# Physics 342 – Computational Modeling and Analysis Fall 2023

**Course website** https://bright.uvic.ca Assignments and other material will be posted and completed assignments are to be uploaded to this website.

**Instructor** Dean Karlen karlen@uvic.ca (250) 721-6585
Office hours: Zoom drop-in or by appointment. Link on course website.

**Class schedule** Lectures: Monday, Thursday 8:30-9:50 (ECS 130)
Labs: Thursday 2:30-3:50 (CLE C108)

**Textbooks** The course notes for this course are available online.
Optional: Any reference textbook on Java and Python.

**Course objectives** The course introduces students to the use of computers in physical science research. Behaviours of simple and complex physical systems are simulated by applying numerical methods to solve ordinary differential equations. Complex systems with a degree of unpredictability are treated using the concept of probability. Much of the course is devoted to statistical methods used to deal with uncertainties present in experimental measurements. Students will use Java and Python for coursework and need to have experience with at least one of these programming languages.

**Topics** Numerical solutions to ordinary differential equations, probability theory, Monte Carlo methods, testing hypotheses, parameter estimation, errors and confidence intervals

**Grading** There are weekly lab assignments/exams, short online quizzes, in-class questions, and three written exams, including a final exam on the last class session, December 3. The final grade is determined as follows:

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|---|---|---|---|
| Online quizzes | 5% | In-class questions | 5% |
| Lab assignments | 30% | Midterm exams (2) | 30% |
| Lab exams (3) | 15% | Final exam | 15% |

The letter grades are obtained by converting the numerical scores as follows:

| F | D | C | C+ | B- | B | B+ | A- | A | A+ |
|---|---|---|---|---|---|---|---|---|---|
| 0-49 | 50-59 | 60-64 | 65-69 | 70-72 | 73-76 | 77-79 | 80-84 | 85-89 | 90-100 |

**Computer** Students need a reliable portable personal computer capable of running Java and Python with wireless networking for use in class, lab sessions, and for the lab exams.

**Calculator** For written exams, the departmental policy will be followed: the only acceptable calculator is the Sharp EL-510R which can be bought in the Bookstore for about $10.

**Course experience** Near the end of term you will be invited to complete an anonymous survey regarding your learning experience. The survey site is: http://ces.uvic.ca