HONORS COLLEGE

Honors Laureate: Neuroscience, Medicine, and Culture Diploma

Diploma Requirements Checksheet

This diploma is available to non-Neuroscience majors only. Students pursuing an Honors Laureate: Neuroscience, Medicine, and Culture Diploma will earn a minimum of 30 honors credits across the Four Elements of an Honors Education:

1. **Honors College Curriculum**
2. **Disciplinary Depth**
3. **Transdisciplinary Capabilities**
4. **Undergraduate Research and Guided Experiential Learning**

Students must earn at least 6 credits in each of these four elements. They will add a minimum of 6 additional credits to one or more of these elements as they see fit.

1. Honors College Curriculum

Courses taken in this element must carry the UH prefix. Course options include:

UH 1054: HONORS COLLEGE FIRST-YEAR SEMINAR
UH 1604: HONORS UNDERGRADUATE RESEARCH PRACTICES
UH 2124: HONORS READING SEMINAR
UH 2604: INTRODUCTION TO HONORS TRANSDISCIPLINARY RESEARCH
UH 3204: HONORS SERVICE LEARNING
UH 4104: HONORS STUDENT TEACHING PRACTICUM
UH 4504: TOPICS IN HONORS DISCOVERY AND INNOVATION STUDIOS

2. Disciplinary Depth

Courses taken in this element must be in Neuroscience (NEUR) and must be either Departmental Honors Courses, Independent Studies, or utilize a Faculty–Student Agreement. Standardized faculty–student agreements will be developed whenever possible. Course options include:

NEUR 2004H: FUNDAMENTALS OF NEUROSCIENCE ***(REQUIRED)***
Pre: BIOL 1105
[NEUR 2984 for Spring 2018]
NEUR 3084: COGNITIVE NEUROSCIENCE
Pre: NEUR 2004H
NEUR 3144: MECHANISM OF LEARNING MEMORY
Pre: NEUR 2004H
NEUR 4034: DISEASES OF THE NERVOUS SYSTEM
Pre: NEUR 2004H
NEUR 3044: CELLULAR AND MOLECULAR NEUROSCIENCE
NEUR 2974/4974: INDEPENDENT STUDY

Please note: Students wanting to take NEUR 3044 as the prerequisite to NEUR 4034, NEUR 4514, or NEUR 4814 will need permission from Dr. Kristin Phillips (kfphill@vt.edu) prior to being admitted into NEUR 3044.

3. Transdisciplinary Capabilities
Courses taken in this element must be outside of a student's primary major. Secondary major and in-minor courses, however, are permissible. Courses must be either Departmental Honors Courses, Independent Studies, or utilize a Faculty–Student Agreement. Standardized faculty-student agreements will be developed whenever possible. Course options include:

NEUR 3464: NEUROSCIENCE AND SOCIETY
Pre: Junior Standing
NEUR 3914: NEUROSCIENCE OF DRUG ADDICTION
Pre: NEUR 2004H
NEUR 4084: NEUROSCIENCE OF LANGUAGE AND COMMUNICATION DISORDERS
Pre: NEUR 2004H
NEUR 4454: NEUROECONOMICS
Pre: NEUR 2004H or ECON 3104
NEUR 4514: NEUROIMMUNOLOGY
Pre: NEUR 2004H, 3044
NEUR 4814: NUTRITIONAL NEUROSCIENCE
Pre: NEUR 2004H, 3044

HD 3114: ISSUES IN AGING
HIST 3724: HISTORY OF DISEASE, MEDICINE, AND HEALTH
PHIL 3324: BIOMEDICAL ETHICS
STS 3314: MEDICAL DILEMMAS AND HUMAN EXPERIENCE
BMES 4134: GLOBAL, SOCIETAL, AND ETHICAL CONSIDERATIONS IN BIOMEDICAL ENGINEERING
PHS 3014: INTRODUCTION TO ENVIRONMENTAL HEALTH
ENGL 3154: LITERATURE, MEDICINE, AND CULTURE
BMVS 4064 (BMES 4064): INTRODUCTION TO MEDICAL PHYSIOLOGY
GEPG 4074: MEDICAL GEOGRAPHY
XXXX 2974/4974: INDEPENDENT STUDY

See appendix for the full listing of possible courses to fulfill this requirement.

4. Undergraduate Research & Guided Experiential Learning
Course and credit options include:

NEUR 4594: CLINICAL NEUROSCIENCE IN PRACTICE
XXXX 4994: UNDERGRADUATE RESEARCH (in any department)
UH 3204: HONORS SERVICE LEARNING
STUDY ABROAD/PROFESSIONAL DEVELOPMENT

HONORS COLLEGE

Appendix

Course Options for Transdisciplinary Breadth Courses

NO PREREQUISITES

HIST 3624: HEALTH AND ILLNESS IN AFRICAN HISTORY
Examines key subjects and themes in the history of health, medicine, and disease in African history. Topics include indigenous health systems, colonial medicine, and post-colonial health crises, including HIV/AIDS. (3H, 3C)

HIST 3724: HISTORY OF DISEASE, MEDICINE, AND HEALTH
Development of Western concepts of disease, medicine, and health with emphasis on period from eighteenth century to present. Social construction of disease and relationship between health and social, economic, and political structures. Special attention to impact of public health and the development of scientific and technological medicine. (3H, 3C)

PHIL 3324: BIOMEDICAL ETHICS
Philosophical analysis of ethical issues in medicine and biotechnology, such as problems arising in connection with the relations between physicians and patients, the challenges of cultural diversity, practices surrounding human and animal research, decisions about end of life care, embryonic stem cell research, genetic engineering, biotechnological human enhancement, and social justice in relation to health-care policy. (3H, 3C)

STS 2154: HUMANITIES, TECHNOLOGY, AND THE LIFE SCIENCES
Examines the value-laden issues surrounding the professional dimensions of research in the biological and life sciences and provides humanistic perspectives on the role and function of science in society. (3H, 3C)

STS 3314: MEDICAL DILEMMAS AND HUMAN EXPERIENCE
This course will explore medical dilemmas from a humanistic perspective, including topics related to assisted reproduction, genetic testing and treatment, organ transplantation, clinical trials, end-of-life interventions, and decisions regarding allocation of health-care resources. (3H, 3C)

BMES 4134: GLOBAL, SOCIETAL, AND ETHICAL CONSIDERATIONS IN BIOMEDICAL ENGINEERING
Overview of contemporary technological advances to improving human health. Comparison of healthcare systems, problems, and existing solutions throughout the developed and developing world. Consideration of legal and ethical issues associated with developing and implementing new medical technologies. Recognition and definition of gaps between medical needs and current methods and therapies between developed and developing countries. Conceptually design a novel technology. (3H, 3C)

PHS 1514: PERSONAL HEALTH
Fundamental health content and theory to provide students with constructive health information necessary to meet current and future personal health needs. Special emphasis on wellness and health promotion. (3H, 3C)

PHS 3014: INTRODUCTION TO ENVIRONMENTAL HEALTH
Overview of environmental health, examining local, national, and international frameworks. Environmental factors that affect human health, including major classes of chemical, biological, and physical exposures from different environmental media (air, water, food, and soil). Special emphasis on toxicology and epidemiology methodologies used at the individual (mechanistic) level and at the population level to determine environmental causes of disease. Find the most appropriate prevention or control measure to minimize adverse health outcomes. (3H, 3C)

PHS 3534: DRUG EDUCATION
Interpretation of multidimensional (social, psychological and physiological) scientific data regarding drugs. The major drug categories will be covered with special emphasis on substance misuse and abuse. (3H, 3C)

PHS 4044: PUBLIC HEALTH POLICY AND ADMINISTRATION
Evolution and analysis of public health policy in the United States. Public health and care systems. Administrative concepts central to public health such as human resources, strategic planning, controlling, directing, leadership and health law. Junior Standing. (3H, 3C)

PHS 4054: CONCEPTS IN ONE HEALTH
One Health refers to the dynamic interdependence of human, animal and environmental health and provides an important perspective in examining health problems. Theoretical foundations of One Health, methods for assessing animal- human linkages, policies and practices related to One Health and capacity building and public engagement. Junior Standing. (3H, 3C)

ESSENTIALLY NO PREREQUISITES REQUIRED

ENGL 3154: LITERATURE, MEDICINE, AND CULTURE
The representation of health and illness in literature and the cultural aspects of medicine as a practice. Pre: 1106 or 1204H or COMM 1016. (3H, 3C)

BMES 4064 (BMVS 4064): INTRO MED PHYSIOLOGY
An introductory to the principles of medical physiology. Designed primarily for (but not limited to), undergraduate students minoring in biomedical engineering, and other related engineering and physical sciences majors with little or no formal background in biological sciences. Basic principles and concepts of human physiology. Special emphasis on the interactions of human systems biology in their entirety rather than individual genes and pathways. Pre: Junior standing or permission of instructor. (3H, 3C)

BMVS 4064 (BMES 4064): INTRODUCTION TO MEDICAL PHYSIOLOGY
An introductory course to the principles of medical physiology, designed primarily for -- but not limited to -- undergraduate and graduate students majoring in biomedical engineering, and other related engineering and physical sciences majors with little or no formal background in biological sciences. The focus is on basic principles and concepts of physiology with a special emphasis on the interactions of human systems biology in their entirety rather than individual genes and pathways. Not intended for students expecting to major in biology or planning to enter health professional fields. Pre: Junior standing or permission of the instructor.
(3H, 3C)

GEPG 4074: MEDICAL GEOGRAPHY
Geographic patterns of disease and health care at various scales. Study of interactions between the physical environment and health. Analysis of spatial patterns associated with HIV/AIDS epidemic. Examination of health implications of social and cultural variation in developed a developing contexts. Pre: Junior Standing. (3H, 3C)

AAEC 4814: FOOD AND HEALTH ECONOMICS
Microeconomics of food, nutrition, and health. Overview of nutrition, nutrition recommendations, and implications for economics based decisions. Individual and household food consumption and health production models. Farm to consumer market linkage models with nutrition and health implications Effectiveness of food and nutrition interventions

and policies. Cost-benefit and cost-effectiveness analysis of health interventions. Pre-requisite: Senior Standing required. (3H, 3C)

PREREQUISITES REQUIRED

SOC 4414: DRUGS AND SOCIETY
Examines the use of drugs, including legal and illegal drugs, from a sociological perspective. Cross-cultural and historical patterns of use are discussed and explained. Particular attention is given to drug use within the context of various social institutions. Junior standing. Pre: 1004. (3H, 3C)

SOC 4704: MEDICAL SOCIOLOGY
Social and cultural response to illness and infirmity. Emphasis on the sick role, patient role, practitioner role, organization and politics of health care delivery, stratification, professionalism, and socialization of health practitioners. Taught alternate years. Junior Standing. Pre: 1004. (3H, 3C)

STS 4314 (ENGL 4314): NARRATIVE MEDICINE
Introduction to the field of narrative medicine, with attention to narrative competencies, the use of narrative medical education, and the function of narratives in the experience of healing. Includes narrative approaches to biomedical ethics. Pre: ENGL 3154 or ENGL 3324. (3H, 3C)

4334 (SOC 4334) (WGS 4334): SEXUAL MEDICINE
Discusses sex and medicine in contemporary U.S. society. Explores how notions of sexual behavior and "normality" are defined and structured by medical discourse. Examines cultural institutions that play significant roles in formulating ideas about and definitions of deviance, perversity, and tolerated marginality. Critiques medical responses to sexual variations. Examines experiences of people who have sought out, or been the unwilling victims of, sexual medicine. Junior standing required. Pre: WGS 1824. (3H, 3C)

SOC 3324 (STS 3324) (WGS 3324): PERSPECTIVES ON THE BIOLOGY OF WOMEN
Examines historical social and cultural views on women's biology and how those views have impacted women's physical and mental health. Special attention is paid to the influence of cultural and beliefs on scientific perspectives. Pre: WGS 1824. (3H, 3C)

SOC 4714: SOCIOLOGY OF MENTAL ILLNESS
Mental illness and social systems, historically and in contemporary society. Distribution of mental illness with special reference to stratification, role, and deviance theories. Mental health occupations and organization of treatment. Implications for social policy. Taught alternate years. Junior standing. Pre: 1004. (3H, 3C)

FST 4634: EPIDEMIOLOGY FOODBORNE DISEASE
Overview of causes, transmission, and epidemiology of major environmental, food, and water borne diseases. Outbreak and sporadic detection, source tracking and control of pathogens. Overview of the impact of foodborne outbreaks on regulatory activities at the national and international level. Corequisite: Enrollment in either FST 3604 or BIOL 4674. Co: BIOL 4674, 3604. (3H, 3C)

BMES 2104: INTRODUCTION TO BIOMEDICAL ENGINEERING
Methods of mathematical modeling and engineering analyses related to human physiology. Emphasis placed on fundamental concepts such as biomaterials, biomechanics, tissue engineering, biomedical imagining and nanomedicine. Broad spectrum of current biomedical engineering research areas. Pre: (ENGE 1104 or ENGE 1114 or ENGE 1216), PHYS 2305. Co: MATH 2214. (3H, 3C)

BMES 3124: INTRODUCTION TO BIOMECHANICS
Basic principles of biomechanics. Basic musculoskeletal anatomy. Application of classical mechanics to biological systems. Emphasis placed on mechanical behavior (stress and strain), structural behavior, motion, and injury tolerance of the human body. Biomechanics of medical devices and implants. Advances in safety equipment used in automotive, military, and sports applications. Pre: 2104, ESM 2204, ESM 2304. (3H, 3C)

BMES 3134: INTRODUCTION TO BIOMEDICAL IMAGING
Introduction to major biomedical imaging modalities. Emphasis on X-rays, computerized tomography (CT), magnetic resonance imaging (MRI), positron emission tomography (PET), ultrasound, and optical imaging. Essential physics and imaging equations of the imaging system. Sources of noise and primary artifacts. Patient safety and clinical application. Pre: 2104, (MATH 2204 or MATH 2204H), PHYS 2306. (3H, 3C)

BMES 3144: BIOMEDICAL DEVICES
Design and uses of biomedical devices for diagnosis and therapy of human and animal diseases. Disease ecologies, progression, risk factors, and epidemiology. Tissue, organ, and systems dysfunction and failure and relevance to life stages (pediatric, adolescent, adult, aged). Useful characteristics of engineered materials for device fabrication, including biocompatibility. Gaps between medical needs and current medical devices. Pre: 2104. (3H, 3C)

BIOL 3134: HUMAN GENETICS
Principles of genetic analysis in humans with emphasis on genetic diseases of humans; methods of karyotyping human chromosomes; methods of pedigree and genetic analysis of humans; principles, techniques, and analysis of twin studies in humans; techniques used to identify and characterize normal and abnormal chromosomes; principles and methods of DNA fingerprint analysis of humans. Pre: 2004 or 2104. (3H, 3C)

BIOL 3254 (ENT 3254): MEDICAL AND VETERINARY ENTOMOLOGY
An introduction to the roles of insects and other arthropods in the direct causation of disease in humans and animals, and as vectors in the transmission of disease organisms. The epidemiology and replication cycles of vector-borne pathogens with major medical and veterinary importance will be examined. Information will be provided on the biology and behavior of disease vectors and external parasites, and on the annoying and venomous pests of humans and animals. Mechanisms of control will be discussed Pre: (1005, 1006) or (1105, 1105) or (1205H, 1206H). (3H, 3C)

BIOL 4554 (ALS 4554): NEUROCHEMICAL REGULATION
Neurochemical transmission within the vertebrate brain will be examined. Emphasis will be placed on the chemical coding underlying the control of various behaviors and how these systems can be modified by various drugs or diet. Pre: (ALS 2304 or BIOL 3404), (CHEM 2535). (3H, 3C)

BIOL 4674: PATHOGENIC BACTERIOLOGY
Characteristics of bacteria that cause human disease, nature of infectious processes, virulence factors, epidemiology, resistance, immunization. Pre: 2004, 2104, (2604 or 2604H), 2614. (3H, 3C)

BIOL 4874: CANCER BIOLOGY
The molecular and cellular basis of cancer, including viral and cellular oncogenes, tumor suppression mechanics, cellular immortality, genomic integrity, angiogenesis, metastasis, and traditional and developing theories. Pre: 2004, 2104. (3H, 3C)

CHEM 4554: DRUG CHEMISTRY
Structure, synthesis, and physiological effects of major classes of pharmaceutical agents including CNS depressants and stimulants, analgesics, anesthetics, cardiovascular agents, chemotherapeutic drugs, and oral contraceptives. Pre: 2536 or 2566. (3H, 3C)

ECON 4214: ECONOMICS OF HEALTH CARE
Effects of medical care on health; cost and production of medical care; demand for medical care and its financing; structure of the health care industry; reorganization for efficiency. Pre: 2005 or 2025H. (3H, 3C)

BIOL 3134: HUMAN GENETICS
Principles of genetic analysis in humans with emphasis on genetic diseases of humans; methods of karyotyping human chromosomes; methods of pedigree and genetic analysis of humans; principles, techniques, and analysis of twin studies in humans; techniques used to identify and characterize normal and abnormal chromosomes; principles and methods of DNA fingerprint analysis of humans. Pre: 2004 or 2104. (3H, 3C)

BIOL 4554 (ALS 4554): NEUROCHEMICAL REGULATION
Neurochemical transmission within the vertebrate brain will be examined. Emphasis will be placed on the chemical coding underlying the control of various behaviors and how these systems can be modified by various drugs or diet. Pre: (ALS 2304 or BIOL 3404), (CHEM 2535). (3H, 3C)

BIOL 4564: INFECTIOUS DISEASE ECOLOGY
Principles of infectious disease dynamics from ecological and evolutionary perspectives. Examines a variety of wildlife hosts and disease-causing agents (bacteria, viruses, and parasites) using the framework of agent-host- environment interactions. Selective coverage of specific host and pathogen models to illustrate underlying principles of wildlife disease emergence, maintenance, and spread, as well as connections between wildlife and human health. Pre: 2704, 2804. (3H, 3C)

BIOL 4704: IMMUNOLOGY
Immunochemistry of antigens and antibodies, serological reactions, chemistry of complement, control of immunity, immune response of an intact animal. Pre: 2104, (CHEM 2536 or CHEM 2566). (3H, 3C)

BIOL 4874: CANCER BIOLOGY
The molecular and cellular basis of cancer, including viral and cellular oncogenes, tumor suppression mechanics, cellular immortality, genomic integrity, angiogenesis, metastasis, and traditional and developing theories. Pre: 2004, 2104. (3H, 3C)

NANO 4314: NANOMEDICINE
Medical use of nanomaterials including basic, translational, and clinical research. Nanomedical approaches to drug delivery. Diagnostic sensors. Use of nanomedical tools over conventional techniques to treat diseases/disorders. Technical issues associated with medical applications. Bioavailability of nanotherapies. Use of quantum dots for imaging. Ethical concerns and economic benefits associated with nanomedicine. Pre: 3016, (BIOL 2104 or BIOL 2124). (3H, 3L, 4C)

PHYS 4714: INTRODUCTION TO BIOPHYSICS
Selected topics from the general area of biomechanics, bioelectricity, radiation biophysics, molecular biophysics, and thermodynamics and transport in biological systems. Emphasis on the physical aspects of biological phenomena and biophysical measurement techniques and instrumentation. Pre: 2206 or 2306. (3H, 3C)

PSYC 2064: NERVOUS SYSTEMS & BEHAVIOR
Introduction to the workings of the nervous system and the relation between those workings and behavior. Special emphasis on human nervous systems and behavior. Pre: 2004 or 1004. (3H, 3C)

PSYC 3054: HEALTH PSYCHOLOGY
Major theories, strategies, and methods for understanding psychological contributions to health and disease; psychological approaches to the treatment and prevention of disease and unintentional injuries, and health and safety promotion. Pre: 2004 or 1004. (3H, 3C)

BMVS 4074: PHARMACOLOGY
A basic course in the science of pharmacology, intended to provide an understanding of the mechanisms of action and physiological systemic effects of major classes of drugs of biological, agricultural, social, and medical importance. Must have prerequisites or equivalent. Pre: CHEM 2514 or CHEM 2535 or ALS 2304 or BIOL 2406. (3H, 3C)

BMVS 4084 (VM 9204): MEDICAL TOXICOLOGY
Adverse health effects of exposure to drugs or substances of abuse. Covers principles of toxicodynamics, toxicokinetics, biotransformation, diagnosis and treatment. Emphasis will be placed on mechanism(s) of action of the various drug classes, body system(s) affected, clinical manifestations of problems and the resulting adverse effects on human health and society. Methods of treatment and client education will also be addressed. Laws controlling and governing the use of these drugs/substances and the agencies responsible for them will also be covered. Pre: third year standing in DVM curriculum. Pre: (CHEM 2514 or CHEM 2535), (BIOL 2406 or ALS 2304), (MATH 1015 or MATH 1014). (2H, 2C)

BMSP 2135-2136: HUMAN ANATOMY & PHYSIOLOGY
Structure and function of the human body for students preparing for professions in the health fields. 2135: body plan and organization, homeostasis, cell structure and function, histology, integumentary system, skeletal system, muscular system, nervous system and special senses. 2136: endocrine system, circulatory & cardiovascular system, lymphatic system and immunity, respiratory system, digestive system, metabolism, excretion, reproduction, and development. BMSP 2135-2136 duplicates BIOL 2405-2406; may not receive credit for both. Pre: (BIOL 1005 or BIOL 1006) or (BIOL 1105 or BIOL 1106) or (BIOL 1205H or BIOL 1206 H) for 2135; 2135 for 2136. (3H, 3C)

BMSP 2145-2146: HUMAN ANATOMY AND PHYSIOLOGY LABORATORY
Laboratory exercises investigating the structure and function of the human body for students preparing for professions in the health fields. 2145: body plan and organization, homeostasis, cell structure and function, histology, integumentary system, skeletal system, muscular system, nervous system and special senses. 2146: endocrine system, circulatory & cardiovascular system, lymphatic system and immunity, respiratory system, digestive system, metabolism, excretion, reproduction, and development. BMSP 2145-2146 duplicates BIOL 2414; may not receive credit for both. Co: 2135 for 2145; 2136 for 2146. (3L, 1C)