GRANDE PRAIRIE REGIONAL COLLEGE

COURSE OUTLINE - WINTER 1999

COMPUTING SCIENCE 1150

Elementary Data Structures

INSTRUCTOR

Stephen Rochefort

OFFICE AND PHONE

Rm.: C211, 539-2964

E-mail: rochefort@gprc.ab.ca

Office Hours: MWF, 11:00-12:00 & W, 13:00-15:00

Office hours may also be arranged by individual appointment with the instructor.

I can also be reached at 538-0962 in the case of emergencies.

PREREQUISITE

CS 1140 OR CS 1000

COURSE DESCRIPTION

The course provides a review of programming principles (specification, implementation and testing), and an extension of procedural concepts from CS 1140 including data abstraction, modular program construction and program re-use. The emphasis is on dynamic data structures (eg. lists, string, stacks, queues, tables), and their associated algorithms (eg. recursion, traversal, sorting, searching, hashing).

COURSE MATERIALS

Required Text:

Nance, Douglas W. and Naps, Thomas L. *Introduction to Computer Science: Programming, Problem Solving, and Data Structures*. West Publishing, 1995.

Materials:

Several 3½" floppy disks are required for saving your work.

DATES TO REMEMBER

18 January 1999	Last day to Drop Registration for winter courses.
22-26 February 1999	Winter break.
12 March 1999	Last day to apply for Withdrawal With Permission for winter courses.
16 April 1999	Last day of scheduled classes.
20-23, 26-28 April 1999	Winter Semester Exam Period. The final exam may be scheduled *at any time* during this period. The student should not plan to be absent during this period until his/her final exams have been completed.

EVALUATION PROFILE AND GRADING

Applied Component

Lab Quizzes (3)	10%
Lab Exercises (5)	05%
Assignments (5)	15%

Theory Component

Class Quizzes (3)	10%
Midterm	25%
Final Exam	35%
	100%

Note:

- The quizzes will be given at the instructors discretion.
- In order to obtain the marks for completion of the applied component, the student **must** successfully obtain a passing grade in the theory component.

The final percentage achieved by the student will be converted to GPRC's nine point scale as follows:

9	90 - 100	4	50 – 56
8	80 - 89	3	45 – 49
7	72 - 79	2	26 – 44
6	65 - 71	1	0 – 25
5	57 – 64		

HANDING IN ASSIGNMENTS

Submitted assignments shall consist of the following items:

- A **Title Page** with your name, course name, section number, assignment number and date of submission (not due date) clearly marked on it.
- **Program Listings** of each of your units and main program. Do not submit code that was provided to you in the assignment.
- A **Structure Chart** showing the structure of the entire program, including calls to procedures and functions that were given to you as part of the assignment.

- **Results of Testing** your programs should be submitted. Be sure to test simple cases as well as on boundary cases, special cases, and more complex cases. The following modifications can be made to your program to capture your output:

```
{* add at beginning of main program *)
assign (output, 'filename');
rewrite (output); (* the previous contents of 'filename' are
lost *)

{* add to end of main program *)
close (output);
```

- A **Diskette Containing Your Code and Test Data.** This diskette should even contain the code provided to you in the assignment. Please include a README file to indicate a description of each of the files on the diskette.

Notes:

- Assignments should be submitted in a manilla envelope with your name, student ID number, and date of submission.
- Assignments that are handed in loose will be penalized.
- It is the *student's* responsibility to ensure that all portions of the assignment are handed in together.
- The penalty for late assignments is a 30% deduction for any assignment up to three (3) days late. Any assignment received after this period will not be assigned a grade.

COURSE CONTENT

Three hours per week will be dedicated to a classroom presentation of class topics. The lab component of the course will focus on lab exercises that address the content covered in class. You will need to use this lab time efficiently in order to complete lab exercises on time.

Week	Theory Topics	Lab Topic	Assignments
1	Introduction to course. Ch. 12: Record Definitions Using Records		Assignment 1
2	Data Structures with Records Record Variants Ch. 13: Binary Files Working with Binary Files Files with Structured Components	Turbo Debugger Records & Data Structures	
3	Ch. 14: Declarations and Terms Set Operations and Relational Operators Using Sets Ch. 15: Designing Programs	Files Sets	
4	Simple Sorting Algorithms Which Sort is Best? The Space/Time Tradeoff Simple Search Algorithms	Sorting & Searching	Assignment 2
5	Simple Search Algorithms Ch. 16: The String Abstract Data Type The Table Abstract Data Type	Sorting & Searching	

6	The Keyed List Abstract Data Type Ch. 18: The Linked List Abstract Data Type Array Implementation of a Linked List Pascal Pointer Variable Implementation of a Linked List	Abstract Data Types	
7	Pascal Variable Implementation of a Linked List Variations on Linked List Structures Applications of Linked Lists	Pointer Variables Linked Lists	Midterm Assignment 3
8	**Reading Week**		
9	Ch. 19: The Stack Abstract Data Type An Application of Stacks The Queue Abstract Data Type	Linked Lists	
10	Ch. 8.4: Recursion Ch. 20: Controlling Simple Iteration Complex Recursive Patterns	Linked Lists Stacks & Queues	Assignment 4
11	Complex Recursive Patterns Trial and Error Backtracking Generalized Nested Loops Ch. 21: General and Binary Trees as Abstract Data Types	Recursion	
12	Linked Implementation of a Binary Tree Binary Search Tree Implementation of a Keyed List Linear Implementation of a Binary Tree	Recursion	
13	General Trees Graphs and Networks Ch. 22: Advanced Sorting Algorithms Analysis of Sorting Algorithms	Recursion	Assignment 5
14	Advanced Sorting Algorithms Ch. 23: Density Dependent Search Techniques	Binary Search Trees	
15	Abstract Data Types Revisited Ch. 17: Aspects of Software Engineering (time permitting)		

The readings from the Nance and Naps text are required and are examinable material. The student should read the indicated chapters either before or during the week the material is presented in class.

The exact course content, order of presentation and schedule described above are subject to adjustment at the instructor's discretion.