

*No Text Required*

Prerequisite: PHYS 2212K

This course provides an introduction to the use of computers in solving physics problems, and towards that end it also provides a practical level of knowledge of the primary software package being used. Mathcad is the primary tool used in this course; the version installed on our lab computers is Mathcad 14. SPSU has a 100-seat license for Mathcad 14, and the software is also available on several other computers around campus. Much of what we do, however, can also be done on earlier versions of this software.

This software has the advantages that it is relatively easy to use, has minimal syntax requirements, is fast and powerful, has both numeric and symbolic capabilities, includes good graphics packages, and is capable of producing documents that are readable and attractive. Computational physics has traditionally focused on "number crunching". This course does maintain that focus but also makes considerable use of the symbolic processing features that are included in the software.

A large portion of the course will be focused on learning to use the software. The applications of this package will be physics problems. Much of the physics content should be familiar to you from the PHYS 22XX course sequence; however, some new physics material will be introduced in this course. Some new mathematics will also be introduced. This content should remain useful to you when you take additional physics courses.

Most of the handout materials will be Mathcad documents. Some of the materials will be available on-line at the following web address: [www.spsu.edu/science/physics/thackston](http://www.spsu.edu/science/physics/thackston). The files at this location will be either Mathcad or .pdf files. You may, from time to time, find it useful to extract materials from the Mathcad files for use in your own worksheets. The Mathcad files are stored as compressed xml documents; Mathcad 14 is needed to utilize these files.

The grades for this course will be derived from a series of problem assignments, which will be paired with the various explanatory handouts. The due date and points available will be included with each assignment. The final letter grade will be determined by dividing the total points obtained on the assignments by the number of points available. There are no tests and no final exam.

Completed assignments must be submitted in printed form. Note: it is assumed that students will discuss their work in this course with one another. Discussion, however, does not include copying another's work or the production of collaborative solutions. All work submitted that is an obvious copy of another student's work will be awarded a grade of zero; this will apply to both submissions. There will be no opportunity for re-working the assignment or making up the grade.

Do not save your work on any lab computer's hard drive. This might make it possible for another student to access and copy (or modify) your work. [See the above statement regarding copied work.] It is also likely that the computer, in the process of refreshing the "lab image", will delete your work if you do save it on the hard drive.

The last day to withdraw with a grade of 'W' is Tuesday, October 13.

Students completing this course will be able to:

- (1) use Mathcad to perform calculations related to the solution of a variety of physics problems.
- (2) solve algebraic equations involved in physics problems using a computational symbolic engine, such as the one contained in Mathcad.
- (3) apply numeric differential equation solvers to the analysis of physical situations.
- (4) run programs simulating physical processes with appropriate inputs.
- (5) interpret the output of programs simulating physical processes.

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M, T, Th 3:00 -- 3:50