

COMPUTER SCIENCE - B.S.

College of Arts and Sciences

Department of Computer Science
 241 Mathematics and Computer Science Building
 Kent Campus
 330-672-9980
 depsec@cs.kent.edu
 www.kent.edu/cs

Description

The Bachelor of Science degree in Computer Science is intended to teach students how to understand, design and build complex computer software systems. Foundational coursework and materials explain the theories and practices of programming and designing software. Students learn to understand how the underlying operating and networking systems interact with local and remote information sources to solve complex problems. Computer science offers a foundation that enables graduates to adapt to new technologies and new ideas over their lifetime.

Graduates of the computer science program have careers in developing, managing and building software in a variety of industries, including finance, health care, entertainment, telecommunications and manufacturing.

The Computer Science major includes the following optional concentrations:

- The **Data Engineering** concentration prepares students to perform the data analysis and modeling needed by organizations and to process structured, semi-structured, and unstructured data using statistical and semantic analysis techniques to meet their employers' needs.
- The **Game Programming** concentration provides students with a solid understanding of the algorithms, techniques and software used to construct interactive virtual environments. Students work in teams with content specialists and artists to develop the teamwork skills required in this multidisciplinary field, which includes a range of opportunities, from the game industry to education to training design.
- The **Information Security** concentration prepares students to meet the security needs of industry and government through coursework that provides a thorough understanding of security, privacy and cryptographic techniques and protocols used in computing and communication.
- The **Robotics and Embedded Systems** concentration prepares students to work with devices that combine hardware and software. Such devices include robots and most high tech mechanical devices like cars, planes, farm equipment and construction equipment.

Fully Offered At:

- Kent Campus

Admission Requirements

The university affirmatively strives to provide educational opportunities and access to students with varied backgrounds, those with special talents and adult students who graduated from high school three or more years ago.

Freshman Students on the Kent Campus: The freshman admission policy on the Kent Campus is selective. Admission decisions are based

upon the following: cumulative grade point average, ACT and/or SAT scores, strength of high school college preparatory curriculum and grade trends. The Admissions Office at the Kent Campus may defer the admission of students who do not meet admissions criteria but who demonstrate areas of promise for successful college study. Deferred applicants may begin their college coursework at one of seven regional campuses of Kent State University. For more information on admissions, including additional requirements for some academic programs, visit the admissions website for new freshmen.

Freshman Students on the Regional Campuses: Kent State campuses at Ashtabula, East Liverpool, Geauga, Salem, Stark, Trumbull and Tuscarawas, as well as the Regional Academic Center in Twinsburg, have open enrollment admission for students who hold a high school diploma, GED or equivalent.

English Language Proficiency Requirements for International Students: All international students must provide proof of English language proficiency (unless they meet specific exceptions) by earning a minimum 525 TOEFL score (71 on the Internet-based version), minimum 75 MELAB score, minimum 6.0 IELTS score or minimum 48 PTE score, or by completing the ESL level 112 Intensive Program. For more information on international admission, visit the Office of Global Education's admission website.

Transfer, Transitioning and Former Students: For more information about admission criteria for transfer, transitioning and former students, please visit the admissions website.

Program Learning Outcomes

Graduates of this program will be able to:

1. Understand essential facts, concepts, principles and theories relating to computer science.
2. Apply computer science concepts to solve computer-related problems.
3. Analyze algorithms, computer science methods and techniques.
4. Analyze and plan the development of a typical professional computer science problem.
5. Make succinct oral presentations and written expositions about technical problems and their solutions.
6. Work effectively as a member of a software development team.

University Requirements

All students in a bachelor's degree program at Kent State University must complete the following university requirements for graduation.

NOTE: University requirements may be fulfilled in this program by specific course requirements. Please see Program Requirements for details.

Destination Kent State: First Year Experience	1
Course is not required for students with 25 transfer credits, excluding College Credit Plus, or age 21+ at time of admission.	
Diversity Domestic/Global (DIVD/DIVG)	2 courses
Students must successfully complete one domestic and one global course, of which one must be from the Kent Core.	
Experiential Learning Requirement (ELR)	varies
Students must successfully complete one course or approved experience.	

Kent Core (see table below)	36-37
Writing-Intensive Course (WIC)	1 course
Students must earn a minimum C grade in the course.	
Upper-Division Requirement	39 (or 42)
Students must successfully complete 39 upper-division (numbered 30000 to 49999) credit hours to graduate. Students in a B.A. and/or B.S. degree in the College of Arts and Sciences must complete 42 upper-division credit hours.	
Total Credit Hour Requirement	120
Some bachelor's degrees require students to complete more than 120 credit hours.	

Kent Core Requirements

Kent Core Composition (KCOMP)	6
Kent Core Mathematics and Critical Reasoning (KMCR)	3
Kent Core Humanities and Fine Arts (KHUM/KFA) (min one course each)	9
Kent Core Social Sciences (KSS) (must be from two disciplines)	6
Kent Core Basic Sciences (KBS/KLAB) (must include one laboratory)	6-7
Kent Core Additional (KADL)	6
Total Credit Hours:	36-37

Program Requirements

Major Requirements

Code	Title	Credit Hours
Major Requirements (courses count in major GPA)		
CS 13011 & CS 13012	COMPUTER SCIENCE IA: PROCEDURAL PROGRAMMING and COMPUTER SCIENCE IB: OBJECT ORIENTED PROGRAMMING (min C grade) ¹	4
or CS 13001	COMPUTER SCIENCE I: PROGRAMMING AND PROBLEM SOLVING	
CS 23001	COMPUTER SCIENCE II: DATA STRUCTURES AND ABSTRACTION (min C grade)	4
CS 23022	DISCRETE STRUCTURES FOR COMPUTER SCIENCE	3
CS 33007	INTRODUCTION TO DATABASE SYSTEM DESIGN	3
CS 32301	HUMAN INTERFACE COMPUTING	3
CS 33101	STRUCTURE OF PROGRAMMING LANGUAGES	3
CS 33211	OPERATING SYSTEMS	3
CS 33901	SOFTWARE ENGINEERING	3
CS 35101	COMPUTER ARCHITECTURE	3
CS 35201	COMPUTER COMMUNICATION NETWORKS	3
CS 44001	COMPUTER SCIENCE III-PROGRAMMING PATTERNS	4
CS 46101	DESIGN AND ANALYSIS OF ALGORITHMS	3
MATH 12002	ANALYTIC GEOMETRY AND CALCULUS I (KMCR)	5
MATH 12013	BRIEF CALCULUS II	3
MATH 20011	DECISION-MAKING UNDER UNCERTAINTY	3
MATH 21002	APPLIED LINEAR ALGEBRA	3
Additional Requirements (courses do not count in major GPA)		
UC 10097	DESTINATION KENT STATE: FIRST YEAR EXPERIENCE	1
Foreign Language (see Foreign Language College Requirement below)		8

Kent Core Composition	6
Kent Core Humanities and Fine Arts (minimum one course from each)	9
Kent Core Social Sciences (must be from two disciplines)	6
Kent Core Basic Sciences (must include one laboratory)	6-7
Kent Core Additional	6
General Electives (total credit hours depends on earning 120 credit hours, including 42 upper-division credit hours)	6

Additional Requirements or Concentrations

Choose from the following:	19
Additional Requirements for Students Not Declaring a Concentration	
Data Engineering Concentration	
Game Programming Concentration	
Information Security Concentration	
Robotics and Embedded Systems Concentration	

Minimum Total Credit Hours: 120

¹ Minimum C grade must be earned in CS 13001 or in both CS 13011 and CS 13012 for graduation.

ADDITIONAL REQUIREMENTS FOR STUDENTS NOT DECLARING A CONCENTRATION

Code	Title	Credit Hours
Major Requirements (courses count in major GPA)		
CS 49901	CAPSTONE PROJECT (ELR) (WIC) ¹	4
Computer Science (CS) Upper-Division Electives (30000 or 40000 level)		6
Computer Science (CS) Upper-Division Electives (40000 level)		9
Minimum Total Credit Hours:		19

¹ A minimum C grade is required to fulfill the writing-intensive requirement.

Data Engineering Concentration Requirements

Code	Title	Credit Hours
Concentration Requirements (courses count in major GPA)		
CS 43016	BIG DATA ANALYTICS	3
CS 43105	DATA MINING TECHNIQUES	3
CS 43118	GRAPH AND SOCIAL NETWORK ANALYSIS	3
CS 49901	CAPSTONE PROJECT (ELR) (WIC) ¹	4
Computer Science (CS) Upper-Division Electives (30000 or 40000 level)		3
Computer Science (CS) Upper-Division Elective (40000 level only)		3
Minimum Total Credit Hours:		19

¹ A minimum C grade is required to fulfill the writing-intensive requirement.

Game Programming Concentration requirements

Code	Title	Credit Hours
Concentration Requirements (courses count in major GPA)		
CS 38101	INTRODUCTION TO GAME PROGRAMMING	3
CS 47101	COMPUTER GRAPHICS	3
CS 48101	GAME ENGINE CONCEPTS	3
CS 48102	GAME DEVELOPMENT PRACTICUM (ELR) (WIC) ¹	4

Computer Science (CS) Upper-Division Electives (40000 level)	6
Minimum Total Credit Hours:	19

¹ A minimum C grade is required to fulfill the writing-intensive requirement.

Information Security Concentration requirements

Code	Title	Credit Hours
Concentration Requirements (courses count in major GPA)		
CS 43203	SYSTEMS PROGRAMMING	3
CS 45203	COMPUTER NETWORK SECURITY	3
CS 47205	INFORMATION SECURITY	3
CS 47221	INTRODUCTION TO CRYPTOLOGY	3
CS 49901	CAPSTONE PROJECT (ELR) (WIC) ¹	4
Concentration Electives, choose from the following:		3
CS 43401	SECURE PROGRAMMING	
CS 47206	DATA SECURITY AND PRIVACY	
CS 47207	DIGITAL FORENSICS	
Minimum Total Credit Hours:		19

¹ A minimum C grade is required to fulfill the writing-intensive requirement.

Robotic and Embedded Systems Concentration Requirements

Code	Title	Credit Hours
Concentration Requirements (courses count in major GPA)		
CS 23301	ROBOTICS AND EMBEDDED SYSTEMS LABORATORY I	1
CS 23302	ROBOTICS AND EMBEDDED SYSTEMS LABORATORY II	2
CS 33301	EMBEDDED SYSTEM PROGRAMMING	3
CS 43302	ALGORITHMIC ROBOTICS	3
or CS 43303	INTERNET OF THINGS	
or CS 43334	HUMAN-ROBOT INTERACTION	
CS 49901	CAPSTONE PROJECT (ELR) (WIC) ¹	4
Concentration Elective, choose from the following:		6
CS 43203	SYSTEMS PROGRAMMING	
CS 43301	SOFTWARE DEVELOPMENT FOR ROBOTICS	
CS 43302	ALGORITHMIC ROBOTICS	
CS 43303	INTERNET OF THINGS	
CS 43334	HUMAN-ROBOT INTERACTION	
CS 44201	ARTIFICIAL INTELLIGENCE	
CS 45203	COMPUTER NETWORK SECURITY	
CS 45231	INTERNET ENGINEERING	
CS 47201	HUMAN COMPUTER INTERACTION	
Minimum Total Credit Hours:		19

¹ A minimum C grade is required to fulfill the writing-intensive requirement.

Graduation Requirements

Minimum Major GPA	Minimum Overall GPA
2.000	2.000

• A minimum grade may be required in some courses

Foreign Language College Requirement

- Students pursuing the Bachelor of Science degree in the College of Arts and Sciences must complete 8 credit hours of foreign language.¹
- Minimum Elementary I and II of the same language

¹ All students with prior foreign language experience should take the foreign language placement test to determine the appropriate level at which to start. Some students may begin their university foreign language experience beyond the Elementary I level and will complete the requirement with fewer credit hours and fewer courses. This may be accomplished by: (1) passing a course beyond the Elementary I through Intermediate II level or (2) receiving credit through Credit by Exam (CBE), the College Level Examination Program (CLEP), the Advanced Placement (AP) exam or credit through the International Baccalaureate (IB) program; or (3) being designated a "native speaker" of a non-English language (consult with the College of Arts and Sciences Advising Office for additional information) . When students complete the requirement with fewer than 8 credit hours and two courses, they will complete the remaining hours with general electives.

Roadmaps

- Computer Science Major (no concentration)
- Data Engineering Concentration
- Game Programming Concentration
- Information Security Concentration
- Robotics and Embedded Systems Concentration

Computer Science Major (no concentration)

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

Semester One		Credits	
!	CS 13011 & CS 13012 or CS 13001	COMPUTER SCIENCE IA: PROCEDURAL PROGRAMMING and COMPUTER SCIENCE IB: OBJECT ORIENTED PROGRAMMING or COMPUTER SCIENCE I: PROGRAMMING AND PROBLEM SOLVING	4
	MATH 12002	ANALYTIC GEOMETRY AND CALCULUS I (KMCR)	5
	UC 10097	DESTINATION KENT STATE: FIRST YEAR EXPERIENCE	1
	Kent Core Requirement		3
	General Electives		3
Credit Hours			16
Semester Two		Credits	
!	CS 23001	COMPUTER SCIENCE II: DATA STRUCTURES AND ABSTRACTION	4
!	CS 23022	DISCRETE STRUCTURES FOR COMPUTER SCIENCE	3
	MATH 12013	BRIEF CALCULUS II	3
	MATH 20011	DECISION-MAKING UNDER UNCERTAINTY	3
	Kent Core Requirement		3
Credit Hours			16
Semester Three		Credits	
!	CS 33211	OPERATING SYSTEMS	3
!	CS 35101	COMPUTER ARCHITECTURE	3
	MATH 21002	APPLIED LINEAR ALGEBRA	3
	Foreign Language		4
Credit Hours			13
Semester Four		Credits	
	CS 32301	HUMAN INTERFACE COMPUTING	3
	CS 33007	INTRODUCTION TO DATABASE SYSTEM DESIGN	3
	CS 35201	COMPUTER COMMUNICATION NETWORKS	3
	Foreign Language		4
Credit Hours			13
Semester Five		Credits	
!	CS 33901	SOFTWARE ENGINEERING	3
	CS 44001	COMPUTER SCIENCE III-PROGRAMMING PATTERNS	4
!	CS 46101	DESIGN AND ANALYSIS OF ALGORITHMS	3
	Kent Core Requirement		3
	Kent Core Requirement		3
Credit Hours			16
Semester Six		Credits	
!	CS 33101	STRUCTURE OF PROGRAMMING LANGUAGES	3
	Computer Science (CS) Upper-Division Electives (30000 or 40000 level)		3

	Kent Core Requirement		3
	Kent Core Requirement		3
	Kent Core Requirement		3
Credit Hours			15
Semester Seven		Credits	
	CS 49901	CAPSTONE PROJECT (ELR) (WIC)	4
	Computer Science (CS) Upper-Division Electives (30000 or 40000 level)		3
	Computer Science (CS) Upper-Division Electives (40000 level)		3
	Kent Core Requirement		3
	Kent Core Requirement		3
Credit Hours			16
Semester Eight		Credits	
	Computer Science (CS) Upper-Division Electives (40000 level)		6
	Kent Core Requirement		3
	Kent Core Requirement		3
	General Electives		3
Credit Hours			15
Minimum Total Credit Hours:			120

Data Engineering Concentration

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

Semester One		Credits	
!	CS 13011 & CS 13012 or CS 13001	COMPUTER SCIENCE IA: PROCEDURAL PROGRAMMING and COMPUTER SCIENCE IB: OBJECT ORIENTED PROGRAMMING or COMPUTER SCIENCE I: PROGRAMMING AND PROBLEM SOLVING	4
	MATH 12002	ANALYTIC GEOMETRY AND CALCULUS I (KMCR)	5
	UC 10097	DESTINATION KENT STATE: FIRST YEAR EXPERIENCE	1
	Kent Core Requirement		3
	General Electives		2
Credit Hours			15
Semester Two		Credits	
!	CS 23001	COMPUTER SCIENCE II: DATA STRUCTURES AND ABSTRACTION	4
!	CS 23022	DISCRETE STRUCTURES FOR COMPUTER SCIENCE	3
	MATH 12013	BRIEF CALCULUS II	3
	MATH 20011	DECISION-MAKING UNDER UNCERTAINTY	3
	Kent Core Requirement		3
Credit Hours			16
Semester Three		Credits	
!	CS 33211	OPERATING SYSTEMS	3
!	CS 35101	COMPUTER ARCHITECTURE	3
	MATH 21002	APPLIED LINEAR ALGEBRA	3
	Foreign Language		4
Credit Hours			13
Semester Four		Credits	
	CS 32301	HUMAN INTERFACE COMPUTING	3
!	CS 33007	INTRODUCTION TO DATABASE SYSTEM DESIGN	3
!	CS 35201	COMPUTER COMMUNICATION NETWORKS	3
	Foreign Language		4

Kent Core Requirement	3
Credit Hours	16
Semester Five	
! CS 33901 SOFTWARE ENGINEERING	3
CS 43105 DATA MINING TECHNIQUES	3
! CS 46101 DESIGN AND ANALYSIS OF ALGORITHMS	3
Kent Core Requirement	3
General Elective	2
Credit Hours	14
Semester Six	
! CS 33101 STRUCTURE OF PROGRAMMING LANGUAGES	3
CS 43016 BIG DATA ANALYTICS	3
CS 44001 COMPUTER SCIENCE III-PROGRAMMING PATTERNS	4
Kent Core Requirement	3
Kent Core Requirement	3
Credit Hours	16
Semester Seven	
CS 43118 GRAPH AND SOCIAL NETWORK ANALYSIS	3
Computer Science (CS) Upper-Division Elective (30000 or 40000 level)	3
Kent Core Requirement	3
Kent Core Requirement	3
Kent Core Requirement	3
Credit Hours	15
Semester Eight	
CS 49901 CAPSTONE PROJECT (ELR) (WIC)	4
Computer Science (CS) Upper-Division Elective (40000 level)	3
Kent Core Requirement	3
Kent Core Requirement	3
General Electives	2
Credit Hours	15
Minimum Total Credit Hours:	120

Game Programming Concentration

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

Semester One		Credits
! CS 13011 COMPUTER SCIENCE IA: PROCEDURAL & CS 13012 PROGRAMMING or CS 13001 and COMPUTER SCIENCE IB: OBJECT ORIENTED PROGRAMMING or COMPUTER SCIENCE I: PROGRAMMING AND PROBLEM SOLVING		4
MATH 12002 ANALYTIC GEOMETRY AND CALCULUS I (KMCR)		5
UC 10097 DESTINATION KENT STATE: FIRST YEAR EXPERIENCE		1
Kent Core Requirement		3
General Electives		2
Credit Hours		15
Semester Two		
! CS 23001 COMPUTER SCIENCE II: DATA STRUCTURES AND ABSTRACTION		4
! CS 23022 DISCRETE STRUCTURES FOR COMPUTER SCIENCE		3
MATH 12013 BRIEF CALCULUS II		3

MATH 20011 DECISION-MAKING UNDER UNCERTAINTY	3
Kent Core Requirement	3
Credit Hours	16
Semester Three	
! CS 33211 OPERATING SYSTEMS	3
! CS 35101 COMPUTER ARCHITECTURE	3
MATH 21002 APPLIED LINEAR ALGEBRA	3
Foreign Language	4
Credit Hours	13
Semester Four	
CS 32301 HUMAN INTERFACE COMPUTING	3
! CS 33007 INTRODUCTION TO DATABASE SYSTEM DESIGN	3
! CS 35201 COMPUTER COMMUNICATION NETWORKS	3
Computer Science (CS) Upper-Division Electives (40000 level)	3
Foreign Language	4
Credit Hours	16
Semester Five	
! CS 33901 SOFTWARE ENGINEERING	3
! CS 46101 DESIGN AND ANALYSIS OF ALGORITHMS	3
! CS 38101 INTRODUCTION TO GAME PROGRAMMING	3
Kent Core Requirement	3
General Electives	2
Credit Hours	14
Semester Six	
! CS 33101 STRUCTURE OF PROGRAMMING LANGUAGES	3
! CS 44001 COMPUTER SCIENCE III-PROGRAMMING PATTERNS	4
! CS 48101 GAME ENGINE CONCEPTS	3
Kent Core Requirement	3
Kent Core Requirement	3
Credit Hours	16
Semester Seven	
! CS 48102 GAME DEVELOPMENT PRACTICUM (ELR) (WIC)	4
! CS 47101 COMPUTER GRAPHICS	3
Computer Science (CS) Upper-Division Elective (40000 level)	3
Kent Core Requirement	3
Kent Core Requirement	3
Credit Hours	16
Semester Eight	
Kent Core Requirement	3
Kent Core Requirement	3
Kent Core Requirement	3
Kent Core Requirement	3
General Electives	2
Credit Hours	14
Minimum Total Credit Hours:	120

Information Security Concentration

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

Semester One		Credits
! CS 13011	COMPUTER SCIENCE IA: PROCEDURAL	4
& CS 13012	PROGRAMMING	
or CS 13001	and COMPUTER SCIENCE IB: OBJECT ORIENTED PROGRAMMING	
	or COMPUTER SCIENCE I: PROGRAMMING AND PROBLEM SOLVING	
MATH 12002	ANALYTIC GEOMETRY AND CALCULUS I (KMCR)	5
UC 10097	DESTINATION KENT STATE: FIRST YEAR EXPERIENCE	1
Kent Core Requirement		3
General Electives		2
Credit Hours		15
Semester Two		
! CS 23001	COMPUTER SCIENCE II: DATA STRUCTURES AND ABSTRACTION	4
! CS 23022	DISCRETE STRUCTURES FOR COMPUTER SCIENCE	3
CS 32301	HUMAN INTERFACE COMPUTING	3
MATH 12013	BRIEF CALCULUS II	3
MATH 20011	DECISION-MAKING UNDER UNCERTAINTY	3
Credit Hours		16
Semester Three		
! CS 33211	OPERATING SYSTEMS	3
! CS 35101	COMPUTER ARCHITECTURE	3
CS 47221	INTRODUCTION TO CRYPTOLOGY	3
MATH 21002	APPLIED LINEAR ALGEBRA	3
Foreign Language		4
Credit Hours		16
Semester Four		
! CS 33007	INTRODUCTION TO DATABASE SYSTEM DESIGN	3
! CS 35201	COMPUTER COMMUNICATION NETWORKS	3
CS 43203	SYSTEMS PROGRAMMING	3
Foreign Language		4
Kent Core Requirement		3
Credit Hours		16
Semester Five		
! CS 33901	SOFTWARE ENGINEERING	3
! CS 46101	DESIGN AND ANALYSIS OF ALGORITHMS	3
! CS 47205	INFORMATION SECURITY	3
Kent Core Requirement		3
General Electives		2
Credit Hours		14
Semester Six		
! CS 33101	STRUCTURE OF PROGRAMMING LANGUAGES	3
! CS 44001	COMPUTER SCIENCE III-PROGRAMMING PATTERNS	4
CS 45203	COMPUTER NETWORK SECURITY	3
Concentration Elective		3
Kent Core Requirement		3
Credit Hours		16
Semester Seven		
! CS 49901	CAPSTONE PROJECT (ELR) (WIC)	4
Kent Core Requirement		3
Kent Core Requirement		3
Kent Core Requirement		3
Credit Hours		13

Semester Eight		
Kent Core Requirement		3
Kent Core Requirement		3
Kent Core Requirement		3
Kent Core Requirement		3
General Electives		2
Credit Hours		14
Minimum Total Credit Hours:		120

Robotics and Embedded Systems Concentration

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

Semester One		Credits
! CS 13011	COMPUTER SCIENCE IA: PROCEDURAL	4
& CS 13012	PROGRAMMING	
or CS 13001	and COMPUTER SCIENCE IB: OBJECT ORIENTED PROGRAMMING	
	or COMPUTER SCIENCE I: PROGRAMMING AND PROBLEM SOLVING	
MATH 12002	ANALYTIC GEOMETRY AND CALCULUS I (KMCR)	5
UC 10097	DESTINATION KENT STATE: FIRST YEAR EXPERIENCE	1
Kent Core Requirement		3
General Electives		2
Credit Hours		15
Semester Two		
! CS 23001	COMPUTER SCIENCE II: DATA STRUCTURES AND ABSTRACTION	4
! CS 23022	DISCRETE STRUCTURES FOR COMPUTER SCIENCE	3
MATH 20011	DECISION-MAKING UNDER UNCERTAINTY	3
MATH 12013	BRIEF CALCULUS II	3
Kent Core Requirement		3
Credit Hours		16
Semester Three		
! CS 33211	OPERATING SYSTEMS	3
! CS 35101	COMPUTER ARCHITECTURE	3
CS 33301	EMBEDDED SYSTEM PROGRAMMING	3
MATH 21002	APPLIED LINEAR ALGEBRA	3
Foreign Language		4
Credit Hours		16
Semester Four		
CS 23301	ROBOTICS AND EMBEDDED SYSTEMS LABORATORY I	1
CS 32301	HUMAN INTERFACE COMPUTING	3
! CS 33007	INTRODUCTION TO DATABASE SYSTEM DESIGN	3
! CS 35201	COMPUTER COMMUNICATION NETWORKS	3
Foreign Language		4
Credit Hours		14
Semester Five		
! CS 33901	SOFTWARE ENGINEERING	3
! CS 46101	DESIGN AND ANALYSIS OF ALGORITHMS	3
Concentration Elective		3
Kent Core Requirement		3
Kent Core Requirement		3
Credit Hours		15

Semester Six		
CS 23302	ROBOTICS AND EMBEDDED SYSTEMS LABORATORY II	2
!	CS 33101	STRUCTURE OF PROGRAMMING LANGUAGES 3
	CS 44001	COMPUTER SCIENCE III-PROGRAMMING PATTERNS 4
	Kent Core Requirement	3
	Kent Core Requirement	3
Credit Hours		15
Semester Seven		
CS 43334	HUMAN-ROBOT INTERACTION	3
	or CS 43302 or ALGORITHMIC ROBOTICS	
	or CS 43303 or INTERNET OF THINGS	
	Concentration Elective	3
	Kent Core Requirement	3
	Kent Core Requirement	3
	Kent Core Requirement	3
Credit Hours		15
Semester Eight		
CS 49901	CAPSTONE PROJECT (ELR) (WIC)	4
	Kent Core Requirement	3
	Kent Core Requirement	3
	General Electives	4
Credit Hours		14
Minimum Total Credit Hours:		120