MATH089: FYS - Literate Scientific Computing

Course Info

Computational modeling of natural phenomena has become a cornerstone of scientific inquiry, completing the traditional methods of theory construction and experimentation. The distinctive feature of scientific computation is exhaustive testing of our understanding of well-defined theoretical models, to an extent that is not possible without machines to rapidly carry out arithmetic operations. This seminar will introduce students to the art of successful scientific simulation. Simple models from the physical, biological, and social sciences will be introduced, given correct mathematical formulations, implemented in computer code, and analyzed. Concepts from the sciences, mathematics, and programming will be introduced as needed with no formal prerequisites beyond typical high school material. The objective will be to produce 'live' computational documents that serve as virtual experiments for some field of scientific inquiry.

Prerequisites: none

Course goals: students will acquire an appreciation of the efficacy of numerical simulation of natural phenomena, and proficiency in algorithm design and implementation.

Title	**MATH089: FYS: Literate Scientific Computation**
Times	TuTh 11:00AM-12:15 PM, Graham Memorial 38
Office hours	W 1:00-2:00 PM, MF 11:00AM-12:00PM, CP451
Instructor	Sorin Mitran

Honor Code:

- All homework is individual. You may discuss various approaches to homework problems with students, instructors, but must draft your answers by yourself
- The final project will be carried in small groups of 3-4 students

Grading

Required work

- Homework - 8 assignments x 10 points = 80 points
- Final Project - 20 points

Mapping of point scores to letter grades

Grade	**Points**	**Grade**	**Points**	**Grade**	**Points**	**Grade**	**Points**
		B+,H-	86-90	C+,	71-75	D+	56-60
A	96-100	B	81-85	C	66-70	D	50-55
A-	91-95	B-	76-80	C-	61-65	F	0-49

Bibliography

There is no required course text. Lecture notes will be provided as the course progresses.

Lectures, reading assignments

Students are requested to carefully read notes periodically posted here prior to the specified class date.

Week	**Tuesday**	**Thursday**

1	-	1/9 L1
2	1/14 L2	1/16 L3
3	1/21 L4	1/23 L5
4	1/28 L6	1/30 L7
5	2/4 L8	2/6 L9
6	2/11 L10	2/13 L11
7	2/18 L12	2/20 L12
8	2/25 L13	2/27 L14
9	3/4 L15	3/6 L16
10	3/18 L17	3/20 L18
11	3/25 L19	3/27 L20
12	4/1 L21	4/3 L22
13	4/8 L23	4/10 L24
14	4/15 L25	4/17 L26

Homework

Nr.	Issue Date	Due Date	Topic	Problems	Solutions
1	1/16	1/23			
2	1/23	1/30			
3	1/30	2/6			
4	2/6	2/13			
5	2/13	2/20			
6	2/20	2/27			
7	3/20	4/3			
8	4/3	4/17			