CIS*2520 Data Structures

Fall 2019
Section(s): C01

School of Computer Science
Credit Weight: 0.50
Version 1.00 - September 03, 2019

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1 Course Details

1.1 Calendar Description

This course is a study of basic data structures, such as lists, stacks, queues, trees, and tables. Topics which will be examined include abstract data types, sequential and linked representations, and an introduction to algorithm analysis; various traversal, search, insertion, removal, and sorting algorithms.

Pre-Requisites: CIS*2500, (1 of CIS*1910, ENGG*1500, MATH*2000)

1.2 Timetable

Lecture Section 01: Tuesdays, and Thursdays, 02:30PM - 03:50PM, Alexander Hall, Room 100.

Lecture Section 02: Tuesdays, and Thursdays, 11:30AM - 12:50PM, Macdonald Hall, Room 149.

Classes begin on Sept. 5th, 2019 and end on Nov. 29, 2019. There are no classes on Oct. 15th (study break).

Labs begin on Sept. 9th, 2019 and end on Nov. 22, 2019. There are no labs Oct. 14th-18th (study break week). (But there is a lecture on Oct. 17th).

1.3 Final Exam

Monday, Dec. 2nd, 2019, 08:30AM - 10:30AM, Room TBA.

2 Instructional Support

Help Centre E-mail:

For help with course material, lectures, labs, assignments, examinations, on-line exercises, please use the help centre e-mail:

cis2520@socs.uoguelph.ca

This is the best and fastest way to get answers to your questions.

2.1 Instructional Support Team

Instructor: Stefan C. Kremer
Telephone: +1-519-824-4120 x58913
Office: REY 3309
Office Hours: Wednesdays 13:00-16:00, or by appointment.
For any personal issues, including academic consideration, special circumstances or issues surrounding the TAs, contact the instructor directly at: skremer@uoguelph.ca. For issues related to course material, lectures, labs, assignments, examinations, on-line exercises, please use the help centre e-mail:

cis2520@socs.uoguelph.ca

2.2 TAs

Kevin Glover-Netherton, Nickolas Leipold, Sooraj Modi, Manav Patel, Benjamin Pearo, and Kevin Pirabaharan.

3 Learning Resources

3.1 Required Resources

Course Web Page URL (Website)
https://courselink.uoguelph.ca/d2l/home/567708

ZyBooks Textbook (Required) (Textbook)
https://www.zybooks.com/catalog/data-structures-essentials/

This is an on-line textbook for this course. It contains reading materials, demos and interactive quizzes used throughout the course. It covers the conceptual aspects of data structures in a language-independent manner.

- zyBook: CIS 2520: Data Structures
- zyBook code: UOGUELPHCIS2520KremerFall2019
- zyBook ISBN: 978-1-5418-8356-7

1. Sign in or create an account at learn.zybooks.com
2. Enter zyBook code: UOGUELPHCIS2520KremerFall2019
3. Subscribe

A subscription is **$58US**. Students may begin subscribing on Aug 22, 2019 and the cutoff to subscribe is Dec 03, 2019. Subscriptions will last until Dec 28, 2019.

3.2 Recommended Resources

Physical textbook covering data structures and implementation in C (Textbook)

T. A. Standish, Data Structures, Algorithms & Software Principles in C, Addison Wesley, 1994.

This is a recommended book that covers the C programming language implementation of the data structures covered in this course. There are also many examples covered in the lectures and in the labs as well as many on-line resources that cover this material, but if you are looking for everything in one place, in a nicely organized way, this is the book.

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4 Learning Outcomes

Students will learn concepts of the commonly used data structures, as well as their representations and uses, and algorithms for manipulating the structures. The emphasis is on the use of data structures in software development and evaluation of alternative implementations. Students will acquire skills of designing and implementing data structures for solving problems in C. The topics include:

- Review of C, including pointers, recursion, etc.
- Introduction of algorithm analysis
- Stacks, queues, strings, lists, trees, graphs, dictionaries, and hashing
- Searching and sorting

4.1 Course Learning Outcomes

By the end of this course, you should be able to:

1. Describe and implement common data structures for solving complex programming problems including algorithms for the creation, insertion, deletion, searching, and sorting of each data structure.
2. Analyse the space and time efficiency of algorithms including algorithms for the creation, insertion, deletion, searching, and sorting of data structures discussed.
3. Select and correctly use the appropriate abstract data type for programming problems.

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5 Teaching and Learning Activities

5.1 Lecture

When	Topic
Week 1	Review of C programming.
Week 2	Review of C programming (style, pointers, dynamic memory).
Week 3	Introduction to data structures and algorithms.
Week 4	Searching, sorting and algorithm analysis.
Week 5	Lists, stacks and queues.
Week 6	Hash tables.
Week 7	Trees and balanced trees.
Week 8	Heaps and treaps.
Week 9	Graphs and algorithms.

When	Topic
Week 10	B-trees.
Week 11	Sets.
Week 12	Review.

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6 Assessments

NOTE: It is your responsibility to resolve any conflicts concerning the dates and times below. If you contact the instructor **early** it is likely that conflicts can be resolved.

IMPORTANT: Assignment marks will NOT count toward your final grade if you fail the examination portion of the course. If you fail the examination portion, your final grade for the course will be equal to the failing examination grade.

6.1 Marking Schemes & Distributions

Name	Scheme A (%)
Assignment 1	10
Assignment 2	10
Assignment 3	10
Assignment 4	10
Midterm examination	15
Final Examination	35
zyBooks Exercises	10
Total	100

6.2 Assessment Details

Assignment 1 (10%)
Date: Sun, Sep 29, 11:59 PM

Assignment 2 (10%)
Due: Sun, Oct 20, 11:59 PM

Assignment 3 (10%)
Date: Sun, Nov 3, 11:59 PM

Assignment 4 (10%)
Date: Sun, Nov 17, 11:59 PM

Midterm examination (15%)
Date: Tue, Oct 22, Lecture hall.
Midterm examination will be held during regular lecture time.

Final Examination (35%)
Date: Mon, Dec 2, 8:30 AM - 10:30 AM, Location tbd

zyBook Exercises (10%)
Date: Weeks 2-11.
As assigned (see zyBooks web-site), students will complete the zyBooks exercises by 11:30am on class days.

6.3 Assignment Hand-in

All assignments must be submitted by depositing them to the git server for the course as per the instructions given on CourseLink. Assignments submitted by e-mail or any other way, will not be graded.

6.4 Late work

Work submitted after the deadline will receive a grade of zero unless extenuating circumstances (as defined in the Undergraduate Calendar) apply. (Hand in what you have completed by the deadline.)

6.5 Missed zyBooks exercises

Students who are unable to complete a zyBooks exercise for a given day due to extenuating circumstances, etc, should contact the instructor as soon as possible. Their grade for the missed exercise will be assigned based on their final examination grade. A medical note is **not** required.

6.6 Missed Assignments or Midterm

If you miss the midterm exam or an assignment during the semester for a documented valid reason (e.g., medical illness) your final exam be reweighted to make up for the missed work.

If you miss the final exam for any reason, you must see your program counsellor. University regulations require specific procedures to be followed regarding the conduct of final exams, including recourse, if any, for missed final examinations. These procedures are out of my control.

6.7 Regrade requests

Regrade requests must be received by e-mail within 7 calendar days of the grade being posted. A regrade request will result in the entire deliverable being regraded. The revised grade may be higher or lower than the original grade.

7 University Statements

7.1 Email Communication

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

7.2 When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals
https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml

Graduate Calendar - Grounds for Academic Consideration
https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml

Associate Diploma Calendar - Academic Consideration, Appeals and Petitions
https://www.uoguelph.ca/registrar/calendars/diploma/current/index.shtml

7.3 Drop Date

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all students (undergraduate, graduate and diploma) except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in their respective Academic Calendars.

Undergraduate Calendar - Dropping Courses
https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml

Graduate Calendar - Registration Changes
https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml

Associate Diploma Calendar - Dropping Courses
https://www.uoguelph.ca/registrar/calendars/diploma/current/c08/c08-drop.shtml

7.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

7.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to book their exams at least 7 days in advance and not later than the 40th Class Day.

For Guelph students, information can be found on the SAS website
https://www.uoguelph.ca/sas

For Ridgetown students, information can be found on the Ridgetown SAS website
https://www.ridgetownc.com/services/accessibilityservices.cfm

7.6 Academic Integrity

The University of Guelph is committed to upholding the highest standards of academic integrity, and it is the responsibility of all members of the University community-faculty, staff, and students-to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff, and students have the responsibility of supporting an environment that encourages academic integrity. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

Undergraduate Calendar - Academic Misconduct
https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml

Graduate Calendar - Academic Misconduct
https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml

7.7 Recording of Materials

Presentations that are made in relation to course work - including lectures - cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

7.8 Resources

The Academic Calendars are the source of information about the University of Guelph's procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.

Academic Calendars
https://www.uoguelph.ca/academics/calendars
