

## COURSE DESCRIPTION

**Department and Course Number:** CSCI 111 (CIS majors sections)

**Course Title:** Computer Science I

**Current Catalog Description:** Introduction to computer science with emphasis on problem solving and algorithm development. Using a high-level, block-structured programming language, students design, implement, debug, test, and document computer programs for various applications.

**Total Credits:** 3 hours

**Coordinator:** Pamela B. Lawhead, Associate Professor of Computer and Information Science

**Textbook:** Dale, Nell, Chip Weems, and Mark Headington. *Introduction to Java and Software Design*. Sudbury, Massachusetts, Jones and Bartlett Publishers, 2000. ISBN: 0-7637-1064-4.

**Other required materials:** Two 3.5" IBM preformatted floppy diskettes. One hard-sided loose leaf binder.

**References:** <http://www.cs.olemiss.edu/~lawhead/csci111/>

### Course Goals:

1. Use the repetition statements; while, for, and do-while.
2. Use array-processing techniques to solve a programming problem.
3. Use classes and methods to accomplish code reuse.
4. Perform simple sequential file I/O processing.
5. Provide the student with the opportunity to design, code, debug, document and test programs that:
  - a. Use LEGO MindStorms robotics kits to create robots that can be programmed in Java using a package called leJos
  - b. Have a focus on event programming
  - c. Use Java "leJos" to control a programmable RCX Brick
6. Use interactive input/output statements
7. Use arithmetic operations that illustrate operator precedence.
8. Use the selection statements; if, nested-if and switch.

**Prerequisites by Topic:** None

**Corequisite:** MATH 123 or MATH 125.

**Major Topics Covered in the Course:** problem solving, solution design methodology, elementary data types (excluding pointers), int, char, float, real, boolean, string, user defined, sets, arrays, records arithmetic expressions, simple i/o, assignment,, boolean expressions, iteration, looping (pre test, post test, counted), conditionals, simple and complex, switch, nesting of: ctrl structures, loops, conditionals, scope, language defined procedures and functions, user defined procedures and functions, parameter passing,, understand the following: compile, link, make, external libraries external file use, debugging, coding style, design style, documentation, testing.

### Laboratory projects:

Programming Assignment 1 – “Hello World” The purpose of this exercise is to give the student experience in editing, compiling, and executing an introductory leJOS Java program. 1 week.

Programming Assignment 2 – “Arithmetic” The purpose of this assignment is to give the student an experience of Java event programming involving touch sensors, LCD Screen control, arithmetic expressions, and mathematical calculations. 1 week.

Programming Assignment 3 – “Introduction to Sensors” The purpose of this assignment is to give the student additional experience using Java in event programming. This assignment requires the student to use touch sensors, LCD Screen control, arithmetic expressions, mathematical calculations and the four buttons on the RCX brick. The students create a very basic calculator. 1 week.

Programming Assignment 4 – This assignment helps reinforce both the use of arithmetic and the use of the Touch Sensor associated with the RCX Brick. It also reinforces the use of Java expressions. In this assignment, the student will write another program for the addition, subtraction, multiplication, and division of two numbers. There are two things that are different about this assignment. First, we have provided far fewer hints than in past assignments and second, this assignment will involve two weeks. During Lab of the first week the student is asked to come to work on simply writing the assignment, in the second the student must actually type it in and debug it. 2 weeks.

Programming Assignment 5 – “The Light Sensor” The purpose of this assignment is to give the student experience in Java event programming involving light sensors. It will also give students more chance to practice using the RCX-TinyVm LCD screen control, the if statement and additional loop control skills. 2 weeks.

Programming Assignment 6 – “Controlling Objects from Classes” The purpose of this assignment is to give the student experience in Java event programming using classes to create objects. First the student writes a robot class definition and then later uses that definition in a program. All sensors used in this assignment have been used before, light and touch. 2 weeks.

Programming Assignment 7 – “The Candy Machine” This is a multifaceted assignment that asks the student to use two touch sensors listening simultaneously to create a small vending machine that dispenses candies based on a rule set. It reinforces the arithmetic taught earlier and requires extensive use of “If then else” statements. It also uses sound. In requires both pre-test and counted loops. 2 weeks

Programming Assignment 8 – “Arrays” - The purpose of this assignment is to give the student experience in Java event programming using arrays. The student will be asked to create an array and fill it with robot commands. The RCX will then be programmed using the buttons and using button counts as array indices. 2-3 weeks.

Programming Assignment 9 – “Sorting arrays” The purpose of this assignment is to give the student experience in using Java arrays, light sensors and arrays to sort the sensor reading stored in an array. The text used for this class provides code for sorting a simple on dimensional array. This code may be used in this assignment. The only sensor required is a light sensor. 1 week

**Estimate of ABET/CAC Category Content:**

	CORE		ADVANCED			CORE		ADVANCED
Data Structures					Computer Organization and Architecture			
Algorithms	1				Concepts of Programming Languages	1		
Software Design	1							

**Oral and Written Communications:**

Not a significant focus of the course.

**Social and Ethical Issues:**

Software Piracy	1 hour	not graded on this
Plagiarism	2 hours	not graded on this
Honor Code	2 hours	required to put it on every assignment

**Theoretical Content (Foundations):**

One class period is devoted to software complexity and a brief exam bonus question is sometimes given on that topic. The students are introduced to the idea that there are ways to solve problems and “better ways” to solve problems.

**Problem Analysis:**

One goal of the course is problem solving. Some part of each class period is devoted to possible solutions to the current problem. Again, adequate, good and better solutions are discussed. Once the problem is completed then the solution is presented and discussed.

**Solution Design:**

A primary goal of this course is problem solving hence, solution design is taught as a part of almost every class period. All topics are introduced as a part of a problem solution. “How would this tool help you in the solution of a problem of type X” or again “What sorts of problems might you attempt to solve where this idea would help”.