

Human Physiology

Chairperson: Daniel J. McCann

Professors: C. Geithner, D. McCann

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The Department of Human Physiology offers courses that provide students with an opportunity for specialized work in and original investigation of human structure and function. The Bachelor of Science (BS) degree in Human Physiology provides an introduction to the physical and life sciences, followed by a concentrated study of human structure and function spanning the hierarchy of structure and function from molecules to the entire organism. Acute physiological responses and chronic adaptations to normal activity, exercise, disease and aging are emphasized. Laboratory experiences are used to introduce students to the methods of investigation, evaluation, and remediation of human structure and function. In concert with Gonzaga University's Jesuit tradition and academic core, the program attempts to fulfill the University Mission in developing general knowledge and skills as well as specialized competence in a least one discipline or profession. The degree is unique within the University because it emphasizes the scientific basis and mechanisms of human function, adaptation, aging, health and disease, and performance. All majors must complete the University core (31 credits) plus the Human Physiology degree (82 credits), plus an additional 15 general elective credits for a total of 128 credits to graduate with the degree.

B.S. Major in Human Physiology: 82 credits Science Core: 31 credits

BIOL101, 101L Diversity of Life & L	4 credits
BIOL170, 170L Introductory Microbiology&L	4 credits
CHEM 101, 101L General Chemistry & L	4 credits
CHEM 230, 230L Organic Chemistry & L	5 credits
MATH 112, or 147, or 158	3 credits
PHYS 101, 101L General Physics I & L	4 credits
PHYS 102, 102L General Physics II & L	4 credits
PSYC 101 General Psychology	3 credits

Lower Division: 20 credits

HPHY 105 Introduction to Human Physiology	3 credits
HPHY 205 Experimental Research Design and Data Analysis	3 credits
HPHY 210 Scientific Writing	3 credits
HPHY 241, 241L Human Anatomy and Physiology I & L	4 credits
HPHY 242, 242L Human Anatomy and Physiology II & L	4 credits
HPHY 244 Nutrition and Metabolism	3 credits

Upper Division: 31 credits

HPHY 374, & 374L Human Kinetics	4 credits
HPHY 376, & 376L Exercise Physiology	4 credits
HPHY 377 Environmental Physiology	2 credits
HPHY 377L Research in Physiology	2 credits

HPHY 401, & 401L Assessment of Health and Function	4 credits
HPHY 402 Clinical Exercise Physiology	3 credits
HPHY 475 & 475L Biomechanics	4 credits
HPHY 478 Physiology of Aging	3 credits
HPHY 499 Culminating Experience	1 credit
Electives (upper division HPHY courses)	4 credits

Prerequisites: In all 100-level prerequisites for HPHY classes (e.g., BIOL 101, CHEM 101, MATH, PHYS 101, HPHY 105) a minimum grade of C- is required. In all 200-level prerequisites for upper division HPHY classes (e.g., HPHY 205, 210, 241, 242), a minimum grade of C is required.

Restrictions: HPHY 241, 242, and 244 are restricted to HPHY and NURS majors. Other students may take these courses by permission from the Department of Human Physiology if space is available.

Courses recommended for Human Physiology majors pursuing career paths requiring graduate study:

Because prerequisites for admission to different graduate programs vary, students are advised to obtain the specific prerequisites from programs and schools of interest as early in their academic career as possible.

Lower Division

HPHY 105 Introduction to Human Physiology 3 credits
This course introduces basic concepts and provides a foundation for study in human physiology and the scientific method. Topics covered include basic cellular structure and function and an introduction to systems physiology. Spring.

HPHY 190 Directed Study 1-2 credits
Topic to be decided by faculty. Course may be repeated to total not more than 2 credits. By permission from department only. Fall, Spring, Summer.

HPHY 205 Experimental Research Design and Data Analysis 3 credits

Relationships among research, research design, measurement, and data analysis provide the context for an introduction to basic concepts of research design and data analysis. Students will learn how to interpret statistics in peer-reviewed research and how to apply statistical methods to analyze data and address research questions in the sciences. Prerequisite: any one of MATH 112, 147, 148 or 158. Fall.

HPHY 210 Scientific Writing 3 credits

This course introduces students to scientific writing via immersion in the peer-reviewed literature. Students will learn how to perform effective literature searches, and how to write literature reviews, statements of purpose and hypotheses, and methods sections by developing a research proposal. The ethical treatment of subjects, function and content of results, discussion, and conclusions sections; and the proper citation of references will also be addressed. Students will also

learn how to write abstracts and will prepare and give a formal oral presentation of their work, and develop the knowledge and skills necessary to critically read and understand, interpret, and design research studies. Prerequisite: HPHY 205 (C or above). Spring.

HPHY 241 Human Anatomy and Physiology I 3 credits
An introduction to the fundamentals of anatomical and physiological science, emphasizing the role of basic physical and chemical principles in establishing the complementarity of biological structure and function. Topics include cells, tissues, metabolism, the endocrine system, the nervous system, and muscle tissue and function. Prerequisites: CHEM 101, and either BIOL 101 or HPHY 105. Co-requisite: HPHY 241L. Fall.

HPHY 241L Human Anatomy & Physiology Lab 1 credit
This laboratory covers the gross anatomy of the skeletal and muscular systems as well as neuromuscular physiology. Corequisite: HPHY 241. Fall.

HPHY 242 Human Anatomy and Physiology II 3 credits
This course is a continuation of HPHY 241. Topics include the cardiovascular, respiratory, urinary, immune system, and fluid, electrolyte, and acid base balance. Prerequisite: HPHY 241. Corequisite: HPHY 242L. Spring.

HPHY 242L Human Anatomy & Physiol. Lab II 1 credit
This laboratory covers the anatomy and functions of the cardiovascular, respiratory, and urinary systems. Corequisite: HPHY 242. Spring.

HPHY 244 Nutrition and Metabolism 3 credits
An introduction to the study of the roles of carbohydrates, fat, protein, vitamins, minerals, and water in the diet and in the body; and their digestion, absorption, metabolism and storage of these substances. Energy balance and weight control, nutrition and physical activity, and nutrition and disease prevention are also addressed. Prerequisite: EXSC 241 (minimum grade "C"). Spring

HPHY 290 Directed Study 1-2 credits
Topic to be decided by faculty. Course may be repeated to total not more than 2 credits. By permission from department only. Fall, Spring, Summer.

HPHY 304 Practice in Lab Teaching 1 credit
Students gain experience in assisting in teaching, directing human physiology laboratory sections. Prerequisite: Successful completion of lab for which student will be a teaching assistant. By permission from department only. May be repeated with departmental permission to total not more than 2 credits. Fall, Spring, Summer.

HPHY 374 Kinesiology/Functional Anatomy 3 credits
An introduction to the basic principles of kinesiology with emphasis on osteology, arthrology, and the mechanical interactions between the muscles and joints of the body.

Prerequisites: HPHY 210, HPHY 242, and PHYS 101. Spring.

HPHY 374L Kinesiology Lab 1 credit
Laboratory techniques and exercises focused on the quantitative and qualitative analysis of human motion. Basic kinematic and kinetic analysis techniques will be introduced. Co-requisite: HPHY 374. Spring.

HPHY 376 Exercise Physiology 3 credits
A course dealing with the nature and function of neuromuscular activity, circulation, metabolism, respiration and acid-base balance as they relate to exercise and performance. Prerequisites: HPHY 210, HPHY 242, and PHYS 101. Co-requisite: HPHY 376L. Fall.

HPHY 376L Exercise Physiology Lab 1 credit
Laboratory study and techniques dealing with the evaluation of physiological capacities involved in exercise, neuromuscular interactions, metabolism, respiration, and circulation. Co-requisite: HPHY 376. Fall.

HPHY 377 Environmental Physiology 2 credits
An in-depth study of specific topics in environmental physiology, including the cellular and systemic responses and adaptations of various organ systems to environmental stress. Prerequisite: HPHY 376. Co-requisite: HPHY 377L. Spring.

HPHY 377L Research in Physiology 2 credits
Laboratory research in the study of human physiology with an emphasis on acute and chronic responses and adaptations to exercise. Students will work in groups and independently in conducting, analyzing, and presenting experimental research. Prerequisite: HPHY 376L. Co-requisite: HPHY 377. Spring.

HPHY 390 Directed Study 1-2 credits
Topic to be decided by faculty. Course may be repeated to total not more than 2 credits. By permission from department only. Fall, Spring, Summer.

HPHY 401 Assessment of Health and Function 3 credits
The relationships among physical activity, fitness, and disease provide the basis for developing a knowledge and understanding of the purposes, methods, and guidelines related to assessment of health, fitness, and function as well as exercise program design. Students will learn the principles of exercise prescription and to individualize exercise programs for the purposes of reducing disease risk; improving health, fitness, and/or function; and meeting a client's goals. Prerequisites: HPHY 242 Human Anatomy and Physiology II, and HPHY 376 Exercise Physiology or concurrently. Co-requisite: HPHY 401L. Fall.

HPHY 401L Assess. of Health & Function Lab 1 credit
Students will learn how to perform and administer selected field and laboratory test to assess different

components of health-related fitness and functional status. Students will apply their knowledge and skills in a service-learning project involving assessment and exercise program design. Co-requisite: HPHY 401. Fall.

HPHY 402 Clinical Exercise Physiology 3 credits
This course extends the content of HPHY 376 & L and 401 & L. Patient-oriented exercise management will provide the framework for understanding, assessing, and treating individuals with chronic diseases and disabilities, as well as other special populations. Content will include physiology and pathophysiology, exercise prescription, clinical applications, and current research related to a variety of diseases and conditions. Prerequisites: HPHY 401 Assessment of Health and Function, and HPHY 377 Environmental Physiology or concurrently. Spring

HPHY 475 Biomechanics 3 credits
An introduction to the physical laws and mechanical aspects governing human motion which covers analysis of internal and external forces acting on the human body and the effects of these forces. Topics include kinematics and kinetics of human motion, function of the musculoskeletal system, and mechanical analysis of movement. Prerequisite: HPHY 374, Corequisite: HPHY 475L. Fall.

HPHY 475L Biomechanics Lab 1 credit
Exposure to advanced techniques and experimental methods used in the study of human motion. Students will work collaboratively to conduct an experimental research project (collect and analyze data) and present their research. Prerequisite: HPHY 474L, Corequisite: HPHY 475. Spring.

HPHY 478 Physiology of Aging 3 credits
An introduction to normal structural and functional changes that occur in the body from cellular to organismal levels over time (with aging). Relevant terminology, methodologies used to study aging, and theories of aging will be covered. Aging-disease interactions and their effects on the aging process will also be discussed. Prerequisites: HPHY 242 and HPHY 210. Spring.

HPHY 489 Advanced Topics 2-3 credits
An introduction to current research literature on specific topics in human physiology. This course prepares students to study, critically review and evaluate, and discuss results of human physiology research. Prerequisite: HPHY 242 and additional prerequisites based on content on a course-by-course basis. Fall, Spring.

HPHY 489L Advanced Topics Lab 1 credit
Elective taken concurrently with HPHY 402 or 488 to gain practical experience directly related to a specific topic in human physiology (e.g., with rehabilitation therapies, special populations or environments, research methodologies, etc.) when opportunities are available. Prerequisite: HPHY 242 and additional prerequisites

based on course content on a course-by-course basis. Fall, Spring.

HPHY 490 Directed Study 1-2 credits
Topic to be decided by faculty. Course may be repeated to total not more than 2 credits. By permission from department only. Fall, Spring, Summer.

HPHY 492 Research Techniques 1-2 credits
An introduction to some of the experimental techniques used in research in human physiology. Course content may vary with instructor. HPHY 242 and HPHY 210. Course may be repeated to total not more than 2 credits. By permission from department only. Fall, Spring, Summer.

HPHY 498 Directed Research 1-2 credits
This course provides the motivated student with the opportunity to conduct or assist with a research project under the direction of a human physiology faculty member. Course may be repeated to total not more than 2 credits. Prerequisite: HPHY 210. By permission from department only. Fall, Spring, Summer.

HPHY 499 Culminating Experience 1 credit
Required of all HPHY majors in their senior or final year. Spring