Instructor:
Professor C. Huang
Room 4486ME
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Email: huang@sce.carleton.ca
http://www.sce.carleton.ca/faculty/huang.html

Prerequisites:
STAT 2605 or STAT 3502 and fourth-year status in Engineering, or permission of the Department

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. If time permits, special topics such as design of experiments and variance reduction techniques will be discussed.

Learning Outcomes:
1. know common probability models
2. know basic queueing models
3. know how to model inputs
4. know how to build simulation models
5. know how to plan and conduct simulations
6. know how to estimate system performance
7. know how to compare different design alternatives
8. know how to write a project report
9. know how to complete a project in a team
10. know how to use different software tools (MATLAB, GPSS, spreadsheet, etc.) to conduct simulation
11. know how to generate random variates

Graduate Attributes (GA’s):

1.4 Programming and Algorithms
2.1 Problem clarification
2.2 Assumptions
2.3 Validity
3.3 Synthesis and data interpretation
4.1 clear design goals
4.2 detailed design spec
4.3 Alternate solution
4.4 Design solution
4.5 Design implementation
5.3 Tools
5.5 Limitations of tools
The Canadian Engineering Accreditation Board requires graduates of engineering programs to possess 12 attributes. Activities related to the learning outcomes listed above are intended to develop students' competence in all GA's listed above. Data obtained from exam questions related to learning outcomes 1, 2, 3, 6, and 11 will be collected to assess students' progress towards achieving GA 1.4, 2.2, 2.3, 3.3, and 4.5.

In addition, data collected from project deliverables related to learning outcomes 3, 4, 5, 6, 7, 8, 9, 10, 11 will be used to assess GA 1.4, 2.1, 2.2, 2.3, 3.3, 4.1, 4.2, 4.3, 4.4, 4.5, 5.3, and 5.5.


References:


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


Marking Scheme:

<table>
<thead>
<tr>
<th>Component</th>
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<tbody>
<tr>
<td>Attendance</td>
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<td>Midterm 1</td>
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Notes:
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. 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:
8:35am-9:55am, Tuesday and Thursday, ME3380.

Lab Hours:
L1: 10:35am-11:25am, Thursday, ME4233
L2: 13:05pm-13:55pm, Tuesday, ME4233
L3: 10:35am-11:25am, Tuesday, ME4233
L4: 12:05pm-13:25pm, Monday, ME4233

TA Info:
Ahmed Abada, AhmedAbada@cmail.carleton.ca
Khoa Nguyen, KhoaTNguyen@cmail.carleton.ca

Office Hours:
TBD

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.

Plagiarism:
Plagiarism (copying and handing in for credit someone else's work) is a serious instructional offense that will not be tolerated. Please refer to the section on instructional offenses in the Undergraduate Calendar for additional information.

Review Week:
Accreditation of our Engineering programs requires that classes and laboratories, tutorials, or problem analysis sessions continue to run through the review period of the fall term. For 2019, the last day of normally scheduled classes falls on April 9, 2019.

Course Schedule:
1. Introduction to Simulation
2. Statistical Models
3. Input Modeling
4. General Principles
5. Simulation Software
6. Random-Number Generation
7. Random-Variate Generation
8. Simulation Examples
9. Verification and Validation
10. Performance Estimation
11. Queueing Models
12. Variance Reduction Techniques
13. 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 1.2, Course Selection and Registration and Section 1.5, 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 2.6, 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 2.7, Informal Appeal of Grade and Section 2.8, 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 obligation**: write to me 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)

- **Religious obligation**: write to me 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 pme@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). After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult [https://carleton.ca/pmc/students/dates-and-deadlines/](https://carleton.ca/pmc/students/dates-and-deadlines/) 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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