

# Computer Science and Physics

## Computer Science and Physics Double Major

Since the dawn of the computer age, Computer Science and Physics have been closely intertwined disciplines. Computational physics is now an established branch of physics, complementing experiment and theory, that develops and applies computer modeling approaches to the solution of a wide range of physical problems. At the same time, software development (e.g., for graphics and data mining applications) is increasingly inspired by physics. Computer modeling, including simulation and numerical analysis, is an essential component of modern research and development. Correspondingly, the demand is growing for scientists with multidisciplinary training that combines fundamental knowledge of physics and computer science with practical skills in programming and computation. The Computer Science and Physics double major program is designed to allow students to complete the core requirements of both majors in a four-year degree. Graduates of the program will have a unique background qualifying them to work in industry or to pursue graduate studies in physics, computer science, engineering, or other technical fields.

## Major Requirements

### Major: Computer Science & Physics

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

Required Degree Credits to Graduate: 134

### 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 CSCI, 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>Computer Science Major Requirements</b>		
CSCI 160	Computer Science I	4
CSCI 161	Computer Science II	4
CSCI 213	Modern Software Development	3
CSCI 336	Theoretical Computer Science II	3
CSCI 366	Database Systems	3
CSCI 372	Comparative Programming Languages	3
CSCI 374	Computer Organization and Architecture	3
CSCI 467	Algorithm Analysis	3
CSCI 474	Operating Systems Concepts	3
CSCI Electives	CSCI 313 and/or any 400-level CSCI course that is not already used.	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
Physics Electives: Select from the following:		6
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	
PHYS 489	Physics Projects (If not used to satisfy project requirement)	
MSUM AST	Astronomy courses (300/400-level) with departmental permission	
<b>Related Required Courses</b>		
MATH 129 or MATH 429	Basic Linear Algebra Linear Algebra	2-3
MATH 166	Calculus II	4
MATH 265	Calculus III	4
MATH 266	Introduction to Differential Equations	3
MATH 270	Introduction to Abstract Mathematics	3
CSCI 445 or PHYS 489	Software Projects Capstone Physics Projects	3
<b>Total Credits</b>		<b>134-143</b>

## Program Notes

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

<b>Freshman</b>		
<b>Fall</b>	<b>Credits</b>	<b>Spring Credits</b>
PHYS 171	1	PHYS 251 4
UNIV 189	1	PHYS 251L 1
MATH 165	4	PHYS 251R 1
CSCI 160	4	MATH 129 2
ENGL 110 <sup>credit automatically granted if you earn a "C" in ENGL 120</sup>	3	MATH 166 4
ENGL 120 <sup>can enroll in ENGL 120 if ACT score &gt; 17</sup>	3	CSCI 161 4
Wellness Elective	2	
	<b>18</b>	<b>16</b>
<b>Sophomore</b>		
<b>Fall</b>	<b>Credits</b>	<b>Spring Credits</b>
PHYS 252	4	PHYS 350 3
PHYS 252L	1	MATH 266 3
PHYS 252R	1	COMM 110 3
MATH 265	4	CSCI 336 3
CSCI 213	3	Humanities/Fine Arts Elective 3
MATH 270	3	Social/Behavioral Science Elective 3
	<b>16</b>	<b>18</b>
<b>Junior</b>		
<b>Fall</b>	<b>Credits</b>	<b>Spring Credits</b>
PHYS 360	3	PHYS 370 3
PHYS 455	3	PHYS 486 3
PHYS 485	3	ENGL 324 3
CSCI 366	3	CSCI 372 3
Humanities/Fine Arts Elective	3	CSCI 374 3
	<b>15</b>	<b>15</b>
<b>Senior</b>		
<b>Fall</b>	<b>Credits</b>	<b>Spring Credits</b>
PHYS 361	3	PHYS 489 3
PHYS 462	3	PHYS 463 3
Physics Elective	3	CSCI 467 3
CSCI 474	3	CSCI 313 3
CSCI 4XX Computer Science Elective	3	or CSCI 4XX Computer Science Elective
Social/Behavioral Science Elective	3	Humanities/Fine Arts Elective 3
		Social/Behavioral Science Elective 3
	<b>18</b>	<b>18</b>

**Total Credits: 134**