Sports Science

Northern Michigan University
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“Sports Science” is an umbrella term with many sub-areas

Clinical Aspects
- Medicine
- Physical Therapy
- Athletic Training
- Cardiac/Pulmonary Rehabilitation
- Adult Fitness & Wellness

Science Aspects
- Exercise Physiology
- Biomechanics
- Motor Control
- Sport Nutrition
- Sport Psychology
Sports Science is a Graduate School Preparation Program of Study

Most of our Sports Science graduates progress to graduate programs in Physical Therapy, Medicine, Physician Assistant, Exercise Physiology, Biomechanics, Nutrition ...
Exercise Physiology

The study of how the body, from a functional standpoint, responds, adjusts, and adapts to exercise and training.

Foss & Keteyian, 1998
Metabolic assessment during treadmill roller skiing

Measuring finger–curl force before and after difficult rock climbing

Biomechanics

The area of study wherein the knowledge and methods of mechanics are applied to the structure and function of a living system.
Digital video analysis of body position during cycling

“… is concerned with the study of nutrient intake and utilization in sport and fitness activities. It includes helping athletes or fitness enthusiasts find the optimal balance of nutrients for sport performance and to achieve appropriate body weight and body composition.”

- Human Kinetics Publishers Website
Sports Science is not limited to traditional “sports”
Sports Science is not limited to “sports”
Exercise Science graduate student Bob Bowen measuring the energy cost of pushing 50 lbs in a grocery cart.
Sports Science
The Path to Graduation
Sports Science
Required courses in the major

- ES 110 Intro. Sport Science
- CH 111 Gen. Chem. I
- CH 112 Gen. Chem. II
- BI 201 Hum. Anatomy
- BI 202 Hum. Physiol.
- PH 201 College Physics I
- HL 242 Emerg. Health Care
- HN 210 Hum. Nutrition
- MA 171 or PY 305 Statistics
- ES 315 Physiology of Exercise
- ES 317 Anatomical Kinesiology
- ES 417 Biomechanics
- ES 421 Physiology of Training for Sport
- ES 422 Sport Biomechanics
- ES 470 Psychology of Athletic Performance

All courses in the major require a final grade of “C” or higher.
Sports Science Cluster Minor
(24 credits from list or approved by advisor)

BI 206 Human Genetics (3 cr.)
BI 406 Advanced Cell Biology (4)
BI 425 Endocrinology (3)
BI 426 Human Histology (4)
CH 220 Introduction to Organic Chemistry (5)
CH 321 Organic Chemistry I (4)
CH 322 Organic Chemistry II (4)
CH 450 Biochemistry I (4)
CH 452 Biochemistry II (4)
CLS 100 Obtaining a blood specimen (1)
CLS 109 Intro lab testing for organ systems (1)
CLS 201 Clinical hematology /coagulation (3)
CLS 202 Clinical chemistry (4)
CLS 301 Advanced hematology/coagulation (3)
CLS 302 Advanced clinical chemistry (2)
CLS 436 Medical Genetics (4)
ES 475 Theory of Strength and Conditioning (2)
ES 476 Ex and Fitness for Special Populations (2)
ES 498 Directed Study (1–4)
HL 101 Medical Terminology (1)
HL 485 Drug Use and Abuse (3)
HL 471 2 cr. Exercise specialization (2)
HL 472 2 cr. Health and ex leadership skills (2)
HN 415 Obesity and Weight Management (4)
MET 211 Mechanics–Statics (4)
MET 310 Mechanics–Dynamics (3)
MET 311 Strength of Materials (4)
NE 212 Pharmacology Therapeutics (2)
NE 222 Concepts of altered health states (3)
PE 241 Prevention and Care of Injuries (2)
PE 495 Weightlifting Sport Performance (2)
PH 393 Experimental Instrumentation and Analysis (4)
PY 204 Physiological Psychology (4)

The Sports Science Cluster Minor enables the student to customize the program according to future goals.
Cluster Minor Options
Graduate School – Exercise Physiology

• BI 203 Medical Microbiology 3
• BI 218 Intro. Cell & Molec. Biology 4
• BI 225 Physiology of Aging 3
• BI 312 Genetics 4
• BI 425 Endocrinology 3
• CH 220 Intro. Organic Chem 5
• CH 450 Biochemistry I 4
• CH 452 Biochemistry II 4
• ES 498 Directed Study (Research) 1-4
An ES 498 Directed Study can provide an undergraduate research experience ...

As a Sports Science student, Shinya Abe completed a research Directed Study and subsequently presented his results at an international conference:
Cluster Minor Options
Graduate School – Biomechanics

- PH 202 Intro. Physics II 5
- PH 393 Exp. Instr. & Analysis 4
- MA 104/105 Col. Algebra 4
- MA 271 Calculus w/ Applications 4
- MA 115 Precalculus 4
- MA 161-163, Calculus 4-5
- MET 310 Mechanics-Dynamics 3
- PE 498 Dir. Study (Research) 1-4
# Cluster Minor Options

**Graduate School – Physical Therapy**

<table>
<thead>
<tr>
<th>Specific Course</th>
<th>Credit</th>
<th>Where it counts for Sports Science</th>
</tr>
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<tbody>
<tr>
<td>BI 112 Introductory Biology: Diversity</td>
<td>4</td>
<td>LS Div. III or SPOR Cluster Minor/SPOR elective</td>
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<tr>
<td>CH 220 Intro Organic Chem or CH 321/322 Organic Chem I &amp; II</td>
<td>8</td>
<td>can count in SPOR cluster minor/SPOR elective</td>
</tr>
<tr>
<td>CH 450 Intro Biochemistry</td>
<td>4</td>
<td>can count in SPOR cluster minor/SPOR elective</td>
</tr>
<tr>
<td>PH 202 College Physics II</td>
<td>5</td>
<td>can count in SPOR cluster minor/SPOR elective</td>
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<tr>
<td>PY 100S Psychol. as Nat. Sci. or PY 100L Psychol. as Nat. Sci. with lab</td>
<td>4</td>
<td>Liberal Studies Div. III</td>
</tr>
<tr>
<td>PY 344 Lifespan Develop. Psychol.</td>
<td>4</td>
<td>Liberal Studies Div. III</td>
</tr>
<tr>
<td>PY 205 Research Methods (recommended)</td>
<td>4</td>
<td>can count in SPOR cluster minor/SPOR elective</td>
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<tr>
<td>NE 212 Pharm. and Therapeutics</td>
<td>2</td>
<td>can count in SPOR cluster minor/SPOR elective</td>
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Optional/Recommended:

<table>
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<tr>
<th>Specific Course</th>
<th>Credit</th>
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</thead>
<tbody>
<tr>
<td>BI 303 General Microbiology</td>
<td>5</td>
<td>can count in SPOR cluster minor/SPOR elective</td>
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<tr>
<td>BI 312 Genetics</td>
<td>4</td>
<td>can count in SPOR cluster minor/SPOR elective</td>
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<tr>
<td>HL 101 Med. Terminology</td>
<td>1</td>
<td>can count in SPOR cluster minor/SPOR elective</td>
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<tr>
<td>HN 301 Nutrition for Hlth Prof.</td>
<td>2</td>
<td>can count in SPOR cluster minor/SPOR elective</td>
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*Recommended Additional Courses for Students Interested in Graduate Study in Physical Therapy*
Potential Career Option Areas

- University teaching and research
- Medicine/clinical rehabilitation
- Private sector agency, corporate fitness, YMCA, personal training
- Coaching and sports performance
Alternative Programs

- Management of Health and Fitness
  - Dr. Patricia Hogan  –  phogan@nmu.edu

- Athletic Training
  - Julie Rochester  –  jrochest@nmu.edu
Sports Science Advisors ...

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