

## PHYSICS MAJORS AND MINORS *(updated 8/15)*

### Major Field of Concentration:

The major concentration in physics leading to a Bachelor of Science degree consists of the following coursework depending on the track chosen. The Physics program offers three major tracks designed to help students focus their physics study to a desired graduate program/career path. The three tracks are: the Physics of Medicine Pre-Professional Track, the Medical Physics Track, or the Pure & Applied Physics Track. The Physics of Medicine Pre-Professional Track and the Medical Physics Track are recommended for those students intending to pursue graduate studies in medicine or healthcare fields, medical physics, or biomechanics/kinesiology. The Pure & Applied Physics track is recommended for those students considering careers in business, industry, engineering, etc. or graduate studies in research or applied physics. A grade of C or better is required in each upper-division course counted toward fulfillment of the minor requirements. (A grade of C- will not satisfy this requirement.)

Below is a summary of degree program requirements for the three physics major tracks:

Physics of Medicine (POM) Pre-Professional Track	Medical Physics Major Track	Pure & Applied Physics Major Track
<p><b>Pre – req: One year of introductory physics:</b> PH 2800/2810 <u>or</u> PH 2850/2860 (4) PH 2900/2910 <u>or</u> PH 2940/2920 (4) <u>or</u> PH 1700/1710 &amp; PH 1750/1760 (8)</p> <p><u>and</u> MT 1800 Calculus I (4) – pre-req or concurrent with PH 3210, 3240, 4900 &amp; 4940; pre-requisite for MT 3260</p>	<p><b>Pre – req: One year of introductory physics:</b> PH 2800/2810 <u>or</u> PH 2850/2860 (4) PH 2900/2910 <u>or</u> PH 2940/2920 (4) <u>or</u> (with instructor’s approval) PH 1700/1710 &amp; PH 1750/1760 (8)</p> <p><u>and</u> MT 1800 Calculus I (4)</p>	<p><b>Pre – req: One year of introductory physics:</b> PH 2850/2860 <u>or</u> PH 2800/2810 (4) PH 2940/2920 <u>or</u> PH 2900/2910 (4))</p> <p><u>and</u> MT 1800 Calculus I (4)</p>
<p><b>Upper Division Physics Required:</b> PH 3200 Physics of the Body I (3) PH 3210 Physics of the Body II (3) PH 3240 Physics of Medical Imaging (3) PH 4400 Optics (3) <u>or</u> PH 4500 Modern (3) PH 4900 Statistics for the Health Sciences (3) <u>or</u> MT 3260 Mathematical Modeling PH 4940 Research in Physics of Medicine (capstone course) (1)</p>	<p><b>Upper Division Physics Required:</b> PH 3200 Physics of the Body I (3) PH 3210 Physics of the Body II (3) PH 3240 Physics of Medical Imaging (3) PH 4400 Optics (3) PH 4500 Modern (3) PH 4900 Statistics for the Health Sciences <u>OR</u> MT 3400 Probability &amp; Statistics I (3) PH 4940 Research in Physics of Medicine (capstone course) (1)</p>	<p><b>Upper Division Physics Required:</b> PH 3500 Statics (3) PH 4000 Electric Circuits (3) PH 4100 Dynamics (3) PH 3510 Physical Chemistry I (3) <u>OR</u> PH 3400_Thermo (3) PH 3530 Physical Chem II (3) PH 3560 Physical Chemistry Lab (1) PH 4500 Modern Physics (3) PH 4215 Advanced Lab (1) PH 4940 Capstone - Research in Physics (1)</p>

<p><b>Additional Required Courses :</b>  <b>(choose <u>minimum</u> of 9 credit hours from list below)</b></p> <ul style="list-style-type: none"> <li>• <i>Exercise Science:</i> Motor Behavior EXS 4200, Kinesiology Concepts/Lab EXS 3300/3301, Exercise, Health and Chronic Disease Prevention EXS 4310, Physiology of Exercise/Lab EXS 3500/3501, Psychosocial Aspects of Exercise and Sport EXS 3700</li> <li>• <i>Biology/Chemistry:</i> General Biochemistry I CH 3310, General Physiology BL 3700/3701, Advanced Human Anatomy BL 3440/3441, Microbiology/Lab BL 3100/3101, Cell Biology/Lab BL3620/3621, Genetics/Lab BL 3610/3611</li> <li>• <i>Spanish:</i> Medical Spanish II SP3070</li> <li>• <i>Psychology:</i> Health Psychology PY 3700, Behavioral Neuroscience PY 3300, Cognitive Neuropsychology PY 4890, Developmental Psychology PY 3400</li> <li>• <i>Sociology:</i> Medical Sociology SO 3650, Sociology of Death and Dying SO 3670, Bioethics and Society SO 3690</li> <li>• <i>Philosophy:</i> Medical Ethics PL 4700, Philosophy of Death or Dying PL 3300</li> <li>• <i>Health Professions:</i> Perspectives in Global Health HP 3500, Global Perspectives on Disability HP 3700</li> <li>• <i>Communication:</i> CT 3070 Health Communication</li> </ul>	<p><b>Additional Required Courses :</b>  <b>(choose <u>minimum</u> of three credit hours from list below - work with advisor to choose appropriate additional coursework for graduate school requirements)</b></p> <ul style="list-style-type: none"> <li>• Statics (3) PH 3500</li> <li>• Dynamics (3) PH 4100</li> <li>• Electric Circuits (3) PH 4000</li> <li>• Physical Chemistry I (3) PH/CH 3510 <u>or</u> Physical Chemistry II (3) PH/CH 3530</li> <li>• Thermodynamics (3) PH 3400</li> <li>• Mathematical Modeling (3) MT 3260</li> </ul>	
<p><b>Only Calculus I is required for the POM Pre-Health Professional Track</b></p>	<p><b>Additional Mathematics Courses Required for the Medical Physics Track:</b></p>	<p><b>Additional Mathematics Courses Required for the Medical Physics Track:</b></p>

	<ul style="list-style-type: none"> <li>• Calculus II (4) MT 1810</li> <li>• Differential Equations MT 3700 (3)</li> <li>• Linear Algebra MT 3810 (3) <u>or</u> Mathematical Methods in Physics (3) PH 3710</li> </ul>	<ul style="list-style-type: none"> <li>• Calculus II (4) MT 1810</li> <li>• Differential Equations MT 3700 (3)</li> <li>• Linear Algebra MT 3810 (3) <u>or</u> Mathematical Methods in Physics (3) PH 3710</li> </ul>
<b>Total Upper Division Hours Required: 16 hours physics and 9 hours from list above = 25 hrs.</b>	<b>Total Required Upper Division Hours: 25 – 28 (depending on needed math courses)</b>	<b>Total Required Upper Division Hours: 24 – 27 (depending on needed math courses)</b>
		<b>Recommended courses:</b> Physics of Medical Imaging (3) PH 3240 Optics (3) PH 4400 Mathematical Modeling (3) MT 3260 Probability & Statistics II (3) MT 3410

#### **Additional Upper Division Coursework:**

Per university requirements, students must choose additional upper division coursework to complete the major requirement of 30 hours of upper division coursework. Students are advised to work with advisor to choose these hours to complete coursework necessary for desired graduate school entrance requirements.

### **Minor Field of Concentration**

There are two minors offered in the physics program: 1) a specialized twelve upper division credit hour Physics of Medicine minor designed for students interested in pursuing a health care career (see below), and 2) a physics minor consisting of twelve upper division physics credits of the students' choice. Students are encouraged to work with their advisor to choose the best course of study for their career goals. A grade of C or better is required in each upper-division course counted toward fulfillment of the minor requirements. (A grade of C- will not satisfy this requirement.)

The Physics of Medicine minor (POM) is available to students interested in medicine and health care to deepen their understanding of physics principles and the applicability of those principles to the field of health care. Lower-division prerequisites for this minor are PH 1700/1710 and PH 1750/1760; or PH 2800/2810 and PH 2900/2910.

For the Physics of Medicine Minor, complete 4 of the following courses (12 credit hours):

- PH 3200 Physics of the Body I (3 hrs.)
- PH 3210 Physics of the Body II (3 hrs.) – *PH 3200 is a pre-requisite for this course*
- PH 4400 Optics (With Medical Emphasis) (3 hrs.)
- PH 3240: Physics of Medical Imaging (3 hrs.)
- PH 4900: Statistics for the Health Sciences (3hrs.)

- MT 3260: Mathematical Modeling (3 hrs)

Note: MT 1800 Calculus I is a pre-requisite or co-requisite for PH 3210, PH 3240, PH 4900 and MT 3260, and MT 1800 must be completed to graduate with a Physics of Medicine Minor.

**Other Requirements:** A grade of "C" or better is required in each upper division course of this major. A grade of "C-" will not fulfill the requirement. A grade of "C" or better is required in composition and other writing courses.

**FOR MORE INFORMATION:**

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