BIOLOGICAL SCIENCE (BSCI)

Equivalent(s):
Attributes:

Agents of biological warfare are also discussed. Prereq: ENGL 401.

sciences, such as microbiology, immunology, and molecular biology.

research methodologies underlying several fields within the biological

are also discussed. Students will acquire a basic understanding of the

prevalent over the next century. Treatment and prevention of the disease

Credits:

BSCI 418 - Phage Bioinformatics Lab

Credits:

BSCI 415 - Millyard Scholar Academic Skills and Planning Seminar

Credits:

BSCI 410 - Contemporary Health Issues

Credits:

This course exposes students to the three major dimensions of health -

physical, emotional, and social. Nutrition, infectious diseases, substance

abuse and addiction, mental health, sexual health, aging and stress

management are among the issues that will be discussed. Students will

learn to intelligently relate health knowledge to the social issues of the
day.

Attributes: Biological Science(Discovery)

BSCI 415 - Millyard Scholar Academic Skills and Planning Seminar

Credits: 2

Through in-class activities, workshops and guest speakers, students in the
Millyard Scholars Program will explore career paths, and develop
resources and skills for academic success. All student work, planning and
experiences will be showcased in a digital portfolio.

BSCI 418 - Phage Bioinformatics Lab

Credits: 2

In the course, students undertake a hands-on undergraduate research
experience to describe, document, and publish the discovery of new
bacteriophages (bacterial viruses). In doing so, students will elucidate
how the genome codes biological information. The aim of the course
is for students to develop further research and computational analysis
skills while preparing to publish their scientific discoveries. The course
will focus on research data analysis and presentation of research data to
scientists and the public. Permission required.

BSCI 421 - Diseases of the 21st Century

Credits: 4

Provides a basic understanding of several different diseases that may be
prevalent over the next century. Treatment and prevention of the disease
are also discussed. Students will acquire a basic understanding of the
research methodologies underlying several fields within the biological
sciences, such as microbiology, immunology, and molecular biology.
Agents of biological warfare are also discussed. Prereq: ENGL 401.

Attributes: Biological Science(Discovery)

Equivalent(s): UMST 599G

BSCI 422 - Biotechnology and Society

Credits: 4

Provides a basic understanding of genetic engineering. Techniques
discussed include cloning, gene transfer, the Polymerase chain reaction
(PCR), in vitro fertilization, organ transplants, and paternity testing.
Ethical issues involved with each technological advance are examined.

Attributes: Biological Science(Discovery)

Equivalent(s): BIOL 404, BIOL 444A

BSCI 432 - Medical Terminology

Credits: 2

This course is an introduction to medical terminology. The origin,
roots, prefixes and suffixes of common scientific and medical terms
are examined. Course is totally online and includes assigned online
interactive material. Appropriate for biology majors, prePA, premed, and
other interested majors.

BSCI 450 - The Small Microbial World

Credits: 4

An introduction to the invisible world of microbes and microorganisms
and their impact on human life and ecosystems. Laboratory will be an
opportunity for science and non-science students to learn the scientific
method while they participate in citizen or crowdsourced science and
contribute to scientific knowledge. Vaccines, antibiotics, and other topics
will be presented. Special fee.

Attributes: Biological Science(Discovery)

BSCI 501 - Ethical Issues in Biology

Credits: 4

This course is an introduction to the ethical issues associated with
current and future use of biotechnology. Students will think critically
about different ethical problems that emerge from scientific research and
its applications to medical technology. The focus will be on personal and
public policy decision making. Prereq: BIOL 413 and 414 or BIOL 411
and BIOL 412. Writing intensive.

Attributes: Writing Intensive Course

Equivalent(s): BIOL 404

BSCI 502 - Intro to Biotech Manufacturing

Credits: 4

Introduction to the terminology and practices of the biotechnology
industry, with an emphasis on the business, regulatory, legal, and basic
scientific underpinnings of modern biotechnology in the commercial and
government sectors.

BSCI 510 - Introduction to Biofabrication

Credits: 4

This project-based course introduces students to the techniques and
challenges of biofabrication. Students learn how additive manufacturing
is used to combine cells with a variety of bioinks to create living tissues
such as skin, cartilage, vascularized bone, and blood vessels. During this
process students learn how to design for and operate 3D printing and
bioprinting equipment. An emphasis will be placed on the ways in which
this emerging technology impacts our society.

Attributes: Environment, TechSociety(Disc)

BSCI 599 - Special Topics in Biology

Credits: 1-4

This course explores and investigates topics in biology that would not
normally be covered in other courses in the curriculum.

Repeat Rule: May be repeated for a maximum of 12 credits.
BSCI 620 - Global Science Exploration
Credits: 4
This course includes a spring break trip abroad investigating living organisms in their natural habitat. Students will participate in pre-trip seminars on the country, local flora, fauna and habitats they will visit. Students will design a project to integrate their personal interests and objections with in-country investigation. Post-trip seminar will focus on preparation of project and its presentation. Prereq: BIOL 413 and 414, or BIOL 411 and 412. Permission required. May be repeated if the spring break trip is to a different country.
Attributes: Writing Intensive Course
Repeat Rule: May be repeated for a maximum of 8 credits.

BSCI 670 - Clinical Pathophysiology
Credits: 4
This course covers the principles and mechanisms of disease at the cellular, tissue, organ, and system levels, including responses to cell injury, death and adaptation, and inflammation. Acute and chronic disease processes as well as trauma are used to both understand the impact of these processes on body function as well as a means to gain a better understanding of integrative body systems. No credit if credit earned for BMS 794 or UMST 599 Clinical Pathophysiology. Prereq: BIOL 413 and BIOL 414 or BMS 507 and BMS 508.
Equivalent(s): BMS 704

BSCI 680 - Pharmacology
Credits: 4
This course is designed to cover the concepts of basic pharmacology and drug therapy. It includes examination of the body systems and the related drugs therapy within each system. It explores the basic drug groups, key similarities and differences among drugs in each group. Emphasis is placed on the mechanism of action for each group and how these medications act in relation to normative and pathophysiology. The therapeutic use and adverse effects of drugs as well as understanding recreational drug use will be included. No credit if credit received for UMST 599 Pharmacology. Prereq: BIOL 413 and BIOL 414 or BMS 507 and BMS 508.

BSCI 692 - Evolutionary Medicine
Credits: 4
This course introduces the theory of evolution by natural selection and the influence of evolutionary theory on our understanding of the cause and treatment of human disease. Topics covered include evolutionary theory, natural selection, human evolution, pathogen evolution, evolutionary mismatch, and the evolution of aging, cancer, and reproduction. Prereq: GEN 604 or permission of the instructor. Writing intensive.
Attributes: Writing Intensive Course

BSCI 695 - Exploring Biology Teaching
Credits: 1-4
Students assist in teaching labs in undergraduate courses supervised by the lab coordinator/instructor. Responsibilities include facilitating lab endeavors, giving a presentation, and writing a report. Prereq: permission. Repeat Rule: May be repeated for a maximum of 4 credits.
Equivalent(s): BIOL 695

BSCI 701 - Senior Seminar I
Credits: 1
To be taken during the last two semesters of the senior year as students complete their Capstone project. Course emphasizes written and oral communication, discussion of current topics in biology, and career guidance. Fall and spring semester. Cr/F.

BSCI 702 - Senior Seminar II
Credits: 1
To be taken during the last two semesters of the senior year as students complete their Capstone project. Course emphasizes written and oral communication, discussion of current topics in biology, and career guidance. Fall and spring semester. Cr/F.

BSCI 735 - Cell Biology
Credits: 4
This course is an upper level biology class that expands on the basic knowledge of cellular structure and function. The focus is on molecular biology and cell signaling. Experiments by preeminent scientists are explored and analyzed. Prereq: BIOL 413 and BIOL 414, CHEM 403 and CHEM 404, or equivalent.
Equivalent(s): BMCB 605

BSCI 737 - Microbial Genomics
Credits: 4
Microbial genomics (primarily bacteria and bacteriophages) and genome-scale approaches to addressing questions in microbial physiology and pathogenesis are the focus of the course. Large-scale sequencing projects, genome structure and evolution, metagenomics, and other challenges in comparative genomics are discussed. Hands-on wet laboratory and bioinformatics projects are included in this laboratory-lecture course. Prereq: GEN 604, BMS 503 and BMS 504. Special fee.

BSCI 740 - Aquatic Microbiology
Credits: 4
Lectures and labs focus on Lake Massabesic and its use as the source of supply as the drinking water for approximately 160,000 New Hampshire residents. The course covers a basic history of the Lake, the importance of watershed protection, EPA regulations, and standards and the various techniques and methods available to analyze water for basic quality. No credit for students who have earned credit for UMST 599 Aquatic Microbiology. Prereq: BMS 503 and BMS 504. Permission. Special fee. Writing intensive.
Attributes: Writing Intensive Course

BSCI 747 - Industrial Microbiology and Fermentation
Credits: 4
Production of biologics and food by the biotechnology and agribusiness industries is the major focus of this course. Development of procedures for fermentation and bioprocessing, from proof of concept through scale-up stages will be emphasized, utilizing both theory and quantitative understanding as well as hands-on wet lab experience with modern bioprocessing equipment. Troubleshooting, safety, and QC considerations will be addressed. Prereq: BMS 503, BMS 504. Special fee.
Equivalent(s): BSCI 606

BSCI 750 - Cancer Biology: From Benchtop Research to Therapeutic Interventions
Credits: 4
The development and progression of cancer can be defined by several molecular and cellular biological characteristics. In this course, we will utilize primary literature to begin to understand (1) how specific cellular processes are altered during cancer initiation and progression; (2) how different cancers and the genetic landscape underlying them are being studies using models in the laboratory; and (3) how innovative therapeutics are being designed to target tumors based upon their individual molecular signatures. Prereq: GEN 604.
Attributes: Writing Intensive Course
BSCI #765 - Nucleic Acid Techniques
Credits: 4
Laboratory course focused on application of molecular biology techniques for the extraction, detection, and use of nucleic acids. Emphasis is on recombinant DNA cloning and bioengineering techniques in biotechnology. Special fee. Prereq: GEN 604, BMCB 658/659. No credit for students who have received credit for BMCB 754, BMCB 755, BMS 650, or BMS 714.
Equivalent(s): BMCB 754, BMCB 755, BMS 650, BMS 714

BSCI 766 - Protein and Immunologic Techniques
Credits: 4
Laboratory course focused on application of molecular biology techniques for the isolation, quantitation, detection, analysis, and use of proteins. Substantial emphasis on the use of immunoassays and antibodies in protein work. Modern proteomics techniques are also discussed. Emphasis on recombinant protein expression in the field of biotechnology. Prereq: GEN 604, BMCB 658. Credit cannot be received if credit received for BMS 650, BMS 714, BMS 715. Special fee.
Equivalent(s): BMS 650, BMS 714, BMS 715

BSCI 777 - Molecular Biology and Biotechnology
Credits: 5
The organization, expression, and control of RNA and protein-coding genes in prokaryotic and eukaryotic cells. The focus of the course is on mechanisms of genetics at the molecular level and the application of modern techniques to laboratory biotechnology projects. Prereq: GEN 604. Special fee.

BSCI 792 - Research
Credits: 1-4
Advanced independent research under the direction of a faculty mentor. Content area to be determined in consultation with faculty member. Prereq: permission. Up to 4 credits may be applied to self-designed concentration. Up to 4 credits may be applied to the Capstone requirement. Fall and spring semester. Prereq: Permission of Faculty mentor. Cr/F.
Repeat Rule: May be repeated for a maximum of 8 credits.

BSCI 793 - Internship
Credits: 1-4
Field-based learning opportunities in the biological sciences through placement in the appropriate outside agency, under the direction of a faculty mentor and representative of outside agency. Content area to be determined in consultation with faculty mentor. Prereq: Permission. Up to 4 credits may be applied to self-designed concentration. Up to 4 credits may be applied to the Capstone requirement. Fall and spring semester. Cr/F.
Repeat Rule: May be repeated for a maximum of 8 credits.

BSCI 794 - Clinical Microbiology Internship
Credits: 4
Advanced instruction in clinical bacteriology, mycology, parasitology, and/or virology at a local hospital or reference laboratory. Isolation, identification, determination of antibiotic sensitivities, and modern advanced testing for common pathogens are emphasized. Prereq: BMS 602 and permission of instructor.
Equivalent(s): BMS 751, BMS 761

BSCI 795 - Independent Study
Credits: 1-4
Advanced individual study under the direction of a faculty mentor. Content area to be determined in consultation with faculty mentor. Prereq: permission. Up to 4 credits may be applied to self-designed concentration. Up to 4 credits may be applied to the Capstone requirement. Fall and spring semester. Cr/F.
Repeat Rule: May be repeated for a maximum of 8 credits.