

CELL & MOLECULAR BIOLOGY (CELL)

CELL 1010 Intro to Cell & Molec Biology (3 Credit Hours)

A study of phenomenology and fundamental concepts that apply to all living systems. Major topics include: cell biology, cellular respiration, photosynthesis, physiology, genetics, and development. For biological science majors.

CELL 1030 Heredity and Society (3 Credit Hours)

The nature, scope, and implications of recent accomplishments in genetics, including consideration of human birth defects, hereditary diseases, and the potential of the human species to manipulate its own genes. For non-majors.

CELL 1035 Heredity & Society Lab (1 Credit Hour)

Laboratory and computer exercises to reinforce concepts discussed in CELL 1030. Students will learn basic laboratory skills, including microscopy and molecular biological techniques. For non-majors.

Prerequisite(s): CELL 1030^{*}, 1030, 1030 or 1030.

^{*} May be taken concurrently.

CELL 1040 Forensic Biology (3 Credit Hours)

Lectures, readings, and discussion of the literature in the fields of forensic biology. For non-majors.

CELL 1500 Biology Lecture (3 Credit Hours)

CELL 1505 Biology Lab (1 Credit Hour)

CELL 1890 Service Learning (0-1 Credit Hours)

CELL 1940 Transfer Coursework (3-99 Credit Hours)

CELL 2050 Genetics (3 Credit Hours)

The principles of genetic analysis and the nature of genes. Discussion of DNA, chromosomes, and molecular mechanism of replication, mutation, expression, and transmission of heritable characteristics.

Prerequisite(s): CELL 1010, 1010, 1010 or 1010.

CELL 2115 General Biology Lab (1 Credit Hour)

Laboratory exercises emphasizing concepts in cell, molecular, and developmental biology. Designed for majors in the biological sciences.

Prerequisite(s): (CELL 1010, 1010, 1010 or 1010) and (CHEM 1080, 1080, 1080 or 1080) and (CHEM 1180, 1180, 1180, 1180, 1085, 1085, 1085 or 1085).

CELL 2220 Careers in Cell & Molec Biol (1 Credit Hour)

This course will examine different careers in medicine, the distribution of hours spent in practice each week, and some of the disease processes and treatments seen by physicians. It will be taught from a practical, clinical point of view and is intended to help students identify their areas of interest in medicine or medical research. Does not count toward the requirements for a major or minor in cell and molecular biology.

CELL 2660 Special Topics (0-4 Credit Hours)

Courses offered by visiting professors or permanent faculty primarily for undergraduates. For description, consult department.

CELL 2665 Special Topics Lab (0-4 Credit Hours)

Courses offered by visiting professors or permanent faculty primarily for undergraduates. For description, consult department.

CELL 2710 Intro to Clinical Cancer (3 Credit Hours)

Learn how complex clinical decisions are developed and evaluated. Apply your knowledge of Cell and Molecular Biology in a clinical laboratory setting to diagnose cancer, develop patient-specific treatment options, evaluate treatment outcomes, predict and counter life-threatening therapeutic resistance. Students will appraise their newly acquired clinical oncology skills by attending the multidisciplinary Tulane Cancer Center tumor board meetings. Prerequisites: CELL 2050 and CELL 2115 or permission from instructor. Does not count toward CMB major.

Prerequisite(s): CELL 2050 and 2115.

CELL 2890 Service Learning (0-1 Credit Hours)

Service learning component to CELL courses. See Schedule of Classes each semester for offerings. 20 or 40 hours of public service with a CPS approved community partner.

CELL 2940 Transfer Coursework (1-4 Credit Hours)**CELL 3030 Molecular Biology (3 Credit Hours)**

The course is designed to provide basic knowledge of molecular biology. Topics covered include DNA replication, gene structure and regulation, transcription, translation, and protein structure and regulation. Basic laboratory techniques and experimental design in molecular biology are emphasized.

Prerequisite(s): CELL 2050, 2050, 2050 or 2050.

CELL 3035 Molecular Biology Lab (1 Credit Hour)

Laboratory experience in molecular biology techniques. Students will learn to analyze DNA via gel electrophoresis; isolate, detect, and quantitate RNA and/or protein; and use plasmids to clone and express a gene. Prerequisites: CELL 2115, CELL 3030.

Prerequisite(s): (CELL 3030^{*}, 3030, 3030 or 3030) and (CELL 2115^{*}, 2115, 2115 or 2115).

^{*} May be taken concurrently.

CELL 3050 Foundations of Pharmacology (3 Credit Hours)

This course explains cellular mechanisms by which drugs act in the body. Specific topics include basic pharmacokinetics, drug receptor interactions, drug tolerance, toxicity and drug interactions. The course integrates biology and chemistry by using examples of drug action on the autonomic and central nervous systems, cardiovascular and endocrine systems as well as the treatment of infections. Concepts from cell biology, anatomy, biochemistry, neurochemistry and physiology are covered.

Prerequisite(s): CELL 1010 and CHEM 2420.

CELL 3210 Physiology (3 Credit Hours)

This course is a survey of the organ systems of the human body. The cellular and molecular mechanisms of organ function are discussed. Emphasis is placed on clinical implications.

CELL 3230 Virology (3 Credit Hours)

In the virology lecture course you will learn about the structural and reproductive cycles for the major classes of viruses. You will gain an understanding of the structural and genetic factors involved in the virus-host cell interaction. You will also learn about the techniques used to study viruses. You will be using all this knowledge to identify new viruses, solve case studies, hypothesize how specific features of viruses evolved, and propose experiments to study the virus life cycle.

Prerequisite(s): CELL 2050 or EBIO 2070.

CELL 3310 Cellular Neuroscience (3 Credit Hours)

In-depth coverage of the basic principles of cellular neuroscience, including the biophysical basis of the membrane potential, action potential generation and propagation, and synaptic signaling. Students will be introduced to the synaptic organization of higher neural systems, such as the visual system and somatic sensory system.

Prerequisite(s): CELL 1010, 1010, 1010 or 1010.

CELL 3315 Cellular Neuroscience Lab (1 Credit Hour)

This is an interactive lab class giving students hands-on experience working with techniques used in the study of cellular neuroscience. Techniques include: behavioral testing using invertebrates, tissue staining, immunocytochemistry, and intracellular electrophysiological recordings.

Prerequisite(s): CELL 3310, 3310, 3310, 3310, NSCI 3310, 3310, 3310 or 3310.

CELL 3320 Systems Neuroscience (3 Credit Hours)

The subject of this course is the human nervous system, its anatomy, connectivity and function. Discusses the normal structure of the nervous system and the relationship of that structure to physiological function. The course is taught from a practical, clinical point of view and is intended to prepare students for further study in the neurosciences.

Prerequisite(s): CELL 3310 or NSCI 3310.

CELL 3325 Neuroanatomy Lab (1 Credit Hour)

The subject of this course is the anatomy of the human nervous system. Students will learn to identify and map the structure and position of nuclei, pathways, and anatomical divisions of the brain and spinal cord. The course is a practical correlate to Systems Neuroscience, and is intended to prepare students for further study in the neurosciences.

Prerequisite(s): CELL 3320^{*}, 3320, 3320, 3320, NSCI 3320^{*}, 3320, 3320 or 3320.

^{*} May be taken concurrently.

CELL 3400 Regenerative Biology (3 Credit Hours)

This course encompasses the mechanisms of natural regeneration that occurs in both invertebrates and vertebrates and little bit about the application to the development of therapies to restore tissues and organs damaged by injury or disease. This course focuses mainly on the vertebrate regeneration and the primary objective of this course is to introduce students to regeneration mechanism in tissue, cellular and molecular level.

Prerequisite(s): CELL 3750 or 3010.

CELL 3560 Pathophysiology (3 Credit Hours)

This course focuses on the molecular pathophysiology of infectious disease, immunopathology of the cardiovascular system and skin disorders. The impact of a diseased cardiovascular system will be examined. Concepts from cell biology, anatomy, biochemistry, and physiology are covered.

Prerequisite(s): CELL 3210.

CELL 3750 Cell Biology (3 Credit Hours)

An examination of the structure and function of eukaryotic cells. Emphasis is placed on mechanisms of intracellular and transmembrane transport, cellular control, and intercellular and intracellular signaling. Experimental methods and applications will be emphasized.

Prerequisite(s): CELL 3030 or 3110.

CELL 3755 Cell Biology Laboratory (1 Credit Hour)

Laboratory experience in in vitro methodologies. Students will learn to maintain and manipulate mammalian cell cultures.

Prerequisite(s): CELL 3750* or 3030* and (CELL 3110 or 3030).

* May be taken concurrently.

CELL 3890 Service Learning: CELL 3750 (0-1 Credit Hours)

Students complete a service activity in the community in conjunction with the content of a three-credit corequisite course.

CELL 3891 Service Learning: CELL 3210 (0-1 Credit Hours)**CELL 3940 Transfer Coursework (1-4 Credit Hours)****CELL 4010 Cellular Biochemistry (3 Credit Hours)**

An examination of the structure and function of biological molecules, energetics of biological reactions, enzyme kinetics, metabolism, synthesis of macromolecules, and assembly of structures. Emphasis is placed on mammalian metabolism and mechanisms of control used to regulate metabolic pathways. Detailed explorations into the chemical function of biomolecules lay the foundation for the course.

Prerequisite(s): (CELL 2050, 2050, 2050 or 2050) and (CHEM 2420, 2420, 2420 or 2420) or (CHEM 2460, 2460, 2460 or 2460).

CELL 4110 Human Histology (4 Credit Hours)

Descriptive study of mammalian microscopic anatomy in a physiological context. Lectures and laboratory.

Prerequisite(s): CELL 1010.

Corequisite(s): CELL 4111.

CELL 4111 Human Histology Lab (0 Credit Hours)

Lab section for CELL 4110

Prerequisite(s): CELL 1010.

Corequisite(s): CELL 4110.

CELL 4130 Embryology (3 Credit Hours)

Anatomical study of developmental processes in humans. Lectures and online laboratory.

Prerequisite(s): CELL 3750.

CELL 4160 Developmental Biology (3 Credit Hours)

The origin and development of form and patterns in organisms. Recent investigations and research methodology on the processes of growth and differentiation are stressed.

CELL 4180 Biomedical Research in Animals (3 Credit Hours)

Lectures, readings, presentations, and discussion of the use of animal models in biomedical research. Prerequisites: CELL 3750 or CELL 4010 or approval from instructor

Prerequisite(s): CELL 3750 or 4010.

CELL 4200 General Endocrinology (3 Credit Hours)

This course explains the basics of hormone action and hormone interactions with their receptors, with an emphasis on the molecular mechanisms by which homeostasis is maintained in multicellular organisms. Physiological outcomes of hormone actions on different organs, as well as aberrant hormone action will be covered.

Prerequisite(s): CELL 3030, 3010, 3110 or 3750.

CELL 4220 Microbiology (3 Credit Hours)

Taxonomy, physiology, genetics and ecology of microorganisms. This course will cover the role of microbes in medicine and industry, and as model systems for research.

CELL 4225 Microbiology Laboratory (1 Credit Hour)

Laboratory studies of microbial taxonomy, physiology, biochemistry, and genetics.

Prerequisite(s): CELL 4220*, 4220*, 4220* or 4220*.

* May be taken concurrently.

CELL 4240 Sem In Morbid & Mortalty (3 Credit Hours)

This is a seminar course that will focus on recent reports of bacterial or viral diseases in the "Morbidity and Mortality Weekly Report" (MMWR) published by the Centers for Disease Control and Prevention. Students will read selected reports each week that will be analyzed in detail in class.

CELL 4250 Principles In Immunology (3 Credit Hours)

An introduction to the biology of the human immune system with review of relevant literature. Students will learn to critically read scientific articles and analyze experimental data.

Prerequisite(s): CELL 3750 or 3010.

CELL 4260 Princ of Biomed Write Capstone (3 Credit Hours)

An examination of various types of scientific literature, scientific writing and presentation. Exploration of scientific databases such as PubMed. Emphasis on critical reading of scientific literature and writing in a scientific style. Also satisfies writing intensive requirement.

CELL 4340 Neurobiology of Disease (3 Credit Hours)

This is an advanced course which reviews the physiology of the nervous system and the various pathologies that attack the system. The course focuses on the cellular mechanisms of the pathology, what treatments are available, and what the current research literature has to say about the diseases. Emphasis is placed on readings from original clinical and research papers. Pathologies discussed range from motor control and neuromuscular diseases to high cognitive function, autism, and dementia.

CELL 4350 Developmental Neurobiol (3 Credit Hours)

A broad overview of the different stages of neural development. Examination of the molecular aspects of developmental neurobiology, with reference to some important signaling pathways involved in neural growth and specification. Particular attention will be given to those active research fields, such as growth cone guidance and collapse, activity-dependent development, and applications of these to injury and disease.

Prerequisite(s): CELL 3750, 3010, 3030, 3310 or NSCI 3310.

CELL 4370 Molecular Neurobiology (3 Credit Hours)

Introduction to the molecular biology of neurons and neuronal functions. Topics of study will include: the molecular composition of nerve cells, and how this provides a basis for their functional properties; their synaptic connectivity; how they receive, transmit, and retain information at a molecular level. Studies will focus on current research in the field of molecular neurobiology.

Prerequisite(s): CELL 3310, 3320, NSCI 3310 or 3320.

CELL 4440 Adv Molecular Biology (3 Credit Hours)

Current topics in molecular biology with emphasis on higher-order chromatin structure and transcription, mutability, and DNA repair mechanisms in prokaryotes and eukaryotes. Other topics include: nuclear hormone receptors, HOX gene activation in development, RNAi, and genome organization.

Prerequisite(s): CELL 3030, 3030, 3030, 3030, 3110, 3110, 3110, 3110, 6030 or 6030.

CELL 4450 Genome Biology (3 Credit Hours)

Genome-level science is changing the pace of biomedical research and medicine. This course will examine how whole genomes, transcriptomes, and proteomes are studied, and what we are learning about the biology of multiple organisms using these novel techniques. Epigenetics, genomics, and proteomics will be covered in the context of disease and the development of novel therapeutics.

Prerequisite(s): CELL 3030 or NSCI 4370.

CELL 4480 Head and Neck Anatomy (3 Credit Hours)

This 3 credit lecture and laboratory course focuses on the gross anatomy of the head and neck, as well as central nervous system anatomy. This includes cadaver dissection of the head, neck, cranial nerves, and brain. This class mirrors dental and medical school anatomy courses and will prepare students to succeed in medical school, dental school, or allied health professions. Prerequisite: CELL 6490/4490. Does not count toward CMB major.

Prerequisite(s): CELL 4490 or 6490.

CELL 4490 Anatomy (4 Credit Hours)

An exploration of the back, upper and lower extremities with an emphasis on bones, muscles, arteries, nerves, and veins in these regions of the human body. Does not count toward CMB major.

Corequisite(s): CELL 4491.

CELL 4491 Anatomy Lab (0 Credit Hours)

Co-requisite lab for CELL 4491 Anatomy. Does not count toward CMB major.

Corequisite(s): CELL 4490.

CELL 4500 Adv Molec Neurobiology (3 Credit Hours)

This course provides detailed description and in-depth discussion of current techniques and experimental topics in the field of molecular neurobiology.

Prerequisite(s): CELL 4370 or NSCI 4370.

CELL 4560 Internship (1-3 Credit Hours)

An experiential learning process coupled with pertinent academic course work. Open only to juniors and seniors in good standing. Registration is completed in the CMB Department.

CELL 4570 Internship (1-3 Credit Hours)

An experiential learning process coupled with pertinent academic course work. Open only to juniors and seniors in good standing. Registration is completed in the CMB Department.

CELL 4660 Special Topics (0-4 Credit Hours)

Courses offered by visiting professors or permanent faculty primarily for undergraduates. For description, consult department.

Prerequisite(s): CELL 3030 and 3750.

CELL 4665 Special Topics Lab (1-3 Credit Hours)

Courses offered by visiting professors or permanent faculty primarily for undergraduates. For description, consult department.

CELL 4710 Molec Biology of Cancer (3 Credit Hours)

The complex multistep process which transforms a normal cell into a cancer cell, carcinogenesis, will be examined with emphasis on current molecular insights.

Prerequisite(s): CELL 3750.

CELL 4780 Developmental Genetics (3 Credit Hours)

This course examines the genetic pathways regulating development and the underlying molecular mechanisms by which these pathways are regulated. The goal of the course is to expose students to topics and techniques shaping the field of development biology.

CELL 4880 Writing Intensive: (0-1 Credit Hours)

Course to be attached to regular courses that incorporate a writing component within the regular course. Register within department.

CELL 4890 Service Learning: CELL 4340 (0-1 Credit Hours)

Students complete a service activity in the community in conjunction with the content of a three-credit corequisite course.

Corequisite(s): CELL 4560.

CELL 4910 Independent Study (1-3 Credit Hours)

Laboratory or library research under direction of a faculty member.

CELL 4920 Independent Study (1-3 Credit Hours)

Laboratory or library research under direction of a faculty member.

CELL 4940 Transfer Coursework (1-4 Credit Hours)

Transfer Coursework.

CELL 4990 Honors Thesis (3 Credit Hours)

Honors thesis research, first semester. Register in department.

CELL 5000 Honors Thesis (4 Credit Hours)

Honors thesis research, second semester. Register in department.

CELL 5110 Capstone Component: CELL 4910 (0 Credit Hours)

Corequisite(s): CELL 4910.

CELL 5111 Capstone Component: CELL 4920 (0 Credit Hours)

Corequisite(s): CELL 4920.

CELL 5112 Capstone Component: CELL 4950 (0 Credit Hours)

Corequisite(s): CELL 4930.

CELL 5113 Capstone Component: CELL 4960 (0 Credit Hours)

Corequisite(s): CELL 4960.

CELL 5380 Study Abroad (1-20 Credit Hours)

Courses taught abroad by non-Tulane faculty. Does not count toward Tulane GPA.

CELL 5390 Study Abroad (1-20 Credit Hours)

Courses taught abroad by non-Tulane faculty. Does not count toward Tulane GPA.

CELL 6000 Biomedical Ethics (3 Credit Hours)

An interdisciplinary course that examines the moral principles that apply to biology and medicine. Ethical principles will be analyzed in relation to such topical issues as informed consent, abortion, death and dying, allocation of scarce resources, personhood, AIDS, risk, human experimentation, and public policy. Case studies and class discussion will complement lectures and video presentations.

CELL 6010 Cellular Biochemistry (3 Credit Hours)

An examination of the structure and function of biological molecules, energetics of biological reactions, enzyme kinetics, metabolism, synthesis of macromolecules, and assembly of structures. Emphasis is placed on mammalian metabolism and mechanisms of control used to regulate metabolic pathways. Detailed explorations into the chemical function of biomolecules lay the foundation for the course. In addition, a term paper or oral presentation is required.

CELL 6030 Molecular Biology (3 Credit Hours)

The course is designed to provide basic knowledge of molecular biology. Topics covered include DNA replication, gene structure and regulation, transcription, translation, and protein structure and regulation. Basic laboratory techniques and experimental design in molecular biology are emphasized.

CELL 6035 Molecular Biology Lab (1 Credit Hour)

Laboratory experience in molecular biology techniques. Students will learn to analyze DNA via gel electrophoresis; isolate, detect, and quantitate RNA and/or protein; and use plasmids to clone and express a gene.

CELL 6040 Trends in Neuroscience (1 Credit Hour)

Students select, analyze, present, and discuss recent empirical articles in the field of Neuroscience.

CELL 6050 Foundations of Pharmacology (3 Credit Hours)

This course explains cellular mechanisms by which drugs act in the body. Specific topics include basic pharmacokinetics, drug receptor interactions, drug tolerance, toxicity and drug interactions. The course integrates biology and chemistry by using examples of drug action on the autonomic and central nervous systems, cardiovascular and endocrine systems as well as the treatment of infections. Concepts from cell biology, anatomy, biochemistry, neurochemistry and physiology are covered.

CELL 6070 Neurobiology of Aging (3 Credit Hours)

This course will survey the current literature in clinical and research journals regarding the Neurobiology of the aging process. Emphasis is placed on the state of research in aging, looking at experimental design issues as well as published results. Connections will be drawn between the research literature and current clinical practice, as well as what the research literature says regarding aging and lifestyle.

CELL 6080 Adv Dev & Cell Biol II (3 Credit Hours)

Lectures, readings, and discussion of the literature in the fields of cellular, developmental, and molecular biology.

CELL 6110 Human Histology (4 Credit Hours)

Descriptive study of mammalian microscopic anatomy in a physiological context. Lectures and laboratory. In addition, a term paper is required.

Corequisite(s): CELL 6111.

CELL 6111 Human Histology Lab (0 Credit Hours)

Lab section for CELL 6110

Corequisite(s): CELL 6110.

CELL 6130 Embryology (0-4 Credit Hours)

Anatomical study of developmental processes in humans. Lecture. In addition, a term paper is required.

Prerequisite(s): CELL 3750.

CELL 6131 Embryology Lab (0 Credit Hours)

Lab section for CELL 6130

CELL 6150 Methods in Neuroscience (3 Credit Hours)

A lecture course exposing students to contemporary theories and techniques used in cellular and behavioral neuroscience by Tulane neuroscientists in their own research programs. The course is taught by faculty members representing several departments from both the uptown and downtown campus and the Health Sciences Center.

CELL 6160 Developmental Biology (3 Credit Hours)

The origin and development of form and patterns in organisms. Recent investigations and research methodology on the processes of growth and differentiation are stressed. In addition, a term paper is required.

CELL 6180 Biomedical Research in Animals (3 Credit Hours)

Lectures, readings, presentations, and discussion of the use of animal models in biomedical research. A term paper is required. Prerequisites: CELL 3750 or CELL 4010 or approval from instructor

CELL 6200 General Endocrinology (3 Credit Hours)

This course explains the basics of hormone action and hormone interactions with their receptors, with an emphasis on the molecular mechanisms by which homeostasis is maintained in multicellular organisms. Physiological outcomes of hormone actions on different organs, as well as aberrant hormone action will be covered.

CELL 6210 Physiology (3 Credit Hours)

This course is a survey of the organ systems of the human body. The cellular and molecular mechanisms of organ function are discussed. Emphasis is placed on clinical implications. Oral presentations are required.

CELL 6220 Microbiology (3 Credit Hours)

Taxonomy, physiology, genetics and ecology of microorganisms. This course will cover the role of microbes in medicine and industry, and as model systems for research. In addition, a term paper is required.

CELL 6225 Microbiology lab (1 Credit Hour)

Laboratory studies of microbial taxonomy, physiology, biochemistry, and genetics.

CELL 6230 Virology (3 Credit Hours)

In the virology lecture course you will learn about the structural and reproductive cycles for the major classes of viruses. You will gain an understanding of the structural and genetic factors involved in the virus-host cell interaction. You will also learn about the techniques used to study viruses. You will be using all this knowledge to identify new viruses, solve case studies, hypothesize how specific features of viruses evolved, and propose experiments to study the virus life cycle. A mock research proposal is required.

CELL 6310 Cellular Neuroscience (3 Credit Hours)

n-depth coverage of the basic principles of cellular neuroscience, including the biophysical basis of the membrane potential, action potential generation and propagation, and synaptic signaling. Students will be introduced to the synaptic organization of higher neural systems, such as the visual system and somatic sensory system. Corequisite: CELL 6360.

CELL 6320 Systems Neuroscience (3 Credit Hours)

The subject of this course is the human nervous system, its anatomy, connectivity and function. Discusses the normal structure of the nervous system and the relationship of that structure to physiological function. The course is taught from a practical, clinical point of view and is intended to prepare students for further study in the neurosciences. In addition, a term paper is required.

Prerequisite(s): CELL 3310, NSCI 3310, CELL 6310 or NSCI 6310.

CELL 6325 Neuroanatomy Lab (1 Credit Hour)

The subject of this course is the anatomy of the human nervous system. Students will learn to identify and map the structure and position of nuclei, pathways, and anatomical divisions of the brain and spinal cord. The course is a practical correlate to Systems Neuroscience, and is intended to prepare students for further study in the neurosciences.

Prerequisite(s): CELL 3320*, 3320, 3320, 3320, NSCI 3320*, 3320, 3320 or 3320.

* May be taken concurrently.

CELL 6340 Neurobiology of Disease (3 Credit Hours)

Advanced course on the higher neural functions of the nervous system and neurological diseases resulting from disruption of these functions. An emphasis is placed on the physiology of the nervous system and neural dysfunction caused by inherited and acquired diseases. Topics range from motor control and neuromuscular diseases to high cognitive function and dementia. In addition, a term paper is required.

CELL 6350 Developmental Neurobiol (3 Credit Hours)

A broad overview of the different stages of neural development. Examination of the molecular aspects of developmental neurobiology, with reference to some important signaling pathways involved in neural growth and specification. Particular attention will be given to those active research fields, such as growth cone guidance and collapse, activity-dependent development, and applications of these to injury and disease. In addition, a term paper is required.

CELL 6360 Topics In Cellular Neuroscienc (0 Credit Hours)

Journal club course intended as a supplement to Cellular Neuroscience in order to receive graduate credit for Cellular Neuroscience. Meets once a week for one hour. Students prepare and give oral presentations of topical papers from literature. Grade received contributes to final grade in Cellular Neuroscience.

CELL 6370 Molecular Neurobiology (3 Credit Hours)

Introduction to the molecular biology of neurons and neuronal functions. Topics of study will include: the molecular composition of nerve cells, and how this provides a basis for their functional properties; their synaptic connectivity; how they receive, transmit, and retain information at a molecular level. Studies will focus on current research in the field of molecular neurobiology. In addition, a term paper is required.

CELL 6400 Regenerative Biology (3 Credit Hours)

This course encompasses the mechanisms of natural regeneration that occurs in both invertebrates and vertebrates and a little bit about the application to the development of therapies to restore tissues and organs damaged by injury or disease. This course focuses mainly on the vertebrate regeneration and the primary objective of this course is to introduce students to regeneration mechanism in tissue, cellular and molecular level. In addition, either a term paper or additional oral presentations are required.

CELL 6440 Adv Molecular Biology (3 Credit Hours)

Current topics in molecular biology with emphasis on higher-order chromatin structure and transcription, mutability, and DNA repair mechanisms in prokaryotes and eukaryotes. Other topics include: nuclear hormone receptors, HOX gene activation in development, RNAi, and genome organization. In addition, a term paper is required.

CELL 6450 Genome Biology (3 Credit Hours)

Genome-level science is changing the pace of biomedical research and medicine. This course will examine how whole genomes, transcriptomes, and proteomes are studied, and what we are learning about the biology of multiple organisms using these novel techniques. Epigenetics, genomics, and proteomics will be covered in the context of disease and the development of novel therapeutics.

Prerequisite(s): CELL 3030 or NSCI 4370.

CELL 6480 Head and Neck Anatomy (3 Credit Hours)

This 3 credit lecture and laboratory course focuses on the gross anatomy of the head and neck, as well as central nervous system anatomy. This includes cadaver dissection of the head, neck, cranial nerves, and brain. This class mirrors dental and medical school anatomy courses and will prepare students to succeed in medical school, dental school, or allied health professions. Prerequisite: CELL 6490/4490

Prerequisite(s): CELL 6490.

CELL 6490 Anatomy (0-4 Credit Hours)

An exploration of the back, upper and lower extremities with an emphasis on bones, muscles, arteries, nerves, and veins in these regions of the human body.

Corequisite(s): CELL 6491.

CELL 6491 Anatomy Lab (0 Credit Hours)

Co-requisite lab for CELL 6491 Anatomy

Corequisite(s): CELL 6490.

CELL 6500 Adv Molec neurobiology (3 Credit Hours)

This course provides detailed description and in-depth discussion of current techniques and experimental topics in the field of molecular neurobiology. A term paper is required.

CELL 6550 Syn Org of the Brain (3 Credit Hours)

To discuss and understand functional connections within and between areas of the brain to lead to a greater understanding of brain function and behavior.

CELL 6560 Pathophysiology (3 Credit Hours)

This course focuses on the molecular pathophysiology of infectious disease, immunopathology of the cardiovascular system and skin disorders. The impact of a diseased cardiovascular system will be examined. Concepts from cell biology, anatomy, biochemistry, and physiology are covered. Oral presentations are required.

CELL 6660 Special Topics (0-4 Credit Hours)

Courses offered by visiting professors or permanent faculty. For description, consult department.

CELL 6665 Special Topics Lab (1-3 Credit Hours)

Courses offered by visiting professors or permanent faculty primarily for undergraduates. For description, consult department.

CELL 6710 Molec Biology of Cancer (3 Credit Hours)

The complex multistep process which transforms a normal cell into a cancer cell, carcinogenesis, will be examined with emphasis on current molecular insights. In addition, a term paper is required.

CELL 6750 Cell Biology (3 Credit Hours)

An examination of the structure and function of eukaryotic cells. Emphasis is placed on mechanisms of intracellular and transmembrane transport, cellular control, and intercellular and intracellular signaling. Experimental methods and applications will be emphasized. A term paper is required as part of this course.

CELL 6755 Cell Biology Lab (1 Credit Hour)

Laboratory experience in in vitro methodologies. Students will learn to maintain and manipulate mammalian cell cultures.

CELL 6840 Current Topics Dev Biol (2 Credit Hours)

Reports and discussions of current literature on developmental processes.

CELL 6940 Transfer Coursework (1-4 Credit Hours)**CELL 7110 Research Rotations (1-3 Credit Hours)**

Individual research supervised by faculty.

CELL 7120 Research Rotations (1-3 Credit Hours)

Individual research supervised by faculty.

CELL 7130 Research (2-10 Credit Hours)

Individual research supervised by faculty.

CELL 7260 Graduate Communications (3 Credit Hours)

In today's competitive science market place, effective communication can be the deciding factor in obtaining postdoctoral fellowships, faculty positions or alternative career options, as well as in getting grants funded and manuscripts published. Deliberate practice of these skills is therefore critical for graduate level science trainees. This course will involve extensive discussion and practice of oral and written communication. By the end of the semester, students will have prepared a draft of their proposals required for qualifying exams and will receive input on the clarity, rigor, format, grammar, and writing style of this document. This course is open to Ph.D. students only, and is recommended to students in their 4th semester of graduate study.

CELL 7450 Genome Biology (3 Credit Hours)

Genome-level science is changing the pace of biomedical research and medicine. This course will examine how whole genomes, transcriptomes, and proteomes are studied, and what we are learning about the biology of multiple organisms using these novel techniques. Epigenetics, genomics, and proteomics will be covered in the context of disease and the development of novel therapeutics.

CELL 7860 Master's Seminar (3 Credit Hours)**CELL 7870 Doctoral Seminar (1 Credit Hour)****CELL 7940 Transfer Credit-Grad (1-12 Credit Hours)****CELL 7990 Research (1-9 Credit Hours)**

Individual research supervised by faculty.

CELL 8000 Research (3 Credit Hours)

Individual research supervised by faculty.

CELL 9990 Dissertation Research (3 Credit Hours)

Research toward completion of a doctoral degree.