P2820 Computational Mechanics Fall 2015

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Course website: http://www.physics.mun.ca/~entcho/P2820

Overview: Students will use computers to solve physics problems, with a focus on classical mechanics problems of increasing complexity. The course will cover some numerical techniques and working with data. The programming language will be Mathematica.

Lecture Topics: (estimated number of lectures in parentheses)
Introduction to Mathematica (1)
Reexamining some physics problems from first year mechanics (3)
Projectile motion (2)
Central forces (2)
Numerical differentiation and integration (2)
Numerical solution of ODE's; Euler, midpoint, Runge-Kutta (2)
Oscillators: SHO, damped and driven oscillators, pendulum, coupled oscillators (3)
Wave Equation (2)
Curve fitting; working with data (2)

Some lecture periods will be devoted to in-class exercises and time to work on assignments.

Classes: Tuesday and Thursday 2:00-3:15 pm, room C2045 (C2039)

Labs: Tuesday and Thursday 3:30-5:00 pm, room C2039

Required Software: The software required for the course, Mathematica, is available for purchase from http://www.wolfram.com/solutions/education/students/.

Recommended Textbook: Boccara, Nino (2007), Essentials of Mathematica with applications to mathematics and physics, Springer. This book is available as an ebook through the library.

Evaluation:

- 15% Assignments (Seven)
- 5% In-class Assignments
- 10% Laboratories (Ten)
- 10% Midterm Exam I (Thursday, October 15, 2015)
- 10% Midterm Exam II (Thursday, November 12, 2015)
- 50% Final Examination

See course webpage or university calendar for information regarding medical notes.