

COURSE OUTLINE Physics 3C03

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Preamble: This course is a sequel to Physics 2E03, or Physics 2D03. Its purpose is to extend and deepen your knowledge of non-relativistic classical mechanics, especially the aspects which are related to quantum physics. I am assuming that the majority of students have taken Physics 2E03, and possibly Physics 2C03, as well as a first level physics course. If anyone has taken Physics 2D03, there will be some overlap in rigid body dynamics.

Text: (can be purchased from Titles for approx. \$33.00.)

Classical Mechanics (Fifth Edition) T.W.B. Kibble and F.H. Berkshire
Imperial College Press, ISBN 978-1860944352.

Outline: Here is a general outline. A more detailed version can be found on the course website.

1. Brief review of Newtonian mechanics.
2. Accelerated coordinate systems.
3. Lagrangian mechanics.
4. Small oscillations and normal modes.
5. Rigid body dynamics, Euler's equations, motion of tops.
6. Hamiltonian mechanics, canonical transformation of variables, Hamilton-Jacobi theory, Poisson brackets, quantization.
7. Classical chaos.

Evaluation: Problems will be assigned and graded bi-weekly. There will be a mid-term test on or about March 1, and a final exam in April. Grades will be based on a 0-100 scale and converted to letter grades only after the final mark is calculated as follows:

Problems 10
Mid-Term 30
Final 60

You must pass one of the tests in order to pass the course. In the event that your test mark is higher than the final exam mark, I will consider a more equal weighting of the two. Your effort in doing the problems will be taken into account in the weighting.

You may use the standard pocket calculator during exams.

The Senate Policy Statements on page 32 of the 2011-12 Undergraduate Calendar apply. (See also next page.)

The University Senate requires that students be shown the instruments of torture when commencing any course:

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Academic dishonesty consists of misrepresentation by deception or by other fraudulent means, and can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads “Grade of F assigned for academic dishonesty”), and/or suspension or expulsion from the university. It is your responsibility to understand what constitutes academic dishonesty. For information on the various kinds of academic dishonesty please refer to the Academic Integrity Policy, specifically Appendix 3, located at

<<http://www.mcmaster.ca/univsec/policy/AcademicIntegrity.pdf>>

The following examples illustrate only three forms of academic dishonesty:

1. Plagiarism, e.g. the submission of work that is not one’s own or for which credit has been obtained previously.
2. Improper collaboration in group work.
3. Copying or using unauthorized aids in tests and examinations.

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Last but not least: The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes. For further information see the Undergraduate Course Management policies at <http://www.mcmaster.ca/univsec/policy/UGCourseMgmt.pdf>

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