

EMBRY-RIDDLE AERONAUTICAL UNIVERSITY
Department of Computing and Mathematics
COURSE OUTLINE FOR

Course No.: CS315
Cr Hrs: 3

Title: Data Structure and Algorithms

Lecture Hours: 3

Laboratory Hours: 0

COURSE DESCRIPTION:

This course emphasizes the design, implementation, and analysis of algorithms that deal with elementary discrete structures, searching and sorting, trees, graphs, and disk files. Prerequisite: CS225 and CS222

GOALS:

This course continues the study of data structures and algorithms begun in CS225. The primary purpose of the course is to provide students with knowledge and skills that support the efficient and effective development of small program units. In particular, students will be prepared to solve a problem by selecting the appropriate data structure, constructing a new algorithm or choosing an existing one, and performing an analysis of the data and algorithm to determine its viability in solving the problem.

PERFORMANCE OBJECTIVES:

Upon completion of this course, students should be able to:

1. Analyze and evaluate algorithms (especially with respect to running time).
2. Implement common data structures and algorithms for trees and graphs.
3. Design algorithms with increased competence.
4. Use a programming language with increased proficiency.
5. Use a defined process to develop programs.

Department of Computing and Mathematics
COURSE OUTLINE FOR CS315, Continued

TEXTBOOK:

Weiss, Mark, *Data Structures and Algorithm Analysis in ADA*, Benjamin/Cummings, 1993.

SUGGESTED SUPPLEMENTAL MATERIALS:

Humphrey, Watts, *Introduction to the Personal Software Process*, Addison-Wesley, 1997.

PREREQUISITE KNOWLEDGE BY TOPIC:

1. moderate to substantial experience programming in a high-level language.
2. basic data structures and algorithms
3. discrete mathematics
4. technical level calculus or higher

TOPIC	CLASS HOURS	COURSE OBJECTIVES
1. Fundamentals of Algorithm Analysis	6	Analyze the space and time complexity of simple algorithms.
3. Elementary Discrete Structures	4	Analyze, describe and apply the logic of algorithms dealing with sets, lists, stacks and queues. Construct simple algorithms for these structures using recursive and non-recursive techniques.
4. Tree Structures and Algorithms	10	Analyze, describe and apply the logic of algorithms dealing with various tree structures. Construct simple algorithms for these structures using recursive and non-recursive techniques.
4. Graph Structures and Algorithms	14	Analyze, describe and apply the logic of algorithms dealing with graph structures. Construct simple algorithms for these structures using recursive and non-recursive techniques.
5. Searching and Sorting	4	Analyze, describe and apply the logic of algorithms dealing with searching and sorting.
6. Personal Software Process	2	Use the PSP in the development of small to moderate sized programs.

LABORATORY:

an open computer laboratory for individual project work.

COMPUTER USAGE:

software development tools (editor, linker, compiler, debugger, OOA/OOD tools)

GRADING SYSTEM:

Assignments and Quizzes	25 %
Tests	50 %
Final Exam	25 %

ESTIMATED CONTENT:

Skills:	30%
Content:	70%