

## COURSE SYLLABUS

### CMPT 360: CS JOB-INTERVIEW PREPARATION

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#### Catalogue Description

CMPT 360.3 – 1(3L)

#### Machines and Algorithms

The first part develops and analyzes some standard techniques for algorithm development which are widely applicable to computer science problems. The second part analyzes several formal models of computers so that their capabilities are known.

**Prerequisite(s):** CMPT 260 and 280;  
6 credit units in 200-level MATH or STAT  
(excluding MATH 213 and STAT 244)

**Class Time and Location:** lectures: TR, 2:30–3:50 in Arts 102

**Website:** CS Moodle: <https://moodle.cs.usask.ca>

#### Instructor Information

**Instructor** Christopher Dutchyn

**Contact:** Email: <mailto:dutchyn@cs.usask.ca>,  
Office Phone: +(306) 966-4896  
WebEx: <https://usask.webex.com/meet/cjd032>

**Office Hours:** Location: Thorv 281.10,  
Hours: TBD

#### Course Overview

To learn the major methods for designing algorithms and the major mathematical models of computation.

#### Course Objectives

Upon completion of this course, students will be able to do the following:

- analyze asymptotic performance of algorithms,
- write rigorous correctness proofs for algorithms,
- demonstrate familiarity with major algorithms and data structures,
- apply important algorithmic design paradigms and methods of analysis,
- synthesize efficient algorithms in common engineering design situations.

This course serves to meet requirements from the <http://www.acm.org/education/CS2013-final-report.pdf> guidelines, namely much of tier 1 and tier 2 of *AL/Algorithms and Complexity*, a large portion of *DS/Discrete Structures*, some of *CN/Modeling and Simulation* and *DS/Discrete Structures*, and (based on student's effort) parts of *PL/Programming Languages*, *SDF/Software Development Foundations* and *SE/Software Engineering*.

## Student Evaluation

**Note: All students must be properly registered in order to attend lectures and receive credit for this course.**

### Grading Scheme

Intangibles may count in the determination of your grade. The relative weights of different course activities are shown in Table 1.

Table 1: Course Work and Grades

| <i>Item</i>         | <i>Description</i>     | <i>Weighting</i> |
|---------------------|------------------------|------------------|
| Assignments         | six @ 5%               | 30%              |
| Midterm Examination | (in-class + take-home) | 20%              |
| Final Examination   | (180 minutes)          | 50%              |
|                     | <i>Total</i>           | 100%             |

### Tasks

There are six assignments, containing both written and programming activities. Written work will be submitted to the course moodle hosted at `moodle.cs.usask.ca`. Programming solutions must be constructed in the GitLab service hosted at `git.cs.usask.ca`. A rubric correlating grades to [the university Grading System](#) is posted to the course moodle.

The midterm examination will consist of an in-class examination, along with a take-home programming activity. No collaboration of any form is permitted: even the usual *no-recording* variation is disallowed.

The final examination is written, three hours long, at the time and place designated by the registrar. Students are advised not to make travel arrangements for the exam period until the official exam schedule has been posted.

### Attendance Expectation

All students are expected to attend lectures. If you miss a lecture, contact other students to obtain lecture notes.

### Textbook Information

#### Required Text

- Kleinberg and Tardos, *Algorithm Design 1ed.*, Pearson, 2005.

#### Recommended Texts

- Sanjoy, Papadimitriou, and Vazirani, *Algorithms*, McGraw Hill, 2006.
- Cormen, Leiserson, Rivest, and Stein, *Introduction to Algorithms 3ed.*, MIT Press, 2009.
- Parberry and Gasarch, *Problems on Algorithms 2ed.*, Prentice Hall, 2002.
- Bentley, *Programming Pearls 2ed.*, Addison-Wesley, 1999.

## Lecture Topics and Dates

Table 2: Topics and Dates

| — —Date— — |     | Topic | Due                          | K&T Readings             |
|------------|-----|-------|------------------------------|--------------------------|
| -T         | W   |       |                              |                          |
| Sep        |     | 7     | <i>introduction</i>          | §1,2                     |
|            |     | 12    | graph ...                    | §3.1-2, §3.4-6           |
|            |     | 14    | ...                          |                          |
|            |     | 19    | ... algorithms               |                          |
|            |     | 21    | greedy...                    | §4.1, §4.4-7             |
|            |     | 26    | ...                          |                          |
|            | 27  |       | ... algorithms               | A1: graph                |
|            |     | 28    |                              |                          |
| Oct        | 3   |       | divide-...                   | §5.1-6                   |
|            |     | 5     | ...-and-...                  |                          |
|            | 9   |       | ...-conquer ...              | A2: greedy               |
|            | 10  |       | ... algorithms               |                          |
|            |     | 11    |                              |                          |
|            | 17  |       | dynamic ...                  | §6.1-2, §6.4, §6.6, §6.8 |
|            | 19  |       | <i>midterm exam—in class</i> |                          |
|            | -21 |       | <i>midterm exam</i>          | -programming             |
|            | 24  |       | ...                          |                          |
|            | 25  |       |                              | A3: d&c                  |
|            | 26  |       | ... programming              |                          |
|            | 31  |       | network...                   | §7.1-2                   |
| Nov        |     | 2     | ...                          |                          |
|            | 6-  |       |                              | A4: dp                   |
|            | 7   |       | ... flow                     |                          |
|            | 9   |       | NP-...                       | §8.1-4                   |
|            | 14  |       | — — <i>Fall</i> — —          |                          |
|            |     | 16    | — — <i>Break</i> — —         |                          |
|            | 21  |       | ...-completeness             |                          |
|            | 22  |       |                              | A5: flow                 |
|            |     | 23    | hard problems                | §10.1-2, §11.2, §12.1-2  |
|            | 28  |       | machines: FSM                |                          |
|            |     | 30    | PDA                          |                          |
| Dec        | 3-  |       |                              | A6                       |
|            | 5   |       | TM                           |                          |
|            |     | 7     | <i>summary</i>               |                          |

All dates are approximate, and may be adjusted as the term progresses.

## Policies

### Examinations with Disability Services for Students (DSS)

Students who have disabilities (learning, medical, physical, or mental health) are strongly encouraged to register with Disability Services for Students (DSS) if they have not already done so. Students who suspect they may have disabilities should contact DSS for advice and referrals. In order to access DSS programs and supports, students must follow DSS policy and procedures. For more information, check <http://www.students.usask.ca/disability/>, or contact DSS at 966-7273 or [dss@usask.ca](mailto:dss@usask.ca).

Students registered with DSS may request alternative arrangements for mid-term and final examinations. Students must arrange such accommodations through DSS by the stated deadlines. Instructors shall provide the examinations for students who are being accommodated by the deadlines established by DSS. In accordance with **DSS policy**, you must submit notice to me as early as possible: certainly no later than the September 19 registration deadline; otherwise, accommodations may not be provided.

### Incomplete Course Work and Final Grades

“When a student has not completed the required course work, which includes any assignment or examination including the final examination, by the time of submission of the final grades, they may be granted an extension to permit completion of an assignment, or granted a deferred examination in the case of absence from a final examination.

Extensions past the final examination date for the completion of assignments must be approved by the Department Head, or Dean in non-departmentalized Colleges, and may exceed thirty days only in unusual circumstances. The student must apply to the instructor for such an extension and furnish satisfactory reasons for the deficiency. Deferred final examinations are granted as per College policy.

In the interim, the instructor will submit a computed percentile grade for the class which factors in the incomplete coursework as a zero, along with a grade comment of INF (Incomplete Failure) if a failing grade.

In the case where the student has a passing percentile grade but the instructor has indicated in the course outline that failure to complete the required coursework will result in failure in the course, a final grade of 49% will be submitted along with a grade comment of INF (Incomplete Failure).

If an extension is granted and the required assignment is submitted within the allotted time, or if a deferred examination is granted and written in the case of absence from the final examination, the instructor will submit a revised assigned final percentage grade. The grade change will replace the previous grade and any grade comment of INF (Incomplete Failure) will be removed.

A student can pass a course on the basis of work completed in the course provided that any incomplete course work has not been deemed mandatory by the instructor in the course outline and/or by College regulations for achieving a passing grade.”

For more details on policies governing examinations and grading, students are referred to the source for the above quotation, the Assessment of Students section of the University policy ‘Academic courses: class delivery, examinations, and assessment of student learning’

(<http://policies.usask.ca/policies/academic-affairs/academic-courses.php>)

Singular and extenuating circumstances (requiring **written declaration**) will be negotiated individually. Server outages in the 24-hours preceding an assignment due date will be handled on ad-hoc but across-the-board basis, depending on the length and severity of the problem. Typically, any outage lasting less than 4 hours will not grant extensions: you can resubmit at any time, so submit regularly as you progress toward completion of an assignment.

### Missed Examinations

Students who miss an exam should contact the instructor as soon as possible. If it is known in advance that an exam will be missed, the instructor should be contacted before the exam.

“A student who is absent from a final examination due to medical, compassionate, or other valid reasons, may apply to the **College of Arts and Science Undergraduate Student’s Office** for a deferred exam. Application must be made within three business days of the missed examination and be accompanied by supporting documents.”

(<http://artsandscience.usask.ca/undergraduate/advising/strategies.php>)

## Academic Honesty

“The University of Saskatchewan is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the Student Conduct & Appeals subsection of the University Secretary Website and avoid any behaviour that could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University.

All students should read and be familiar with the [Regulations on Academic Student Misconduct](#), as well as the [Standard of Student Conduct in Non-Academic Matters and Procedures for Resolution of Complaints and Appeals](#). Academic honesty is also defined and described in the [Department of Computer Science statement on Academic Honesty](#).

For more information on what academic integrity means for students see the Student Conduct & Appeals subsection of the University Secretary Website at:

[http://www.usask.ca/university\\_secretary/pdf/dishonesty\\_info\\_sheet.pdf](http://www.usask.ca/university_secretary/pdf/dishonesty_info_sheet.pdf)

## Collaboration Policy

You may neither possess work from other students (including those not enrolled in this course) nor share your work (rough drafts, finished answers, or graded assignments) with another student at any time during the course: **before or after** any assignment is due. Study groups and group discussion are encouraged; but if you plan to employ these then you must adhere to a *no-recording* policy:

Collaboratively, you may discuss and sketch on a non-permanent surface (e.g. white board), but no written-on-paper and no typed-into-computer activities are allowed. Every student must leave the discussion without a record (no written notes or document, no computer file, no photograph, and no audio/video recording) and must reproduce the result from their own memory. The impermanent surface must be erased.

**For the take-home part of the midterm examination, no collaboration of any form is permitted.**

One student’s possession of other students’ work (even after the due date) is *prima facie* evidence of academic dishonesty on the part of both students, even if one is not registered in this class.

## Recording Policy

Lectures will not be recorded; students may not record or photograph lectures.