COURSE OUTLINE

Course Number	Course Title	Credits
COS 102	**Computer Science 1 – Algorithms and Programming**	**4**

Hours: Lecture/Lab/Other	Co- or Pre-requisite	Implementation Semester & Year
3 lecture / 2 lab	**Pre-requisite: COS 101, IST 107, IST 108, IST 109, or IST 123 or equivalent**	**Spring 2022**

Catalog description:

Algorithm design and object-oriented programming in the Java language. Topics include data representation, input/output, control structures, exception handling, classes, methods, inheritance, polymorphism, encapsulation, overloading and dynamic memory.

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: Lewis & Loftus, Java Software Solutions: Foundations of Program Design, 9/E, Pearson, ISBN-13: 9780134462028
Java Development Kit (JDK): free download
JGrasp Integrated Development Environment: free download

Course Student Learning Outcomes (SLO):

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

1. Use an IDE (Integrated Development Environment) to compile and run a computer program. [Supports ILG # 4; PLO #1]
2. Define and use variables, 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. Comprehend Object-Oriented Programming concepts of inheritance, polymorphism, encapsulation. [Supports ILG # 4, 11; PLO #1, 2]
5. Define and use arrays. [Supports ILG # 4, 11; PLO #1, 2]
6. Use exception handling. [Supports ILG # 4, 11; PLO #1, 2]

Course-specific Institutional Learning Goals (ILG):

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 **Introduction to Java [**Supports Course SLO #1]

Learning Objectives

The student will be able to:

- Understand programming languages and coding styles.
- Write their first Java program.

Unit II **Primitive types, Data and Expressions [**Supports Course SLO #2]

Learning Objectives

The student will be able to:

- Use literals and primitive types.
- Write assignment statements and declare and initialize variables.
- Use arithmetic operators and the precedence rules.

Unit III **Classes and Objects [**Supports Course SLO #2]

Learning Objectives

The student will be able to:

- Create object from predefined classes.
- Write and Invoke methods.
- Write Classes.

Unit IV **Flow of Control [**Supports Course SLO #2, 3]

Learning Objectives

The student will be able to:

- Understand and use selection control structures.
- Understand and use repetition control structures.

Unit V **Arrays [**Supports Course SLO #2, 5]

Learning Objectives

The student will be able to:

- Create and initialize arrays.
- Access array elements.
- Store and operate data in arrays.

Unit VI **Object-Oriented Design, Inheritance and Polymorphism [**Supports Course SLO #2, 3, 4]

Learning Objectives

The student will be able to:

- Understand the visibility.
- Use method overloading and overriding.
- Create subclasses from super classes.
- Use “super” key word.
- Explain the work flow of the code with inheritance and polymorphism.

Unit VI **Exception Handling [**Supports Course SLO #2, 3, 6]

Learning Objectives

The student will be able to:

- Interpret try-catch statements.
- Explain “finally” key word.

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
Midterm Exam = 30% of the grade
Final Exam = 40% of the grade