

Bouvé College of Health Sciences

www.bouve.neu.edu

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The programs in Bouvé College of Health Sciences combine cooperative education experiences with highly innovative academic curricula that are designed to meet the demand for well-educated allied health professionals, nurses, and pharmacists. The college prepares students to become effective professional practitioners, enter graduate schools, and work in many areas responsible for the delivery of health care.

There are three schools within the Bouvé College of Health Sciences: the School of Nursing, the School of Pharmacy, and the School of Health Professions, which comprises the following majors: athletic training, cardiopulmonary and exercise sciences, medical laboratory science, physical therapy, respiratory therapy, and speech-language pathology and audiology. The college offers students a health-care education that features a curriculum of highly relevant and closely integrated basic courses in the physical, biological, behavioral, and administrative sciences; on-site involvement in clinical patient care, including early and advanced pharmacy practice experiences and clinical affiliations in nursing, physical therapy, and other health professions; a cooperative education work program; and a commitment to the search for and advancement of new and progressive concepts, ideas, and philosophies of education and professional practice.

Each of the programs offered by the college is accredited by the appropriate professional group. The college is a member of the Association of Schools of Allied Health Professions, the American Association of Colleges of Nursing, and the American Association of Colleges of Pharmacy.

Academic Requirements

Students must receive a grade of C or better in professional courses.

Professional courses:

Courses taught within the major/college as identified by unit/faculty: ATP, BHS, CES, MLS, NUR, PMD, PSC, PTH, SLA, TOX

Nursing—All NUR courses including the following interdisciplinary courses: BHS U105, Nutrition, BHS U450, Research, and PCS U340, Pharmacology

Students must receive a grade of C– or better in selected professional prerequisites.

Professional prerequisites:

All courses, including sciences, essential, content, and prerequisite courses, as determined by unit faculty. Laboratory sections may be treated separately from lecture.

Athletic Training: BIO, CHM, MTH, PHY

Cardiopulmonary and Exercise Sciences: BIO, CHM, MTH, PHY, PSC

Medical Laboratory Science: BIO, CHM, MTH, PHY

Nursing: BIO, CHM, MTH

Pharmacy: BIO, CHM, PHY, MTH

Physical Therapy: BIO, CHM, MTH, PHY

Speech-Language Pathology and Audiology: BIO, MTH, PSY U101

For all other courses:

The University's minimum passing grade for the course will be accepted.

Academic Standing

Freshmen must have an overall GPA greater than or equal to 1.800 and earn at least 12 semester hours in the semester just completed in order to maintain good academic standing.

Upperclass students must have an overall GPA greater than or equal to 2.000 and earn at least 12 semester hours in the semester just completed in order to maintain good academic standing.

Status	Freshman	Upperclass
Warning	GPA less than 1.800 after one semester	NA
Probation	GPA of less than 1.800 at the end of freshman year	GPA of less than 2.000; earned fewer than 12 semester hours in the semester just completed
Probation Extended	NA	GPA of less than 2.000 for any two consecutive semesters
Dismissal from Program	<ol style="list-style-type: none"> GPA of less than 1.800 after completion of summer remedial work, or Failure to receive minimum required grade in the same course twice 	<ol style="list-style-type: none"> Failure to bring GPA above 2.000 after two semesters of probation, or Three failures in professional courses regardless of remediation, or Failure to pass the same course twice

Academic Progression

In order to progress from freshman to sophomore year, students must have a GPA greater than 1.800, have completed 27 semester hours, and successfully repeated courses for which they have not received the minimum required grade for their major. In order to progress into the subsequent year of professional courses, the student must have passed all professional

courses with a grade of C or better and all professional prerequisites (as determined by the department) with a grade of C– or better. Students are responsible for following the curriculum plan based on their assigned major, cooperative education division, and year of graduation. Students have a responsibility for monitoring their own progress through the curriculum by registering for the proper courses, knowing the course prerequisites, and knowing the sanctions for unsatisfactory academic progress.

Special requirements

Cooperative education is a required component for all Bouvé programs unless otherwise noted.

Graduation requirements

The college reserves the right to amend programs, courses, and degree requirements to fulfill its educational responsibility to respond to relevant changes in the field. Students must complete all of the requirements in the degree program in which they are candidates. Degree requirements are based on the year of graduation, determined by the date of entry or reentry into the college. Degree requirements and the year of graduation for a degree candidate who fails to make satisfactory academic progress will be subject to review and possible change.

Pathways Program

The Pathways Program is designed for students who want to explore the health science professions within Bouvé College before selecting a major. The program offers freshmen a core of courses designed to provide the basic scientific background for many of the professional programs in the college.

Satisfactory completion of the Pathways curriculum is necessary for transfer, on a space-available basis, to one of the professional programs of the college.

Transfer Credit

The college may accept qualified transfer students who have successfully completed course work in an accredited college or university. No student transferring from another college or university may receive a degree unless 32 of the last 40 semester hours of academic work immediately preceding graduation have been completed at Northeastern.

SCHOOL OF HEALTH PROFESSIONS

www.bouve.neu.edu/Health

MARY E. WATSON, EDD, RRT,

Dean of the School and Associate Dean of the College

ATHLETIC TRAINING

www.bouve.neu.edu/Health/athletics.html

JAMIE L. MUSLER, MS, ATC

Program Director and Assistant Clinical Specialist

ASSOCIATE PROFESSOR

Chad A. Starkey, PhD

ASSISTANT PROFESSOR

Andrew Krause, PhD

COORDINATOR OF CLINICAL EDUCATION
AND ASSISTANT CLINICAL SPECIALIST

Kimberly Ashton Wise, MS, ATC

The five-year athletic training education program is designed for students who are interested in an allied health-care profession specializing in the health care of the physically active. Working under a physician's supervision, athletic trainers are members of the sports medicine field who specialize in the prevention, evaluation, management, treatment, and rehabilitation of injuries to a physically active population. Athletic trainers function as integral members of the health-care team in secondary schools, colleges and universities, professional sports programs, sports medicine clinics, hospitals, corporate and industrial settings, and other health-care facilities.

Students may apply from high school or apply for transfer into the athletic training education program after successfully completing their first year of academic study. To be accepted into the program, transfer applicants must demonstrate an established academic record with a solid foundation in the sciences. In addition, the athletic training education program has minimum physical, emotional, and cognitive skill requirements considered necessary for all students admitted to the program. These requirements are outlined in the Technical Standards that can be found on the program Web site and from the program office. Candidates for selection to the athletic training education program will be required to verify they understand and meet these Technical Standards or that they believe, with certain accommodations, they can meet the standards. It is the sole responsibility of the student to notify the Disability Resource Center if they feel accommodations are needed.

Students in the program take courses designed to develop competencies in the following domains: risk management and injury prevention, pathology of injuries and illnesses, assessment and evaluation, acute care of injury and illness, pharmacology, therapeutic modalities, therapeutic exercise, general medical conditions and disabilities, nutritional aspects of injury and illness, psychosocial intervention and referral, health-care administration, and professional development and responsibilities. The athletic training education program is committed to the advancement of scholarship by implementing evidence-based practice into didactic, clinical, and cooperative

education. In addition, students are required to fulfill clinical education requirements in four structured clinical affiliations during academic semesters. These affiliations may include Northeastern University, other colleges, universities, and high schools as well as clinics and medical facilities in the Boston area. To progress in the program, students must maintain acceptable standards of scholarship, academic performance, and psychomotor development as outlined in this catalog and the student handbook.

The program is accredited by the Commission on Accreditation of Allied Health Education Programs (CAAHEP). Students who graduate from the athletic training education program are eligible to sit for the National Athletic Trainers' Association Board Certification Examination and may be eligible for state licensure in those states that require licensure for athletic trainers. See pages 224–226 for course descriptions.

BS in Athletic Training

ENGLISH REQUIREMENT

Complete the following course:

ENG U111	College Writing	4 SH
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and one approved Advanced Writing in the Disciplines course for the major. A grade of C or higher is required in both courses.

DIVERSITY

Complete SOA U101 Peoples and Cultures 4 SH
or choose a course from the list "Approved Courses: Diversity" on page 48.

ATHLETIC TRAINING GENERAL EDUCATION
REQUIREMENTS*Mathematics*

Complete the following course:

MTH U121	Precalculus	4 SH
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Anatomy and Physiology

Complete the following two courses with corresponding labs:

BIO U117	Integrated Anatomy and Physiology 1	4 SH
with BIO U118	Lab for BIO U117	1 SH
BIO U119	Integrated Anatomy and Physiology 2	4 SH
with BIO U120	Lab for BIO U119	1 SH

Chemistry

Complete one of the following courses with corresponding lab:

CHM U101	General Chemistry for Health Sciences	4 SH
with CHM U102	Lab for CHM U101	1 SH
or CHM U104	Organic Chemistry for Health Sciences	4 SH
with CHM U105	Lab for CHM U104	1 SH
or CHM U211	General Chemistry 1	4 SH
with CHM U212	Lab for CHM U211	1 SH
or CHM U214	General Chemistry 2	4 SH
with CHM U215	Lab for CHM U214	1 SH
or CHM U311	Organic Chemistry 1	4 SH
with CHM U312	Lab for CHM U311	1 SH
or CHM U313	Organic Chemistry 2	4 SH
with CHM U314	Lab for CHM U313	1 SH

Physics

Complete the following course with corresponding lab:

PHY U145	Physics for Life Sciences 1	4 SH
with PHY U146	Lab for PHY U145	1 SH

Psychology

Complete the following course:

PSY U101	Foundations of Psychology	4 SH
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ATHLETIC TRAINING REQUIREMENTS**Introductory Courses**

Complete the following two courses with corresponding lab:

ATP U105	Athletic Health-Care Overview	3 SH
ATP U120	Clinical Practice Skills in Athletic Training	3 SH
with ATP U121	Lab for ATP U120	1 SH

Intermediate Courses

Complete the following three courses with corresponding labs:

ATP U310	Therapeutic Modalities	3 SH
with ATP U311	Lab for ATP U310	1 SH
ATP U320	Therapeutic Exercise	3 SH
with ATP U321	Lab for ATP U320	1 SH
ATP U330	Neuromuscular and Cardiovascular Programming	2 SH

Advanced Courses

Complete the following five courses with corresponding labs:

ATP U500	Evaluation: Lower Extremity	4 SH
with ATP U501	Evaluation: Lower Extremity Skills Lab	1 SH
and ATP U502	Evaluation: Lower Extremity Anatomy Lab	1 SH
ATP U510	Evaluation: Upper Extremity	4 SH
with ATP U511	Evaluation: Upper Extremity Skills Lab	1 SH
and ATP U512	Evaluation: Upper Extremity Anatomy Lab	1 SH
ATP U520	Evaluation: Head and Spine	4 SH
with ATP U521	Evaluation: Head and Spine Skills Lab	1 SH
and ATP U522	Evaluation: Head and Spine Anatomy Lab	1 SH
ATP U530	Disease and Disabilities in Athletics	3 SH
with ATP U531	Lab for ATP U530	1 SH
ATP U600	Administration in Athletic Health Care	4 SH

Clinical and Field Work

Complete the following five courses:

ATP U941	Athletic Training Clinical Affiliation 1	3 SH
ATP U942	Athletic Training Clinical Affiliation 2	3 SH
ATP U943	Athletic Training Clinical Affiliation 3	3 SH
ATP U944	Athletic Training Clinical Affiliation 4	3 SH
ATP U946	Athletic Training Senior Experience	2 SH

Additional Bouvé Course Work

Complete the following six courses and corresponding labs:

BHS U105	Nutrition	4 SH
CAP U502	Health Counseling	3 SH
CES U400	Statistics and Research Design	4 SH
or BHS U450	Health-Care Research	4 SH
CES U500	Exercise Physiology 1	4 SH
with CES U501	Lab for CES U500	1 SH

CES U504	Clinical Kinesiology	4 SH
with CES U505	Lab for CES U504	1 SH
PSC U340	Pharmacology for the Health Professions	4 SH

GRADE REQUIREMENTS

A grade of C or higher is required in all ATP and science courses.

GENERAL ELECTIVES

Additional courses taken beyond college and major course requirements to satisfy graduation credit requirements.

COOPERATIVE EDUCATION**UNIVERSITY-WIDE REQUIREMENTS**

128 total semester hours required

Transition students are required to complete 132 total semester hours

Minimum 2.000 GPA required

CARDIOPULMONARY AND EXERCISE SCIENCES

www.bouve.neu.edu/Health/cep.html

WILLIAM J. GILLESPIE, EdD

Associate Professor and Chair

PROFESSOR

Thomas A. Barnes, EdD, RRT

ASSOCIATE PROFESSORS

Marilyn A. Cairns, ScD

Carol Ewing Garber, PhD

Patrick F. Plunkett, EdD, RRT

Mary E. Watson, EdD, RRT

ASSOCIATE CLINICAL SPECIALISTS

Scott A. Stanley, MS, RRT

Annemarie C. Sullivan, MS

The Department of Cardiopulmonary and Exercise Sciences offers both five-year co-op and four-year non-co-op Bachelor of Science (BS) degree programs in exercise physiology and respiratory therapy. In addition, the department offers a new six-year co-op and five-year non-co-op combined Bachelor of Science/Master of Science (BS/MS) degree program in clinical exercise physiology.

All programs have a common core curriculum in arts and sciences and cardiopulmonary sciences during the freshman and sophomore years. At the completion of the sophomore year, students decide on the various program options (co-op or non-co-op, BS or BS/MS in exercise physiology, or BS in respiratory therapy).

Exercise Physiology

Exercise physiologists administer exercise tests and develop, implement, and supervise exercise and health-promotion programs for people to help improve their health, fitness, and functional capacity. Clinical exercise physiologists do the above, but work primarily with patients who have chronic cardiovascular, pulmonary, metabolic, and musculoskeletal diseases and disorders to help improve their health, fitness, and functional status.

All students in the program take courses in exercise physiology, exercise testing and prescription, clinical kinesiology, and health promotion and program planning. Students then choose a concentration in health and fitness, research, or clinical exercise physiology. Students in the health and fitness concentration complete a two-semester practicum sequence during their senior year in which they have internship experiences in a commercial and/or corporate health and fitness center. Students in the research concentration complete a two-semester thesis sequence during their senior year in which they complete a research project under the direction of a faculty member. Students in the clinical exercise physiology program complete graduate courses during their final two years in advanced cardiopulmonary physiology, cardiopulmonary pathophysiology, musculoskeletal pathophysiology and assessment, electrocardiography, pharmacology, advanced exercise physiology, clinical exercise testing, and exercise in health and disease. Students then complete twelve months or three semesters of rotations in cardiology departments performing exercise testing and in rehabilitation programs working with people with a variety of diseases and disabilities.

Students completing the BS degree program in exercise physiology with a concentration in health and fitness are eligible to sit for the American College of Sports Medicine Health/Fitness Certification. Students completing the MS degree program in clinical exercise physiology are eligible to sit for the ACSM Clinical Exercise Physiology Registry Examination and Exercise Specialist Certification.

Respiratory Therapy

Respiratory therapists are instrumental in the diagnosis, treatment, management, and preventive care of patients with cardiopulmonary problems. Patients suffering from a variety of acute or chronic disabling conditions may be found in newborn nurseries, surgical and medical units, emergency rooms, outpatient departments, and intensive-care units. Respiratory therapists are expected to assess and quantify their patients' cardiopulmonary status, to provide appropriate respiratory care by applying patient-care protocols, and to evaluate the medical benefits and cost-effectiveness of their care. Respiratory therapists have often promoted the expansion of services in their communities, such as diagnosis and treatment of sleep disorders, patient education on health promotion and disease prevention, pulmonary rehabilitation, disease-specific case management, and life support outside of the intensive-care unit. Changes in health-care policy, regulations, and reimbursements have required therapists to adopt these expanded roles, work

more independently in settings across the continuum of care, and collaborate as partners on the health-care delivery team.

Respiratory therapists are involved in treating disorders such as cardiac failure, asthma, pulmonary edema, emphysema, cerebral thrombosis, drowning, hemorrhage, and shock. The respiratory therapist is a life-support specialist trained in airway management, artificial ventilation, emergency cardiac care, and other sophisticated emergency support measures.

Working under physicians' orders, respiratory therapists administer therapeutic measures. They must provide and recommend specialized care and be skilled in such areas as medical gas administration, aerosol therapy, chest physiotherapy, cardiopulmonary resuscitation, mechanical ventilation, airway management, pulmonary function studies, blood gas analysis, and hemodynamic monitoring. All students in the respiratory therapy specialization take several respiratory therapy didactic, laboratory, seminar, and clinical practice courses.

After successful completion of the program, students are eligible to take the respiratory therapy registry examination administered by the National Board for Respiratory Care. Those who pass the exam earn the designation Registered Respiratory Therapist (RRT). The program is accredited by the Commission on Accreditation of Allied Health Education Programs.

BS in Cardiopulmonary and Exercise Sciences

ENGLISH REQUIREMENT

Complete the following course:

ENG U111	College Writing	4 SH
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and one approved Advanced Writing in the Disciplines course for the major. A grade of C or higher is required in both courses.

DIVERSITY

Complete the following course:

SOA U101	Peoples and Cultures	4 SH
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or choose a course from the list "Approved Courses: Diversity" on page 48.

CARDIOPULMONARY AND EXERCISE SCIENCES GENERAL EDUCATION REQUIREMENTS

Mathematics and Science

MATHEMATICS

Complete the following course:

MTH U141	Calculus 1	4 SH
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ANATOMY AND PHYSIOLOGY

Complete the following two courses and corresponding labs:

BIO U117	Integrated Anatomy and Physiology 1	4 SH
with BIO U118	Lab for BIO U117	1 SH
BIO U119	Integrated Anatomy and Physiology 2	4 SH
with BIO U120	Lab for BIO U119	1 SH

CHEMISTRY

Complete the following two courses and corresponding labs:

CHM U101	General Chemistry for Health Sciences	4 SH
with CHM U102	Lab for CHM U101	1 SH
or CHM U211	General Chemistry 1	4 SH
with CHM U212	Lab for CHM U211	1 SH

CHM U104	Organic Chemistry for Health Sciences	4 SH
with CHM U105	Lab for CHM U104	1 SH
or CHM U214	General Chemistry 2	4 SH
with CHM U215	Lab for CHM U214	1 SH

PHYSICS

Complete the following two courses and corresponding labs:

PHY U145	Physics for Life Sciences 1	4 SH
with PHY U146	Lab for PHY U145	1 SH
PHY U147	Physics for Life Sciences 2	4 SH
with PHY U148	Lab for PHY U147	1 SH

PHARMACOLOGY

Complete the following course:

PSC U340	Pharmacology for the Health Professions	4 SH
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Arts and Humanities**PSYCHOLOGY**

Complete the following course:

PSY U101	Foundations of Psychology	4 SH
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ETHICS

Complete the following course:

PHL U165	Moral Problems in Medicine	4 SH
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HUMANITIES ELECTIVE

Complete one elective from the following departments: ART, ASL, CMN, ENG, JRN, LNA, LNC, LNF, LNG, LNH, LNI, LNJ, LNL, LNM, LNR, LNS, MUS, PHL, or THE.

ARTS AND SCIENCES ELECTIVES

Complete four courses from the following College of Arts and Sciences departments: AFR, ARC, ART, ASL, BIO, CHM, CIN, CMN, ECN, ED, ENG, ENV, GEO, HS, HST, IAF, INT, JRN, LIN, LNA, LNC, LNF, LNG, LNH, LNI, LNJ, LNL, LNM, LNR, LNS, MMS, MTH, MUS, PHL, PHY, POL, PSY, SOA, SOC, or THE.

CARDIOPULMONARY AND EXERCISE SCIENCES**Introductory Courses**

Complete the following three courses:

CES U201	Cardiopulmonary and Exercise Sciences Seminar	1 SH
CES U202	Basic Clinical Skills	3 SH
COP U101	Professional Development for Co-op	1 SH

Intermediate Courses

Complete the following three courses:

BHS U450	Health-Care Research	4 SH
CES U300	Cardiopulmonary Physiology and Pathophysiology	4 SH
CES U301	Cardiopulmonary Assessment	4 SH

CONCENTRATION

Complete the concentration in respiratory therapy or the concentration in exercise physiology.

Concentration in Respiratory Therapy**MICROBIOLOGY COURSE**

Complete the following course and corresponding lab:

BIO U121	Basic Microbiology	4 SH
with BIO U122	Lab for BIO U121	1 SH

RESPIRATORY THERAPY REQUIRED COURSES

Complete the following five courses and corresponding labs:

CES U302	Cardiopulmonary Disease	4 SH
CES U600	Fundamentals of Respiratory Therapy	4 SH
with CES U601	Lab for CES U600	1 SH
CES U602	Advanced Respiratory Therapy Practice	4 SH
with CES U603	Lab for CES U602	1 SH
CES U604	Neonatal and Pediatric Respiratory Therapy	3 SH
with CES U605	Lab for CES U604	1 SH
CES U606	Advanced Cardiovascular Life Support	3 SH

SEMINAR AND PRACTICUM IN RESPIRATORY THERAPY

Complete the following four courses:

CES U910	Clinical Seminar in Respiratory Therapy	1 SH
CES U945	Practicum in Respiratory Therapy 1	4 SH
CES U946	Practicum in Respiratory Therapy 2	6 SH
CES U947	Practicum in Respiratory Therapy 3	6 SH

Concentration in Exercise Physiology**EXERCISE PHYSIOLOGY REQUIRED COURSES**

Complete the following five courses and corresponding lab:

CES U500	Exercise Physiology 1	4 SH
with CES U501	Lab for CES U500	1 SH
CES U502	Exercise Testing and Prescription	4 SH
CES U504	Clinical Kinesiology	4 SH
CES U506	Health Promotion and Program Planning	4 SH
CES U520	Exercise Physiology 2	3 SH

THESIS OR PRACTICUM

Complete either the thesis or practicum sequence.

THESIS

CES U701	Senior Thesis in Exercise Physiology 1	6 SH
with CES U702	Senior Thesis in Exercise Physiology 2	6 SH

PRACTICUM

CES U940	Practicum in Exercise Physiology 1	6 SH
with CES U941	Practicum in Exercise Physiology 2	6 SH

CES ELECTIVE COURSE

Complete one course from the CES department.

CARDIOPULMONARY AND EXERCISE SCIENCES GRADE REQUIREMENT

A grade of C or higher is required in all CES courses.

GENERAL ELECTIVES

Additional courses taken beyond college and major course requirements to satisfy graduation credit requirements.

COOPERATIVE EDUCATION**UNIVERSITY-WIDE REQUIREMENTS**

132 total semester hours required

Minimum 2.000 GPA required

BS/MS in Clinical Exercise Physiology**ENGLISH REQUIREMENT**

Complete the following course:

ENG U111 College Writing 4 SH
and one approved Advanced Writing in the Disciplines course for the major. A grade of C or higher is required in both courses.

DIVERSITY

Complete the following course:

SOA U101 Peoples and Cultures 4 SH
or choose a course from the list "Approved Courses: Diversity" on page 48.

**CARDIOPULMONARY AND EXERCISE SCIENCES
GENERAL EDUCATION REQUIREMENTS****Mathematics and Science****MATHEMATICS**

Complete the following course:

MTH U141 Calculus 1 4 SH

ANATOMY AND PHYSIOLOGY

Complete the following two courses and corresponding labs:

BIO U117 Integrated Anatomy and Physiology 1 4 SH
with BIO U118 Lab for BIO U117 1 SH
BIO U119 Integrated Anatomy and Physiology 2 4 SH
with BIO U120 Lab for BIO U119 1 SH

CHEMISTRY

Complete the following two courses and corresponding labs:

CHM U101 General Chemistry for Health Sciences 4 SH
with CHM U102 Lab for CHM U101 1 SH
or CHM U211 General Chemistry 1 4 SH
with CHM U212 Lab for CHM U211 1 SH
CHM U104 Organic Chemistry for Health Sciences 4 SH
with CHM U105 Lab for CHM U104 1 SH
or CHM U214 General Chemistry 2 4 SH
with CHM U215 Lab for CHM U214 1 SH

PHYSICS

Complete the following two courses and corresponding labs:

PHY U145 Physics for Life Sciences 1 4 SH
with PHY U146 Lab for PHY U145 1 SH
PHY U147 Physics for Life Sciences 2 4 SH
with PHY U148 Lab for PHY U147 1 SH

PHARMACOLOGY

Complete the following course:

PSC U340 Pharmacology for the Health Professions 4 SH

Arts and Humanities**PSYCHOLOGY**

Complete the following course:

PSY U101 Foundations of Psychology 4 SH

ETHICS

Complete the following course:

PHL U165 Moral Problems in Medicine 4 SH

HUMANITIES ELECTIVE

Complete one elective from the following departments: ART, ASL, CMN, ENG, JRN, LNA, LNC, LNF, LNG, LNH, LNI, LNJ, LNL, LNM, LNR, LNS, MUS, PHL, or THE.

ARTS AND SCIENCES ELECTIVES

Complete five courses from the following College of Arts and Sciences departments: AFR, ARC, ART, ASL, BIO, CHM, CIN, CMN, ECN, ED, ENG, ENV, GEO, HS, HST, IAF, INT, JRN, LIN, LNA, LNC, LNF, LNG, LNH, LNI, LNJ, LNL, LNM, LNR, LNS, MMS, MTH, MUS, PHL, PHY, POL, PSY, SOA, SOC, or THE.

CARDIOPULMONARY AND EXERCISE SCIENCES**Introductory Courses**

Complete the following three courses:

CES U201 Cardiopulmonary and Exercise Sciences Seminar 1 SH
CES U202 Basic Clinical Skills 3 SH
COP U101 Professional Development for Co-op 1 SH

Intermediate Courses

Complete the following three courses:

BHS U450 Health-Care Research 4 SH
CES U300 Cardiopulmonary Physiology and Pathophysiology 4 SH
CES U301 Cardiopulmonary Assessment 4 SH

**EXERCISE PHYSIOLOGY ADVANCED
AND GRADUATE REQUIREMENTS****Advanced Undergraduate Courses**

Complete the following three courses and corresponding lab:

CES U500 Exercise Physiology 1 4 SH
with CES U501 Lab for CES U500 1 SH
CES U502 Exercise Testing and Prescription 4 SH
CES U504 Clinical Kinesiology 4 SH

Graduate Musculoskeletal

Complete the following two courses:

CES G230 Musculoskeletal Pathophysiology 3 SH
CES G231 Musculoskeletal Assessment 2 SH

Graduate Cardiopulmonary

Complete the following six courses:

CES G200 Cardiopulmonary Physiology 3 SH
CES G201 Cardiopulmonary Pathophysiology 3 SH
CES G202 Electrocardiography 3 SH
CES G203 Clinical Pharmacology 3 SH
CES G220 Exercise Physiology 3 SH
CES G221 Clinical CP Exercise Testing 2 SH

Advanced Seminar

Complete the following course:

CES G222 Exercise in Health and Disease 3 SH

Research Design

Complete the following course:

CES G263 Research Design and Methodology 3 SH

Internship or Thesis

Complete the following course:

CES G401 Clinical Exercise Physiology Internship 1 3 SH
and either the following internship or thesis sequence:

INTERNSHIP		
CES G402	Clinical Exercise Physiology Internship 2	3 SH
with CES G403	Clinical Exercise Physiology Internship 3	3 SH

THESIS		
CES G691	Thesis 1	3 SH
with CES G692	Thesis 2	3 SH

Electives

Complete two courses from the CES department. At least one course must be a graduate course.

CARDIOPULMONARY AND EXERCISE SCIENCES GRADE REQUIREMENTS

A grade of C or higher is required in all CES courses.
Minimum 3.000 GPA required for all graduate courses.

GENERAL ELECTIVES

Additional courses taken beyond college and major course requirements to satisfy graduation credit requirements.

COOPERATIVE EDUCATION**UNIVERSITY-WIDE REQUIREMENTS**

156 total semester hours required
Minimum 2.000 GPA required

HEALTH SCIENCE

PATRICK F. PLUNKETT, EdD, RRT
Associate Professor and Program Director

The rapidly changing health system is creating a demand for broadly educated graduates possessing a strong understanding of health, health care, and community service-related issues. Individuals with these skills are needed by public and private agencies, public health services, hospitals, and other nonprofit and for-profit companies and health-related organizations. The health science program is designed for undergraduate students who are seeking a general preparation for entry-level positions in health care, health education, health administration, and community-based public health. The health science curriculum is an integrated model that builds upon a foundation of the social sciences, natural sciences, and the liberal arts. Health science students complete an array of major courses that introduce them to the health-care system in the United States and provide them with the opportunity to develop a deep understanding of health policy and administration, health research, quality improvement, medical informatics, and evidence-based health care. The health science curriculum also includes a significant number of electives that enable students to enrich their intellectual lives. Students may undertake a formal minor in an academic area that is related to and complements their health science studies. The entire academic experience is drawn together through a capstone project during the senior year. The capstone project is intended to provide students with

a structured opportunity to broaden, deepen, and integrate the knowledge and skills acquired in prior courses and experiential activities.

BS in Health Science

Pending Trustees' approval

YEAR 1**American Health Care**

Complete the following course:

BHS U250	The American Health-Care System	3 SH
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Freshman Seminar

Complete the following course:

BHS U100	College: An Introduction	1 SH
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General Biology 1

Complete the following course and corresponding lab:

BIO U101	Principles of Biology 1	4 SH
BIO U102	Lab for BIO U101	1 SH

Calculus

Select one of the following courses:

MTH U121	Precalculus	4 SH
MTH U141	Calculus 1	4 SH

PREMED OPTION

MTH U151	Calculus and Differential Equations for Biology 1	4 SH
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General Chemistry for Health Sciences

Complete the following course and corresponding lab:

CHM U101	General Chemistry for Health Sciences	4 SH
with CHM U102	Lab for CHM U101	1 SH

PREMED OPTION

CHM U211	General Chemistry 1	4 SH
with CHM U212	Lab for CHM U211	1 SH

General Biology 2

Complete the following course and corresponding lab:

BIO U103	Principles of Biology 2	4 SH
with BIO U104	Lab for BIO U103	1 SH

Organic Chemistry for Health Sciences

Complete the following course and corresponding lab:

CHM U104	Organic Chemistry for Health Sciences	4 SH
with CHM U105	Lab for CHM U104	1 SH

PREMED OPTION

CHM U313	Organic Chemistry 2	4 SH
with CHM U314	Lab for CHM U313	1 SH

Foundations of Psychology

Complete the following course:

PSY U101	Foundations of Psychology	4 SH
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College Writing

Complete the following course:

ENG U111	College Writing with a grade of C or higher.	4 SH
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Career Decision Making

Complete the following course:

COP U181	Internship for Career Decision Making	1 SH
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YEAR 2**Community and Public Health**

Complete the following course:

BHS U350 Community and Public Health 4 SH

Anatomy and Physiology 1

Complete the following course and corresponding lab:

BIO U117 Integrated Anatomy and Physiology 1 4 SH

with BIO U118 Lab for BIO U117 1 SH

Statistical Thinking

Complete the following course:

MTH U180 Statistical Thinking 4 SH

General Elective

Select one general elective.

Nutrition

Complete the following course:

BHS U105 Nutrition 4 SH

Influences on Health and Illness

Complete the following course:

NUR U210 Influences on Health and Illness 3 SH

Anatomy and Physiology 2

Complete the following course and corresponding lab:

BIO U119 Integrated Anatomy and Physiology 2 4 SH

with BIO U120 Lab for BIO U119 1 SH

Program Elective

Select one course from the following list or consult with your adviser to discuss additional advanced-level course alternatives (500 level or above). An approved minor may also satisfy this requirement:

ATP U530 Disease and Disabilities in Athletics 3 SH

BHS U302 Alternative Medicine 4 SH

BIO U321 Microbiology 4 SH

with BIO U322 Lab for BIO U321 1 SH

BIO U323 Biochemistry 4 SH

CAP U485 Mental Health and Counseling 4 SH

CAP U505 Human Sexuality 4 SH

CES U500 Exercise Physiology 1 4 SH

with CES U501 Lab for CES U500 1 SH

CHM U214 General Chemistry 2 4 SH

with CHM U215 Lab for CHM U214 1 SH

ECN U230 Health Care and Medical Economics 4 SH

ENV U115 Environmental Science 4 SH

HS U101 Human Services Professions 4 SH

MTH U152 Calculus and Differential Equations 4 SH

for Biology 2

NUR U103 Assessment across the Life Cycle 4 SH

NUR U205 Wellness 4 SH

PHL U165 Moral Problems in Medicine 4 SH

PHY U145 Physics for Life Sciences 1 4 SH

with PHY U146 Lab for PHY U145 1 SH

PHY U147 Physics for Life Sciences 2 4 SH

with PHY U148 Lab for PHY U147 1 SH

POL U385 U.S. Health and Welfare Policy 4 SH

PSY U406 Abnormal Psychology 4 SH

SLA U101 Introduction to Speech and Hearing 4 SH

SOC U200 Sociology of Alcoholism 4 SH

SOC U241 Sociology of Violence 4 SH

SOC U295 Drugs and Society 4 SH

YEAR 3 (4-YEAR OPTION)**YEARS 3 AND 4 (5-YEAR CO-OP OPTION)****Communications for Health Professions**

Complete the following course:

BHS U300 Communication Skills for the 4 SH

Health Professions

Health-Care Research

Complete the following course:

BHS U450 Health-Care Research 4 SH

Health Policy

Complete the following course:

BHS U515 Health Policy 4 SH

Program Electives

Select two courses from the program electives course list shown in Year 2 above or consult with your adviser to discuss additional advanced-level course alternatives (500 level or above). An approved minor may also satisfy this requirement.

Health-Care Ethics

Complete the following course:

BHS U510 Health-Care Ethics 4 SH

Health-Care Management

Complete the following course:

BHS U511 Health-Care Management 4 SH

General Elective

Select one general elective.

FINAL YEAR**Diversity**

Complete the following course:

BHS U520 Race, Ethnicity, and Health in the 4 SH
United States

Advanced Writing in the Health Professions

Complete the following course with a grade of C or higher:

ENG U306 Advanced Writing in the Health 4 SH
Professions

Program Electives

Select four courses from the program electives course list shown in Year 2 above or consult with your adviser to discuss additional advanced-level course alternatives (500 level or above). An approved minor may also satisfy this requirement.

Capstone Project

Take one capstone course.

HEALTH SCIENCE MAJOR GRADE REQUIREMENT

A grade of C or higher is required in all health science courses.

GENERAL ELECTIVES

Additional courses taken beyond college and major course requirements to satisfy graduation credit requirements.

COOPERATIVE EDUCATION

If elected

UNIVERSITY-WIDE REQUIREMENTS

134 total semester hours required

Minimum 2.000 GPA required

MEDICAL LABORATORY SCIENCEwww.bouve.neu.edu/Health/mls.html

MARY LOUISE TURGEON, EDD, MT(ASCP), CLS(NCA)

*Acting Chair, Program Director, and Senior Clinical Specialist***ASSOCIATE PROFESSOR EMERITUS**

Britta L. Karlsson, MS, MT(ASCP)

VISITING ASSISTANT CLINICAL SPECIALIST

Carol Finn, MS, MT(ASCP)

LABORATORY COORDINATOR

Judith Baronas, BS, MT(ASCP)

The Department of Medical Laboratory Science prepares professionals in the laboratory disciplines of clinical chemistry, hematology, immunohematology, immunology, and microbiology. Medical laboratory scientists (medical technologists) perform diagnostic test procedures using state-of-the-art computerized analyzers. They are responsible for overseeing patient specimen collection, and for test accuracy, cost-effectiveness, and efficiency in reporting results to physicians. Physicians rely on laboratory tests to establish a diagnosis and to determine therapy. Traditionally, the program has prepared students for positions in health-care delivery, but, through cooperative education experiences, it also offers students the opportunity to explore positions in biological, chemical, and medical research, the biotechnology industry, and governmental agencies. Many graduates enter responsible positions in these areas. The curriculum also provides excellent preparation for advanced studies in graduate and professional schools.

The five-year program leads to a Bachelor of Science degree. Students begin the experiential learning phase of the program during their sophomore year, with cooperative education placements in regional institutions. Upperclass students have the opportunity for international placements. Recently students have had co-ops in Sweden and the United Kingdom. In their senior year, students receive formal clinical training at some of metropolitan Boston's finest health-care facilities. To enter clinical training, students must complete all prerequisite courses and maintain an acceptable grade-point average. Graduates of the Bachelor of Science program are eligible for national certification examinations as medical technologists and clinical laboratory scientists. Some states require additional licensure examinations. See pages 354–356 for course listings.

Minor Curriculum

This minor provides students majoring in other science fields an opportunity to explore the principles of the biological and

chemical sciences as applied in the medical laboratory.

Students may specialize in one of the five categorical areas of Medical Laboratory Science: clinical chemistry, hematology, immunology, immunohematology, or microbiology.

Postbaccalaureate Certificate Program

The postbaccalaureate certificate program in medical laboratory science enables students with a baccalaureate degree and sufficient background in the biological and chemical sciences to become eligible for certification in clinical microbiology, clinical chemistry, hematology, immunohematology, or immunology. Depending upon the specialty, students must complete 24–26 semester hours of professional course work, which must include applied study at an affiliated clinical site. After completing the program, students may be eligible for the national certification examination in a categorical area. Completion requires twelve to twenty-four months of part-time study depending on prerequisite course work, specialty chosen, and the timing of a student's entry into the program.

BS in Medical Laboratory Science**ENGLISH REQUIREMENT**

Complete the following course:

ENG U111 College Writing 4 SH

and one approved Advanced Writing in the Disciplines course for the major. A grade of C or higher is required in both courses.

DIVERSITY

Complete SOA U101 Peoples and Cultures 4 SH

or choose a course from the list "Approved Courses: Diversity" on page 48.

**MEDICAL LABORATORY SCIENCE
GENERAL STUDIES COURSES****Mathematics Courses**

Complete the following course:

MTH U121 Precalculus 4 SH

Anatomy and Physiology

Complete the following two courses with corresponding labs:

PSC U301 Human Physiology and Anatomy 1 3 SH

with PSC U302 Human Physiology and Anatomy 1— 1 SH
Lab

PSC U303 Human Physiology and Anatomy 2 3 SH

with PSC U304 Human Physiology and Anatomy 2— 1 SH
Lab**Biology Courses**

Complete the following four courses with corresponding labs:

BIO U111 General Biology 1 4 SH

with BIO U112 Lab for BIO U111 1 SH

BIO U113 General Biology 2 4 SH

with BIO U114 Lab for BIO U113 1 SH

BIO U301 Genetics and Molecular Biology 4 SH

with BIO U302 Lab for BIO U301 1 SH

or BIO U117 Integrated Anatomy and Physiology 1 4 SH

with BIO U118 Lab for BIO U117 1 SH