

Basic Medical Sciences

Department Information

Basic Medical Sciences		(251) 460-6153
Director of Graduate Studies/Co-Director, Office of Research Education and Training		Mark Taylor, Ph.D.
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[Interdisciplinary Graduate Program in Basic Medical Sciences](https://www.southalabama.edu/colleges/com/doctoral-program/)
<https://www.southalabama.edu/colleges/com/doctoral-program/>

Requirements For Admission

The requirements for admission to the Interdisciplinary Graduate Program for the Doctor of Philosophy degree in Basic Medical Sciences are:

1. The applicant shall possess, by the time of matriculation, a baccalaureate degree or the equivalent from an accredited college or university.
2. Two semesters or three quarters of undergraduate work are recommended in each of the following: physics, general chemistry, organic chemistry, biology, English composition, and mathematics (including calculus and statistics).
3. A grade-point average of at least 3.0 for all undergraduate and graduate work, on a 4.0 scale.
4. Satisfactory standing at the last educational institution attended.
5. Additionally, international applicants must present evidence of competence and fluency in spoken and written English with a TOEFL score of at least 95-100, an IELTS score of at least 7, an iTEP score of at least 4.5, or a PTE score of at least 68.

Matriculation is contingent upon review and recommendation by the Admissions Committee of the Graduate Program in Basic Medical Sciences.

Procedures For Admission

Applications for the Basic Medical Sciences Interdisciplinary Graduate Program are accepted for matriculation in the Fall Semesters only. The Basic Medical Sciences Graduate Program does not accept students on a "non-degree" or "provisional" basis. Applications and materials should be accessed and submitted through the university's website: <https://www.southalabama.edu/departments/admissions/graduate.html>.

Information for the graduate program can be obtained on-line <https://www.southalabama.edu/colleges/com/doctoral-program/how-to-apply.html> or by contacting the Associate Director of the Office of Research Education and Training, 5795 USA Drive North, CSAB 212, College of Medicine, University of South Alabama, Mobile, Alabama 36688-0002; Telephone: (251) 460-6153; E-mail: oret@southalabama.edu.

To be considered for review by the Admissions Committee, an applicant must submit the following:

1. A completed application form through UNICAS.
2. An official transcript from each college or university attended.
3. For international students: An official score report from an English proficiency examination (TOEFL/IELTS/ITEP/PTE).
4. Supplemental materials required for the program in Basic Medical Sciences must be submitted through UNICAS. Supplemental materials include:
 - a. Three letters of recommendation from instructors, advisors, or other persons qualified to evaluate the student's academic performance and potential in graduate school.
 - b. A personal statement

All documents submitted for admissions review become the property of the University of South Alabama.

Areas Of Study

Basic Medical Sciences (PhD)

Courses

Biochemistry - MD (BCH)

BCH 400 Biochemistry Externship 1 TO 4 cr
To be determined.

BCH 410 Research in Biochem & Mol Biol 1 TO 4 cr
: To carry out research under the supervision of a sponsoring faculty member. The student will help design experiments, learn and apply established techniques, record and evaluate data and make a final report both written and oral that describes the overall experimental results. The faculty member will assist the student in the project. This rotation is highly recommended for the student considering a career in academic medicine. Research areas include the biochemistry and molecular biology of cancer, lung diseases, and RNA viruses.

BCH 526 Biochemistry Lit Reports 1 cr
Students and faculty participate in a supervised reading of current literature and meet once a week to interact in a discussion of the selected article. The goal of this course is to maintain the student's level of information at a "state of the art" in both methods and theory in the discipline and to develop critical skills in reviewing the literature. Student presentation is required to receive credit.

BCH 527 Dir Studies Biochemistry 1 TO 6 cr
Students participate in research under the direction of a graduate faculty member. The student may pursue independent research or participate in a literature project. This course should be taken by students who have completed their laboratory rotations, but have not yet submitted a research proposal.

BCH 590 Sp Top - 1 TO 3 cr
This course provides in-depth tutorial exposure to specific areas in the discipline. Student and/or faculty presentations followed by group discussions (usually in the Socratic mode), examine the subject matter in an area of current interest either to one student or to a group of students. Credit and title are arranged with an individual faculty member.

BCH 622 Molecular Biology 3 cr

The focus of this course is on cellular processes involving DNA repair, replication and translation. Current concepts regarding the organization and structure of chromosomes, genes and the regulation of gene expression will be discussed. Eukaryotic molecular biology is emphasized, however some eukaryotic and prokaryotic processes are compared and contrasted. This course stresses the methods and experimental design used to delineate and understand cellular information transfer and molecular phenomena.

BCH 626 Biochemistry Research Seminar 1 cr

Students and faculty present a research topic for discussion before members of the department. The presentations are usually scheduled on a rotational basis. The student may present research data for critique by the faculty.

BCH 799 Research-Dissertation 1 TO 6 cr

Independent research by the student under the sponsorship of the graduate faculty. Students are required to submit a research project description form before enrolling in this course. Progress reports of the work accomplished are required every six months.

Cell Biology/Neuroscience- MD (CBN)

CBN 112R Medical Histology 8 cr

Summer make-up course in Medical Histology at an LCME approved medical school.

CBN 114 Neuroanatomy 4 cr

The course consists of both laboratory and lecture material. Emphasis is given to the functional neurobiology of the human central nervous system. In addition to basic anatomical systems, considerable time is given to the delineation of the anatomical bases of human CNS dysfunction.

CBN 400 Cell Biol & Neuro Externship 4 cr

To be determined.

CBN 405 Research Assistantship 1 TO 4 cr

Teaching assistantships are available in the following areas: head and neck; thorax and abdomen; pelvis and perineum; or extremities.

CBN 406 Teach Asst-Histology 1 TO 4 cr

Participants will assist the faculty in teaching histology laboratories either pertaining to tissues (4 weeks) or organ systems (4 weeks, or 8 weeks for both). The student will be mentored by one of the listed faculty who will assume responsibility for the final evaluation of the student.

CBN 407 Teach Assistantship - Anatomy 1 TO 4 cr

Teaching assistantships are available in the following areas: head and neck; thorax and abdomen; pelvis and perineum or extremities.

CBN 516 Cell Biol-Neurosci Lit Reports 1 cr

Students and faculty participate in a supervised reading of the current literature and meet periodically (usually once a week) to interact in a discussion of the selected article or topic. The goal of this course is to maintain the faculty's and students' level of information at the "state of the art" in both methods and theory in the discipline to develop critical review skills in reviewing the literature. Student presentation is required to receive credit.

CBN 517 Dir St - Cell Bio Neuroscience 1 TO 6 cr

Students participate in research under the direction of a graduate faculty member. The student may pursue independent research or participate in a literature project. This course should be taken by students who have completed their laboratory rotations, but have not yet submitted a research proposal.

CBN 590 Sp Top - 1 TO 3 cr

This course provides in-depth tutorial exposure to specific areas in the discipline. Student and/or faculty presentations followed by group discussion (usually in the Socratic mode), examine the subject matter in an area of current interest either to one student or to a group of students. Credit and title are arranged with an individual faculty member.

CBN 610 Molecular-Cellular Neuroscienc 2 cr

A course which requires students to read and evaluate critically the contemporary literature dealing with the cellular and molecular mechanisms of neural function.

CBN 614 Gene Expr- Reg- Repair- Ther 2 cr

This course requires students to read, present, and evaluate critically the modern literature on gene expression and regulation, repair and therapy.

CBN 616 Cell Biol-Neurosci Resrch Sem 1 cr

Students and faculty present a research topic for discussion before members of the department. The presentations are usually scheduled on a rotational basis. The student may present research data for critique by the faculty.

CBN 799 Research Dissertation 1 TO 6 cr

Independent research by the student under the sponsorship of the graduate faculty. Students are required to submit a research project description form before enrolling in this course. Progress reports of the work accomplished are required every six months.

Interdepartmental Stds (IDL) (IDL)

IDL 560 Cancer Biology 3 cr

This course provides a comprehensive coverage of molecular and cellular aspects of carcinogenesis as well as clinical issues related to human cancer. This course will specifically cover areas of histology, pathology, epidemiology, genetics, viruses, oncogenes and tumor suppressor genes. Additionally, topics to be covered include cellular and molecular basis of chemotherapy, pharmacology of anticancer drugs, molecular and cellular basis of radiotherapy, and biological therapy of cancer and clinical trial design.

IDL 566 Topics in Cancer Biology 1 cr

Students and faculty participate in a supervised reading of current literature and meet once a week to interact in a discussion of the selected article. The goal of this course is to maintain the student's level of information at a "state of the art" in both methods and theory in the discipline and to develop critical skills in reviewing the literature.

IDL 567 Dir Studies in Cancer Biology 1 TO 6 cr

Students participate in research under the direction of a graduate faculty member. The student may pursue independent research or participate in a literature project.

IDL 571 Mouse Models Biomed Research 3 cr

This course utilizes the primary scientific literature to provide students with in-depth knowledge regarding the development and utilization of mouse models in biomedical research. Students are required to actively participate in class discussions, present scientific papers, and develop a research project that utilizes mouse models.

IDL 576 Interdisciplinary Lit Reports 1 cr

Students and faculty participate in a supervised reading of the current literature and meet periodically (usually once a week) to interact in a discussion of the selected article or topic. The goal of this course is to maintain the faculty's and students' level of information at a "state of the art" in both methods and theory in the discipline and to develop critical skills in reviewing the literature.

IDL 577 Intro to Research Methods 3 cr

Theoretical and practical training in basic skills utilized in basic medical science research laboratories, for students entering the first year interdisciplinary curriculum. Discussion of regulatory issues in biomedical research will be interwoven with hands-on laboratory exercises. Offered concurrently with IDL 580.

IDL 580 Fund Basic Medical Sciences I 8 cr

First of a two-semester sequence designed for students in the first year interdisciplinary curriculum. In-depth exploration of the fundamentals of biochemistry, cell biology, and molecular biology prerequisite to advanced study of basic medical sciences. Didactic lectures will be complemented with discussions of the literature.

IDL 581 Fund Basic Medical Sciences II 8 cr

Second of a two-semester sequence designed for students in the first year interdisciplinary curriculum. Detailed exploration of the fundamentals of microbiology and immunology, developmental biology, integrative systems physiology, and mechanisms of drug action prerequisite to advanced study of basic medical sciences. Didactic lectures will be complemented with discussions of the literature. Pre-requisite: IDL 580 Minimum Grade of C.

IDL 590 Sp Top - 1 TO 3 cr

In-depth tutorial exposure to interdisciplinary topics in Basic Medical Sciences.

IDL 594 Interdisciplinary Dir Studies 1 TO 6 cr

Directed research study under the direction of a member of the graduate faculty. This course should be taken by students who have not yet identified a major professor in Basic Medical Sciences.

IDL 595 Distinguished Scientist Sem 0 cr

A seminar course in which outside speakers are brought in to discuss their research. Students will attend the seminar and have an opportunity to meet informally with the speaker. Attendance will be required, and the material will be testable during each student's qualifying exam.

IDL 620 Biomedical Engineering I 4 cr

Fundamental concepts of medical instrumentation, biomedical imaging and biological systems modeling as used in biomedical engineering. Course is cross-listed with EG 620.

IDL 621 Biomedical Engineering II 4 cr

Fundamental concepts of transport phenomena, cellular and tissue mechanics, and materials as used in biomedical engineering. Course is cross-listed with EG 621.

IDL 630 Lung Biology 4 cr

This course introduces an advanced level of lung physiology. An understanding of fundamental lung development, anatomy, and cell and organ physiology is emphasized. The course consists of lectures and written assignments and essay exams. Reading assignments are from the primary literature. Pre-requisite: IDL 580 Minimum Grade of C and IDL 581 Minimum Grade of C.

IDL 631 Lung Pathobiology 4 cr

This course builds on an in-depth understanding of normal lung biochemistry, cell biology, pharmacology, and physiology to examine lung disease. Emphasis is given on understanding mechanism(s) underlying the genetic, cell biology, anatomy and physiology of disease development and progression. Current therapeutic interventions are discussed. Clinical correlations are utilized to track signs and symptoms of specified diseases, and provide a framework for treatment options. The course consists of lectures and written assignments and essay exams. Reading assignments are exclusively from the primary literature.

Pre-requisite: IDL 630 Minimum Grade of C.

IDL 635 Advanced Signal Transduction 4 cr

This course builds on signal transduction topics discussed in the Fundamentals course (IDL 580, 581). The mechanisms of more generalized signaling pathways (e.g., G-protein couples pathways) to specific signaling pathways (e.g., TGF/BMP family) will be discussed. Signal transduction pathways will be examined using classic literature references, from the molecular details of pathway components to the effects on the organ-system. The course consists of lectures, student presentations, and essay/problem solving examinations.

Pre-requisite: IDL 580 Minimum Grade of C and IDL 581 Minimum Grade of C.

IDL 640 Stat Exp Design in Biomed Res 2 cr

This course covers statistical analysis, logic and hypothesis-driven experimental design in biomedical research, utilizing a combination of lectures, weekly practical data sets or written assignments, and student presentation.

IDL 641 Effective Scientific Writing 1 cr

This course provides strategies to improve communication skills via construction of logical scientific arguments and effective writing. Course format will include lecture/discussion, in class practical exercises, and writing assignments. In addition, participants will be introduced to the Turnitin software, reference databases, and other electronic resources useful in preparation of proposals and manuscripts.

Pre-requisite: IDL 580 Minimum Grade of C and IDL 581 Minimum Grade of C.

IDL 645 Res Prog Smth Musc/Vasc Blgy 1 cr

Students meet on alternate weeks for 2 hr with faculty and other research professionals to discuss on-going research projects in the field of smooth muscle and vascular biology. Signal transduction pathways, pathophysiological mechanisms in vascular disorders associated with smooth muscle, and other topics of interest will be discussed. Emphasis will be on up-to-date research results from laboratories as well as newly published literature findings. Students will be expected to present the results of their own laboratory research at least once a year to the group.

IDL 650 Topics in Lung Biology 1 cr

In-depth exposure to selected topics in lung biology or pathobiology. Course may be repeated for credit when course content varies.

Pre-requisite: IDL 630 Minimum Grade of B and IDL 631 Minimum Grade of B.

IDL 656 Research Sem Lung Biology 1 cr

Students and faculty present a research topic for discussion before members of the Center for Lung Biology. The presentations are usually scheduled on a rotational basis. The student may present research data for critique by the faculty.

IDL 667 Cancer Biology Research Sem 1 cr

Students and faculty present a research topic for discussion before members of the department. The presentations are usually scheduled on a rotational basis. The student may present research data for critique by the faculty.

IDL 676 Literature Report Lung Biology 1 cr

Students and faculty participate in a supervised reading of the current literature and meet once a week to discuss the selected article or topic and its relation to ongoing research. The goal of this course is to maintain the faculty's and students' level of information at a "state of the art" in both methods and theory in the discipline and to develop critical skills in reviewing the literature of lung biology.

IDL 799 Research-Dissertation 1 TO 6 cr

Independent research by the student under the sponsorship of the graduate faculty in individual departments in the Basic Medical Sciences. Prerequisite: Approved formal research proposal

Microbiology/Immunology - MD (MIC)

MIC 400 Microbiology Externship 1 TO 4 cr

To be determined.

MIC 480 Molec Basis of Pathogenesis 1 TO 4 cr

Bench research on the biology or the Rickettsiales family of intracellular pathogens and on the pathogenesis of the diseases caused by these organisms. Participation in ongoing research or initiation of new projects are possible.

MIC 530 Microbes & Host Defense 3 cr

Presents the fundamental aspects of microbiology including morphology, metabolism of micro-organisms, the basic principles of the use of antibiotics and chemotherapeutic agents, microbial genetics, virology, and medical microbial ecology. The principles of immunology and infection in relation to clinical disease are discussed with special emphasis on laboratory diagnosis.

MIC 536 Literature Reports 1 cr

Students and faculty participate in a supervised reading of the current literature and meet periodically to interact in a discussion of the selected article or topic. The goal of this course is to maintain the faculty's and students' level of information at a "state of the art" in both methods and theory in the discipline and to develop critical skills in reviewing the literature.

MIC 537 Dir St - Microbiology 1 TO 6 cr

Students participate in research under the direction of a graduate faculty member. This course should be taken by students who have completed their lab rotations, but have not yet submitted a formal research proposal.

MIC 590 Sp Top - 1 TO 3 cr

Each course provides in-depth tutorial exposure to specific areas in the discipline. Student and/or faculty presentations followed by group discussions, examine the subject matter in an area of current interest either to one student or a group of students. Credit and title are arranged with an individual faculty member.

MIC 630 Adv Microbial Pathogenesis 3 cr

This course discusses the fundamentals of this area with particular emphasis on *Escherichia coli* and *Salmonella typhimurium* as model systems. The development of problem solving skills will be stressed. Topics including aerobic vs. anaerobic metabolism, membrane physiology, biosynthesis of macromolecules and regulation of gene expression provide view of microbial cell.

Pre-requisite: IDL 580 Minimum Grade of B and IDL 581 Minimum Grade of B.

MIC 632 Advanced Immunology 3 cr

Selected topics in immunology are considered using formal lectures followed by student presentations. Design and interpretation of immunological experiments are emphasized throughout the course.

Pre-requisite: IDL 580 Minimum Grade of B and IDL 581 Minimum Grade of B.

MIC 633 Advanced Virology 3 cr

This course reviews the reproductive cycles of important human viruses and subviral agents and the diseases they cause. The focus is on the molecular biology of animal viruses and their mechanisms of regulation, assembly, and pathogenesis. Human immunodeficiency virus will be considered in detail. The course is constructed as an interactive lecture series with student reports and literature surveys.

Pre-requisite: IDL 580 Minimum Grade of B and IDL 581 Minimum Grade of B.

MIC 636 Microbiology-Immun Res Sem 1 cr

Students present a research topic for discussion before members of the department. Usually scheduled on a rotational basis. Student participation required after end of second year. Attendance required.

MIC 799 Research-Dissertation 1 TO 6 cr

Independent research by the student under the sponsorship of the graduate faculty in individual departments in the Basic Medical Sciences. Students are required to submit a research project description form before enrolling in this course. Progress reports of the work accomplished are required every six months.

Pharmacology (PHA) (PHA)

PHA 546 Pharmacology Lit Reports 1 cr

Students and faculty participate in a supervised reading of the current literature and meet periodically (usually once a week) to interact in a discussion of the selected article or topic. The goal of this course is to maintain the faculty's and students' level of information at a "state of the art" in both methods and theory in the discipline and to develop critical skills in reviewing the literature. Student presentation is required to receive credit.

PHA 547 Dir St in Pharmacology 1 TO 6 cr

Students participate in research under the direction of a graduate faculty member. The student may pursue independent research or participate in a literature project. This course should be taken by students who have completed their laboratory rotations, but have not yet submitted a formal research proposal.

PHA 548 Physiological Pharmacology 6 cr

This course covers both cellular and organ system physiology. It is designed to prepare graduate students for Medical Pharmacology (PHA 540), and for research in pharmacology.

PHA 590 Sp Top - 1 TO 3 cr

Each course provides in-depth tutorial exposure to specific areas in the discipline. Student and/or faculty presentations followed by group discussions (usually in the Socratic mode), examine the subject matter in an area of current interest either to one student or to a group of students. Credit and title are arranged with an individual faculty member.

PHA 640 Molecular-Cellular Pharmacology 3 cr

This course consists of presentations and literature discussions. The central themes of signal transduction from cellular receptor to amplified response, structure-activity relationships, and drug design are studied comprehensively. Specific topics include receptor-ligand interactions, receptor structure and coupling mechanisms, the biochemical and molecular aspects of G-proteins, protein phosphorylation mechanisms, molecular modeling and protein crystallography. A comprehensive course in biochemistry is prerequisite for this course.

PHA 643 Molecular-Cellular Toxicology 3 cr

This course is concerned with the mechanisms by which toxic substances exert their effects at the molecular and cellular level. Detailed analysis of the processes by which toxic materials are metabolized to toxic intermediates is addressed. The mode of action of how toxic compounds interact with structural proteins and other macromolecules, enzymes and receptors, and the genome is included. Examples of toxicity of the heart, liver, lung, pancreas, brain, including teratogenic, mutagenic and carcinogenic effects are discussed at the mechanistic level.

PHA 646 Cell Signaling Seminar 1 cr

Students present a research topic for discussion before members of the department. The presentations are usually on a rotational basis. The student may present research data for critique by the faculty.

PHA 799 Research Dissertation 1 TO 6 cr

Independent research by the student under the sponsorship of the graduate faculty in individual departments in the Basic Medical Sciences. Students are required to submit a research project description form before enrolling in this course. Progress reports of the work accomplished are required every six months.

Physiology (PHS) (PHS)

PHS 556 Literature Reports 1 cr

Students and faculty participate in a supervised reading of the current literature and meet periodically to interact in a discussion of selected article or topic. The goal of this course is to maintain the faculty's and students' level of information at a "state of the art" in both methods and theory in the discipline and to develop critical skills in reviewing the literature. Student presentation is required to receive credit.

PHS 557 Dir St Physiology 1 TO 6 cr

Students participate in research under the direction of a graduate faculty member. Student may pursue independent research or participate in a literature project. This course should be taken by students who have completed their lab rotations, but have not yet submitted a formal research project.

PHS 590 Special Topics - 1 TO 3 cr

Each course provides in-depth tutorial exposure to specific areas in the discipline. Student and/or faculty presentations followed by group discussions (usually in the Socratic mode), examine the subject matter in an area of current interest either to one student or to a group of students. Credit and title are arranged with an individual faculty member.

PHS 651 Adv Cardiovascular Physiology 5 cr

This is an advanced course covering cardiac function and metabolism, peripheral circulation, and microcirculation. The objective is to provide the student with a thorough understanding of cardiovascular physiology at both the organ and cellular level.

PHS 654 Transport Physiology Barriers 2 cr

This course is designed to present a detailed analysis of physiological membranes and the physical principles governing the movement of solute and water across these barriers.

PHS 656 Cell Signaling Seminar 1 cr

Students present a research topic for discussion before members of the department. The presentations are usually scheduled on a rotational basis. The student may present research data for critique by the faculty.

PHS 799 Research-Dissertation 1 TO 6 cr

Independent research by the student under the sponsorship of the graduate faculty in individual departments in the Basic Medical Sciences. Students are required to submit a research project description form before enrolling in this course. Progress reports of the work accomplished are required every six months.

Faculty

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