1. **Course:** CPSC 491: Techniques for Numerical Computation  
   **Lecture Sections:**  
   L01, MWF 9:00-9:50, Jon Rokne, ICT 714, 220-6016, rokne@ucalgary.ca  
   Office Hours: W 10:00-12:00  
   **Course Website:** [http://pages.cpsc.ucalgary.ca/~rokne/CPSC491/top_level_491.htm](http://pages.cpsc.ucalgary.ca/~rokne/CPSC491/top_level_491.htm)

2. **Prerequisites:** One of CPSC 319 or 331, one of MATH 211, 213, and one of MATH 249, 251, 265, 275, 281 or AMAT 217. ([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:  
   - Assignments 50%  
   - Midterm Exam 20%  
   - Final Exam 30%  
   (In-Class Wednesday February 17th, 2016)  
   This course will have a Registrar’s Scheduled Final Exam.  
   Special Regulations affecting the Final Grade: Each of the above components will be given a percentage based mark (0-100%). The final grade will be calculated using the weighted percentage based marks and converted to a final letter grade using the official University grad point equivalents. Students must attempt and achieve a passing grade in all the course components to get a C- or better for an overall term grade.

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:**  

7. **Online Course Components:**

8. **Examination Policy:** Closed book, No material or aids allowed. Students should also read the Calendar, Section G, on examinations.

9. **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:** See 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 fulfil 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 __________________________

   *A signed copy of this document is kept on file in the Computer Science Main Office ICT 602*
# CPSC 491 Percentage to Letter Grade Conversion Table

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A+</td>
<td>95-100</td>
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<tr>
<td>A</td>
<td>90-94</td>
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<tr>
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<td>D</td>
<td>45-49</td>
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<tr>
<td>F</td>
<td>0-44</td>
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Tentative Topics Covered:

The following is a synopsis of the lecture material and timelines planned for CPSC 491. The times for each topic are elastic and may be adjusted to accommodate student interest as well as the possible need for greater depth in selected topics.

1) **Introduction (1 week)**
   - Scientific computation, numerical computation and models

2) **Errors in numerical and scientific computation (1 week)**

3) **Systems of linear equations (2 weeks)**

4) **Linear least squares (2 weeks)**
   - Least squares for different bases, conditioning, errors and estimations. Approximation. SVD. Orthogonalization methods.

5) **Eigenvalue problems (2 weeks)**
   - Eigenvalues and eigenvectors. Characteristic polynomial, sensitivity, computational methods, the Google matrix. More SVD.

6) **Nonlinear equations (2 weeks)**

7) **Polynomial interpolation (1.5 week)**

8) **Numerical integration and differentiation (1.5 weeks)**
   - Numerical quadrature. Difference between:
     - Integration and differentiation and
     - Numerical integration and differentiation