

## COURSE SYLLABUS

# CMPT 815: COMPUTER SYSTEMS AND PERFORMANCE EVALUATION

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### Catalogue Description

Provides a comprehensive overview of the quantitative aspects of computer systems with a particular focus on performance evaluation. Topics include performance measurement, the analysis and interpretation of measurement data, workload characterization and modeling, the design and evaluation of performance experiments, and the design and application of analytical techniques. A variety of application domains will be considered.

**Prerequisite(s):** No formal prerequisite  
**Class Time & Location:** M W, 2:00-3:20, Spinks 342  
**Website:** Canvas

### Instructor Information

**Instructor:** Derek Eager  
**Contact:** Email: [eager@cs.usask.ca](mailto:eager@cs.usask.ca)  
Office: Thorv 281.2  
Feel free to email me or drop by my office at any time

### Course Overview and Objectives

This offering of CMPT 815 will provide an introduction to computer systems performance modeling and optimization. The course will cover basic concepts and techniques in this area, with emphasis on their application rather than on details of the underlying theory. Illustrative applications will be drawn from topics in computer architecture, Internet applications, cloud and cluster computing, and network protocol design.

### Student Evaluation

There will be 3 equally-weighted assignments (likely approximate due dates – early October, late October, and mid-November) consisting of modelling and data analysis exercises. Students will be expected to complete a project on a mutually-agreeable topic in the computer systems performance modeling and optimization area, with due date in mid-December. Evaluation will also be based on the extent and quality of participation in class discussions, short summaries of papers from the reading list, and a paper presentation.

### Grading Scheme

Class Participation	10 %
Paper Summaries	10 %
Paper Presentation	10 %
Assignments (3)	30 %
Project	40 %
<b>Total</b>	<b>100%</b>

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

## Reference Materials

A reading list will be provided.

## Schedule of Topics

- Characterizing Measurement Data
  - important types of probability distributions including Pareto, Zipf, exponential, and others; Poisson processes; correlation, stationarity; case studies
- Analytic Models
  - simple models based on Amdahl's law, bound and bottleneck analysis; queueing models; case studies
- Machine Learning Based Approaches
  - DNN-based, reinforcement learning based, and others; case studies

## Policies

### Use of Generative AI Tools

Any use of Generative AI tools for paper summaries, assignments, or the project, must be approved by the instructor in advance of making such use.

### Recording of Lectures

Students may record lectures if desired.

### Paper Summaries

Credit will be given only for paper summaries submitted **prior** to the discussion of the respective paper.

### Late Presentation/Assignments/Project

Requests for extensions will only be considered by the instructor when such requests are received **in advance** of the presentation date or assignment/project due date.

### Missed Presentation/Assignments/Project

Students who do not submit anything for an assignment or the project by the due date (possibly as extended by the instructor), or do not do a paper presentation, will receive a grade of zero for it.

### 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.” (<https://policies.usask.ca/policies/academic-affairs/academic-courses.php>)

For policies governing examinations and grading, students are referred to the Assessment of Students section of the University policy “Academic courses: class delivery, examinations, and assessment of student learning” (<https://policies.usask.ca/policies/academic-affairs/academic-courses.php>)

## Copyright

Course materials are provided to you based on your registration in a class, and anything created by your professors and instructors is their intellectual property, unless materials are designated as open education resources. This includes exams, PowerPoint/PDF slides and other course notes. Additionally, other copyright-protected materials created by textbook publishers and authors may be provided to you based on license terms and educational exceptions in the Canadian Copyright Act (see <http://laws-lois.justice.gc.ca/eng/acts/C-42/index.html>).

Before you copy or distribute others’ copyright-protected materials, please ensure that your use of the materials is covered under the University’s Fair Dealing Copyright Guidelines available at <https://library.usask.ca/copyright/general-information/fair-dealing-guidelines.php>. For example, posting others’ copyright-protected materials on the open web is not covered under the University’s Fair Dealing Copyright Guidelines, and doing so requires permission from the copyright holder.

For more information about copyright, please visit <https://library.usask.ca/copyright/index.php> where there is information for students available at <https://library.usask.ca/copyright/students/rights.php>, or contact the University’s Copyright Coordinator at [copyright.help@usask.ca](mailto:copyright.help@usask.ca) or 306-966-8817.

## Integrity

The University of Saskatchewan is committed to the highest standards of academic integrity (<https://academic-integrity.usask.ca/>). Academic misconduct is a serious matter and can result in grade penalties, suspension, and expulsion. Students are expected to act with academic integrity. Students are encouraged to complete the Academic Integrity Tutorial to understand the fundamental values of academic integrity and how to be a responsible scholar and member of the USask community (tutorial link: <https://libguides.usask.ca/AcademicIntegrityTutorial>). Students can access campus resources that support development of study skills, time and stress management, and ethical writing practices important for maintaining academic integrity and avoiding academic misconduct.

Students are expected to be familiar with the academic misconduct regulations (<https://governance.usask.ca/student-conduct-appeals/academic-misconduct.php#About>).

- Definitions appear in Section II of the academic misconduct regulations.
- The academic misconduct regulations apply regardless of type of assessment or presence of supervision during assessment completion.
- Students are advised to ask for clarification as to the specific expectations and rules for assessments in all of their courses.
- Students are urged to avoid any behaviour that could result in suspicions of cheating, plagiarism, misrepresentation of facts. Students should note that posting copyrighted course materials (e.g., notes, questions, assignments or exams) to third party websites or services or other forum or media without permission is an academic or non-academic misconduct offense.

Non-academic offenses are dealt with under the [Standard of Student Conduct in Non-Academic Matters and Procedures for Resolution of Complaints and Appeals](#).

## Access and Equity Services (AES) for Students

Students who have disabilities (learning, medical, physical, or mental health) are strongly encouraged to register with Access and Equity Services (AES) if they have not already done so. Students who suspect they may have disabilities should contact AES for advice and referrals at any time. Those students who are registered with AES with mental health disabilities and who anticipate that they may have responses to certain course materials or topics, should discuss course content with their instructors prior to course add / drop dates. In order to access AES programs and supports, students must follow AES policy and procedures. For more information or advice, visit <https://students.usask.ca/health/centres/access-equity-services.php>, or contact AES at 306-966-7273 or [aes@usask.ca](mailto:aes@usask.ca).

Students registered with AES may request alternative arrangements for mid-term and final examinations. Students must arrange such accommodations through AES by the stated deadlines. Instructors shall provide the examinations for students who are being accommodated by the deadlines established by AES.

## Student Supports

See <https://library.usask.ca/studentlearning/> and <https://students.usask.ca>.

### Financial Support

Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact Student Central (<https://students.usask.ca/student-central.php>).

### College Supports

Students in Arts & Science are encouraged to contact the Undergraduate Student Office and/or the Trish Monture Centre for Success with any questions on how to choose a major; understand program requirements; choose courses; develop strategies to improve grades; understand university policies and procedures; overcome personal barriers; initiate pre-career inquiries; and identify career planning resources. Contact information is available at: (<http://artsandscience.usask.ca/students/current-students.php>)

### Aboriginal Students' Centre

The [Aboriginal Students' Centre \(ASC\)](#) is dedicated to supporting the personal, social, cultural, and academic success of Métis, First Nations, and Inuit students.

### International Student and Study Abroad Centre

The International Student and Study Abroad Centre (ISSAC) supports student success in their international education experiences at the U of S and abroad. ISSAC is here to assist all international undergraduate, graduate, exchange and English as a Second Language students and their families in their transition to the U of S and Saskatoon. ISSAC offers advising and support on all matters that affect international students and their families and on all matters related to studying abroad. Please visit <https://students.usask.ca/international/issac.php> for more information.

## Land Acknowledgement

I would like to acknowledge that the Saskatoon campus of the University of Saskatchewan is on **Treaty Six Territory** and the **Homeland of the Métis**. We pay our respect to the First Nation and Métis ancestors of this place and reaffirm our relationship with one another. I would also like to recognize that some may be attending this course from other traditional Indigenous lands. I ask that you take a moment to make your own Land Acknowledgement to the peoples of those lands. In doing so, we are actively participating in reconciliation as we navigate our time in this course, learning and supporting each other.