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
Communication (C):		
ENGL 110	College Composition I	3
ENGL 120	College Composition II	3
One Course in Upper Leve	Writing: Select from current general education list	3
COMM 110	Fundamentals of Public Speaking	3
Quantitative Reasoning (I	R):	
MATH 165	Calculus I	4
Science & Technology (S) :	
PHYS 251	University Physics I	5
& 251L	and University Physics I Laboratory	
PHYS 252	University Physics II	5
& 252L	and University Physics II Laboratory	
Humanities & Fine Arts (A): Select from current general education list		
Social & Behavioral Scien	nces (B): Select from current general education list	6
Wellness (W): Select from current general education list		
Cultural Diversity (D): Sel	ect from current general education list	
Global Perspectives (G):	Select from current general education list	
Total Credits		41

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.

General Education Requirements		40
College of Science and Mathemat	ics Requirements	6-12
Physics Major Requirements (Opt	tical 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	Optics for Scientists & Engineers	4
& 411L	and Optics for Scientists and Engineers Lab	
PHYS 413	Lasers for Scientists and Engineers	3
PHYS 415	Elements of Photonics	3

PHYS 455 Classical Mechanics PHYS 330 Intermediate Mechanics (MSUM) PHYS 462 Heat & Thermodynamics PHYS 485 Quantum Mechanics I PHYS 486 Quantum Mechanics II PHYS 489 Physics Projects CSCI 160 Computer Science I or ECE 173 Introduction to Computing EE 206 Circuit Analysis I Related Required Courses Mathematics: MATH 129 Basic Linear Algebra 2 or MATH 429 Linear Algebra 2 or MATH 426 Introduction to Differential Equations MATH 266 Introduction to Differential Equations MATH 266 Introduction to Differential Equations MATH 4266 Introduction to Differential Equations CHEM 150 Principles of Chemistry I & CHEM 151 General Chemistry I & 121L and General Chemistry II & 2 CHEM 151 Principles of Chemistry II & CHEM 151 Principles of Chemistry II & CHEM 151 General Chemistry II & CHEM 152 General Chemistry II & 122L and General Chemistry II Laboratory Degree Requirements: Potential of one credit to reach 122			
PHYS 330 Intermediate Mechanics (MSUM) PHYS 482 Heat & Thermodynamics PHYS 486 Quantum Mechanics II PHYS 489 Physics Projects CSCI 160 Computer Science I or ECE 173 Introduction to Computing EE 206 Circuit Analysis I Related Required Courses Mathematics: Mathematics Mathra 129 Basic Linear Algebra 2 or MATH 429 Linear Algebra 2 MATH 166 Calculus II MATH 265 MATH 266 Introduction to Differential Equations MATH 266 MATH Electives (400-level (MATH 452, MATH 481, and/or MATH 488 are recommended) Chemistry. Select one of the following (150/160 recommended): CHEM 150 Principles of Chemistry I 3 & CHEM 160 and Principles of Chemistry I Laboratory 3 Select one of the following (151/161 recommended): CHEM 151 Principles of Chemistry I Laboratory Select one of the following (151/161 recommended): CHEM 151 Principles of Chemistry II Laboratory Select one of the following (151/161 recommended): CHEM 151	Select one of the following:		3-4
PHYS 462 Heat & Thermodynamics PHYS 485 Quantum Mechanics I PHYS 489 Physics Projects CSCI 160 Computer Science I 3 or ECE 173 Introduction to Computing EE 206 Circuit Analysis I Related Required Courses Mathematics: MATH 129 Basic Linear Algebra 2 or MATH 429 Linear Algebra 2 MATH 286 Calculus II MATH 286 MATH 286 Introduction to Differential Equations Introduction to Differential Equations MATH Electives (400-level (MATH 452, MATH 481, and/or MATH 488 are recommended) Chemistry: Select one of the following (150/160 recommended): CHEM 150 Principles of Chemistry I A CHEM 150 and Principles of Chemistry I and General Chemistry I Laboratory CHEM 121 General Chemistry I Laboratory Select one of the following (151/161 recommended): CHEM 161 Principles of Chemistry I Laboratory Select one of the following (151/161 recommended): General Chemistry II and Gene	PHYS 455	Classical Mechanics	
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PHYS 486 Quantum Mechanics II PHYS 489 Physics Projects CSCI 160 Computer Science I or ECE 173 Introduction to Computing EE 206 Circuit Analysis I Related Required Courses MATH 129 MATH 129 Basic Linear Algebra MATH 29 Linear Algebra MATH 265 Calculus II MATH 265 Calculus III MATH 266 Introduction to Differential Equations MATH 266 Introduction to Differential Equations MATH 266 (400-level (MATH 452, MATH 481, and/or MATH 488 are recommended) Chemistry: Select one of the following (150/160 recommended): CHEM 150 Principles of Chemistry I & CHEM 160 and Principles of Chemistry Laboratory I CHEM 121 General Chemistry I & 121 And General Chemistry I Laboratory Select one of the following (151/161 recommended): CHEM 151 Principles of Chemistry II & CHEM 152 General Chemistry II & CHEM 152 General Chemistry II & CHEM 152 Gen	PHYS 462	Heat & Thermodynamics	3
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CSCI 160 Computer Science Computer Science Computer Science Computing Computer Science Comp	PHYS 486	Quantum Mechanics II	3
or ECE 173 Introduction to Computing EE 206 Circuit Analysis I Related Required Courses MATH 29 Basic Linear Algebra 2 or MATH 429 Linear Algebra 2 or MATH 429 Linear Algebra 2 MATH 166 Calculus II MATH 265 Calculus III MATH 266 Introduction to Differential Equations MATH 266 Introduction to Differential Equations MATH Electives (400-level (MATH 452, MATH 481, and/or MATH 488 are recommended) Chemistry: Select one of the following (150/160 recommended): CHEM 150 Principles of Chemistry I & CHEM 160 and Principles of Chemistry Laboratory I CHEM 121 General Chemistry I & 121L and General Chemistry I Laboratory Select one of the following (151/161 recommended): CHEM 151 Principles of Chemistry II & CHEM 161 and Principles of Chemistry II CHEM 122 General Chemistry II & CHEM 123 General Chemistry II CHEM 124 General Chemistry II Laboratory Degree Requirements: Potential of one credit to reach 122 Total Credits Circuit Analysis II ECE 311 Circuit Analysis II ECE 321 Electronics I ECE 417 Optical Signal Transmission	PHYS 489	Physics Projects	3
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Mathematics: MATH 129 Basic Linear Algebra or MATH 429 Linear Algebra MATH 166 Calculus II MATH 265 Calculus III MATH 266 Introduction to Differential Equations MATH 266 MATH 450 MATH 266 Introduction to Differential Equations MATH Electives (400-level (MATH 452, MATH 481, and/or MATH 488 are recommended) Chemistry: Select one of the following (150/160 recommended): CHEM 150 Principles of Chemistry I & CHEM 150 And Principles of Chemistry Laboratory I CHEM 121 General Chemistry I & 121 A 121 Select one of the following (151/161 recommended): CHEM 151 Principles of Chemistry I Laboratory Select one of the following (151/161 recommended): CHEM 151 A 121 A 121 A 121 A 121 A 121 A 121 A 122 B 122 C 123 A 123 A 124 Recommended Electives for Optical and Engineering Option ECE 311 C 124 C 125 C 126 C 127 C 126 C 127 C 12	or ECE 173	Introduction to Computing	
Mathematics: MATH 129	EE 206	Circuit Analysis I	4
MATH 129 Basic Linear Algebra or MATH 429 Linear Algebra MATH 166 Calculus II MATH 265 Calculus III MATH 266 Introduction to Differential Equations MATH 266 Introduction to Differential Equations MATH Electives (400-level (MATH 452, MATH 481, and/or MATH 488 are recommended) Chemistry: Select one of the following (150/160 recommended): CHEM 150 Principles of Chemistry I	Related Required Courses	s	
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Chemistry: Select one of the following (150/160 recommended): CHEM 150	MATH 266	Introduction to Differential Equations	3
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ECE 417 Optical Signal Transmission	ECE 311	Circuit Analysis II	4
11	ECE 321	Electronics I	5
ECE 483 Instrumentation for Engineers	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.