

# PH4390 Fall 2009 Ulrich H.E. Hansmann

**Office hours: Fisher 110, Wed. and Fri. 4:00 - 5:00 p.m.**

**Book: “Numerical Recipes”, 3rd ed (Press/Teukolsky/Vetterling/Flannery)**

## **Aim of the course:**

Experience the use and limitations of computers in solving problems in physics. Emphasis will be put on the development of good programming skills and an understanding of the sources of errors and potential pitfalls.

## **Course Grade:**

At the end of the third week will be an exam (1h) focusing on programming concepts. Place and date of the exam will be announced in class and on blackboard (web-site).

Up to five computational exercises and one project will be assigned during the semester. All assignments have to be completed on individual basis. You may consult books, but you may **not** copy program code. You will be asked to explain your code, and demonstrate its working.

You need to turn in **all** exercises before you get a project assigned. Projects are assigned to groups of two, but each student will be evaluated separately. The project includes a 10 min presentation of your work and results, and a written report.

The course grade will be based on your scores from the test (20%), exercises (30%) and the project (50%). For each of the components you will be given a numerical grade in the form of the percentage point. The letter grades will be based on the following scheme:

A	≥ 88	C	= 65-73
AB	= 86 - 87	CD	= 63 - 64
B	= 76 - 85	D	= 55 - 62
BC	= 74 - 75	F	= 0 - 54

An unexcused absence from the exam, or a exercise/project not turned in timely, will be graded zero. The exam will be closed books.

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<sup>0</sup>MTU complies with all federal and state laws and regulations regarding discrimination, including the Americans with Disabilities Act of 1990 (ADA). If you have a disability and need a reasonable accommodation for equal access to education or services at MTU, please call the Associate Dean of Students, at 487-2212. For other concerns about discrimination, you may contact your advisor, department head/chair, or the Affirmative Action Office

## **SCHEDULE:**

**Week 1:** Introduction into basics of computational science, computers, operating systems and programming.

**Week 2-3:** Basic programming concepts

**Week 4:** Roots of functions

**Week 5-6:** Numerical Integration

**Week 6-7:** Ordinary Differential Equations

**Week 8:** Molecular Dynamics

**Week 9:** Monte Carlo Integration

**Week 10-13:** Project

**Week 14:** Project presentation