



UNIVERSITY OF CALGARY
FACULTY OF SCIENCE
DEPARTMENT OF COMPUTER SCIENCE
COURSE OUTLINE

1. **Course:** CPSC 331: Data Structures, Algorithms and Their Analysis

Lecture Sections:

L01, MWF 10:00-10:50, Michael Jacobson, ICT 612, 210-9410, jacobs@ucalgary.ca

Office Hours: MW 14:00-16:00

Course Website: <http://pages.cpsc.ucalgary/~jacobs/Courses/cpsc331/W17/index.html>

Computer Science Department Office, ICT 602, 220-6015, cpsc@cpsc.ucalgary.ca

2. **Prerequisites:** MATH 271 or 273; and one of CPSC 219, 233, 235 or ENCM 339

(<http://www.ucalgary.ca/pubs/calendar/current/computer-science.html#3620>)

3. **Grading:** The University policy on grading and related matters is described in sections F.1 and F.2 of the online University Calendar. In determining the overall grade in the course the following weights will be used:

Assignments	30%
Midterm	30%
<i>(Wednesday March 8th, 2017 at 17:00 in EDC 179)</i>	
Final Exam	40%

This course **will** have a Registrar's Scheduled Final Exam.

Special Regulations affecting Final grade: Each of the above components will be given a percentage grade. The final grade will be calculated weighted by the percentages given above and the reconverted to a final letter grade using the attached cut-offs. In order to obtain a final grade of C- or better, and to pass the course, a student must achieve a weighted average of C- or better in the Assignments component.

4. **Missed Components of Term Work:** The regulations of the Faculty of Science pertaining to this matter are found in the Faculty of Science area of the Calendar. Section 3.6. It is the student's responsibility to familiarize themselves with these regulations. See also Section E.6 of the University calendar.

5. **Scheduled Out-of-Class Activities:** REGULARLY SCHEDULED CLASSES HAVE PRECEDENCE OVER ANY OUT-OF-CLASS-TIME ACTIVITY. If you have a clash with this out-of-class activity, please inform your instructor as soon as possible so that alternative arrangements can be made.

6. **Course Materials:**

Introduction to Algorithms Third Edition, Cormen, Leiserson, Rivest and Stein, MIT Press 2009

Online Course Components:

Lecture notes, assignments and tutorial exercises will be posted on the course website.

7. **Examination Policy:** Closed book. Students should also read the Calendar, Section G, on examinations.

8. **Approved Mandatory and Optional Course Supplemental Fees:** None.

9. **Writing across the Curriculum Statement:** In this course, the quality of the student's writing in the weighted components of the course will be a factor in the evaluation of these components. See also Section E.2 of the University Calendar.

10. **Human Studies Statement:** Students will be expected to participate as subjects or participants in projects. See also Section E.5 of the University Calendar.

11. **OTHER IMPORTANT INFORMATION FOR STUDENTS:**

- a) **Misconduct:** Academic misconduct (cheating, plagiarism, or any other form) is a very serious offense that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the University Calendar under Section K, Student Misconduct to inform yourself of definitions, processes and penalties.
- b) **Assembly Points:** In case of emergency during class time, be sure to FAMILIARIZE YOURSELF with the information on assembly points which can be found in each classroom and building.
- c) **Student Accommodations:** Students needing an Accommodation because of a Disability or medical condition should contact Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities available at http://www.ucalgary.ca/policies/files/policies/procedure-for-accommodations-for-students-with-disabilities_0.pdf. Students needing an Accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, preferably in writing, to the Associate Head of Computer Science.
- d) **Safewalk:** Campus Security will escort individuals day or night (<http://www.ucalgary.ca/security/safewalk/>). Call 403-220-5333 for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.
- e) **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). As one consequence, students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. For more information see also <http://www.ucalgary.ca/secretariat/privacy>
- f) **Student Union Information:** VP Academic (403) 220-3911 suvpaca@ucalgary.ca SU Faculty Rep (403) 220-3913 science1@su.ucalgary.ca, science2@su.ucalgary.ca and science3@su.ucalgary.ca, Student Ombuds Office: (403) 220-6420 ombuds@ucalgary.ca, <http://ucalgary.ca/provost/students/ombuds>
- g) **Internet and Electronic Device Information:** You can assume that in all classes that you attend your cell phone should be turned off unless instructed otherwise. All communications with other individuals via laptop computers, cell phones or other devices connectable to the internet in not allowed during class time unless specifically permitted by the instructor. If you violate this policy you may be asked to leave the classroom. Repeated abuse may result in a charge of misconduct.
- h) **U.S.R.I.:** At the University of Calgary feedback provided by students through the Universal Student ratings of Instruction (USRI) survey provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses (www.ucalgary.ca/usri). Your responses make a difference – please participate in USRI surveys.

Department Approval _____ Date _____

Faculty Approval for
out of regular class-time activity: _____
Date: _____

Faculty Approval for
Alternate final examination arrangements: _____
Date: _____

A signed copy of this document is on file in the Computer Science Main Office

CPSC 331 Percentage to Letter Grade Conversion Table

A+	95-100
A	90-94
A-	85-89
B+	80-84
B	75-79
B-	70-74
C+	65-69
C	60-64
C-	55-59
D+	50-54
D	40-49
F	0-39

CPSC 331 Syllabus

Tentative Topics Covered:

- * Correctness of Algorithms
- * Testing
- * Analysis of Algorithms
- * Basic Data Types (Lists, Stacks, Queues)
- * Searching and Classical Sorting
- * Dictionaries (Binary Search Trees, Red-Black Trees, Hash Tables)
- * Fast Sorting (Merge Sort, Heap Sort, Quicksort)
- * Graph Algorithms (Graph Data Structures, Depth-First Search, Breadth-First Search, Minimum-Cost Paths, Minimum-Cost Spanning Trees)

Learning Outcomes:

By the end of the course, students will:

- Develop mathematical expressions for time and storage requirements, for simple algorithms, given pseudocode for these algorithms.
- Use asymptotic notation to simplify expressions for resource requirements of algorithms, without omitting essential information about these.
- Identify the abstract data types that can be used to solve a variety of computations, along with data structures that can be used to implement these when resource bounds for the cost of operations are also supplied.
- Use simple English descriptions as well as pseudocode to describe algorithms to implement the operations of an abstract data type when a given data structure is used to implement it.
- Understand and correctly identify asymptotic relations between functions that are commonly used to bound resource requirements - including logarithmic functions, polynomial functions with various degrees, and exponential functions with various bases.
- Explain - clearly and precisely - why algorithms, discussed in this course, are correct and efficient.
- Describe several data structures that can be used to implement each of the abstract data types that have been studied, and compare and contrast the resource requirements for the resource requirements for each operation when each data structure is used.
- Use a modern (object-oriented) programming language to implement various abstract data types using specified data structures and use a software library - which includes industry-standard implementations of abstract data types with promised resource bounds for the costs of operations - to write short and simple programs that solve nontrivial computation problems correctly, and within specified resource bounds.
- Describe various classical abstract data types including stacks, queues, dictionaries and graphs as well as the operations that each supports.
- Discover assertions that explain why algorithms are correct, and that can be used as documentation or to make programs self-testing.

Allowable Sources:

No Restrictions on source material.

Cited Sources:

If you used an article, book, function or algorithm that you did not create for this course you must cite it. (This means you may have to cite yourself!) Use APA for citations in a report, paper or in the header documentation of computer code you submit. If citing a website, make sure you include the date you accessed the website. Don't forget to cite code that you used, even if you modified the code.

Level of Collaboration between Students:

You may discuss the assignments with other students in the class but do NOT share any code, do not ask others to provide you with code and do not show code that you have created for assignments to other students. Similarly, do not share any written materials, and make sure that all solutions are written in your own words.

Disclosure Policy

If you discuss the assignments with others, make sure to cite these discussions.