



UNIVERSITY OF CALGARY  
FACULTY OF SCIENCE  
DEPARTMENT OF COMPUTER SCIENCE  
COURSE OUTLINE

1. **Course:** CPSC 491: Techniques for Numerical Computation

**Lecture Sections:**

L01, MWF 9:00-9:50, ST 059, Jon Rokne, ICT 714, 220-6016, [rokne@ucalgary.ca](mailto:rokne@ucalgary.ca)

Office Hours: W 10:00-12:00

**Course Website:** D2L

**Computer Science Department Office, ICT 602, 220-6015, [cpsc@cpsc.ucalgary.ca](mailto:cpsc@cpsc.ucalgary.ca)**

2. **Prerequisites:** CPSC 319 or 331, and MATH 211, or 213, and one of MATH 249, 251, 265, 275, 281, or AMAT 217  
(<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	40%
Midterm Exam	20%
( <i>In-Class Friday October 21<sup>st</sup>, 2016</i> )	
Final Exam	40%

This course **will** have a Registrar's Scheduled Final Exam.

Special Regulations affecting Final grade: None.

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:**

Scientific Computing: An Introductory Survey, Heath, *McGraw Hill*

**Online Course Components:**

See D2L.

7. **Examination Policy:** Closed book. A simple calculator will be 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](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.
- 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](mailto:suvpaca@ucalgary.ca) SU Faculty Rep (403) 220-3913 [science1@su.ucalgary.ca](mailto:science1@su.ucalgary.ca), [science2@su.ucalgary.ca](mailto:science2@su.ucalgary.ca) and [science3@su.ucalgary.ca](mailto:science3@su.ucalgary.ca), Student Ombuds Office: (403) 220-6420 [ombuds@ucalgary.ca](mailto: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](http://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: \_\_\_\_\_

Associate Dean's Approval for  
Alternate final examination  
arrangements: \_\_\_\_\_ 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**

A+	95-100
A	90-94
A-	85-89
B+	80-84
B	75-79
B-	70-74
C+	65-69
C	60-64
C-	55-59
D+	50-54
D	40-49
F	0-39

## **CPSC 491 Syllabus**

### **Learning Outcomes:**

By the end of the course: students will:

- The students will become familiar with eigenvalue and eigenvector problems for linear equations. They will be able to compute eigenvalues and eigenvectors of systems of equations using standard tools.
- The students will know how to solve linear least squares problems in one and more dimensions. They will know how to assess existence and uniqueness of linear least squares problems.
- The students will be presented with an introduction to scientific computing methodologies. They will acquire basic knowledge of errors in numerical computations. They will gain a basic understanding of computer arithmetic.
- The students will understand what is meant by stability and conditioning of linear equations and how these concepts affect how linear equations are solved.
- The students will acquire a basic understanding of linear equations in  $n$  dimensions and be able to assess the existence and uniqueness of solutions. They will become familiar with the standard direct elimination methods for linear equations.