**BARTON COMMUNITY COLLEGE**

**COURSE SYLLABUS**

# **GENERAL COURSE INFORMATION**

Course Number: PRGM 1038

Course Title: Computer Science II

Credit Hours: 3

Prerequisite: PRGM 1037 with a “C” or better

Division/Discipline: WTCE

Course Description: Computer Science II is an intermediate level programming course which introduces students to common data structures and algorithms utilized in programming. Students are also introduced to algorithm analysis. Topics to be covered in this course include: lists, stacks, queues, trees, graphs, hashing, recursion, sorting/searching algorithms, and algorithm efficiency.

# **INSTRUCTOR INFORMATION**

# **COLLEGE POLICIES**

Students and faculty of Barton Community College constitute a special community engaged in the process of education. The College assumes that its students and faculty will demonstrate a code of personal honor that is based upon courtesy, integrity, common sense, and respect for others both within and outside the classroom.

Plagiarism on any academic endeavors at Barton Community College will not be tolerated. The student is responsible for learning the rules of, and avoiding instances of, intentional or unintentional plagiarism. Information about academic integrity is located in the Student Handbook.

The College reserves the right to suspend a student for conduct that is determined to be detrimental to the College educational endeavors as outlined in the College Catalog, Student Handbook, and College Policy & Procedure Manual. (Most up-to-date documents are available on the College webpage.)

Any student seeking an accommodation under the provisions of the Americans with Disability Act (ADA) is to notify Student Support Services via email at [disabilityservices@bartonccc.edu](mailto:disabilityservices@bartonccc.edu).

# **COURSE AS VIEWED IN THE TOTAL CURRICULUM**

Data Structures and Algorithms is an intermediate level programming class. Students learn common data structures and algorithms used in program development which enhance problem solving abilities. It provides students with a solid foundation of computer programming, especially for those who are pursuing careers in computer science and technology.

# **ASSESSMENT OF STUDENT LEARNING**

Barton Community College is committed to the assessment of student learning and to quality education. Assessment activities provide a means to develop an understanding of how students learn, what they know, and what they can do with their knowledge. Results from these various activities guide Barton, as a learning college, in finding ways to improve student learning.

1. Recognize the proper use of the following data structures, algorithms and programming methods: Lists, Stacks, Queues, Trees, Graphs, Recursion, and Sorting & Searching algorithms
   1. Explain the purpose of an abstract and generic data types
   2. Describe a list and common list operations
   3. Explain the purpose of a stack and its operations
   4. Describe the purpose of a queue and its operations
   5. Explain the purpose of a tree, common tree terminology, operations and tree variations
   6. Describe the purpose of a graph and its terminology
   7. Recognize common searching and sorting algorithms
   8. Explain the use of hashing
   9. Identify the components of a recursive algorithm
2. Apply data structures and programming methods to solve problems with a high-level programming language.
   1. Apply data structures in a program
   2. Search and sort a list
   3. Create a linked list
   4. Implement a stack in a program
   5. Create a queue in a program
   6. Implement a tree in a program
   7. Traverse a tree and a graph
   8. Create a graph in a program
   9. Trace and implement recursive algorithms
3. Compare alternative implementations of the above data structures.
   1. Compare array based vs. linked list implementations of lists, stacks, and queues
4. Estimate the complexity of common algorithms.
   1. Identify notation and terminology of algorithmic complexity
   2. Recognize levels of complexity in algorithms
   3. Compare the complexity of common algorithms
5. **INSTRUCTOR'S EXPECTATIONS OF STUDENTS IN CLASS**

# **TEXTBOOKS AND OTHER REQUIRED MATERIALS**

# **REFERENCES**

# **METHODS OF INSTRUCTION AND EVALUATION**

# **ATTENDANCE REQUIREMENTS**

1. **COURSE OUTLINE**