

# Mathematics and Physics

## Mathematics and Physics

This program is intended for students who desire additional mathematical background and preparation for graduate school or technical careers in the sciences, especially theoretical physics.

## Major Requirements

### Major: Mathematics & Physics

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

Required Degree Credits to Graduate: 132

### General Education Requirements

Code	Title	Credits
<b>First Year Experience (F):</b>		
UNIV 189	Skills For Academic Success (Students transferring in 24 or more credits do not need to take UNIV 189.)	1
<b>Communication (C):</b>		
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
<b>Quantitative Reasoning (R):</b>		
MATH 165	Calculus I	4
<b>Science &amp; Technology (S):</b>		
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
<b>Social &amp; Behavioral Sciences (B): Select from current general education list</b>		6
<b>Wellness (W): Select from current general education list</b>		2
<b>Cultural Diversity (D): Select from current general education list</b>		
<b>Global Perspectives (G): Select from current general education list</b>		
<b>Total Credits</b>		<b>41</b>

## 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

A grade of 'C' or better is required for all MATH, PHYS, and AST prefix courses.

Code	Title	Credits
<b>General Education Requirements</b>		40
<b>College of Science and Mathematics Requirements</b>		6-12
<b>Mathematics Major Requirements</b>		
MATH 166	Calculus II	4
MATH 265	Calculus III	4

MATH 266	Introduction to Differential Equations	3
MATH 270	Introduction to Abstract Mathematics	3
MATH 420	Abstract Algebra I	3
MATH 429	Linear Algebra	3
MATH 450	Real Analysis I	3
MATH 421	Abstract Algebra II	3
or MATH 451	Real Analysis II	
MATH 491	Seminar	2
Mathematics Electives	Any MATH prefix course 400-level or higher (MATH 488 & MATH 489 are recommended)	6
<b>Physics Major Requirements</b>		
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
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
Physics Electives: Select 3 of the following:		9
PHYS 215	Research For Undergraduates	
PHYS 411	Optics for Scientists & Engineers	
PHYS 413	Lasers for Scientists and Engineers	
PHYS 415	Elements of Photonics	
PHYS 463	Statistical Mechanics	
PHYS 481	Introduction to Solid State Physics	
MSUM AST	Astronomy courses (300/400-level) with departmental permission	
<b>Related Required Courses</b>		
Computer Science:		
CSCI 160	Computer Science I	4
Chemistry: Select one of the following (150/160 recommended):		
CHEM 150 & CHEM 160	Principles of Chemistry I and Principles of Chemistry Laboratory I	4
CHEM 121 & 121L	General Chemistry I and General Chemistry I Laboratory	
Select one of the following (151/161 recommended):		
CHEM 151 & CHEM 161	Principles of Chemistry II and Principles of Chemistry Laboratory II	4
CHEM 122 & 122L	General Chemistry II and General Chemistry II Laboratory	

**Total Credits****132-140****Program Notes**

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

**Freshman**

<b>Fall</b>	<b>Credits Spring</b>	<b>Credits</b>
PHYS 171	1 PHYS 251	4

UNIV 189	1	PHYS 251L	1
MATH 165	4	PHYS 251R	1
CHEM 150	3	MATH 166	4
CHEM 160	1	COMM 110	3
ENGL 110 <sup>credit automatically granted if you earn a "C" in ENGL 120</sup>	3	CHEM 151	3
ENGL 120 <sup>can enroll in ENGL 120 if ACT score &gt; 17</sup>	3	CHEM 161	1
Wellness Elective	2		
	<b>18</b>		<b>17</b>

**Sophomore**

<b>Fall</b>	<b>Credits</b>	<b>Spring</b>	<b>Credits</b>
PHYS 252	4	PHYS 350	3
PHYS 252L	1	MATH 266	3
PHYS 252R	1	CSCI 160	4
MATH 265	4	MATH 429	3
MATH 270	3	Humanities/Fine Arts Elective	3
Humanities/Fine Arts Elective	3	Social/Behavioral Science Elective	3
	<b>16</b>		<b>19</b>

**Junior**

<b>Fall</b>	<b>Credits</b>	<b>Spring</b>	<b>Credits</b>
PHYS 360	3	PHYS 370	3
PHYS 455	3	PHYS 486	3
PHYS 485	3	ENGL 324	3
MATH 420	3	MATH 421	3
MATH 450	3	or MATH 451 Real Analysis II	
		Social/Behavioral Science Elective	3
	<b>15</b>		<b>15</b>

**Senior**

<b>Fall</b>	<b>Credits</b>	<b>Spring</b>	<b>Credits</b>
PHYS 361	3	PHYS 489	3
PHYS 462	3	PHYS 463	3
Physics Elective	3	Physics Elective	3
MATH 4XX Math Elective	3	MATH 4XX Math Elective	3
Humanities/Fine Arts Elective	3	MATH 491	2
		Social/Behavioral Science Elective	3
	<b>15</b>		<b>17</b>

**Total Credits: 132**