

# MASTER OF SCIENCE (M.S.) IN CLINICAL EXERCISE PHYSIOLOGY

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**College:** College of Science and Health

**Department:** Biological Sciences

**Student Type:** Graduate Semester

**Degree:** Master of Science (M.S.)

**Campus:** Lisle Campus

## Introduction

Benedictine University's Master of Science (M.S.) in Clinical Exercise Physiology program is designed in accordance with the American College of Sports Medicine (ACSM) for certification as a Certified Clinical Exercise Physiologist (ACSM-CEP). The program can be completed in as little as 15 months on a full-time basis. Students develop the skills and qualifications to work in the prevention of cardiovascular, pulmonary and other lifestyle diseases such as obesity and diabetes. The program's curriculum also includes two internships for students to acquire 600 hours of hands-on clinical experience. These internships provide extensive hands-on training in the rehabilitation of individuals who have experienced problems related to chronic diseases. The program is academically demanding and requires considerable commitment on the part of the student. If you are a highly motivated person who takes pride in building a sound scientific knowledge base about exercise physiology, we encourage you to contact us to arrange an interview and tour our facilities.

## Overview

The M.S. in Clinical Exercise Physiology program is part of the Department of Biological Sciences at Benedictine University. The curriculum was developed with the input of an advisory committee composed of practicing exercise physiology professionals and in accordance with the guidelines designated by the ACSM. The program is based on the Benedictine philosophy that man is spirit, mind and body, and that the realization of human potential is based on an integration of the three components.

Graduates of the M.S. in Clinical Exercise Physiology program are employed at many clinical sites, including cardiac rehabilitation and non-invasive cardiac diagnostics departments, in the Chicago area. These alumni often serve as preceptors for students during their clinical internships. In addition, our alumni are active in the professional organizations for the field.

## Admission Requirements

### Starting the Program

#### Admissions and Prerequisites Clinical Exercise Physiology Program

Students must have earned an undergraduate degree from a regionally accredited university, and completed undergraduate courses in exercise physiology, general chemistry, biochemistry, nutrition, anatomy and physiology. A combined health science organic/biochemistry class may be substituted for biochemistry. Due to the rigor of this program of study, it is highly recommended that a "B" or better is attained in undergraduate prerequisite courses.

Applicants who may have outstanding prerequisite coursework are encouraged to apply during the fall. Certain prerequisite coursework needs to be completed prior to entering the program in order to follow the recommended course sequence. Applicants may be admitted on a conditional status depending on which prerequisites are outstanding. Prerequisite courses may be taken at Benedictine University or any accredited university.

Applications must be submitted by March 1 in order to receive an acceptance decision by March 31. Students may still apply after the March 1 deadline. All acceptances will be based on a student's qualifications, experience and incoming student space availability.

The Graduate Record Examination (GRE) is not required.

For a full list of application requirements, please visit <https://ben.edu/degree-programs/clinical-exercise-physiology/>. Among the requirements are a one-page essay discussing your education addressing prior exercise physiology and/or exercise testing coursework and career goals, and a personal or phone interview with the directors of the M.S. in Clinical Exercise Physiology program. Two letters of recommendation are also required; one that can address your academic potential (from a science instructor) and one that can address your interpersonal skills and work ethic (from an employer).

## Degree Requirements Curriculum

The M.S. in Clinical Exercise Physiology program uses a variety of different teaching methods, including case studies in combination with laboratories, to better integrate academic information with practical application. It also requires two internships for further application of learned concepts in the workplace setting.

Students are introduced to the most recent information in the natural sciences through rigorous coursework in physiology, pathophysiology and pharmacology. Additional coursework in electrocardiography, advanced exercise physiology, behavioral modification and exercise testing both for healthy individuals and clinical populations prepare students with the knowledge and skills they will need for professional practice.

Two clinical internships which offer students the opportunity to gain practical experience in the workplace are required. Internships are supervised by practicing professionals in the field who provide feedback on the student's knowledge, skills and abilities, as well as personal attributes that employers seek when making new hires. Students gain expertise in numerous physiological assessment techniques through internships, community testing and Benedictine's Young Hearts for Life screening program.

The Exercise Physiology Laboratory at Benedictine University allows students to assess the physiological responses to the stress of exercise. The fitness center in the Dan and Ada Rice Center is an additional resource for laboratory-based courses. Students also have the opportunity to provide exercise programming to a wide variety of older individuals at the Performance Enhancement Center at the Villa St. Benedict retirement facility.

The M.S. in Clinical Exercise Physiology program is academically demanding and prepares students for the critical responsibility they assume in professional practice. Students improve decision-making skills, learn to critically analyze the literature, and demonstrate the ability

to safely assess physiological performance of patients. Successful completion of the program requires that each student pass an academic and skills competency exam that is based on the knowledge and skills learned throughout their coursework.

## Recommended Curriculum Planner Clinical Exercise Physiology Recommended Course Sequence

Course	Title	Hours
<b>First Semester</b>		
(Summer)		
BIOL 5521	Clinical Exercise Testing and Prescription I	1
BIOL 5522	Electrocardiography	2
BIOL 6681	Behavior Modification	2
<b>Hours</b>		<b>5</b>
<b>Second Semester</b>		
(Fall)		
BIOL 5340	Advanced Integrative Human Physiology I <sup>1</sup>	3
BIOL 6662	Advanced Exercise Physiology	3
BIOL 6623	Graded Exercise Testing	3
<b>Hours</b>		<b>9</b>
<b>Third Semester</b>		
(Spring)		
BIOL 5359	Pathophysiology <sup>1</sup>	3
BIOL 6663	Exercise Pharmacology	3
BIOL 6664	Clinical Exercise Testing and Prescription II	2
BIOL 6690	Internship I	2
<b>Hours</b>		<b>10</b>
<b>Fourth Semester</b>		
(Summer)		
BIOL 6625	Comprehensive Clinical Exercise Physiology Exit Exam and Skills Examination	1
BIOL 6642	Applied Nutritional Physiology w/metabolism	2
BIOL 6692	Internship II	3
<b>Hours</b>		<b>6</b>
<b>Total Hours</b>		<b>30</b>

<sup>1</sup> These courses are designated as foundational, which means, a "B" or better is required to meet degree requirements.

## Courses

**BIOL 5319 Histology.** (Formerly 319) The microscopic anatomy of the tissues and organs of vertebrates. Lecture and lab. 4 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Periodically)

**BIOL 5325 Biology of Complex Systems.** (Formerly INPH 525) Survey of emergent and organizing principles in complex biological systems modeled as networks. Topics include genome and cellular interaction networks, anatomical networks such as brain and cardiovascular systems, social, linguistic, cultural, and technological networks, and ecological networks. Graph theory and computer software are used to visualize and analyze system properties. 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Periodically)

**BIOL 5340 Advanced Integrative Human Physiology I.** (Formerly INPH 540) 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Fall Term)

**BIOL 5344 Gross Dissection Anatomy.** (Formerly 344) Dissection of the human cadaver. Prerequisite: "C" or better in CHEM 1123 and "B" or better in BIOL 3203. 3 semester credit hour/s. Department Consent Required.

**Campus:** LISLE (Typically Offered: Periodically)

**BIOL 5345 Gross Dissect Anatomy II: Head and Neck.** (Formerly INPH 345/545) 3 semester credit hour/s. Department Consent Required.

**Campus:** LISLE (Typically Offered: Periodically)

**BIOL 5346 Gross Dissect Anatomy III: Lower Body.** (Formerly INPH 346/546) 3 semester credit hour/s. Department Consent Required.

**Campus:** LISLE (Typically Offered: Periodically)

**BIOL 5347 Medicinal Chemistry.** (Formerly 347) This course will investigate the role of organic chemistry in the design and mechanism of drugs. The principles of drug discovery, drug development, drug/receptor interactions and structure/activity relationships will be covered. Prerequisite: "C" or better in CHEM 2247. CHEM 4347 is cross-listed with BIOL 5347. 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Periodically)

**BIOL 5350 Molecular Pharmacology.** A course introducing students to the molecular foundations of drug action with an emphasis on molecular structure-function relationships. Includes receptor-ligand interactions, agonists and antagonists, and signal transduction pathways. 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Periodically)

**BIOL 5354 Immunology.** (Formerly INPH 554) Includes structural and functional components of the immune system, as well as types and control of immune response. 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Spring Term)

**BIOL 5355 Molecular Pharmacology.** (Formerly INPH 555) A course introducing students to the molecular foundations of drug action with an emphasis on molecular structure-function relationships. Includes receptor-ligand interactions, agonists and antagonists, and signal transduction pathways. 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Periodically)

**BIOL 5356 Cellular and Molecular Mechanisms of Human Disease II.** (Formerly 356) Mechanisms of human disease that occur in the neurological, endocrine, reproductive hematologic, musculoskeletal and integumentary systems. 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Periodically)

**BIOL 5358 Exercise Physiology.** (Formerly EXPH/INPH/HLSC 358/558) Provides an in-depth overview of how the body's physiological, hormonal, and biochemical systems acutely and chronically respond to various forms of physical activity and environmental conditions in untrained and trained individuals. 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Fall, Spring, and Summer Terms)

**BIOL 5359 Pathophysiology.** (Formerly INPH 359/559) Integrates the pathological processes of human disease with those of the normal functioning body. Cellular and organismal disease mechanisms are studied with reference to specific diseases, with opportunity to apply this learning to actual case studies. 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Spring Term)

**BIOL 5360 Physiological Regulatory Systems: Endocrinology.** An integrative study of basic medical endocrinology through case studies and the primary literature. 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Fall Term)

**BIOL 5368 Biomechanics.** (Formerly INPH 568) Principles from the fields of physics, engineering, anatomy and physiology are used to analyze motion of the human body and to describe the forces acting upon the various body segments during normal daily activities. 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Spring Term)

**BIOL 5369 Neurobiology.** (Formerly INPH 569) Introduction to the nervous system including the human brain and its specialized functions. Topics covered include pathophysiology of the brain, how and why psychotic and other drugs affect the nervous system, and how and why memories are formed. 3 semester credit hour/s.

**Designation:** Writing Intensive Class

**Campus:** LISLE (Typically Offered: Spring Term)

**BIOL 5371 Molecular Biology.** (Formerly INPH 571) An advanced study of mechanisms controlling gene and genome organization, expression, regulation, and evolution. Includes viral, prokaryotic, and eukaryotic systems. Exposure to fundamental bioinformatics and programming, and readings from the primary literature. 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Fall Term)

**BIOL 5372 Genomics and Bioinformatics.** (Formerly INPH 572) A survey of the fields of genomics, proteomics, and metabolomics, and systems biology with an emphasis on using bioinformatics resources and understanding the computational and mathematical basis behind many of the tools used for data mining and analysis. Student project involves programming. 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Spring Term)

**BIOL 5385 Principles of Infectious Disease.** Survey of infectious microorganisms and their diseases through team-based case studies. Topics covered throughout the semester include infectious disease epidemiology, clinical presentations, diagnostics, and treatments. Students will focus on primary and secondary literature to interpret their case study files. 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Spring Term)

**BIOL 5387 Neurophysiology.** (Formerly INPH 576) Introduction to the function of nervous systems at the molecular, cellular, and network level. Topics will include the electrical properties of excitable cells, cell-to-cell communication in the nervous system, and network level processing and modulation of neural circuits. Special attention will be paid to current and developing techniques in the field. 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Fall Term)

**BIOL 5408 Microbiomes.** This course explores microbiomes and the link between microbes and their hosts. There will be an introduction on the methodology used to study microbiomes allowing students to use primary literature to discuss and evaluate primary literature investigating the link between microbiomes and host health processes. 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Spring Term)

**BIOL 5502 Stem Cell Biology.** (Formerly 502) Stem cell basic biology, including stem cells, their microenvironment, regulatory control of proliferation/differentiation, clinical applications, FDA regulation, and ethical considerations. 4 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Fall and Spring Terms)

**BIOL 5503 Stem Cell Laboratory.** (Formerly 503) Hands-on training with different stem cell platform technologies including minimal HPC processing, "rare event" Flow Cytometry analysis, cell selection and isolation devices, automated cell counting. 2 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Fall and Spring Terms)

**BIOL 5504 Stem Cell Studies.** (Formerly 504) Journal readings and discussions for stem cell studies, cell therapy approaches, novel platform technologies, and clinical laboratory applications. 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Fall and Spring Terms)

**BIOL 5505 Global Challenges for the Health Services Professional: Using a Critical Reflection Platform.** (Formerly INPH 505) Global Challenges for the Health Services Professional: Using a Critical Reflection Platform. 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Fall Term)

**BIOL 5520 Great Ideas in Physiology.** (Formerly INPH 520) A study in the original articles from some of the great physiologists to understand basic concepts and current writings on advances in the field of physiology. Students are exposed to original research publications from various physiological systems. 2 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Fall Term)

**BIOL 5521 Clinical Exercise Testing and Prescription I.** (Formerly EXPH 521) Laboratory exercise testing and training covering: pre-exercise screening procedures, indications and contraindications for exercise testing, exercise testing procedures and protocols, interpretation of the exercise response. 1 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Summer Term)

**BIOL 5522 Electrocardiography.** (Formerly EXPH/HLSC 322) Practice in the measurement and interpretation of the 12-lead ECG normal, changes with disease, changes with exercise and stress testing. Recognition of the most common abnormalities. 2 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Summer Term)

**BIOL 5550 Advanced Integrative Human Physiology II.** (Formerly INPH 550) A thorough study of the normal functioning of immune, urinary, digestive, endocrine and reproductive systems. Emphasis is placed on integrative nature of physiology, highlighting the molecular and cellular basis behind normal functions. 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Spring Term)

**BIOL 5565 Advanced Biochemistry and Metabolism.** (Formerly INPH 565) The major metabolic pathways and cellular bioenergetics are discussed. An emphasis is placed upon the chemistry of these processes. 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Spring Term)

**BIOL 5566 Essential Medical Biochemistry.** (Formerly INPH 566) Course will focus on principles of molecular recognition and on the study of human metabolism in health and disease 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Spring Term)

**BIOL 5577 Cancer Biology.** Classic and modern papers will be used to study experimental methods for analysis of oncogene and tumor suppressor functions in cancer. Particular emphasis will be on DNA repair, cell cycle checkpoints, apoptosis, and signal transduction. Students will be expected to select and discuss primary literature in a seminar setting. 3 semester credit hour/s.

**Campus:** LISLE

**BIOL 5581 Professional Experiences in Clinical Exercise Physiology.** (Formerly EXPH/HLSC 381) This course is an introductory course to clinical exercise physiology, related professional organizations, licensure, and certifications. Research designs and library research resources are covered, providing the basis for literature discussion in other courses. Students will gain exposure to the field through observation visits where clinical exercise physiologists are employed, leading to a class presentation and a paper. 1 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Fall Term, 1st 8 Weeks)

**BIOL 5590 Comprehensive Exam.** (Formerly INPH 590) Comprehensive exam is designed to assess the depth and breadth of understanding, synthesis and integration of knowledge, written and oral communications skills of the students acquired through the program. All program class course work must be completed. 1 quarter credit hour/s.

**Campus:** LISLE (Typically Offered: Spring Term)

**BIOL 5591 Special Topics.** (Formerly INPH 591) Special courses on various topics with which the student has not become acquainted in formal course work. May be an extension of or a supplement to material previously encountered, or lectures from a completely new area. 1-3 semester credit hour/s. Course Repeatable. Maximum number of units allowed: 9.

**Campus:** LISLE

**BIOL 5701 Advanced Molecular Biology Techniques I.** Students will learn practical laboratory skills relevant to basic and applied research questions in molecular and cellular biology. Labs will provide practical experience with genomic DNA and cDNA amplification, cloning, and library construction; analysis of genomic polymorphisms; in vitro mutagenesis using CRISPR/Cas9 systems; transformation and expression systems; quantitation and structural analysis of mRNA and regulatory RNAs; conventional and next generation sequencing analysis of genomic and cDNA, including large dataset analysis. Students will work with model microorganisms and learn tissue culture techniques. 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Fall Term)

**BIOL 5729 Biostatistics II.** This course is a continuation of the fundamentals of biostatistics with the discussion and application of more advanced techniques. Topics will include person-time data analysis, survival analysis topics including Kaplan-Meier estimation, Cox-proportional Hazard models, and censoring, logistic regression and will discuss clinical trials. 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Spring Term)

**BIOL 5750 On Being a Scientist.** Ethical foundations of scientific practices and some personal and professional issues that researchers encounter in their work. 2 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Summer Term)

**BIOL 6340 Advanced Cell Biology.** This course covers structures, processes and systems of eukaryotic cells and tissues. Primary literature will be used to study experimental methods and current understanding of cellular organelles, intracellular traffic, cell-cell communication, cellular responses to environmental/developmental cues (cell cycle regulation, signal transduction, transcriptional response pathways, repair/apoptosis pathways). 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Spring Term)

**BIOL 6600 Professional Insights into Health Care Clinical Experience.** (Formerly INPH 600) The Practicum requires observation hours for a specific health care career, along with structured readings and written reflections. The observation is in a variety of clinical sites and/or private practice offices. Students have unique opportunity to be exposed to current advances in therapeutics, including stem cell research. 1-3 semester credit hour/s.

**Campus:** LISLE

**BIOL 6623 Graded Exercise Testing.** (Formerly EXPH 623) Consideration of the implication of exercise for persons in rehabilitative programs. Discussion of performing diagnostic stress testing and understanding the contraindications involved in these actions. Practical Experience conducting exercise tests with ECG monitoring. Prerequisite: Biology 5522. 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Fall Term)

**BIOL 6625 Comprehensive Clinical Exercise Physiology Exit Exam and Skills Examination.** (Formerly EXPH 625) Comprehensive written and skills based program exam. This exam will be designed so that students can demonstrate, prior to graduation, competency in the content requirements of the ACSM Certified Clinical Exercise Physiologist exam. Prerequisites: completion of all first year coursework, co-registration with BIOL 6642. 1 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Summer Term)

**BIOL 6642 Applied Nutritional Physiology w/metabolism.** Study of the role of nutrition in chronic disease including CVD, diabetes, hypertension, obesity, and systemic inflammation. Coverage of endocrine regulation of fuel turnover with particular reference to exercise, diabetes and obesity. 2 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Summer Term)

**BIOL 6662 Advanced Exercise Physiology.** (Formerly EXPH 662) Advanced topics in 1) musculoskeletal system, 2) cardiopulmonary function, 3) Nervous system and neuromuscular function, 4) macronutrient metabolism, 5) endocrine and immune systems, 6) integrated exercise responses, and 7) environmental exercise physiology. Prerequisite: BIOL 5521, BIOL 5358 or equivalent 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Fall Term)

**BIOL 6663 Exercise Pharmacology.** (Formerly EXPH 663) Pharmacokinetics and pharmacodynamics of commonly prescribed drugs (e.g., antibiotics/antivirals, anti-inflammatory drugs, pain medications, muscle relaxers, asthma medications, antihistamines, GI tract medications, hypertension and heart disease medications, antipsychotic medications, diabetes medication). Emphasis on current use of therapeutic drugs and their effects on the various systems and risk factors involved in the exercise state. Prerequisite: BIOL 6623, co-registration in BIOL 5359. 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Spring Term)

**BIOL 6664 Clinical Exercise Testing and Prescription II.** (Formerly EXPH 664) Exercise prescription for clinical diseases or conditions (e.g., cardiovascular, pulmonary, obesity/metabolic, orthopedic/musculoskeletal, neoplastic, frailty, neuromuscular). Prerequisite: BIOL 5521, co-registration in BIOL 5359. 2 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Spring Term)

**BIOL 6681 Behavior Modification.** (Formerly EXPH 681) Application of current approaches to modifying health impaired habits, lifestyles and beliefs including stress theories of disease, health behavior change and techniques of stress management. 2 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Summer Term)

**BIOL 6690 Internship I.** (Formerly EXPH 690) Practical experience in exercise physiology in various settings such as hospitals and rehabilitation centers under the supervision of an experienced on site professional. Internships available in wellness/fitness, rehabilitation, diagnostics or research. Prerequisite: BIOL 6662, BIOL 6623, co-registration in BIOL 5359 1-2 semester credit hour/s. Department Consent Required.

**Campus:** LISLE (Typically Offered: Spring Term)

**BIOL 6691 Selected Topics.** (Formerly EXPH 691) Special courses on various topics with which the student has not become acquainted in formal course work. May be an extension of or a supplement to material previously encountered, lectures from a completely new area, or independent study. 1-3 semester credit hour/s. Department Consent Required.

**Campus:** LISLE (Typically Offered: Periodically)

**BIOL 6692 Internship II.** (Formerly EXPH 692) Practical experience in exercise physiology in various settings such as hospitals, and rehabilitation centers, under the supervision of an experienced on site professional. Internships available in wellness/fitness, rehabilitation, diagnostics or research. 3 semester credit hour/s. Department Consent Required.

**Campus:** LISLE (Typically Offered: Summer Term)

**BIOL 6701 Advanced Molecular Biology Techniques II.** Students will continue developing practical laboratory skills with emphasis on protein expression and cellular responses. Methods will include inducible protein expression and purification systems (native and fusion proteins; immunoprecipitation and tagged protein purification systems); Western and ELISA analysis of protein expression levels and modifications; mobility shift and supershift assays; protein expression in tissue culture cells, with emphasis on growth rates, cell migration assays, and flow cytometry analysis of cell cycle/apoptosis states; immunofluorescence analysis of cellular responses to protein expression, DNA damage, genomic demethylation, and ribosylation inhibition. 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Spring Term)

**BIOL 6720 Scientific Communications.** Participants will hone essential skills in scientific writing and public presentations for professional and lay audiences. Students will practice reading and presenting primary literature in molecular biology, giving scientific platform talks for fellow students with various backgrounds, giving mock press interviews, preparing publication-quality manuscripts, posters, and grant proposals. 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Spring Term)

**BIOL 6790 Research Experience.** Practical experience in a research laboratory utilizing molecular biology, bioinformatics, or cellular biology techniques in a project. Research may be on site or at another approved institution. Prerequisite: BIOL 5701 1-3 semester credit hour/s. Course Repeatable. Maximum number of units allowed: 5.

**Campus:** LISLE (Typically Offered: Periodically)

**BIOL 6799 Thesis.** Culmination of dedicated research on a project approved by committee that demonstrates proficiency in techniques associated with molecular biology, bioinformatics, and/or cellular biology in addition to critical analyses of a research project. Students will disseminate work in both written and oral forms. A thesis defense of the work will be evaluated by a committee. Prerequisite: BIOL 6701 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Spring Term)

## Faculty

### Preston Aldrich (2004), Ph.D.

Biological Sciences  
Professor, Biological Sciences - MSCEP  
Ph.D., 1997, Botany, University of Georgia, Athens  
M.S., 1991, Botany, University of Minnesota, St. Paul  
B.A., 1987, Chemistry, St. Olaf College

### Leigh Anne Harden (2015), Ph.D.

Biological Sciences  
Associate Professor, Biological Sciences - MSCEP  
Ph.D. 2013, Marine Biology, University of North Carolina Wilmington  
B.S. 2007, Biology, Davidson College

### Cheryl Heinz (2004), Ph.D.

Department Chair, Biological Sciences

Associate Professor, Biological Sciences - MSCEP  
Ph.D., 2002, Entomology, Cornell University  
B.S., 1993, Honors Biology, University of Illinois at Urbana

### Jayashree Sarathy (2010), Ph.D.

Director of Graduate Programs, Biological Sciences  
Professor, Biological Sciences - MSCEP  
Ph.D. 1999, Physiology, University of Illinois at Chicago  
M.Phil. 1991, University of Madras, India  
M.S. 1990, University of Madras, India  
B.S. 1988, University of Madras, India

### Regina Schurman (2007), Ed.D., ACSM-CEP, C.P.A.

Director of Pre-Health Professions, Biological Sciences  
Assistant Professor, Biological Sciences - MSCEP  
Ed.D. 2012, Higher Education and Organizational Change, Benedictine University  
M.S. Clinical Exercise Physiology, 2007, Benedictine University  
B.S. Accountancy 1991, DePaul University  
A.A.S. Data Processing 1984, Oakton Community College

### Lee Ann Smith (2004), Ph.D.

Biological Sciences  
Professor, Biological Sciences - MSCEP  
Ph.D. 2004, Biomedical Science, University of Connecticut Health Center  
B.S. 1997 Biochemistry, Benedictine University

## Lecturers

## Objectives

Students in the M.S. in Clinical Exercise Physiology will achieve the following student learning outcomes (SLO):

Student Learning Outcome 1: Students will demonstrate knowledge of metabolic processes, cardiopulmonary and musculoskeletal systems  
• University SLO: 1. Disciplinary Competence and Skills

Student Learning Outcome 2: Students will learn to effectively communicate physiological concepts

• University SLO: 3. Communication Skills

Student Learning Outcome 3: Demonstrate the ability to administer and interpret diagnostic techniques associated with physiological processes

• University SLO: 5. Analytical Skills

Student Learning Outcome 4: Students will demonstrate understanding of methods used in clinical exercise testing

• University SLO: 4. Information Fluency

Student Learning Outcome 5: Students will apply knowledge of clinical exercise physiology in a real-world setting

• University SLO: 5. Analytical Skills; 7. Civic Engagement and Social Responsibility