

# BIOMEDICAL SCIENCE (BMS)

The Biomedical Science (BMS) major focuses on fundamental concepts in biological sciences as they apply to human and animal health, medicine, and disease. Students attracted to Biomedical Science have a profound interest in human and animal physiology and diseases. The BMS major encompasses three options: Medical Laboratory Sciences (MLS), Medical Microbiology (MM), and Medical and Veterinary Sciences (MVS). Each of the options in the BMS major is based on solid foundational and advanced courses in chemistry and the biological sciences. BMS:MLS focuses on the laboratory diagnosis of human disease, BMS:MM focuses on infectious agents and host response, and BMS:MVS focuses on health and manifestations of disease in animals, including humans. For descriptions of each option and their curricular details, visit <http://colsa.unh.edu/mcbs/biomedical/biomedical-science-bs>.

Faculty in the BMS major have expertise in many areas of biomedical science, including physiology, cell biology, infectious diseases, veterinary pathology, and laboratory medicine. The biomedical science faculty strongly encourage students to complement their academic courses with experiential learning opportunities through internships, field experience, and independent research projects conducted with biomedical research faculty. On-campus facilities include state-of-the-art research and teaching laboratories and the New Hampshire Veterinary Diagnostic Laboratory (<https://nhvdl.unh.edu>) (NHVDL) that provides unique learning opportunities for students interested in veterinary medicine, pathobiology, and laboratory diagnostics.

There is high demand for skilled biomedical scientists as research technicians in biotechnology companies, pharmaceutical companies, government agencies, forensics, academic research laboratories, and hospitals, so BMS majors enjoy excellent job prospects upon graduation. The BMS curriculum also provides graduates with the required and recommended courses for admission to most graduate schools and professional schools of medicine, veterinary medicine, dentistry, public health, and pharmacy, as well as to physician assistant and pathology assistant programs. BMS graduates have a knowledge base that is valuable in the fields of sales, marketing, regulatory affairs, technical writing, patent law, and scientific journalism. With additional courses in education, the B.S. in biomedical science also qualifies graduates to teach at the elementary, junior high, and high school levels.

## Pre-Professional Health Programs

Students interested in postgraduate careers in the health care professions (e.g., medical, dental, physician's assistant, pharmacy, etc.) should visit the Pre-Professional Health Programs Advising Office (<http://www.unh.edu/uacc/premed-advising>). Students interested in veterinary medicine should consult the Pre-Veterinary Medicine Program (<http://colsa.unh.edu/mcbs/prevet>) website. While many of the prerequisite courses required by professional schools are also requirements of the biomedical science major, students should consult with their faculty adviser to create a plan of study that best prepares them for pursuing a career in one of these health professions.

<http://colsa.unh.edu/mcbs/biomedical>

[sciences-agriculture/programs-study/biomedical-science/biomedical-science-major-medical-laboratory-sciences-option-bs](http://colsa.unh.edu/mcbs/biomedical-science/biomedical-science-major-medical-laboratory-sciences-option-bs)

- Biomedical Science Major: Medical Microbiology Option (B.S.) (<http://catalog.unh.edu/archives/2017-2018/undergraduate/life-sciences-agriculture/programs-study/biomedical-science/biomedical-science-major-medical-microbiology-option-bs>)
- Biomedical Science Major: Medical and Veterinary Sciences Option (B.S.) (<http://catalog.unh.edu/archives/2017-2018/undergraduate/life-sciences-agriculture/programs-study/biomedical-science/biomedical-science-major-medical-veterinary-option-bs>)
- Biomedical Science Minor (<http://catalog.unh.edu/archives/2017-2018/undergraduate/life-sciences-agriculture/programs-study/biomedical-science/biomedical-science-minor>)

## Courses

### Biomedical Science (BMS)

#### BMS 401 - Professional Perspectives in Biomedical Sciences

**Credits:** 1

Introduction to the major and the options of Biomedical Sciences. Strategies for successfully achieving academic and professional goals in the biomedical sciences. Professional opportunities for BMS majors are presented. Cr/F.

#### BMS 402 - Special Topics in Biomedical Sciences

**Credits:** 1

Introduces contemporary research and provides an avenue to explore recent developments in the field of biomedical science. Each semester focuses on a different theme. Cr/F.

#### BMS 407 - Germs 101

**Credits:** 4

Societal and technological impact of the invisible microbial world on our lives and on the planet. Weekly extra-class activities enable students to use the scientific method of inquiry to explore topics like bacteria that use sunlight to live or use of bacteria in genetic engineering. Presents germs from different perspectives: as living organisms, as human enemies or friends, and as represented in newspapers or on TV. Especially useful for people with microphobia. No credit for BMS or Biology majors. Special fee.

**Attributes:** Biological Science(Discovery); Biological Science GP 3B

#### BMS 408 - Germs 101

**Credits:** 4

Online version of BMS 407. Societal and technological impact of the invisible microbial world on our lives and on the planet. Weekly extra-class activities enable students to use the scientific method of inquiry to explore topics like bacteria that use sunlight to live or the use of bacteria in genetic engineering. Presents germs from different perspectives: as living organisms, as human enemies or friends, and as represented in newspapers or on TV. Especially useful for people with microphobia. No credit for BMS or Biology majors. Special fee.

**Attributes:** Biological Science(Discovery)

## Programs

- Biomedical Science Major: Medical Laboratory Sciences Option (B.S.) (<http://catalog.unh.edu/archives/2017-2018/undergraduate/life->

**BMS 501 - Microbes in Human Disease****Credits:** 4

Identification, pathogenesis, epidemiology, treatment, and prevention of medically important microorganisms. The biology of clinically relevant bacteria, viruses, fungi, and parasites is presented in relation to disease progress and host defense mechanisms. Clinical correlations that indicate microbes are causative agents of disease are emphasized. The laboratory introduces techniques for identification of pathogenic microorganisms to reinforce and expand the theoretical content. Special fee. Lab.

**Attributes:** Biological Science(Discovery); Discovery Lab Course; Biological Science GP 3B

**BMS 503 - General Microbiology****Credits:** 3

Principles of microbiology; morphology, physiology, genetics, culture, and classification of bacteria and other microorganisms; relationships of microbes to agriculture, environment, industry, sanitation, and infectious diseases. Prereq: BIOL 411 and BIOL 412 or equivalent; CHEM 403 and CHEM 404 or equivalents.

**BMS 504 - General Microbiology Laboratory****Credits:** 2

Practical laboratory training in general microbiology. Topics include safe handling, visualization, and physiological identification of microorganisms with special attention given to aseptic technique. Prereq: BIOL 411 and BIOL 412 and CHEM 403 and CHEM 404 or equivalents. Pre- or Coreq: BMS 503 and BMS 504. Special fee.

**BMS 507 - Human Anatomy and Physiology I****Credits:** 4

Cellular and systematic aspects of the human body. Laboratory exercises utilize preserved specimens, dissectible models, living tissue and computer-aided instruction. Systems covered include: the cell, chemistry, tissues, integument, osseous tissue and the skeleton, muscular tissue and muscles, nerves, the brain, spinal cord, autonomic nervous system, and special senses. No credit earned for ANSC 511 and ANSC 512. Lab. Special fee.

**Attributes:** Biological Science(Discovery); Discovery Lab Course; Biological Science GP 3B

**BMS 508 - Human Anatomy and Physiology II****Credits:** 4

Cellular and systematic aspects of the human body. Laboratory exercises utilize preserved specimens, dissectible models, living tissue and computer-aided instruction. Systems covered include: endocrine, blood, cardiovascular, respiratory, immune, digestive and metabolism, urinary, acid-base and electrolyte balance, reproductive. Prereq: BMS 507. No credit earned for ANSC 511 and ANSC 512. Lab. Special fee.

**Attributes:** Biological Science(Discovery); Discovery Lab Course; Biological Science GP 3B

**BMS 560 - Body Fluids****Credits:** 3

The study of diseases and disorders through the analysis of extra-vascular body fluids. Emphasizes renal anatomy and physiology, and diseases and metabolic disorders affecting renal function.

**BMS 561 - Body Fluids Laboratory****Credits:** 1

Practical experience in the performance and clinical correlation of urinalysis and selected body fluid procedures. Special fee.

**BMS 600 - Field Experience****Credits:** 1-4

Supervised experience providing the opportunity to apply academic experience in settings associated with future professional employment and/or related graduate opportunities. Must be approved by a faculty advisor selected by the student. May be repeated to a maximum of 8 credits. Only 4 credits can be used toward the major. Permission required. Cr/F.

**BMS 601 - Bacteriology of Food****Credits:** 5

Lectures and laboratories address modern technical concepts of microbiology, physiology, and biochemistry related to food sanitation. Theoretical and practical approach serves as an integrative experience. Food sanitation is a serious public health issue in the meat, dairy, fish, and water industries. Benefits students seeking employment in public health or sanitary microbiology fields. Topics include food as a substrate for microorganisms, causes of food spoilage, food borne disease outbreaks, public health complications, isolation and identification of food spoiling microorganisms, and essentials for food safety and sanitation. Prereq: BMS 503 and BMS 504 or equivalent. (Not offered every year.) Special fee. UNHM only.

**BMS 602 - Pathogenic Microbiology****Credits:** 3

An introduction to microbial disease, with a focus on bacterial and viral diseases in humans and animals. This course examines the clinical presentation, laboratory diagnosis, and treatment of specific microbial pathogens. Molecular aspects of both microbial infection and host immune response are discussed. Case studies based on real clinical and research microbiology problems are presented. Prereq: BMS 501 or BMS 503 and BMS 504.

**BMS 603 - Pathogenic Microbiology Laboratory****Credits:** 2

An introduction to morphologic, cultural, biochemical and pathogenic characteristics of microorganisms causing human and animal diseases. Laboratory exercises focus on both classical and modern laboratory diagnostic testing. Prereq: BMS 501 or BMS 503 and BMS 504. Special fee.

**BMS 610 - Biomedical Lab Management****Credits:** 4

Overview of biomedical laboratory management, including lab operation, compliance, financial management, personnel management, information systems, and leadership. Writing intensive.

**Attributes:** Writing Intensive Course

**BMS 620 - Tissue Engineering Cell Culture Laboratory****Credits:** 4

Introduction to culture of mammalian cell lines with applications to bioengineering and biomedical sciences. Techniques and skills include those most relevant to bioengineering and biomedical sciences: basic cell culture, sterile technique, growth and maintenance of cell lines, growth curves, transfection, cryopreservation, and cytotoxicity assays. Inquiry-based final project. Preference given to Bioengineering majors. Prereq: BMS 503 and 504.

**BMS 623 - Histology: Microscopic Cellular Structure and Function****Credits:** 4

Cellular structure, function, and physiology, as well as the interactions between cells in different organ systems, are examined at the microscopic level. Digital microscopic images are utilized to examine the cellular structure of all organ systems and the interactions between cells in these organs. Prereq: ANSC 511 and ANSC 512 or BMS 507 and BMS 508. Hybrid course with online lab.

**BMS 635 - Preceptorial in Prehospital Care****Credits:** 2

Practice and evaluation of prehospital care. Understand the roles of different provider levels in a healthcare setting. Students participate in ambulance activities, then discuss assessment and treatment of patients in the prehospital setting. Licensure by the New Hampshire Board of EMS required before course start date. Prereq: KIN 684 and KIN 685 or equivalents. May be repeated for a maximum of 4 credits. Cr/F.

**BMS 640 - Phlebotomy Theory****Credits:** 2

Theory and demonstration of procedures involved in blood collection with an emphasis on safety and professionalism. Hands-on practice of selected techniques. Special fee.

**BMS 641 - Phlebotomy Clinical Internship****Credits:** 1-2

Students obtain experience and proficiency in routine blood collection techniques at a health care facility (80 to 120 hours). Prereq: BMS 640. Special fee. Cr/F.

**BMS 642 - Clinical Immunology and Serology****Credits:** 2

Innate and specific immunity in the context of chemical and cellular responses to antigenic challenge. Also introduces the immunologic basis of autoimmunity, immune proliferation and deficiency, and hypersensitivity. Current clinical analytical methodologies and diagnostic criteria used to identify, differentiate and/or monitor these responses and conditions included. Prereq: BIOL 411 and BIOL 412 or BMS 507 and BMS 508 or ANSC 511 and ANSC 512.

**BMS 643 - Clinical Serology Laboratory****Credits:** 2

Performance, interpretation and application of serological techniques for the diagnosis of immune system disorders. Special fee.

**BMS 644 - Clinical Hematology****Credits:** 3

Human blood cell physiology in both health and disease. Includes benign and malignant conditions of red blood cells and white blood cells.

**BMS 645 - Clinical Hematology Laboratory****Credits:** 2

Analysis of whole blood for cellular components with special emphasis on differentiating benign from malignant processes, as well as cellular identification by morphologic characteristics and cytochemical staining. Special fee.

**BMS 646 - Clinical Hemostasis****Credits:** 1

Introduction to hemostasis through evaluation of platelets, blood vessels, coagulation factors and fibrinolysis, including dysfunction and disease states. Pre- Coreq: BMS 644 or permission.

**BMS 650 - Molecular Diagnostics****Credits:** 4

Fundamental principles of molecular technology and techniques used in clinical laboratories such as nucleic acid extraction, DNA amplification, sequencing and hybridization, gel electrophoresis, and chromosome analysis. Prediction and detection of human disease (infectious disease, cancer, and other inherited disease), identity testing, molecular epidemiology, pharmacogenetics, and ethical issues. Previous knowledge of genetics and biochemistry lab techniques is highly recommended.

**Attributes:** Environment,TechSociety(Disc); Technology GP 3T**BMS 655 - Human and Animal Parasites****Credits:** 3

Introduction to the parasitic process in humans and different animals indigenous to domestic and foreign areas of the world. Topics include epidemiology, infection, control, genetics, immunology as well as global economic consequences. Prereq: BMS 503-504.

**BMS 656 - Immunohematology****Credits:** 3

The immunology of blood, including blood group systems and the critical role they play in safe transfusion medicine. Additional topics include blood collection, component use, transfusion reactions, and transfusion-transmitted infections.

**BMS 657 - Blood Banking Laboratory****Credits:** 1

Hands-on experience in clinical blood banking practices including blood typing, antibody screening an identification, cross matching, and confirmatory testing. Special fee.

**BMS 658 - Medical Biochemistry****Credits:** 3

Use of body fluids to assess specific disease states including the pathophysiology of the disease, pre-analytical issues, analytical methodologies, and instrumentation. Topics include the biochemistry of analytes (amino acids, proteins, enzymes, tumor markers, non-protein nitrogen metabolites, carbohydrates, lipids, electrolytes, blood gases, etc.), clinical endocrinology, toxicology and therapeutic drug monitoring. Prereq: BMB 658 and BMB 659; BIOL 528 or equivalent.

**BMS 659 - Clinical Chemistry Laboratory****Credits:** 2

Measurement of blood analytes such as proteins, glucose, electrolytes, and cholesterol, etc. Screening for drugs in urine and evaluation of clinical significance in human specimens. Principles of spectrometry, immunoassay, point-of-care testing, chromatography, mass spectrometry, electrophoresis, automation, and ion selective electrodes, with emphasis on instrumentation, quality control, and pre-analytical and analytical issues. Special fee.

**BMS 696 - Independent Study****Credits:** 1-6

In-depth studies under faculty supervision. Prereq: approval of the faculty the area concerned. May be repeated up to a maximum of 16 credits. Cr/F.

**BMS 699 - Independent Study in Biomedical Science****Credits:** 1-6

In-depth studies under faculty supervision. Permission required. Cr/F.

**BMS 699W - Independent Study in Biomedical Science****Credits:** 1-6

In-depth studies under faculty supervision. Permission required. Writing intensive. Cr/F.

**Attributes:** Writing Intensive Course

**BMS 702 - Endocrinology****Credits: 4**

Structure and function of vertebrate endocrine systems through the lens of physiology, biochemistry, and cell and molecular biology, with special reference to mammals. Current investigations of the body's major endocrine glands, such as the brain, thyroid, pancreas, adrenals and gonads, as regulators and integrators of biological systems. BMCB 605 recommended. Prereq: BMCB 658 or BMCB 751.

**BMS 703 - Infectious Disease and Health****Credits: 4**

Principles underlying the nature of infectious disease agents, including representative parasites, fungi, bacteria, viruses, and prions. Established pathogens and emerging human and animal disease agents; will highlight zoonotic diseases. Will include epidemiology, pathogenesis, host immune response, disease transmission, treatment, and control. Weekly review and discussion of current world disease events using the Program for Monitoring in Emerging Infectious Diseases (ProMED) as a resource. Prereq: BMS 503 and BMS 504.

**BMS 704 - Pathologic Basis of Disease****Credits: 4**

Principles and mechanisms of disease at the cellular and tissue levels, including responses to cell injury, death and adaptation, inflammation, circulatory disturbances, disorders of the immune system, and neoplasia. ANSC 511 and ANSC 512 or BMS 507 and BMS 508 recommended.

**BMS 705 - Immunology****Credits: 3**

An introduction to the fundamental mechanisms of the immune system with applications in basic research, medicine and public health. Topics include the mechanisms of induction, regulation, and expression of the cellular and humoral immune responses, antigen-antibody reactions, immunogenetics, immunopathologies, and immunodeficiencies. Coreq: BMS 715 for BMS:MM majors only. Prereq: BMS 503 and BMS 504.

**BMS 706 - Virology****Credits: 3**

Principles of animal and selected plant and bacterial virology in relation to infection and disease. Emphasizes the molecular biology of viruses, viral replication, isolation, propagation, assay, pathogenesis, diagnosis, detection, epidemiology, and control. Coreq: BMS 708 for BMS:MM majors only. Prereq: BMS 503 and BMS 504.

**BMS 708 - Virology Laboratory****Credits: 2**

Principles and practices of animal, selected plants, and bacterial virological methods for the propagation, detection and enumeration of viruses. Prereq: BMS 503 and BMS 504. Coreq: BMS 706. Special fee.

**BMS 711 - Toxicology****Credits: 4**

Examination of mechanisms by which chemicals and other toxicants produce adverse effects in biological systems. Consideration of toxicant exposure and absorption, systemic and cellular distribution and metabolism, altered cellular mechanisms, and systemic and organ-specific effects of toxicity. Case-based discussions of toxicants affecting humans and other species in environmental and clinical contexts. Prereq: BMCB 658.

**BMS 712 - Grand Rounds****Credits: 2**

Interactive presentation and observation of disease through pathological examination of animals submitted to the NH Veterinary Diagnostic Lab for necropsy. Discussion of underlying pathogenesis of diseases and disorders. Examination of archived gross and digital tissue specimens. Integrates aspects of anatomy, physiology, microbiology, immunology, and other core sciences as well as medical ethics and social issues. Intended for those in pre-professional medical, dental, pharmacy, veterinary and biomedical fields. Prereq: BMS 507 and BMS 508 or ANSC 511 and ANSC 512. May be repeated up to a maximum of 4 credits.

**BMS 715 - Immunology Laboratory****Credits: 2**

This applied immunology laboratory course highlights both historic and current methodologies important for elucidation and diagnosis of immune function. Techniques used to study phagocytosis, antibody production, immunodiffusion, and T-cell function will be introduced. Applications of the antibody technologies to other scientific disciplines (ELISA, immunofluorescence microscopy, immunoblotting, etc.) will also be covered. Prereq: BMS 503 and BMS 504. Special fee.

**BMS 716 - Public Health: Food- and Water-borne Diseases****Credits: 4**

How and why food-borne and water-borne agents (virus, protozoal, bacterial and toxic material) are still prevalent within our society with focus on the roles of government, disease and epidemiology, and sources of anthropogenic pollution. Field trips to wastewater plant and/or drinking water plant, town meetings and/or public policy hearings. Prereq: BMS 503 and BMS 504. Special fee. Lab. Writing intensive.

**Attributes:** Writing Intensive Course

**BMS 718 - Mammalian Physiology****Credits: 4**

Advanced study of the systems that control mammalian functions with emphasis on cellular and molecular mechanisms. Includes the nervous, muscular, cardiovascular, renal, gastrointestinal, and endocrine systems. Prereq: at least one semester of animal/human physiology, or one semester of anatomy and physiology. Permission required. Writing intensive.

**Attributes:** Writing Intensive Course

**BMS 719 - Host-Microbe Interactions****Credits: 4**

An examination of the way microorganisms interact with their hosts, with an emphasis on the pathogenic and commensal organisms of humans. Course material is introduced via reading, analysis and group presentations of primary scientific literature. Students are not only introduced to different types of host-microbe interactions, but different methods, systems and model organisms used to study these interactions. Prereq: BMS 501 or BMS 503 and BMS 504; GEN 604.

**BMS 720 - Mycology, Parasitology, and Virology****Credits: 3**

Theoretical basis of the pathogenesis, epidemiology, and diagnosis of fungal, parasitic, and viral infections. Prereq: BMS 602 and BMS 603.

**BMS 721 - Mycology, Parasitology, and Virology Laboratory****Credits: 2**

Practical experience in medical mycology and parasitology diagnostic techniques. Isolation and identification of mycological and parasitological specimens. Principles and practices of proper specimen collections, analysis, and interpretation of results. Special fee.

**BMS 730 - Ethical Issues in Biomedical Science****Credits:** 4

An examination of the importance of scientific integrity in the biomedical sciences. Students are introduced to the ethical issues that scientists must be familiar with when conducting research. Issues include scientific record keeping, authorship and peer review, conflicts of interest, use of animals and humans in research, and recombinant DNA technology. Class is discussion-based, encouraging both an appreciation of established guidelines and an opportunity to critically examine them. Prereq: BIOL 411; GEN 604; BMS 503 and BMS 504. Writing intensive.

**Attributes:** Writing Intensive Course**BMS 740 - Human Microbiome****Credits:** 4

The human microbiome is a new, rapidly growing field of microbiology that has already made important contributions to the understanding of human health. This laboratory course utilizes current research methodology to investigate the microbiome of the human skin. Students gain hands-on experience in PCR, genomics, bioinformatics, and modern clinical identification techniques. They also generate primary data to make their own contribution to this important field of research. Prereq: GEN 604; BMS 501 or BMS 503 and BMS 504. Special fee. Lab.

**BMS 750 - Case Studies****Credits:** 1-5

Analysis of patient case studies are analyzed in up to four different areas: microbiology, hematology, clinical chemistry, or immunohematology. Correlation of patient history with clinical presentation and interpretation of clinical laboratory results. Learn to interpret given information, recognize abnormal results and their clinical significance, generate etiologic possibilities, and determine the best diagnosis for the patient condition including appropriate treatment and recommended follow-up testing. Writing intensive. Microbiology case studies. 2 credits. Prereq: BMS 602 and BMS 603; BMS 720 and BMS 721. Hematology case studies. 1 credit. Prereq: BMS 644 and BMS 645. Medical Biochemistry case studies. 2 credit. Prereq: BMS 658 and BMS 659. Immunohematology case studies. 1 credit. Prereq: BMS 656 and BMS 657.

**Attributes:** Writing Intensive Course**BMS 751 - Advanced Clinical Microbiology Internship****Credits:** 5

Instruction and clinical practice of microbiology related techniques and their applications in the medical laboratory setting. Includes the principles and practices of proper specimen collection, clinical diagnosis testing, and interpretation of results. Special fee.

**BMS 751W - Advanced Clinical Microbiology Internship****Credits:** 5

Instruction and clinical practice of microbiology related techniques and their applications in the medical laboratory setting. Includes the principles and practices of proper specimen collection, clinical diagnosis testing, and interpretation of results. Special fee. Writing intensive.

**Attributes:** Writing Intensive Course**BMS 752 - Advanced Hematology Internship****Credits:** 5

Instruction and clinical practice of hematology related techniques and their applications in the medical laboratory setting. Includes the principles and practices of special hematology procedures including diagnostic staining, advanced hemostasis studies, and evaluation of blood cells in disease states.

**BMS 752W - Advanced Hematology Internship****Credits:** 5

Instruction and clinical practice of hematology related techniques and their applications in the medical laboratory setting. Includes the principles and practices of special hematology procedures including diagnostic staining, advanced hemostasis studies, and evaluation of blood cells in disease states. Writing intensive.

**Attributes:** Writing Intensive Course**BMS 753 - Advanced Immunohematology Internship****Credits:** 5

Introduction and clinical practice of immunohematology related techniques and their applications in the medical laboratory setting. Includes the principles and practices of advanced blood-banking procedures, including antibody identification, and component therapy.

**BMS 753W - Advanced Immunohematology Internship****Credits:** 5

Introduction and clinical practice of immunohematology related techniques and their applications in the medical laboratory setting. Includes the principles and practices of advanced blood-banking procedures, including antibody identification, and component therapy. Writing intensive.

**Attributes:** Writing Intensive Course**BMS 754 - Advanced Clinical Chemistry Internship****Credits:** 5

Instruction and clinical practice of clinical chemistry related techniques and their applications in the medical laboratory setting. Includes the principles and practices of advanced laboratory analysis of body fluid chemistries. Enzymology, isotopes, hormones, blood gases, and toxicology. Theory, operation, evaluation and maintenance of automated chemistry systems.

**BMS 754W - Advanced Clinical Chemistry Internship****Credits:** 5

Instruction and clinical practice of clinical chemistry related techniques and their applications in the medical laboratory setting. Includes the principles and practices of advanced laboratory analysis of body fluid chemistries. Enzymology, isotopes, hormones, blood gases, and toxicology. Theory, operation, evaluation and maintenance of automated chemistry systems. Writing intensive.

**Attributes:** Writing Intensive Course**BMS 761 - Clinical Microbiology Internship****Credits:** 20

Advanced instruction in clinical bacteriology, mycology, parasitology, and virology at local hospital or reference laboratory. Isolation, identification, and antibiotic sensitivities for common pathogens are emphasized. Special fee.

**BMS 761W - Clinical Microbiology Internship****Credits:** 20

Advanced instruction in clinical bacteriology, mycology, parasitology, and virology at local hospital or reference laboratory. Isolation, identification, and antibiotic sensitivities for common pathogens are emphasized. Special fee. Writing intensive.

**Attributes:** Writing Intensive Course

**BMS 762 - Clinical Hematology Internship****Credits:** 20

Advanced instruction in hematology and hemostasis at a local hospital or reference laboratory. Specialized tests such as automated cell counts, cytochemical analyses, and specialized hemostasis are covered. Special fee.

**BMS 763 - Clinical Immunohematology Internship****Credits:** 20

Advanced instruction in clinical immunohematology at a local hospital or reference laboratory. Pre-transfusion testing, donor screening, phlebotomy and component therapy emphasized. Special fee.

**BMS 764 - Clinical Chemistry Internship****Credits:** 20

Advanced instruction in clinical chemistry at a local hospital or reference laboratory. Analysis of carbohydrates, proteins, enzymes, lipids, hormones, electrolytes, blood gases, and drugs. Special fee.

**BMS 790 - Undergraduate Teaching Experience****Credits:** 1-4

Provide academic support to graduate teaching assistants or faculty in preparing, presenting, and executing Biomedical Science lectures or labs. May be repeated up to a maximum of 4 credits. Permission required.

**BMS 795 - Investigations in Biomedical Science****Credits:** 1-8

Advanced research or scholarly projects developed and conducted under the supervision of a faculty member. Provides the opportunity to apply knowledge and techniques of the major to a specific problem or question. Permission required. May be repeated up to a maximum of 8 credits.

**BMS 795W - Investigations in Biomedical Science****Credits:** 1-8

Advanced research or scholarly projects developed and conducted under the supervision of a faculty member. Provides the opportunity to apply knowledge and techniques of the major to a specific problem or question. Permission required. May be repeated up to a maximum of 8 credits. Writing intensive.

**Attributes:** Writing Intensive Course**BMS 796 - Biomedical Research Internship****Credits:** 4-16

Advanced instruction/participation in some aspect of biomedical research at an off-campus location. Student designs program of study with research supervisor and BMS faculty advisor. Permission required. May be repeated up to a maximum of 16 credits.

**BMS 799 - Senior Thesis****Credits:** 1-4

Independent research project under the direction of a faculty sponsor for seniors in biomedical sciences. Final product is a written thesis. One or two semesters. May be repeated to a maximum of 8 credits. Permission required. Writing intensive.

**Attributes:** Writing Intensive Course**BMS 799H - Senior Honors Thesis****Credits:** 1-4

Independent research project under the direction of a faculty sponsor for seniors in biomedical sciences and in the Honors Program. Final product is a written thesis. One or two semesters. May be repeated to a maximum of 8 credits. Permission required. Writing intensive.

**Attributes:** Writing Intensive Course**Faculty**<http://colsa.unh.edu/faculty/all>