BIOMEDICAL AND CLINICAL SCIENCES B.S.

All students must meet the Degree and University Requirements.

All students must meet the Catamount Core Curriculum Requirements.

All students must meet the College Requirements.

Biomedical and Clinical Scientists are health professionals involved in the development, performance, and evaluation of laboratory tests that lead to assessment of health status, diagnosis of disease, and monitoring of therapeutic treatment. Students in this major work closely with faculty members and engage in hands-on learning in the classroom, laboratory, and an applied environment to develop critical thinking and technical skills.

Students select a concentration in medical laboratory science, public health laboratory science, or applied biomedical science at the end of their second year. The curriculum provides balance between general and professional education, with coursework in the sciences and liberal arts serving as a foundation for the biomedical and clinical science courses. In the fourth year, the final semester consists of a full time medical or public health laboratory practicum, or an applied biomedical research or internship at an off-campus affiliate site, which may require additional room, meal, and/or transportation expenses. Site selection for the final semester is determined by a lottery system.

Students in programs offered by the Department of Biomedical and Health Sciences (BHSC) must maintain a cumulative grade point average of 2.3 or higher. Students with a cumulative grade point average below 2.3 will be placed on academic trial. First-year students must achieve a cumulative GPA of 2.3 or higher by the end of two subsequent semesters to be removed from trial. Students who fail to raise their cumulative GPA to 2.3 after the trial semesters may be discontinued from the program. Students beyond the first year must achieve a cumulative GPA of 2.3 or higher by the end of the subsequent semester to be removed from trial. Students who fail to raise their cumulative GPA to 2.3 after the trial semester may be discontinued from the program. Students who earn one grade below a C in any non-practicum, non-internship, professional/core course will be placed on "academic warning" and will receive a letter informing them of such. Professional or core courses are identified on each major curriculum sheet. In order to remain in good standing within the BHSC programs, students must also be consistently progressing in the program curriculum. Failure to follow the required sequence of courses outlined in the BHSC program of study for more than one semester is grounds for discontinuation from the major.

Graduates who complete the medical laboratory science concentration are qualified for a national certification exam administered by the American Society for Clinical Pathology (ASCP). Students who choose the concentration in public health laboratory science may elect to complete a clinical rotation in microbiology to qualify to take the ASCP microbiology-only certification exam. Taking and passing the ASCP Certification Exam is not a requirement for graduation. ASCP certification is required by most clinical diagnostic and public health laboratories. The curriculum of the medical laboratory science concentration is accredited by the National Accrediting Agency for Clinical Laboratory Sciences. The public health laboratory science and applied biomedical science concentrations are not accredited pathways.

Applied Biomedical Science Concentration

Students in Applied Biomedical Science plan to pursue careers in research, industry, or as a healthcare professional. This concentration provides students with a foundation of knowledge and skills which are appealing to numerous areas of study including biotechnology, pharmacology, veterinary science, agricultural science, and even forensics and public health. Applied biomedical science students will complete an internship or research at an approved industry partner.

Medical Laboratory Science Concentration

Medical laboratory science students complete course work which prepares them for practica in medical laboratories where they will apply their biomedical knowledge and technical skills and further learn about the health and disease status of patients.

PRACTICUM SITES* HAVE INCLUDED:

- Beth Israel Deaconess Medical Center, Boston, MA
- Brigham and Women's Hospital, Boston, MA
- Champlain Valley Physicians Hospital, Plattsburgh, NY
- Central Vermont Medical Center, Berlin, VT
- Dartmouth Hitchcock Medical Center, Lebanon, NH
- Elliott Hospital, Manchester, NH
- Glens Falls Hospital, Glens Falls, NY
- Massachusetts General Hospital, Boston, MA
- NorDx, Portland and Scarborough, ME
- Rutland Regional Medical Center, Rutland, VT
- St. Peter's Hospital, Albany, NY
- University of Vermont Medical Center, Burlington, VT
- Yale New Haven Hospital, New Haven, CT

*Clinical affiliations subject to change.

Public Health Laboratory Science Concentration

Public health laboratory scientists work in public health laboratories at the state, federal, and international levels. The curriculum focuses on the use of microbiology and molecular biology in the field of

public health, in support of epidemiology, and to monitor health status and disease prevention strategies.

PRACTICUM SITES* HAVE INCLUDED:

- District of Columbia Health Department, Washington, DC
- New Hampshire Department of Health Laboratory, Concord, NH
- Vermont Department of Health Laboratory, Burlington, VT
- Wadsworth Center, New York Department of Health, Albany, NY

*Public health laboratory affiliations subject to change.

PLAN OF STUDY

The Biomedical and Clinical Sciences major offers three concentrations:

- Applied Biomedical Science Concentration
- Medical Laboratory Science Concentration
- Public Health Laboratory Science Concentration

Applied Biomedical Science Concentration

First Year		Credits
	Fall	Spring
NH 1500 App to Hlth: From Pers to Syst	1	
HSCI 1100 Introduction to Public Health (S1)	3	
ENGL 1001 Written Expression (WIL2)	3	
CHEM 1400 General Chemistry 1 (N2)	4	
MATH 1212 Fundamentals of Calculus I (N2)	3	
BHSC 1980 Intro to Scientific Writing (WIL2)		3
BHSC 1340 Human Cell Biology (N2)		4
CHEM 1450 General Chemistry 2 (N2)		4
Catamount Core - AH1, AH2 with D1, D2 or SU		6
Year Total:	14	17

Sophomore		Credits
	Fall	Spring
ANPS 1190 Ugr Hum Anatomy & Physiology 1	4	
MLS 2010 Medical Diagnostic Techniques[1]	3	
MMG 2010 Microbiol & Infectious Disease	4	
NH 2200 Health Care Ethics	3	
Catamount Core - AH1, AH2 with D1, D2 or SU	3	3
ANPS 1200 Ugr Hum Anatomy & Physiology 2		4
CHEM 1580 Intro Organic Chemistry w/lab		4
STAT 1110 Elements of Statistics (QD) or STAT 1410 Basic Statistical Methods 1		3
Elective		3
Year Total:	17	17

Junior		Credits
	Fall	Spring
BIOC 3001 Fundamentals of Biochemistry	3	
PATH 2010 Intro to Human Disease	3	
MLS 3100 Clinical Chemistry I[1]	4	
Lab Course	1	
Elective	4	3
MMG 3220 Adv Medical Microbiology w/lab[1]		4
BHSC 3420 Immunology[1] or MMG 3230 Immunology		3
BHSC 3440 Immunology Lab[1]		1
MLS 3110 Clinical Chemistry II[1]		3
Year Total:	15	14

Senior		Credits
	Fall	Spring
BHSC 3810 Applied Molecular Biology[1]	3	
BHSC 3820 Applied Molecular Biology Lab[1]	1	
MLS 3200 Hematology[1]	3	
MLS 3300 Clinical Microbiology II[1]	3	
Lab Course	1	
Elective	6	
HSCI 3400 Writing for Health Profess.		3
Choose one of the following courses:		6
MLS 3XXX Applied Experience		
MLS 3995 Undergraduate Research		
MLS 3910 Fndtn of Interprofessionalism (Winter Session)[1,2]		1
Year Total:	17	10

Total Credits in Sequence:	**121**

[1] Professional course
[2] MLS 3910 is an online course.

This plan of study is designed to meet the requirements for the Biomedical and Clinical Science major's applied biomedical science concentration. Changes should be reviewed with a student's academic advisor. A minimum of 121 semester credit hours, minimum GPA per program requirement, and fulfillment of the University's Catamount Core are required for graduation.

Medical Laboratory Science Concentration

First Year		**Credits**
	Fall	**Spring**
NH 1500 App to Hlth: From Pers to Syst (S1)	1	
ENGL 1001 Written Expression (WIL2)	3	
HSCI 1100 Introduction to Public Health (N2)	3	
CHEM 1400 General Chemistry 1 (N2)	4	
MATH 1212 Fundamentals of Calculus I (MA)	3	
BHSC 1980 Intro to Scientific Writing (WIL2)		3
BHSC 1340 Human Cell Biology (N2)		4
CHEM 1450 General Chemistry 2 (N2)		4
Catamount Core - AH1, AH2 with D1, D2 or SU		6
Year Total:	14	17

Sophomore		**Credits**
	Fall	**Spring**
ANPS 1190 Ugr Hum Anatomy & Physiology 1	4	
STAT 1110 Elements of Statistics or STAT 1410 Basic Statistical Methods 1	3	
MMG 2010 Microbiol & Infectious Disease	4	
NH 2200 Health Care Ethics	3	
Catamount Core - D1, D2 or SU	3	3
ANPS 1200 Ugr Hum Anatomy & Physiology 2		4
CHEM 1580 Intro Organic Chemistry w/lab (Catamount Core - AH1, AH2 with D1, D2 or SU)		4
Elective		3
Year Total:	17	14

Junior		**Credits**
	Fall	**Spring**
BHSC 2970 Leadership & Mgt in Hlth Care[1]	3	
BIOC 3001 Fundamentals of Biochemistry	3	
PATH 2010 Intro to Human Disease	3	
MLS 3100 Clinical Chemistry I[1]	4	
Elective	2	3
MMG 3220 Adv Medical Microbiology w/lab		4
Choose one of the following courses:		3
BHSC 3420 Immunology[1]		
MMG 3230 Immunology[1]		
BHSC 3440 Immunology Lab[1]		1
MLS 3110 Clinical Chemistry II[1]		3
Year Total:	15	14

Senior		**Credits**
	Fall	**Spring**
BHSC 3810 Applied Molecular Biology[1]	3	
BHSC 3820 Applied Molecular Biology Lab[1]	1	
MLS 3200 Hematology[1]	3	
MLS 3220 Hematology Lab	1	
MLS 3300 Clinical Microbiology II[1]	3	
MLS 3400 Immunohematology[1]	4	
MLS 3910 Fndtn of Interprofessionalism (Winter Session)		1
MLS 3900 Topics in Medical Lab Science (Certification Review)[1]		2
MLS 3192 Clinical Practicum: Chemistry[1]		3
MLS 3292 Clinical Practicum:Hematology[1]		3
MLS 3392 Clin Practicum:Microbiology[1]		3
MLS 3492 Clin Practicum:Immunohematolog[1]		3
Year Total:	15	15

Total Credits in Sequence:	**121**

[1] Professional course

This plan of study is designed to meet the requirements for the Biomedical and Clinical Science major's medical laboratory science concentration. Changes should be reviewed with a student's academic advisor. A minimum of 121 semester credit hours, minimum GPA per program requirement, and fulfillment of the University Catamount Core are required for graduation.

Public Health Laboratory Science Concentration

First Year		Credits
	Fall	Spring
NH 1500 App to Hlth: From Pers to Syst	1	
HSCI 1100 Introduction to Public Health (S1)	3	
ENGL 1001 Written Expression (WIL2)	3	
CHEM 1400 General Chemistry 1 (N2)	4	
MATH 1212 Fundamentals of Calculus I (MA)	3	
BHSC 1980 Intro to Scientific Writing (WIL2)		3
BHSC 1340 Human Cell Biology (N2)		4
CHEM 1450 General Chemistry 2		4
Catamount Core - AH1, AH2 with D1, D2 or SU		6
Year Total:	14	17

Sophomore		Credits
	Fall	Spring
ANPS 1190 Ugr Hum Anatomy & Physiology 1	4	
STAT 1110 Elements of Statistics or STAT 1410 Basic Statistical Methods 1	3	
MMG 2010 Microbiol & Infectious Disease (Catamount Core - AH1, AH2 with D1, D2 or SU)	4	
Catamount Core - D1, D2 or SU	3	3
NH 2200 Health Care Ethics	3	
ANPS 1200 Ugr Hum Anatomy & Physiology 2		4
CHEM 1580 Intro Organic Chemistry w/lab		4
Elective[3]		3
Year Total:	17	14

Junior		Credits
	Fall	Spring
BHSC 2970 Leadership & Mgt in Hlth Care[1]	3	
BIOC 3001 Fundamentals of Biochemistry	3	
PATH 2010 Intro to Human Disease	3	
STAT 3000 Med Biostat&Epidemiology (Elective)[3] or STAT 1410 Basic Statistical Methods 1	3	
Elective[3]	3	
MMG 3220 Adv Medical Microbiology w/lab[1,2]		4
Choose one of the following courses:		3
BHSC 3420 Immunology[1]		
MMG 3230 Immunology[1]		
BHSC 3440 Immunology Lab[1]		1
BCOR 2300 Genetics		3
HSCI 2400 Hlthcare & Pub Hlth Syst US or HSCI 3100 Epi, Pub Hlth & Emerg Disease		3
Year Total:	15	14

Senior		Credits
	Fall	Spring
BHSC 3810 Applied Molecular Biology[1]	3	
BHSC 3820 Applied Molecular Biology Lab[1]	1	
NFS 3203 Food Microbiology	3	
NFS 3204 Food Microbiology Lab	1	
MLS 3300 Clinical Microbiology II[1]	3	
Approved Elective[3]	4	
MLS 3892 Public Health Lab Practicum		12
MLS 3392 Clin Practicum:Microbiology (or Approved Elective)[1,2,3]		3
Year Total:	15	15
Total Credits in Sequence:		**121**

[1] Professional course
[2] MLS 3392 must be approved by the MLS program director.
[3] For the public health science concentration, students must take 6 credits of department-approved electives in the area of Public

Health. Students must obtain a list of approved elective courses for each respective academic year from their academic advisor.

This plan of study is designed to meet the requirements for the Biomedical and Clinical Sciences major's public health laboratory science concentration. Changes should be reviewed with a student's academic advisor. A minimum of 121 semester credit hours, minimum GPA per program requirement, and fulfillment of the University Catamount Core are required for graduation.