DOUGLAS COLLEGE COMMERCE AND BUSINESS ADMINISTRATION COURSE OUTLINE AND SCHEDULE

CSIS 3475 – DATA STRUCTURES AND ALGORITHMS SEC: 070

Prerequisites: CSIS 1275 OR CMPT 1110

Semester: Summer 2018
Class / Lab Location: NWN 5111

Class Time(s): Saturday 1:00 pm - 3:50 pm

Instructor: WILLIAM TAN help.dc@outlook.com

Office Location: N5216

Office Hours: Saturdays 12:00 pm – 1:00 pm

Wed 2:00pm – 3:00pm; Thu 5:00pm-6:00pm

COURSE MATERIALS REQUIRED:

Required Textbook: PRICHARD AND CARRANO / Data Abstraction and Problem Solving with Java: Walls and Mirrors (3rd Edition) Pearson ISBN: 978-0132122306

Software to be used: Eclipse Java IDE

http://www.eclipse.org/downloads/packages/eclipse-standard-432/keplersr2

Supplies: At least ONE (1) USB Memory Stick – at least 4GB capacity is required for all assignments and exams. You must delete all files from the USB drive before using it for exams. During exams, student using any USB drives that contain files other than those authorized for the exams will be considered as cheating in exams. College policy on academic dishonesty will strictly be enforced in this course.

CALENDAR COURSE DESCRIPTION

The purpose of this course is to provide the students with solid foundations in the basic concepts of programming: data structures and algorithms. The main objective of the course is to teach the students how to select and design data structures and algorithms that are appropriate for problems that they might encounter. This course offers the students a mixture of theoretical knowledge and practical experience. The programming language Java will be used to implement the solutions to the programming problems.

COURSE CONTENT

- 1) Algorithm Analysis
- 2) Lists, Stacks, and Queues
- 3) Trees
- 4) Hashing
- 5) Priority Queues
- 6) Sorting
- 7) Recursion
- 8) Graph Algorithms
- 9) Algorithm Design Techniques
- 10) Advanced Data Structures and Implementation

EVALUATION

A final course grade will be determined based on the following instruments and their corresponding weighted percentages:

Evaluation Method	Grade	
	Allocation	
Assignments (4)	20%	
Participation (Labs)	10%	
Quizzes/Tests (2)	10%	
Mid-Term	30%	
Final Exam	30%	
Total	100%	

Percentage	Letter Grade	GPA
95-100%	A+	4.33
90-94%	A	4.00
85-89%	A-	3.67
80-84%	B+	3.33
75-79%	В	3.00
70-74%	B-	2.67
65-69%	C+	2.33
60-64%	С	2.00
55-59%	C-	1.67
50-54%	P	1.00
Below 50%	F	0.00

Participation will be based upon attendance and submission of class work.

To receive a non-zero grade in the course, a student must attempt and hand in for marking at least 71% of the assignments, examinations and quizzes; and must be present at 70% or more of all scheduled class times. Work not handed in, or handed in late for marking, will automatically receive a zero. The student's achievement will be converted to a letter grade, in accordance with department policy. Late arrival to class after 10 minutes' grace will be marked absent.

COURSE OBJECTIVES/LEARNING OUTCOMES:

The student will be able to

- discuss the fundamentals of algorithmic complexities;
- carry out elementary analysis of algorithm;
- determine the space and time complexity of an algorithm;
- select the appropriate abstract data types such as queues, stacks for a small but realistic problem;

- demonstrate more in-depth applications of other data types such as trees and graphs;
- design and implement different programs using appropriate data structures through the use of programming languages Java;
- apply problem solving approaches such as "divide and conquer" in designing algorithms;
- Be familiar with some of the fundamental sorting techniques.

TRANSFERABILITY:

See BC Transfer Guide at www.bccat.bc.ca.

REGULATIONS FOR STUDENTS

<u>Video, Audio, and Image recording</u>: Students may NOT make any video, audio, or image recording without prior permission of the instructor. If unauthorized recording is detected, the student(s) will be asked to leave the class immediately.

<u>Timeliness:</u> Students are expected to be in class at the start of the class. If a student must be late, contact the instructor with an explanation prior to the late class. The Faculty of Commerce & Business Administration has passed a policy regarding students who go to their classes late. The policy is as follows: "Learners are expected to be on time for class. Arriving on time is a matter of respect: for the instructor and fellow students. Late entry disrupts the learning environment. After due warning, students who are repeatedly late for class can be prohibited from entering the classroom until there is a natural break in that day's class." Late arrival to class after 10 minutes' grace will be marked absent

Assignment due dates: Every assignment will be given a due date, which will appear at the top of the first page. Each assignment with the student name and number are to be handed in (using USB or as directed by the instructor) to the instructor directly. An incomplete assignment, including missing files / folders, and with insufficient student information will end up with zero mark.

Note that department office staff will not accept assignment/project(s). Emailed assignment are also NOT acceptable. Late assignments/project(s) will be deducted marks (25% off for each day including weekends) with the exception of extraordinary circumstances or prior arrangements.)

Extra Copies of Projects/Assignment: Students are required to keep extra copies (i.e. photocopies or file backups) of their projects/assignments in case of any possible technical issues with Blackboard. If such incident does occur, the student will be allowed to submit the extra copy for grading.

<u>Term Quizzes and Exams</u>: Examinations will be held according to the schedule. Exceptions may be considered in cases of extraordinary circumstances. <u>It is the responsibility of the student to inform the College and the instructor at the earliest reasonable opportunity.</u> Missing the midterm will NOT be substituted with a makeup exam. Midterm weightage CANNOT be added to the final exam weightage. Missing a final exam without a valid reason will result in a mark of "0" and will receive a final grade of UN for missing the final examination.

For exams and quizzes, Students are not permitted to enter the exam room and write the exam after 15 minutes of the scheduled time. Students are expected to stay in the exam room for at least 30 minutes for exams and 15 minutes for quizzes, regardless.

Religious Event: Students who are scheduled for class, lab, work placements, practicum, examinations, etc. on holy days of their religion that requires absence from the day or from specific events will notify their instructor at the beginning of the semester of the holy days they wish to observe (absence). It is the student's responsibility to work together with his or her instructor to find an effective means to complete any and all work missed due to this absence.

<u>Emailing your instructor:</u> During the course, your emails must be addressed to <u>help.dc@outlook.com</u> for fastest response. Emailing with inadequate sender's information (including course number and section) might not be answered in a timely fashion. Should you miss an assignment deadline, a quiz, or an examination due to unavoidable circumstances or personal difficulties, please email me at **help.dc@outlook.com** at your earliest opportunity. On the email include

- your Course and Section number in the Subject line Example: CSIS3475 Section 070.
- your name and student number (e.g. Student Number 300121212)
- late assignment or missed quiz (e.g. Missed Quiz #1)
- have doctor's note or not (e.g. Have Doctor's note)
- brief comment.

Preparation, Attendance and Participation: Attendance will be taken twice; at the beginning and at the end of every class. If a student leaves early, the student will be marked absent. The method of delivery includes classroom discussion and lab exercises; and so students need to be present both in order to participate and to learn. Students are expected to prepare for, attend and actively participate in all class sessions and exercises, to sit the required tests and examinations and to submit projects as and when required. Students who miss a class are responsible for material covered in the missed class. Office hours are intended to assist students who have attended class and who wish additional help, not for the transmission of missed class contents. Students are expected to behave appropriately while attending Douglas College.

A student missing 30% or more of classes will receive a final grade of UN regardless of his/her performance in the course.

Phones and wireless devices are turned off (or don't bring) or set to silence mode. Cells going on in the middle of class are disruptive and exhibit a lack of consideration for your fellow-student. Cell phones are not allowed to be used in the classroom at all. When you really need to communicate with someone, please do it outside the classroom. Laptops and tablets may be used with the sole purpose of taking notes or reading the textbook.

Student Conduct: Any student who displays disruptive or dangerous behaviour will be asked to leave the classroom/lab by the instructor. Such behaviour will be classified as misconduct. Reprimands and appeals will be exercised according to official college policy. For details, please refer to:

http://www.douglascollege.ca/~/media/4310D1BD02AE4A74B9D0832D61FA18A1.ashx

Students are responsible for being familiar with the information contained in the Douglas College Calendar and policies and procedures relating to appeals, petitions and formal complaints, sexual and personal harassment, standards of conduct, violence and academic honesty.

College policies are available at http://www.douglascollege.ca/about-douglas/governance/policies

ACADEMIC INTEGRITY:

REFERENCE: Douglas College Educational Policy Academic Integrity

Plagiarism and Cheating: Douglas College, in common with other educational institutions, condemns academic dishonesty.

Plagiarism: presenting or submitting as one's own work the work, research, words, ideas, artistic imagery, arguments, calculations, illustrations or diagrams of another person or persons without explicit or accurate citation or credit; this includes submission of purchased material as well as material in which the student has permitted someone else (a fellow student, tutor, mentor or teaching assistant, friend, etc.) to contribute unacknowledged.

Self-plagiarism: submitting one's own work for credit in more than one course without the permission of the instructors, or re-submitting work, in whole or in part, for which credit has already been granted.

Cheating: The possession or provision of unauthorized aids, assistance or materials in the preparation of assignments, during examinations or in the completion of practical work, including but not limited to the following:

- Copying or attempting to copy the work of another during an examination
- Communicating work to another student during an examination
- Possession of unauthorized aids, notes or electronic devices or means during an examination
- Unauthorized possession of an examination or answer key
- Submission of a substantially similar assignment / test by two or more students, except in the case where such submission is specifically authorized by the instructor.

Students are responsible for conducting themselves honestly and ethically and for becoming familiar with and adopting the principles of academic integrity in their studies. This responsibility includes being vigilant with the use of sources and documentation to avoid plagiarism.

Violations of Academic Integrity policy are reported to the appropriate Responsible Administrator for adjudication and that serious and/or repeat offenses will lead to students being suspended or expelled.

See: http://www.douglascollege.ca/~/media/27C599ABC76048A0A713648565906273.ashx

RULES (applied to CB&A)

1. If you are <u>repeatedly</u> **LATE** for the class, you will be warned by the instructor and will **NOT** be allowed to enter the classroom as you will be interrupting the class in progress. In that case, you may only enter the classroom <u>during the natural break</u>. If such a person still enters the classroom after the class has started, he/she will be considered disturbing the class. This individual may be escorted out by the security guard and will be given a warning for misconduct. A subsequent offense will result in possible suspension from the College.

- 2. Unless otherwise stated, all the assignments MUST be submitted on Blackboard (email NOT accepted). **LATE** assignments will be given a **ZERO** mark <u>except</u> for extraordinary circumstances or prior arrangements with the instructor. Technical problems with network and equipment are not acceptable.
- 3. If you are going to miss a scheduled test or examination, make sure that you inform your instructor (by phone or via e-mail) **ON THE SAME DAY**; otherwise, you will be given a **ZERO** mark for that evaluation even though you may have a valid reason. In the case of illness, a doctor's note **MUST** be shown to your instructor as proof before or during the next class that you attend.
- 4. If you **DO NOT** write the midterm or final examination, you will be given a final grade of **UN** <u>regardless</u> of your achieved percentage up to that point. A UN grade will be assigned a 0.00 GPA.
- 5. A student <u>MUST</u> complete <u>no less than 71%</u> of all the evaluations for this course in order to obtain credits; otherwise, he/she will be assigned an **UN** as the final grade.
- 6. If you are caught cheating, you will receive a **ZERO** mark for that evaluation and a written warning for the first offense. However, if you are caught for a subsequent offense, you will be expelled from the College.
- 7. You will receive PDF copies of class notes and solutions via Blackboard .or X:\ drive. If you post these on any publicly accessible website, you will be assigned an UN as the final grade.
- 8. If you talk loudly during the class, you will be given a warning for disturbing your classmates. Any subsequent offense will result in possible suspension from the College.
- 9. All cellular phones and other mobile devices **MUST** be turned **OFF** <u>BEFORE</u> you enter the classroom unless you have been approved by your instructor to use such a device.
- 10. Your assignment title page is considered part of the assignment; therefore, it will also be graded. Your instructor will deduct ONE MARK for each mistake (such as incorrect information) made on the assignment title page. Also, the student will lose ONE MARK for <u>EACH</u> spelling mistake made in any assignment.
- 11. You MUST do all the assignments <u>on your own</u> in this course. Anyone involved in copying another student's answers (or posted material on any website) for any assignment will be given a **ZERO** mark for such activity and a warning for academic dishonesty.
- 12. You are **NOT** allowed to use any calculators, language translators or dictionaries during any quiz or examination in this course unless you are authorized to do so.

FROM: Douglas College grading policy found at:

http://www.douglascollege.ca/~/media/E78C494E965E40448262F45500DA4F58.ashx

Course Schedule

The course information and schedule is tentative and subject to change (Consistent with College Policy and with notice to students).

Week	Date	Topics	Chapter Readings	Due Dates	
1	May 12 th	Overview of the course Review of Java fundamentals Principles of programming and Software Engineering Introduction to Data Structures and Algorithms	Chapter 1 + notes		
2	May 19th	Introduction to Recursion Recursion and Efficiency	Chapter 3		
3	May 26 th	Algorithm Efficiency and analysis Searching and Sorting algorithms	Chapter 10	Quiz#1 - 5% May 26 th	
4	Jun 2 nd	Abstract Data Types (ADT) Introduction to Lists and Linked lists	Chapter 4, 5 + notes	Ass #1 - 5% Jun 3 rd	
5	Jun 9 th	Linked lists (cont'd.) Introduction to Stacks	Chapter 5 and 7		
6	Jun 16 th	Introduction to Stacks Introduction to Queues	Chapter 7 and 8	Ass # 2 - 5% Jun 17 th	
7	Jun 23 rd	Midterm Exam		Midterm Exam – 30% Jun 23 rd Ch. 1-7	
8	Jul 7 th	Introduction to Queues	Chapter 8		
9	Jun 30 th	Trees, Binary Trees and Binary Search Trees	Chapter 11	Ass #3 – 5% Jul 1 st	
10	Jul 7 th	Trees, Binary Trees and Binary Search Trees Heaps and Priority Queues	Chapter 11	Quiz# 2 – 5% Jul 7 th	
11	Jul 14 th	Heaps, Priority Queues and AVL trees Graphs	Chapter 12		
12	Jul 21st	Graphs and Hashing	Chapter 14	Ass #4 – 5% Jul 22 nd	
13	Jul 28 th	Hashing, Algorithm Design Techniques	Chapter 13		
14	Aug 4th	Exam Review			
	Exam period Fri Aug 10 – Mon Aug 20 Please do NOT book your flight before you know your exam dates. The College will NOT allow any travel accommodation except with the Dean's prior permission.				