DEPARTMENT OF SCIENCE

COURSE OUTLINE – WINTER 2016

CS 1150 (A3): Elementary Data Structures 3 (3-0-3) 90 Hours for 15 Weeks

INSTRUCTOR:	David Gregg	**PHONE:**	780-539-2976
OFFICE:	C-427	**E-MAIL:**	dgregg@gprc.ab.ca
OFFICE HOURS:	TBA		

CALENDAR DESCRIPTION:

The course provides a review of programming principles (specification, implementation and testing), and an extension of object-oriented concepts from CS1140 including data abstraction, modular program construction and program reuse. The emphasis is on dynamic data structures (eg. lists, string, stacks, queues, tables), and their associated algorithms (eg. recursion, traversal, sorting, searching, hashing).

PREREQUISITE(S)/COREQUISITE: CS1140

REQUIRED TEXT/RESOURCE MATERIALS:

Introduction to Java Programming by D. Liang. ISBN 10th Edition 0-13-376131-2. Please make good use of the on-line and library resources related to data structures also. See the CS1150 MOODLE page for additional materials.

DELIVERY MODE(S): In class lecture and lab.

COURSE OBJECTIVES:

This course introduces students to:

- object oriented analysis and design: specification, implementation and testing.
- fundamental data structures: strings, stacks, queues, lists, trees, heaps, sets, dictionaries and graphs.
- algorithms associated with data structures: recursion, traversal, sorting, searching, hashing.
- asymptotic complexity analysis of algorithms

LEARNING OUTCOMES:

As a result of taking this course, students will gain the ability to:

- analyze problems, design algorithms and data structures to implement computational solutions to problems using an object oriented computer language.
- design and implement object oriented classes, using inheritance and polymorphism.
- design and implement array based and linked data structures like: strings, stacks, queues, lists, trees, heaps, sets, dictionaries and graphs.
- design and implement efficient accessor and mutator methods for data structures.
- describe and implement common algorithms related to searching, sorting, traversals, and hashing. (This includes recursive algorithms.)

TRANSFERABILITY:

University of Alberta
University of Calgary *
University of Lethbridge *
Athabasca University
Augustana Faculty, University of Alberta
Concordia University College
Canadian University College
King's University College
Grant MacEwan University
* An asterisk (*) beside any transfer institution indicates important transfer information. Consult the Alberta Transfer Guide.

***Warning:** Although we strive to make the transferability information in this document up-to-date and accurate, **the student has the final responsibility for ensuring the transferability of this course to Alberta Colleges and Universities**. Please consult the Alberta Transfer Guide for more information. You may check to ensure the transferability of this course at Alberta Transfer Guide main page http://www.transferalberta.ca or, if you do not want to navigate through few links, at http://alis.alberta.ca/ps/tsp/ta/tbi/onlinesearch.html?SearchMode=S&step=2

** Grade of D or D+ may not be acceptable for transfer to other post-secondary institutions. **Students are cautioned that it is their responsibility to contact the receiving institutions to ensure transferability**

EVALUATIONS:

Assignments	30%
Midterm Exam I	10%
Midterm Exam II	25%
Final Exam	35%

GRADING CRITERIA:

Please note that most universities will not accept your course for transfer credit **IF** your grade is **less than C-**.

Alpha Grade	4-point Equivalent	Percentage Guidelines	Alpha Grade	4-point Equivalent	Percentage Guidelines
A+	4.0	90-100	C+	2.3	67-69
A	4.0	85-89	C	2.0	63-66
A-	3.7	80-84	C-	1.7	60-62
B+	3.3	77-79	D+	1.3	55-59
B	3.0	73-76	D	1.0	50-54
B-	2.7	70-72	F	0.0	00-49

COURSE SCHEDULE/TENTATIVE TIMELINE:

Sequence	Topic
1	Introduction and Review
2	Strings and Files
3	Thinking in Objects (Introduction to the Stack)
4	Inheritance and Polymorphism
5	Binary Search
6	Abstract Classes, Interfaces, and Object Oriented Design
7	Exception Handling
8	Midterm I
9	Array Based Lists and Stacks
10	Recursion
11	Algorithm Analysis and Sorting (n^2 and $n \log_2 n$)
12	Linked Lists
13	Stacks and Queues
14	Midterm II
15	Trees
16	The Heap
17	Hashing
18	Graphs
19	Generics and Iterators
20	Final Exam

STUDENT RESPONSIBILITIES:

Assignments are to be handed in and/or demonstrated in the scheduled lab on the due-date. Late assignments will be penalized by 50%. Late assignments may not be accepted after the end of classes. Some assignments may be weighted differently than others. Students will be eligible for a passing grade, only if they obtain 35 out of a possible 70 marks (on exams).

STATEMENT ON PLAGIARISM AND CHEATING:

Cheating and plagiarism will not be tolerated and there will be penalties. For a more precise definition of plagiarism and its consequences, refer to the Student Conduct section of the College Admission Guide at http://www.gprc.ab.ca/programs/calendar/ or the College Policy on Student Misconduct: Plagiarism and Cheating at http://www.gprc.ab.ca/about/administration/policies/

**Note: all Academic and Administrative policies are available on the same page.

Additional Information:

CS 1150 A3	Instructor	Room	Day	Time
Lecture	David Gregg	G111	Tuesday, Thursday	11:30 to 12:50
Lab	David Gregg	J101	Wednesday	14:30 to 17:20