COMPUTATIONAL SCIENCE MINOR - PHYSICS (PHYSICS AND ENGINEERING)

A minor in Computational Science is offered to those who wish to combine their knowledge of Biology, Chemistry, Physics or Psychology with Mathematics and Computer Science. This minor allows students to have the skills to work in cross disciplinary teams to solve challenging scientific problems. This minor is intended for students majoring in Biology, Chemistry, Computer Science, Mathematics, Physics or Psychology.

Core Courses for Physics Emphasis

Physics Major [1]

Code	Title	Units
Lower-Division Requirements		
CSC 1043 and CSC 1043L	Introduction to Computer Programming and Introduction to Computer Programming Lab	3
MTH 1064 and MTH 1064L	Calculus I (FE) and Calculus I Lab (FE)	4
PHY 2044 and PHY 2044L	University Physics I (FE) and University Physics I Lab (FE)	4
PHY 2054 and PHY 2054L	University Physics II and University Physics II Lab	4
Upper-Division Requirements		
CSC 3002	UNIX and Python Scripting for Computational Science	2
MTH 3063 or MTH 3083	Calculus Based Statistics with R Mathematical Probability and Statistics	3
Physics Major - Required Courses		
CSC 1054 and CSC 1054L	Objects and Elementary Data Structures and Objects and Elementary Data Structures Lab	4
CSC 3022	Data Management for Computational Science	2
EGR 1012 and EGR 1012L	Introduction to Engineering I and Introduction to Engineering I Lab	2
PHY 3004 and PHY 3004L	Modern Physics and Modern Physics Lab	4
Project		
Choose at least three (3) units from the following:		3
CSC 4133	Service Learning in Computer Science	
HON 4098 and HON 4099	Honors Project I and Honors Project II	
MTH 4133	Service Learning in Mathematics	
Total Units		**35**

[1] Minor Total for PHY Majors: 35 (11 units distinct from the major)

Electrical Engineering or Mechanical Engineering Physics Major [1]

Code	Title	Units
Lower-Division Requirements		
CSC 1043 and CSC 1043L	Introduction to Computer Programming and Introduction to Computer Programming Lab	3
MTH 1064 and MTH 1064L	Calculus I (FE) and Calculus I Lab (FE)	4
PHY 2044 and PHY 2044L	University Physics I (FE) and University Physics I Lab (FE)	4
PHY 2054 and PHY 2054L	University Physics II and University Physics II Lab	4
Upper-Division Requirements		
CSC 3002	UNIX and Python Scripting for Computational Science	2
MTH 3063 or MTH 3083	Calculus Based Statistics with R Mathematical Probability and Statistics	3
Electrical Engineering or Mechanical Engineering Physics Major - Required Courses		
CSC 1054 and CSC 1054L	Objects and Elementary Data Structures and Objects and Elementary Data Structures Lab	4
CSC 2052 and CSC 2052L	Data Structures in C++ and Data Structures in C++ Lab	2
CSC 3022	Data Management for Computational Science	2
EGR 1012 and EGR 1012L	Introduction to Engineering I and Introduction to Engineering I Lab	2
Choose one (1) course from the following:		3-4
EGR/PHY 4013	Thermodynamics	
PHY 3004 and PHY 3004L	Modern Physics and Modern Physics Lab	
Project		
Choose at least three (3) units from the following:		3
CSC 4133	Service Learning in Computer Science	
HON 4098 and HON 4099	Honors Project I and Honors Project II	
MTH 4133	Service Learning in Mathematics	
Total Units		**36-37**

[1] Minor Total for EGR Majors: 33 (9 units distinct from the major)

Computer Science Majors [1]

Code	Title	Units
Lower-Division Requirements		
CSC 1043 and CSC 1043L	Introduction to Computer Programming and Introduction to Computer Programming Lab	3
MTH 1064 and MTH 1064L	Calculus I (FE) and Calculus I Lab (FE)	4
PHY 2044 and PHY 2044L	University Physics I (FE) and University Physics I Lab (FE)	4
PHY 2054 and PHY 2054L	University Physics II and University Physics II Lab	4
Upper-Division Requirements		

Code	Title	Units
CSC 3002	UNIX and Python Scripting for Computational Science	2
MTH 3063	Calculus Based Statistics with R	3
or MTH 3083	Mathematical Probability and Statistics	
Computer Science Majors - Required Courses		
ISS 4014	Data Base Systems and Web Integration	4
CSC 3011	Machine Learning and Multivariate Modeling in R	1
or CSC 3031	Data Visualization and Communication with R	
Project		
Choose at least three (3) units from the following:		3
CSC 4133	Service Learning in Computer Science	
HON 4098 and HON 4099	Honors Project I and Honors Project II	
MTH 4133	Service Learning in Mathematics	
Total Units		**28**

[1] Minor Total for Computer Science Majors: 28 (12 units distinct from the major)

Mathematics Majors [1]

Code	Title	Units
Lower-Division Requirements		
CSC 1043 and CSC 1043L	Introduction to Computer Programming and Introduction to Computer Programming Lab	3
MTH 1064 and MTH 1064L	Calculus I (FE) and Calculus I Lab (FE)	4
PHY 2044 and PHY 2044L	University Physics I (FE) and University Physics I Lab (FE)	4
PHY 2054 and PHY 2054L	University Physics II and University Physics II Lab	4
Upper-Division Requirements		
CSC 3002	UNIX and Python Scripting for Computational Science	2
MTH 3063	Calculus Based Statistics with R	3
or MTH 3083	Mathematical Probability and Statistics	
Mathematics Majors - Required Courses		
CSC 3022	Data Management for Computational Science	2
PHY 3004 and PHY 3004L	Modern Physics and Modern Physics Lab	4
CSC 3011	Machine Learning and Multivariate Modeling in R	1
or CSC 3031	Data Visualization and Communication with R	
Project		
Choose at least three (3) units fromt the following:		3
CSC 4133	Service Learning in Computer Science	
HON 4098 and HON 4099	Honors Project I and Honors Project II	
MTH 4133	Service Learning in Mathematics	
Total Units		**30**

[1] Minor Total for Mathematics Majors: 32 (12 units distinct from the major)