SIU CARBONDALE Southern Illinois University

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Physiology.....1

Physiology

The School of Biological Science Physiology program offers training in mammalian, cellular and comparative physiology, pharmacology, and human anatomy. Students majoring in physiology are encouraged to gain research experience under faculty supervision. The undergraduate major provides general rather than specialized training in physiology. To become a professional physiologist usually requires the completion of an advanced degree in the field. An undergraduate major in physiology would provide an excellent foundation for those planning a career in teaching or research or a medical field such as medicine, dentistry, veterinary science, nursing or medical technology. Students considering a major in Physiology should discuss their program with the Program Director for Undergraduate Studies in Physiology. A grade of C or better is required in every Physiology course used to satisfy the major's requirements for a degree in Physiology. A student cannot repeat a course or its equivalent in which a grade of B or better was earned without the consent of the School.

Bachelor of Science (B.S.) in Physiology Degree Requirements

Degree Requirements	Credit Hours
University Core Curriculum Requirements [1]	39
Requirements for Major in Physiology	(14)+61
PHSL 310	(2)+3
PHSL 410A, PHSL 410B	8
Physiology electives - (13 hours at the 300 or 400-level)	13
BIOL 211 & BIOL 212 or BIOL 213	(6)+2
BIOL 304, BIOL 305, BIOL 306, BIOL 409 (any two)	6
CHEM 200, CHEM 201, CHEM 202, CHEM 210, CHEM 211, CHEM 212, CHEM 340, CHEM 341, CHEM 350, CHEM 351, CHEM 442	(3)+20
PHYS 203A, PHYS 203B; PHYS 253A, PHYS 253B	8
MATH 150 [2]	(3)+1
Supportive Skills: To include foreign language (two Semesters at 200 level); or two from the following: ENGL	6

Degree Requirements	Credit Hours
290 or ENGL 291 or ENGL 391 or ENGL 491; PLB 360 or Math 282; CS 200, CS 2012 [3]	
Electives	14
Total	120

[1] *Total of fourteen hours of biology, chemistry, mathematics and physiology elective course work are accounted for in the 41-hour Core Curriculum requirement.*

[2] *Prerequisite is MATH 111 or MATH 108 and MATH 109. The elective hours are reduced by 4 hours for students who place into a course lower than calculus.*

[3] *If two years of a foreign language are taken to complete this requirement, the total hours will be 16. The elective hours are reduced by 10 hours.*

Physiology Minor

A minor in Physiology requires completion, with at least a C grade, of PHSL 410A, PHSL 410B (8 hours) and eight hours of 300 or 400-level courses offered by the School.

Junior-Senior Honors Program

Juniors who have shown outstanding ability in biology courses and related subjects in their freshman and sophomore years may apply for acceptance into the honors program. Honors students do independent study in the physiological sciences (PHSL 491) during their junior and senior years.

Technology Fee

The College of Agricultural, Life, and Physical Sciences assesses undergraduate majors a technology fee of $4.58 per credit hour up to 12 credit hours. The fee is charged Fall and Spring semester.

Physiology Courses

PHSL201 - Human Physiology (University Core Curriculum) A course which relates the normal function of the human body to the disruptions which occur in a variety of disease states. Three lecture hours per week. Not open to students who have taken 310. With 208 (if not used for health) satisfies University Core Curriculum Science Group II requirement. Credit Hours: 3

PHSL208 - Laboratory Experiences in Physiology (University Core Curriculum course) Laboratory course which provides experiences with small animal experimentation and measurements made on the human subject. One two-hour laboratory per week. Prerequisite: completion of, or current enrollment in, PHSL 201. With 201 (if not used for health) satisfies the University Core Curriculum Science Group II requirement. Lab fee: $20. Credit Hours: 1

PHSL240A - Anatomy & Physiology for Nursing A-B Sequence. Functional architecture of the human body. Tissues, skeletal, muscular and nervous systems. Three hour lectures and one three-hour laboratory per week. Not for major credit. Prerequisites: ZOOL 118 and CHEM 140A. Restricted to Pre-Nursing and Nursing majors. Lab fee: $25. Credit Hours: 4

PHSL240B - Anatomy & Physiology for Nursing A-B Sequence. Functional architecture of the human body. Continuation of A. Endocrine, Circulatory, Respiratory, Digestive and Urinary systems. Three

hours lectures and one three-hour laboratory per week. Not for major credit. Prerequisites: PHSL 240A. Restricted to Pre-Nursing and Nursing majors. Lab fee: $25. Credit Hours: 4

PHSL257 - Concurrent Work Experience Under exceptional circumstances, and with prior approval of the departmental chair, credit may be granted for practical experience or other work directly related to physiology. Mandatory Pass/Fail. Credit Hours: 1-6

PHSL258 - Previous Work Experience Under exceptional circumstances, and after petition to the departmental chair, credit may be granted for practical experience or other work directly related to physiology. Mandatory Pass/Fail. Credit Hours: 1-6

PHSL259 - Occupational Education Credit Under special circumstances, advanced training in a paramedical or other field directly related to physiology can be used as a basis for granting credit in physiology. Such credit is sought by petition to the chair of department and requires approval of dean of the College of Science. Credit Hours: 2-8

PHSL301 - Basic Human Anatomy with Laboratory Lectures, demonstrations and observations of the prosected body, plus experiences in the anatomy laboratory. Course is designed for students in nursing, mortuary science, biological science, and related disciplines. Three lecture hours and one two-hour laboratory per week. Lab fee: $20. Credit Hours: 4

PHSL310 - Principles of Physiology (University Core Curriculum Course) Beginning course in human physiology designed for majors in physiology and other biological sciences, and recommended to pre-medical and other students considering biological sciences and health professions. Three lectures per week, one-hour discussion and one two-hour laboratory. NOTE: Lab includes both small animal experimentation as well as measurements made with human subjects. Satisfies the University Core Curriculum Human Health requirement in lieu of PHSL 201. Prerequisites: CHEM 200 or 205H, 201, 202 or 207H, and CHEM 210 or 215H, 211, 212 or 217H with grades of C or better. Lab fee: $20. Credit Hours: 5

PHSL320 - Reproduction and Sexuality (Same as WGSS 321) Comprehensive course examining the physiological basis of mammalian reproduction and the behavioral aspects of sexuality. Human sexuality and reproductive function is the primary focus. Topics include hormonal control, anatomy, ovulation, sexual response and behavior, fertilization, pregnancy and parturition. Human specific topics include reproductive medicine, STDs, paraphilias, birth control and infertility. Prerequisite: BIOL 211. Credit Hours: 3

PHSL401A - Advanced Human Anatomy with Laboratory A-B sequence. Laboratory dissection of the human body with lectures as needed. Primarily for students majoring in physiology, biological sciences, anthropology or pre-medical fields. Prerequisite: PHSL 301. Enrollment by consent of instructor. Lab fee: $20. Credit Hours: 5

PHSL401B - Advanced Human Anatomy with Laboratory A-B sequence. Laboratory dissection of the human body with lectures as needed. Primarily for students majoring in physiology, biological sciences, anthropology or pre-medical fields. Prerequisite: PHSL 301. Enrollment by consent of instructor. Lab fee: $20. Credit Hours: 5

PHSL402 - Functional Neuroanatomy with Lab Examines the detailed structure of the human nervous system, linking structure to function at both the clinical and neurobiological level. The overall objective of the course will be a three-dimensional understanding of nervous system structure and organization, based upon anatomical connections, functions, and diseases. Enrollment requires consent of the instructor. Prerequisites: BIOL 211 or BIOL 213 and PHSL 301, PHSL 310, or PSYC 302 with grades of C or better. Lab fee: $25. Credit Hours: 4

PHSL403 - Human Embryology Embryology is the branch of anatomy that looks at the developmental events that occur prior to birth. This course is designed to provide a basic foundation in human embryology to undergraduate students who are interested in the biomedical sciences. We will explore human development from fertilization to birth. Our major focus will be on the morphological changes that take place during development, but we will also explore many of the underlying molecular mechanisms

and relevant congenital anomalies. Prerequisites include BIOL 211 or 213 and PHSL 301 or 310 with a grade of C or better. Credit Hours: 3

PHSL409 - Mammalian Histology This course is intended to provide life sciences students with an introduction and understanding of mammalian tissues with a strong emphasis on human anatomy. The course utilizes self-directed and problem-based learning strategies employing on-line resources including virtual microscopy. By completing this course, successful students should 1) be familiar with the organization, structure, and appearance of mammalian tissues; 2) be able to recognize and identify tissues from all major mammalian organs; and 3) be able to describe the relationship between tissue conformation and organ function. Prerequisites: BIOL 211 and PHSL 301 with grades of C or better. Credit Hours: 4

PHSL410A - Mammalian Physiology Physical and chemical organization and function in mammals, with emphasis on the human. Physiology of blood and circulation, respiration, digestion, metabolism, excretion, endocrines, sensory organs, nervous systems, muscle and reproduction. Primary course for all students majoring in physiology or related sciences. Four lectures per week. May be taken in any sequence. Prerequisite: CHEM 210, 211, 212; PHYS 203B and PHYS 253B or PHYS 205B and PHYS 255B; PHSL 310 with grades of C or better. Credit Hours: 4

PHSL410B - Mammalian Physiology Physical and chemical organization and function in mammals, with emphasis on the human. Physiology of blood and circulation, respiration, digestion, metabolism, excretion, endocrines, sensory organs, nervous systems, muscle and reproduction. Primary course for all students majoring in physiology or related sciences. Four lectures per week. May be taken in any sequence. Prerequisite: CHEM 210, 211, 212; PHYS 203B and PHYS 253B or PHYS 205B and PHYS 255B; PHSL 310 with grades of C or better. Credit Hours: 4

PHSL412 - Teaching Methods and Strategies This online course is designed to introduce instructional theories and methods to students interested in teaching physiology or other similar subjects. It will provide coverage of various methods of classroom instruction, course management, assessment and evaluation. Students should finish the course prepared to be competent in critical teaching practices for lecture and lab courses as well as being proficient in promoting diversity and inclusiveness in the classroom. Credit Hours: 2

PHSL420A - Principles of Pharmacology Examines basic principles of pharmacology (pharmacokinetics) and the action of various classes of drugs on living organisms. Drug classes covered include those affecting most organ systems of the human body, such as the nervous, cardiovascular, gastrointestinal and renal systems as well as drugs used for antibiotic and cancer chemotherapy. Three lectures per week. Prerequisites: PHSL 310 or PHSL 410A,B, CHEM 340 and CHEM 341 (or equivalent) with grades of C or better. Credit Hours: 3

PHSL420B - Principles of Pharmacology Examines basic principles of pharmacology (pharmacokinetics) and the action of various classes of drugs on living organisms. Drug classes covered include those affecting most organ systems of the human body, such as the nervous, cardiovascular, gastrointestinal and renal systems as well as drugs used for antibiotic and cancer chemotherapy. Three lectures per week. Prerequisites: PHSL 310 or PHSL 410A,B, CHEM 340 and CHEM 341 (or equivalent) with grades of C or better. Credit Hours: 3

PHSL426 - Comparative Endocrinology (Same as ANS 426, ZOOL 426) Comparison of mechanisms influencing hormone release, hormone biosynthesis, and the effects of hormones on target tissues, including mechanisms of transport, receptor kinetics, and signal transduction. Prerequisites: PHSL 310 or ANS 331 or ZOOL 220 with a grade of C. Laboratory/Field Trip fee: $15. Credit Hours: 3

PHSL430 - Cellular and Molecular Physiology This course will examine the molecular and cellular aspects of physiology in the context of human pituitary and neurological genetic disorders. Topics include experiments and model systems used to examine the regulation of gene expression, signaling pathways, protein activities, and cellular functions that underlie these disorders. Prerequisites: BIOL 306 or CHEM 350 & 351 with minimum grade of C or better. Credit Hours: 3

PHSL433 - Comparative Animal Physiology (Same as ZOOL 433) Variations of the physiological processes in animal phyla, comparison with human physiology, and review of basic physiology principles

and comparative aspects of mechanism and function. Prerequisite: BIOL 211, BIOL 212 & BIOL 213 or PHSL 310 with a grade of C or better. Credit Hours: 3

PHSL440A - Biophysics Biomathematics, biomechanics and biotransport. Three lectures per week. Prerequisites: MATH 141 or 150; PHSL 310; PHYS 203 A&B and 253 A&B or PHYS 205 A&B and 255 A&B. May be taken in B,A sequence with consent of instructor. Credit Hours: 3

PHSL440B - Biophysics Bioelectrics and bio-optics applied to physiological problems. Three lectures per week. Prerequisites: MATH 141 or 150; PHSL 310; PHYS 203 A&B and 253 A&B or PHYS 205 A&B and 255 A&B. May be taken in B,A sequence with consent of instructor. Credit Hours: 3

PHSL450 - Advanced Human Sexuality (Same as WGSS 449) Advanced, comprehensive course intended to supplement and expand the critical examination of topics covered in PHSL 320, Reproduction and Sexuality. The objectives of this class are to examine the physiological and behavioral basis of human reproduction and sexuality. Examining how humans reproduce from a physiological perspective including all aberrations and clinically relevant dysfunctions, as well as, the spectrum of human sexual behaviors including typical and atypical sexual behavior, paraphilias and diversity of human relationships. Prerequisite: PHSL 320. Credit Hours: 3

PHSL460 - Electron Microscopy Lecture course designed to introduce the student to the theory and principles of electron microscopy. Two lecture hours per week. Restricted to senior standing or permission of instructor. Credit Hours: 2

PHSL462 - Biomedical Instrumentation Diagnostic and therapeutic modalities related to engineering. Cardiovascular, neural, sensory and respiratory instrumentation. Special approval needed from the instructor. Credit Hours: 3

PHSL470 - Biological Clocks Study of the temporal aspects of diverse physiological and behavioral functions which possess diurnal and sectional periodicity. Species covered will include many eukaryotic organisms including plants, but will mainly stress mammals. Oscillations in sleep-wake cycle, locomotion, reproduction, hormonal secretion and numerous other processes will be explored. In addition, the effects of biological clocks in humans and the effect of jet lag and depression will be examined. Prerequisite: PHSL 310. Credit Hours: 3

PHSL480 - Cancer Journal Club Goal of the journal club is to discuss current primary journal articles about cancer, often with an emphasis on ovarian cancer. Each semester a theme is selected to guide selection of articles. Grade is based on: 1) presentation; 2) participation; 3) short essay on each journal article that is discussed. Each student presents at least one journal article per semester and is expected to participate in the discussion of each paper that is presented. Faculty and graduate students also present articles for discussion to provide examples of how to read and discuss primary scientific literature. Student will, with instructor approval, choose either 1 cr/hr for a research paper component for which they write a 10 page research paper reviewing current literature related to the journal club's theme for the semester or a different cancer theme as determined by the instructor, or select 2 cr/hrs for journal club participation as outlined above, or 3 cr/hrs for completing both course components. Prerequisite: PHSL 310 with a B or better or concurrent enrollment. Credit Hours: 1-3

PHSL490 - Senior Seminar Readings, writings, presentations and discussions of current topics in physiology. One hour per week. Not for graduate credit. Restricted to senior standing or consent of instructor. Credit Hours: 1

PHSL491 - Independent Research for Honors Supervised readings and laboratory research in physiology directed by a member of the physiology faculty. Undergraduate honors students only. By special arrangement with the instructor in the physiology department with whom the student wishes to work. Credit Hours: 3-8

PHSL492 - Special Problems in Physiology Supervised readings and laboratory research in physiology directed by a member of the physiology faculty. Open to undergraduate students only. By special arrangement with the instructor in the physiology department with whom the student wishes to work. No more than 3 hours may be counted as electives towards the major in physiology. Credit Hours: 1-8

Physiology Faculty

Arbogast, Lydia A., Professor, Physiology, Ph.D., Indiana University, 1988; 1996. Molecular aspects of reproductive neuroendocrinology.

Bany, Brent, Associate Professor, Physiology, Ph.D., Western University (Canada), 1997; 2003. Uterine biology with a focus on the establishment and progression through early pregnancy in rodents and humans.

Ellsworth, Buffy S., Associate Professor, Physiology, Ph.D., Colorado State University, 2002; 2007. Pituitary gland development, molecular biology, regulation of gene expression.

Griffith, Chelsea M., Education Assistant Professor, Physiology, Ph.D., Southern Illinois University Carbondale, 2018; 2019. Neurobiology, anatomy, physiology.

Hiremath, Deepak Somashekar, Instructor, Physiology, Ph.D., Southern Illinois University Carbondale, 2020; 2020. Reproductive physiology.

Jensik, Philip J., Assistant Professor, Physiology, Molecular and Cellular & Systemic Physiology, Ph.D., Southern Illinois University Carbondale, 2009; 2016. Neurodevelopmental and neurodegenerative disorders, functional genetics, neurobehavioral measures.

Krimsier, Jonathan M., Instructor, Physiology, M.S., Eastern Virginia Medical School, 2017; 2020. Learning and retention of anatomical sciences.

Nordman, Jacob C., Assistant Professor, Physiology, Behavior Neuroscience, Ph.D., George Mason University, 2014; 2021. Stress, synaptic and intrinsic plasticity, brain circuits, aggression, maladaptive behavior.

Raymer, Angela M., Instructor, Physiology, Animal Science, M.S., Southern Illinois University Carbondale, 1999; 1999. Physiology.

Zaczek, Denise J., Education Assistant Professor, Physiology, Physiology, Ph.D., Southern Illinois University Carbondale, 2003; 2003. Systems physiology with emphasis in reproduction.

Zheng, Zhengui (Patrick), Associate Professor, Physiology, Ph.D., Shanghai University of Traditional Chinese Medicine, 1997; 2014. Steroid hormone-regulated sexual dimorphic development of external genitalia, brain, and limbs and the genetic impact of environmental chemicals on sexual dimorphic organ development.

Emeriti Faculty

Bartke, Andrzej, Professor, Emeritus, Ph.D., University of Kansas, 1965.

Browning, Ronald A., Professor, Emeritus, Ph.D., University of Illinois Medical Center, Chicago, 1971.

Collard, Michael W., Associate Professor, Emeritus, Ph.D., Washington State University, 1987.

Ferraro, James S., Associate Professor, Ph.D., The Chicago Medical School, 1984.

Hales, Dale Buchanan., Professor, Emeritus, Ph.D., University of Colorado Health Sciences Center, 1983; 2009.

Huggenvik, Jodi I., Associate Professor, Emerita, Ph.D., Washington State University, 1985.

Murphy, Laura L., Professor, Emerita, Ph.D., Medical College of Georgia, 1983.

Narayan, Prema, Associate Professor, Emerita, Ph.D., University of Minnesota, 1984; 2005.

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