



MERCER
COUNTY COMMUNITY COLLEGE

COURSE OUTLINE

Course Number	Course Title	Credits
COS 101	Introduction to Computer Science	4
Hours: Lecture/Lab/Other	Co- or Pre-requisite	Implementation Semester & Year
3 lecture / 2 lab	Pre-requisite: MAT 037, 042 or equivalent	Spring 2022

Catalog description:

Introduces both majors and non-majors to the concepts and topics of computer science. Students will develop algorithmic thinking and abstraction using a 3-D animation programming language and MATLAB, a numerical programming tool for scientists and engineers. Students will also explore the various topics of computer science including computer architecture, algorithm analysis, operating systems and programming languages.

General Education Category:

Goal 4: Technology or Info
Literacy

Course coordinator:

Meimei Gao, 609-570-3483, gaom@mccc.edu

Required texts & Other materials:

Required Textbook: Dann, Cooper & Pausch, "Learning to Program with Alice", 3rd Edition, Prentice Hall, ISBN-10: 0132122472, ISBN-13: 9780132122474

Software: Alice, free download

Course Student Learning Outcomes (SLO):

Upon successful completion of this course the student will be able to:

1. Create and run a computer program. [Supports ILG # 4; PLO #1]
2. Create and use functions, methods, classes and objects. [Supports ILG # 4, 11; PLO #1, 2]
3. Use control selection and repetition structures. [Supports ILG # 4, 11; PLO #1, 2]
4. Understand and explain basic computer architecture and concepts, including data storage, data manipulation, operating systems, networking and numerical programming. [Supports ILG # 2, 4, 11; PLO #1, 2, 3]

Course-specific Institutional Learning Goals (ILG):

Institutional Learning Goal 2. Mathematics. Students will use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.

Institutional Learning Goal 4. Technology. Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.

Institutional Learning Goal 11. Critical Thinking: Students will use critical thinking skills understand, analyze, or apply information or solve problems.

Program Learning Outcomes for Computer Science AS (PLO)

1. Apply the fundamental concepts and techniques of computation, algorithms, and software design to a specific problem in a variety of applied fields;
2. Provide detailed specifications, analyze the problem, and design a solution that functions as desired, has satisfactory performance, is reliable and maintainable, and meets desired criteria;
3. Apply a firm understanding in areas of mathematics and science.

Units of study in detail – Unit Student Learning Outcomes:

Unit I **Programming Using a 3-D Animation Language [Supports Course SLO #1, 2 and 3]**

Learning Objectives

The student will be able to:

- Create an Alice program
- Edit code and run an Alice program.
- Distinguish between objects and classes.
- Create objects from classes.
- Call build-in methods.
- Define and call world-level methods.
- Define and call class-level methods.
- Demonstrate the use of class inheritance.
- Call build-in functions.
- Define and call functions.
- Pass parameters to method and function calls.
- Build event handlers.
- Create selection structures.
- Determine the appropriate time to use an if/else statement.
- Create repetition structures.
- Use a counter controlled loop to repeat a call to a call to a method.
- Implement a while-loop.
- Create nested control structures.

Unit II **Programming Using a Numerical Programming Language [Supports Course SLO #3, 4]**

Learning Objectives

The student will be able to:

- Use MATLAB IDE and commands.
- Create MATLAB programs.
- Create and use selection structures.
- Create and use repetition structures.
- Call MATLAB built-in functions.
- Use graphic facilities to visualize data.

Unit III **Computer Science Concepts [Supports Course SLO #4]**

Learning Objectives

The student will be able to:

- Convert from binary to decimal and conversely.
- Convert from binary to hexadecimal and conversely.
- Explain the machine cycle.
- Describe the units in a CPU and their roles.
- Describe the components in an operating system and their roles.
- Build a simple web page with fundamental HTML tags.
- Convert the network IP address from a dotted decimal notation to bit pattern and conversely.

Evaluation of student learning:

Specific methods for evaluating student progress through the course is up to the discretion of the instructor. Below is an example:

Project Assignments = 30% of the grade
3 Tests = 70% of the grade