

CISC271, Scientific Computing: Course Syllabus

Calendar Description:

Introduction to scientific computing: algorithm design, error analysis, ill-conditioning. Linear equations. Least-squares fitting. Non-linear equations. Effective use of library programs, with discussion of their limitations and some aspects of their design and implementation.

Learning Outcomes:

Number	Learning Outcome
1	Design and use algorithms for tabulated data
2	Design and analyze algorithms for solution of linear equations
3	Select, apply, and analyze solutions in basic machine learning
4	Solve problems in basic data analytics

Textbook:

We will use the text *Introduction to Linear Algebra, Fifth Edition* by Gilbert Strang. Earlier editions may have uncorrected errors and definitely differ in the problem sets that are found at the end of each section.

We will provide additional instructional material as needed and as appropriate.

Calculator Policy:

In accordance with Academic Regulation 9.2, only Casio 991 series calculators are pre-approved in tests. Any other calculator must be approved by the instructor at least one day before the test. A calculator needs only the basic five functions and must not have storage capability or communication capability. The use of a calculator is recommended but the tests are written with the intent that they can be answered without the use of a calculator.

Additional Syllabus Information

Please see the course's "Syllabus Addendum" for additional information on academic integrity, accommodation requests, extenuating circumstances, and relevant copyright protection.

Grading Method:

The grade in the course will be calculated numerically, then converted to a final letter grade according to the Queen's Official Grade Conversion Scale. The course grade will be weighted as 60% for in-class tests and 40% for assignments.

There will be 4 compulsory in-class tests, graded numerically. The lowest test grade will be weighted as 13% of the total test grade, with the other tests each weighted as 29% of the total test grade. A test that is missed will receive a grade of zero. Per Academic Regulation 6.1, students are expected to attend all classes and tests.

Assignments:

There will be several compulsory written assignments, based on MATLAB coding and a clear English answer to the assignment questions, each assignment receiving a numerical grade. The assignments will have varying numbers of marks that reflect the expected difficulty of the assignments, with easier assignments having fewer marks that contribute towards the final grade. Each assignment will be graded by a teaching assistant (TA) so a TA should be contacted first for any question regarding grading.

The policy for late assignments will apply starting immediately after the submission deadline, with the deadline being specified in the statement of the assignment. Marks will be deducted at a rate of 20% off the assignment value for each 24 hours that the assignment is late. Academic consideration for assignments will be managed on an individual basis.

Requests for re-grading of an assignment must be made within 72 hours of completion of grading, which will be determined by the time in onQ that general feedback for the assignment is provided. This will help us to ensure that we address each student's concerns in a timely manner.

Non-credit homework exercises will be given out in eight of the twelve weeks of the course. This homework will not be a formal part of the student assessment, but the solutions will be provided prior to in-class testing and will be selected to best guide students in preparing for the tests.

In-Class Tests:

The instructor has chosen a multiple-choice style of testing after careful consideration and study. One shortcoming of multiple-choice questions, as commonly given, is that there is no way for a student to communicate a degree of confidence in the answer. Another shortcoming, as commonly given, is that there is no way for a student to receive part marks for an answer. These shortcomings will be addressed by permitting more than one response to each question. A student can indicate a primary and a secondary response; the primary response will be worth more marks. If a student is highly confident of an answer to a question, and provides the correct answer as both a primary and secondary response, then the student will be awarded the sum of the marks for the responses. For example, if the primary response is worth 4 marks and the secondary response is worth 2 marks, then:

- A correct primary response will receive 4/6 marks
- A correct secondary response will receive 2/6 marks
- A correct combined response will receive 6/6 marks
- Both responses incorrect will receive 0/6 marks

Test Schedule:

The in-class tests are planned to occur during 4 Friday classes:

Test #1:	Jan 26	Week 3
Test #2:	Feb 16	Week 6
Test #3:	Mar 16	Week 9
Test #4:	Apr 5	Week 12

An entirely optional Test #5 – intended to provide academic consideration for students who have contacted Accommodations Services – will be offered after the last day of classes. This test will cover material in the first 3/4 of the course so it will be comprehensive in nature. If Test #5 is written then its grade will replace the lowest grade of the first 3 compulsory tests. Not only is it possible that a poor performance on the optional test can lower a student's overall grade: in previous years this has almost invariably happened, so the instructor recommends that the optional test not be treated as an opportunity for grade improvement. A student **must** apply to write this test, by email directly to the instructor, at least 7 calendar days prior to the optional test; this time will allow the instructor to copy the correct number of tests, to find a room for the test, and to ensure that proctoring of the test will proceed appropriately. No exception will be made for a student who does not apply in advance for the optional test. Academic consideration for Test #4 will be managed on an individual basis.

No Syllabus Changes:

Academic Regulation 7.2.1 requires that the instructor makes no changes to grade calculation “if the changes will disadvantage any student in the class”. Accordingly, *no request for re-weighting or additional work will be granted* other than for extenuating circumstances as described in the Faculty policy on academic consideration.