

## Stern College for Women

**Department/Program Name:** Computer Science

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### **I. Department/Program Mission Statement**

The mission of the computer science program is to prepare students for employment in various fields of computer science and/or to pursue advanced studies in computer science. In addition to covering fundamentals of Computer Science theory and practice, department courses will strive to help students maximize their portfolios of significant coding projects. The courses are structured to expose students to a variety of programming languages in a broad range of application areas. Students who complete this program should be well versed in the disciplines of object oriented design and development, the architectures of software and hardware systems, the theory and practice of programming language technology, the construction and use of data structures and algorithms for the solution of computing problems, and the theory and application of database systems.

### **II. Department/Program Student Learning Goals**

Students in the computer science major will be able to:

1. Solve real-world problems using object-oriented analysis and design techniques
2. Implement methods for the design, testing, and performance evaluation of algorithms and data structures
3. Understand the impact of computer architecture and organization on code performance and design.
4. Write code that takes advantage of hardware and operating systems features
5. Design and implement databases and client applications

### III. Department/Program Student Learning Objectives:

<b>Department/Program Goal</b>	<b>Objectives</b>
1. Solve real-world problems using object-oriented analysis and design techniques	a. Students will be able to write Python and Java code with good programming style, expression, and documentation
	b. Students will be able to distinguish object-oriented programming methods from other methodologies and to use them effectively in solving computing problems
2. Implement methods for the design, testing, and performance evaluation of algorithms	a. Students will be able to implement standard data structures for the design of algorithms
	b. Students will be able to understand and use methods for evaluating the theoretical and observed efficiency of an algorithm and its implementation in a programming language
3. Understand the impact of computer architecture and organization on code performance and design.	a. Students will be able to write code that executes efficiently by taking advantage of computer organization.
4. Write code that takes advantage of hardware and operating systems features	a. Students will be able to write code that utilizes operating system primitives for networked and interprocess communication.

	b. Students will be able to program in assembly language
5. Design and implement databases and client applications	a. Students will be able to design a database using appropriate normal forms
	b. Students will be able to be able to apply the theory of relational algebra to the construction of queries using Structured Query Language.
	c. Students will be able to build client applications that dynamically query and update databases.

#### IV. Curriculum Mapping

Levels Curriculum Map

Learning objectives/outcomes	Computer Science courses: COM XXXX									
	1300	1320	1504	2115	2545	3563	3640	3650	2314	3780
Students will be able to write Python and Java code with good programming style, expression, and documentation	X							X		
Students will be able to distinguish object-oriented programming methods from other methodologies and to use them effectively in solving computing problems	X	X					X	X		
Students will be able to implement standard data structures for the design of algorithms		X			X					
Students will be able to understand and use methods for evaluating the theoretical and observed efficiency of an algorithm and its implementation in a programming language		X			X			X		
Students will be able to write code that utilizes operating system primitives for networked and interprocess communication.				X					X	
Students will be able to write code that executes efficiently by taking advantage of computer organization.				X					X	
Students will be able to program in assembly language				X						
Students will be able to design a database using appropriate normal forms						X				
Students will be able to apply the theory of relational algebra to the construction of queries using Structured Query Language.						X				
Students will be able to build client applications that dynamically query and update databases.						X				X