This document serves as an official historical record for a specific period in time. The information found 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
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Program Type: Baccalaureate
Requirements for this program are current for Fall 2019
Required credits to graduate with this degree: 120 to 126
Required credits within the major: 93 to 102
This program requires summer terms.
Coursework and clinical rotations at Mayo Clinic School of Health Sciences
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

Transfer students should check Transferology or the planning sheets on the UMR Admissions website to see what courses from their institution meet the program admission requirements.

Students applying to Echocardiography and Sonography must complete the patient care coursework that qualifies them to take the exam for one of the 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 course, however applicants who have patient care experience will be more competitive. The following coursework/certifications meet the patient care requirement:
• Certified nursing assistant (CNA)
• Registered medical assistant (RMA)
• Registered nurse (RN)
• Licensed practical nurse (LPN)
• Certified EMT
• Respiratory therapist
• 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
For this and ALL other admission requirements, transfer students should check Transferology or the planning sheets on the UMR Admissions website to see what courses from their institution meet the program admission requirements.
MATH 1161 - Introduction to Statistics [MATH] (3.0 cr)

College Algebra
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 1 [MATH] (4.0 cr)
Chemistry with Laboratory
   CHEM 1331 - Chemical Structures and Properties [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)
   or COMM 2711 - Communication in Professional Contexts (3.0 cr)

Ethics
   PHIL 1441 - Introduction to Ethics [CIV] (3.0 cr)
   or SOC 1641 - Social Justice and Ethical Decision Making [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 BSHA 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)
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 53 credits.
RADI 3011 - Foundations of Radiography [TS] (2.0 cr)
RADI 3101 - Radiographic Procedures I (2.0 cr)
RADI 3102 - Radiographic Procedures II (7.0 cr)
RADI 3111 - Radiation Physics (2.0 cr)
RADI 3201 - Introduction to Clinical Radiography (2.0 cr)
RADI 3202 - Principles of Radiographic Exposure (2.0 cr)
RADI 3301 - Clinical Practicum I (5.0 cr)
RADI 3302 - Clinical Practicum II (9.0 cr)
RADI 4103 - Radiographic Procedures III (2.0 cr)
RADI 4202 - Principles of Radiographic Exposure II (1.0 cr)
RADI 4243 - Radiation Biology & Protection (2.0 cr)
RADI 4302 - Advanced Modalities (1.0 cr)
RADI 4303 - Clinical Practicum III (7.0 cr)
RADI 4403 - Clinical Practicum IV (7.0 cr)
RADI 4501 - Certification Exam Review (2.0 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 options 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 3201 - Cardiopulmonary Patient Assessment (4.0 cr)
RESP 3202 - Advanced Cardiopulmonary Physiology and Pathophysiology (3.0 cr)
RESP 3301 - Clinical Practicum I (3.0 cr)
RESP 3302 - Clinical Practicum II (3.0 cr)
RESP 3401 - Seminar in Respiratory Care I (1.0 cr)
RESP 3402 - Seminar in Respiratory Care II (1.0 cr)
RESP 3502 - Clinical Research: Literature, Methodology, and Application (3.0 cr)
RESP 4300 - 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 4412 - 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)
Rochester Campus
Health Sciences B.S.
UM Rochester
UMR Chancellor’s Office

- Program Type: Baccalaureate
- Requirements for this program are current for Fall 2019
- Required credits to graduate with this degree: 120
- Required credits within the major: 71 to 74
- 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. 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 2 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.

Foundational Courses
Take exactly 11 course(s) totaling exactly 31 credit(s) from the following:
- BIOL 2311 - Integrative Biology [BIOL, TS] (4.0 cr)
- BIOL 2321 - Biology of Human Function (4.0 cr)
- or BIOL 2331 - Anatomy and Physiology I [BIOL] (4.0 cr)
- CHEM 1331 - Chemical Structures and Properties [PHYS] (4.0 cr)
- CLI 1000 - Academic Inquiry into the Health Sciences (2.0 cr)
- CLI 1712 - Personal Development and Career Exploration (1.0 cr)
- CLI 2713 - Career Development and Career Skills in the Health Sciences (1.0 cr)
- MATH 1161 - Introduction to Statistics [MATH] (3.0 cr)
- PHL 1441 - Introduction to Ethics [CIV, AH] (3.0 cr)
- PSY 1511 - Introduction to Psychology [SOCS] (3.0 cr)
PUBH 2561 - Introduction to Public Health [GP] (3.0 cr)
SOC 1571 - Introduction to Sociology [SOCS, DSJ] (3.0 cr)

**Writing**
Take 1 - 2 course(s) totaling exactly 2 credit(s) from the following:
- WRIT 1520 - Introduction to Academic Writing (2.0 cr)
- or WRIT 1510 - Academic Writing: Responding to Ideas (1.0 cr)
- WRIT 1511 - Academic Writing: Summarizing & Persuading (1.0 cr)
Take exactly 1 course(s) totaling exactly 2 credit(s) from the following:
- •WRIT 1512 - Academic Research & Scientific Writing (2.0 cr)

**Communication**
Take exactly 1 course(s) totaling exactly 3 credit(s) from the following:
- •COMM 2511 - Communication Methods (3.0 cr)
- or COMM 2711 - Communication in Professional Contexts (3.0 cr)

**Civic Engagement**
Take 1 or more course(s) totaling 3 - 6 credit(s) from the following:
- •CLI 2522 - Community Collaboratory (3.0 cr)
- or six credits of coursework with the Community Engaged Learning (CEL) attribute

**Language**
**Spanish Introductory Course Sequence**
Take exactly 2 course(s) totaling exactly 6 credit(s) from the following:
- •SPAN 1521 - Spanish I (3.0 cr)
- •SPAN 1522 - Spanish II (3.0 cr)
- or Spanish Proficiency Exam
Spanish proficiency exam
- or Approved Alternate Language Assessment
approved alternate language assessment
- or Approved Alternate Language Introductory Course Sequence
completion of the introductory sequence of a language other than English at the college level

**Quantitative Reasoning**
Take exactly 1 course(s) totaling 3 - 4 credit(s) from the following:
- •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)
- or MATH 2161 - Biostatistics [MATH] (3.0 cr)
- or MATH 2171 - Calculus, Modeling, and Data II [MATH] (4.0 cr)

**Upper-Division Coursework**
Take 12 or more credit(s) from the following:
- •BIOC 3321 - Biochemistry (3.0 cr)
- •BIOC 3322 - Biochemistry II (4.0 cr)
- •BIOC 3721 - Special Topics in Biochemistry (1.0 - 4.0 cr)
- •BIOL 3311 - Genetics [BIOL, TS] (3.0 cr)
- •BIOL 3332 - Anatomy and Physiology II (4.0 cr)
- •BIOL 3344 - Microbiology [ENV] (4.0 cr)
- •BIOL 3721 - Special Topics in the Life Sciences (1.0 - 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 3721 - Special Topics in Chemistry (1.0 - 4.0 cr)
- •CHEM 4331 - Chemical Biology/Bioorganic Chemistry (3.0 cr)
- •CHEM 4333 - Physical Chemistry (3.0 cr)
- •ENGL 3471 - Gender and Sexuality Studies [DSJ] (3.0 cr)
- •ENGL 3481 - Society, Science, and Science Fiction [TS] (3.0 cr)
- •ENGL 3721 - Special Topics in English (1.0 - 4.0 cr)
- •HIST 3245 - Epidemics, Empires, and Environment [HIS, ENV] (3.0 cr)
- •HIST 3721 - Special Topics in History (1.0 - 4.0 cr)
- •HP 4802 - Health Economics and Finance [DSJ] (3.0 cr)
- •HP 4902 - Management and Leadership in Healthcare [GP] (2.0 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)
PHIL 3721 - Special Topics in Philosophy (1.0 - 4.0 cr)
PHYS 3721 - Special Topics in the Physical Sciences (1.0 - 4.0 cr)
PSY 3510 - Human Development across the Lifespan (3.0 cr)
PSY 3512 - Principles of Abnormal Psychology (3.0 cr)
PSY 3721 - Special Topics in Psychology (1.0 - 4.0 cr)
PSY 4512 - Social Psychology (3.0 cr)
PUBH 3331 - Health Equity & Social Determinants of Health (3.0 cr)
PUBH 3531 - Health Policy & Systems [GP, SOCS] (3.0 cr)
PUBH 3561 - Environmental Health and Environmental Justice [ENV, SOCS] (3.0 cr)
PUBH 3721 - Special Topics in Public Health (1.0 - 4.0 cr)
PUBH 4561 - Introduction to Epidemiology (3.0 cr)
SOC 3571 - Drugs and Society [DSJ, SOCS] (3.0 cr)
SOC 3581 - Medical Sociology and Technology [SOCS, TS] (3.0 cr)
SOC 3721 - Special Topics in Sociology (1.0 - 4.0 cr)
SPAN 3721 - Special Topics in Spanish (1.0 - 4.0 cr)
WRIT 3721 - Special Topics in Writing (1.0 - 4.0 cr)

Capstone
Proposal & Reflection
Take exactly 2 course(s) totaling exactly 3 credit(s) from the following:
• CLI 3712 - Capstone Proposal Writing (2.0 cr)
• CLI 4713 - Capstone Reflections (1.0 cr)

Activities
Take 6 or more credit(s) from the following:
• upper-division (3xx-level or higher) coursework

3+2 Pre-PA Pathway
Students admitted to the 3+2 pre-PA Master's program (offered in collaboration with MCSHS) are required to take the following courses, normally optional within the BSHS degree: BIOC 3321; BIOL 3332, 3344 & 4364; CHEM 1333, 2231 & 2333; MATH 1110 & 1111; and PSY 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.