MOLECULAR, CELLULAR, & INTEGRATIVE PHYSIOLOGY (MCP)

Graduate Studies

MCP 200L — Animal Cell Culture Laboratory (4 units)

Course Description: Techniques of cell culture, with emphases on cell physiology and the actions of drugs and toxicants on cultured somatic cells. Design, performance and interpretation of experiments with animal cells in vitro.
Prerequisite(s): Courses in undergraduate Biochemistry, Cell Biology, or General Physiology, or consent of instructor.
Learning Activities: Discussion 2 hour(s), Laboratory 6 hour(s).
Grade Mode: Letter.

MCP 210A — Advanced Physiology (5 units)

Course Description: Advanced course on fundamental principles of cell physiology, transport physiology, signal transduction, physiology of excitable cells, and muscle physiology.
Prerequisite(s): Physiology Ph.D. program or consent of instructor.
Learning Activities: Lecture 3 hour(s), Discussion 2 hour(s).
Enrollment Restriction(s): MCP 210A (or HPH 210A) is a required core course for the Molecular, Cellular, & Integrative Physiology graduate group; course contains thermodynamics discussions and requires substantial math and physics background in order to succeed; approval for registering from Co-IRs is required to get CRN.
Cross Listing: HPH 210A.
Grade Mode: Letter.

MCP 210B — Advanced Physiology (6 units)

Course Description: Advanced course in general principles of physiology, surveying homeostasis, cellular and selected topics, and neurophysiology.
Prerequisite(s): Physiology Ph.D. program, or consent of instructor.
Learning Activities: Lecture 5 hour(s), Discussion 1 hour(s).
Grade Mode: Letter.

MCP 210C — Advanced Physiology (5 units)

Course Description: Graduate level instruction in the general principles of physiology and the neural and humoral control of the cardiovascular, renal, respiratory, gastrointestinal, sensory, musculoskeletal, and reproductive systems.
Prerequisite(s): Doctoral student in the Molecular, Cellular, Integrative Physiology graduate group, or consent of instructor.
Learning Activities: Lecture 5 hour(s).
Grade Mode: Letter.

MCP 210L — Physiology Laboratory Rotations (5 units)

Course Description: One mandatory rotation and up-to two voluntary rotations. Students learn techniques and perform experiments related to particular research problems. At the end of the rotations students give a short talk and hand in a research paper.
Learning Activities: Laboratory 15 hour(s).
Enrollment Restriction(s): Restricted to Molecular, Cellular, & Integrative Physiology graduate students.
Repeat Credit: May be repeated 2 time(s).
Grade Mode: Satisfactory/Unsatisfactory only.

MCP 211A — Critical Evaluation of Physiology Research (2 units)

Course Description: Recent peer-reviewed articles on topics in cell physiology, transport physiology, signal transduction, physiology of excitable cells, and muscle physiology. Critical evaluation of research questions, experimental design, data quality, and interpretation. Development of subject-matter mastery, critical reading, presentation, and discussion skills for physiological research.
Prerequisite(s): MCP 210A (can be concurrent).
Learning Activities: Discussion 2 hour(s).
Enrollment Restriction(s): Open to graduate students in Molecular, Cellular, & Integrative Physiology, Pharmacology & Toxicology, Biochemistry, Molecular, Cellular, & Developmental Biology, Neuroscience, and Biophysics; others allowed with consent of instructor.
Grade Mode: Letter.

MCP 211B — Animal Models in Physiology Research (2 units)

Course Description: Use of animal models in research, types of models available, selection criteria and limitations, alternative approaches. Principles of basic and systemic physiology. Student presentations promote critical independent thinking, public speaking skills, conception of a scientific hypothesis, and scientific rigor in developed experimental plans.
Prerequisite(s): MCP 210A; MCP 210B (can be concurrent).
Learning Activities: Discussion/Laboratory 2 hour(s).
Grade Mode: Letter.

MCP 215 — Electrophysiology Techniques & Applications (3 units)

Course Description: Broad scope of topics in electrophysiology techniques and applications.
Learning Activities: Lecture 1.50 hour(s), Discussion 1.50 hour(s).
Cross Listing: PTX 215.
Grade Mode: Satisfactory/Unsatisfactory only.

MCP 216 — Neurophysiology Literature (3 units)

Course Description: Lectures covering experimental and theoretical methods in studying cell membrane ion channels and the resulting characterization of the physiological functions and structure/function relationships of some of the most important channel types. Discussion of classical and current original papers.
Learning Activities: Lecture 1 hour(s), Discussion 2 hour(s).
Grade Mode: Letter.

MCP 219 — Muscle Growth & Development (3 units)

Course Description: Integration of growth and development of skeletal muscle; morphology, biochemistry, neural control mechanisms, circulatory and nutritional factors. Prenatal and neonatal differentiation of fiber types. Experimental and hereditary myopathies.
Prerequisite(s): BIS 103; (BIS 104 or MCB 150); or consent of instructor.
Learning Activities: Lecture 2 hour(s), Seminar 1 hour(s).
Grade Mode: Letter.

MCP 220 — General & Comparative Physiology of Reproduction (3 units)

Course Description: Basic phenomena of sexual and asexual reproduction and comparisons of processes in a wide variety of animals; gamete formation, structure, and metabolism; fertilization; neuroendocrine mechanisms in maturation and reproductive cycles; behavioral aspects.
Prerequisite(s): (BIS 101 or BIS 101V); BIS 103; NPB 110; NPB 110L.
Learning Activities: Lecture 3 hour(s).
Grade Mode: Letter.

MCP 222 — Mammalian Gametogenesis & Fertilization (3 units)

Course Description: Emphasizes our current understanding of events in mammalian gametogenesis and the fertilization process. Published results, conclusions drawn from these results, and their contribution to our understanding are discussed.
Prerequisite(s): NPB 121; or the equivalent.
Learning Activities: Lecture 3 hour(s).
Grade Mode: Letter.

MCP 230 — Advanced Endocrinology (2 units)

Course Description: Focus on timely topic of endrocrine research. Critical review of current literature and discussion of future research strategies in the area.
Prerequisite(s): NPB 130; or the equivalent, and graduate standing.
Learning Activities: Lecture 2 hour(s).
Repeat Credit: May be repeated when topic differs.
Grade Mode: Letter.

MCP 231 — Neuroendocrinology (3 units)

Course Description: Neural-endocrine interactions; neural regulation of the endocrine system, especially in relation to reproduction; the role of hormones and growth factors in sexual differentiation of the brain.
Prerequisite(s): NPB 130; or the equivalent course in endocrinology; NPB 110 or the equivalent course in systemic physiology.
Learning Activities: Lecture 3 hour(s).
Grade Mode: Letter.

MCP 234 — Current Topics in Neurotoxicology (3 units)

Course Description: General principles of neurotoxicology, the cell and molecular mechanisms and health impacts of specific neurotoxicants and the contribution of neurotoxic compounds to complex neurodevelopmental disorders and neurodegenerative diseases.
Prerequisite(s): Core courses in one of the following graduate programs: Pharmacology Toxicology (PTX), Agricultural Environmental Chemistry (AGC), Biochemistry Molecular Biology (BMB), Cell Developmental Biology (CDB), Immunology (IMM), Molecular Cellular Integrative Physiology (MCP) or Neuroscience (NSC).
Learning Activities: Lecture 3 hour(s).
Enrollment Restriction(s): Restricted to upper level undergraduate students must obtain permission from the course coordinator.
Cross Listing: ETX 234, VMB 234.
Grade Mode: Letter.

MCP 242 — Biological Rhythms (3 units)

Course Description: General aspects and basic mechanisms of biological rhythms; the importance of rhythm desynchronization in areas of pharmacology and space medicine; telemetry; mathematical methods; chronometry; daily, reproductive, and annual periods; shift-work, jet lag and sleep disorders.
Prerequisite(s): NPB 110 or the equivalent.
Learning Activities: Lecture 2 hour(s), Lecture/Discussion 1 hour(s).
Grade Mode: Letter.

MCP 255 — Physiology of the Stress Response (2 units)

Course Description: Definition of Stress; Physiological mechanisms of adaptation to stress; Hormonal control of the systemic stress response; Mechanisms of the cellular stress response; Discussion of current trends in stress physiology and current methods for studying the stress response.
Prerequisite(s): Graduate Student Status.
Learning Activities: Lecture/Discussion 2 hour(s).
Cross Listing: ABG 255.
Grade Mode: Letter.

MCP 261A — Topics in Vision: Eyes & Retinal Mechanisms (2 units)

Course Description: Structure and function of the visual system, with emphasis on the eye and retina, including optics, anatomy, transduction, retinal synapses, adaptation, and parallel processing.
Prerequisite(s): NPB 100 or NPB 112; or the equivalent; graduate standing.
Learning Activities: Lecture/Discussion 2 hour(s).
Cross Listing: NSC 261A, NPB 261A.
Grade Mode: Satisfactory/Unsatisfactory only.

MCP 261B — Topics in Vision: Systems, Psychophysics, Computational Models (2 units)

Course Description: Functions of the central visual pathways and their underlying mechanisms. Recent research on aspects of anatomy, biochemistry, electrophysiology, psychophysics, development, and genetics of the visual system.
Prerequisite(s): Consent of instructor; MCP 261A recommended.
Learning Activities: Lecture/Discussion 2 hour(s).
Cross Listing: NSC 261B, NPB 261B.
Grade Mode: Satisfactory/Unsatisfactory only.

MCP 261C — Topics in Vision: Clinical Vision Science (2 units)

Course Description: Causes and mechanistic bases of major blinding diseases. Recent research on aspects of anatomy, biochemistry, electrophysiology, psychophysics, development, and genetics of the visual system related to disease.
Prerequisite(s): MCP 261A; MCP 261B; or consent of instructor.
Learning Activities: Lecture/Discussion 2 hour(s).
Cross Listing: NSC 261C, NPB 261C.
Grade Mode: Satisfactory/Unsatisfactory only.

MCP 275 — Neurohumoral Regulatory Mechanisms of Thermogenesis (3 units)

Course Description: Designed for graduate and advanced undergraduate students, examines thermogenic systems in homeotherms (primarily mammals) with respect to regulation (hormonal and central nervous control) and effector mechanisms (basis of heat generation at the target cell).
Prerequisite(s): BIS 104; BIS 102 or BIS 102V; or equivalent courses, and consent of instructor.
Learning Activities: Lecture 2 hour(s), Discussion 1 hour(s).
Grade Mode: Letter.

MCP 290 — Seminar (1 unit)

Course Description: Discussion and critical evaluation of advanced topics and current trends in research.
Learning Activities: Seminar 1 hour(s).
Grade Mode: Pass/No Pass only.

MCP 290C — Research Conference in Physiology (1 unit)

Course Description: Presentation and discussion of faculty and graduate student research in physiology.
Prerequisite(s): Consent of instructor. Graduate standing.
Learning Activities: Discussion 1 hour(s).
Repeat Credit: May be repeated.
Grade Mode: Pass/No Pass only.

MCP 291B — Seminar in Cellular Mechanisms of Adaptation (1 unit)

Course Description: Review and evaluation of current literature and research in cellular adaptations to the environment.
Prerequisite(s): BIS 103; NPB 100B; consent of instructor.
Learning Activities: Discussion 0.50 hour(s), Seminar 0.50 hour(s).
Repeat Credit: May be repeated when topic differs.
Grade Mode: Pass/No Pass only.

MCP 291D — Research Approaches in Physiology (2 units)

Course Description: Current research in physiology. Overall design of experiments and particular research areas.
Learning Activities: Seminar 2 hour(s).
Grade Mode: Pass/No Pass only.

MCP 293 — Current Progress in Physiology (1 unit)

Course Description: Seminars presented by guest lecturers describing their current research activities.
Prerequisite(s): Consent of instructor; graduate standing.
Learning Activities: Seminar 1 hour(s).
Repeat Credit: May be repeated.
Grade Mode: Pass/No Pass only.

MCP 298 — Group Study (1-5 units)

Course Description: Group study.
Learning Activities: Variable.
Grade Mode: Letter.

MCP 299 — Research (1-12 units)

Course Description: Research.
Learning Activities: Variable.
Grade Mode: Satisfactory/Unsatisfactory only.

MCP 300A — Pedagogical Aspects of Physiology in Higher Education (3 units)

Course Description: Participation as a teaching assistant for one quarter in a designated physiology course. Instruction in methods of leading discussion groups, leading laboratory sections, writing and grading quizzes, operation and use of laboratory equipment, and reading and grading laboratory reports. Meets teaching requirements for Ph.D. program in Physiology.
Prerequisite(s): Meet qualifications for teaching assistant in physiology.
Learning Activities: Lecture, Discussion, Laboratory.
Grade Mode: Pass/No Pass only.

MCP 300B — Pedagogical Aspects of Physiology in Higher Education (3 units)

Course Description: Participation as a teaching assistant for one quarter in a designated physiology course. Instruction in methods of leading discussion groups, leading laboratory sections, writing and grading quizzes, operation and use of laboratory equipment, and reading and grading laboratory reports. Meets teaching requirements for Ph.D. program in Physiology.
Prerequisite(s): Meet qualifications for teaching assistant in physiology.
Learning Activities: Lecture, Discussion, Laboratory.
Grade Mode: Pass/No Pass only.

MCP 390 — The Teaching of Physiology (1 unit)

Course Description: Practical experience in methods and problems of teaching physiology lecture courses. May include analyses of texts and supporting material, discussion of teaching techniques, preparing for and conducting discussion sessions, and formulation of topics and questions for examinations under supervision of instructor.
Prerequisite(s): Consent of instructor; Teaching Assistant assignment to a physiology lecture course.
Learning Activities: Discussion 1 hour(s).
Repeat Credit: May be repeated.
Grade Mode: Pass/No Pass only.