

# HEALTH SCIENCES

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**Lynn Peterson**

Health Sciences and  
2+2 Program Advisor

The aim of the health science major is to: 1) facilitate professional advancement for health care providers who currently hold a technical (associate) degree in a health-related profession, and 2) provide a program of study for those Carroll University students interested in obtaining coursework leading to professional licensure in one of the imaging modalities (Radiologic Technology or Diagnostic Medical Sonography). This program is designed to lead to various 2+2 degree completion or professional programs only.

This major provides depth and breadth within the basic and behavioral sciences to prepare students for the balanced integration of critical thinking, basic science knowledge application, and interpersonal skills necessary to provide the best care in a variety of health science disciplines. To meet the educational missions of the university and of the health science major, students study in a variety of academic and professional disciplines including biology, psychology, chemistry, physics and mathematics.

## **Health Science Major Bachelor of Science**

### **Major Core Courses (49 credits)**

Biology 130, Introduction to Human Anatomy and Physiology I (4 credits)

Biology 140, Introduction to Human Anatomy and Physiology II (4 credits)

Chemistry 101, General Chemistry (4 credits)

Chemistry 102, Biological Chemistry (4 credits)

Chemistry 208, Nutrition (3 credits)

Computer Science 107, Problem Solving Using Information Technology (2 credits)

Mathematics 112, Introduction to Statistics (4 credits)

Physics 101, Introductory Physics I (4 credits)

Physics 102, Introductory Physics II (4 credits)

Psychology 101, Introductory Psychology (4 credits)

Psychology 201, Abnormal Psychology (4 credits)

Psychology 221, Life-Span Psychology (4 credits)

Psychology 260, Health Psychology (4 credits)

### **Capstone**

Capstone requirements for degree completion students will be within the degree completion curriculum or Independent Study/Special Topics Capstone

### **Bachelor of Science Degree Completion Emphasis**

For students who have earned, or might be currently earning an Associate Degree in a health related profession such as surgery technician, radiography, etc., the Health Science major provides an avenue for professional growth and advancement. Students are awarded thirty credits by Carroll University for course work taken at either Waukesha County Technical College (WCTC) or Milwaukee Area Technical College (MATC) in conjunction with their respective degree.

The remaining required courses will vary depending on the degree program. For example, students with a surgical technician degree from MATC would be required to complete 36 of the above 48 core credits while a student with a radiography degree from WCTC would be required to complete 44 of the 48 core credits above. Students with a degree from either WCTC or MATC who wish to pursue the Health Science major would have an opportunity to take between ten and twenty-six elective credits. Additional course work focuses on preparing the individual for enhanced personal and professional development. Recommended options include a minor in a desired area of interest such as Hispanic Health and Human Services or Organizational Leadership, or a broad course of study within the liberal arts and sciences.

### **Fees**

Specific courses that require use of equipment and disposable supplies are assigned a course fee.

### **Interdisciplinary Health Sciences Courses**

- Health Sciences 101, Introduction to Health Care Skills (1 credit)
- Health Sciences 103, Personal and Community Health (4 credits)
- Health Sciences 105, Group Exercise Instruction (1 credit)
- Health Sciences 110, Basic Weight Training Instruction (1 credit)
- Health Sciences 120, Fundamental Motor Development (4 credits)
- Health Sciences 300, Pharmacology (3 credits)
- Health Sciences 303, Exercise Physiology (4 credits)
- Health Sciences 322, Kinesiology (4 credits)
- Health Sciences 402, Human Anatomy (4 credits)
- Health Sciences 403, Human Physiology (4 credits)

#### **101. Introduction to Health Care Skills**

**1 credit**

The purpose of this course is to provide the knowledge and skills that are necessary to become First Aid and Professional Rescuer CPR/AED (Automated External Defibrillator) certified in accordance with the American Red Cross. These skills include the ability to call for help, to help sustain life, reduce pain, and minimize the consequences of injury or sudden illness until advanced medical care arrives. Students will also be trained on policies and standards regarding blood borne pathogens and occupational exposure in accordance with the Occupational Safety and Health Administration (OSHA) guidelines. (Required course fee) (*Fa, Wn, Sp*)

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### 103. Personal and Community Health

4 credits

Studies the dynamics of health in modern life with special emphasis on health concepts relevant to personal and community living. (*Fa, Sp*)

### 105. Group Exercise Instruction

1 credit

This course provides training for the entry-level Group Exercise instructor. This course will cover basic cardiorespiratory physiology, aerobic program design and group exercise class development using activity and application to develop instructional skills. (Required course fee) (*Fa, Sp*)

### 110. Basic Weight Training Instruction

1 credit

This course provides training for the entry-level resistance-training instructor, introducing basic strength training techniques, basic training principles, functional anatomy, and exposure to a variety of forms of resistance training. Students learn to apply basic physiology, biomechanics, weight room safety, and basic program design. (Required course fee) (*Sp*)

### 120. Fundamental Motor Development

4 credits

Introductory course exploring the growth and development of basic motor skills from infancy to adulthood and changes which occur in skills with advanced age. This course will also explore different learning theories and variables associated with mastering motor skills. (Required course fee) (*Sp*) Prerequisites: BIO 130.

### 130. Health Careers Exploration

2 credits

This course will help students to explore the various health care professions. There is a great deal of interest in health care careers, and there is a need for workers in all health care fields. Certain professions such as doctor and nurse are well known among the general population. Others may be unknown or not understood well, yet may be valuable options for the student to explore as a possible health care career opportunity. Those students who are sure of their majors in a health care area may want to know more about the function of other individuals on the health care team. Information regarding resume writing and job searching will also be presented. A variety of methods including lecture, discussion, presentations, a job shadow/interview experience, and writing assignments will be employed. (*Fa, Sp*)

### 290. Cultural Influences in Hispanic Health Care

2 credits

This course will focus on the impact of cultural influences in Hispanic populations as people make health care decisions. The learning objectives will be based on the need for students to obtain an understanding of Hispanic culture as it affects the clinician/patient relationship. The topics covered will enhance the effectiveness of the students to develop better research questions and to be able to anticipate the most appropriate ways of interacting with Hispanic populations. This course will be taught in English as a main language but also will introduce students to bilingual terminology. (*Fa*)

**300. Pharmacology****3 credits**

Addresses pharmacology for the licensed athletic trainer and nurse. Students explore basic knowledge about major drug groups, physiological effects of pharmacotherapeutic agents, utilization of pharmacotherapeutic agents, and storage, dispensing, and tracking protocols for pharmacotherapeutic agents. (*Fa, Sp*) Prerequisites: CHE 101/102 or higher, BIO 103/104 or 130/140 or higher.

**303. Exercise Physiology****4 credits**

Students explore the functions and the underlying mechanisms of action of the body's physiological systems, their acute response to physical activity, and their adaptation to chronic physical activity. This course also explores means by which physical performance can be enhanced. (*Fa*) Prerequisite: BIO 130 and 140.

**322. Kinesiology****4 credits**

The anatomical and mechanical bases of normal human movement are studied in this course. Biomechanical terminology and principles are introduced. Students examine the laws of nature that govern movement and how they can be applied to human movement in a manner designed to enhance performance. The course also explores the roles and functions of the nervous and musculoskeletal systems in human movement and performance and the manner in which they work individually and collectively during movement. (*Fa*) Prerequisite: BIO 130 and 140.

**402. Human Anatomy****4 credits**

The microanatomy and gross anatomy of muscle, bone and cartilage and the integumentary, nervous, cardiovascular, lymphatic, respiratory, renal, digestive, endocrine, and reproductive systems are studied. Using multi-media software, male and female bodies are dissected from anterior, posterior, medial, lateral, and medial/lateral views and histologies, radiologies, cross-sections, and MRIs are linked to the anatomy. Models are also employed to study the structure of the human body. In addition, palpation laboratories are integrated into the course. (Required course fee) (*Fa*) Prerequisites: Junior Standing, BIO 130/140 or BIO 120/125.

**403. Human Physiology****4 credits**

Fundamental concepts related to the normal function of the human body are presented. The normal functioning of the human body is discussed across gender, race, and life span. Basic pathophysiological concepts are introduced. Resources used include physiology laboratories, computer simulations, and videos. (Required course fee) (*Sp*) Prerequisites: Junior standing, BIO 130/140 or BIO 120/125, CHE 110 or a C or better in CHE 101 and 102.

**Diagnostic Medical Sonography Emphasis**  
Bachelor of Science

<b>Laura Sorenson</b>	Education Coordinator School of Diagnostic Medical Sonography Aurora Health Care
<b>Lynn M. Peterson</b>	Health Sciences and 2+2 Program Advisor

Carroll University offers an opportunity to major in Health Sciences with an Emphasis in Diagnostic Medical Sonography through Aurora Health Care. The partnership allows students the benefits of close, personal attention during the first two years at Carroll followed by two years at Aurora's School of Diagnostic Medical Sonography and its associated clinical sites with a small class of other students pursuing diagnostic medical sonography.

Diagnostic medical sonographers most often are employed in hospitals, but can also find employment with physicians, medical and diagnostic laboratories, diagnostic imaging centers and outpatient care centers. Some diagnostic medical sonographers find employment with manufacturers of equipment used in the field. Long-term employment prospects in this area are forecast to be excellent.

Entry into the Aurora Health Care professional phase of the program is highly competitive and dependent upon completion of Carroll University general education and Health Science requirements, a minimum cumulative and required science course GPA of 3.0, a grade of 'C' or better in all science courses, CNA training (at the student's own expense), and the accumulation of at least 300 hours of direct patient care prior to application, with another 200 hours of direct patient care prior to the time of the interview (February), for a total of 500 hours. The acceptance of students into the professional phase of the curriculum lies with the Aurora Health Care School of Diagnostic Medical Sonography Admissions Committee. Two options are possible for those students seeking placement in DMS: A general and vascular sonography track or a cardiac and vascular sonography track. See Admissions section of the catalog for details on applying.

**Required Carroll University Courses**

CCS 100, Cultural Seminar  
CSC 107, Problem Solving using Information Technology  
English 170, Writing Seminar  
General Education requirements, GE (H1, F1), CCE and GPC

**Science and mathematics courses taken at Carroll University**

Biology 130, Introduction to Human Anatomy and Physiology I  
Biology 140, Introduction to Human Anatomy and Physiology II

Biology 212, Microbiology  
Biology 324, Bioethics (P1)  
Chemistry 101, General Chemistry  
Chemistry 102, Biological Chemistry  
Communication 207, Intercultural Communication (S1, CCD)  
Mathematics 112, Introduction to Statistics  
Nursing 100, Health Care and Nursing,  
Nursing 230, Health Assessment,  
Nursing 236, Human Pathophysiologic Responses  
Physics 101, Introductory Physics I  
Physics 102, Introductory Physics II  
Psychology 101, Introductory Psychology (S1)  
Psychology 260, Health Psychology (GE2, S2)

**Sample program at Carroll University**

Class Standing	Fall Semester	Spring Semester	Winter/Summer Term
<b>Freshman</b>	CCS 100 BIO 130 MAT 101 or GE1 (H1, F1) COM 207 (S1, CCD)	ENG 170 BIO 140 PHY 101 NRS 100	Get CNA training and begin to work as a CNA to get 500 hours of patient care  PSY 101 (S1)
<b>Sophomore</b>	CHE 101 PHY 102 BIO 324 (P1) MAT 112	CHE 102 NRS 236 NRS 230 PSY 260 (GE2, S2)	CSC 107 BIO 212 GE1 (H1,F1) or in senior year GE-CCE

**Sample program at Aurora Health Care**

<b>Junior</b>	HSC 370 HSC 371 HSC 372 HSC 373	HSC 376 HSC 377 HSC 378 HSC 374 HSC 380	HSC 379 HSC 375
<b>Senior</b>	HSC 470 HSC 471 HSC 473 GE-GPC	HSC 472 HSC 474	

Cross cultural experiences are currently under development. Please see program advisor for specific information.

**Radiologic Technology Emphasis**  
Bachelor of Science

<b>Rochelle Olive-Harmon</b>	Program Director Froedtert Memorial Lutheran Hospital School of Radiologic Technology
<b>Lynn M. Peterson</b>	Health Sciences and 2+2 Program Advisor
<b>Diane Wingenter</b>	Program Director Wheaton Franciscan Healthcare St. Joseph School of Radiologic Technology
<b>Jayne Wisniewski</b>	Program Director Columbia St. Mary's School of Radiologic Technology

Carroll University offers an opportunity to major in Health Sciences with an Emphasis in Radiologic Technology with the Radiology Alliance – Froedtert Hospital, Columbia-St. Mary's Hospital and Wheaton Franciscan – St. Joseph. The partnership allows students the benefits of close, personal attention during the first two years at Carroll followed by two years at one of these area hospitals with a small class of other students pursuing Radiologic Technology.

Radiologic technologists are most often employed in hospitals, but can also find employment with physicians, medical and diagnostic laboratories, diagnostic imaging centers and outpatient care centers. Some radiologic technologists find employment with manufacturers of equipment used in the field. Long-term employment prospects in this area are forecast to be favorable.

Entry into the professional training phase at the hospitals is highly competitive and dependent upon completion of general education requirements, a minimum overall and science GPA of 2.75, a grade of 'C' or better in all science courses and completion of all required and elective courses within the first two years. See Admissions section of this catalog for requirements.

**Carroll University courses**

Biology 130, Introduction to Human Anatomy and Physiology I  
Biology 140, Introduction to Human Anatomy and Physiology II  
Biology 324, Bioethics (P1)  
CCS 100, Cultural Seminar  
Chemistry 101, General Chemistry  
Chemistry 102, Biological Chemistry  
Chemistry 208, Nutrition  
Communication 207, Intercultural Communication (S1, CCD)

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CSC 107, Problem Solving using Information Technology

English 170, Writing Seminar

General Education requirements, GE (H1, F1), CCE and GPC.

Mathematics 112, Introduction to Statistics

Physics 101, Introductory Physics I

Physics 102, Introductory Physics II

Psychology 101, Introductory Psychology (S1)

Psychology 201, Abnormal Psychology

Psychology 221, Life Span Psychology (GE2 (S2))

Psychology 260, Health Psychology

Sample program at Carroll University

Class Standing	Fall Semester	Spring Semester	Winter/Summer Term
<b>Freshman</b>	CCS 100 BIO 130 MAT 101 OR PSY 101 (S1) GE1 (H,F)	ENG 170 BIO 140 PHY 101 GE1 (H1, F1)	CSC 107 PSY 201
<b>Sophomore</b>	CHE 101 PSY 221 (S2) PHY 102 COM 207 (S1, CCD)	CHE 102 CHE 208 PSY 260 (GE2,S) MAT 112	BIO 324 (P1) GE-CCE

Sample program at Radiology Alliance Hospital

<b>Junior</b>	HSC 350 HSC 352 HSC 354 HSC 356 HSC 359	HSC 351 HSC 353 HSC 355 HSC 357 HSC 360	HSC 358 HSC 361
<b>Senior</b>	HSC 450 HSC 452 HSC 454 HSC 456 HSC 459	HSC 451 HSC 453 HSC 455 HSC 457 HSC 458 HSC 460 GPC	HSC 461 HSC 462

Cross cultural experiences are currently under development. Please see program advisor for specific information.