Roadmap: Physics – Computer Science - Bachelor of Science
[AS-BS-PHY-CS]
College of the Arts and Sciences
Department of Physics
Computer Science Minor [CS]
College of the Arts and Sciences
Department of Computer Science
Catalog Year: 2013-2014

This roadmap is a recommended semester-by-semester plan of study for this major. However, courses and milestones designated as critical (in boldface and shaded areas) must be completed in the semester listed to ensure a timely graduation.

Course Subject and Title	Credit Hours	Upper Div.	Min. Grade	Major GPA	Important Notes
Semester One: [16 Credit Hours]					
MATH 12002 Analytic Geometry and Calculus I	**5**			■	**Fulfills Kent Core Mathematics and Critical Reasoning; prerequisites: MATH 11010 and 11022 may be bypassed with sufficient background**
PHY 12000 Introductory Physics Seminar	**1**			■	
US 10097 Destination Kent State: First Year Experience	1				Not required for transfer students with 25 credits
Kent Core Requirement	3				See Kent Core Summary on page 2
Kent Core Requirement	3				
General Elective	3				
Semester Two: [14 Credit Hours]					
CS 13001 Computer Science I: Programming and Problem Solving	**4**			■	**Must earn a C in order to fulfill the minor requirement**
MATH 12003 Analytic Geometry and Calculus II	**5**			■	
PHY 23101 General University Physics I	**5**			■	**Fulfills Kent Core Basic Sciences**
Semester Three: [16 Credit Hours]					
CS 23022 Discrete Structures	**3**			■	**Must earn a C in order to fulfill the minor requirement**
MATH 32051 Mathematical Methods in Physical Sciences I	**4**	■		■	
PHY 23102 General University Physics II	**5**			■	**Fulfills Kent Core Basic Sciences**
Foreign Language (Elementary I)	4-5				Fulfills College General Requirements
Semester Four: [14 Credit Hours]					
MATH 32052 Mathematical Methods in the Physical Sciences II	**4**	■		■	
PHY 36001 Introductory Modern Physics	**3**	■		■	
Foreign Language (Elementary II)	4-5				Fulfills College General Requirements
Kent Core Requirement	3				See Kent Core Summary on page 2
Semester Five: [16 Credit Hours]					
PHY 30020 Intermediate Physics Laboratory	**2**	■	**C**	■	**Fulfills writing–intensive course requirement; see note 1 on page 2**
PHY 35101 Classical Mechanics	**4**	■		■	
PHY 36002 Applications of Modern Physics	**3**	■		■	
PHY 45201 Electromagnetic Theory	**4**	■		■	
Kent Core Requirement	3				See Kent Core Summary on page 2
Semester Six: [16 Credit Hours]					
CS 23001 Computer Science II: Data Structures and Abstraction	**4**			■	**Must earn a C in order to fulfill the minor requirement**
CS Elective (upper division)	3	■		■	Fulfills minor requirement
Kent Core Requirement	3				See Kent Core Summary on page 2
Kent Core Requirement	3				
Physics Elective (upper division)	3	■		■	

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Critical requirements are boldface in shaded areas

Course Subject and Title	Credit Hours	Upper Div.	Min. Grade	Major GPA	Important Notes
Semester Seven: [15 Credit Hours]					
CHEM 10060 General Chemistry I	**4**			■	**Fulfills Kent Core Basic Sciences**
CHEM 10062 General Chemistry Laboratory I	**1**			■	**Fulfills Kent Core Basic Sciences**
CS 42201 Introduction to Numerical Computing I	**3**	■		■	**Fulfills minor requirement**
PHY 40020 Advanced Physics Laboratory	**2**	■	**C**	■	**Fulfills writing–intensive course requirement; see note 1 below**
PHY 40092 Internship in Physics	**2**	■		■	**See note 2 below; fulfills experiential learning requirement**
Kent Core Requirement	3				See Kent Core Summary below
Semester Eight: [14 Credit Hours]					
CHEM 10061 General Chemistry II	**4**			■	**Fulfills Kent Core Additional**
CHEM 10063 General Chemistry Laboratory II	**1**			■	**Fulfills Kent Core Basic Sciences**
CS Elective (upper division)	3	■		■	Fulfills minor requirement
PHY Elective (upper division)	3	■		■	
General Elective (lower or upper division)	3				Number of credits required depends on meeting minimum 121 credit hours and minimum 42 upper-division credit hours

Graduation Requirements Summary

Minimum Total Hours	Minimum Upper-Division Hours	Minimum Kent Core Hours	Global / Domestic Diversity Course	Writing-Intensive	Experiential Learning	Minimum Major GPA	Overall GPA
121	42	36	Kent Core or General Electives	PHY 30020 or 40020	PHY 40092	2.000	2.000

Kent Core Summary

Kent Core Categories	Important Notes	Remaining Credit Hours
Composition (6-8 credit hours) *ENG 11002, 11011, 21011; HONR 10197, 10297*	Enrollment based on placement test	6-8
Mathematics and Critical Reasoning (3-5 credit hours)	Fulfilled in this major with MATH 12002	0
Humanities and Fine Arts (9 credit hours) *Minimum one course from humanities in Arts and Sciences and minimum one course from fine arts*	May fulfill diversity requirement	9
Social Sciences (6 credit hours) *Must be selected from two curricular areas*	May fulfill diversity requirement	6
Basic Sciences (6-7 credit hours) *Must include one laboratory*	Fulfilled in this major with CHEM 10060, CHEM 10062, CHEM 10063, PHY 23101, PHY 23102	0
Additional (6 credit hours)	Fulfilled in this major with CHEM 10061 and CS 10051	0

Note 1: A minimum C grade must be earned in either PHY 30020 or PHY 40020 in order to fulfill the writing-intensive requirement.

Note 2: With advisor's permission. PHY 40092 may be replaced with PHY 40096 Individual Investigation or PHY 40099 Senior Honors Thesis. If PHY 40096 is taken, a suitable research project should be selected.

Additional Notes for the Physics major:

1. The following courses fulfill the Kent Core Basics Sciences category; however, they **may not** count towards the major:

PHY 11030 Seven Ideas that Shook the Universe	3	PHY 21430 Frontiers in Astronomy	3
PHY 21040 Physics in The Entertainment and the Arts	3	PHY 21431 Frontiers in Astronomy Laboratory	1
PHY 21041 Physics in The Entertainment and the Arts Laboratory	1		

2. Credit is not granted for both the PHY 13001/PHY 13002 and the PHY 23101/PHY 23102 series, nor for the PHY 13011/ PHY 13012 series.

Note: All courses taken from the list of major program requirements are used in the calculation of the major GPA.

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Kent Core

Students must complete a minimum 36 credit hours of the Kent Core. Certain courses required in programs and in student's major field may also fulfill the Kent Core. Honors equivalents shall satisfy the Kent Core. None of the courses on the Kent Core list may be taken with a pass/fail grade. Visit www.kent.edu/catalog/kent-core for course list.

Diversity Course Requirement

Students must complete a two-course diversity requirement, consisting of one with a domestic (U.S.) focus and one with a global focus. One course must come from the Kent Core. The second course may be taken as a second Kent Core, within a major or minor, or as a general elective; or, with dean's approval, by completing one semester of study in another country. Visit www.kent.edu/catalog/diversity for course list.

Writing-Intensive Course Requirement

Students must complete a one-course writing-intensive requirement in their major and earn minimum C (2.000) grade. Visit www.kent.edu/catalog/wic for course list.

Experiential Learning Requirement (ELR)

To provide students with direct engagement in learning experiences that promote academic relevance, meaning and an understanding of real-world issues, students must complete this requirement at Kent State, either as a for-credit course or as a non-credit, non-course experience approved by the appropriate faculty member. Visit www.kent.edu/catalog/elr for course list.

Upper-Division Requirement

Students must complete a minimum 39 upper-division (numbered 30000 to 49999) credit hours of coursework. Programs in the College of Arts and Sciences require a minimum of 42 hours of upper-division coursework.

Foreign Language

Visit www.kent.edu/catalog/foreign-languages for course list.