This document serves as an official historical record for a specific period in time. The information found in this document is subject to change without notice. Colleges and departments make changes to their degree requirements and course descriptions frequently. More information is available at catalogs.umn.edu.

For current information, refer to:
Program search: z.umn.edu/publicprogramsearch
Course search: z.umn.edu/publiccoursecatalog
University policies: policy.umn.edu

The University of Minnesota is an equal opportunity educator and employer. This publication is available in alternative formats upon request. Contact the Office of Admissions, 240 Williamson Hall, 231 Pillsbury Dr. SE, Minneapolis, MN 55455-0213, 612-625-2008, or TTY 612-625-9051.
<table>
<thead>
<tr>
<th>Program</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Professions B.S.</td>
<td>1</td>
</tr>
<tr>
<td>Health Sciences B.S.</td>
<td>5</td>
</tr>
</tbody>
</table>
Rochester Campus
Health Professions B.S.
UM Rochester
UMR Chancellor's Office

• Program Type: Baccalaureate
• Requirements for this program are current for Fall 2018
• Required credits to graduate with this degree: 120 to 126
• Required credits within the major: 96 to 102
• This program requires summer terms.
• Degree: Bachelor of Science

The Bachelor of Science in Health Professions (BSHP) is an educational collaboration between the University of Minnesota Rochester and Mayo Clinic School of Health Sciences. The curriculum has a broad focus and includes rigorous science foundations, liberal education, and prerequisite courses selected to meet the need for deeper academic preparation in health professions. Students majoring in the health professions are admitted into one of four tracks: Echocardiography, Radiography, Respiratory Care or Sonography. Academic coursework is coordinated with clinical rotations at Mayo Clinic to optimize the learning experience. The BSHP program prepares students to become certified health professionals in select allied health fields where increased technical complexity and strong cognitive abilities are needed due to specialization and new technologies in health care.

Program Delivery
This program is available:
• via classroom (the majority of instruction is face-to-face)

Admission Requirements
Students must complete 12 courses before admission to the program.

A GPA above 2.0 is preferred for the following:
• 2.75 already admitted to the degree-granting college
• 2.75 transferring from another University of Minnesota college
• 2.75 transferring from outside the University

Students applying to Echocardiography and Sonography must complete the patient care coursework that qualifies them to take the exam for one of the medical profession certifications listed below. Sonography students must also pass the relevant certification exam; Echocardiography students are only required to take the coursework. Students in the other programs are not required to complete a patient-care course, however applicants who have patient care experience will be more competitive. The following coursework/certifications meet the patient care requirement for Echocardiography and Sonography:
  o Certified nursing assistant (CNA)
  o Registered medical assistant (RMA)
  o Registered nurse (RN)
  o Licensed practical nurse (LPN)
  o Certified EMT
  o Respiratory therapist
  o Radiologic technologist R.T.(R) or senior radiography student

For information about University of Minnesota admission requirements, visit the Office of Admissions website.

Required prerequisites
Statistics
MATH 1161 - Introduction to Statistics [MATH] (3.0 cr)

College Algebra
MATH 1110 - College Algebra with Physical Concepts [MATH] (3.0 cr)
or MATH 1111 - Precalculus with Physical Concepts [MATH] (3.0 cr)
or MATH 1171 - Calculus, Modeling, and Data I [MATH] (4.0 cr)

Chemistry with Laboratory
CHEM 1321 [Inactive] [PHYS] (4.0 cr)
or CHEM 2331 - General Chemistry I [PHYS] (4.0 cr)

Physics with Laboratory
PHYS 1251 - Physics I [PHYS] (4.0 cr)

Microbiology with Laboratory
BIOL 3344 - Microbiology [ENV] (4.0 cr)

Anatomy and Physiology
BIOL 2331 - Anatomy and Physiology I [BIOL] (4.0 cr)
BIOL 3332 - Anatomy and Physiology II (4.0 cr)

Psychology
PSY 1511 - Introduction to Psychology [SOCS] (3.0 cr)

Writing
WRIT 1511 - Writing Studio I (1.0 cr)
WRIT 1512 - Writing Studio II (2.0 cr)

Speech or Communication
COMM 2511 - Communication Methods (3.0 cr)

Ethics
PHIL 1441 - Introduction to Ethics [CIV] (3.0 cr)

Medical Terminology
PHAR 1002 [UMTC Course] - Health Sciences Terminology (2.0 cr) or other course of two or more credits in medical terminology

General Requirements
All students are required to complete general University and college requirements including writing and liberal education courses. For more information about University-wide requirements, see the liberal education requirements.

Program Requirements
Admission to Mayo Clinic School of Health Sciences in one of four programs: Echocardiography, Radiography, Respiratory Care, or Sonography.

Program Sub-plans
Students are required to complete one of the following sub-plans.

Echocardiography-Mayo Clinic School of Health Sciences
The BSHP Echocardiography Track delivers upper-division curriculum designed to prepare students to become well-rounded, fully competent cardiac sonographers in an environment based on teamwork and mutual respect. The program offers an exceptional educational experience by providing high-quality didactic and clinical experiences that prepare students to: perform patient assessments, acquire and analyze data obtained using ultrasound and related diagnostic technologies, provide a summary of findings to the physician to aid in patient diagnosis and management, and use independent judgment and systematic problem solving methods to produce high quality diagnostic information and optimize patient care.

Echocardiography
The echocardiography curriculum currently consists of 66 credits.
ECHO 3011 - Foundations of Echocardiography [TS] (2.0 cr)
ECHO 3101 - Cardiovascular Anatomy & Physiology (3.0 cr)
ECHO 3202 - Adult Echocardiography (6.0 cr)
ECHO 3301 - Clinical Practicum I (8.0 cr)
ECHO 3302 - Clinical Practicum II (7.0 cr)
ECHO 3403 - Echocardiographic Application (3.0 cr)
ECHO 3503 - Stress Echocardiography (2.0 cr)
ECHO 4111 - Ultrasound Physics I (2.0 cr)
ECHO 4112 - Ultrasound Physics II (2.0 cr)
ECHO 4211 - Congenital Heart Disease I (3.0 cr)
ECHO 4303 - Clinical Practicum III (6.0 cr)
ECHO 4401 - Clinical Practicum IV (8.0 cr)
Radiography-Mayo Clinic School of Health Sciences

The Bachelor of Science in Health Professions (BSHP) Radiography Track delivers upper-division curriculum designed to prepare students to become well-rounded, fully competent radiographers in an environment based on teamwork and mutual respect. Radiography is an exciting and challenging career involving the use of highly sophisticated equipment to create x-rays—anatomical images that are used by physicians to diagnose disease, injury, or disability. Radiographers have direct patient contact in clinic and hospital settings and are valuable members of the primary health care team. Our high-quality professional curriculum presents a broad didactic component, comprehensive clinical rotations, and an environment that instills professional skills in our students.

Radiography

The radiography curriculum currently consists of a total of 62 credits.

- HP 3021 - Patient Care Techniques (1.0 cr)
- HP 4802 - Health Economics and Finance [DSJ] (3.0 cr)
- HP 4902 - Management and Leadership in Healthcare [GP] (2.0 cr)
- RADI 3011 - Foundations of Radiography [TS] (2.0 cr)
- RADI 3101 - Radiographic Procedures I (4.0 cr)
- RADI 3102 - Radiographic Procedures II (7.0 cr)
- RADI 3111 - Radiation Physics (2.0 cr)
- RADI 3201 - Principles of Radiographic Exposure (2.0 cr)
- RADI 3301 - Clinical Practicum I (5.0 cr)
- RADI 3302 - Clinical Practicum II (5.0 cr)
- RADI 3501 - Applied Radiography Topics (1.0 cr)
- RADI 4101 - Radiographic Procedures III (3.0 cr)
- RADI 4201 - Radiation Protection Advanced Imaging (3.0 cr)
- RADI 4301 - Clinical Practicum III (7.0 cr)
- RADI 4401 - Clinical Practicum IV (7.0 cr)
- RADI 4402 - Clinical Practicum V (8.0 cr)

Respiratory Care-Mayo Clinic School of Health Sciences

The BSHP Respiratory Care Track delivers upper-division curriculum designed to prepare students to become respiratory care practitioners with advanced-level clinical skills. The curriculum includes professional courses and clinical experiences to support professional development and prepares students to serve as consultants to physicians and other medical staff. Students are offered the option to engage in specialized clinical study in areas of adult critical care and patient transport, newborn and pediatric critical care, cardiopulmonary diagnostics-pulmonary function testing, cardiopulmonary rehabilitation, disease prevention, case management in asthma and Chronic Obstructive Pulmonary Disease (COPD), as well as smoking cessation and lung health counseling.

Respiratory Care

The respiratory care curriculum currently consists of a total of 61 credits.

- HP 3021 - Patient Care Techniques (1.0 cr)
- HP 4802 - Health Economics and Finance [DSJ] (3.0 cr)
- HP 4902 - Management and Leadership in Healthcare [GP] (2.0 cr)
- RESP 3011 - Foundations of Respiratory Care [TS] (2.0 cr)
- RESP 3101 - Respiratory Care Modalities and Equipment I (4.0 cr)
- RESP 3102 - Respiratory Care Modalities and Equipment II (4.0 cr)
- RESP 3502 - Clinical Research: Literature, Methodology, and Application (3.0 cr)
- RESP 3600 - Clinical Practicum Summer - Adult Critical Care (2.0 cr)
- RESP 4311 - Advanced Perinatal and Pediatric Respiratory Care (3.0 cr)
- RESP 4321 - Advanced Cardiopulmonary Diagnostics (2.0 cr)
- RESP 4331 - Cardiopulmonary Rehabilitation, Disease Prevention and Case Management (1.0 cr)
- RESP 4341 - Clinical Practicum III: Advanced Respiratory Care (3.0 cr)
- RESP 4342 - Clinical Practicum V: Advanced Respiratory Care (3.0 cr)
- RESP 4400 - Advanced Adult Respiratory Critical Care Techniques I (2.0 cr)
- RESP 4401 - Clinical Practicum IV: Advanced Adult Respiratory Critical Care (1.0 cr)
- RESP 4402 - Clinical Practicum VI: Advanced Adult Respiratory Critical Care (2.0 cr)
RESP 4500 - Advanced Adult Respiratory Critical Care Techniques II (1.0 cr)
RESP 4501 - Research Project I (1.0 cr)
RESP 4502 - Research Project II (1.0 cr)
RESP 4602 - Grand Rounds (2.0 cr)
PHAR 3800 - UMTC Course - Pharmacotherapy for the Health Professions (3 cr.)

Sonography-Mayo Clinic School of Health Sciences
The BSHP Sonography track delivers upper-division curriculum designed to prepare students to become competent, entry-level sonographers in an environment based on teamwork and mutual respect. Students will have the opportunity to train in specialties that include abdomen, obstetrics, gynecology, and peripheral vascular. The program offers an exceptional educational experience by providing high-quality didactic and clinical experiences that prepare students to perform patient assessments, acquire and analyze data obtained using ultrasound and related diagnostic technologies, provide a summary of findings to the physician to aid in patient diagnosis and management, as well as to use independent judgment and systematic problem solving methods to produce high quality diagnostic information and optimize patient care.

Sonography
The sonography curriculum currently consists of a total of 65 credits.
SONO 3011 - Foundations of Sonography [TS] (3.0 cr)
SONO 3111 - Abdomen I Sonography (2.0 cr)
SONO 3201 - Gynecologic Sonography (2.0 cr)
SONO 3121 - Cross-Sectional Abdominal Anatomy (1.0 cr)
SONO 3311 - Vascular Technology (2.0 cr)
SONO 3301 - Clinical Practicum I (3.0 cr)
SONO 3112 - Abdomen II Sonography (3.0 cr)
SONO 3401 - OB Sonography (2.0 cr)
SONO 3312 - Vascular Technology II (3.0 cr)
SONO 3302 - Clinical Practicum II (5.0 cr)
SONO 3503 - Superficial Sonography (2.0 cr)
SONO 3113 - Abdomen III Sonography (2.0 cr)
SONO 3313 - Vascular Technology III (1.0 cr)
SONO 3403 - Concepts Review and Case Studies (2.0 cr)
SONO 4303 - Clinical Practicum III (6.0 cr)
SONO 4111 - Ultrasound Physics I (2.0 cr)
SONO 4201 - Pediatric Sonography (1.0 cr)
SONO 4301 - Fetal Anomalies (2.0 cr)
SONO 4401 - Clinical Practicum IV (7.0 cr)
SONO 4501 - Research Project & Publication (1.0 cr)
SONO 4112 - Ultrasound Physics II (2.0 cr)
SONO 4802 - Mock Exams (1.0 cr)
SONO 4602 - Professional Growth and Development (1.0 cr)
SONO 4402 - Clinical Practicum V (8.0 cr)
SONO 4502 - Research Project and Publication II (1.0 cr)
Program Type: Baccalaureate
Requirements for this program are current for Fall 2018
Required credits to graduate with this degree: 120
Required credits within the major: 83 to 93
Degree: Bachelor of Science

Rochester students majoring in the health sciences will receive an integrated education across the biological sciences, the physical sciences, the quantitative sciences, the social sciences, and the arts and humanities. Students must complete at least 120 credits, including at least 80 credits in the major. All courses in the major must be taken A-F, unless the course is only offered S-N.

The health sciences BS program prepares students for post baccalaureate education in a broad spectrum of health science related fields and for graduate programs in the sciences, social sciences, and humanities; health profession careers, including certificate programs in the health sciences; professional schools in the health sciences; and entry-level science and laboratory positions in industry, government agencies, and universities.

Program Delivery
This program is available:
• via classroom (the majority of instruction is face-to-face)

Admission Requirements
A GPA above 2.0 is preferred for the following:
• 2.50 transferring from outside the University

For information about University of Minnesota admission requirements, visit the Office of Admissions website.

General Requirements
All students are required to complete general University and college requirements including writing and liberal education courses. For more information about University-wide requirements, see the liberal education requirements.

Program Requirements
Students are required to take 3 semester(s) of Spanish or approved alternate language.

All students are required to complete campus-wide requirements for liberal education and writing. UMR liberal education is integrated into the curriculum throughout the four years and follows the liberal education requirements on the UMTC campus, except that UMR requires all five themes. Writing and communication follows a writing-integrated curriculum and is incorporated throughout the curriculum across all courses.

In addition to the requirements below, students are required to create a personalized capstone. As part of the capstone, students write a proposal that requires them to list credit bearing activities, reflect upon their holistic experience, and express how their capstone endeavors align with their personal and professional goals. It may be possible, in some unique cases, for specially approved capstones to fulfill or waive program requirements.

Foundational Courses
BIOL 2311 - Integrative Biology [BIOL, TS] (4.0 cr)
BIOL 2331 - Anatomy and Physiology I [BIOL] (4.0 cr)
CHEM 1331 - Chemical Structures and Properties [PHYS] (4.0 cr)
CHEM 1333 - Chemical Reactivity [PHYS] (4.0 cr)
CLI 1711 - University Experience I (1.0 cr)
CLI 1712 - Personal Development and Career Exploration (1.0 cr)
CLI 2522 - Community Collaboratory (3.0 cr)
CLI 2713 - Career Exploration in the Health Sciences (1.0 cr)
ENGL 1433 - Introduction to Literature [LITR] (3.0 cr)
MATH 1161 - Introduction to Statistics [MATH] (3.0 cr)
PHIL 1431 - Introduction to Philosophy [AH] (3.0 cr)
PHYS 1251 - Physics I [PHYS] (4.0 cr)
PUBH 2561 - Public Health: A Global Perspective [GP] (3.0 cr)
SOC 1571 - Introduction to Sociology [SOCS, DSJ] (3.0 cr)
WRIT 1511 - Writing Studio I (1.0 cr)
WRIT 1512 - Writing Studio II (2.0 cr)

Additional Required Coursework

Ethics
PHIL 1441 - Introduction to Ethics [CIV] (3.0 cr)
or SOC 1641 - Social Justice and Ethical Decision Making [CIV] (3.0 cr)

Communication
COMM 2511 - Communication Methods (3.0 cr)
or COMM 2711 - Communication in Professional Contexts (3.0 cr)

Language
SPAN 1521, SPAN 1522, SPAN 2521 can be replaced by a Spanish proficiency exam or an approved alternative language assessment.
SPAN 1521 - Spanish I (3.0 cr)
SPAN 1522 - Spanish II (3.0 cr)
SPAN 2521 - Spanish III (3.0 cr)
or an approved alternate language

Quantitative Reasoning
Take 2 or more course(s) from the following:
• MATH 1110 - College Algebra with Physical Concepts [MATH] (3.0 cr)
• MATH 1111 - Precalculus with Physical Concepts [MATH] (3.0 cr)
• MATH 1171 - Calculus, Modeling, and Data I [MATH] (4.0 cr)
• MATH 2161 - Biostatistics [MATH] (3.0 cr)
• MATH 2171 - Calculus, Modeling, and Data II [MATH] (4.0 cr)

Upper Division
Take 3 or more course(s) from the following:

Biological and Physical Sciences
Take 1 or more course(s) from the following:
• BIOL 3321 - Biochemistry (3.0 cr)
• BIOL 3332 - Anatomy and Physiology II (4.0 cr)
• BIOL 3311 - Genetics [BIOL, TS] (3.0 cr)
• BIOL 3344 - Microbiology [ENV] (4.0 cr)
• BIOL 4312 - Advanced Topics in Molecular and Cellular Biology and Genetics (4.0 cr)
• BIOL 4342 - Neuroscience (3.0 cr)
• BIOL 4364 - Immunology (3.0 cr)
• CHEM 4331 - Chemical Biology/Bioorganic Chemistry (3.0 cr)
• CHEM 4333 - Physical Chemistry (3.0 cr)

• Humanities, Public Health and Social Sciences
Take 1 or more course(s) from the following:
• ENGL 3471 - Gender and Sexuality Studies [DSJ] (3.0 cr)
• ENGL 3481 - Society, Science, and Science Fiction [TS] (3.0 cr)
• PHIL 3437 - History and Philosophy of Science [HIS] (3.0 cr)
• PHIL 3441 - Ethics of Medicine and the Sciences [AH, CIV] (3.0 cr)
• PSY 3510 - Human Development across the Lifespan (3.0 cr)
• PSY 3512 - Principles of Abnormal Psychology (3.0 cr)
• PSY 4512 - Social Psychology (3.0 cr)
• PUBH 3531 - Health Policy in a Global Context [GP, SOCS] (3.0 cr)
• PUBH 3561 - Environmental Health and Environmental Justice [ENV, SOCS] (3.0 cr)
• PUBH 4561 - Introduction to Epidemiology: Research and Data Exploration (3.0 cr)
• SOC 3531 - Health Policy in a Global Context [GP, SOCS] (3.0 cr)
• SOC 3571 - Drugs and Society [DSJ, SOCS] (3.0 cr)
• SOC 3581 - Medical Sociology and Technology [SOCS, TS] (3.0 cr)

Capstone

Proposal & Reflection
CLI 3712 - Capstone Proposal Writing (2.0 cr)
CLI 4713 - Capstone Reflections I and II (2.0 cr)
(or CLI 4711 - Capstone Reflections I (1.0 cr)
CLI 4712 - Capstone Reflections II (1.0 cr)

Activities
Student must complete a minimum of 6 additional credit hours of upper division (3xxx+) coursework. These credits cannot be used to satisfy any other program requirements.

**Pre-PA Pathway**

Students should choose the following courses, normally options within the BSHS degree, to prepare for PA Master's programs: BIOC 3321; BIOL 3332, 3344 & 4364; CHEM 2331 & 2333; MATH 1110 & 1111; and PSY 1511, 3510 & 3512. In addition, the following courses are recommended: BIOL 3311; additional upper division physiological sciences courses such as cellular biology or virology; and a research methodology course.