1. **Course:** CPSC 531: Systems Modelling and Simulation  
   **Lecture Sections:**  
   L01, MWF 12:00-12:50, ST 064, Majid Ghaderi, ICT 746, 210-3855, mghaderi@ucalgary.ca  
   Office Hours: MW 13:00-14:00 or by Appointment  
   **Course Website:** [http://www.ucalgary.ca/~mghaderi/cpsc531](http://www.ucalgary.ca/~mghaderi/cpsc531)

2. **Prerequisites:** CPSC 457 and one of MATH 321 or STAT 205 or 211 or 213 or 321  
   ([http://www.ucalgary.ca/pubs/calendar/current/computer-science.html#3620](http://www.ucalgary.ca/pubs/calendar/current/computer-science.html#3620))

3. **Grading:** The University policy on grading and related matters is described in sections F.1 and F.2 of the online University Calendar. In determining the overall grade in the course the following weights will be used:  
   - In-Class Quizzes: 10%  
   - Assignments: 30%  
   - Midterm Exam: 25%  
   - (Thursday October 22nd, 2015 at 18:00 in ST 147)  
   - Final Exam: 35%

   This course will have a Registrar's Scheduled Final Exam.  
   
Each of the above components will be given a letter grade using the official University grading system. The final grade will be calculated using the grade point equivalents weighted by the percentage given above and then reconverted to a final letter grade using the official University grade point equivalents.

4. **Missed Components of Term Work:** The regulations of the Faculty of Science pertaining to this matter are found in the Faculty of Science area of the Calendar. Section 3.6. It is the student's responsibility to familiarize themselves with these regulations. See also Section E.6 of the University calendar.

5. **Scheduled Out-of-Class Activities:** REGULARLY SCHEDULED CLASSES HAVE PRECEDENCE OVER ANY OUT-OF-CLASS-TIME ACTIVITY. If you have a clash with this out-of-class activity, please inform your instructor as soon as possible so that alternative assignments can be arranged.

6. **Course Materials:**

   - Discrete-Event System Simulation 5th Edition, Jerry Banks et al, Pearson (Recommended)  
   - **Online Course Components:** D2L and TopHat

7. **Examination Policy:** All exams are closed books. No aids, except a simple calculator, are allowed. Students should also read the Calendar, Section G, on examinations.

8. **Approved Mandatory and Optional Course Supplemental Fees:** None.
9. **Writing across the Curriculum Statement:** In this course, the quality of the student’s writing in the weighted components of the course will be a factor in the evaluation of these components. See also Section E.2 of the University Calendar.

10. **Human Studies Statement:** Students will be expected to participate as subjects or participants in projects. See also Section E.5 of the University Calendar.

11. **OTHER IMPORTANT INFORMATION FOR STUDENTS:**

   a) **Misconduct:** Academic misconduct (cheating, plagiarism, or any other form) is a very serious offense that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the University Calendar under Section K, Student Misconduct to inform yourself of definitions, processes and penalties.

   b) **Assembly Points:** In case of emergency during class time, be sure to FAMILIARIZE YOURSELF with the information on assembly points which can be found in each classroom and building.

   c) **Student Accommodations:** Students needing an Accommodation because of a Disability or medical condition should contact Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities available at http://www.ucalgary.ca/policies/files/policies/procedure-for-accommodations-for-students-with-disabilities_0.pdf. Students needing an Accommodation in relation to their coursework or to fulfill requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, preferably in writing, to the Associate Head of Computer Science. Dr. Ben Stephenson, by email bdstephe@ucalgary.ca or phone 403-220-6781.

   d) **Safewalk:** Campus Security will escort individuals day or night (http://www.ucalgary.ca/security/safewalk/). Call 403-220-5333 for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.

   e) **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). As one consequence, students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. For more information see also http://www.ucalgary.ca/secretariat/privacy

   f) **Student Union Information:** VP Academic (403) 220-3911 suvpaca@ucalgary.ca SU Faculty Rep (403) 220-3913 science1@su.ucalgary.ca, science2@su.ucalgary.ca and science3@su.ucalgary.ca. Student Ombuds Office: (403) 220-6420 ombuds@ucalgary.ca, http://ucalgary.ca/provost/students/ombuds

   g) **Internet and Electronic Device Information:** You can assume that in all classes that you attend your cell phone should be turned off unless instructed otherwise. All communications with other individuals via laptop computers, cell phones or other devices connectable to the internet in not allowed during class time unless specifically permitted by the instructor. If you violate this policy you may be asked to leave the classroom. Repeated abuse may result in a charge of misconduct.

   h) **U.S.R.I.:** At the University of Calgary feedback provided by students through the Universal Student ratings of Instruction (USRI) survey provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses (www.ucalgary.ca/usri). Your responses make a difference – please participate in USRI surveys.

Department Approval__________________________________________Date__________________________

Associate Dean’s Approval for out of regular class-time activity: __________________________________________________________________________Date:_________________________

*A signed copy of this document is kept on file in the Computer Science Main Office ICT 602*
**Tentative Topics Covered:**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Duration</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>1 week</td>
<td>• Introduction&lt;br&gt;• Performance evaluation&lt;br&gt;• Simulation</td>
</tr>
<tr>
<td>Probability Models</td>
<td>2 weeks</td>
<td>• Probability and random variables&lt;br&gt;• Probability mass/density functions&lt;br&gt;• Expectation, variance, covariance&lt;br&gt;• Probability distributions&lt;br&gt;• Discrete probability distributions&lt;br&gt;• Continuous probability distributions</td>
</tr>
<tr>
<td>Queuing Models</td>
<td>3 weeks</td>
<td>• Elements of a queue&lt;br&gt;• Deterministic queue&lt;br&gt;• Little’s law&lt;br&gt;• M/M/1 queue&lt;br&gt;• M/M/m queue&lt;br&gt;• M/G/1 queue&lt;br&gt;• Queuing networks&lt;br&gt;• Queuing networks</td>
</tr>
<tr>
<td>Discrete-Event Simulation</td>
<td>2 weeks</td>
<td>• Monte Carlo and Event-Driven simulations&lt;br&gt;• DES concepts and event scheduling&lt;br&gt;• Manual simulation&lt;br&gt;• Simulation program&lt;br&gt;• Simulation of a single server queue&lt;br&gt;• Simulation of a network of queues&lt;br&gt;• Validation &amp; verification</td>
</tr>
<tr>
<td>Random Numbers</td>
<td>1 weeks</td>
<td>• Random variate generation&lt;br&gt;• Random variate generation&lt;br&gt;• Random number generation</td>
</tr>
<tr>
<td>Output Analysis</td>
<td>2 weeks</td>
<td>• Stochastic nature of simulations&lt;br&gt;• Transient and steady-states&lt;br&gt;• Confidence interval</td>
</tr>
<tr>
<td>Input Modeling</td>
<td>2 week</td>
<td>• Histograms&lt;br&gt;• QQ plots&lt;br&gt;• Goodness-of-fit tests&lt;br&gt;• Chi square test&lt;br&gt;• Modeling without data</td>
</tr>
</tbody>
</table>