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# Physical Education (majors and minors)

## Department of Physical Education/Exercise Studies & Recreation/Leisure Studies: Thomas R. Kettelkamp, chair

**Faculty:** Michael S. Beardsley, Andrea N. Boon, Deanna Hand, Sandra D. Johnson, Thomas R. Kettelkamp, David B. Lewis, Christopher Nafziger, Trini G. Rangel, Matthew Webb, Brad P. Zarges

**Web site:** [www.houghton.edu/academics/programs/physical\\_education](http://www.houghton.edu/academics/programs/physical_education)

**Phone:** 585.567.9645

**Majors:** Physical Education (teaching K-12: 36.5 hours in the major; 29 in education; 4 hours in pre/co-requisites),  
Physical Education (physical fitness: 54 hours; 4 hours in pre/co-requisites);  
Physical Education majors meet Health and Wellness: Point 1 by taking PHED 237.

**Minors:** Physical Education (15.5 hours)  
Physical Education with focus on athletic training (16 hours)  
Physical Education with focus on Pre-physical Therapy (14.5-16 hours)  
Sports Ministry (18 hours)

### Teaching Option

For admission to the **teacher education program**, a student must:

1. Complete an application (available from the education department office, 200 Chamberlain Center),
2. Successfully complete the writing sample assessment,
3. Present a cumulative grade point average of at least 2.7, and
4. Receive formal approval from Teacher Education Committee.

For entry into **physical education courses containing practicum experiences**, a student must:

1. Have been admitted to the teacher education program,
2. Have successfully completed EDUC 240 Teaching in Urban America,
3. Present a cumulative grade point average of at least 2.6, and
4. Receive formal approval from Teacher Education Committee.

Note: Continuation in remaining practicum experiences is contingent upon successful completion of all requirements for coursework and field placements.

To be approved for **student teaching**, a student must:

1. Complete and submit the Application for Professional Field Semester **by the end of the second week of the semester prior to the requested professional semester**,
2. Have successfully completed the junior level course sequence appropriate to the major,
3. Have presented an acceptable junior portfolio as an outcome of practicum requirements
4. Present a cumulative grade point average of at least 2.7,
5. Complete all state-mandated training sessions required for certification (completed in EDUC 202), and
6. Receive formal approval from the Teacher Education Committee.

The physical education major leading to New York state teacher certification requires 36.5 hours in physical education courses, 11.5+ in required activities and 29 in education requirements.

### Pre/Co-requisites

PSY 101	Introduction to Psychology .....	4
	Total.....	4

### Core Requirements

BIOL217, 218	Human Anatomy and Physiology .....	8
PHED 212	Foundations of Physical Education.....	2
PHED 237	Holistic Health.....	4
PHED 239	Principles of Coaching and Sport Management.....	4
PHED 246	Care and Prevention of Athletic Injuries .....	2
PHED 248	Inclusive Physical Education.....	2
PHED 249	Inclusive Physical Education Practicum.....	0.5
PHED 308	First Aid/Safety.....	2

PHED 320 Measurement and Eval in P E.....	4
PHED 330 Physiology of Exercise.....	4
PHED 341 Kinesiology.....	4
Total.....	38

**Required Activities**

PHED 221 Educational Gymnastics and Movement Foundations.....	2
PHED 230 Aquatics.....	2
PHED 124 Cross Country Skiing.....	0.5
PHED 125 Downhill Skiing.....	0.5
PHED 123 Canoeing.....	0.5
PHED Sport Competencies.....	0-?
PHED 256 Cooperative Games.....	1
PHED 254 Teaching Net/Wall/Target Sports.....	2
PHED 255 Teaching Team Passing/Striking/Fielding Sports.....	2

*Choose one course from following list:*

REC 103 Initiatives.....	1
REC 109 Highlander.....	2
REC 227 Outdoor Leadership Training.....	4
REC 240 Administration of Organized Camps.....	4
REC 301 Methods and Materials: Camps and Outdoor Ed.....	4
Total.....	11.5+

**Education Requirements**

EDUC 217 Education and American Culture.....	4
(or EDUC 218 Secondary Education and American Culture.....)	4
EDUC 240 Teaching in Urban America.....	2
PHED 225 Teaching Elementary Physical Education.....	2
PHED 302 Teaching Secondary Physical Education.....	2
PHED 235, 303 Teaching Practicum I, II.....	0.5/0.5
EDUC 313 Language, Literacy and Curriculum integration.....	4
PHED 405 and 407 Student Teaching.....	12
(CPR/First Aid must be current)	
PHED 411 Senior Capstone: Issues Seminar In Physical Education.....	2
Total:.....	29

*The Physical Education major satisfies the Health and Wellness competencies with the following courses:*

- Point 1 - PHED 237 Holistic Health*
- Point 2 - PHED 330 Physiology of Exercise*
- Point 3 - PHED 221 Educational Gymnastics or PHED 254 Teaching Net/Wall/Target Sports or PHED 255 Teaching Team Passing/Striking/Fielding Sports*
- Point 4 - PHED 123 Canoeing or PHED 124 Cross Country Skiing or PHED 125 Downhill Skiing*

**Physical Education Minor:** The physical education minor (15.5 hours) consists of the following:

**Pre/Co-requisites**

Three activity courses which fulfill the Lab, Indoor and Outdoor components of the Integrative Studies requirements.....	1.5
PHED 212 Foundations of Physical Education.....	2
PHED 237 Holistic Health.....	4
Plus 8 hours from courses numbered above 200*.....	8
(* no more than four credits may be in activity laboratories.)	
Total:.....	15.5

**Athletic Training Minor:** The physical education minor with a focus in athletic training (16 hours) is comprised of the courses listed below. This minor is designed to enhance the student's skills in preventing, evaluating, and treating various athletic injuries.

**Required classes**

PHED 246 Care, Prevention & Management of Athletic Injuries.....	2
PHED 247 Recognition and Evaluation of Athletic Injuries.....	4
PHED 308 First Aid/Safety.....	2
PHED 330 Physiology of Exercise <i>or</i>	
PHED 341 Kinesiology.....	4
PHED 347 Therapeutic Modalities.....	2
PHED 348 Therapeutic Exercise Mgmt. of Injuries.....	2
Total:.....	16

**Pre-physical Therapy Minor:** (14.5-16 hours) – See *Pre-physical Therapy* entry.

**Sports Ministry Minor:** (18 hours, interdisciplinary) – See *Sports Ministry* entry.

### Physical Fitness

The physical fitness option is a non-teaching option requiring 54 credits in physical education plus 4 hours in prerequisites. One of the credits shall be earned in activity laboratories (AL). Also included is a four-credit internship.

#### Pre/Co-requisites

PSY111	Introduction to Psychology .....	4
		Total:.....4

#### Core Requirements

BIOL 217, 218	Human Anatomy and Physiology .....	8
CHEM 187	Introduction to Nutrition (with lab).....	4
PHED 212	Foundations of Physical Education.....	2
PHED 230	Aquatics.....	2
PHED 237	Holistic Health.....	4
PHED 246	Care, Prevention, and Management of Athletic Injuries.....	2
PHED 248	Inclusive Physical Education .....	2
PHED 306	Principles of Coaching & Sport Management .....	4
PHED 350	Health and Physical Fitness for Senior Adults .....	2
PHED 325	Fitness Assessment & Evaluation.....	2
PHED 330	Physiology of Exercise.....	4
PHED 341	Kinesiology .....	4
PHED 308	First Aid and Safety .....	2
PHED ST:	Advanced Concepts of Personal Training.....	4

#### At least two hours from the following activities:

PHED 229	Educational Gymnastics & Movement Foundations .....	2
REC 103	Initiatives or REC 227 Outdoor Leadership Training .....	1-4
PHED 124	Cross country Skiing.....	0.5
PHED 125	Downhill Skiing.....	0.5
PHED 123	Canoeing.....	0.5
		Total:..... 48-50

#### Senior Capstone

PHED 420	Internship .....	4
or PHED 423	Practicum I.....	1
and PHED 424	Practicum II .....	1
and PHED 426	Issues Seminar/Fitness Testing & Prescription .....	2

Current certification in CPR and first aid

Total:.....4

### Coaching Registration

Completion of the teaching certification option meets all requirements for New York registration for coaching interscholastic sports in the public schools. Students in other majors/minors interested in coaching registration should take:

PHED 295	ST: Principles, Philosophy and Organization of Athletics in Education.....	3
PHED 395	ST: Health Sciences Applied to Coaching.....	3

These are expected to be alternating courses offered during Mayterm and will meet 2 of the 3 required courses for New York registration (courses will be offered through an “on demand” basis).

Courses meeting the requirements for coaching interscholastic sports in New York public schools must be completed within one year unless an extension has been filed (up to three years). For this reason, these courses are recommended for junior and senior students ONLY. The remaining 2-credit course, Theory and Techniques of Coaching will need to be completed on the student’s own time and expense in order to complete the coaching certification.

### Course Descriptions

**PHED 101 Fitness for Life** (1, F&S)  
Health-related physical fitness, self-evaluation, and individualized wellness programs. Health and Wellness: Point 1.

**PHED 103 Adaptive Physical Education** (1/1, F&S)  
For those who have some physical handicap or are limited by lack of coordination and basic training. Pre-

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requisite: PHED 101 or 101M.

**PHED 108 First Aid/CPR/AED** (.5, F&S)  
Basic understanding of lifesaving techniques relative to first aid and cardiopulmonary resuscitation. The course is taught via instructional videos and by the practice of several emergency procedures on human subjects and manikins per standards established by the American Red Cross. (No Integrative Studies credit.)

**PHED 121 Badminton** (.5, F&S)  
Physical coordination and conditioning; basic skills; appreciation for physical activity and lifetime fitness in Christian life. Health and Wellness: Point 3.

**PHED 122 Beginning Ballet** (.5, F)  
Physical coordination and conditioning; basic skills; appreciation for physical activity and lifetime fitness in Christian life. Health and Wellness: Point 3.

**PHED 123 Canoeing** (.5, S)  
Physical coordination and conditioning; basic skills; appreciation for physical activity and lifetime fitness in Christian life. Health and Wellness: Point 4.

**PHED 124 Cross Country Skiing** (.5, S)  
Evaluate personal health-related physical fitness components and incorporate exercise prescription through the venue of Cross Country Skiing. Develop basic skills and an appreciation for physical activity and lifetime fitness in Christian Life. Health and Wellness: Point 2 or 4.

**PHED 125 Downhill Skiing** (.5, S)  
Physical coordination and conditioning; basic skills; appreciation for physical activity and lifetime fitness in Christian life. Health and Wellness: Point 4.

**PHED 126 Golf** (.5, F)  
Physical coordination and conditioning; basic skills; appreciation for physical activity and lifetime fitness in Christian life. Health and Wellness: Point 4.

**PHED 128 Personal Fitness Contract** (.5, OD)  
Evaluate personal health-related physical fitness components and incorporate exercise prescription through the use of a personal fitness contract and under the direction of a qualified fitness major. Develop basic skills and an appreciation for physical activity and lifetime fitness in Christian Life. Health and Wellness: Point 2.

**PHED 129 Table Tennis** (.5, F&S)  
Physical coordination and conditioning; basic skills; appreciation for physical activity and lifetime fitness in Christian life. Health and Wellness: Point 3.

**PHED 130 Racquetball** (.5, F&S)  
Physical coordination and conditioning; basic skills; appreciation for physical activity and lifetime fitness in Christian life. Health and Wellness: Point 3.

**PHED 131 Rock Climbing** (.5, F&S)  
Physical coordination and conditioning; basic skills; appreciation for physical activity and lifetime fitness in Christian life. Health and Wellness: Point 3.

**PHED 133 Softball** (.5, F)  
Physical coordination and conditioning; basic skills; appreciation for physical activity and lifetime fitness in Christian life. Health and Wellness: Point 4.

**PHED 135 Swimming for non-majors** (.5, F)  
Evaluate personal health-related physical fitness components and incorporate exercise prescription through the venue of Swimming. Develop basic skills and an appreciation for physical activity and lifetime fitness in Christian Life. Health and Wellness: Point 2 or 3.

**PHED 136 Tennis** (.5, F&S)  
Physical coordination and conditioning; basic skills; appreciation for physical activity and lifetime fitness in Christian life. Health and Wellness: Point 4.

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- PHED 137 Volleyball** (5, F)  
Physical coordination and conditioning; basic skills; appreciation for physical activity and lifetime fitness in Christian life. Health and Wellness: Point 3.
- PHED 138 Walking/Jogging** (5, F&S)  
Evaluate personal health-related physical fitness components and incorporate exercise prescription through the venue of Walking/Jogging. Develop basic skills and an appreciation for physical activity and lifetime fitness in Christian Life. Health and Wellness: Point 2 or 3.
- PHED 139 Water Skiing** (5, F)  
Physical coordination and conditioning; basic skills; appreciation for physical activity and lifetime fitness in Christian life. Health and Wellness: Point 4.
- PHED 140 Weight Training** (5, F&S)  
Evaluate personal health-related physical fitness components and incorporate exercise prescription through the venue of Weight Training. Develop basic skills and an appreciation for physical activity and lifetime fitness in Christian Life. Health and Wellness: Point 2 or 3.
- PHED 145 Continuing Ballet** (1, OD)  
Provides the student with the concepts, technique and practice that is required to advance beyond the beginning ballet level. Health and Wellness: Point 3.
- PHED 146 Beginning Jazz Dance** (5, F&S)  
Provides beginning student with the introductory concepts and proper classical technique necessary to participate and appreciate the art of jazz dance. Health and Wellness: Point 3.
- PHED 147 Soccer** (5, F)  
Physical coordination and conditioning; basic skills; appreciation for physical activity and lifetime fitness in Christian life. Health and Wellness: Point 4.
- PHED 148 Continuing Jazz** (1, F)  
Physical coordination and conditioning; basic skills; appreciation for physical activity and lifetime fitness in Christian life. Health and Wellness: Point 3.
- PHED 212 Foundations of Physical Education** (2, F)  
Basic philosophical principles, history, scientific foundation, and contemporary significance of physical education; educational aims and objectives; physical education in the modern school curriculum.
- PHED 220 Adventure Sports (Activity Lab)** (4, Mayterm)  
Experiential learning of a variety of adventure sports (backpacking, climbing, mountain biking, kayaking/rafting) in canyons of the Adirondack or Rocky Mountain regions; teaching experience and leadership development, fitness training for lifetime benefits; personal and spiritual growth; environmental stewardship; principles of aerobic conditioning; developing training programs. Health and Wellness: Point 2 or 4.
- PHED 222 Traditional Gymnastics II (Activity Lab)** (1, OD)  
Olympic-style progressions for floor exercise and all apparatus, enhance performance base established in Educational Gymnastics; develop confidence and proficiency with techniques; professional involvement. Permission from instructor.
- PHED 225 Teaching Elementary Physical Education** (2, F)  
Student development and learning styles, teaching methods, analysis of one's own teaching, classroom management, evaluation of students' performance, and preparation of curriculum, unit, and lesson plans for the elementary level. Fifteen hours of field experience required.
- PHED/CFRM 227 Sports Ministry: The Integration of Faith and Sport** (4, S11)  
Students will develop an understanding of the sports culture and how the gospel can be effectively communicated within this context. They will consider sociological factors, historic developments and the Biblical text in order to build a theological foundation for the practice of sports ministry. Church and para-church organizations will be examined as well as evangelism and discipleship methodologies. Students will practice communication skills within sports ministry settings.

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**PHED 228 Lifeguarding (Activity Lab)** (1, M)  
Preventive lifeguarding, basic skills, emergency plans, search and recovery techniques, legal responsibilities, pool operations, and record keeping. Prerequisites: 15 years of age or older, 500 yds continuous swim, strong swimming skills. (No IS credit)

**PHED 229 Educational Gymnastics and Movement Foundations** (2, F)  
Introduction to teaching gymnastics in a K-12 curriculum; floor exercise, tumbling, basic skills for limited apparatus; routine development; safety and spotting; conceptual approach to human movement; techniques for dealing with force, time and space, and flow as they relate to movement; the use of lead-up experiences, skills, and rhythms in games; teaching methods.

**PHED 230 Aquatics** (2, S)  
Review and refinement of swimming strokes, diving form, and water safety skills to a level adequate to obtain swimming instruction certification. Exploration of methods of instruction for swimmers of all ages and abilities. Prepare lesson plans and teach community swim lessons. Preventive lifeguarding, basic skills, emergency plans, search and recovery techniques, legal responsibilities, pool operations, and record keeping. Prerequisites: 15 years of age or older, 500 yds continuous swim, strong swimming skills.

**PHED x95 ST: Advanced Concepts of Personal Training** (4, M)  
This course is designed to prepare students with the knowledge, skills, and competence to conduct fitness assessments and to design exercise programs for various populations. Students will gain practical experience related to healthy fitness management programs and will learn safety techniques and basic sports nutrition. This course will prepare the students to take the National Council on Strength and Fitness (NCSF) personal trainer exam.

**PHED 235 Elementary Teaching Practicum I** (0.5, F&S)  
Meets one day per week in the elementary setting at the same time as scheduled for the Teaching Elementary PE course. Focus on observing children and the learning environment, assisting the classroom teacher with daily routines, and supporting the learning of individual children. Increased responsibilities as the semester progresses including planning and teaching lessons under the guidance of the classroom teacher. Placement will switch half way through the semester.

**PHED 237 Holistic Health** (4, F)  
Lifetime health and well-being, interpersonal relationships, and current issues. Topics include stress, human sexuality, mental health, substance use and abuse, death and dying, personal safety, and fitness and nutrition. Health and Wellness: Point 1.

**PHED 246 Care, Prevention, and Management of Athletic Injuries** (2, F)  
Introduction to the principles of prevention of athletic injuries and managing injuries when they occur. Students will develop an understanding of common injuries, illness, and disorders of the head, trunk, and extremities. Includes techniques and philosophies of taping, wrapping, padding and bracing for prevention, management and treatment of athletic injuries.

**PHED 247 Recognition and Evaluation of Athletic Injuries** (4, S)  
Pathology and evaluation of most common injuries/conditions found in the lower and upper extremities (i.e., ankle, knee, shoulder). History; observation; palpation; active and passive range of motion; muscle, neurological, and functional testing; and postural assessment. Prerequisite: PHED 246 or permission of the instructor.

**PHED 248 Inclusive Physical Education (Activity Lab)** (2, S)  
Physical and psychological aspects of illness and disabilities within context of physical activity. Evaluation of the individual and prescription of appropriate activity. Survey of legal aspects. Ten hours of field experience required. Prerequisites: BIOL 103 and 217; PHED 212; or permission of the instructor. Health and Wellness: Point 1.

**PHED 249 Inclusive Physical Education Practicum** (.5, S)  
Meets one day per week in the inclusive physical education setting at the same time as scheduled for the Inclusive Physical Education course. Focus on observing children and the learning environment, assisting the classroom teacher with daily routines, and supporting the learning of individual children. Increased responsibilities as the semester progresses including planning and teaching lessons under the guidance of the classroom teacher.

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- PHED 253 Teaching Track and Field** (1, M)  
Basic understanding of skills and teaching methods for selected track and field events including high jump, long jump, triple jump, sprint mechanics, hurdling, sprint starts, relays, shot-put, and discus. Students will examine preparatory activities, drills, mechanical analysis of skills and unit and lesson planning; principles of aerobic conditioning; and developing training programs. Students will also help organize and run a local track and field event.
- PHED 254 Teaching Net/Wall/Target Sports** (2, F09)  
Basic understanding of skills and teaching methods for selected net, wall, and target sports including badminton, golf, racquetball, tennis, and volleyball. Students will examine preparatory activities, drills, mechanical analysis of skills, and unit and lesson planning; principles of aerobic conditioning; developing training programs.
- PHED 255 Teaching Team Passing/Striking/Fielding Sports** (2, F10)  
Basic understanding of skills and teaching methods for selected team passing, striking, and fielding sports including basketball, flag football, soccer, softball, and team handball. Students will examine preparatory activities, drills, mechanical analysis of skills, and unit and lesson planning; principles of aerobic conditioning; developing training programs.
- PHED 256 Cooperative Games** (1, S10)  
Basic understanding of skills and teaching methods for encouraging the growth and development of skills in leadership, cooperation, and teamwork. Students will examine activities and systems of instruction that promote the development of these skills in their physical education classes.
- PHED/CRFM 275 Methods & Administration of Sports Ministry** (2, S10)  
Students will evaluate sports ministry strategies within local church, parachurch, mission and educational settings. They will review and develop curriculum and programs for use within these settings. Students will develop communication skills for a sports audience and will examine evangelism and discipleship methods.
- PHED 281 Pre-Physical Therapy Field Experience I** (2, F)  
Mastery of competencies in injury prevention, recognition, and assessment; taping and bracing techniques; understanding of the lower extremity; and medical documentation. *Requires 25 hours of observation in each of three settings: orthopedics, pediatrics, and geriatrics, with an additional 25 hours assisting with rehabilitation in the Houghton College training room. (Hours logged prior to taking this class may count with instructor's pre-approval.) Pre-PT majors only. Pre-/Co-Req: PHED 247.*
- PHED 290 Sociology of Sport** (3, OD)  
Sport as a social institution and microcosm of society. Topics: socialization into and via sport; social stratifications; sport and gender, race, economics, politics, religion, social change, education.
- PHED 302 Teaching Secondary Physical Education** (2, F)  
Student development and learning styles, teaching methods, analysis of one's own teaching, classroom management, evaluation of students' performance, and preparation of curriculum, unit and lesson plans for the secondary level. Fifteen hours of field experience required.
- PHED 303 Secondary Teaching Practicum II** (0.5, F)  
Meets one day per week in the secondary setting at the same time as scheduled for the Teaching Secondary PE course. Focus on observing children and the learning environment, assisting the classroom teacher with daily routines, and supporting the learning of individual children. Increased responsibilities as the semester progresses including planning and teaching lessons under the guidance of the classroom teacher. Placement will switch half way through the semester.
- PHED 305 Sports Ministry Field Practicum** (2, M/OD)  
A supervised field experience in a sports ministry setting: church, camp, mission organization or parachurch sports ministry. The student will relate theory to practice through a cooperative learning relationship between the ministry organization, student and advisor.
- PHED 306 Principles of Coaching and Sport Management** (4, S)  
Principles and techniques of coaching, systems used in coaching, and the development of a coaching system. An in-depth study of the athlete, the coach, and the team as a group. Theories, philosophy, and systems of management; program development, finance, purchasing and care of equipment, public relations, facility and personnel management, and legal liability.
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**PHED 308 First Aid and Safety** (2, S)  
Gives students the knowledge and skills necessary to administer first aid in a reasonable and prudent manner. American Red Cross, First Aid-Responding to Emergencies and CPR/AED for the Professional Rescuer certification will be given upon satisfactory completion of all requirements.

**PHED 320 Measurement and Evaluation in Physical Education** (4, F09)  
Modern theories and practices in evaluation of knowledge, attitudes, and skills. Construction of both written and practical tests to measure the various aspects included in physical education. Use of descriptive and inferential statistics.

**PHED 325 Fitness Assessment and Evaluation** (2, OD)  
Practical application and fundamental understanding of measurement techniques associated with the field of fitness and fitness testing. Use of descriptive and inferential statistics in proposing and conducting research and in understanding relevant material from the field.

**PHED 330 Physiology of Exercise** (4, S)  
The analysis of the physiological changes that occur in the body during exercise, after exercise, and during a training period. Prerequisites: BIOL 103 and BIOL 217, 218, or permission of instructor.

**PHED 341 Kinesiology** (4, F)  
The analysis of the musculoskeletal system and its interrelationship with human movement. Prerequisites: BIOL 103 and BIOL 217, 218 or permission of instructor.

**PHED 347 Therapeutic Modalities** (2, F09)  
To promote an understanding of the indications, contraindications, applications, and physiological effects of various therapeutic modalities and manual techniques used in rehabilitation of injuries.

**PHED 348 Therapeutic Exercise Management of Injuries** (2, S11)  
Mechanisms, signs, symptoms, immediate and long-term rehabilitation procedures for injuries affecting extremities and axial skeleton. Rehabilitation procedures focus on range of motion activities, joint mobilization, open vs. closed kinetic chain activities, therapeutic exercises and equipment.

**PHED 350 Health and Physical Fitness for Senior Adults** (2, F09)  
Holistic health and wellness of adults 55 years and older. Emphases: physical fitness, program planning, development, evaluation; principles and practices of leadership.

**PHED 381 Pre-Physical Therapy Field Experience II** (2, S)  
Mastery of competencies in injury prevention, recognition, and assessment; taping, and bracing techniques; understanding of the back, and upper extremity; and developing rehabilitation programs. *Requires 25 hours of observation in each of three settings: orthopedics, cardiac, and neural rehabilitation with an additional 25 hours assisting with rehabilitation in the Houghton College training room. (Hours logged prior to taking this class may count with instructor's pre-approval.) Pre-PT majors only. Pre-/Co-Requsite: PHED 348.*

**PHED 405 Student Teaching in Physical Education K-6** (6, F&S)

**PHED 407 Student Teaching in Physical Education 7-12** (6, F&S)  
Observation and teaching in elementary and secondary programs. Off-campus assignment under the direction of skilled teachers. Senior year. Student must register for PHED 411 concurrently. **Note: see Educ. Dept. policy on "Employment and Activities While Student Teaching."** Student must have overall GPA of 2.7.

**SENIOR CAPSTONE for TEACHING OPTION**

**PHED 411 Issues Seminar in Physical Education** (2 F&S)  
Critical analysis and synthesis of student teaching experience and of crucial issues in education.

**SENIOR CAPSTONE for PHYSICAL FITNESS OPTION**

**Either** four hours of PHED 420 **or** four hours of PHED 423 and 424 and 426.

**PHED 420 Internship: Physical Fitness** (4, F&S)  
Observation and practical experience in a public or private agency. Off-campus assignment under the direction of skilled professionals. NOTE: Students choosing this option must complete a total of four hours in PHED 420 or a total of four hours from PHED 423, 424, and 426. The four hours in PHED 420 includes one hour of topics in current issues. Overall GPA of 2.5 required.

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PHED 423 <b>Physical Fitness Practicum I</b>	(1, F&S)
Directed observation in off-campus fitness center programs with hands-on practical experience. Requires at least 50 observation hours from two or more agencies; sites to be negotiated. Overall GPA of 2.5 required.	
PHED 424 <b>Physical Fitness Practicum II</b>	(1, F&S)
Directed observation in off-campus rehabilitation programs with hands-on practical experience. Requires at least 50 observation hours from two or more agencies; sites to be negotiated. Overall GPA of 2.5 required.	
PHED 426 <b>Issues Seminar/Fitness Testing and Prescription</b>	(2, F&S)
Critical analysis and synthesis of critical issues in the area of health and physical fitness. On-campus fitness testing; prescriptions and follow-ups will be conducted by the student. Prerequisites: PHED 423 and 424.	
PHED 191, 291, 391, 491 <b>Independent Study</b>	(1, 2, 3 or 4)
PHED 295, 395, 495 <b>Special Topics</b>	(1, 2, 3 or 4)
Depending on interest, demand and faculty availability and expertise courses will be offered to allow students to consider issues and aspects of physical education not covered in other courses.	
PHED 496 <b>Honors in Physical Education</b>	(4, OD)

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## *Physics BA, BS (majors and minor)*

**Department of Physics and Earth Science:** Mark E. Yuly, chair

**Faculty:** Donell Brandon Hoffman, Mark E. Yuly

**Web site:** [www.houghton.edu/academics/programs/physics/](http://www.houghton.edu/academics/programs/physics/)

**Phone:** 585.567.9280

**Physics Major: BS** (35 hours in major; 16 in prerequisites; 12 in co-requisites)

**Physics Minor:** (12 hours of credit in physics courses numbered 211 or above)

### **General Information**

The BS physics major provides a broad variety of experiences with the theoretical basis of physics, its applications, experimental and mathematical techniques, and its study using computer programming and simulations. It serves as an excellent preparation for graduate work in physics or related fields, such as engineering, astrophysics, biophysics, physical oceanography, geophysics, and meteorology. Students may also use the physics major as preparation for attending professional school in fields such as medicine, dentistry, and law.

The requirements for the BS in physics are as follows:

#### Prerequisites (16):

PHYS 151, 152 General Physics I, II ..... 8

MATH 180 Calculus and Its Origins or

MATH 181 Calculus I ..... 4

MATH 182 Calculus II ..... 4

#### Co-requisites (12):

MATH 241 Differential Equations ..... 4

MATH 321 Multivariate Calculus ..... 4

CHEM 151 General Chemistry I ..... 4

#### Required (35) which must include:

PHYS 251 Mechanics I ..... 4

PHYS 352 Mechanics II ..... 4

PHYS 212 Modern Physics ..... 4

PHYS 355 Thermal Physics ..... 4

PHYS 356 Quantum Mechanics ..... 4

PHYS 353 Electricity and Magnetism I ..... 4

PHYS 354 Electricity and Magnetism II ..... 4

PHYS 471,472 Physics Project Lab ..... 2

PHYS 482 Senior Capstone: Physics Seminar ..... 1

An additional 4 hours in PHYS courses above 200 level