Instructor:
Professor C. Huang  
Room 4486ME  
Tel: 520-2600 ext. 5730  
Email: huang@sce.carleton.ca  
http://www.sce.carleton.ca/faculty/huang.html

Office Hours
TBD

TA Info:
Ahmed Abada, AhmedAbada@cmail.carleton.ca  
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TA Office Hours
TBD

Calendar Description
Prerequisite: Lectures three hours a week, laboratory one hour a week.

Prerequisites
SYSC 2510 or STAT 2605 or STAT 3502 and fourth-year status in Engineering, or permission of the Department. Students who have not satisfied the prerequisites for this course must either withdraw from the course or obtain a prerequisite waiver by visiting the Engineering Undergraduate Academic Support Office.  
http://www3.carleton.ca/calendars/ugrad/0910/courses/SYSC/4005.html

Assumed Knowledge
Upon entry into this course, students are expected to have knowledge of: Basic probability theory; A high-level programming language such as C++, Java, or Python

Course Objectives
The goal of the course is to provide the basic background for modeling and computer simulation of systems. Emphasis is placed on the design of simulation experiments and the correct interpretation of the associated statistical results. The course includes a brief overview of simulation languages and probability theory. If time permits, special topics such as design of experiments and variance reduction techniques will be discussed.

Learning Outcomes
1. know how to solve a problem using simulation and modeling approach  
2. know how to use common probability models  
3. know how to use basic queueing models  
4. can analyze and model input data
5. know how to generate random variates
6. can design and implement simulation models
7. know how to verify and validate a simulation model
8. know how to plan and conduct simulations
9. know how to estimate system performance
10. can process output data and assess different design alternatives
11. know how to write a project report
12. can complete a project in a team
13. can use different software tools (MATLAB, GPSS, spreadsheet, etc.) to conduct simulation

Graduate Attributes (GA’s)
The Canadian Engineering Accreditation Board requires graduates of engineering programs to possess 12 attributes at the time of graduation. For more information on these attributes and the accreditation process, please visit: https://engineerscanada.ca/.


References:

H. Perros, Computer Simulation Techniques: The definitive introduction!
https://people.engr.ncsu.edu/hp/files/simulation.pdf


I. Stahl., Introduction to Simulation with GPSS on the PC, Macintosh and VAX, Prentice Hall, 1990

Evaluation and Grading Scheme
Attendance 20%
Midterm 1 10%
Midterm 2 10%
Project 20%
Final Exam 40%

Breakdown of Course Requirements
1. Students are allowed to do the project in a team with up to three students per team at most.
2. Project will include four deliverables.
3. No late assignments will be accepted.
4. Midterm 2 will cover the contents after Midterm 1.
5. Final exam will cover the whole course with more weight on the contents after Midterm 2.
6. The final examination is for evaluation purposes only and will not be returned to students. You will be able to make arrangements with the instructor or with the department office to see your marked final examination after the final grades have been made available.

Deadline Policy:
A minimum of one week, but normally ten days, will be allowed for completion of all assignments. Late assignments will not be accepted. All assignments shall be submitted online.

Class Schedule:
10:05am-11:25am, Monday and Wednesday, 372 Residence Commons.

Lab Hours:
L1: 13:35am-14:25am, Wednesday, ME4233
L2: 13:35pm-14:25pm, Monday, ME4233
L3: 12:35am-13:25am, Monday, ME4233
L4: 10:05am-11:25pm, Tuesday, ME4233

Checking Marks:
Lists of term marks will be posted on dates to be announced. It is each student’s responsibility to check that marks are correct or report any errors by the specified deadline.

Course Schedule:
1. Introduction to Simulation
2. General Principles
3. Simulation Software
4. Statistical Models
5. Input Modeling
6. Random-Number Generation
7. Random-Variate Generation
8. Verification and Validation
9. Performance Estimation
Course Outline

10. Queueing Models
11. Variance Reduction Techniques
12. Special topics if time permit

General Regulations

Attendance: Students are expected to attend all lectures and lab periods. The University requires students to have a conflict-free timetable. For more information, see the current Undergraduate Calendar, Academic Regulations of the University, Section 2.1.3, Course Selection and Registration and Section 2.1.7, Deregistration.

Health and Safety: Every student should have a copy of our Health and Safety Manual. A PDF copy of this manual is available online: http://sce.carleton.ca/courses/health-and-safety.pdf

Deferred Term Work: Students who claim illness, injury or other extraordinary circumstances beyond their control as a reason for missed term work are held responsible for immediately informing the instructor concerned and for making alternate arrangements with the instructor and in all cases this must occur no later than three (3.0) working days after the term work was due. The alternate arrangement must be made before the last day of classes in the term as published in the academic schedule. For more information, see the current Undergraduate Calendar, Academic Regulations of the University, Section 4.4, Deferred Term Work.

Appeal of Grades: The processes for dealing with questions or concerns regarding grades assigned during the term and final grades is described in the Undergraduate Calendar, Academic Regulations of the University, Section 3.3.4, Informal Appeal of Grade and Section 3.3.5, Formal Appeal of Grade.

Academic Integrity: Students should be aware of their obligations with regards to academic integrity. Please review the information about academic integrity at: https://carleton.ca/registrar/academic-integrity/. This site also contains a link to the complete Academic Integrity Policy that was approved by the University's Senate.

Plagiarism: Plagiarism (copying and handing in for credit someone else's work) is a serious instructional offense that will not be tolerated.

Academic Accommodation: You may need special arrangements to meet your academic obligations during the term. You can visit the Equity Services website to view the policies and to obtain more detailed information on academic accommodation at http://www.carleton.ca/equity/ For an accommodation request, the processes are as follows:
- **Pregnancy or Religious obligation**: Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details see [https://carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf](https://carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf)

- **Academic Accommodations for Students with Disabilities**: The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or pmc@carleton.ca for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your **Letter of Accommodation** at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). **Requests made within two weeks will be reviewed on a case-by-case basis.** After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website (www.carleton.ca/pmc) for the deadline to request accommodations for the formally-scheduled exam (if applicable).

- **Survivors of Sexual Violence**: As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and where survivors are supported through academic accommodations as per Carleton’s Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: [https://carleton.ca/sexual-violence-support/](https://carleton.ca/sexual-violence-support/).

- **Accommodation for Student Activities**: Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, see [https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf](https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf)

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