topics in physics, and attendance in prescribed classes.

Prerequisite: permission of the department chairperson.

A total of 8 hours of credit may be earned.

691 Advanced General Science. (3) Further study of the principles of physics, chemistry, meteorology, geology, and astronomy that were introduced in the prerequisite: PHYCS 101.

693 Theories of Physics for Secondary Physics Teachers. (3) Classical mechanics, relativity, electricity, quantum mechanics, and statistical mechanics used to enable students to use new developments and recent scientific advances. Designed primarily for teachers and workers in the field who need to update their general knowledge of physics. No regularly scheduled laboratory.

Prerequisite: 8 hours of credit in college physics.

696 Modern Developments in Physics Teaching. (1–3) Recent developments in secondary physics curricula, multimedia teaching methods, national and local trends in physics teaching, laboratory work, textbooks, tests.

Prerequisite: permission of the department chairperson.

A total of 3 hours of credit may be earned.

Not open to students who have credit in PHYCS 396.

790 Internship in Science Education. (3) Supervised experience in instruction of physics or science education courses.

PHYSIOLOGY AND HEALTH SCIENCE

www.bsu.edu/physiology

Cooper Science Complex 325, (765) 285-5961

Chairperson: Diana Godish

Graduate Advisors: Martin Wood, health science; Marianna Zamlauski-Tucker, physiology

Graduate Faculty: Amschler, Bishop, Bock, Brey, Clark, Ganion, Godish, Hahn, Javed, Kelly-Worden, Kotecki, Marini, McKenzie, Pinger, Wood, Zamlauski-Tucker

The Department of Physiology and Health Science offers graduate programs leading to either the master of arts or the master of science degree in health science or in physiology. Both physiology and health science may be used as academic cognate areas for students pursuing doctoral or specialist in education programs in related disciplines.

Although each graduate program has specific requirements, there is flexibility to meet individual student's interests and needs. For example, a student who wants to earn a master of science degree in either physiology or health science will be required to complete a thesis. Graduate students who wish to professionalize their Indiana teaching licenses in health and safety will complete appropriate course work in the master of arts or master of science degree program in health science.

PROGRAMS

Master of arts (MA) and master of science (MS) in health science or in physiology.

See the Science listing under the College of Sciences and Humanities, page 158, for the doctoral programs in science and science education.

Master's Programs in Health Science

Admission

Applicant must meet the admission requirements of the Graduate School and must have a bachelor's degree from an accredited college or university with at least a academic minor in health education, health and safety education, health science, or an equivalent subject. A student applying for a graduate teaching assistantship must have a grade point average of at least 3.0 on a scale of 4.0.

MASTER OF ARTS IN HEALTH SCIENCE

This degree is designed for students seeking a comprehensive background in educational planning (including program development, implementation, and evaluation) relating to health promotion and disease prevention activities in community health agencies, wellness centers, health-care facilities, and business and industrial settings. Special course work in advanced health and safety methodology is offered for students seeking professionalization of their secondary teaching licenses in health and safety.

Degree Requirements

PREFIX	*NO*	*SHORT TITLE*	*CR HRS*
Core requirements			
HSC	670	Rsearch Tech	3
	671	Research Sem	2
	687	Qtn Meth Hsc (3)	
	or		
EDPSY	641	Statist Meth (3)	3
RES	697	Research Ppr (1–3)	
	or		
HSC	697	Spec Studies (1–3)	3
Electives			5–7
Complete one of the following tracks:			
Community health education, 14 hours			
HSC	585	Co Hl Mthds	4
	683	Epidemiology	3
	686	Prg Pln Eval	4
	669	Pd HSC Pract (3)	
	or		
	675	Internship (3)	3
School health education, 14 hours			
HSC	595	Mth Mtrl H E	4
	563	CSHP Org Is	4
6 hours from			
HSC	550	El S Hlth Pg (3)	
	562	Hl Pro Wkste (3)	
	564	H Ed Clinic (3)	
	565	Alcohol Prob (3)	
	567	Drug Depn Ab (3)	
	568	Con Hlth Iss (3)	
	569	Health Aging (3)	
	571	Death Dying (3)	
	572	Women Health (3)	
	581	Stress Mang (3)	
	582	Environ Hlth (3)	
	589	Pub Hlth Ent (3)	
Category II or III education courses (3)			6
			30 hrs

MASTER OF SCIENCE IN HEALTH SCIENCE

The purpose, general nature, and admission standards of this degree program are similar to those of the MA curriculum with a major in health science. However, students are expected to demonstrate a higher level of research skills in this program by completing a thesis (THES 698).

PREFIX	*NO*	*SHORT TITLE*	*CR HRS*
Core requirements			
HSC	670	Rsearch Tech	3
	671	Research Sem	2
	687	Qtn Meth HSC (3)	
	or		
EDPSY	641	Statist Meth (3)	3
THES	698	Thesis (1–6)	6
Electives			2–4
Complete one of the following tracks:			
Community health education, 14 hours			
HSC	585	Co Hl Mthds	4
	683	Epidemiology	3
	686	Prg Pln Eval	4
	669	Pd HSC Pract (3)	
	or		
	675	Internship (3)	3
School health education, 14 hours			
HSC	595	Mth Mtrl H E	4
	563	CSHP Org Is	4
6 hours from			
HSC	550	El S Hlth Pg (3)	
	562	Hl Pro Wkste (3)	

564 H Ed Clinic (3)
565 Alcohol Prob (3)
567 Drug Depn Ab (3)
568 Con Hlth Iss (3)
569 Health Aging (3)
571 Death Dying (3)
572 Women Health (3)
581 Stress Mang (3)
582 Environ Hlth (3)
589 Pub Hlth Ent (3)

Category II or III education courses (3) 6

30 hrs

MASTER'S PROGRAMS IN PHYSIOLOGY

These programs are designed for students seeking in-depth coverage of physiological principles pertaining to the human organism, endocrinology, renal function, cardiovascular dynamics, and pathophysiology.

Admission

Applicant must meet the admission requirements of the Graduate School and must also have a bachelor's degree from an accredited college or university with an academic major or minor in biology, the life sciences, or equivalent science fields. For students applying for graduate teaching assistantships, a grade point average of at least 3.0 on a scale of 4.0 is required.

MASTER OF ARTS IN PHYSIOLOGY

Degree Requirements

PREFIX	*NO*	*SHORT TITLE*	*CR HRS*
PHYSL	585	Resrch Tech	3
CHEM	563	Prn Biochm 1	3
	564	Prn Biochm 2	3
3 hours from			
PHYSL	511	Endocrinolgy (3)	
	513	Renal Physl (3)	3
3 hours from			
PHYSL	514	Cardiovsculr (3)	
	520	Neuroscience (3)	3
3–4 hours from			
ANAT	520	Hum Embryolg (3)	
	530	Histology (4)	3–4
PHYSL or ANAT electives (excluding MED PHYSL 640) (at least 3 credit hours must be in physiology)			9
General electives			3

30–31 hrs

MASTER OF SCIENCE IN PHYSIOLOGY

Degree Requirements

PREFIX	*NO*	*SHORT TITLE*	*CR HRS*
PHYSL	585	Resrch Tech	3
CHEM	563	Prn Biochm 1	3
	564	Prn Biochm 2	3
THES	698	Thesis (1–6)	6
3 hours from			
PHYSL	511	Endocrinolgy (3)	
	513	Renal Physl (3)	3
3 hours from			
PHYSL	514	Cardiovsculr (3)	
	520	Neuroscience (3)	3
3–4 hours from			
ANAT	520	Hum Embryolg (3)	
	530	Histology (4)	3–4
PHYSL or ANAT electives (excluding MED PHYSL 640)			3
General electives			3

30–31 hrs

COGNATE AREAS FOR DOCTORAL DEGREE PROGRAMS

Health Science Cognate

This 15-hour or 24-hour concentration of courses in health science and related academic disciplines is offered to qualified doctoral students who want a high level of competency in advanced content and program planning, implementation, and evaluation pertaining to health promotion and disease prevention.

Physiology Cognate

This 15-hour or 24-hour concentration of course work in physiology, anatomy, and related science disciplines is offered to qualified doctoral students who want advanced courses in body function and structure.

ANATOMY (ANAT)

505 Human Neuroanatomy. (3) A strong background in the basic structural and functional relations of the central nervous system. Emphasizes the location of nerve-cell centers and the fiber tracts entering and leaving these centers. Two two-hour laboratory periods weekly.

Prerequisite: ANAT 201 or ZOOL 330.

Prerequisite recommended: ANAT 320 or 520 and ANAT 430 or 530.

Not open to students who have credit in ANAT 405.

520 Human Embryology. (3) Normal development of the human organism including germ cell formation, fertilization, implantation, and organ formation. Embryonic environment, physiology, and abnormal development.

Prerequisite: BIO 111 and 112 or ANAT 201.

Not open to students who have credit in ANAT 320.

530 Histology. (4) Microscopic structure of organisms with special emphasis on the tissue of vertebrates. Introductory micro-techniques. Three lectures and one laboratory period weekly.

Prerequisite: four courses in biological science.

Prerequisite recommended: BIO 460; ZOOL 330.

Not open to students who have credit in ANAT 430.

601 Human Gross Anatomy. (8) A strong background in basic morphologic and functional relations. Emphasizes regional anatomy. Four two-and-one-half hour laboratory periods weekly.

Prerequisite: admission to the medical education program.

606 Medical Neuroanatomy. (4) Normal structural and functional organization of the human central nervous system as a background for the interpretation of its dysfunction. Assumes previous knowledge of human peripheral nervous system and effector mechanisms. Two-and-one-half hour lecture plus four hours of laboratory weekly.

Prerequisite: ANAT 601.

631 Medical Histology-Embryology. (5) Normal and abnormal developmental processes related to the differentiation of tissues and organs; microscopic study of organs and tissues as background for physiological and pathological consideration.

Prerequisite: admission to the medical education program.

690 Special Studies in Anatomy. (1–3) Problems of special interest in anatomy or in anatomy teaching. Individual work under the direction of a staff member may involve one or more of the following: experimental work, attendance in undergraduate classes, wide reading, and development of special techniques or skills in scientific investigation.

Prerequisite: permission of the department chairperson.

A total of 3 hours of credit may be earned.

HEALTH SCIENCE (HSC)

550 Elementary School Health Programs. (3) School's role in promoting health and preventing disease among preschool and elementary school children. Focus on the school health program (instruction, services, and environment), community resources, and health problems common to school children. No regularly scheduled laboratory.

Prerequisite: HSC 160.

Not open to students who have credit in HSC 350.

562 Health Promotion in the Worksite. (3) Explores the major components of planning, implementing, and evaluation of health promotion programs at the worksite.

Not open to students who have credit in HSC 462.

563 Coordinated School Health Programs: Organization and Issues. (4) Addresses the processes and issues associated with the planning, implementing, evaluating, and organizing of a coordinated school health program in accordance with national and state guidelines.

Prerequisite: HSC 261 or 467 or 471 or permission of the department chairperson.

Not open to students who have credit in HSC 363.

564 Health Education in the Clinical Setting. (3) Theories of client education and application of the educational process to individuals and groups in a variety of health-care settings. Emphasizes the multidisciplinary team concept in planning, implementing, and evaluating client education. Application of knowledge of growth and development in meeting learning needs of clients from a variety of ages and intellectual levels.

Not open to students who have credit in HSC 464.

565 Alcohol Problems. (3) Alcohol as a mood modifier and its use, nonuse, and abuse in drinking societies. Critical and controversial issues relevant to alcohol ingestion will be explored for medical, economic, legal, educational, historical, physiological, and public health implications.

Not open to students who have credit in HSC 465.

567 Drug Dependence and Abuse. (3) The medical, psychological, sociological, and legal dimensions of drug use in the United States. Examines the incidence and prevalence of drug abuse along with the roles played by the school and community in dealing with this health problem.

Not open to students who have credit in HSC 467.

568 Consumer Health Issues. (3) Health services and consumer protection organizations. Analysis of fraudulent health practices and nostrums, available health care systems, and health products.

Not open to students who have credit in HSC 468.

569 Health and Aging. (3) Dynamics of later life and the aging process with specific emphasis on health. The physiological and behavioral dimensions of the aging process.

Not open to students who have credit in HSC 469.

571 Death and Dying. (3) The relationship between death and health with emphasis on physiological, psychological, legal, and medical aspects of death in contemporary America. Roles of individual, family, school, community, and various professionals. Problems in meaning of death, care of the dying, death education, and attitudes toward death.

Prerequisite: HSC 160 or permission of the department chairperson.

572 Women and Health. (3) General overview of issues related to women and health: health needs of working women, special nutritional concerns, the gynecological exam, reproductive anatomy and physiology, fertility and infertility, breast problems, wife abuse, and rape.

Not open to students who have credit in HSC 472.

581 Stress Management. (3) Aids in understanding the physiological, psychological, and sociological aspects of stress. Students will increase their awareness of the effects of stress, identify personal stress triggers, and develop strategies to minimizing stress throughout their daily lives.

Not open to students who have credit in HSC 481.

582 Environmental Health. (3) Physical environment and its relationship to disease causation. Review of environmental health problems and their solutions. Areas of study include air and water pollution, food sanitation, disposal of human excreta and waste, radiation and occupational health problems, and risk.

585 Community Health Methods. (4) Provides the skills necessary to become effective community health educators including policy development, advocacy, coalition building, grant writing, cultural competency, fund raising, and community health assessment.

Not open to students who have credit in HSC 385.

589 Public Health Entomology. (3) A survey of diseases caused or transmitted by insects and other arthropods. Emphasizes the recognition of medically important arthropods and their biology and control. A weekly three-hour laboratory provides an opportunity to collect and study live and preserved arthropod specimens.

Not open to students who have credit in HSC 389.

595 (510) Methods, Materials, and Curriculum for Teaching Health Education. (4) Application of the roles of the health teacher in a school setting. Functions considered include needs assessment, program planning, direct instruction and evaluation, and curriculum development.

Prerequisite: EDSEC 150, 380; identification to pursue a teaching curriculum.

598 Workshop in Health Science. (1–6) Critical contemporary issues in health science. May include consultants, guest lecturers, field trips, and group activities.

Prerequisite: permission of the department chairperson.

A total of 6 hours of credit may be earned.

669 Paid Health Science Practicum. (3–6) A paid work and learning experience in an approved health agency, facility, educational institution, professional organization, or private business for a time commensurate with the hours of credit to be earned. Assignments depend upon students' interests and the resources of participating organizations.

Prerequisite: permission of the department coordinator of practicums and internships.

A total of 6 hours of credit may be earned.

670 Health Science Research Techniques. (3) An introduction to the study and practical application of research design as it applies to the health sciences. Emphasizes the necessary skills and competencies required to develop an acceptable research proposal.

671 Research Seminar. (2) Review, analysis, and discussion of the literature related to selected topics of current interest in health science. Includes public presentation of research proposal.

Prerequisite: HSC 670.

Open only to students enrolled in health science master's degree programs.

675 Internship in Health Science. (3–6) Assignment to an approved health agency or educational institution for a period of time commensurate with the hours of credit to be earned. The student will make periodic and final reports to an academic advisor and to the administrator of the participating agency.

Prerequisite: permission of the department coordinator of practicums and internships.

A total of 6 hours of credit may be earned.

683 Epidemiology. (3) Introduction to principles and methods of epidemiology, including appropriate uses of descriptive, analytical, and experimental approaches to the study of classic epidemics and contemporary health problems.

Prerequisite: HSC 180, 385 or 585, and 687.

686 Health Promotion Program Planning and Evaluation. (4) Advanced study of program development, implementation, and evaluation. Includes an in-depth examination of the theories, models, and techniques/methods associated with these processes.

687 Application of Quantitative Methods in Health Science. (3) Advanced study of the application of quantitative methods in health promotion. Uses various approaches to identify, evaluate, compare, and report data used to describe health-promotion programs. One two-hour laboratory period weekly emphasizes data manipulation using a microcomputer.

695 Seminar in Health Science. (3–9) Selected literature on current scientific research. Extensive reading in scientific journals. Seminar members report at stated intervals on assigned problems in health science or health science teaching.

Prerequisite: HSC 670; permission of the instructor.

A total of 9 hours of credit may be earned.

697 Special Studies in Health Science. (1–3) Problems of special interest in health science or in health science teaching. Individual work under the direction of a staff member may involve one or more of the following: experimental work, attendance in undergraduate classes, wide reading, and development of special techniques or skills in scientific investigation.

Prerequisite: permission of the department chairperson.

A total of 6 hours of credit may be earned, but no more than 3 in any one semester or term.

PHYSIOLOGY (PHYSL)

511 Endocrinology. (3) Endocrine functions in humans and mammals with special emphasis on mechanisms. Normal hormone regulation and pathophysiological principles. Laboratory experience with small-mammal surgery and endocrine testing. One three-hour laboratory period weekly.

Prerequisite: ANAT 201; PHYSL 210, 211; one year of general chemistry.

513 Renal Physiology. (3) Detailed study of the urinary system and excretory functions. Emphasizes human physiology but includes comparative vertebrate systems. Laboratory study includes gross, microscopic anatomy, and small mammal surgery. One three-hour laboratory a week.

Prerequisite: one course each in inorganic chemistry, anatomy, and physiology.

Not open to students who have credit in PHYSL 413.

514 Cardiovascular Physiology. (3) A study of the dynamics of the human cardiovascular system, stressing

applications of basic physical principles and the operation of physiological regulatory systems. Includes seminar-style discussion of recent literature.

Prerequisite: one course in physiology.

Not open to students who have credit in PHYSL 414.

515 Physiology of Aging. (3) Study of how physiological systems change with age and the mechanisms that are thought to cause these changes. Disorders and diseases of aging will be covered.

Prerequisite: one course each in inorganic chemistry and physiology.

516 Human Toxicology. (3) Chemical, physical, zoological, and botanical toxicoses in human health. The implications and methodology of dealing with hazardous substances and poisons.

Prerequisite: CHEM 101 or 111, 112; one year of biology or physiology or combination of both; or permission of the instructor.

Not open to students who have credit in PHYSL 416.

520 Neuroscience. (3) Introductory study of the organization and function of the nervous system. Emphasizes integration of the structure and function of the nervous system.

Prerequisite: one year of chemistry and one year of biology or physiology.

535 Pathophysiology. (3) The physiological pathology of selected disease processes and dysfunctions. The pathogenesis of certain derangements with broad applicability. Underlying chemical, biological, and physical mechanisms. Laboratory experience will include demonstrations, visitations, and specimen study. One three-hour laboratory period weekly.

Prerequisite: one course each in anatomy, physiology, and chemistry.

Not open to students who have credit in PHYSL 435.

585 Research Techniques in Physiology. (3) Introduction to experimental design, laboratory techniques, and data analysis and interpretation in anatomy and physiology. Laboratory will include methods employing animal preparations, modern cellular/molecular techniques, and general histological procedures. Introduction to computer data acquisition and analysis.

Prerequisite: one course in physiology or permission of the instructor; CHEM 563 recommended.

640 Medical Physiology. (8) Summary of human physiology for medical students. Cellular and organ-system physiology; physiological regulation. Laboratory exercises will demonstrate general principles of physiology and introduce basic techniques and instrumentation.

Prerequisite: admission to the medical education program.

645 Emergency Medicine. (2) Designed to develop an awareness of proper diagnosis and treatment during emergency medical care by professional medical personnel. Fractures; environmental emergencies; injuries to the eye, chest, and abdomen; shock; and wound care.

Prerequisite: admission to the medical education program.

690 Special Studies in Physiology. (1–3) Problems of special interest in physiology or in physiology teaching. Individual work under the direction of a staff member may involve one or more of the following: experimental work, attendance in undergraduate classes, wide reading, and development of special techniques or skills in scientific investigation.

Prerequisite: permission of the department chairperson.

A total of 3 hours of credit may be earned.

SCIENCE (SCI)

501 Electron and Confocal Microscopy. (3) Introduction to the techniques and theory of electron and confocal microscopy. Emphasizes basic procedures employed in specimen preparation, production of micrographs and operation of the transmission, scanning, and confocal microscopes.