PHYSICS 234
Introductory Computational Physics

Instructor:	Dr. Kevin Beach	**Phone:**	492-7176
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Course objectives:

The goal of this course is to introduce students to scientific programming in C/C++ with an emphasis on code correctness and good programming style. A variety of basic algorithms and numerical methods will be taught, including regression, interpolation, polynomial fitting, Fourier analysis, numerical integration and differentiation, matrix manipulation, root finding, and optimization. Examples will be drawn from problems in physics.

Prerequisite courses:

PHYS 126 or 146 or EN PHYS 131, MATH 113 or 114, and MATH 102 or 120 or 125. Please speak to the instructor about having any of these requirements waived.

Lectures:	T 193, Monday, Wednesday, Friday, 12:00 – 12:50
Lab (H31):	CEB 324, Tuesday, 14:00 – 16:50
Lab (H71):	CEB 324, Thursday, 14:00 – 16:50

Office hours: Monday, Wednesday, Friday, 12:50 – 14:00 (or by appointment)

Textbook: There is no required text. The following, however, is available from the campus book store. I recommend it for students who are unfamiliar with C programming:

C++ Primer Plus, 5th Ed., Steven Prata, Sams (2004) ISBN-10: 0672326973

Students who have a serious interest in numerical methods and are looking for a useful reference text might also consider buying a copy of

Numerical Recipes: The Art of Scientific Computing, 3rd Ed.,
W. H. Press, S. A. Teukolsky, W. T. Vetterling, and B. P. Flannery,
Cambridge University Press (2007) ISBN-10:0521880688

Examination schedule:

Midterm exam:	T 193, Monday, February 14, 12:00 – 12:50
Final exam:	T 193, Tuesday, April 26, 14:00 – 17:00

Grading scheme:

Quizzes:	5%
Assignments:	20%
Lab Test:	15%
Midterm Exam:	20%
Final Exam:	40%

A curve appropriate for the class will be applied at the end of the term. The average mark is expected to be in the B range. This might be revised depending on the performance of the class as a whole.

Labs and assignments:

Attendance at weekly labs is mandatory. Students are encouraged to take this part of the course seriously as labs are the best opportunity they will have to develop their programming skills and to get hands-on experience with the UNIX computing environment.

Each lab covers a separate topic and includes both introductory exercises that can easily be completed in the allotted time and a small programming assignment that students are expected to complete later on their own. For five of the labs, the assignment portion will be collected and graded. An electronic version of each lab will be posted in advance on the class website. Students may work co-operatively at the level of discussing algorithms and general approaches, but each student should turn in his or her own, independent work. Be aware that any code copied from another student (even if it is disguised by cosmetic changes) is easily identified by our electronic submission system.

Quizzes, tests, and examinations:

From time to time, the class will begin with a brief quiz on the previous week's material. Each student's best five quizzes will count toward his or her final grade. There will be two substantial written examinations—a 50-minute midterm focussed entirely on C++ and a three-hour final devoted to algorithms and numerical methods—and a programming test scheduled during the last lab period.

University policy regarding academic offences:

"The University of Alberta is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the Code of Student Behaviour (online at www.ualberta.ca/secretariat) and to avoid any behaviour which could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University."