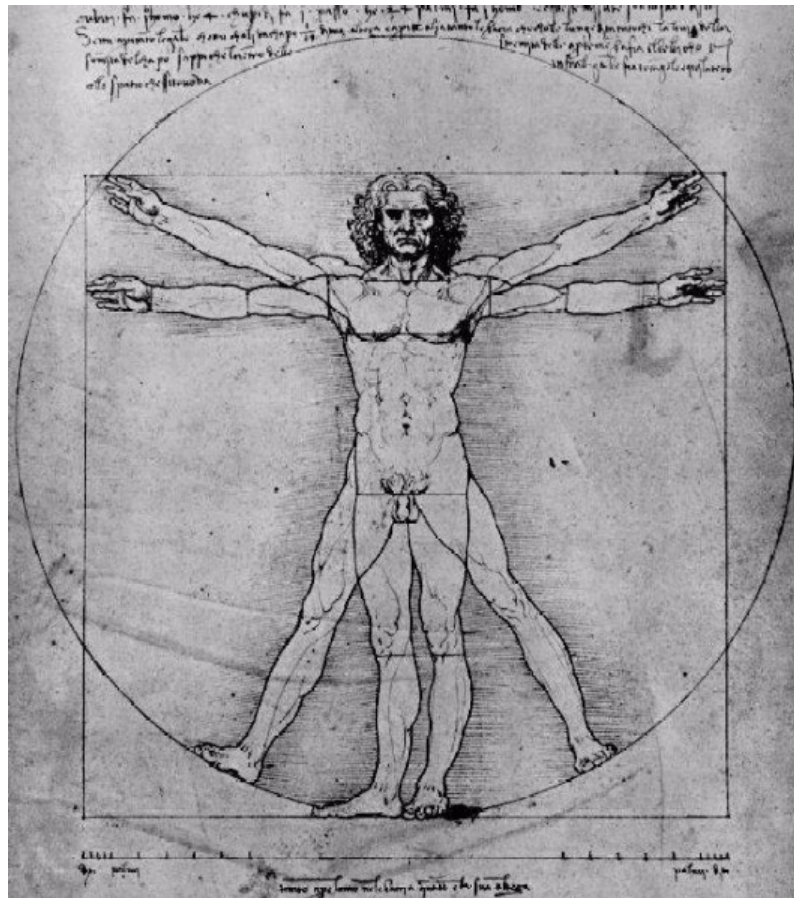


**Department of Pathology and Cell Biology  
School of Biomedical Sciences  
College of Medicine**



**Master's Program in Medical Sciences  
Anatomy  
Concentration**

# Graduate Curriculum: New Concentration



## *M.S. in Medical Sciences: Anatomy Concentration*

**Abstract:** Anatomy is the structural basis of all biological disciplines, and is currently one of the most dynamic areas in the biomedical sciences. Manifestations of health and disease can be regarded as attributes of anatomical structures ranging in size from individual molecules to whole organs. The concepts and techniques that have been developed from anatomical studies have been adapted to such areas as molecular medicine, biotechnology and forensics. Many of the new methodologies have facilitated the design, development and implementation of new approaches to disease diagnosis, treatment and prevention.

Recent advances in the focus of research and scholarship in the biomedical sciences have directed attention to the development and training of students who are able to “bridge” the traditional bioscience disciplines and embrace the concepts of interdisciplinary approaches to biomedical problems. The Anatomy concentration within the M.S. program in Medical Sciences in the College of Medicine has been developed to provide a novel interdisciplinary and concentrated program of study that is designed for students interested in either future doctoral or professional programs in the biomedical sciences who value interdisciplinary education. The program integrates the traditional subject areas of gross anatomy, microscopic anatomy, embryology and neuroanatomy with molecular and biochemical sciences to address issues of health and disease, to provide the student with a solid foundation in biomedical sciences. The rigorous program is designed to allow students to demonstrate their full academic ability and suitability for future graduate and professional programs whilst also providing a solid foundation in many of the topics that are common to either the first year of graduate school in the biomedical sciences, medical school, and other professional schools. The interdisciplinary nature of the program promotes a broad intellectual focus that is required of current and future graduate students in the biomedical sciences or health-care professions. In addition to the typical subject matter, the majority of the courses integrate modern teaching methods with extensive student participation designed to improve their written communication skills that are also important components of their future professional development. An important feature of the program that distinguishes it from other concentrations in the Medical Sciences Master’s program is the opportunity for students to be engaged in an original research project of the student’s choice, under the supervision of an established faculty member in the Department of Pathology and Cell Biology, that culminates in a manuscript describing the results of the students research experience, or an original paper exploring aspects of anatomy that interest the student.

### ***Relationship to the USF Strategic Plan:***

The proposed Master’s concentration in Anatomy will contribute to the University’s strategic plan in the following goals and strategies:

#### **Goal I**

##### **Expanding world-class interdisciplinary research, creative, and scholarly endeavors.**

- Promote nationally and internationally distinctive and prominent research and graduate programs.

The Anatomy Master’s concentration represents a focused graduate program that concentrates on the traditional anatomic disciplines and expands access to courses that are traditionally only

available to students enrolled in professional medical programs. In addition, the ability to participate in biomedical research provides the student with an outstanding laboratory experience and training for future research endeavors.

## **Goal II**

**Promoting globally competitive undergraduate, graduate and professional programs that support interdisciplinary inquiry, intellectual development, knowledge and skill acquisition, and student success through a diverse, fully- engaged, learner-centered campus environment.**

- Create and support globally competitive, relevant and distinctive academic programs that address the changing needs of the region, state and nation through innovative approaches to curriculum development and delivery,
- Provide increased access to excellence in higher education and research for students who demonstrate the aptitude to succeed,
- Enhance and expand the talent pool by shaping the enrollment profile of USF's undergraduate and graduate student body to reflect that found at a pre-eminent research university,

The Anatomy Master's concentration represents a distinctive academic program by virtue of its component courses, their associated content and the inclusion of the option to engage in a research project of the student's choice. The modern curriculum will address the region's and state's need for more graduates that are trained in the biomedical sciences and advanced research protocols. In addition, students who successfully complete the program will have demonstrated substantial academic ability and will be well-prepared to continue their education in USF's various doctoral and professional programs, resulting in an expanded applicant pool, or will be qualified for various industrial applications.

***Program (Major):*** M.S. in Medical Sciences

***Requirements:*** The proposed curriculum is attached and features five required courses that can be completed in one year together with a variety of elective courses that include diverse subjects as well as the opportunity to engage in modern biomedical research. For admission, students must meet the minimum qualifications of a bachelor's degree in the biological or chemical sciences from a regionally accredited institution together with minimum GPA of 3.0 and a GRE score. MCAT scores may be acceptable in lieu of the GRE. The majority of students typically applying to this type of program significantly exceed these minimums.

***Total hours:*** 31 credit hours

***Budget Account Number:*** USF01HSC10000-610601-000000-0000000

***Proposed Catalog Copy:*** Anatomy is the structural basis of all biological disciplines, and is currently one of the most dynamic areas in the biomedical sciences. Manifestations of health and disease can be regarded as attributes of anatomical structures ranging in size from individual molecules to whole organs. The concepts and techniques that have been developed from anatomical studies have been adapted to such areas as molecular medicine, biotechnology and

forensics. Many of the new methodologies have facilitated the design, development and implementation of new approaches to disease diagnosis, treatment and prevention.

This graduate program, which provides advanced training in Anatomy, is focused on an integrated approach to the classical disciplines of gross anatomy, microscopic anatomy, neuroanatomy and embryology. Together with a capstone course in molecular medicine and an introduction to scientific ethics, these courses provide an extensive background in the biomedical sciences.

The program has been constructed to prepare students for future educational endeavors in advanced graduate or professional programs in addition to industrial opportunities in the biomedical sciences. However, the training will also be valuable for students focusing on alternative careers in industry or business where a detailed understanding of the principles of the biomedical sciences is a prerequisite.

The integrated curriculum has been designed to provide the background training that will equip students with the essential tools for a successful career in any of the fields related to anatomical sciences. The program requires a minimum of 31 credit hours, which can be completed in four semester's of study. Six core courses provide both foundation and advanced training together with an exposure to ethical considerations in the biomedical sciences, while the directed research elective provides the student with the opportunity to participate in a research project under the guidance of a faculty mentor.

***Accreditation:***

Accredited by the Commission on Colleges of the Southern Association of College and Schools.

***ADMISSION INFORMATION***

Must meet University requirements (see Graduate Admissions) as well as requirements listed below.

***Program Admission Requirements:***

1. A bachelor's degree or equivalent from a regionally accredited university in the biological or chemical sciences
2. Minimum overall grade-point average of 3.0 out of a possible 4.0 with a minimum grade point average of 3.0 in the sciences
3. Graduate Record Examination (MCAT scores can be submitted in lieu of the GRE)

***Program Faculty:***

All the program faculty involved in the delivery of the associated courses are senior Ph.D.-level faculty members in the School of Biomedical Sciences in the College of Medicine who have a minimum of 5-years experience in graduate education at the University of South Florida.

***DEGREE PROGRAM REQUIREMENTS***

The following table indicates the courses and their associated credit hours that student's must successfully complete to be awarded the M.S. degree in Medical Sciences with a concentration in Biochemistry and Molecular Biology.

Department of Pathology and Cell Biology  
M.S. in Medical Sciences  
Anatomy Concentration



**Program Curriculum:**

<b>FALL SEMESTER</b>	<b>Credit</b>
GMS 6001 Foundations in Biomedical Science	6
GMS 6610 Advanced Neuroanatomy	4
<b>Total Credits</b>	<b>10</b>
<b>SPRING SEMESTER</b>	<b>Credit</b>
GMS 6604 Human Embryology	3
GMS 6608 Advanced Microscopic Anatomy	4
<b>Total Credits</b>	<b>7</b>
<b>SUMMER SEMESTER</b>	<b>Credit</b>
GMS 6609 Advanced Gross Anatomy	6
<b>Total Credits</b>	<b>6</b>
<b>Electives</b> (may be taken in any appropriate semester)	8
<b>Total Program Credits (minimum)</b>	<b>31</b>

*Approved electives:*

GMS 6091 Responsible Conduct	1
GMS 6210 Basic Medical Biochemistry (on-line)	3
GMS 6334 Pathobiology of Human Cancer	3
GMS 6601 Methods in Microscopy	3
GMS 6870 Medical Ethics and Humanities	3
GMS 7910 Directed Research	1-2
GMS 7910 Directed Research	1-5
GMS 7910 Directed Research	2
GMS7930 History of Pathology and Cell Biology	2
GMS7930 Theory of Cell Culture	3
PHC 6050 Biostatistics (on-line)	3

## **Master's Program in Medical Sciences: Anatomy Concentration**

### *Course descriptions:*

#### **GMS 6610 "Advanced Neuroanatomy" (4 cr. hrs)**

A comprehensive course emphasizing the relationship of structure to function in the nervous system with attention to molecular mechanisms of neural function.

#### **GMS 6609 "Advanced Gross Anatomy" (6 cr. hrs)**

This laboratory and lecture course examines the musculoskeletal, circulatory, nervous, respiratory, digestive, reproductive, and endocrine systems of the human body.

#### **GMS 6608 "Advanced Microscopic Anatomy" (4 cr. hrs)**

This lecture and laboratory course examines the human organism at the microscopic level, focusing on cellular morphology and the histological organization of tissues and organ systems.

#### **GMS 6604 "Human Embryology" (3 cr. Hrs)**

This course examines the development of the human from conception to birth

#### **GMS 6091 "Responsible Conduct" (1 cr. Hrs)**

This course will introduce the beginning graduate to the principles of responsible conduct in research, and how decisions made on a daily basis in the life of a scientist depend on these core principles.

#### **GMS 6210 "Basic Medical Biochemistry" (3 cr. Hrs)**

The course examines fundamental aspects of biochemistry critical to understanding the chemical and cellular mechanisms relevant to health and disease including intermediary metabolism, enzymology and storage and transfer of genetic information.

#### **GMS 6334 "Pathobiology of Human Cancer" (3 cr. Hrs)**

Using tissue-related oncology topics that complement molecular biology & experimental therapeutics, this graduate course will provide the morphologic and biologic basis of human cancer. This course is not restricted and is repeatable for 3 credits.

#### **GMS 6601 "Methods in Microscopy" (3 cr. Hrs)**

This course examines the variety of methods of used to visualizing tissue and provides some hands-on experience with some of these techniques

#### **GMS 6870 "Medical Ethics and Humanities" (3 cr. Hrs)**

Terminology, historical perspectives, ethical principles and dilemmas, and case studies. Examination of aspects of the human journey and various voices or perspectives thorough fiction, essays, history, art, poetry,

**GMS7930 “History of Pathology and Cell Biology” (2 cr. Hrs)**

The course gives a historical perspective to the development of Anatomy, Pathology (i.e., abnormal anatomy) and Cell Biology from the earliest written records to the present.

**GMS7930 “Theory of Cell Culture” (3 cr. Hrs)**

This course explores the theory of isolating and culturing primary cells and development of cell lines for research.

**PHC 6050 “Biostatistics” (3 cr. Hrs)**

Concepts, principles, and methods of statistics applied to public health issues.

**GMS 7910 “Direct Research” (var. cr. hrs)**

**GMS 7930 “Selected Topics” (1-3 cr. hrs)**