

# Physics 2014

## Major: Physics with Optical Science and Engineering Option

Degree Type: B.A. or B.S.

Required Degree Credits to Graduate: 122

### General Education Requirements

#### First Year Experience (F):

UNIV 189	Skills For Academic Success (Students transferring in 24 or more credits do not need to take UNIV 189.)	1
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#### Communication (C):

ENGL 110	College Composition I	3
ENGL 120	College Composition II	3
One Course in Upper Level Writing: Select from current general education list		3
COMM 110	Fundamentals of Public Speaking	3

#### Quantitative Reasoning (R):

MATH 165	Calculus I	4
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#### Science & Technology (S):

PHYS 251 & 251L	University Physics I and University Physics I Laboratory	5
PHYS 252 & 252L	University Physics II and University Physics II Laboratory	5

<b>Humanities &amp; Fine Arts (A): Select from current general education list</b>		6
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<b>Social &amp; Behavioral Sciences (B): Select from current general education list</b>		6
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<b>Wellness (W): Select from current general education list</b>		2
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<b>Cultural Diversity (D): Select from current general education list</b>		
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<b>Global Perspectives (G): Select from current general education list</b>		
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Total Credits		41
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### College Requirements

**Bachelor of Science (BS) Degree** – An additional 6 credits in Humanities or Social Sciences\*

**Bachelor of Arts (BA) Degree** – An additional 12 credits Humanities and Social Sciences\* and proficiency at the second year level in a modern foreign language.

\* Humanities and Social Sciences may be fulfilled by any course having the following prefix: ADHM, ANTH, ARCH, ART, CJ, CLAS, COMM, ECON, ENGL, FREN, GEOG, GERM, HDFS, HIST, LA, LANG, MUSC, PHIL, POLS, PSYC, RELS, SOC, SPAN, THEA, WGS, or any course from the approved list of general education courses in humanities and social sciences (general education categories A and B). These credits must come from outside the department of the student's major.

### Major Requirements - Optical Science and Engineering Option

A grade of 'C' or better is required for all PHYS prefix courses.

<b>General Education Requirements</b>	40
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<b>College of Science and Mathematics Requirements</b>	6-12
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#### Physics Major Requirements (Optical Science and Engineering Option)

PHYS 171	Introductory Projects in Physics	1
PHYS 251R	University Physics I Recitation	1
PHYS 252R	University Physics II Recitation	1
PHYS 350	Modern Physics	3
PHYS 360	Modern Physics II	3
PHYS 361	Electromagnetic Theory (or PHYS 370: Electromagnetic Theory - MSUM)	3-4
PHYS 370	Introduction to Computational Physics	3
PHYS 411 & 411L	Optics for Scientists & Engineers and Optics for Scientists and Engineers Lab	4
PHYS 413	Lasers for Scientists and Engineers	3
PHYS 415	Elements of Photonics	3

Select one of the following:		3-4
PHYS 455	Classical Mechanics	
PHYS 330	Intermediate Mechanics (MSUM)	
PHYS 462	Heat & Thermodynamics	3
PHYS 485	Quantum Mechanics I	3
PHYS 486	Quantum Mechanics II	3
PHYS 489	Physics Projects	3
CSCI 160	Computer Science I	3-4
or ECE 173	Introduction to Computing	
EE 206	Circuit Analysis I	4

**Related Required Courses**

Mathematics:		
MATH 129	Basic Linear Algebra	2-3
or MATH 429	Linear Algebra	
MATH 166	Calculus II	4
MATH 265	Calculus III	4
MATH 266	Introduction to Differential Equations	3
MATH Electives	(400-level (MATH 452, MATH 481, and/or MATH 488 are recommended)	6
Chemistry: Select one of the following (150/160 recommended):		4
CHEM 150 & CHEM 160	Principles of Chemistry I and Principles of Chemistry Laboratory I	
CHEM 121 & 121L	General Chemistry I and General Chemistry I Laboratory	
Select one of the following (151/161 recommended):		4
CHEM 151 & CHEM 161	Principles of Chemistry II and Principles of Chemistry Laboratory II	
CHEM 122 & 122L	General Chemistry II and General Chemistry II Laboratory	

<b>Degree Requirements: Potential of one credit to reach 122</b>	<b>1</b>
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Total Credits	122-132
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**Recommended Electives for Optical and Engineering Option**

ECE 311	Circuit Analysis II	4
ECE 321	Electronics I	5
ECE 417	Optical Signal Transmission	3
ECE 483	Instrumentation for Engineers	3

**Program Notes**

- Except for courses offered only as pass/fail grading, no course may be taken Pass/Fail.