfort from the examination. They may assist the radiologist in some complex procedures, often involving the injection of opaque media through needles or catheters. Radiographers must be well educated and experienced in aseptic techniques, requiring skills comparable to those of nurses in some specialties. Most technologists are employed in hospitals, clinics, and physicians' offices.

**Graduates of the Program** Graduates receive an associate of science degree from Indiana University and are eligible to take the certification examination of the American Registry of Radiologic Technologists (ARRT) to become certified as a registered technologist (radiography), R.T.(R).

**Credential Required to Practice** R.T.(R) Registered Technologist (Radiography).

**Indiana Requirements to Practice** A State license is required to operate an X-ray machine. The state accepts the ARRT registry credential to satisfy educational requirements for licensure.

**For further information, contact:** Donna Clark,  
Academic Support Specialist  
IU Radiologic and Imaging Sciences Programs  
541 Clinical Drive, Rm 120  
Indianapolis, IN 46202

Phone: (317) 274-3802

Fax: (317) 274-4074

E-mail: [dvclark@iupui.edu](mailto:dvclark@iupui.edu)

Last Updated: February 14, 2012

## Educational Program

### Associate of Science in Radiography at IUPUI

- **Program Director:** Associate Professor Long
- **Medical Advisor:** Professor Jackson
- **Associate Professors:** Baker, Kosegi
- **Associate Clinical Professors:** Cox, Robinson
- **Assistant Clinical Professors:** DeVore, Cranfill
- **Adjunct Lecturer:** Mussa, Ripperger, Dempsey, Herron, Jones

- **Lecturer:** Markanday, Echeverria

**Length of the Program** A new class begins in summer session II each year and continues for 22 months, including all summer sessions.

**Structure of the Program** The 22-month curriculum for radiography is based on a combination of professional courses, general-education courses, and clinical experience. Professional classes and clinical experience are scheduled from 8 a.m. to 4 p.m., Monday through Friday. While in the program, students are also required to participate in clinical experience on two Saturdays and in four weeks of evening rotations. Indiana University holidays are observed. The schedule of classes and clinical experiences closely follows the IUPUI academic calendar. Vacations do not constitute excused absences and, if taken, must occur during the breaks between academic sessions of the university.

**Design of the Professional Curriculum** The general-education courses, professional lecture/laboratory course material, and clinical experiences are integrated throughout the program.

**Additional Cost** In addition to regular university tuition and fees, students should expect to pay for program-related expenses such as books, uniforms, and other supplies.

**Opportunity for Students to Work** There are no restrictions on the number of hours a student may work during the program. The radiology departments of many hospitals have part-time evening and weekend positions that are suitable for radiography students. The student must recognize, however, that the professional curriculum requires approximately 25–32 hours per week of on-campus participation in classroom, laboratory, and clinical course work. Study time and completion of general education courses must also be considered. While most of the professional course activities are scheduled during daytime hours on Monday through Friday, there are several clinical experiences that require student participation on weekends and evenings.

**Program Facilities** The Radiography Program is offered in Indianapolis at the Indiana University Medical Center. The program offices, classrooms, and laboratory facilities are located on the first floor of the Gatch Hall (Clinical Building). Students obtain clinical experience in the radiology departments located in IU Health (University, Riley, IU-West hospitals), Wishard, the Veterans Administration hospitals, and Franciscan St. Francis Health (Indianapolis and Mooresville). Students should expect to rotate to at least four clinical sites during the program.

**Accreditation** The associate degree program in radiography is fully accredited by the Joint Review Committee on Education in Radiologic Technology, 20 N. Wacker Drive, Suite 2850, Chicago, IL 60606-3182, (312) 704-5300, [www.jrcert.org](http://www.jrcert.org).

Last Updated: February 14, 2012

## Admission

**General Information** Students accepted into the program must complete the Health Professions Programs (HPP) and the program admission requirements before the

first day of classes. Admission to the professional program is competitive; therefore, completion of the prerequisites does not guarantee admission to the program. **NOTE: Students entering in summer 2013 or after must complete all requirements by the end of the prior spring term.**

**Criteria Used for Selection of Class** For the selection of applicants for admission, the Radiologic Science Admission Committee considers academic background, including total and science/mathematics GPA, and significant volunteer or work experience in a direct patient care area, previous application for admission to the program, and the results of a personal interview.

**Class Size** Each year, thirty-seven (37) new students are admitted to start the professional program at the beginning of summer session II

**Specific Requirements** In addition to the HPP' admission policies and procedures found at the beginning of this section of the bulletin, the following apply to the Radiography Program.

**Application Deadline** November 15 of the year before anticipated entry in the program.

**Total Number of Prerequisite Credit Hours** 15, to include English composition, college algebra, medical terminology, and either a two semester human biology sequence or human anatomy and human physiology. Either sequence must include the laboratory component.

**Minimum Qualifications** Meeting minimum criteria listed below will qualify applicants for continuation of the admission process. It does not guarantee admission to the program. Applicants for admission to the Associate of Science in Radiography degree may qualify for admission consideration in one of two ways:

A. Applicants with fewer than 12 college credit hours by the end of the fall semester Completion of fewer than 12 credit hours of GPA-earning courses including the prerequisite courses.

*Qualifying Criteria:*

1. High school cumulative academic GPA of at least 3.00 on a 4.00 scale. The high school GPA is calculated using college preparatory academic courses only. Other courses, such as band, chorus, physical education, etc., are removed from the GPA when it is calculated.
2. High school mathematics/science GPA of at least 3.00 on a 4.00 scale.
3. Qualifications for regular admission to IUPUI if not already admitted.
4. College GPA of at least 2.80 on a 4.00 scale.
5. No less than a C in any of the prerequisite courses.

B. Completion of a minimum of 12 credit hours of GPA-earning courses including the prerequisite courses.

*Qualifying Criteria:*

1. College GPA of at least 2.80 on a 4.00 scale for all college work completed. (Course grades from all institutions attended will be used.)
2. No less than a C in any of the prerequisite courses.

3. College mathematics/science GPA of at least 2.50 on a 4.00 scale.
4. All college courses taken, including remedial courses, are considered when calculating the minimum total GPA and mathematics/science GPA.

The criteria listed above represent the minimum criteria. The required grade point averages will be applied after the fall semester of the year of application and must be maintained at the completion of each enrollment period.

**High School Applicants** Check with your school to see if you can earn college credit while in high school to complete the prerequisite courses.

**GED Applicants** Those who have completed the GED certificate must qualify under section B above.

**College Applicants** All applicants with more than 12 credit hours of GPA-earning courses must qualify under Section B regardless of high school background.

**Interview** An interview is required for admission. If, however, the number of applications to the program far exceeds the number of positions available, the program admissions committee reserves the right to limit the number of applicants interviewed to two times the number of positions available in the class. Interviews are scheduled in early February.

**Technical Requirements** See the Health Professions Programs' policy.

**Indiana Residents Preference Policy** See the Health Professions Programs' policy.

**Volunteer Experience** The admissions committee urges all interested applicants to spend time observing or volunteering in a radiology department. If you cannot arrange to do so at a local hospital, the radiologic and imaging sciences office can provide an observation experience in one of the hospital departments affiliated with the radiography program.

Last Updated: February 14, 2012

## Curriculum

**Prerequisites\***

English Composition (ENG-W 131)	3 cr.
College Algebra (MATH 153, MATH-M 118, or MATH-M 119)	3 cr.
Medical Terminology (RADI R108 or equivalent)**	1 cr.
Human Biology (BIOL-N 212/213) or Human Anatomy (BIOL-N 261)	4-5 cr.
Human Biology (BIOL-N 214/215) or Human Physiology (BIOL-N 217)	4-5 cr.

**\*Students entering in summer 2013 or after will be required to complete all prerequisite requirements by the end of the prior spring term.**

<b>Professional Program</b>	
<b>First Year</b>	
<i>Summer Session II</i>	<i>Credits</i>
Introduction to Radiography (RADI-R 110)	3.0
Patient Care I (RADI-R 112)	3.0
<b>Total</b>	<b>6.0</b>
<i>Fall</i>	<i>Credits</i>
Radiographic Procedures I (RADI-R 114)	4.0
Radiographic Procedures I lab (RADI-R 115)	1.0
Principles of Radiography I (RADI-R 118)	3.0
Radiography Clinical Lab I (RADI-R 150)	1.0
Basic Clinical Experience Course (RADI-R151 or 152 & 153)	3.0
<b>Total</b>	<b>12.0</b>
<i>Spring</i>	<i>Credits</i>
Radiographic Procedures II (RADI-R 124)	3.0
Principles of Radiography II (RADI-R 128)	3.0
Physical Basis for Radiography (RADI-R 140)	2.0
Radiography Clinical Lab II (RADI-R 170)	1.0
Basic Clinical Experience Course (RADI-R171 or 172 & 153)	3.0
<b>Total</b>	<b>12.0</b>
<b>Second Year</b>	
<i>Summer</i>	<i>Credits</i>
Patient Care II (RADI-R 212)	1.0
Processing Theory (RADI-R 218)	1.0
Clinical Experience Course (RADI-R 271 or 274 & 275)	4.0
<b>Total</b>	<b>6.0</b>
<i>Fall</i>	<i>Credits</i>
Radiographic Pathology (RADI-R 210)	2.0
Radiographic Procedures III (RADI-R 214)	2.0
Principles of Radiography III (RADI-R 228)	3.0
Radiographic/Fluoroscopic Equipment (RADI-R 241)	2.0
Clinical Experience Course (RADI-R 271 or 272 or 274 & 275)	4.0
Oral Communications (COMM-R 110 or COMM-C 180) - <i>If not completed</i>	3.0
<b>Total</b>	<b>13.0-16.0</b>
<i>Spring</i>	<i>Credits</i>

Advanced Non-Contrast Imaging (RADI-R 216)	2.0
Advanced Contrast Imaging (RADI-R 224)	1.0
Imaging a Diverse Population (RADI-R 226)	3.0
Quality Control in Radiography (RADI-R 243)	2.0
Radiation Biology and Protection in Diagnostic Radiology (RADI-R 262)	1.0
Clinical Experience Course (RADI-R 272 or 274 & 275)	4.0
<b>Total</b>	<b>13.0</b>

**Awards** The faculty will recommend to the university graduating students with superior academic performance for degrees awarded with distinction according to the Indiana University policy. Students with outstanding academic and clinical achievement during the professional program may be recognized by the program at the time of graduation.

**Graduation Requirements** Satisfactory completion of 80 credit hours to include 18 credit hours of prerequisites/graduation requirements and 62 credit hours of professional courses. All course work must be completed in compliance with the program's and Health Professions Programs' academic and professional policies.

Last Updated: February 14, 2012

## Respiratory Therapy

The educational program in respiratory therapy is part of a consortium that also includes Indiana University, Ball State University, the University of Indianapolis, and IUHealth. Classroom and laboratory courses are held at Methodist Hospital (Indianapolis), which is connected to the Indiana University–Purdue University Indianapolis (IUPUI) campus via a free monorail system. Students remain enrolled at IUPUI for all their respiratory therapy courses and receive their degree from the IU School of Medicine.

**Scholarships** Once accepted to the program, students are eligible to compete for scholarships offered by the Indiana Society for Respiratory Care and the American Association for Respiratory Care.

**For further information contact:** Linda Van Scoder, Program Director  
Respiratory Therapy Program  
Wile Hall 652  
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Last Updated: February 8, 2012

## Educational Program

### Bachelor of Science in Respiratory Therapy at IUPUI

- **Program Director:** Adjunct Associate Professor Van Scoder
- **Medical Director:** Adjunct Assistant Professor Naum

- **Associate Medical Director:** Associate Professor of Clinical Medicine Ober
- **Clinical Director:** Adjunct Assistant Professor Johnson
- **Instructor:** Adjunct Lecturer Hunt-Dimirsky, Adjunct Lecturer Bischoff

**Description of the Profession** Respiratory therapists evaluate and treat patients with cardiopulmonary disorders and are actively involved in health promotion and disease prevention. They care for all types of patients, from the premature infant to the extremely old, and practice in a variety of settings, ranging from patients' homes to the highest level of critical care units. Students in the respiratory therapy major will learn diagnostic procedures ranging from physical examination to the use of highly sophisticated computerized equipment. Patient treatment skills will include everything from the administration of inhaled medications to maintaining critically ill patients on ventilators. The Bachelor of Science in respiratory therapy will provide graduates with the critical-thinking and problem-solving skills that they will need to be successful in their careers.

**Graduates of the Program** The graduates of the Respiratory Therapy Program are eligible for state licensure examinations as well as examinations offered by the National Board for Respiratory Care. Completion of the program will allow a graduate to sit for the Registered Respiratory Therapist (R.R.T.) examination.

**Credential Required to Practice** C.R.T., Certified Respiratory Therapist; R.R.T., Registered Respiratory Therapist

**Licensure Requirements to Practice** Graduates of the Respiratory Therapy Program will file an application for a license as a respiratory care practitioner in the state of Indiana. 49 states require respiratory therapists to be licensed in order to practice.

### Educational Program

**Structure of the Program** The professional phase of the program consists of a carefully planned sequence of classroom and laboratory instruction, as well as more than 1,000 hours of supervised clinical instruction. Clinical instruction is provided in a variety of hospitals and health care facilities throughout central Indiana. The prerequisites may be taken on a part-time basis; the professional program is full time and is conducted primarily during the day.

**Length of the Program** Four years; two years of prerequisite course work (55 credit hours) plus two years (70 credit hours) of professional course work.

**Design of the Professional Curriculum** The program is designed to cover all aspects of respiratory therapy, with an emphasis on general and critical care.

**Program Facilities** The program offices are located in Wile Hall on the Methodist Hospital campus.

**Location of Clinical Sites** Clinical education experiences occur in a variety of settings, including hospitals, rehabilitation centers, nursing homes, physician offices, and other health care facilities in Indiana. Most of the clinical sites are located within a 60-minute drive from downtown Indianapolis, and many are in Indianapolis.

Students are expected to provide their own transportation to all clinical sites.

**Additional Cost** In addition to standard university fees, students are responsible for travel to clinics, laboratory fees, clinical fees, uniforms, vaccination costs, and CPR course. Students may be required to attend professional meetings or seminars, and fees for attending these events may be necessary. Membership in the professional organization is required.

**Opportunity for Students to Work** Most students work part time while completing the program. Students may be eligible to apply for a limited student permit as a respiratory care practitioner following successful completion of the first year of the professional course work.

**Accreditation** The Respiratory Therapy Program is accredited by the Commission on Accreditation for Respiratory Care, 1248 Harwood Rd., Bedford, TX 76021-4244, (817) 283-2835, [www.coarc.com](http://www.coarc.com).

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### Admission

**General Information** Students accepted into the program must complete the school's and the program's admission requirements before the first day of classes. Admission to the professional program is competitive; therefore, completion of the prerequisites does not guarantee admission to the program. At the time of application, students may request any of the following options: repeated courses, academic bankruptcy, or fresh start. For more information about these options, please see an advisor.

**Criteria Used for Selection of Class** Grade point average.

**Class Size** Approximately 30 students.

**Specific Requirements** In addition to School of Medicine Health Professions Programs admission policies and procedures found at the beginning of this section of the bulletin, the admission policies below apply to the respiratory therapy baccalaureate degree program.

**Application Deadline** January 1. Late applications will be considered on a space-available basis.

**Total Number of Prerequisite Hours** 55. Graduates from accredited associate degree respiratory therapy programs are eligible to apply for advanced standing; however, all applicants must complete the prerequisites.

**Minimum Cumulative Grade Point Average** 2.50 on a 4.00 scale. This requirement is applied at the time of program application and must be maintained.

**Minimum Grade Requirement in a Stated Math or Sciences Prerequisite Course** C (2.00 on a 4.00 scale).

**Interview** All qualified applicants must be interviewed.

**Technical Standards** All accepted students will be required to sign a statement certifying that they can meet the program's technical standards.

**Medical Requirements** All students are required to document a complete vaccination program once accepted

into the Respiratory Therapy Program. Drug screening may also be required.

**Indiana Resident Preference Policy** See the School of Medicine Health Professions Programs policy.

**Clinical Observation** All applicants are required to complete and document at least three hours of clinical observation with a respiratory therapist. The documentation must be submitted with the program application.

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## Academic Requirements

Students must comply with the academic regulations and policies of Indiana University and the School of Medicine Health Professions Programs. Additionally, the following regulations and policies govern the professional portion of the Respiratory Therapy Program.

### General Policies and Regulations

1. Students are required to obtain a grade of C or higher in all professional course work.
2. Students who receive a grade of C- or lower in a professional course may be dismissed from the program. Students who are dismissed may reapply for admission the following year with approval of the program faculty and the HPP Advisory Committee.
3. Students must maintain American Heart Association Healthcare Provider Basic Life Support (BLS) status throughout their term in the Respiratory Therapy Program.

### Probation

1. A student will be placed on probation if the semester and/or cumulative GPA falls below 2.30.
2. A student will be placed on probation if there is a failure to progress either academically or professionally. **Probation resulting from a failure to progress is not limited to these examples:**
  - failure to maintain BLS status;
  - poor attendance in classroom, clinical, or laboratory classes resulting in poor academic progress and performance;
  - failure to meet academic standards as set forth in the course syllabus, such as failure to turn in papers and assignments, resulting in poor academic progress and performance;
  - failure to conform to the American Association for Respiratory Care Code of Ethics and/or clinical performance characteristics as set forth in the Program Handbook and Clinical Syllabus;
  - lack of clinical progress, failure to demonstrate clinical patient safety, or failure to advance through the clinical skills progression; or
  - any critical incidence documentation for unsafe or poor clinical performance.
3. As a condition of probation, the student will be notified of conditions and requirements necessary for remediation for continuation in the program. When the student satisfactorily completes all program requirements, as well as those stipulated by the school and university, and when the reason for the

administrative action has been corrected or the deficiency remediated, the student will be returned to good standing. All probationary actions are reviewed at the end of each semester.

### Dismissal

Upon the recommendation of the faculty in the student's program, a student may be dismissed from the school. Dismissal is based on the failure to meet academic or professional standards. The student will be informed of the dismissal in writing by the dean.

1. A student may be dismissed from the program if a grade of C- or lower is recorded for any professional course.
2. A student will be dismissed from the program if probationary status is continued for two consecutive semesters. In addition, once placed on probation, a student will be dismissed from the program if continued poor academic performance, unsafe or poor clinical performance, or unprofessional behavior is documented (including documentation of a critical incident).
3. A student will be dismissed from the program if there is failure to complete the bachelor's degree within three years of the initial admission to the professional program.

### Appeals Procedure

On occasion, students and faculty will have differing perceptions or accounts of situations or events. It is important for the parties directly involved to discuss their differences honestly in order to reach a solution. However, if no mutually satisfactory resolution can be reached in these discussions, the matter may be appealed in accordance with the school's appeals policy.

Last Updated: February 8, 2012

## Prerequisites

Before entering the program, the student must complete the following minimum prerequisites. Students should consult with their academic advisors for appropriate courses and semester sequence in order to complete prerequisites. Prerequisites may be taken at any accredited college or university. The code "G" indicates a course that meets the school's general-education requirements.

### General Education

Written Communication (G)	6 cr.
<i>(Second course should focus on professional and technical writing)</i>	
Verbal Communication (G)	3 cr.
College Algebra or Higher (G)	5-6 cr.
Social/Behavioral Sciences (G)	3 cr.
Life Span or Developmental Psychology (G)	3 cr.
Statistics	3 cr.
Human Anatomy (with lab) (G)	3-5 cr.

Human Physiology (with lab) (G)	3-5 cr.
Chemistry (with lab)	3-5 cr.
Microbiology	3-4 cr.
Physics	4-5 cr.
Ethics	3 cr.
Introduction to Computers	3 cr.

**Suggested Electives**

The following course subjects, while not inclusive or mandatory, are suggested: science, cellular biology, nutrition, health care administration, exercise physiology, medical terminology, epidemiology, public health, computer literacy, and psychology.

**Cardiopulmonary Resuscitation** In addition to the above courses, all students are required to complete instruction for adult, child, and infant CPR before entry into the program. This must be the Healthcare Provider CPR or CPR for the Professional Rescuer. These courses are offered for a fee through the American Heart Association and the American Red Cross.

*A Suggested Plan of Study*

<b>Freshman</b>	
<i>Fall</i>	<i>Credits</i>
Elementary Composition I	3.0
Human Anatomy (with lab)	4.0-5.0
Social/Behavioral Science	3.0
College Math I	3.0
Total	13.0-14.0
<i>Spring</i>	<i>Credits</i>
Speech Communication	3.0
Chemistry (with lab)	5.0
Human Physiology (with lab)	4.0-5.0
College Mathematics II	3.0
Total	15.0-16.0
<b>Sophomore</b>	
<i>Fall</i>	<i>Credits</i>
Professional Writing	3.0
Physics	4.0-5.0
Ethics	3.0
Introduction to Computers	3.0
Total	13.0-14.0
<i>Spring</i>	<i>Credits</i>
Statistics	3.0
Introduction to Microbiology	3.0-4.0
Lifespan or Human Development	3.0
Electives	3.0+
Total	12.0-13.0+

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**Professional Program**

Courses in the professional program are sequential and must be taken in the order specified by the program faculty.

<b>Junior</b>	
<i>Fall</i>	<i>Credits</i>

Introduction to Human Disease for Respiratory Therapists (PULM-F 303)	2.0
Cardiorespiratory Physiology (PULM-F 311)	3.0
Cardiorespiratory Assessment and Patient Care (PULM-F 315)	3.0
General Respiratory Care (PULM-F 325)	4.0
Respiratory Care Techniques I (PULM-F 326)	2.0
Cardiorespiratory Pharmacology I (PULM-F 333)	2.0
Total	16.0
<i>Spring</i>	<i>Credits</i>
Cardiorespiratory Diseases (PULM-F 350)	3.0
Life Support (PULM-F 355)	3.0
Respiratory Care Techniques II (PULM-F 356)	2.0
Respiratory Care Practicum I (PULM-F 385)	3.0
Neonatal-Pediatric Respiratory Care (PULM-F 405)	2.0
Cardiorespiratory Pharmacology II (PULM-F 444)	2.0
Total	16.0
<i>Summer Session I</i>	<i>Credits</i>
Respiratory Care Practicum II (PULM-F 395)	4.0
Total	4.0
<b>Senior</b>	
<i>Fall</i>	<i>Credits</i>
Pulmonary Diagnostics (PULM-F 371)	3.0
Introduction to Research in Respiratory Care (PULM-F 420)	2.0
Cardiorespiratory Monitoring and Special Techniques (PULM-F 451)	3.0
Respiratory Care Practicum III (PULM-F 456)	6.0
Pulmonary Rehabilitation and Geriatrics (PULM-F 461)	3.0
Total	17.0
<i>Spring</i>	<i>Credits</i>
Management and Leadership for Respiratory Care (PULM-F 430)	3.0
Advanced Cardiac Life Support (PULM-F 440)	2.0
Seminar in Cardiorespiratory Care (PULM-F 445)	3.0

Patient Education Techniques (PULM-F 480)	3.0
Respiratory Care Practicum IV (PULM-F 485)	6.0
Total	17.0

**Graduation Requirements** Satisfactory completion of 125 credit hours to include 55 credit hours of prerequisite course work and 70 credit hours of professional course work. All course work must be completed in compliance with the program's and school's academic and professional policies.

Last Updated: March 26, 2010

## Advanced Standing

Graduates of CoARC accredited, advanced practitioner-level associate degree programs in respiratory therapy at a regionally accredited college or university are eligible to apply for advanced standing in the respiratory therapy baccalaureate degree program. These applicants must meet all program admissions requirements and standards. If admitted, they would be enrolled in the fourth year of the program's professional program curriculum. Students who wish to apply for advanced standing must contact the program director for available options.

Last Updated: April 15, 2010

## Student Learning Outcomes

- Clinical Laboratory Science, B.S.
- Cytotechnology, B.S.
- Histotechnology, Certificate and A.S.
- Medical Imaging Technology, B.S.
- Nuclear Medicine Technology, B.S.
- Paramedic Science, A.S.
- Radiation Therapy, B.S.
- Radiography, A.S.
- Respiratory Therapy, B.S.

March 13, 2012

## Clinical Laboratory Science, B.S.

The mission of the CLS program at Indiana University is to provide a high quality education in knowledge, skills, and professional attitudes in CLS in order to prepare graduates who have entry-level competencies to practice in the clinical laboratory.

**The goal of the CLS program is to prepare graduates who:**

1. Have the knowledge and skills needed to provide health care professionals with accurate and timely diagnostic and therapeutic laboratory data and participate as effective members of the health care team.
2. Demonstrate professionalism through honesty and integrity in reporting results, respect for patient confidentiality, and a desire for life-long learning through continuing education, scholarship, service, and participation in professional organizations.
3. Successfully complete the national certification examination.

## Clinical Laboratory Science Program Competencies

Upon successful completion of the CLS Program, the clinical laboratory scientist should be able to demonstrate the behaviors described in the entry-level competencies:\*

- Perform proficiently the full range of clinical laboratory tests in areas such as hematology, clinical chemistry, immunohematology, microbiology, serology/immunology, coagulation, and molecular and other emerging diagnostics.
- Play a role in the development and evaluation of test systems and interpretive algorithms.
- Participate effectively in clinical decision making, regulatory compliance with applicable regulations, education, and quality assurance/performance improvement wherever laboratory testing is researched, developed, or performed.
- Communicate effectively to enable consultative interactions with members of the healthcare team, external relations, customer service, and patient education.
- Apply knowledge of financial operations, marketing, and human resource management of the clinical laboratory to enable cost-effective, high-quality, value-added laboratory services.
- Support information management to enable effective, timely, accurate, and cost-effective reporting of laboratory-generated information.
- Demonstrate sufficient knowledge of the research process to evaluate published studies as an informed consumer.
- Participate in safety programs.
- Have requisite knowledge and skills to educate laboratory professionals, other healthcare professionals, and the public with regards to in laboratory practice.

\* The CLS Program has multiple objectives associated with each competency. These are available upon request.

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## Cytotechnology, B.S.

To provide education of the highest quality in accordance with the guidelines established by the Commission on Accreditation of Allied Health Education Programs, the American Society of Cytopathology and the Board of Certification of the American Society of Clinical Pathologists, the Cytotechnology Program Advisory Committee adopted the following "Program Goals and Objectives" and "Outcomes."

### Program Goals

The Indiana University Cytotechnology Program adopts the following goals and minimum expectations for its graduates:

"To prepare competent entry-level Cytotechnologists in the cognitive (knowledge), psychomotor (skills), and affective (behavior) learning domains."

### Outcomes Assessment

- Student Retention of at least 80%.
- Job Placement of at least 75%.
- Board of Registry Pass Rate of at least 80%.
- Graduate Survey with at least 50% return rate and 80% student satisfaction.

- Employer Survey with at least 50% return rate and 80% student satisfaction.

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## **Histotechnology, Certificate and A.S.**

The Program's goals have been developed within the mission of the Health Professions Programs in the School of Medicine. In an effort to provide theoretical background and the development of a high degree of occupational competence, the Program has established the following goals:

1. To provide students with the education experiences necessary to enter a career as a Histologic Technician, to include entry-level competence and eligibility for the ASCP Board of Registry Histotechnician exam.
2. To provide the nation-wide health care community with individuals competent to conduct high quality histologic procedures.
3. To provide a curriculum containing a balance between technical knowledge and clinical competence gained in the histology laboratory setting.
4. To assist the students in reaching their goals by providing academic and occupational advisement.
5. To instill in students a lifelong desire to achieve professional and academic excellence.

### **Histotechnology Program Objectives**

Upon successful completion of all standard academic requirements established for this program, the graduate is entitled to receive a Certificate in Histotechnology from Indiana University. By virtue of the standards required by this program, the graduate is eligible to take the Histotechnician (HT) certification examination administered by the American Society of Clinical Pathologists' Board of Registry. The didactic and practical experience provided by the course of instruction should enable the graduate to accomplish the following objectives:

### **Technical Skill**

1. Perform procedures of basic histologic laboratory techniques, instrumentation and problem solving at the HT entry-level competency.
2. Demonstrate knowledge of general and specific histologic methodology.
3. Perform procedures with accuracy and precision.
4. Monitor internal and external quality assurance measures.
5. Demonstrate knowledge of operational principles of commonly used laboratory instruments to include the ability to perform daily preventative maintenance and correct simple malfunctions.
6. Exercise independent judgment regarding choice of procedure and evaluation of results.
7. Organize tasks to cope with volume of work and unexpected demands.

### **Communication**

1. Communicate effectively with Clinical Education Supervisor and Program Director regarding curriculum and training courses.
2. Effectively organize and present information both in written assignments and oral communication.

3. Communicate effectively with other laboratory and health care providers.

### **Professional Behavior**

1. Display an attitude reflecting pride and professionalism in daily laboratory duties.
2. Demonstrate adaptability, integrity, initiative, neatness, maturity, stability and a desire for excellence.

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## **Medical Imaging Technology, B.S.**

The Medical Imaging Technology program has established the following goals:

1. Graduates will be clinically competent.
2. Graduates will communicate effectively in the healthcare environment.
3. Graduates will think critically and apply problem-solving skills in the healthcare environment.
4. Graduates will have knowledge of the value of professional development and growth.
5. Students will graduate and will be qualified to work as advance-practice radiologic technologists.

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## **Nuclear Medicine Technology, B.S.**

### **GOAL AND OUTCOMES OF THE NUCLEAR MEDICINE TECHNOLOGY PROGRAM**

#### Goal I

Prepare students to function as competent Nuclear Medicine Technologists.

#### Outcomes

Upon completion of the Nuclear Medicine Technology Program in the Department of Radiologic and Imaging Sciences the graduate will:

1. Demonstrate the ability to acquire, comprehend, apply and evaluate patient information sufficiently well to offer appropriate patient care.
2. Demonstrate technical proficiency in all skills necessary to fulfill the role as a Nuclear Medicine Technologist.
3. Demonstrate appropriate administrative functions within the scope of the profession.

#### Goal II

Prepare students in Nuclear Medicine Technology who will continue to learn and grow professionally.

#### Outcomes

Upon completion of the Nuclear Medicine Technology Program in the Department of Radiologic Sciences the graduate will:

1. Demonstrate and sustain appropriate ethical and interpersonal working relationships with patients, physicians, and co-workers.
2. Demonstrate participation in continuing education and professional activities.
3. Aspire toward professional growth in areas of advanced technical positions, administration,

teaching, health care industry or higher educational degree levels.

Last Updated: February 15, 2012

## Paramedic Science, A.S.

The Paramedic Science program has established the following goals:

To prepare competent entry-level Emergency Medical Technician-Paramedics in the cognitive (knowledge), psychomotor (skills), and affective (behavior) learning domains, with or without exit points at the Emergency Medical Technician-Intermediate, and/or Emergency Medical Technician-Basic, and/or First Responder levels.

1. Upon commencement, the Paramedic Science graduate will perform as a Paramedic.
2. Upon graduation, the Paramedic student will have developed knowledge, competency, and awareness of one's abilities and limitations, the ability to relate to people, and a capacity for calm and reasoned judgement under stress.
3. Upon graduation, the Paramedic Science Student, has Developed values to independently process information to make critical decisions while being sensitive to the cultural competency of patients of all ages.

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## Radiation Therapy, B.S.

During the radiation therapy program, the student will be able:

1. Demonstrate the appropriate knowledge of radiation therapy procedures.
2. Apply principles of radiation protection for patient, self, and others.
3. Perform radiation therapy simulation procedure.
4. Perform basic radiation therapy dose calculations and access treatment plans.
5. Deliver radiation therapy treatments as prescribed by a radiation oncologist.
6. Evaluate patient for effects, reactions and therapeutic responses.
7. Demonstrate effective oral and written communication skills.
8. Apply basic research methods.
9. Formulate methods for the pursuit of lifelong learning.

At the completion of the radiation therapy program, the graduate will:

1. Pass the ARRT national certification exam on the first attempt.
2. Be employed within six months post-graduation, if pursuing employment.
3. Complete the professional program within 22 months.
4. Be satisfied with their education.

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## Radiography, A.S.

### Goals for the Associate Degree in Radiography Program

1. Graduates will be clinically competent.
2. Graduates will communicate effectively in the healthcare environment.
3. Graduates will think critically and apply problem-solving skills in the healthcare environment.
4. Graduates will have knowledge of the value of professional development and growth.
5. Students will graduate and will be qualified to work as entry-level radiologic technologists.

### Outcomes for the Associate Degree in Radiography Program

At appropriate points during the radiography program, the student will be able to:

1. Demonstrate appropriate knowledge of radiographic procedures [goal 1].
2. Apply radiographic positioning skills effectively [goal 1].
3. Determine appropriate technical factors [goal 1].
4. Apply principles of radiation protection for patient, self, and others [goal 1].
5. Demonstrate overall competence in performance of radiographic procedures [goal 1].
6. Use effective oral communication skills with clinical staff and patients [goal 2].
7. Demonstrate effective written communication skills. [goal 2].
8. Evaluate images and make appropriate adjustments to technical factors or procedure [goal 3].
9. Adapt positioning for trauma patients [goal 3].
10. Determine the importance of continued professional development [goal 4].
11. Attend professional meetings [goal 4].

At the completion of the radiography program, the graduate will:

1. Pass the ARRT national certification on the 1<sup>st</sup> attempt [goal 5].
2. Be gainfully employed within 6 months post-graduation, if pursuing employment [goal 5].
3. Complete the program within 22 months [goal 5].
4. Be satisfied with their education [goal 5].

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## Respiratory Therapy, B.S.

### Program Goal

Upon completion of the program, the graduate will be a competent advanced-level respiratory therapist.

### Program Objectives

1. Upon completion of the program, students will demonstrate professional behavior consistent with employer expectations as advanced-level respiratory therapists.
2. Upon completion of the program, students will demonstrate the ability to comprehend, apply, and evaluate clinical information relevant to their roles as advanced-level respiratory therapists.

3. Upon completion of the program, students will demonstrate technical proficiency in all the skills necessary to fulfill their roles as advanced-level respiratory therapists.

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## Application Procedures

The Indiana University School of Medicine participates in the American Medical College Application Service (AMCAS). Application information is available on the Web site of the Association of American Medical Colleges (AAMC) at [www.aamc.org](http://www.aamc.org). The deadline for AMCAS's receipt of application and transcripts is December 15 for the following year's entering class.

The School of Medicine participates in the national Early Decision Program (EDP). The deadline for EDP applicants is August 1. Additional information is available from AMCAS and from the Admissions Office.

### Interviews

Beginning in September, members of the Admissions Committee will interview students by appointment only. In general, appointments for interviews are scheduled in the order in which applications are received unless the applicant has not taken the Medical College Admission Test.

### Transcript

It is the applicants' responsibility to send an updated transcript to the Admissions Office at the conclusion of each grading period during the application process.

### Medical College Admission Test

All applicants must take the Medical College Admission Test (MCAT) in order to be considered for admission. Registration information may be obtained from [www.aamc.org](http://www.aamc.org). Students are urged to take this test in the spring of the year preceding the application. Ordinarily, acceptance will not be granted in the absence of an MCAT score.

## Fees

Annual tuition for students in the M.D. program in the School of Medicine for 2008-2009 is \$27,151.20 for residents of the state of Indiana and \$42,130.00 for nonresidents. University assessed technology fees total \$373.80 for the academic year. Specific assessments associated with class year and center of instruction are also levied. All students are required to carry personal health insurance. Students not covered under an insurance policy meeting certain minimal criteria as determined by the school must enroll in the school-sponsored health insurance plan at an annual cost of \$2,421.00 for 2008-2009. Tuition and fees are subject to change by action of the Board of Trustees. All fees may be confirmed by contacting the school.

An application fee of \$50 is required of all new applicants for admission to Indiana University.

Students taking Graduate School courses should consult the appropriate graduate office for relevant fee information.

The School of Medicine possesses a sufficient number of excellent binocular microscopes to meet the needs of all of its students. These are available on a use-charge basis. If a student wishes to provide his or her own microscope, it must meet rigid specifications and be approved by the

microscope committee of the School of Medicine. Storage space for personal microscopes is not available in the teaching laboratories.

## Financial Assistance

It is important to recognize that it costs considerably more to provide a quality medical education than what the student actually pays in tuition and fees. Every student attending the Indiana University School of Medicine benefits from the subsidies provided by the state of Indiana through state-legislated appropriations. These funds enable Indiana University to keep tuition and fees at the lowest reasonable amount possible. In addition, Indiana University benefits through its many generous friends and supportive organizations that assist in making a medical education affordable to all School of Medicine students.

The purpose of the School of Medicine's scholarship and financial aid programs is to assist students whose personal and family resources are not sufficient to meet the total cost of their medical education. To meet the financial needs of our students in a fair and equitable manner through the most desirable aid programs possible, most financial aid programs are made available to students with documented financial need. The school cannot assure that it will be able to fully meet each student's financial need, and therefore, some students will need to investigate other options in meeting their educational expenses.

Student eligibility for financial aid programs is determined by evaluating both the student's and the parents' ability to defray the cost of a medical education. To apply for most desirable financial aid programs, regardless of the independent status of the student, students must complete the Free Application for Federal Student Aid (FAFSA) <http://www.fafsa.ed.gov>. The FAFSA results will be made available electronically to IUPUI. Beginning in April, students will be notified of their eligibility for all federal aid programs for the academic year. Keep in mind that all financial information received is held in strict confidence and is used only to determine the student's eligibility for financial assistance.

The Dean's Medical Student Affairs–Student Financial Services (MSA–SFS) makes available via the MSA Web page, the IUSM Financial Aid Guide, the financial aid application materials, and other information about specific programs. Students are encouraged to investigate outside sources of aid that may be available through bank trusts, churches, and fraternal and professional organizations.

### Financial Assistance Programs

The following financial assistance programs are available to medical students attending the Indiana University School of Medicine (IUSM). Any questions you may have about these programs can be answered by contacting our office:

Medical Student Affairs  
 Student Financial Services  
 Medical Sciences Building 119  
 635 Barnhill Drive  
 IU School of Medicine  
 Indianapolis, IN 46202-5120  
 Phone: (317) 274-1967  
 E-mail: [jespada@iupui.edu](mailto:jespada@iupui.edu)  
 E-mail: [tinfox@iupui.edu](mailto:tinfox@iupui.edu)

E-mail: [mtitus@iupui.edu](mailto:mtitus@iupui.edu)

These programs are described in further detail in the IU Financial Aid Guide for Medical Students at <http://msa.iusm.iu.edu>.

- Federal Perkins Student Loan
- Federal Primary Care Loan
- Federal Subsidized Stafford Student Loan
- Federal Unsubsidized Stafford Student Loan
- Federal Graduate Plus Loan
- Federal College Work-Study Program (CWSP)
- Child-of-Disabled-Veteran Award (CVO) (available to Indiana residents only)
- Scholarships to Disadvantaged Students (SDS)
- Loans to Disadvantaged Students (LDS)
- Indiana Primary Care Scholarship

### Scholarships, Fellowships, and Loans

The School of Medicine Scholarship Committee awards students more than \$3 million in scholarships and fellowships from annual gifts and scholarship endowments. The scholarship awards range from \$1,000 to full tuition. While some programs have donor restrictions, the School of Medicine maintains a philosophy of equal opportunity. All students who complete the school's Application for Financial Assistance will be considered for all of the IU School of Medicine scholarships and fellowships listed at [msa.iusm.iu.edu](http://msa.iusm.iu.edu) in the IU School of Medicine Financial Aid Guide.

While most scholarships are awarded for a combination of financial need and academic achievement, some scholarships are based strictly on academic achievement and a small portion based strictly on financial need. To receive need-based awards, students must first apply for federal aid and submit parental information (regardless of independent status) on the Free Application for Federal Student Aid (FAFSA). Parental information is a factor in granting scholarships based on need or a combination of need and academics. Academic awards honor outstanding medical school achievement.

**Medical students receiving the Armed Forces Health Professions Scholarships (AFHPSP) or the National Health Service Corps (NHSC) will not be considered for scholarships based on financial need or a combination of need and academics.**

Eligibility for and renewability of scholarship assistance has been outlined by the IUSM Scholarship Committee in the following policy statement:

The receipt of any academic or combined need and academic scholarship by a student is contingent upon: (1) the student applying when required, (2) the criteria of the scholarship award, and (3) the student maintaining good academic standing. A student is in good academic standing, as seen by the Scholarship Committee, when the student is not on academic probation for any reason during the entire preceding academic year. The Indiana University School of Medicine Student Manual defines what constitutes good academic standing.

In addition, renewability will be contingent upon the student having demonstrated financial need and the availability of funds.

## Admissions

The modern world is complex, and physicians care for people from a wide range of social, economic, and cultural backgrounds. The Indiana University School of Medicine requires applicants to include in their undergraduate study a minimal number of required science courses (see below). It is also expected that successful applicants will have included in their undergraduate experience a significant number of courses in the humanities and social and behavioral sciences. In this fashion, students gain a better understanding of contemporary society and human experience, and greater insight into their patients' backgrounds, problems, and illnesses. Applicants are expected to be competent in speaking and writing the English language.

### Selection of the Class

Students are offered places in the class on the basis of scholarship, character, personality, references, performance on the Medical College Admission Test, and personal interview. The medical school faculty has specified nonacademic criteria ("Technical Standards for Admission and Retention in Medical School"), which all applicants are expected to meet in order to participate in the medical education program and the study of medicine.

The successful applicant will usually have a record of 1) extracurricular experience in a clinical setting and/or shadowing of physicians and 2) volunteer work/community service.

Except for Early Decision Program candidates, accepted applicants will normally be notified on October 15, November 15, December 15, January 15, February 15, March 15, and at intervals thereafter until the class is filled.

The successful applicant should keep in mind that acceptance is granted subject to the satisfactory completion of all School of Medicine requirements. If the student does not maintain the scholastic average and course load that were evident at the time of acceptance, the committee reserves the right to withdraw acceptance.

Indiana University School of Medicine does not discriminate on the basis of age, color, disability, ethnicity, gender, marital status, national origin, race, religion, sexual orientation, or veteran status.

## Requirements

It is strongly recommended that the applicant complete a B.A. or B.S. degree in a school accredited by one of the regional accrediting agencies. The minimum amount of college course work required is three academic years (90 credit hours, excluding physical education and ROTC courses). Any major from the traditional arts and sciences curriculum is acceptable. Students with educational backgrounds in areas outside the usual liberal arts and sciences curriculum (education, business, engineering, pharmacy, etc.) will be evaluated based on a minimum of 90 credit hours (three academic years) of college course work of arts and sciences equivalence. Such students are invited to consult with the Admissions Office about School of Medicine policy regarding academic course work outside the arts and sciences area. The Admissions Committee encourages highly qualified students to enroll in undergraduate honors courses.

The following science course work is required for admission; each course must have a lecture and laboratory component:

- General chemistry, 8-10 credit hours (one academic year)
- Organic chemistry, 8-10 credit hours (one academic year)
- Physics, 8-10 credit hours (one academic year)
- Biological sciences, 8-10 credit hours (one academic year)

Neither grades nor credit hours from subjects offered in the medical curriculum will be accepted toward fulfilling the required 90 credit hours of undergraduate course work or the above specific science requirements.

The Admissions Committee reserves the right to determine which courses will fulfill its requirements.

### **Scholastic Record**

Every grade becomes a part of the permanent record and is calculated in the overall scholastic average. A student who is an Indiana resident cannot usually expect to gain entrance to the class if his or her average of credit points is below 3.2 on a 4.0 scale. The applications of nonresidents will be considered on an individual basis (see below at "Residence").

Greater weight is given to the quality of work than to an excess of credit hours over the minimum required. A scholastic record that shows a large number of withdrawals and/or a repetition of subjects in order to remove grades of F or to raise low grades will obviously be less impressive than a record showing work of uniformly good quality.

A student who has withdrawn or been dismissed from another medical school is usually not eligible for admission to the first-year class at Indiana University.

### **Residence**

Preference will be given to applicants who are residents of the state of Indiana. Nevertheless, a number of nonresidents are accepted each year, and well-qualified nonresidents with an interest in obtaining a medical education at Indiana University are encouraged to apply. The applications of nonresidents who have significant ties to the state of Indiana may be given greater consideration. The Admissions Committee uses the Indiana University System Residency Policy to determine the residency of applicants for IU fee purposes [http://www.iue.edu/registrar/policies/residency\\_rules.php](http://www.iue.edu/registrar/policies/residency_rules.php).

### **Technical Standards**

The medical school faculty has specified the following nonacademic criteria ("technical standards") that all applicants/medical students are expected to meet in order to participate in the medical education program and the practice of medicine.

#### **Observation**

The applicant/medical student must be able to participate actively in all demonstrations and laboratory exercises in the basic medical sciences and to assess and comprehend the condition of all patients assigned to him or her for examination, diagnosis, and treatment. Such observation and information acquisition usually

requires the functional use of visual, auditory, and somatic sensation.

#### **Communication**

The applicant/medical student must be able to communicate effectively and sensitively with patients in order to elicit information; describe changes in mood, activity, and posture; assess nonverbal communications; and effectively and efficiently transmit information to patients, fellow students, faculty, staff, and all members of the health care team. Communication skills include speaking, reading, and writing, as well as the observation skills described above.

#### **Motor**

The applicant/medical student must have sufficient motor function to elicit information from patients by palpation, auscultation, percussion, and other diagnostic maneuvers; be able to perform basic laboratory tests; possess all skills necessary to carry out diagnostic procedures; and be able to execute motor movements reasonably required to provide general care and emergency treatment to patients.

#### **Intellectual-Conceptual, Integrative, and Quantitative Abilities**

The applicant/medical student must be able to measure, calculate, reason, analyze, and synthesize. Problem solving, the critical skill demanded of physicians, requires all of these intellectual abilities. In addition, the applicant/medical student must be able to comprehend three-dimensional relationships and to understand the spatial relationships of structures. The applicant/medical student must have the capacity to perform these problem-solving skills in a timely fashion.

#### **Behavioral and Social Attributes**

The applicant/medical student must possess the emotional health required for full utilization of his or her intellectual abilities, the exercise of good judgment, the prompt completion of all responsibilities attendant to the diagnosis and care of patients, and the development of mature, sensitive, and effective relationships with patients and others. Applicants/medical students must also be able to tolerate taxing workloads, function effectively under stress, adapt to a changing environment, display flexibility, and learn to function in the face of uncertainties inherent in the clinical problems of many patients. Compassion, integrity, concern for others, commitment, and motivation are personal qualities that each applicant/medical student should possess.

### **Transfer Admissions**

The Indiana University School of Medicine accepts applications for transfer from Indiana residents who are enrolled in another U.S. or foreign medical school, and from nonresidents who are enrolled in U.S. medical schools. Nonresidents enrolled in foreign medical schools and students in other professional or graduate schools cannot be considered for transfer because the School of Medicine's facilities are usually almost totally committed.

Applications for transfer are considered for the second and third years only. If an applicant is accepted to the third year, the acceptance will be contingent on a passing score on the United States Medical Licensure Examination (USMLE) Step 1.

Transfer admission will be granted on the basis of available space and facilities, undergraduate record, MCAT scores, performance in the current medical school curriculum, and, if requested by the Admissions Committee, a personal interview. Nonresidents will be considered only if they have a compelling and legitimate need to transfer to Indiana University.

## Contact Information

[School of Medicine](#)  
1120 South Drive  
Fesler Hall 302  
Indianapolis, IN 46202-5114  
317.274.8157  
[inmedadm@iupui.edu](mailto:inmedadm@iupui.edu)

## Graduate Programs

The IU School of Medicine offers graduate degrees in the following disciplines:

### [Doctor of Medicine \(M.D.\)](#)

#### Dual Degrees

- [Doctor of Medicine/Master of Philosophy](#)
- [Doctor of Medicine/Master of Business Administration](#)
- [Doctor of Medicine/Master of Public Health](#)
- [M.D./Ph.D. \(Medical Scientist Training Program\)](#)

### [Doctor of Philosophy \(Ph.D.\)](#)

- [Anatomy and Cell Biology](#)
- [Biochemistry and Molecular Biology](#)
- [Epidemiology \(Public Health\)](#)
- [Health Policy and Management \(Public Health\)](#)
- [Medical and Molecular Genetics](#)
- [Medical Biophysics and Biomolecular Imaging](#)
- [Medical Neuroscience](#)
- [Microbiology and Immunology](#)
- [Pathology](#)
- [Pharmacology and Toxicology](#)
- [Physiology](#)

### [Master of Science \(M.S.\)](#)

- [Anatomy and Cell Biology](#)
- [Biochemistry and Molecular Biology](#)
- [Biotechnology](#)
- [Clinical Research](#)
- [Medical and Molecular Genetics](#)
- [Medical and Molecular Genetics - Genetic Counseling](#)
- [Medical Biophysics and Biomolecular Imaging](#)
- [Medical Science](#)
- [Pathology](#)
- [Pharmacology and Toxicology](#)
- [Physiology](#)

For more information regarding the Ph.D. and M.S. programs please review this website: <http://grad.medicine.iu.edu/degree-programs/>

## Student Learning Outcomes

Graduates from the Indiana University School of Medicine graduate programs will be able to:

1. Demonstrate the ability to identify and conduct original research, scholarship, and creative endeavors.
2. Think critically and creatively, and to solve problems in their area of specialization.
3. Write clearly, articulate ideas to peer scientists and lay public, and constructively defend research outcomes by developing cogent arguments.
4. Understand and adhere to ethical standards relating to the conduct of scientific research, confidentiality, attribution, and ownership of data.

Visit the following pages to view degree specific Student Learning Outcomes.

### [Doctor of Medicine \(M.D.\)](#)

#### [Doctor of Philosophy \(Ph.D.\)](#)

- Anatomy
- Biochemistry and Molecular Biology
- Medical and Molecular Genetics
- Medical Biophysics and Biomolecular Imaging
- Medical Neuroscience
- Microbiology and Immunology
- Pathology
- Pharmacology and Toxicology
- Physiology

### [Master of Science \(M.S.\)](#)

- Anatomy
- Biochemistry and Molecular Biology
- Biotechnology
- Clinical Research
- Medical and Molecular Genetics
- Medical and Molecular Genetics - Genetic Counseling
- Medical Biophysics and Biomolecular Imaging
- Medical Science
- Pathology
- Pharmacology and Toxicology
- Physiology

For more information regarding the Ph.D. and M.S. programs please review this website: <http://grad.medicine.iu.edu/degree-programs/>

For more information regarding the M.D. program please review this website: <http://admissions.medicine.iu.edu/applying-to-the-iu-school-of-medicine/>

## Doctor of Medicine (M.D.)

The competent graduate in the Doctor of Medicine (M.D.) program of the Indiana University School of Medicine will demonstrate competence in the following areas:

### 1. Effective Communication

- Listen attentively and communicates clearly with patients, families, and health care team members.
- Establish the rapport necessary to form and maintain a therapeutic relationship with the patient.

### 2. Basic Clinical Skills

- Elicit and record a complete and accurate history and performs a skillful examination appropriate to a variety of patient encounters.

- Correctly determine whether to perform a comprehensively or suitably focused history and physical examination.
- Correctly select, proficiently perform, and accurately interpret selected clinical procedures and laboratory tests.

### 3. Using Science to Guide Diagnosis, Management, Therapeutics and Prevention

- Know and explain the scientific underpinnings at the molecular, cellular, organ, whole body, and environmental levels for states of health and disease based upon current understandings and cutting-edge advances in contemporary basic science.
- Use this information to diagnose, manage, and prevent the common health problems of individuals, families, and communities in collaboration with them.
- Develop a problem list and differential diagnosis.
- Carry out additional investigations.
- Choose and implement interventions with consultation and referral as needed.
- Determine outcome goals.
- Recognize and utilize opportunities for prevention.
- Monitor progress.
- Share information and educate.
- Adjust therapy and diagnosis according to results.

### 4. Lifelong Learning

- Aware of the limits of his/her personal knowledge and experience.
- Actively set and pursue clear learning goals.
- Exploit new opportunities for intellectual growth and professional enlightenment.
- Capable of critical, reliable, and valid self-assessment, and can apply the knowledge gained to the practice of his/her profession.

### 5. Self-Awareness, Self-Care and Personal Growth

- Approach the practice of medicine with awareness of his/her limits, strengths, weaknesses, and personal vulnerabilities.
- Assess personal values and priorities in order to develop and maintain an appropriate balance of personal and professional commitments.
- Seek help and advice when needed for his/her own difficulties and develop personally appropriate coping strategies.
- Recognize his/her effect on others in professional contacts.
- Seek, accurately receive, and appropriately respond to performance feedback.

### 6. The Social and Community Context of Health Care

- Recognize the diverse factors that influence the health of the individual and the community.
- Identify the sociocultural, familial, psychological, economic, legal, political, and spiritual factors impacting health care and health care delivery.
- Respond to these factors by planning and advocating the appropriate course of action at both the individual and the community level.

### 7. Moral Reasoning and Ethical Judgment

- Have a comprehensive understanding of the foundations and components of medical ethics and moral reasoning and is able to use that knowledge

in addressing ethical issues in his/her practice of medicine.

- Recognize the ethical issues of medical practice and health policy.
- Identify alternatives in difficult ethical choices.
- Systematically analyze the conflicting considerations supporting different alternatives.
- Formulate, defend, and effectively carry out a course of action that takes account of this ethical complexity.
- Combine a willingness to recognize the nature of the value systems of patients and others with commitment to his/her own system and the ethical choices necessary to maintain his/her own ethical integrity.

### 8. Problem Solving

- Recognize and thoroughly characterize a problem.
- Develop an informed plan of action, act to resolve the problem, and subsequently assess the results of his/her action.
- Display competence in basic problem solving skills as applied to medical problems.
- Know how to interpret and apply information and knowledge to understand and solve straightforward problems.

### 9. Professionalism and Role Recognition

- Recognize the powerful impact of his/her professional attitudes and behaviors on others.
- Consistently demonstrate the highest standards of excellence, duty, and accountability to the patient.
- Value the humanity of all patients and does not exploit the patient for personal gain.
- Recognize his/her role in working collaboratively with others to meet the health care needs of the individual and the community.

## Microbiology and Immunology, Ph.D.

The goal of the Graduate Program is to prepare research scientists for productive careers at the most competitive level. The supporting facility is equipped with all requisite tools for conducting contemporary molecular science and the expertise to implement them. However, our greatest resource is the quality of the research faculty and its commitment to productivity. Thus, the Department

1. offers didactic coursework sufficient for rapid mastery of concepts central to the discipline, while emphasizing active student involvement in the laboratory as quickly as possible,
2. provides varied forums to enhance communication/teaching skills,
3. actively encourages ongoing education beyond formal coursework throughout predoctoral training, and
4. expects training to be completed in 4-5 years with graduates poised to compete successfully for their next position.

To view the Program Goal for Microbiology and Immunology visit <http://micro.medicine.iu.edu/graduate-programs/program-goal/>.

## Pharmacology and Toxicology

### Pharmacology, Ph.D. or Toxicology, Ph.D.

The aim of the doctoral programs of the Department of Pharmacology and Toxicology is to develop independent investigators in pharmacology and toxicology. To earn a Ph.D. in Pharmacology or Toxicology, a student is required by the graduate faculty of the department to demonstrate proficiency in both conceptual and technical facets of modern biomedical research and to perform meritorious original research on a significant problem in pharmacology or toxicology.

Our goal is to educate our students to pursue successful careers in biomedical sciences as researchers and educators in professional schools, colleges and universities, in the pharmaceutical industry, and in the broader healthcare industry. [Graduate Student Handbook]

First year students should visit <http://pharmtox.iusm.iu.edu/grad-program/first-year-students/>.

### Master of Science in Pharmacology or Toxicology

Pharmacology is the scientific discipline that, in the attempt to improve health and alleviate disease, studies the mechanisms by which drugs alter biological systems.

Toxicology is the study of mechanisms by which drugs and chemicals in the environment produce unwanted effects.

Together these disciplines encompass the molecular basis of drug action, the actions of drugs on cells, organs, and organisms, genetic variations in drug action, and drug discovery. Since new drugs are being introduced into clinical medicine at a rapid pace, and since there are increasing concerns regarding the impact of environmental pollutants on our health, research in pharmacology and toxicology is at the forefront of medical science.

## Medical and Molecular Genetics

### Medical and Molecular Genetics, Ph.D.

The requirements for graduation include completion of coursework, successful performance on the department qualifying examination, defend a research proposal, conduct an original research project, and defense of the thesis. Graduates from the program are knowledgeable in the spectrum of medical genetics and will receive specific courses in molecular biology, cytogenetics and population genetics. Unique to our program, students participate in medical genetics clinics to facilitate an understanding of the bench to bedside approach to medical science.

For more information about this Ph.D. program visit <http://genetics.medicine.iu.edu/education/phd-program/>.

### Master of Science in Medical and Molecular Genetics

A full-time student will typically complete the degree in two years. Students must complete a minimum of 30 credit hours of approved course work. At least 20 credit hours must be passed in courses offered by the Department of Medical and Molecular Genetics or approved equivalents. The departmental courses must be in at least four of the following five areas: basic human genetics, clinical genetics, cytogenetics, molecular genetics or hereditary genomics and must be passed with a grade of 'B' or better. A student may choose to complete a thesis for their Master of Science degree requirements.

In addition to completing the course requirements, the student can either prepare and defend a Master's thesis or, with the approval of the department, a first authorship in a refereed publication may substitute for a formal thesis. A second option is to complete a course work Master of Science degree. In addition to completing the course requirements, the student must then complete an additional 6 credit hours of non-research course work.

Each student selects an advisor and an advisory committee to guide and supervise the student. The committee typically consists of at least three faculty members in the Department of Medical and Molecular Genetics. The student must pass a comprehensive oral or written examination as determined by the student's advisory committee. Under exceptional circumstances, the student may petition the committee to be permitted to take the final examination one additional time.

For more information about this master's program visit <http://genetics.medicine.iu.edu/education/master-of-science-program/>.

### Master of Science in Medical and Molecular Genetics - Genetic Counseling

The Indiana University Genetic Counseling Program is fully accredited by the American Board of Genetic Counseling. This two-year program offers:

- a specially designed curriculum to develop knowledge, skills and competency in genetic counseling
- extensive clinical experience in a variety of local genetic counseling settings
- supervising personnel who are certified by either the American Board of Medical Genetics (ABMG) or the American Board of Genetic Counseling (ABGC)
- participation in local and regional genetics education activities
- preparation of students to apply for active candidate status with the American Board of Genetic Counseling

Successful completion of the Indiana University Genetic Counseling Program will lead to a Master of Science degree in medical genetics.

For more information about the Genetic Counseling Program visit <http://genetics.medicine.iu.edu/education/master-of-science-genetic-counseling-program/>.

## Medical Neuroscience, Ph.D.

The first requirement for the Ph.D. in Medical Neuroscience is the completion of several core courses and seminars. Students must pass a Qualifying Examination covering the concepts and research skills presented in the core curriculum. After entering a specific laboratory to engage in a formal research project, a Dissertation Proposal in NIH grant format is evaluated in written form and defended orally in front of the Research Committee. Finally, the dissertation resulting from the student's original research must be presented and defended in a formal seminar. [IUSM\_Med\_Neuro\_Student-Faculty\_Handbook.2010(1).pdf]

To view the IUSM Medical Neuroscience Student/Faculty Handbook visit <http://snri.iusm.iu.edu/education-and-training/current-student-resources/>.

## Anatomy and Cell Biology

### Anatomy and Cell Biology, Ph.D. - Biomedical Research Track

Students enter the track in August through the [Indiana University School of Medicine BioMedical Gateway Program](#) (IBMG) and take the IBMG core courses and complete three lab rotations before selecting the program and lab they will ultimately join. During the second year, students take the major anatomy core courses plus foundation courses of a minor discipline (such as physiology, biochemistry, etc). Students establish an Advisory Committee, headed by the Research Advisor at the end of their first year.

This committee aids the student in preparation for the Qualifying Examination (given at the end of the second year), which typically includes the writing and presentation of a Thesis Research Proposal (extramural grant format). The Qualifying Examination has two aims:

1. to assess the student's competency in the Anatomical subdisciplines and chosen minor, and
2. to determine if the student is prepared to begin thesis research.

Upon passing the Qualifying Examination, the student is admitted to candidacy for the Ph.D. The student's Committee advises the student throughout the conduct and completion of the doctoral research project, including the writing and defense of a Dissertation.

### Anatomy and Cell Biology, Ph.D. - Education Track

The goal of this track is to produce a cadre of doctoral-level anatomy educators who are capable of teaching all of the anatomical disciplines to undergraduate, graduate, or professional students, and who are capable of producing the high-quality educational research and other scholarly work necessary for promotion and tenure.

Designed as a five-year program, the Education Track requires a total of 90 credit hours, which includes 64 credits in required coursework and 26 credits in dissertation research. The coursework is divided into two "core" areas, as well as statistics courses and electives:

- **Anatomy Core** (31 hours) - will provide rigorous training in the major anatomical disciplines of Gross Anatomy, Histology, Neuroscience, and Cell Biology, as well as supervised and mentored teaching experiences with medical students and graduate students.
- **Education Core** (18 hours) - will provide fundamentals of pedagogy and assessment, including educational research and scholarship.
- **Statistics** (6 hours) - will provide the statistical tools needed to properly design and evaluate educational research projects.
- **Electives** (9 hours) - will provide the opportunity for further training in the biomedical sciences, education, or statistics.

After completing the coursework, students will be required to pass a Qualifying Examination that tests their knowledge of anatomy, grasp of relevant literature,

and the ability to form educational research hypotheses and design studies to test these hypotheses. Students must successfully complete a doctoral research project, including the writing and defense of a Dissertation.

### Master of Science in Anatomy and Cell Biology

The master degree in Anatomy & Cell Biology is offered as an independent degree, and is not required as a prerequisite for the doctoral degrees. Requirements are 30 credit hours, including D850 (Gross Anatomy), D851 (Histology), and D852 (Neuroscience and Clinical Neurology), along with two years of D861 (Seminar). Applications will be considered only after the potential student has reached a mentoring agreement with the faculty member in whose laboratory the research work will be done. This is a two-year, full-time program. A masters candidate will prepare a written document (paper or thesis) based on original research work, and successfully defend it before the advisory committee, which will consist of the mentor and two other faculty members.

For more information about these and other Anatomy and Cell Biology graduate programs visit <http://anatomy.iupui.edu/graduate-programs/>.

## Pathology and Laboratory Science

### Experimental Pathology, Ph.D.

The PhD Experimental Pathology program provides the basis for a career of teaching and performing pathology research in academic medicine or in science-related industries. Admission is through the Indiana University School of Medicine BioMedical Gateway (IBMG). The IBMG adviser will advise the student concerning course work and ensure that he or she is familiar with the department, the faculty, and the research opportunities available.

The student, in conjunction with the adviser and with involved faculty members, selects a major adviser, based on the premise that the student will complete the PhD research project under the guidance of that adviser. The major adviser will then assist the student in selecting additional faculty as needed to make up the PhD advisory committee. The advisory committee is responsible for preparing and administering the doctoral qualifying examination. After the doctoral qualifying examination has been completed, the research committee is selected. The research committee will guide the student to completion of the PhD.

The research project is the focus of the PhD program; research opportunities are available in many areas of pathology. The Graduate Faculty of the Department of Pathology and Laboratory Medicine works to match students with projects that are appropriate to their individual areas of interest and expertise.

Requirements for Completion:

- A minimum of 90 credits hours, of which at least 35 are course credits and at least 45 are research credits.
- A PhD minor consisting of the IBMG core curriculum or at least 12 course credits in a related discipline or life science.
- Pathology C603 or equivalent (grade of B or higher)
- Graduate Student Seminar C808 (1- 4 credits)

- Successful completion of the doctoral qualifying examination
- Completion of a research project resulting in a doctoral dissertation

### **Master of Science in Experimental Pathology**

The Master's degree curriculum for Laboratory Science is a research-based program that allows students to focus in an area of pathology such as clinical chemistry, clinical microbiology, hematopathology, transfusion medicine, diagnostic immunoserology, molecular diagnostics, cytotechnology, and others. The program seeks to increase the candidate's background knowledge within a particular field, and to prepare the individual for conducting investigative work in applied laboratory science.

Graduates are primed for positions involving clinical teaching, laboratory supervision, and research and development. The Laboratory Science master's program is suggested for clinical laboratory scientists, cytotechnologists, and others who have a strong background and interest in laboratory sciences. Previous work experience in a hospital clinical pathology laboratory as a clinical laboratory scientist or cytotechnologist is desirable, but not required.

### **Master of Science in Laboratory Science**

The MS in Experimental Pathology is recommended for those who have an interest in basic research and plan careers as research scientists. The program offers opportunities for specialization in various areas of pathology, similar to those available in the Laboratory Science MS track. This track is suggested for students with an interest in any of the many areas of pathology. A strong science background is important. Previous research experience is an asset, but is not required.

A curriculum of basic science courses (21 or more credits including a graduate level biochemistry course and Seminar C808) is designed and personalized for each student, depending on his/her area of interest and experience. Courses may be selected from graduate courses offered by the Department of Pathology and Laboratory Medicine or by other IUPUI and IU School of Medicine basic science departments.

Specific research projects for each student will be determined after completion of the first full semester of course work. The student's area of interest and the availability of a suitable research advisor are considered in this choice. Degree completion involves submission of a bound research thesis or publication of the research in a respected, peer-reviewed journal in the appropriate field. Recent thesis and dissertation titles from the MS Laboratory Science and the Experimental Pathology programs may be accessed in Recent Thesis and Dissertation Titles.

For more information about these graduate programs visit <http://pathology.iupui.edu/education/graduate/graduate-tracks/>.

## **Biochemistry and Molecular Biology**

### **Biochemistry and Molecular Biology, Ph.D.**

The Department offers a Graduate Program in Biochemistry and Molecular Biology leading to the Ph.D. degree awarded by the Indiana University Graduate School. Our teaching mission includes core graduate

courses in molecular biology and biochemistry, as well as medical courses in biochemistry and cellular and molecular biology. In addition, we offer advanced courses in a wide range of specialty areas reflecting the research interests of our faculty.

Students regularly participate in numerous departmental and program events such as journal clubs, research seminars and departmental retreat. We strive to help students develop the biochemical and molecular skills necessary to drive the current revolution in the biomedical sciences. Milestones to the degree include the oral defense of the thesis proposal. Students will also be questioned on topics outside of their thesis work during their thesis proposal oral defense in B803. Passing of this defense (with B/3.0 grade or better) will be required for advancement to candidacy.

Students will be enrolled for credit in B890 in years 2-5 in which they will present a seminar each year as well as attend all student and faculty seminars. Student seminars will generally be of a "journal club" format, where current, published work in the field of biochemistry is presented. Students who have advanced to candidacy may present their own lab work upon approval of course director and thesis advisor.

After choosing a laboratory for thesis research, an advisory committee consisting of at least 3 Biochemistry and Molecular Biology and 1 external faculty member will be formed with the approval of the thesis advisor and departmental chairperson. Upon advancement to candidacy a thesis research committee will be similarly formed that may consist of different faculty.

For more information about these graduate programs visit <http://biochemistry.iu.edu/graduate-program/>.

## **Medical Biophysics and Biomolecular Imaging, Ph.D.**

The interdisciplinary program in Biomolecular Imaging offers graduate research training that leads to the Ph.D. in Medical Biophysics and is designed to train talented students in the use of imaging techniques to study biological processes from the molecular to the cellular level. [Core courses](#) in the fundamentals of biomedical science are complemented by courses teaching specialized knowledge in the physical basis of cell and molecular imaging. The interdisciplinary nature of the program allows you to choose from faculty in a variety of departments who have a wide range of expertise in biomedical and physical science.

For more information about this program visit <http://bioimage.medicine.iu.edu/>.

## **Biotechnology, M.S.**

The IU School of Medicine's M.S. in Biotechnology aims to boost the research skills of individuals interested in health sciences research.

We designed the program for people already employed in local biotech industries or academic research laboratories, for individuals seeking a career change, and for recent graduates in Biology and Chemistry.

The three-year, 30-credit program allows students to evaluate whether a research career in a biotech discipline is an appropriate choice. All of the courses are approved

for graduate credit and could be accepted as part of a Ph.D. Students must initially enroll in the Biotechnology Certificate program and maintain a 3.0 GPA.

Students will select a School of Medicine Core facility like Proteomics, Protein Expression, Microscopy, Transgenics, Flow Cytometry etc. for their research project. The Core Director will match faculty members with a research project with students. Each student will conduct research and write a paper on the goal of the project, methodologies and result.

The core curriculum is the 17 credits of the biotechnology Certificate Program, plus an additional academic course in basic science, a course in scientific writing and 9 credits of research with a faculty mentor and an IUSM core facility. Students will complete and defend an M.S. thesis based on their research. The MS can be completed part-time in 3 years.

### Clinical Research, M.S.

Indiana University has been funded by the National Institute of Health through a K-30 grant to develop and implement the Clinical Investigator Training Enhancement (CITE) program. The purpose of this program is to prepare health care professionals for a career in clinical research. Following completion of the program, graduates can embark on a career in clinical research with the skills necessary to successfully compete for grant funding, conduct and analyze research findings, and publish their work in scientific journals.

By participating in the program, CITE trainees will accomplish two primary objectives:

1. Complete a two-year formal clinical research curriculum, at the end of which they will receive a Master of Science in Clinical Research degree.
2. Conduct clinical research under the mentorship of a faculty scientist whose discipline or area of clinical investigation corresponds to the research interests and career aims of the CITE enrollee. An Advisory Committee consisting of a primary mentor and other relevant faculty scientists will be established for each enrollee to monitor progress.

Substantial time for completing the CITE program is required in that there are two main components: completion of the formal curriculum and active involvement in clinical research under the mentorship of a faculty scientist. Both elements are critical to preparation of the candidate for successful research following graduation.

CITE is an integrated program where the formal classroom curriculum complements and parallels the ongoing clinical research that is relevant to each enrollee's career. This differs from a "sequential" program in which individuals might focus predominantly on formal coursework for several years, deferring their actual research until they have attained their degree.

The rationale is two-fold. First, CITE coursework is most meaningful when applied to research in which the enrollee is engaged and hopes to continue following program completion. Second, success in clinical research requires not only formal training but several primary outcomes, particularly publications and grants. In addition to the M.S. degree, CITE graduates will have completed a

grant proposal for funding as well as one or several manuscripts for publication. The combination of a degree plus the products of successful research will substantially enhance the likelihood of sustained success as a clinical investigator following program completion [[IndianaCTSI HUB](#)].

### Medical Science, M.S.

Problem-based learning (PBL) is an active student-directed educational method. In PBL learners progressively develop autonomous learning skills. Learners increasingly continue to learn on their own in the program and in life. A facilitator provides the educational materials and guidance that enhances learning. A real world problem is the basis of PBL. A complex PBL problem stimulates the learner to organize and integrate learned information in ways that promote its recall and application to future problems. PBL problems challenge learners to acquire problem-solving and critical thinking skills.

Learners process and solve a problem with information they may already possess permitting them to validate what they already know. They also identify and inquire into what they need to know. Learners engage in independent study researching learning issues using different resources such as books, reports, journals, online information, individuals with relevant expertise. Thus, PBL personalizes learning to individual needs and learning styles. Learners return with their research reports and apply their expanded understanding of the problem in order to resolve it. At the conclusion of a PBL case, learners assess their work, each other and the facilitator.

### MCAT Problem-based Learning

MCAT Problem-based learning (PBL) is an active student-directed learning process guided by tutors. Students meet in small groups for 3 hours three times per week for 9 weeks to process MCAT-like passages and solve MCAT-like questions using PBL principles. Most of the tutors have completed at least the first of the medical curriculum at Indiana University School of Medicine and have experience in PBL techniques.

The goals of the MCAT PBL are as follows:

- Use MCAT-like passages to promote student understanding of the MCAT
- Enhance student confidence through mastery of test-taking skills
- Promote students' reasoning and problem solving skills through analysis of MCAT passages to identify significant facts, identify learning issues, make appropriate answer choices.
- Provide an learning environment in which students collaboratively direct their own learning.
- Enhance student's knowledge base and life-long learning skills through self-directed inquiry on learning issues.

### Problem-based Learning in Medical Science: Year 1

This course for first year MSMS students provides an academic context in which students take responsibility for their own learning. The course uses a small team setting in which students can benefit from peer and facilitator feedback and support each other's learning. Basic science course material constitutes the basis of clinical cases used in the MSCI X503. During PBL sessions

students will analyze and explain the scientific basis of the disease process covered in a case.

The goals of the course are as follows:

- Develop life-long learning and reasoning skills
- Promote students' problem solving skills by analyzing a clinical case to identify significant facts, formulate hypotheses, identify learning issues, collect data, and make a diagnosis.
- Provide an academic context in which students collaboratively direct their own learning.
- Enhance student's knowledge base through self-directed research on learning issues.
- Use cases to emphasize the relevance of basic science to clinical medicine.

## Physiology

We invite students who are interested in preparing for exciting careers in biomedical research to join one of our graduate programs. The Department of Cellular & Integrative Physiology has an extraordinary group of dedicated and creative research scientists whose studies embrace both basic cellular and physiological processes, and include ground breaking research focusing on a variety of disease processes including cancer, diabetes, bone remodeling, cardiovascular, renal, membrane, and respiratory pathophysiology. Graduates from our program have enjoyed establishing careers in academic and private research institutes, industry, and government laboratories.

### Master of Science in Physiology

Master of Science (M.S.) Students will apply to enter our graduate program using the instructions provided on the weblink and tab "MS Degree ... Application". This degree pathway requires a total of 30 credits for completion. There is both a research and a non-research option for this degree. This is an intensive 1-2 year (3 semester) program designed for students who wish to pursue advanced positions in academic research institutions, industrial settings, and professional schools (e.g. medicine, dentistry). Students entering this program will enhance their knowledge of cellular and integrated physiology through coursework and research which will help prepare the student for jobs in biomedical research, industry, small colleges, and other professions. In addition, this program serves students who wish to improve their academic qualifications for entry into professional schools such a medical or dental schools.

### Physiology, Ph.D.

Doctoral (Ph.D.) Students will formally enter our graduate program upon completion of the 1<sup>st</sup> year of the [IBMG gateway program](#) by selecting a faculty mentor from our [primary faculty](#) or [adjunct faculty](#) to serve as thesis advisor. Student stipends are highly competitive (\$24,500/year for 2009-10) and pay all of the student's tuition, as well as health plan benefits and associated registration fees. Students in the Cellular & Integrative Physiology graduate program have opportunities for supplementing their stipends by competing for and receiving external fellowships from such organizations as National Institutes of Health, American Heart Association, or the Department of Defense etc.

## Degree Programs

The IU School of Medicine offers graduate degrees in the following disciplines:

### Doctor of Medicine (M.D.)

#### Dual Degrees

- [Doctor of Medicine/Master of Philosophy](#)
- [Doctor of Medicine/Master of Business Administration](#)
- [Doctor of Medicine/Master of Public Health](#)
- [M.D./Ph.D. \(Medical Scientist Training Program\)](#)

### Doctor of Philosophy (Ph.D.)

- [Anatomy and Cell Biology](#)
- [Biochemistry and Molecular Biology](#)
- [Epidemiology \(Public Health\)](#)
- [Health Policy and Management \(Public Health\)](#)
- [Medical and Molecular Genetics](#)
- [Medical Biophysics and Biomolecular Imaging](#)
- [Medical Neuroscience](#)
- [Microbiology and Immunology](#)
- [Pathology](#)
- [Pharmacology and Toxicology](#)
- [Physiology](#)

### Master of Science (M.S.)

- [Anatomy and Cell Biology](#)
- [Biochemistry and Molecular Biology](#)
- [Biotechnology](#)
- [Clinical Research](#)
- [Medical and Molecular Genetics](#)
- [Medical and Molecular Genetics - Genetic Counseling](#)
- [Medical Biophysics and Biomolecular Imaging](#)
- [Medical Science](#)
- [Pathology](#)
- [Pharmacology and Toxicology](#)
- [Physiology](#)

For more information regarding the Ph.D. and M.S. programs please review this website: <http://grad.medicine.iu.edu/degree-programs/>

## Doctor of Medicine (M.D.)

The competent graduate in the Doctor of Medicine (M.D.) program of the Indiana University School of Medicine will demonstrate competence in the following areas:

### 1. Effective Communication

- Listen attentively and communicates clearly with patients, families, and health care team members.
- Establish the rapport necessary to form and maintain a therapeutic relationship with the patient.

### 2. Basic Clinical Skills

- Elicit and record a complete and accurate history and performs a skillful examination appropriate to a variety of patient encounters.
- Correctly determine whether to perform a comprehensively or suitably focused history and physical examination.

- Correctly select, proficiently perform, and accurately interpret selected clinical procedures and laboratory tests.

### 3. Using Science to Guide Diagnosis, Management, Therapeutics and Prevention

- Know and explain the scientific underpinnings at the molecular, cellular, organ, whole body, and environmental levels for states of health and disease based upon current understandings and cutting-edge advances in contemporary basic science.
- Use this information to diagnose, manage, and prevent the common health problems of individuals, families, and communities in collaboration with them.
- Develop a problem list and differential diagnosis.
- Carry out additional investigations.
- Choose and implement interventions with consultation and referral as needed.
- Determine outcome goals.
- Recognize and utilize opportunities for prevention.
- Monitor progress.
- Share information and educate.
- Adjust therapy and diagnosis according to results.

### 4. Lifelong Learning

- Aware of the limits of his/her personal knowledge and experience.
- Actively set and pursue clear learning goals.
- Exploit new opportunities for intellectual growth and professional enlightenment.
- Capable of critical, reliable, and valid self-assessment, and can apply the knowledge gained to the practice of his/her profession.

### 5. Self-Awareness, Self-Care and Personal Growth

- Approach the practice of medicine with awareness of his/her limits, strengths, weaknesses, and personal vulnerabilities.
- Assess personal values and priorities in order to develop and maintain an appropriate balance of personal and professional commitments.
- Seek help and advice when needed for his/her own difficulties and develop personally appropriate coping strategies.
- Recognize his/her effect on others in professional contacts.
- Seek, accurately receive, and appropriately respond to performance feedback.

### 6. The Social and Community Context of Health Care

- Recognize the diverse factors that influence the health of the individual and the community.
- Identify the sociocultural, familial, psychological, economic, legal, political, and spiritual factors impacting health care and health care delivery.
- Respond to these factors by planning and advocating the appropriate course of action at both the individual and the community level.

### 7. Moral Reasoning and Ethical Judgment

- Have a comprehensive understanding of the foundations and components of medical ethics and moral reasoning and is able to use that knowledge in addressing ethical issues in his/her practice of medicine.

- Recognize the ethical issues of medical practice and health policy.
- Identify alternatives in difficult ethical choices.
- Systematically analyze the conflicting considerations supporting different alternatives.
- Formulate, defend, and effectively carry out a course of action that takes account of this ethical complexity.
- Combine a willingness to recognize the nature of the value systems of patients and others with commitment to his/her own system and the ethical choices necessary to maintain his/her own ethical integrity.

### 8. Problem Solving

- Recognize and thoroughly characterize a problem.
- Develop an informed plan of action, act to resolve the problem, and subsequently assess the results of his/her action.
- Display competence in basic problem solving skills as applied to medical problems.
- Know how to interpret and apply information and knowledge to understand and solve straightforward problems.

### 9. Professionalism and Role Recognition

- Recognize the powerful impact of his/her professional attitudes and behaviors on others.
- Consistently demonstrate the highest standards of excellence, duty, and accountability to the patient.
- Value the humanity of all patients and does not exploit the patient for personal gain.
- Recognize his/her role in working collaboratively with others to meet the health care needs of the individual and the community.

## Microbiology and Immunology, Ph.D.

The goal of the Graduate Program is to prepare research scientists for productive careers at the most competitive level. The supporting facility is equipped with all requisite tools for conducting contemporary molecular science and the expertise to implement them. However, our greatest resource is the quality of the research faculty and its commitment to productivity. Thus, the Department

1. offers didactic coursework sufficient for rapid mastery of concepts central to the discipline, while emphasizing active student involvement in the laboratory as quickly as possible,
2. provides varied forums to enhance communication/teaching skills,
3. actively encourages ongoing education beyond formal coursework throughout predoctoral training, and
4. expects training to be completed in 4-5 years with graduates poised to compete successfully for their next position.

To view the Program Goal for Microbiology and Immunology visit <http://micro.medicine.iu.edu/graduate-programs/program-goal/>.

## Pharmacology and Toxicology

### Pharmacology, Ph.D. or Toxicology, Ph.D.

The aim of the doctoral programs of the Department of Pharmacology and Toxicology is to develop independent

investigators in pharmacology and toxicology. To earn a Ph.D. in Pharmacology or Toxicology, a student is required by the graduate faculty of the department to demonstrate proficiency in both conceptual and technical facets of modern biomedical research and to perform meritorious original research on a significant problem in pharmacology or toxicology.

Our goal is to educate our students to pursue successful careers in biomedical sciences as researchers and educators in professional schools, colleges and universities, in the pharmaceutical industry, and in the broader healthcare industry. [Graduate Student Handbook]

First year students should visit <http://pharmtox.iusm.iu.edu/grad-program/first-year-students/>.

### **Master of Science in Pharmacology or Toxicology**

Pharmacology is the scientific discipline that, in the attempt to improve health and alleviate disease, studies the mechanisms by which drugs alter biological systems.

Toxicology is the study of mechanisms by which drugs and chemicals in the environment produce unwanted effects.

Together these disciplines encompass the molecular basis of drug action, the actions of drugs on cells, organs, and organisms, genetic variations in drug action, and drug discovery. Since new drugs are being introduced into clinical medicine at a rapid pace, and since there are increasing concerns regarding the impact of environmental pollutants on our health, research in pharmacology and toxicology is at the forefront of medical science.

## **Medical and Molecular Genetics**

### **Medical and Molecular Genetics, Ph.D.**

The requirements for graduation include completion of coursework, successful performance on the department qualifying examination, defend a research proposal, conduct an original research project, and defense of the thesis. Graduates from the program are knowledgeable in the spectrum of medical genetics and will receive specific courses in molecular biology, cytogenetics and population genetics. Unique to our program, students participate in medical genetics clinics to facilitate an understanding of the bench to bedside approach to medical science.

For more information about this Ph.D. program visit <http://genetics.medicine.iu.edu/education/phd-program/>.

### **Master of Science in Medical and Molecular Genetics**

A full-time student will typically complete the degree in two years. Students must complete a minimum of 30 credit hours of approved course work. At least 20 credit hours must be passed in courses offered by the Department of Medical and Molecular Genetics or approved equivalents. The departmental courses must be in at least four of the following five areas: basic human genetics, clinical genetics, cytogenetics, molecular genetics or hereditary genomics and must be passed with a grade of 'B' or better. A student may choose to complete a thesis for their Master of Science degree requirements.

In addition to completing the course requirements, the student can either prepare and defend a Master's thesis or, with the approval of the department, a first authorship in a refereed publication may substitute for a formal

thesis. A second option is to complete a course work Master of Science degree. In addition to completing the course requirements, the student must then complete an additional 6 credit hours of non-research course work.

Each student selects an advisor and an advisory committee to guide and supervise the student. The committee typically consists of at least three faculty members in the Department of Medical and Molecular Genetics. The student must pass a comprehensive oral or written examination as determined by the student's advisory committee. Under exceptional circumstances, the student may petition the committee to be permitted to take the final examination one additional time.

For more information about this master's program visit <http://genetics.medicine.iu.edu/education/master-of-science-program/>.

### **Master of Science in Medical and Molecular Genetics - Genetic Counseling**

The Indiana University Genetic Counseling Program is fully accredited by the American Board of Genetic Counseling. This two-year program offers:

- a specially designed curriculum to develop knowledge, skills and competency in genetic counseling
- extensive clinical experience in a variety of local genetic counseling settings
- supervising personnel who are certified by either the American Board of Medical Genetics (ABMG) or the American Board of Genetic Counseling (ABGC)
- participation in local and regional genetics education activities
- preparation of students to apply for active candidate status with the American Board of Genetic Counseling

Successful completion of the Indiana University Genetic Counseling Program will lead to a Master of Science degree in medical genetics.

For more information about the Genetic Counseling Program visit <http://genetics.medicine.iu.edu/education/master-of-science-genetic-counseling-program/>.

## **Medical Neuroscience, Ph.D.**

The first requirement for the Ph.D. in Medical Neuroscience is the completion of several core courses and seminars. Students must pass a Qualifying Examination covering the concepts and research skills presented in the core curriculum. After entering a specific laboratory to engage in a formal research project, a Dissertation Proposal in NIH grant format is evaluated in written form and defended orally in front of the Research Committee. Finally, the dissertation resulting from the student's original research must be presented and defended in a formal seminar. [IUSM\_Med\_Neuro\_Student-Faculty\_Handbook.2010(1).pdf]

To view the IUSM Medical Neuroscience Student/Faculty Handbook visit <http://snri.iusm.iu.edu/education-and-training/current-student-resources/>.

## Anatomy and Cell Biology

### Anatomy and Cell Biology, Ph.D. - Biomedical Research Track

Students enter the track in August through the [Indiana University School of Medicine BioMedical Gateway Program](#) (IBMG) and take the IBMG core courses and complete three lab rotations before selecting the program and lab they will ultimately join. During the second year, students take the major anatomy core courses plus foundation courses of a minor discipline (such as physiology, biochemistry, etc). Students establish an Advisory Committee, headed by the Research Advisor at the end of their first year.

This committee aids the student in preparation for the Qualifying Examination (given at the end of the second year), which typically includes the writing and presentation of a Thesis Research Proposal (extramural grant format). The Qualifying Examination has two aims:

1. to assess the student's competency in the Anatomical subdisciplines and chosen minor, and
2. to determine if the student is prepared to begin thesis research.

Upon passing the Qualifying Examination, the student is admitted to candidacy for the Ph.D. The student's Committee advises the student throughout the conduct and completion of the doctoral research project, including the writing and defense of a Dissertation.

### Anatomy and Cell Biology, Ph.D. - Education Track

The goal of this track is to produce a cadre of doctoral-level anatomy educators who are capable of teaching all of the anatomical disciplines to undergraduate, graduate, or professional students, and who are capable of producing the high-quality educational research and other scholarly work necessary for promotion and tenure.

Designed as a five-year program, the Education Track requires a total of 90 credit hours, which includes 64 credits in required coursework and 26 credits in dissertation research. The coursework is divided into two "core" areas, as well as statistics courses and electives:

- **Anatomy Core** (31 hours) - will provide rigorous training in the major anatomical disciplines of Gross Anatomy, Histology, Neuroscience, and Cell Biology, as well as supervised and mentored teaching experiences with medical students and graduate students.
- **Education Core** (18 hours) - will provide fundamentals of pedagogy and assessment, including educational research and scholarship.
- **Statistics** (6 hours) - will provide the statistical tools needed to properly design and evaluate educational research projects.
- **Electives** (9 hours) - will provide the opportunity for further training in the biomedical sciences, education, or statistics.

After completing the coursework, students will be required to pass a Qualifying Examination that tests their knowledge of anatomy, grasp of relevant literature, and the ability to form educational research hypotheses and design studies to test these hypotheses. Students

must successfully complete a doctoral research project, including the writing and defense of a Dissertation.

### Master of Science in Anatomy and Cell Biology

The master degree in Anatomy & Cell Biology is offered as an independent degree, and is not required as a prerequisite for the doctoral degrees. Requirements are 30 credit hours, including D850 (Gross Anatomy), D851 (Histology), and D852 (Neuroscience and Clinical Neurology), along with two years of D861 (Seminar). Applications will be considered only after the potential student has reached a mentoring agreement with the faculty member in whose laboratory the research work will be done. This is a two-year, full-time program. A masters candidate will prepare a written document (paper or thesis) based on original research work, and successfully defend it before the advisory committee, which will consist of the mentor and two other faculty members.

For more information about these and other Anatomy and Cell Biology graduate programs visit <http://anatomy.iupui.edu/graduate-programs/>.

## Pathology and Laboratory Science

### Experimental Pathology, Ph.D.

The PhD Experimental Pathology program provides the basis for a career of teaching and performing pathology research in academic medicine or in science-related industries. Admission is through the Indiana University School of Medicine BioMedical Gateway (IBMG). The IBMG adviser will advise the student concerning course work and ensure that he or she is familiar with the department, the faculty, and the research opportunities available.

The student, in conjunction with the adviser and with involved faculty members, selects a major adviser, based on the premise that the student will complete the PhD research project under the guidance of that adviser. The major adviser will then assist the student in selecting additional faculty as needed to make up the PhD advisory committee. The advisory committee is responsible for preparing and administering the doctoral qualifying examination. After the doctoral qualifying examination has been completed, the research committee is selected. The research committee will guide the student to completion of the PhD.

The research project is the focus of the PhD program; research opportunities are available in many areas of pathology. The Graduate Faculty of the Department of Pathology and Laboratory Medicine works to match students with projects that are appropriate to their individual areas of interest and expertise.

Requirements for Completion:

- A minimum of 90 credits hours, of which at least 35 are course credits and at least 45 are research credits.
- A PhD minor consisting of the IBMG core curriculum or at least 12 course credits in a related discipline or life science.
- Pathology C603 or equivalent (grade of B or higher)
- Graduate Student Seminar C808 (1- 4 credits)
- Successful completion of the doctoral qualifying examination

- Completion of a research project resulting in a doctoral dissertation

### **Master of Science in Experimental Pathology**

The Master's degree curriculum for Laboratory Science is a research-based program that allows students to focus in an area of pathology such as clinical chemistry, clinical microbiology, hematopathology, transfusion medicine, diagnostic immunoserology, molecular diagnostics, cytotechnology, and others. The program seeks to increase the candidate's background knowledge within a particular field, and to prepare the individual for conducting investigative work in applied laboratory science.

Graduates are primed for positions involving clinical teaching, laboratory supervision, and research and development. The Laboratory Science master's program is suggested for clinical laboratory scientists, cytotechnologists, and others who have a strong background and interest in laboratory sciences. Previous work experience in a hospital clinical pathology laboratory as a clinical laboratory scientist or cytotechnologist is desirable, but not required.

### **Master of Science in Laboratory Science**

The MS in Experimental Pathology is recommended for those who have an interest in basic research and plan careers as research scientists. The program offers opportunities for specialization in various areas of pathology, similar to those available in the Laboratory Science MS track. This track is suggested for students with an interest in any of the many areas of pathology. A strong science background is important. Previous research experience is an asset, but is not required.

A curriculum of basic science courses (21 or more credits including a graduate level biochemistry course and Seminar C808) is designed and personalized for each student, depending on his/her area of interest and experience. Courses may be selected from graduate courses offered by the Department of Pathology and Laboratory Medicine or by other IUPUI and IU School of Medicine basic science departments.

Specific research projects for each student will be determined after completion of the first full semester of course work. The student's area of interest and the availability of a suitable research advisor are considered in this choice. Degree completion involves submission of a bound research thesis or publication of the research in a respected, peer-reviewed journal in the appropriate field. Recent thesis and dissertation titles from the MS Laboratory Science and the Experimental Pathology programs may be accessed in Recent Thesis and Dissertation Titles.

For more information about these graduate programs visit <http://pathology.iupui.edu/education/graduate/graduate-tracks/>.

## **Biochemistry and Molecular Biology**

### **Biochemistry and Molecular Biology, Ph.D.**

The Department offers a Graduate Program in Biochemistry and Molecular Biology leading to the Ph. D. degree awarded by the Indiana University Graduate School. Our teaching mission includes core graduate courses in molecular biology and biochemistry, as well as medical courses in biochemistry and cellular and

molecular biology. In addition, we offer advanced courses in a wide range of specialty areas reflecting the research interests of our faculty.

Students regularly participate in numerous departmental and program events such as journal clubs, research seminars and departmental retreat. We strive to help students develop the biochemical and molecular skills necessary to drive the current revolution in the biomedical sciences. Milestones to the degree include the oral defense of the thesis proposal. Students will also be questioned on topics outside of their thesis work during their thesis proposal oral defense in B803. Passing of this defense (with B/3.0 grade or better) will be required for advancement to candidacy.

Students will be enrolled for credit in B890 in years 2-5 in which they will present a seminar each year as well as attend all student and faculty seminars. Student seminars will generally be of a "journal club" format, where current, published work in the field of biochemistry is presented. Students who have advanced to candidacy may present their own lab work upon approval of course director and thesis advisor.

After choosing a laboratory for thesis research, an advisory committee consisting of at least 3 Biochemistry and Molecular Biology and 1 external faculty member will be formed with the approval of the thesis advisor and departmental chairperson. Upon advancement to candidacy a thesis research committee will be similarly formed that may consist of different faculty.

For more information about these graduate programs visit <http://biochemistry.iu.edu/graduate-program/>.

## **Medical Biophysics and Biomolecular Imaging, Ph.D.**

The interdisciplinary program in Biomolecular Imaging offers graduate research training that leads to the Ph.D. in Medical Biophysics and is designed to train talented students in the use of imaging techniques to study biological processes from the molecular to the cellular level. [Core courses](#) in the fundamentals of biomedical science are complemented by courses teaching specialized knowledge in the physical basis of cell and molecular imaging. The interdisciplinary nature of the program allows you to choose from faculty in a variety of departments who have a wide range of expertise in biomedical and physical science.

For more information about this program visit <http://bioimage.medicine.iu.edu/>.

## **Biotechnology, M.S.**

The IU School of Medicine's M.S. in Biotechnology aims to boost the research skills of individuals interested in health sciences research.

We designed the program for people already employed in local biotech industries or academic research laboratories, for individuals seeking a career change, and for recent graduates in Biology and Chemistry.

The three-year, 30-credit program allows students to evaluate whether a research career in a biotech discipline is an appropriate choice. All of the courses are approved for graduate credit and could be accepted as part of a

Ph.D. Students must initially enroll in the Biotechnology Certificate program and maintain a 3.0 GPA.

Students will select a School of Medicine Core facility like Proteomics, Protein Expression, Microscopy, Transgenics, Flow Cytometry etc. for their research project. The Core Director will match faculty members with a research project with students. Each student will conduct research and write a paper on the goal of the project, methodologies and result.

The core curriculum is the 17 credits of the biotechnology Certificate Program, plus an additional academic course in basic science, a course in scientific writing and 9 credits of research with a faculty mentor and an IUSM core facility. Students will complete and defend an M.S. thesis based on their research. The MS can be completed part-time in 3 years.

### **Clinical Research, M.S.**

Indiana University has been funded by the National Institute of Health through a K-30 grant to develop and implement the Clinical Investigator Training Enhancement (CITE) program. The purpose of this program is to prepare health care professionals for a career in clinical research. Following completion of the program, graduates can embark on a career in clinical research with the skills necessary to successfully compete for grant funding, conduct and analyze research findings, and publish their work in scientific journals.

By participating in the program, CITE trainees will accomplish two primary objectives:

1. Complete a two-year formal clinical research curriculum, at the end of which they will receive a Master of Science in Clinical Research degree.
2. Conduct clinical research under the mentorship of a faculty scientist whose discipline or area of clinical investigation corresponds to the research interests and career aims of the CITE enrollee. An Advisory Committee consisting of a primary mentor and other relevant faculty scientists will be established for each enrollee to monitor progress.

Substantial time for completing the CITE program is required in that there are two main components: completion of the formal curriculum and active involvement in clinical research under the mentorship of a faculty scientist. Both elements are critical to preparation of the candidate for successful research following graduation.

CITE is an integrated program where the formal classroom curriculum complements and parallels the ongoing clinical research that is relevant to each enrollee's career. This differs from a "sequential" program in which individuals might focus predominantly on formal coursework for several years, deferring their actual research until they have attained their degree.

The rationale is two-fold. First, CITE coursework is most meaningful when applied to research in which the enrollee is engaged and hopes to continue following program completion. Second, success in clinical research requires not only formal training but several primary outcomes, particularly publications and grants. In addition to the M.S. degree, CITE graduates will have completed a grant proposal for funding as well as one or several

manuscripts for publication. The combination of a degree plus the products of successful research will substantially enhance the likelihood of sustained success as a clinical investigator following program completion [[IndianaCTSI HUB](#)].

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## Academic Regulations

All students admitted to the IU School of Medicine Health Professions Programs are governed by the following academic regulations. In areas where content is limited (\*), students should refer to campus-level policies found in the campus policies section (*see link in right-hand menu box*).

**Grades\*** All students admitted to the School of Medicine Health Professions Programs are governed by the grade definitions and minimum grade requirements established by their professional program. Instructors are responsible for establishing and publishing the grading scale applicable to their courses.

### Grade Point Average\*

#### R Grade, Deferred\*

**Pass/Fail\*** School of Medicine Health Professions Programs students may not use the Pass/Fail option for a stated prerequisite or a professional course. No more than one Pass/Fail course may be taken in any one semester. Students are limited to a maximum of 24 Pass/Fail credit hours for the baccalaureate degree and a maximum of 12 Pass/Fail credit hours for the associate degree.

#### Satisfactory/Fail\*

#### Incompletes\*

**Special Credit Policy\*** The School of Medicine Health Professions Programs may award special credit to students who are enrolled at Indiana University seeking a degree and who possess, by previous education or experience, a background in a health profession represented in the Health Professions Programs. The mechanisms by which a student may be awarded credit include credit by credentials, credit by experience, and credit by examination. Certain programs have policies that define how these mechanisms apply to a student seeking credit from that program. Students may obtain a copy of the available program specific *Special Credit Policy and Procedure* by contacting the Health Professions Programs Administrative Office in Van Nuys Medical Science.

**Dropped or Added Courses\*** Students who alter their original class schedules, whether by personal incentive or university directive, must do so officially by filing the appropriate forms with the registrar. Students who do not assume this responsibility are jeopardizing their records with the possibility of incurring an F in a course not properly dropped and/or not receiving credit in a course improperly added.

**Double Major\*** An undergraduate double major does not exist in the School, and second major options have not been established between the School and any other academic unit. Each health professions degree is a separate academic curriculum, and students may not pursue a double major.

**Multiple Degrees\*** Students earning more than one degree at the same level are required to meet the academic requirements for the degree in each school and must be recommended for the degree by the faculty of each school. Students receiving an undergraduate degree from the School of Medicine are required to complete the

professional component in sequence with their class of admission.

### **Grade Replacement Policy\***

**Remedial Courses** Generally, remedial and refresher courses do not satisfy any course requirement for any health professions programs degree. Contact the program for further information

Last Updated: February 6, 2012

## **Academic Policies**

**Students in Good Standing** Students must maintain a minimum cumulative grade point average of 2.00 (C) and a minimum grade point average of 2.00 for the most recent academic session and meet additional program, academic, and professional standards in order to be considered in good standing. Students are informed of program, academic, and professional standards during program orientation.

**Class Standing** Within Indiana University, class standing is based on the total number of credit hours a student has earned. However, within the Health Professions Programs, class standing is assigned according to a student's progress in the professional curriculum.

**Semester Load** To be considered a full-time student by the university for each session, the student must register for a minimum of 12 credit hours each fall and spring semester and 6 credit hours each summer I and II. The maximum load is 18 credit hours. Students who want to carry more than 18 credits must obtain permission of the program director and the dean or the dean's designee. In addition, students should have a cumulative 3.00 (B) average or have earned a 3.00 (B) average in their last full semester.

**Probation** Upon the recommendation of the faculty in the student's program, a student is placed on probation. Probationary recommendations are made when the student does not meet standards of academic performance or professional behavior. A student will be placed on academic probation for the academic session following the one in which the student fails to attain a minimum 2.00 (C) cumulative or semester grade point average. Individual programs may have additional academic and professional standards. A student who fails to meet these program-specific standards may also be placed on probation. Students are informed of program-specific standards upon entering the program. A student will be removed from probation after satisfactorily completing the program's specified requirements. Students are notified in writing of probationary actions by the Dean of the IU School of Medicine or the dean's designee.

**Dismissal** Upon the recommendation of the faculty in the student's program, a student may be dismissed from the School. Dismissal is based on the failure to meet academic or professional standards. The student will be informed of the dismissal in writing by the Dean of the IU School of Medicine or the dean's designee. A student who has been dismissed from the School may not apply for readmission to the program in which the student was enrolled at the time of dismissal. Under special circumstances, a waiver may be requested by

the program and forwarded to the Health Professions Programs' Advisory Committee for action.

**Academic Standards** A student may be dismissed from the School when, in the judgment of the faculty, the student has ceased to make satisfactory progress toward a degree. When an undergraduate student fails to attain a 2.00 (C) grade point average for two consecutive academic sessions, has a cumulative grade point average below 2.00 (C) for two consecutive semesters, or fails to earn higher than a 1.00 (D) grade point average in any one semester, the student is automatically considered to be making unsatisfactory progress toward a degree and is thereby eligible for dismissal.

In addition, a student who fails to meet program-specific academic requirements is considered to be making unsatisfactory academic progress toward a degree and may be dismissed. At the time of program orientation, each student receives a copy of the program-specific academic requirements.

**Professional Standards** A student failing to meet the standards of professional and personal conduct may be recommended for dismissal.

**Withdrawal and Readmission** A student may be readmitted to the School after withdrawal as follows:

**Temporary Withdrawal** Students in good standing who voluntarily and temporarily withdraw from a program assume temporary inactive status with the School. At the time of departure, it is the student's responsibility to arrange in writing a continuation agreement with the individual program director. The student is allowed to re-enroll as specified in the continuation agreement. The student must meet any specific academic/clinical requirements associated with re-enrollment under the continuation agreement. Students failing to re-enroll as specified in the continuation agreement are subject to dismissal from the School and program.

**Other Withdrawal** A student who withdraws without arranging in writing for a continuation agreement with the program director, or who fails to enroll in any semester, will not be allowed further enrollments in the School and will be considered as not making satisfactory progress toward a degree. Such students who want to re-enroll must file an application for admission and will be considered new applicants. New prerequisites and standards must be met. These students may be considered for advanced standing in the program provided the completed work meets the current standards of the program.

Last Updated: February 6, 2012

## **Honors**

The following honors recognize superior student performances.

**Degrees Awarded with Distinction (IU policy)** The university recognizes a student's superior performance in course work by awarding the associate or bachelor's degree with one of three levels of distinction: distinction, high distinction, or highest distinction. A student must meet the following criteria to receive a degree awarded with distinction.

1. Baccalaureate and associate degree candidates must rank in the highest 10 percent of their graduating class. The determination of eligibility for graduation with academic distinction will be made by the School so that candidates will be ranked with classmates who received the same type of degrees (e.g., B.S. in Cytotechnology, B.S. in Nuclear Medicine Technology). Programs with students who enter with a different cohort class or within a different cohort track can award honors to each separate group.
2. If the 10 percent determination of any class results in a fractional value, the number will be rounded up (i.e., a graduating class of 11 would have two individuals eligible for distinction).
3. Calculation of the grade point average for graduation with distinction will be based on the total number of credit hours completed at Indiana University. A candidate for a baccalaureate degree must have completed a minimum of 60 credit hours at Indiana University; associate degree candidates must have completed at least half of the credit hours required for their degree at Indiana University.
4. No more than 10 percent of the Indiana University credit hours may be eliminated from the grade point average determination by utilization of the mechanisms of Pass/Fail or special credit.
5. A minimum cumulative grade point average of 3.50 must have been achieved.
6. Three levels of distinction will be recognized and determined as follows: 3.50 through 3.74-Distinction; 3.75 through 3.89-High Distinction; 3.90 through 4.00-Highest Distinction.
7. The determination of candidates who will wear honor cords at the May graduation ceremonies should include all academic credit earned at Indiana University, including the spring semester before commencement.
8. Unique cases and appeals should be forwarded to the Dean of the IU School of Medicine or the dean's designee for consideration.

**Dean's List (School Policy)** Each semester, students who excel academically have the privilege of being listed on the School of Medicine Health Professions Programs Dean's List. To be eligible, students must carry 9 or more credit hours and must earn a semester grade point average of 3.50.

**Program Awards** Individual professional programs in the School offer awards recognizing academic excellence, leadership, career potential, and service. Students should refer to specific programs for descriptions of these awards.

Last Updated: February 6, 2012

## IUPUI Honors

Qualified students at IUPUI may work toward the General Honors Degree, which can be earned at the baccalaureate or associate degree level. Students interested in this program should contact the IUPUI Honors College to determine the requirements.

Students in the School who would like to pursue courses under the IUPUI Honors College should consult with

program faculty regarding the availability of such courses within the particular program of interest.

Last Updated: February 6, 2012

## Student Rights & Responsibilities

Application to and enrollment in the university constitute the student's commitment to honor and abide by the practices and policies stated in the University's official announcements, bulletins, handbooks, and other published materials and to behave in a manner that is mature and compatible with the University's function as an institution of higher learning. Students are expected to read the Indiana University Code of Student Rights, Responsibilities, and Conduct and, by their enrollment, agree to its contents and to the additional School statements that appear below.

**Academic Advising** A professional advisor is available to assist students who are working on the prerequisites for a professional program. Once admitted to a professional program, students are advised by faculty within the program. It is the student's responsibility to seek counseling and guidance. The student is responsible for planning a program to meet degree requirements and for filing a completed application by the specific program's application deadline.

**Appeals** The School abides by the appeals procedures discussed in the Indiana University Code of Student Rights, Responsibilities, and Conduct. Students may obtain a copy of the School's Appeals Policy and Appeals Procedure from the Health Professions Programs Administrative Office in Van Nuys Medical Science.

**Attendance** Students are responsible for complying with all attendance requirements that may be established by the School's faculty.

**Cheating and Plagiarism** Faculty and students have rights and responsibilities for learning, teaching, and scholarship within the entire university community. Academic functions are characterized by reasoned discourse, intellectual honesty, mutual respect, and openness to constructive change. Individuals must remain active in avoiding violation of academic ethics. Cheating. Dishonesty of any kind with respect to examinations, course assignments, alteration of records, or illegal possession of examination questions shall be considered cheating.

It is the responsibility of the student not only to abstain from cheating, but also to guard against making it possible for others to cheat. Any student who helps another student to cheat is as guilty of cheating as the student assisted. Students should also do everything possible to induce respect for the examination process and for honesty in the performance of assigned tasks in or out of class.

**Plagiarism** Honesty requires that any ideas or materials taken from another source for either written or oral use must be fully acknowledged. Offering the work of someone else as one's own is plagiarism. The language or ideas taken from another may range from isolated formulas, sentences, or paragraphs to entire articles copied from books, periodicals, speeches, or the writings of other students. The offering of materials assembled or collected by others in the form of projects or collections without acknowledgment also is considered plagiarism. Any

student who fails to give credit for ideas or materials that are taken from another source is guilty of plagiarism.

**Clinical Affiliations** Clinical affiliations are required in most programs. The program faculty is responsible for the selection, approval, and assignment of clinical experiences. Although individual student needs and desires will be recognized, the final placement decisions are made by the program faculty. Students are responsible for transportation, fees, and self-support and for following the rules and regulations of the center(s) to which they are assigned. In addition, student conduct must be consistent with the standards of the University and the profession.

**Confidentiality of Records** Indiana University, in compliance with the General Education Provisions Act, Section 438, titled Family Educational Rights and Privacy Act, provides that all of a student's records are confidential and available only to that student, to his or her parents if the student is under 21, and to the student's dependent as defined by IRS standards. The student may review the record upon request and may ask for deletions or corrections of the record in a hearing process described in detail in the Indiana University Code of Student Rights, Responsibilities, and Conduct. References, recommendations, and other similar documents may carry a voluntary waiver relinquishing the student's right to review this specific material. The student may also release the record to others by signing a written release available in the offices that maintain records. Further details regarding the provisions of the Privacy Act and a list of offices where student records are kept may be found in the Indiana University Code of Student Rights, Responsibilities, and Conduct.

**Degree Applications** Each year, students preparing to graduate during the following calendar year must file an intent-to-graduate form in the office of the program in which they are enrolled. Program faculty then certify the student's satisfactory completion of degree requirements. If there are changes in the anticipated date of degree completion, students must consult their faculty advisor and file an updated intent-to-graduate form.

**Financial Aid** A student may seek financial assistance through the financial aid office on the campus of interest. In addition, assistance may be available through professional associations and other external groups and agencies.

The use of the School's grade enhancement policies (Repeated Courses, Fresh Start, and Academic Bankruptcy) is for admissions purposes only and does not alter the student's official University record. The IUPUI Office of Student Financial Aid Services will continue to count these credits hours towards the evaluation of a student's progress towards completion of their degree. This process, called Satisfactory Academic Progress (SAP), is a federally mandated evaluation which includes the following three components:

1. Students are required to maintain an appropriate cumulative GPA of 2.0 for undergraduates and 3.0 for graduates.
2. Successfully complete at least 75% of their attempted coursework.

3. Complete their degree within 150% of the published timeframe (credit hours).

**Costs** Students are responsible for the following costs:

*Fees and Tuition* Fees and tuition are established annually by the Trustees of Indiana University.

*Books and Supplies* Books and supplies are determined by the program.

*Uniforms* During clinical/fieldwork experiences, students must adhere to the dress code requirements of the program and training site. Students are responsible for providing their own uniforms.

*Transportation* Students are responsible for travel and lodging costs associated with clinical/fieldwork experiences.

While tuition, fees, and other related expenses change each year, the estimated annual cost (resident rate) associated with matriculating in one of the undergraduate programs in the School of Medicine for the 2011-2012 academic year are available on the school's website.

Non-resident students pay a significantly higher rate. This estimate does not include living costs. Contact the program of interest for a current cost sheet.

**Liability Insurance** All students participating in required clinical experiences are covered by the University's medical malpractice insurance. When requested, students may be required to purchase and show proof of general liability insurance before being certified to begin the clinical experience.

**Health or Immunization Requirements** Before beginning the professional program, students are required to demonstrate proof of immunization for tetanus and diphtheria, rubella, rubeola (measles), mumps, varicella (chicken pox), and hepatitis. All students must have a PPD tuberculin skin test within the last three months. Students may be required to complete a physical examination (see program specific requirements). All students must show proof of health insurance before beginning the professional program.

**International Students** Foreign nationals enrolled in the School are subject to the same rights and responsibilities as all other students. International students should consult the IUPUI Office for International Affairs. A processing fee may be charged to entering students.

**Orientation** Students are required to attend program-based orientation programs before the beginning of the professional courses. Students are responsible for attending these sessions and for knowing the program-specific policies and standards distributed and discussed at the sessions. Students transferring directly into the professional program from outside the Indiana University system may also opt to attend the campus orientation program.

**Professional Conduct** Students are responsible for exhibiting conduct appropriate to their professional training and education. Each program distributes standards and policies of appropriate professional conduct at the time of program orientation.

**Registration and Record Changes** It is the student's responsibility to enroll in each required academic session

and satisfactorily complete all courses required for the degree Faculty are available to provide academic advising.

Students are responsible for communicating any necessary record changes with the Health Professions Programs Administrative Office in Van Nuys Medical Science Building as soon as possible.

Last Updated: March 2, 2012

## Credentials/Licensure

Students completing any of the professional programs are qualified to sit for the appropriate licensure and/or credentialing examinations. Contact the program director for further information.

Last Updated: February 6, 2012

## Administrative & Faculty

### Administrative Officers

Dean, D. Craig Brater, M.D.  
Executive Associate Dean for Educational Affairs,  
Maryellen E. Gusic, M.D.  
Director, Marti Reeser, Ed.D.  
Coordinator of Advising and Admissions, Rene Baugh,  
M.A.

### Program Directors

Clinical Laboratory Science, Department of Pathology and Laboratory Medicine, Linda Marler, M.S. and Diane Leland, Ph.D.  
Cytotechnology, Department of Pathology and Laboratory Medicine, William Crabtree, Ph.D.  
Histotechnology, Department of Pathology and Laboratory Medicine, Debra Wood, M.S.  
Paramedic Science, Department of Emergency Medicine, Leon Bell, M.S.  
Radiation Therapy, Department of Radiation Oncology, Judith Schneider, M.S.  
Radiologic Sciences, Department of Radiology & Imaging Sciences, Bruce Long, M.S.  
Respiratory Therapy, Division of Pulmonary and Critical Care Medicine, Linda Van Scoder, Ed.D.

Last Updated: March 13, 2012

## Faculty

**Baker, Sarah S.** [R.T.(R), A.R.R.T., FASRT]; Associate Professor of Radiologic and Imaging Sciences; A.S., Indiana University, 1973; B.S., Indiana University, 1974; M.S., Indiana University, 1979; Ed.D., Indiana University, 2001

**Bell, Leon H.** [E.M.T.-P]; Clinical Associate Professor; B.A., DePauw University, 1976; M.S.Ed., Butler University, 1989

**Cox, Linda A.** [R.T.(R) (MR)(CT), ARRT]; Associate Professor of Clinical Radiologic and Imaging Sciences; A.S., Indiana University, 1979; B.S., Indiana University, 1987; M.S., Indiana University, 1992

**Crabtree, William N.** [C.T.(ASCP), S.C.T. (ASCP)]; Director and Associate Professor of Cytotechnology; B.S.,

University of Tennessee, 1977; M.S., Indiana University, 1983; Ph.D., Indiana University, 2006

**Cranfill, Kellie S.** [R.T.(R)(BD), ARRT]; Assistant Professor of Clinical Radiologic and Imaging Sciences; A.A.S., Ivy Tech State College, 1995; B.S., Indiana University, 2000; M.S., Midwestern State University, 2005

**DeVore, Angela L.** (R.T.[R] [CT], ARRT); Clinical Assistant Professor of Radiologic and Imaging Sciences; A.S., Indiana University, 1995; B.S., Indiana University, 2001; M.S., Indiana University, 2006

**Echeverria, Valerie E.** [R.T. (R)(M) ARRT, RDMS]; Acting Lecturer of Radiologic and Imaging Sciences; A.S. Indiana University, 2004; B.S, Indiana University, 2005.

**Frain, Barbara McGaughey** [C.T.(ASCP), S.C.T. (ASCP)]; Clinical Assistant Professor of Cytotechnology; B.S., Indiana University, 1986; M.S., Indiana University, 1993

**Kosegi, Judith E.** [C.N.M.T.(NMTCB), R.T.(R), (N) ARRT]; Associate Professor of Radiologic and Imaging Sciences; A.S., Indiana University, 1970; B.S., Indiana University, 1972; M.S., Indiana University, 1978; M.S., Indiana University, 1987

**Leland, Diane S.** [M.T.(ASCP), S.M.(ASCP)]; Professor and Co-Director of Clinical Laboratory Science; B.S., Indiana University, 1970; M.S., University of Vermont, 1977; Ph.D., Indiana University, 1986

**Long, Bruce W.** [R.T.(R)(CV) ARRT, FASRT]; Associate Professor and Director of Radiologic and Imaging Sciences; B.S., Murray State University, 1977; M.S., Eastern Illinois University, 1983

**Markanday, Debra A.** [R.T.(R)(MR) ARRT]; Lecturer of Radiologic and Imaging Sciences; B.S., Indiana University, 2001; M.S., Indiana University, 2006.

**Marler, Linda M.** [M.T.(ASCP), S.M.(ASCP)]; Associate Professor and Co-Director of Clinical Laboratory Science; B.S., Indiana University, 1973; M.S., Indiana University, 1978

**Robinson, Susan** [R.T.(R) ARRT]; Associate Professor of Clinical Radiologic and Imaging Sciences; A.S., Indiana University, 1972; B.S., Indiana University, 1973; M.S., Indiana University, 1997

**Rodak, Bernadette F.** [M.T.(ASCP), S.H.(ASCP), C.L.Sp.H.(NSA)]; Associate Professor of Clinical Laboratory Science; B.S., Mount St. Agnes College, 1968; M.S., University of Kentucky, 1980

**Schneider, Judith M.** [R.T.(R) ARRT]; Assistant Professor and Program Clinical Coordinator of Clinical Radiation Therapy; A.S., Indiana State University, 1976; B.S., Indiana University, 1981; M.S., Indiana University, 1987

**Wood, Debra M.** [H.T.(ASCP)]; Lecturer and Program Director of Histotechnology; M.S., Indiana University, 2008.

### Adjunct Faculty

**Bischoff, Peter, W.** (R.R.T.); Adjunct Lecturer; B.S., Indiana University, 2008.

**Byrne, Patrick J.** [D.A.B.R, D.A.B.S.N.M., C.H.P.]; Adjunct Lecturer of Radiologic and Imaging Sciences; B.S., Purdue University, 1999; M.S., University of Michigan, 2001.

**Dempsey, Traci** [R.T.(R) ARRT]; Adjunct Lecturer of Radiologic and Imaging Sciences; A.S., Indiana University, 1999.

**Herron, Susan** [R.T.(R) ARRT]; Adjunct Lecturer of Radiologic and Imaging Sciences; A.S., Indiana University, 1981.

**Hunt-Dirinsky, Tammy A.** (R.R.T., S.D.S., R.P.F.T.); Adjunct Lecturer; A.S., Indiana University, 1986; B.S., Indiana University, 1990.; M.S., Indiana University, 2008.

**Johnson, Janice C.** (R.R.T., N.P.S., A.E.-C.); Adjunct Assistant Professor and Clinical Director of Respiratory Therapy; A.S., Indiana University, 1977; B.S., Indiana University, 1980; M.S., Indiana University, 1986

**Jones, Rhonda** [R.T.(R) ARRT]; Adjunct Lecturer of Radiologic and Imaging Sciences; A.S., Ball State University, ; B.S., Ball State University, .

**Mussa, Rebecca L.** [R.T.(R)(BD) ARRT]; Adjunct Lecturer of Radiologic and Imaging Sciences; A.A.S., Ivy Tech State College, 2004.

**Peterson, Dina** [R.T.(R) ARRT, RDMS, RDCS, RVT]; Adjunct Lecturer of Radiologic and Imaging Sciences; Cert., St. Francis School of Radiologic Technology, 1983.

**Price, Sheri** [R.T.(R) ARRT, RDMS, RVT]; Adjunct Lecturer of Radiologic and Imaging Sciences; A.S., Indiana University, 1981; B.S., Indiana University, 1982.

**Ripperger, Brandi** [R.T.(R) ARRT]; Adjunct Lecturer of Radiologic and Imaging Sciences; A.S., Indiana University, 2007.

**Van Scoder, Linda I.** (R.R.T., F.A.A.R.C.); Adjunct Associate Professor and Program Director of Respiratory Therapy; B.S., University of Cincinnati, 1975; M.S., Indiana University, 1979; Ed.D., Indiana University, 1985

**Wade, Holly S.** [C.N.M.T(NMTCB)]; Adjunct Lecturer of Radiologic and Imaging Sciences; B.A., Indiana University, 2006; B.S., Indiana University, 2008.

**Weatherman, Kara D.** [BCNP, FAPhA]; Adjunct Lecturer of Radiologic and Imaging Sciences; Pharm.D., Purdue University, 1994

**Wilson, Leslie** [R.T.(R) ARRT]; Adjunct Lecturer of Radiologic and Imaging Sciences; A.S., Ball State University, 1995; B.S., Indiana University, 1982.

Last Updated: March 13, 2012

## Faculty Emeriti

**Bartlett, Marilyn, M.S.**, [M.T.(ASCP) 1951], Professor Emerita of Medical Technology, (Indiana University, 1974)

**Feeley, Mary, Ed.D.**, [M.T.(ASCP) 1946], Professor Emerita of Medical Technology, (Indiana University, 1986)

**Hernandez, Emily M.**, M.S. [R.T.(R)(Q.M.), ARRT], Associate Professor Emerita of Radiologic Sciences, (Indiana University, 1978)

**Hocker, Narcissa, M.S.**, [M.T.(ASCP) 1945; S.B.B. (ASCP) 1955], Associate Professor Emerita of Medical Technology, (Indiana University, 1964)

**Kasper, Linda M., Ed.D.**, (M.T. [ASCP] 1963, C.L.S. [NCA] 2002, S.C. [ASCP] 1975). Associate Professor Emerita of Clinical Laboratory Sciences, (Indiana University, 2003)

**Kehrein, Suetta, M.S.**, [RT(R), ARRT], Assistant Professor Emerita of Radiologic Sciences, (Indiana University, 1975)

Last Updated: February 27, 2012

## Faculty Credential Abbreviations

- A.E.-C.-Certified Asthma Educator
- B.C.N.P.-Board Certified in Nuclear Pharmacy
- C.H.P.-Certified Health Physicist
- C.N.M.T. (NMTCB)-Certified Nuclear Medicine Technologist
- C.L.S. (NCA)-Clinical Laboratory Scientist
- C.L.Sp.H. (NCA)-Clinical Laboratory Specialist in Hematology
- C.T. (ASCP)-Cytotechnologist
- D.A.B.R-Diplomate, American Board of Radiology
- D.A.B.S.N.M-Diplomate, American Board of Science in Nuclear Medicine
- E.M.T.-P-Emergency Medical Technician–Paramedic
- F.A.A.R.C -Fellow, American Association of Respiratory Care
- F.A.Ph.A.-Fellow, American Pharmacists Association
- F.A.S.R.T.-Fellow, American Society of Radiologic Technologists
- H.T. (ASCP)-Histotechnician
- M.T. (ASCP)-Medical Technologist
- N.P.S.-Neonatal/Pediatric Specialist
- R.D.C.S.-Registered Diagnostic Cardiac Sonographer
- R.D.M.S.-Registered Diagnostic Medical Sonographer
- R.N.-Registered Nurse
- R.P.F.T.-Registered Pulmonary Function Technologist
- R.R.T.-Registered Respiratory Therapist
- R.T. (BD) ARRT-Registered Bone Densitometry
- R.T. (CT) ARRT-Registered Computed Tomography Technologist
- R.T. (CV) ARRT-Registered Cardiovascular Interventional Technologist
- R.T. (M) ARRT-Mammography
- R.T. (MR) ARRT-Registered Magnetic Resonance Imaging Technologist
- R.T. (QM) ARRT-Registered Quality Management Technologist
- R.T. (N) ARRT-Registered Nuclear Medicine Technologist
- R.T. (R) ARRT-Registered Radiographer
- R.T. (T) ARRT-Registered Radiation Therapy Technologist
- R.V.T.-Registered Vascular Technologist
- S.B.B. (ASCP)-Specialist in Blood Banking
- S.C. (ASCP)-Specialist in Chemistry

- S.C.T. (ASCP)-Specialist in Cytotechnology
- S.D.S.- Sleep Disorders Specialist
- S.H. (ASCP)-Specialist in Hematology
- S.I. (ASCP)-Specialist in Immunology
- S.M. (ASCP)-Specialist in Microbiology

Last Updated: February 15, 2012

## Courses

### Anatomy and Cell Biology

**ANAT-A 550 Gross Human Anatomy 1 (4 cr.)** This course examines the gross anatomy of the human. Developmental anatomy and regional anatomy of the back, thorax, abdomen, pelvis and perineum are examined. Cadaver-based dissection labs accompany lecture topics.

**ANAT-A 560 Cell Biology and Histology (4 cr.)**

**ANAT-D 503 Gross Anatomy for Medical Students (9 cr.)** Study and dissection of entire body, using regional approach. Frequent conferences and discussions with members of staff. Series of lectures on radiographic anatomy and clinical application of anatomy.

**ANAT-D 504 Histology (4 cr.)** Lectures and laboratory study of the microscopic structure of cells, tissues, and organs of the human body; correlation of structure and function.

**ANAT-D 505 Neuroscience and Clinical Neurology (5 cr.)** A multidisciplinary consideration of structural, functional, and clinical features of the human nervous system.

**ANAT-D 506 Gross Anatomy (7 cr.)** The study of anatomy of the adult human body by lectures and dissection, and utilization of prosections, teaching models, and skeletons. Topics of radiographic anatomy will also be presented. Clinical applications will be emphasized by clinical correlation lectures and laboratory presentations.

**ANAT-D 507 Histology and Embryology (6 cr.)** This course has two points of emphasis. Foremost is the discipline of histology, which is the study of cells, tissues, and their arrangement into organ systems. Examination of these structures will be at both the level of the light and electron microscope with the relationship between anatomical structure and physiologic function emphasized. In addition, embryological events causing and resulting in the formation of adult structures will be examined.

**ANAT-D 523 Gross Anatomy (6 cr.)** An intensive study of the human body in relation to medicine using team-based learning, dissections, clinical demonstrations, and participation in autopsies.

**ANAT-D 700 Educational Research Practicum (2 cr.)**

**ANAT-G 901 Advanced Research (6 cr.)**

### Biochemistry and Molecular Biology

**BIOC-B 500 Introductory Biochemistry (3 cr.)** Structures of carbohydrates, proteins, lipids, and nucleic acids. Basic principles of enzyme catalysis, protein synthesis, intermediary metabolism and nutrition.

**BIOC-B 509 Medical Biochemistry (6 cr.)** Introduction to biochemical terminology, methods, and concepts in a

framework relevant to the practice of medicine. Principal topics include structures and reactions of the major classes of biological molecules, protein structure and function, enzymology, metabolism of biological molecules, biosynthesis of macromolecules, regulation of cellular activities, and introductory hematology. Demonstrations, case studies, and clinical correlation conferences are presented during laboratory sessions.

**BIOC-B 523 Medical Biochemistry (5 cr.)** The chemistry and reactions of constituents of living matter, including carbohydrates, lipids, proteins, nucleic acids, vitamins, coenzymes, and minerals; the chemistry and regulations of the reactions and processes of whole organisms; endocrinology; enzymology; nutrition; intermediary metabolism; and biomedical mechanisms in selected disease states.

**BIOC-B 800 Medical Biochemistry (3 cr.)** Biochemistry for medical students. Structure and function of biological molecules, regulation of cellular processes by nutrients and hormones, biochemical and molecular basis of disease. Designed to develop the knowledge base for Competency III "Using Science to Guide Diagnosis, Management, Therapeutics and Prevention."

**BIOC-B 800 Biochemistry (5 cr.)** Macromolecules, enzymes, bioenergetics, intermediary metabolism, nutrition, metabolic control systems, and endocrinology. Lectures and problem-based learning.

**MCHE-C 580 Medical Biochemistry (3 cr.)** The objectives of C580 are multi-fold: 1) to learn the structures of medically important molecules and their functions in health and disease, 2) to learn basic molecular and cell biology and how these relate to medicine, 3) to fulfill competencies for problem solving and for effective communication.

### Cellular and Integrative Physiology

**PHSL-F 898 Senior Elective in Physiology (0-24 cr.)**

**PHSL-P 531 Human Physiology I (3 cr.)** Basic principles of general physiology; cardiovascular, digestion, respiration, and renal physiology relevant to humans.

**PHSL-G 901 Advanced Research (6 cr.)**

### Clinical Laboratory Science

"P" refers to a course prerequisite, and "C" to a course that must be taken concurrently. \* This course is offered intermittently and is not part of the traditional curriculum.

**PATH-C 401 General Externship I (2 cr.)** P: PATH C406 and PATH C426. Supervised clinical experience in clinical chemistry. Student rotates through various areas of clinical chemistry.

**PATH-C 402 General Externship II (2 cr.)** P: PATH C404, PATH C407, PATH C410. Supervised clinical experience in clinical hematology. Student rotates through various areas of clinical hematology, coagulation, and urinalysis.

**PATH-C 403 General Externship III (2 cr.)** P: PATH C409, PATH C411, PATH C420, PATH C421, and C429. Supervised clinical experience in clinical microbiology. Student rotates through various areas of microbiology, serology, virology, mycology, and parasitology.

**PATH-C 404 Hemostasis (1 cr.)** Hemostasis is a course covering the basic principles of the hemostasis mechanism, including an overview of the laboratory techniques used to evaluate disorders of hemostasis. Emphasizes the major components of hemostasis, interaction of these components, and laboratory evaluation of the major hemostatic disorders.

**PATH-C 405 General Externship IV (2 cr.)** P: PATH C408 and PATH C428. Supervised clinical experience in blood banking. Student rotates through various areas of modern blood bank, including donor room, transfusion service, antibody identification, component therapy, transplantation therapy, and quality control.

**PATH-C 406 Clinical Chemistry (4 cr.)** C: PATH C426. Emphasis on metabolic processes that maintain chemical homeostasis in humans, the application of clinical chemistry assay values in evaluating the integrity of these processes, and the correlation of abnormal results with metabolic dysfunction and/or disease states.

**PATH-C 407 Hematology (3 cr.)** P: PATH C427. Study of functions, maturation, and morphology of blood cells in addition to factors regulating production, metabolism, and kinetics of blood cells. The etiologic and morphologic classifications of blood disorders and diseases; correlations with bone marrows and cytochemistries. Study of cellular contents of other body fluids.

**PATH-C 408 Principles of Immunohematology (1 cr.)** C: PATH C428. Emphasis on major blood group antigens and antibodies including their role in transfusion medicine. Current practices in blood donation, apheresis, and quality control are also covered.

**PATH-C 409 Serology (1 cr.)** C: PATH-C 429. Lectures describing and comparing all pertinent serologic procedures utilized in diagnosis of rheumatoid arthritis, rubella, streptococcal disease, syphilis, various febrile conditions, fungal infections, parasite infections, and infectious mononucleosis. Selected lectures in viral culturing methods.

**PATH-C 410 Urine Analysis (2 cr.)** Routine urine examination and special tests; laboratory and special lectures.

**PATH-C 411 Diagnostic Medical Microbiology (4 cr.)** P: PATH C421. An in-depth study of the clinically significant microorganisms with special emphasis on their clinical significance, cultural and biochemical characteristics, and susceptibility testing patterns.

**PATH-C 412 Topics in Medical Technology (3 cr.)** Selected topics in medical technology covered by lecture and clinical experience.

**PATH-C 413 Clinical Correlation and Theory (2 cr.)** Lectures in theoretical and clinical areas designed to emphasize the relationship between laboratory test results and disease states.

**PATH-C 420 Mycology/Parasitology (2 cr.)** Lecture and laboratory experience covering clinically significant fungi and parasites. Clinical manifestations, collection and procedures for processing of specimens, and identification techniques will be employed.

**PATH-C 421 Diagnostic Microbiology Laboratory (2 cr.)** C: PATH C411. Laboratory experience in the performance of skills and procedures needed for the isolation, identification, and susceptibility testing of clinically significant microorganisms.

**PATH-C 426 Clinical Chemistry Instrumentation and Methodologies (2 cr.)** C: PATH C406. Emphasis is on utilization of basic and intermediate methodologies and instrumentation and their application to assaying a variety of body constituents in a clinical chemistry laboratory.

**PATH-C 427 Hematologic Techniques and Procedures (3 cr.)** C: PATH C407. Experience in blood cell identification on stained smears; blood cell, platelet, and reticulocyte counting procedures. Techniques of sedimentation rates, hematocrits, corpuscular indices, hemoglobin determination, and smear preparation staining. Introduction to instrumentation and quality control. Special procedures including bone marrow preparations, flow cytometry, and automated differential counters.

**PATH-C 428 Techniques in Immunohematology (1 cr.)** C: PATH C408. Emphasis on laboratory techniques used in blood banks, including blood typing, crossmatching, antibody identification, record keeping, and quality control.

**PATH-C 429 Serology Laboratory (1 cr.)** C: PATH C409. Laboratory experience in performance of various testing procedures utilized in serologic diagnosis of infectious diseases and various syndromes. Techniques include precipitation, flocculation, various hemagglutination and hemagglutination inhibition techniques, fluorescent antibody testing, and complement fixation.

**PATH-C 431 Hematology I (2 cr.)** Collecting, staining, and counting blood cells; supervised experience with patients. Experience with specimens of spinal fluid, special determinations (platelets, reticulocytes, etc.), and pathologic smears.

**PATH-C 432 Hematology II (2 cr.)** P: PATH C431. PATH C432 and PATH C434 offer more experience than PATH-C 431 allows in the same techniques and offer additional techniques such as erythrocyte sedimentation rate, hematocrit, and the calculation of indices.

**PATH-C 434 Hematology III (2 cr.)** P: PATH C431 and PATH C432. Continuation of practice and experience in hematologic techniques. Individual projects assigned if student is sufficiently advanced.

**PATH-C 440 Bacteriology I (2 cr.)** Diagnostic procedures as means to familiarize students with techniques; work on specimens received from hospital patients under supervision; practical experience with all types of human specimens for bacteriologic and mycologic study.

**PATH-C 441 Bacteriology II (2 cr.)** P: PATH C440. Agglutination and precipitin techniques and their special application to agglutination titers and the use of antibiotics. Special assignments to provide experience with organisms infrequently encountered.

**PATH-C 442 Bacteriology III (2 cr.)** P: PATH C440 and PATH C441. At the end of this course, students should be able to handle usual and somewhat unusual hospital bacteriologic and mycologic problems independently.

**PATH-C 450 Serology I (2 cr.)** Introduction to serologic and immunologic principles.

**PATH-C 451 Serology II (2 cr.)** P: PATH C450. Additional experience in adapting complement fixation, agglutination, hemagglutination, precipitin, and flocculation techniques to diagnostic procedures. \* This course is offered intermittently and is not part of the traditional curriculum.

**PATH-C 471 Clinical Chemistry I (2 cr.)** Training and experience with more frequently used chemistry tests, e.g., determination of glucose and urea nitrogen by automated and manual methods.

**PATH-C 472 Clinical Chemistry II (2 cr.)** P: PATH C471. Limited experience with less frequently performed special procedures.

**PATH-C 473 Clinical Chemistry III (2 cr.)** P: PATH C471 and PATH C472. Special equipment utilization; preparation and maintenance of solutions.

**PATH-C 476 Clinical Chemistry IV (2 cr.)** P: PATH C471, PATH C472, and PATH C473. Advanced procedures, method development, special projects.

**PATH-C 477 Clinical Chemistry V (2 cr.)** P: PATH C472, PATH C472, PATH C473, and PATH C476. Training and experience in special technical and methodological microprocedures.

**PATH-C 491 Blood Bank I (2 cr.)** Review of serologic principles and technical fundamentals of transfusion practice; comprehensive consideration of blood groups and Rh factors, extensive practice with pre-transfusion techniques and safety practices. Other blood types, antigen-antibody relationships with techniques for demonstrating these. Elementary knowledge of genetics is helpful.

**PATH-C 492 Blood Bank II (2 cr.)** P: PATH C491. Transfusion service bloods provide problem cases in isoimmunization and sensitization, Rh titration, etc. Responsibility for blood bank operation and application to special transfusion problems placed before the student.

**PATH-C 493 Blood Bank III (2 cr.)** P: PATH C491 and PATH C492. Required for students working toward special certificate in blood banking. Emphasis on supervision, reference techniques, and such accessory functions as plasma production.

### **Cytotechnology**

\* This course is offered intermittently and is not part of the traditional curriculum.

**PATH-A 412 Gynecologic Cytology, Normal (3 cr.)** Detailed microscopic study of normal squamous, endocervical, and endometrial epithelial cells, as well as other non epithelial cells. Cellular changes seen with microbiological infections, repair, inflammation, degeneration, artifact, and vitamin deficiency status.

**PATH-A 422 Gynecologic Cytology, Abnormal (3 cr.)** Histopathology and cytopathology of lesions of the female genital tract. Detailed studies in the cytologic diagnosis of dysplasia, carcinoma-in-situ, and invasive cancer of this anatomic area. Differential diagnosis of these lesions includes the severity, site of origin, and grade where appropriate.

**PATH-A 432 Pulmonary Cytology (3 cr.)** Systematic study of normal, nonmalignant, and malignant cells in the lower respiratory system.

**PATH-A 442 Cytology of Body Fluids (2 cr.)** Cytology of the eye, central nervous system, synovial membranes, and serosal cavities in fluids associated with nonmalignant and malignant disease processes.

**PATH-A 453 Cytology of the Gastrointestinal Tract (2 cr.)** Study of cells associated with nonmalignant and malignant diseases of the gastrointestinal tract, including the oral cavity, esophagus, stomach, and small and large intestines.

**PATH-A 454 Urinary Tract Cytology (2 cr.)** Clinical cytologic study of cells from normal, nonmalignant, and malignant diseases of the urinary tract, to include the urethra, ureters, renal pelvis, bladder, prostate, seminal vesicles, and kidney.

**PATH-A 455 Cytology of Fine Needle Aspiration (2 cr.)** The study of nonmalignant and malignant cells aspirated from lung, thyroid, salivary glands, breast, liver, prostate, lymph nodes, soft tissue masses, and miscellaneous organs; and the study of fine needle aspiration techniques.

**PATH-A 462 Techniques in Medical Cytology (2 cr.)** Fixation and staining procedures, preparation of monolayers, smears, and cell blocks from fluids and other exfoliates; use of filter techniques and microscopy.

**PATH-A 465 I Certification Internship (3 cr.)** Includes the fall semester of clinical internships where students gain practical experience by working with routine cytology material.

**PATH-A 465 II Certification Internship (3-6 cr.)** Includes six months of clinical internships. Students gain further practical experience by working with routine cytology material. Conferences and lectures provide additional experience.

**PATH-A 470 Seminar in Cytology (2 cr.)** Review of current literature pertaining to diagnostic cytology. Reports and discussions by students and faculty.

**PATH-A 490 Investigations in Cytopathology (1-3 cr.)** To provide the student with an experience in the realm of scientific investigation related to cytopathology. The investigation may be conducted as a research project or a literature review.

### **Emergency Medical Services**

**EMER-E 201 Emergency Medical Technician Basic I (3 cr.)** This course focuses on well-being of the EMT, basic patient assessment and airway management, and special considerations for the pediatric and geriatric patient.

**EMER-E 202 Emergency Medical Technician Basic II (3 cr.)** The content of the course covers specific medical emergencies, trauma, and basic pharmacology.

**EMER-E 210 The Paramedic and Pulmonology (3 cr.)** This course provides an in-depth study of the anatomical and physiological foundation of respiration and the management of respiratory diseases and disorders. Students will have the opportunity to perform adult and pediatric advanced airway management and ventilation

techniques and practice pharmacologic intervention during simulation.

**EMER-E 213 Paramedic as Team Member (6 cr.)**

Students will have the opportunity to use interview and physical exam techniques in assessing patients across the lifespan in prehospital and hospital environments. Scheduled and supervised clinical rotations include the advanced life support ambulance, the 911 communications center, the emergency department, anesthesia, and the pediatric clinic.

**EMER-E 214 Introduction to Paramedic Practice (3 cr.)**

This course focuses on the roles and responsibilities, health and safety, and medical, legal and ethical issues that affect the paramedic. Other content includes illness and injury prevention. The course also helps students acquire the skills to perform a patient assessment.

**EMER-E 215 Essentials/Pharmacology & EKG (6 cr.)**

Course introduces the principles and procedures necessary for the paramedic to properly administer medication in the prehospital environment. Topics include pharmacokinetics, pharmacodynamics, identification of medication, and drug dosage calculations. Students will have the opportunity to practice medication administration and vascular access techniques. General principles of pathophysiology will also be presented.

**EMER-E 220 The Paramedic and Medical Matters (3 cr.)**

This course provides study of the pathophysiology and prehospital management of various medical emergencies. Topics include neurology, endocrinology, allergies and anaphylaxis, gastroenterology, urology, hematology, toxicology, environmental agents, infectious and communicable diseases, psychiatry, gynecology, and obstetrics. Students will have the opportunity to practice pharmacologic intervention during simulation.

**EMER-E 221 The Paramedic and Trauma (3 cr.)** This course focuses on the assessment and management of the trauma victim. Also included are rescue techniques, mass casualty and triage principles, and stress management techniques.

**EMER-E 223 Paramedic as Team Player (5 cr.)**

Students will engage patients across the lifespan in prehospital and hospital environments to assess and manage a variety of pulmonary, cardiovascular and other medical emergencies. Scheduled and supervised clinical rotations include ALS ambulance, emergency department, anesthesia, intensive care unit, cardiac catheterization lab, pediatric clinic, labor and delivery, and special care nursery.

**EMER-E 226 The Paramedic and Cardiology (3 cr.)**

This course introduces electrophysiology and electrocardiology and various cardiovascular emergencies. Topics include ECG interpretation, recognition of cardiac dysrhythmias, management of cardiovascular emergencies. Students will have the opportunity to practice ACLS and PALS skills, including pharmacologic intervention and electric therapy during simulations.

**EMER-E 233 Paramedic as Team Leader (5 cr.)**

Students will have the opportunity to be in charge of various prehospital emergencies while under the supervision of a certified paramedic preceptor on an ALS ambulance. Other clinical rotations include emergency

department, intensive care, and burn units. This course emphasizes assessment-based management.

**EMER-E 243 Paramedic Professional Progress (5 cr.)**

Students will continue to have the opportunity to be in charge of various prehospital emergencies while under the supervision of a certified paramedic preceptor on an ALS ambulance. The student will have the opportunity to practice PEPP and PALS skills and prepare for the NREMT-Paramedic examination.

**EMER-E 246 Contemporary EMS Issues (3 cr.)**

This course will introduce local response and resources for abuse and assault, mass casualty incidents, triage, weapons of mass destruction, and crime scene awareness. Other topics reviewed include ambulance operations, rescue, and hazardous materials.

**EMER-E 299 Independent Study in Paramedic Science (1-4 cr.)**

Special topics, projects, or readings for students enrolled in paramedic science.

**Graduate School**

**GRAD-G 505 Responsible Conduct of Research (1 cr.)**

The purpose of this course is to provide its students with a formal setting to learn about the basic rules and acceptable standards required for anyone conducting scientific research. It will help its students obtain knowledge and develop skills for dealing with potential ethical problems in the research laboratory on their own. This course is designed for all beginning graduate students working in the life sciences or related fields and other researchers who require basic training in the responsible conduct of research.

**GRAD-G 510 MD/Ph.D. Special Options Course (0 cr.)**

**GRAD-G 620 Research Topics: Adolescent Health (3 cr.)**

**GRAD-G 651 Introduction to Biostatistics I (3 cr.)**

P: One year undergraduate mathematics is required. Working knowledge on linear algebra and elementary calculus is expected. Students with insufficient mathematics preparation are expected to remedy the deficiency on their own. G651 is an introductory level biostatistics course designed for healthcare professionals. It is the first in the G651 and G652 series on biostatistics methodology. The course covers topics such as data description and presentation techniques, probability and probability distributions, sampling distributions, statistical inferences from small and large samples, analysis of categorical data, analysis of variance, correlation and simple linear regression analysis. Upon completion of the course, students will achieve a basic understanding of the concepts and techniques of data description and statistical inferences. Students will also acquire a working knowledge of SPSS, a commonly used statistical computation program. Students will be able to understand and interpret the statistical analyses in research articles published in medical journals. Students that complete the course with grade B or better will have adequate preparation for G652.

**GRAD-G 652 Introduction to Biostatistics II (3 cr.)**

P: G651 or equivalent to G651. G652 is an advanced applied biostatistics course designed for students with an interest in the health sciences. Students are expected to have completed at least one semester course of basic

biostatistics. Knowledge of probability and probability distributions, concepts of estimation and hypothesis testing are assumed. Topics covered in this course include multiple linear regression, multi-factor analysis of variance, analysis of covariance, analysis of repeated measures, logistic regression model, and survival analyses. Upon completion of the course, students are expected to understand the appropriate statistical models for various outcomes and be able to interpret results using statistical techniques covered in this course. Students are also expected to conduct simple analyses using SPSS on personal computers.

**GRAD-G 660 Clinical Research Methods (3 cr.)**

**GRAD-G 664 Mentored Clinical Research (1-9 cr.)**

This is an organized research project in the form of an organized scientific contribution or comprehensive analysis conducted under the mentorship of a faculty scientist from the individual CITE enrollee's core discipline. The capstone experience is submission of an abstract to a scientific meeting, defense of one's research before an advisory committee, and completion of a first-authored paper deemed suitable for publication in a scientific journal.

**GRAD-G 667 Tools and Techniques in Translational Research (3 cr.)**

**GRAD-G 704 Physiological Proteomics (1 cr.)** This is a fundamentals-based course on theory and practice of contemporary proteomics techniques. Graduate students will learn to select and apply appropriate proteomic technologies in their research through exposure to protein analytical, quantitative, and informatic approaches to physiologically-relevant biomedical problems.

**GRAD-G 707 Physiology of Smooth Muscle (1 cr.)**

Advanced study of the physiology of the smooth muscle tissues with focus on the normal physiology and pathophysiology of airway smooth muscle and the airways. Biochemical and physiologic mechanisms in the regulation of contraction, growth, and phenotypic expression in smooth muscle tissues will be explored. Focus will be on contemporary molecular and cellular and whole animal approaches for the study of muscle physiology, including tissue transfection and the genetic modification of smooth muscle tissues, organ culture, and methods for the measurement of contractility and contractile protein activation in intact and permeabilized tissues including confocal imaging, and in vivo measurement of airway function.

**GRAD-G 708 Cardiac & Coronary Physiology of Exercise (1 cr.)**

Given the current epidemic and foreseeable continuing trend of obesity and diabetes in the U.S., emphasis will be placed on responses and adaptations of the heart and coronary circulation to exercise in the setting of obesity- and diabetes-induced coronary disease. Concepts of exercise stimulus, quantification of work, and in vivo responses and adaptations will be fundamental to studies of cellular and molecular mechanisms of myocardial and coronary artery responses and adaptations to exercise. The approach taken will be the use of current textbooks, select reviews, original research papers, interactive discussion, and laboratory demonstrations and projects.

**GRAD-G 714 Development of the Vascular System**

**(1 cr.)** This advanced level course is offered to graduate students who have an interest in vascular biology. Concepts of vascular development will be explored with an emphasis on the experimental techniques used to unravel organ development. The course will provide an in-depth knowledge of the physiology, cell, and molecular biology of the development of the vascular system by means of introductory lectures, assigned reviews of current literature, group discussions, and laboratory demonstrations with an emphasis on the experimental techniques used to examine developmental systems. The course will comprise a mixture of didactic lecture, student reading, and presentation of original research and review articles, group discussions, and laboratory demonstrations. The course will comprise four one-hour sessions per week over a four-week session.

**GRAD-G 715 Biomedical Science I (3 cr.)** One of three biomedical science courses intended for incoming doctoral graduate students in the School of Medicine or other graduate students. Covers molecular and metabolic aspects of cellular function. The course will explore topics in the biochemical basis of biological systems, including biological macromolecules, protein ligand interactions, cell-signaling, and metabolic processes.

**GRAD-G 716 Biomedical Science II (3 cr.)** Second of three biomedical science courses intended for incoming doctoral graduate students in the School of Medicine or other graduate students. Topics covered include DNA structure and replication, recombination and repair, genomics and processes of inheritance, gene expression, eukaryotic systems, and molecular genetics and disease.

**GRAD-G 717 Biomedical Science III (3 cr.)** Third of a group of three biomedical science core courses intended for incoming doctoral graduate students in the School of Medicine or other graduate students. Organization and function of cells, tissues and physiologic systems using disease examples. Topics include neurophysiology, musculoskeletal, renal, cardiovascular, gastrointestinal, endocrine and pulmonary systems, and cancer.

**GRAD-G 718 Research in Biomedical Science (1-4 cr.)**

A laboratory research rotation course. Allows incoming basic science doctoral graduate students in the School of Medicine programs to take research rotations in laboratories affiliated with all of the school graduate programs.

**GRAD-G 761 Molecular and Cellular Physiology of Ion Transport (1 cr.)**

Advanced ion transport topics are selected by students from current areas of research on ion channels, pumps, and exchangers. Specific topics include transporter biophysical characteristics, long-term regulation, effects on cell and organ function, electrophysiological and optical methods for study. Format: textbooks, reviews, original research papers, interactive discussion, computer simulations, and laboratory demonstrations and projects.

**GRAD-G 804 Cellular and Molecular Biology (3 cr.)**

Cellular and molecular biology for medical students that emphasizes the structural organization, biochemistry, and molecular biology of cells. Includes cellular processes, development, and differentiation and their relationship to medicine.

**GRAD-G 819 Basic Bone Biology (3 cr.)** P: One semester of introductory biology. An introduction to basic bone biology, including bone morphology, composition and physiology; cell biology of bone cells; measurement techniques; adaptation to the mechanical and metabolic environments; regulatory factors and mineral homeostasis; and growth and development.

**GRAD-G 825 Advanced Topics in Molecular Biology (2 cr.)** The course will highlight selected topics adjusted each year to reflect the most current advancements in molecular biology and will include lectures and paper discussions on: chromatin structure and regulation; transcriptional control; RNA structure and processing; RNAi and miRNA; RNA decay; translational control and its integration in gene expression.

**GRAD-G 831 Concepts & Controversies in Cardiovascular Science (2 cr.)** P: Graduate level physiology course. The focus of this course is topical areas of advanced cardiovascular research, emphasizing modern approaches to study cardiovascular function. Topics will change each semester but may include: regulation of vascular tone, cardiovascular development, control of cardiac function, myopathies, atherosclerosis, and blood pressure. Format: Journal Club/Seminar and facilitated interactive student discussion.

**GRAD-G 855 Experimental Design and Research Biostatistics (1 cr.)** This course will provide students with a functional understanding of experimental design and statistical testing in the biological sciences. Students will learn why a thoughtful approach to the design of their experiments and a rigorous, unbiased testing of their results are both important to their work and future careers. Students will receive an introduction to basic statistical theory with a practical focus on interpreting printouts from a variety of statistical programs (rather than a focus on students carrying out their own calculations). Practical examples of experimental design and statistical testing—both good examples and bad—will be worked through for a variety of real situations in biomedical research.

### Histotechnology

“P” refers to a course prerequisite, and “C” to a course that must be taken concurrently.

**PATH-H 101 Histotechnology I (3 cr.)** C: PATH H181. Teleconference lectures and related written supplemental assignments with focus on specimen receipt and accessioning, laboratory safety, laboratory chemistry and math, instrumentation, and fixation.

**PATH-H 102 Histotechnology II (3 cr.)** P: PATH H101; C: PATH H182. Teleconference lectures and related written supplemental assignments with focus on decalcification, tissue processing and embedding, microtomy, general staining theories, and nuclear and cytoplasmic staining.

**PATH-H 103 Histotechnology III (3 cr.)** P: PATH H102; C: PATH H183. Teleconference lectures and related written supplemental assignments with focus on special staining methodology to include connective tissue, carbohydrates, amyloid, lipids, microorganisms, pigments, and minerals.

**PATH-H 104 Histotechnology IV (3 cr.)** P: PATH H103; C: PATH H184. Teleconference lectures and related

written supplemental assignments with focus on special staining methodology to include nerve and special cells, enzyme and immunohistochemical staining, with an overview of selected topics.

**PATH-H 105 Histotechnology Credential Theory (12 cr.)** Special credit awarded for ASCP registry status or for histology experience and accomplishment of partial registry exam. Contact program director for further information.

**PATH-H 181 Histotechnology Practicum I (3 cr.)** C: PATH H101. Clinical practicum experience in topics covered in PATH H101, performed under direct supervision of designated registered histologist.

**PATH-H 182 Histotechnology Practicum II (3 cr.)** P: PATH H101, PATH H181; C: PATH H102. Clinical practicum experience in topics covered in PATH H102, performed under direct supervision of designated registered histologist.

**PATH-H 183 Histotechnology Practicum III (3 cr.)** P: PATH H102, PATH H182; C: PATH H103. Clinical practicum experience in topics covered in PATH H103, performed under direct supervision of designated registered histologist.

**PATH-H 184 Histotechnology Practicum IV (3 cr.)** P: PATH H103, PATH H183; C: PATH H104. Clinical practicum experience in topics covered in PATH-H104, performed under direct supervision of designated registered histologist.

**PATH-H 185 Histotechnology Credential Practicum (12 cr.)** Special credit awarded for ASCP registry status or for histology experience and accomplishment of partial registry exam. Contact program director for further information.

**PATH-H 201 Comprehensive Experience in Histotechnology (6 cr.)** (Capstone course) P: Completion of 50 credit hours toward Associate of Science in Histotechnology, to include a technical writing course. This course emphasizes critical thinking, problem-solving skills, and literature searches associated with technical and scholarly writing. Introduces students to management issues, supervision, quality assurance principles, and other issues associated with histotechnology laboratory employment.

### Medical Biophysics and Biomolecular Imaging

**BIOP-A 610 Research in Biophysics (1-15 cr.)**

### Other Courses

**MGEN-G 788 Next Generation Sequencing (3 cr.)**

**MGEN-Q 603 Medical Genetics (2 cr.)** A comprehensive course in human genetics emphasizing the principles of genetics and their application to clinical medicine through the family history, clinical findings, and laboratory studies. Examples of specific problems, their evaluation, and genetic counseling will be used to supplement didactic material. Designed to develop proficiency for Competency III “Using Science to Guide Diagnosis, Management, Therapeutics, and Prevention,” Competency VIII “Problem Solving,” Level 1.

**MGEN-Q 640 Special Topics in Human Genetics**

(1-3 cr.) P: Basic genetics. A continuing, nonrepeating series of lectures and/or review of publications on newer advances in human genetics; discussions in specific areas of human genetics not presently available to all students. Additional credits may be obtained by study of a specific area under individual tutelage.

**MGEN-Q 682 Medical Genetics - FWCME (2 cr.)**

This lecture course covers probability, population genetics, inheritance, metabolic diseases, hemoglobinopathies, genetic diagnosis, and counseling.

**Medical Imaging Technology**

"P" refers to a course prerequisite and "C" to a course that must be taken concurrently.

**RADI-R 404 Sectional Imaging Anatomy (3 cr.)** An in-depth study of sectional anatomy pertinent to ultrasound, computed tomography, and magnetic resonance imaging. Standard transverse, parasagittal, and coronal planes are included, using images from all three imaging modalities. A discussion of technique, artifact, and pathology-related alterations of cross-sectional anatomic appearances is included.

**RADI-R 407 Seminar (1-5 cr.)** Individual and group study focusing upon advances in medical imaging.

**RADI-R 408 Topics (.5-4 cr.)** Study of selected topics in radiologic sciences. May be repeated for credit if topics differ.

**RADI-R 451 Medical Imaging Theory (3 cr.)** P: Math, Physics, RADI R404. Lectures on the physical principles of advanced imaging modalities, including computed tomography, magnetic resonance, ultrasound, and interventional imaging. Image evaluation of normal studies is stressed. Student presentations and journal reports are required.

**RADI-R 452 Medical Imaging Applications (3 cr.)** P: RADI R451. Lectures on and evaluations of the computed tomographic, magnetic resonance, ultrasound, and interventional images as applied to pathologic conditions of specific body areas. Student presentations and journal reports are required.

**RADI-R 481 Clinical Practicum: Interventional Imaging (.5-8 cr.)** P: RADI R404, RT(R). Clinical experience in the performance of interventional imaging studies.

**RADI-R 482 Clinical Practicum: Computed Tomography (.5-8 cr.)** P: RADI R404, RT(R). Clinical experience in the performance of computed tomographic imaging studies.

**RADI-R 483 Clinical Practicum: Magnetic Resonance Imaging (.5-8 cr.)** P: RADI R404. Clinical experience in the performance of magnetic resonance imaging studies.

**RADI-R 484 Clinical Practicum: Ultrasound Imaging (.5-8 cr.)** P: RADI R404. Clinical experience in the performance of ultrasound imaging studies.

**RADI-R 485 Clinical Practicum (.5-8 cr.)** P: RADI R404. Clinical experience in medical imaging studies. Specific area of experience will be determined by availability of instruction.

**Medical Sciences**

**MSCI-X 503 Problem-Based Learning in Medical Science (2 cr.)** A small group, problem-based learning course designed to emphasize active, self-directed learning and application of basic biomedical science to clinical problems - Fall and Spring class.

**MSCI-X 804 Cellular and Molecular Biology (3 cr.)**

Cellular and molecular biology that emphasizes the structural organization, biochemistry and molecular biology of cells. Includes cellular processes, development, and differentiation and their relationship to medicine.

**Medicine****MED-M 505 Human Genetics and Development (2 cr.)**

An introduction to the genetics of human traits and inheritable diseases; normal and abnormal development of the human from embryonic life through early childhood. Open to medical students only.

**MED-M 605 Introduction to Medicine 1 (10 cr.)**

A multidisciplinary course designed to introduce clinical medicine. Includes medical history-taking and physical examination skills learned at the bedside with direct patient contact. Clinical medicine is surveyed concurrently with the emphasis on pathophysiology and diagnosis. Problem-solving skills are stressed, including synthesis and interpretation of medical data.

**MED-P 610 Molecular Basis of Medicine (6 cr.)**

This step deals with the basic principles of biochemistry and molecular biology as they apply to medicine. Specifically, in this step, the student will gain a working knowledge of amino acids, proteins, enzymes, thermodynamics, digestion, and metabolism of carbohydrates, lipid, protein, and amino acids (both catabolic and anabolic pathways), metabolic control, lipoprotein metabolism and lipid transport, nitrogen waste disposal, heme metabolism, purine and pyrimidine metabolism, structure of nucleic acids, replication of DNA, synthesis of RNA and protein, genetic code and genetic control in eukaryotes, recombinant DNA technology, the biochemistry of vision, muscle and nerve metabolism, integration of metabolism, vitamins and nutrition, and hormone action. Offered by the Northwest Center only.

**MED-P 620 Human Structure (12 cr.)**

Human Structure is an intensive integrated step combining cell biology, histology, gross anatomy, embryology, and radiology that is designed to acquaint the medical student with the structures of the human body from gross to subcellular. A combination of small-group, case-based sessions, supervised laboratory periods, and selected general lectures are used to instruct the students in this step. The clinical cases are designed to stimulate student-directed learning and problem solving with materials gathered from pathology, surgery, and radiology. The laboratories will offer experience in viewing normal structures from gross dissections to electron micrographs. The emphasis of the step is on gathering a general understanding of the correlations of structure with function and on the views of the body possible with the various macroscopic and microscopic imaging techniques. Offered by the Northwest Center only.

**MED-P 650 Invasion and Defense (11 cr.)**

This interdisciplinary course deals with the nature of infectious agents and tumors and the host response to invasion and

injury. Students learn the concepts of general pathology, immunology, microbiology, infectious diseases, and elements of pharmacology through discussion and problem solving of clinical cases and independent study. Offered by the Northwest Center only.

### Medicine Registration

**MEDC-M 700 Junior Year in Medicine (18 cr.)**

**MEDC-M 800 Senior Year in Medicine (16 cr.)**

### Nuclear Medicine Technology

The RADI courses with R100- or R200-level numbers are found in the radiography section of this bulletin. "P" refers to a course prerequisite, and "C" to a course that must be taken concurrently.

**RADI-R 404 Sectional Imaging Anatomy (3 cr.)** An in-depth study of sectional anatomy pertinent to ultrasound, computed tomography, and magnetic resonance imaging. Standard transverse, parasagittal, and coronal planes are included, using images from all three imaging modalities. A discussion of technique, artifact, and pathology-related alterations of cross-sectional anatomic appearances included.

**RADI-R 407 Seminar (1-5 cr.)** Selected topics.

**RADI-R 408 Topics in Radiologic Sciences (.5-4 cr.)**

Study of selected topics in radiologic sciences. May be repeated once for credit if topics differ.

**RADI-R 410 Project in Nuclear Medicine Technology I (1-5 cr.)**

Basic knowledge required to become a critical consumer of medical literature, data handling and interpretation, plus application of basic medical research statistics

**RADI-R 411 Project in Nuclear Medicine Technology II (2 cr.)**

Independent readings, research, and written assignments in preparation for a research or literature search project in nuclear medicine.

**RADI-R 412 Physics and Instrumentation of Nuclear Medicine I (2 cr.)**

An introduction to the physical disciplines of nuclear medicine. Lectures and laboratory exercises on radiation physics, computer programming, and the statistics of radiation measurements.

**RADI-R 413 Project in Nuclear Medicine Technology III (2 cr.)**

Independent readings and research on a selected topic in nuclear medicine. A paper in published form must be written and presented at a research meeting.

**RADI-R 417 Physics and Instrumentation of Nuclear Medicine II (2 cr.)**

A continuation of RADI-R 412. Lectures and exercises on electronic principles, the operational fundamentals of radiation counting devices and imaging systems, and quality assurance programs.

**RADI-R 422 Radionuclide Measurements (2 cr.)**

Lectures and laboratory sessions emphasizing the clinical utilization of nuclear counting and imaging systems and principles of quantitative measurements.

**RADI-R 423 Nuclear Medicine In-Service I (1 cr.)**

Attend and participate in presentations of selected topics in nuclear medicine and related areas.

**RADI-R 424 Nuclear Medicine In-Service II (1 cr.)**

Attend and participate in presentations of selected topics in nuclear medicine and related areas.

**RADI-R 424 Nuclear Medicine In-Service III (1 cr.)**

Attend and participate in presentations of selected topics in nuclear medicine and related areas.

**RADI-R 427 Radiopharmaceuticals (2 cr.)**

Lectures and laboratories concerning properties and preparation of radiopharmaceuticals.

**RADI-R 432 Application of Radionuclides I (3 cr.)**

Lectures covering the clinical aspects of nuclear medicine procedures, including the physiological and technical procedures for each type of study.

**RADI-R 433 Application of Radionuclides II (2 cr.)**

P: RADI R432. Lectures covering the clinical aspects of nuclear medicine procedures. Includes pathology related to procedures and the role technologists play in helping physicians gather information for accurate interpretations.

**RADI-R 437 Radiation Protection in Nuclear Medicine (1 cr.)**

Lectures on the principles of radiation protection in nuclear medicine.

**RADI-R 438 Essential Radiology I (1 cr.)**

Selected topics in radiology to acquaint the nuclear medicine technology student with a broader understanding of other areas of radiology as well as a more in-depth knowledge about nuclear medicine image/data interpretation and the interconnection of nuclear medicine with other radiology procedures.

**RADI-R 439 Essential Radiology II (2 cr.)**

Selected topics in radiology to acquaint the nuclear medicine technology student with a broader understanding of other areas of radiology as well as a more in-depth knowledge about nuclear medicine image/data interpretation and the interconnection of nuclear medicine with other radiology procedures.

**RADI-R 445 Clinical Nuclear Medicine Practicum I (4-8 cr.)**

Practical clinical application of nuclear medicine theory.

**RADI-R 446 Clinical Nuclear Medicine Practicum II (2-8 cr.)**

Continuation of RADI R445.

**RADI-R 447 Clinical Nuclear Medicine Practicum III (2-8 cr.)**

Continuation of RADI R446.

**RADI-R 449 Medical Imaging Theory for Nuclear Medicine Technologists (1-2 cr.)**

Lectures on the physical principles of advanced imaging modalities, especially those related to the practice of nuclear medicine.

### Other Courses

**MICR-G 901 Advanced Research (6 cr.)**

**MNEU-G 901 Advanced Research (6 cr.)**

**MED-I 200 Service Learning in the Medical Setting for Pre-Professional Students (0 cr.)**

This undergraduate course is associated with the Life-Health Sciences Internship program. This is a zero credit hour course offered once a year in the spring semester of the internship. Only LHSI students may register for MED-I200. Successful completion of the course is dependent on completion of at least 240 work hours over the course of

the internship period and the presentation of a poster at the end of year poster session.

**MICR-J 210 Microbiology & Immunology (4 cr.)** C: Lab

**SMEP-M 500 State Medical Program - Muncie (8-12 cr.)**

**MBIO-M 540 Medical Microbiology/Medical Immunology (5 cr.)**

**MED-S 400 Service Learning in the Medical Setting for Pre-Professional Students (3 cr.)** This course introduces pre-medical students to the medical setting and engages them in serving the medically underserved communities. By incorporating students in providing underserved health care prior to medical school, we hope to stimulate a lasting appreciation for care of the underserved. The course will provide the opportunity for students to work closely with Affiliate Faculty members of the Indiana University School of Medicine. Having students in the Community Health Centers will facilitate relationships between the student, the community, and the institutions (hospitals and institutions of higher learning). In addition to the much sought after exposure to practicing physicians, students will also gain leadership and communication skills. By utilizing these skills in a real life situation, full assimilation of the skills will be possible.

**SMEP-S 500 State Medical Program - South Bend (20-0 cr.)**

### **Pathology and Laboratory Medicine**

**PATH-C 601 General Pathology (5 cr.)**

**PATH-C 603 General Pathology (6 cr.)** Introduction to mechanisms of disease through demonstrations, lectures, laboratory, and conferences; emphasis on basic concepts and principles of disease processes.

**PATH-C 623 General Pathology (7 cr.)** An introduction to mechanisms of disease through demonstrations, lectures, laboratory, and conferences; emphasis on basic concepts and principles of disease processes.

**PATH-C 643 General Pathology (4 cr.)** Introduction to mechanisms of disease through demonstration, lectures, laboratory, and conferences; emphasis on basic concepts and principles of disease processes.

**PATH-C 663 General Pathology (6 cr.)** Introduction to mechanisms of disease through demonstrations, lectures, laboratory, and conferences; emphasis on basic concepts and principles of disease processes.

**PATH-C 683 General Pathology (6 cr.)** Students will be introduced to pathologic terminology and disease processes by lectures, laboratory exercises, case studies, autopsies, and medicine/pathology conferences.

**PATH-C 800 Advanced Pathology (1-12 cr.)** P: C603 Subject material and hours arranged to conform to needs of students.

**PATH-C 859 Research in Pathology (1-12 cr.)** Supervised initiation of a research project in pathology. Counseling in the completion of a thesis.

**PATH-C 901 Advanced Research (6 cr.)**

### **Other Courses**

**PHAR-F 605 Principles of Pharmacology I (4 cr.)**

P: P531-P532 or consent of instructor. Basic principles and clinical aspects of modern pharmacology presented in lectures. Physicochemical properties of drugs. Drugs that affect the autonomic nervous system. Drugs that act on cardiovascular and renal systems. Chemotherapy of cancer, infections, and parasites.

**PHAR-F 624 Medical Pharmacology (6 cr.)** In this course, the drugs are classified as to site and mechanism of action and representative members of each class of drugs are discussed. The emphasis is on rational clinical uses.

**PHAR-F 664 Pharmacology (6 cr.)** Comprehensive lectures, discussions, reviews, and laboratories with emphasis on the principles of drug action. Representative members of the most important groups of drugs are discussed in detail with regard to sites and mechanisms of action, and "dry" laboratories are designed to involve the student in various types of pharmacological problem-solving skills.

**PHAR-F 684 Pharmacology - FWCME (6 cr.)** Pathology of the organ systems will be presented by lectures, laboratory exercises, case studies, and pathology/medicine conferences. Etiologies, morphologic, physiologic changes will be noted; course coverage will be correlated with the Introduction to Clinical Medicine course as much as possible.

**PHAR-F 840 Advanced Pharmacology and Toxicology (3 cr.)** Advanced studies of pharmacodynamic mechanisms in cardiovascular, central nervous system, and renal pharmacology and toxicology. Experimental design related to recent advances and current hypotheses concerning drug action and toxicity.

**PHAR-G 901 Advanced Research (6 cr.)**

### **Radiation Therapy**

"P" refers to a course prerequisite and "C" to a course that must be taken concurrently.

**RAON-J 300 Simulation/Treatment Procedures (6 cr.)**

P: RADI R110, RADI R112, and RADI R108. Lecture and laboratory sessions emphasizing the clinical utilization of simulators and treatment machines.

**RAON-J 301 Orientation to Radiation Oncology (4 cr.)**

P: R.T.(R). An overview of radiation oncology and the role of the radiation therapist. Presentations will orient students to the physical and biological basis of radiation oncology equipment, procedures, tumor pathology, and patient interaction.

**RAON-J 302 Radiation Oncology Techniques I (3 cr.)**

P: R.T.(R) or RADI R118, RAON J300, and RAON J350. Lecture and laboratory sessions presenting concepts of treatment-planning techniques of the head, pelvis, spine, lung, and brain. To include implant localization techniques.

**RAON-J 303 Clinical Oncology I (3 cr.)** P: R. T.(R)

or RADI R118, and RAON J300. Examines the roles and principles of tumor pathology, surgical oncology, radiation oncology, and medical oncology. To include the characteristics, growth patterns, and treatment modalities utilized for tumors of the lung and central nervous system.

**RAON-J 304 Radiation Oncology Patient Care (2 cr.)**

P: R.T.(R) or RADI R112. Concepts of radiation oncology patient care, including considerations of patients' physical and psychological condition. Factors influencing patients' general health during and following a course of radiation therapy treatments will be identified.

**RAON-J 305 Clinical Dosimetry I (2 cr.)** Review of fundamental mathematics concepts as they relate to practical dosimetry and performing routine calculations pertaining to patient set-up and treatment.

**RAON-J 306 Clinical Dosimetry II (2 cr.)** P: RAON J305. Development of computer treatment planning skills in radiation oncology.

**RAON-J 307 Medical Imaging and Processing in Radiation Oncology (2 cr.)** Fundamentals of radiologic exposure techniques, latent image formation, and processing of radiographs utilized in radiation oncology.

**RAON-J 350 Clinical Experience: Basic (3 cr.)** P: RADI R110 and RADI R112. Clinical observation and assistance in the clinical skills of radiation therapy technology under the direct supervision of a registered radiation therapist or equivalent.

**RAON-J 351 Clinical Practicum I (3 cr.)** P: R.T.(R) or RAON J350. Clinical application of patient positioning immobilization, block fabrication, patient simulation techniques, treatment delivery, dosimetry, treatment planning, patient care management, and radiation protection under the direct supervision of a registered radiation therapist or equivalent.

**RAON-J 400 Physics of Radiation Oncology I (2 cr.)** P: R.T.(R) or RADI R241; MATH 153 and 154 or MATH 159; PHYS P201 or PHYS 218. Fundamental principles of the physical quantities of radiation and atomic and nuclear theory. To include discussions of radiation oncology equipment.

**RAON-J 401 Physics of Radiation Oncology II (2 cr.)** P: RAON J400. Continuation of RAON J400 with emphasis on the interactions of ionizing radiation with matter, radiation detection and measurement devices, radiation units, equipment calibration, brachytherapy, and calculation techniques. Principles and concepts of radiation protection are discussed.

**RAON-J 402 Radiation Oncology Techniques II (3 cr.)** P: RAON J302. Lecture and laboratory sessions present concepts of treatment-planning techniques of breast, esophagus, mantel and inverted-Y, pituitary, total body and hemi-body, and common palliative portals.

**RAON-J 403 Clinical Oncology II (3 cr.)** P: R.T.(R) and RAON J303 or RADI R108, RADI R110, RADI R112, RADI R118, RAON J300, and RAON J303. Examines the characteristics, growth patterns, and treatment modalities utilized for tumors of the female genital, urological, male genital, breast, head and neck, bone and soft tissue, hematopoietic, alimentary tract, lymphoreticular, and pediatric sites. Student case presentations required.

**RAON-J 404 Quality Management in Radiation Oncology (3 cr.)** P: RAON J300 or RAON J301, RAON J305, and RAON J350. Identification and application of a comprehensive quality- management program in a radiation oncology facility. Includes discussion on the

operations and functions of a radiation oncology facility with emphasis on quality improvement techniques.

**RAON-J 406 Radiation and Cancer Biology (2 cr.)**

Emphasis on the modern principles of cellular and molecular biology as they relate to normal and cancer cell response both in vitro and in vivo to various radiation types, e.g., X/gamma rays, neutrons, and charged particles. Topics include dose time, fractionation, repair, tumor kinetics, hyperthermia, and radiation protection.

**RAON-J 409 Senior Project in Radiation Oncology (3 cr.)** Individual research in radiation oncology. Research proposal requires the approval of the program director.

**RAON-J 450 Clinical Practicum II (4 cr.)** P: RAON J351. Clinical application of patient positioning immobilization, block fabrication, patient simulation techniques, treatment delivery, treatment planning, patient care management, and radiation protection under the direct supervision of a registered radiation therapist.

**RAON-J 451 Clinical Practicum III (6 cr.)** P: RAON J450. Clinical application of patient positioning immobilization, block fabrication, patient simulation techniques, treatment delivery, dosimetry, treatment planning, patient care management, and radiation protection under the direct supervision of a registered radiation therapist.

**RAON-J 452 Clinical Practicum IV (5 cr.)** P: RAON J451. Clinical application of patient positioning immobilization, block fabrication, patient simulation techniques, treatment delivery, patient care management, and radiation protection under the direct supervision of a registered radiation therapist.

**RAON-J 453 Clinical Practicum V (5 cr.)** P: RAON J452. Clinical application of patient positioning immobilization, block fabrication, patient simulation techniques, treatment delivery, dosimetry, treatment planning, patient care management, and radiation protection under the direct supervision of a registered radiation therapist.

**Radiation Oncology**

**RAON-D 602 Concepts for Preparation and Planning in Medical Dosimetry II (1 cr.)**

**RAON-D 603 Clinical Oncology and Dosimetric Considerations (1 cr.)**

**RAON-D 605 Medical Physics for Radiation Oncology II (2 cr.)**

**RAON-D 607 Clinical Practicum II – Intermediate Planning in Medical Dosimetry (4 cr.)**

**RAON-D 691 Clinical Rotation in Radiation Therapy Physics I (6 cr.)**

**RAON-D 692 Clinical Rotation in Radiation Therapy Physics II (6 cr.)**

**Radiography**

"P" refers to a course prerequisite and "C" to a course that is taken concurrently.

**RADI-R 108 Medical Terminology (1 cr.)** Introduction to origin and derivation of medical words as well as their meaning. This course uses a self-instructional format.

**RADI-R 110 Introduction to Radiography (3 cr.)** Introduction to the functions and basic procedures of

a diagnostic radiography department. Emphasis is placed on radiographic equipment, radiation protection, positioning terminology and procedures used on typical radiographic examinations. Includes laboratory and clinical observations.

**RADI-R 112 Patient Care I (3 cr.)** Introduction to health care practices in the radiology department. Provides an overview of the field of radiology, ethics, patient care, and professional standards. Includes lab.

**RADI-R 114 Radiographic Procedures I (4 cr.)** P: RADI R110 and RADI R112. Concepts in radiography with emphasis on the radiographic procedures used to demonstrate the skeletal system and major contrast media procedures. Includes image study.

**RADI-R 115 Radiographic Procedures I Lab (1 cr.)** C or P: RADI R114. Practice and instruction in methods of performing radiographic examinations presented in R114.

**RADI-R 118 Principles of Radiography I (4 cr.)** P: MATH 110 or 111 and RADI R110. Basic concepts of radiation, its production, and its interactions with matter. Introduction to imaging production including digital radiography.

**RADI-R 124 Radiographic Procedures II (3 cr.)** P: RADI R114. Concepts in radiography with emphasis on radiographic procedures used for the skull, advanced orthopedics, vascular and sectional anatomy, fluoroscopy, and contrast media.

**RADI-R 128 Principles of Radiography II (4 cr.)** P: RADI R118. In-depth study of the properties that effect the quality of the radiographic image and exposure conversion.

**RADI-R 150 Radiography Clinical Lab I (1 cr.)** C: RADI R151 or RADI R152. Supervised laboratory activities to promote understanding of physical and imaging principles needed to facilitate learning in the Basic Clinical Experience courses.

**RADI-R 151 Basic Clinical Experience I (3 cr.)** C: RADI R150. Clinical application of radiographic positioning, procedure, and exposure on cooperative, uncomplicated patients, while under the supervision of a registered radiologic technologist.

**RADI-R 152 Basic Clinical Experience I (2 cr.)** C: RADI R151 and RADI R153. Clinical application of radiographic positioning, procedure, and exposure on cooperative, uncomplicated patients, while under the supervision of a registered radiologic technologist.

**RADI-R 153 Pediatric Clinical Experience I (3 cr.)** C: RADI R152 or RADI R172. Clinical application of radiographic positioning, procedure, and exposure on cooperative, uncomplicated patients in a pediatric practice environment, while under the supervision of a registered radiologic technologist.

**RADI-R 155 Clinical Re-entry 1 (1 cr.)** Clinical application of radiographic positioning, procedure, and exposure emphasizing refamiliarization with skills and knowledge needed to continue the clinical experience courses, while under the supervision of a registered radiologic technologist.

**RADI-R 170 Radiography Clinical Lab II (1 cr.)** P: RADI R108 and RADI R150, C: RADI R171 or RADI R172. Supervised laboratory activities to promote understanding of physical and imaging principles needed to facilitate learning in the Basic Clinical Experience and Clinical Competency Experience courses.

**RADI-R 171 Basic Clinical Experience II (3 cr.)** C: RADI R170. Clinical application of radiographic positioning, procedure, and exposure on cooperative, uncomplicated patients, while under the supervision of a registered radiologic technologist.

**RADI-R 172 Basic Clinical Experience II (1 cr.)** C: RADI R153 and RADI R170. Clinical application of radiographic positioning, procedure, and exposure on cooperative, uncomplicated patients, while under the supervision of a registered radiologic technologist.

**RADI-R 210 Radiographic Pathology (2 cr.)** P: anatomy/physiology, RADI R114 and RADI R124. A survey of the changes that occur in the diseased state to include general concepts of disease, causes of disease, clinical symptoms and treatment, and diseases that affect specific body systems. Emphasis is placed on the imaging appearance of disease.

**RADI-R 212 Patient Care II (1 cr.)** P: RADI R112. Overview of extended patient care procedures including venipuncture, pharmacology, electrocardiography, and code-response procedures.

**RADI-R 214 Radiographic Procedures III (3 cr.)** P: RADI R124. An introductory course designed to familiarize the student with terminology, equipment, procedures and principles of various modalities in radiologic sciences. Included are magnetic resonance imaging (MRI), computed tomography (CT), ultrasound (US), mammography, nuclear medicine, radiation therapy, bone densitometry and interventional radiology (IR).

**RADI-R 216 Advanced Non-Contrast Imaging (2 cr.)** P: RADI R124. Presentations, problem solving, and discussion on methods of performing radiographic procedures on patients with trauma or disease conditions that necessitate adaptation of routine procedures. Topics will include chest, surgical procedures, bone fractures, and arthritides.

**RADI-R 218 Processing Theory (1 cr.)** Concepts in radiography with emphasis on the fundamentals of wet and dry processing.

**RADI-R 224 Advanced Contrast Imaging (1 cr.)** P: RADI R124. Selected topics in radiographic imaging using contrast media, with emphasis on knowledge needed for effective clinical practice.

**RADI-R 226 Imaging a Diverse Population (2 cr.)** P: RADI R124. The study of biophysical and psychosocial changes throughout the lifespan emphasizing imaging adaptations. Topics will cover age-specific considerations as well as those needed for the growing ethnically and culturally diverse groups that present themselves for imaging studies.

**RADI-R 228 Principles of Radiography III (3 cr.)** P: RADI R128. Topics include methods of producing radiographic technical factor charts, automatic exposure

controls, rare earth screen technology, digital imaging, and a cumulative examination over the principles courses.

**RADI-R 236 Seminar in Radiography (.5-3 cr.)** Individual and group study focusing on current and emerging imaging topics. May be repeated for credit if topics differ.

**RADI-R 238 Topics in Radiography (.5-3 cr.)** Selected topics in imaging. May be repeated for credit if topics differ. Prerequisites may be required for topic.

**RADI-R 241 Radiographic/Fluoroscopic Equipment (2 cr.)** P: RADI R140 or PHYS P201 or PHYS 218. A detailed study of equipment used to generate an x-ray beam.

**RADI-R 243 Quality Control in Radiography (2 cr.)** P: RADI R241. A laboratory course emphasizing methods of assuring the adequate function of radiographic equipment. Major topics include: anode heel effect, inverse square law, film sensitometry, radiation intensity, and quality control testing.

**RADI-R 262 Radiation Biology and Protection in Diagnostic Radiology (1 cr.)** P: RADI R140. Study of the biological effects of ionizing radiation and the standards and methods of protection. Emphasis is placed on x-ray interactions. Also included are discussions on radiation exposure standards and radiation monitoring.

**RADI-R 271 Clinical Competency Experience 1 (2-4 cr.)** P: RADI R172. Clinical application of radiographic positioning, procedure, and exposure emphasizing adaptation of practice to specific patient needs, while under the supervision of a registered radiologic technologist.

**RADI-R 272 Clinical Competency Experience 2 (2-4 cr.)** P: RADI R271. Clinical application of radiographic positioning, procedure, and exposure emphasizing adaptation of practice to specific patient needs, while under the supervision of a registered radiologic technologist.

**RADI-R 274 Experience in Imaging Modalities (2 cr.)** P: RADI R172. Exploration and basic skill development in selected imaging modalities, including sonography, MRI, and vascular-interventional radiology, while under the supervision of a registered radiologic technologist.

**RADI-R 275 Pediatric Clinical Experience II (2 cr.)** Clinical application of radiographic positioning, procedure, and exposure, emphasizing adaptation of practice to specific patient needs in a pediatric practice environment, while under the supervision of a registered radiologic technologist.

**RADI-R 408 Topics: (3 cr.)**

**RADI-R 415 Essential Radiology for the Imaging Technologist I (2 cr.)** This course is designed to introduce students to Medical Imaging modalities and the decision making process to determine which imaging method is appropriate for a particular disease, pathology, or injury.

**RADI-R 416 Essential Radiology for the Imaging Technologist II (1 cr.)**

**RADI-R 424 Nuclear Medicine In-Service II (1 cr.)**

**RADI-R 434 Ultrasound Physics I (3 cr.)**

**RADI-R 438 Essential Radiology I (1 cr.)**

**RADI-R 441 Nuclear Medicine Management (1 cr.)**

**RADI-R 449 Medical Imaging Theory for Nuclear Medicine Technologists (1 cr.)**

**RADI-R 456 Medical Imaging Technology Project I (2-3 cr.)**

### **Respiratory Therapy**

“P” refers to a course prerequisite and “C” to a course that must be taken concurrently.

**PULM-F 303 Introduction to Human Disease for Respiratory Therapists (2 cr.)** This course gives respiratory therapy students a general introduction to a broad variety of human diseases. Etiology, diagnosis, and treatment will be discussed.

**PULM-F 311 Cardiorespiratory Physiology (3 cr.)** This course focuses on the normal anatomy and physiology of the cardiorespiratory system, including lung mechanics, ventilation, perfusion, diffusion, gas transport, and acid-base balance.

**PULM-F 315 Cardiorespiratory Assessment and Patient Care (3 cr.)** Basic cardiorespiratory assessment, vital signs, laboratory studies, and charting. Includes required preclinical skills and practice.

**PULM-F 325 General Respiratory Care (4 cr.)** This course focuses on basic respiratory therapy procedures. Physiologic applications, effects on the cardiopulmonary system, and hazards for each therapeutic procedure are discussed. Topics include physical principles, airway care, humidity and aerosol therapy, medical gas therapy, hyperinflation therapy, and chest physical therapy.

**PULM-F 326 Respiratory Care Techniques I (2 cr.)** C: PULM F325. This course focuses on the most important clinical laboratory procedures and on procedures used by the respiratory therapist. Specifically, this course instructs students in patient assessment, oxygen administration, humidity and aerosol therapy, chest physical therapy, hyperinflation therapy, and monitoring expired gas.

**PULM-F 333 Cardiorespiratory Pharmacology I (2 cr.)** This course provides an overview of the basics of pharmacology therapeutics, focusing on dosages and solutions and bronchodilator drugs. Indications, side effects, mechanism of action, and route of administration are discussed.

**PULM-F 350 Cardiorespiratory Diseases (3 cr.)** This course outlines general cardiorespiratory diseases of the adult, including acute and chronic disorders. Respiratory therapeutics applied to these diseases are discussed.

**PULM-F 355 Life Support (3 cr.)** This course includes care of the artificial airway, cardiovascular monitoring and supportive therapy, principles of ventilatory care, and maintenance as well as physiologic effects and complications of airway pressure therapy.

**PULM-F 356 Respiratory Care Techniques II (2 cr.)** C: PULM F355. This course focuses on the most important clinical laboratory procedures and equipment used by the respiratory therapist to support critically ill patients. Specifically, this course instructs students in mechanical

ventilators, pressure and heart rate monitors, pulmonary mechanics devices, and arterial blood gas sampling.

**PULM-F 371 Pulmonary Diagnostics (3 cr.)** This course outlines and discusses both normal and abnormal lung volumes and capacities, mechanics of ventilation, inspiratory and expiratory flows, and diffusion of the lung. Additional specialty.

**PULM-F 385 Respiratory Care Practicum I (3 cr.)** This course applies cardiopulmonary assessment techniques, information gathering, and communication skills in providing general respiratory care in the clinical setting, including medical gas, humidity and aerosol therapy delivery, and treatment modalities.

**PULM-F 395 Respiratory Care Practicum II (4 cr.)** This clinical practicum introduces students to variations in oxygen delivery and basic mechanical ventilation. Treatment modalities and hemodynamic monitoring on mechanically ventilated patients will be integrated.

**PULM-F 405 Neonatal-Pediatric Respiratory Care (3 cr.)** This course outlines fetal physiology, cardiorespiratory transition, and respiratory management of neonatal pathologies, including respiratory distress syndrome. Cardiorespiratory techniques for the pediatric patient as well as pediatric trauma and transport are reviewed.

**PULM-F 410 Independent Study/Respiratory Therapy (2 cr.)** An opportunity for the student of respiratory therapy to identify a relevant area of concern within the field and to develop a tangible solution to or outcome of the concern. Reports and discussion by the students and faculty.

**PULM-F 420 Introduction to Research in Respiratory Care (2 cr.)** This course examines research in respiratory care and applies basic statistics and concepts of research design.

**PULM-F 430 Management and Leadership for Respiratory Care (3 cr.)** Specific theory and practice applied to directing and managing a respiratory therapy department, including the managerial functions of budgeting, controlling, organization, planning, staffing, and coordinating. Leadership and skills pertinent to these functions as well as effective communication and professionalism are included.

**PULM-F 440 Advanced Cardiac Life Support (2 cr.)** This course introduces students to the didactic and technical skills needed for successful proficiency of Advanced Cardiac Life Support standards as set forth by the American Heart Association.

**PULM-F 444 Cardiorespiratory Pharmacology II (2 cr.)**  
P: PULM F333. An overview of pharmacologic agents and their effect on the various body systems. Drug effects on the respiratory, circulatory, and nervous systems are emphasized.

**PULM-F 445 Seminar in Cardiorespiratory Care (1-5 cr.)** Seminar is designed to meet the specialty selected by the student. Students may repeat this course with a new specialty area requested. Each student is required to take a minimum of one hour and a maximum of five hours.

**PULM-F 451 Cardiorespiratory Monitoring and Special Techniques (3 cr.)** This course reviews

electrocardiograms, intracranial pressure monitoring, capnography, and pulmonary artery monitoring techniques. Case studies emphasizing these special procedures are presented.

**PULM-F 456 Respiratory Care Practicum III (6 cr.)** This course allows students to apply advanced patient assessment techniques, information gathering skills, and communication and leadership skills in the neonatal/pediatric and adult critical care clinical settings.

**PULM-F 461 Pulmonary Rehabilitation and Geriatrics (3 cr.)** This course gives an overview of rehabilitation therapies and techniques applicable to chronic lung disease, as well as respiratory therapy home care. Basic concepts of gerontology and geriatrics are presented.

**PULM-F 480 Patient Education Techniques for Respiratory Therapists (3 cr.)** Education techniques for patients and families dealing with chronic respiratory disease. Topics include asthma, chronic obstructive pulmonary disease, and smoking cessation education. Assessment of learning readiness, reading levels, and patient comprehension will be addressed.

**PULM-F 485 Respiratory Care Practicum IV (6 cr.)** Students will manage patients in critical care settings with emphasis on cardiopulmonary assessment and monitoring. They will participate in pulmonary rehabilitation, home care, advanced cardiac life support, pulmonary functions, polysomnography, and other special procedures.