Syllabus for
CSC 255—Data Structures
3 Credit Hours
Spring 2005

I. COURSE DESCRIPTION

A study of the design of structures for representing information and the design of algorithms for manipulating that information. Expertise in the design of structures is developed through consideration of abstract structures and implementation techniques and implementing various structures in specific programming languages. Develops expertise in the design of algorithms by solving problems, including searching and sorting. Programming projects throughout the course provide a synthesis experience in which the student designs data structures and algorithms to solve a given problem.
Prerequisite: CSC 111.
Academic technology fee: $45.

II. COURSE GOALS

The purpose of this course is to enable the student to do the following:

A. Obtain training in the art of information representation and manipulation within a digital computer.

B. Gain experience in the design of algorithms based on the principles of structured programming.

C. Develop computing maturity and hence facilitate the transition from the perception of computing as a technical skill to an appreciation of the science of computing.

D. Prepare for employment in the computing industry.

E. Prepare for graduate work in computer science.

III. STUDENT LEARNING OUTCOMES FOR THIS COURSE

A. Terminal Objectives
As a result of successfully completing this course, the student will demonstrate an understanding of basic data structuring techniques and the basic principles of algorithm design as evidenced by the ability to design and implement programs that solve typical data processing problems.

B. Unit I Objectives
As a result of successfully completing this unit, the student will be able to do the following:

1. Explain the principles of structured programming.
2. Write algorithms using the basic constructs of structured programming.
3. Define and explain the meaning of software engineering.
4. Describe the steps in the software life cycle.
5. Calculate the memory address of components in arrays and records.

C. Unit II Objectives

As a result of successfully completing this unit, the student will be able to do the following:

1. Write the definition, draw the logical diagram, design a storage structure, and write manipulation algorithms for the stack, queue, deque, ring, and list.
2. Utilize recursion in solving a problem.

D. Unit III Objectives

As a result of successfully completing this unit, the student will be able to do the following:

1. Write the definition, draw the logical diagram, design a storage structure, and write manipulation algorithms for tree and graph structures.
2. Establish data structures and algorithms to accomplish the tasks of searching and sorting.

IV. TEXTBOOK

Dale, Nell. Object-Oriented Data Structures Using Java. Jones and Bartlett, 2002.

V. POLICIES AND PROCEDURES

A. University Policies and Procedures

1. Attendance at each class or laboratory is mandatory at Oral Roberts University.
2. Double cuts will be assessed for absences immediately preceding or following holidays.
3. Excessive absences can reduce a student's grade or deny credit for the course.
4. Students taking a late exam because of an unauthorized absence will be charged a late exam fee.
5. Students and faculty at Oral Roberts University adhere to all laws addressing the ethical use of others' materials, whether it is in the form of print, video, multimedia, or computer software.
6. Final exams cannot be given before their scheduled times. Students need to check the final exam schedule before planning return flights or other events at the end of the semester.

B. Computer Science and Mathematics Department Policies and Procedures

1. Each Student who uses the computer is given access to the appropriate computer resources. These limited resources and privileges are given to allow students to perform course assignments. Abuse of these privileges will result in their curtailment. Students should note that the contents of computer directories are subject to review by instructors and the computer Administrative staff.
2. A fee of $10.00 will be assessed for all late exams. This policy applies to all exams taken without notifying the professor prior to the regularly scheduled exam time, and to all exams taken late without an administrative excuse.

C. Course Policies and Procedures

1. ePortfolio Requirements
   There may be an ePortfolio artifact associated with this course. Check your ePortfolio handbook for the requirements.
2. Evaluation Procedures
   The final grade is based approximately 20% on homework, 30% on programs, 30% on exams, and 20% on the final exam
3. Assignments
   Homework assignments and programming problems are given regularly in class. Details of specific requirements are given at that time.

VI. COURSE CALENDAR

Unit	Lesson	Topic
I	1	Introduction
	2-5	Structured programming
	6-13	Software engineering and data design
	14	**Exam I**
II	15-17	Lists
	18-22	Stacks and queues
	23-25	List processing
	26	**Exam II**
III	27-28	Recursion
	29-31	Trees and graphs
	32-33	Searching
	34-36	Sorting
	37	**Exam III**
	38-44	Group projects
	45	**Final Exam**

Course Inventory for ORU's Student Learning Outcomes

CSC 255--Data Structures
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This course contributes to the ORU student learning outcomes as indicated below:
Significant Contribution – Addresses the outcome directly and includes targeted assessment.
Moderate Contribution – Addresses the outcome directly or indirectly and includes some assessment.
Minimal Contribution – Addresses the outcome indirectly and includes little or no assessment.
No Contribution – Does not address the outcome.

The Student Learning Glossary at http://ir.oru.edu/doc/glossary.pdf defines each outcome and each of the proficiencies/capacities.

OUTCOMES & Proficiencies/Capacities	Significant Contribution	Moderate Contribution	Minimal Contribution	No Contribution
1	**Outcome #1 – Spiritually Alive** Proficiencies/Capacities				
1A	Biblical knowledge				X
1B	Sensitivity to the Holy Spirit			X	
1C	Evangelistic capability				X
1D	Ethical behavior		X		
2	**Outcome #2 – Intellectually Alert** Proficiencies/Capacities				
2A	Critical thinking		X		
2B	Information literacy		X		
2C	Global & historical perspectives			X	
2D	Aesthetic appreciation			X	
2E	Intellectual creativity	X			
3	**Outcome #3 – Physically Disciplined** Proficiencies/Capacities				
3A	Healthy lifestyle				X
3B	Physically disciplined lifestyle				X
4	**Outcome #4 – Socially Adept** Proficiencies/Capacities				
4A	Communication skills		X		
4B	Interpersonal skills		X		
4C	Appreciation of cultural & linguistic differences				X
4D	Responsible citizenship			X	
4E	Leadership capacity		X		