Physics 373 Intro to Computational Physics

Dr. Sabri Elatresh

Term 222: 2023



Physics 373 **Department of Physics** King Fahd University of **Petroleum & Minerals**

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Course Description:

Computer Simulation of Physical systems. Topics covered: simulation techniques; programming methods; comparison of ideal and realistic systems; limitations of physical theory; behavior of physical systems.

Pre-requisite: PHYS 212 and ICS 101 (or 102 or 103)

Lecture Hours: UT (12:00-12:50)
LAB Hours: W (12:00-2:50 PM)

Office Hours: UMT (01:00-1:50 PM)

Textbook: "Computational Physics: Problem Solving with Computers", by Landau, Paez & Bordeianu, Wiley (2012)".

Supplementary Books:

- (A)Numerical Analysis, Ninth Edition. Richard L. Burden and J. Douglas Faires
- (B)Python For Everyone, 2rd Edition, Cay S. Horstmann, Rance D. Necaise

Grading Policy

Grading Policy	%
Classwork Quizzes (10%) + LAB work (15%)	25
Projects	15
MidTerm Exam	30
Final Exam	30
Total	100

Attendance Policy:

1. PHYS 373 course is offered in person. Class attendance and participation are required.

A DN grade shall be given to the student who has more than 12 unexcused absences in lectures.

Course Learning Outcomes PHYS-373

On completion of the course, the student should be able to:

- Design and implement working Python code.
- Understand the basic principles of numerical methods and their application to solving physics problems.
- Be able to write computer programs to solve physics problems numerically.
- Be able to use numerical methods to model physical systems and analyze the results.
- Understand the limitations of numerical methods and the trade-offs between accuracy and computational time.
- Be able to critically evaluate the results of numerical simulations and compare them to analytical solutions and experimental data.
- Understand the importance of parallel computing and distributed computing in computational physics.
- Be familiar with the use of common programming languages and software packages used in computational physics.

1 15 Jan Introduction to Computational Physics. No Lab Programs: Language and Structure 2 22 Jan Error Analysis and Uncertainties Programming with python	Week	Date	Topics	Lab Assignment		
2 22 Jan Error Analysis and Uncertainties Programming with	1	15 Jan	Introduction to Computational Physics.	No Lab		
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Physics 373 Lecture Schedule Spring 2023 (Term 222)