Jordan University of Science and Technology

Faculty of Science & Arts

Physics Department

PHY303 Computational Physics - JNQF Level: 7
Second Semester 2023-2024

Course Catalog
3 Credit Hours. This course is designed to use computer programming to solve scientific problems in physics. Introduction to Fortran or Mathematica or any suitable programming languages and main computational tools which permit to simulate and analyze the dynamic behavior of a wide range of physical problems involving fluids, solids, mechanics, electricity and magnetism, quantum systems, differentiation and Integration, ordinary differential equations, data fitting, and plotting.
Teaching Method: Blended

Text Book	
Title	1. A First course in computational physics
Author(s)	Paul L. DeVries
Edition	1st Edition
Short Name	1
Other Information	

Course References

Short name	Book name	Author(s)	Edition	Other Information
2	2. Computational physics	Morten Hjorth-Jensen	1st Edition	
3	Special softwares	variable authors	1st Edition	

Instructor	
Name	**Dr. Adnan Shariah**
Office Location	PH3 L1
Office Hours	
Email	shariah@just.edu.jo

Class Schedule & Room
Section 1: Lecture Time: Sun, Tue : 12:30 - 13:30 Room: M3306

Prerequisites		
Line Number	**Course Name**	**Prerequisite Type**
923511	PHY351 Quantum Mechanics(1)	Pre./Con.

Tentative List of Topics Covered		
Weeks	**Topic**	**References**
Week 1	Introduction to computational physics	From **1**, From **2**
Weeks 2, 3	computer programing	From **1**
Weeks 4, 5	software and calculators for special purposes	From **1**, From **2**
Weeks 6, 7	Solving system of linear equations	From **1**, From **3**
Weeks 8, 9	Integration and Differentiation	From **1**, From **3**
Weeks 10, 11, 12	Solving problems in mechanics, fluids, electricity and magnetisim, quantum mechanics	From **1**, From **3**
Weeks 13, 14	simulation of systems in semiconductors and solar cells	From **1**, From **3**
Weeks 15, 16	data fitting and plotting.	From **1**, From **3**

Mapping of Course Outcomes to Program Outcomes and NQF Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Strengthen the students understanding of the basic physical concepts in computational physics [3SLO1(K1S1)] [1L7K1, 1L7S1]	45%	
An ability to write a program code to solve physical problems numerically. [3SLO2(S23C1)] [1L7S2, 1L7S3, 1L7C1]	35%	
Enhance the ability of students to communicate results and ideas through writing and presenting scientific reports. [1SLO4(C3)] [1L7C3]	10%	
Practice students skills at working cooperatively within a group to achieve solutions to given problems. [3SLO6(S2C3)] [1L7S2, 1L7C3]	5%	
Students will be able to comply with the computer ethics code and social responsibility rules. [1SLO5(C4)] [1L7C4]	5%	

Relationship to Program Student Outcomes (Out of 100%)					
SLO1(K1S1)	SLO2(S23C1)	SLO3(C24)	SLO4(C3)	SLO5(C4)	SLO6(S2C3)
45	35		10	5	5

Relationship to NQF Outcomes (Out of 100%)						
L7K1	L7S1	L7S2	L7S3	L7C1	L7C3	L7C4
22.5	22.5	14.17	11.67	11.67	12.5	5

Evaluation	
Assessment Tool	**Weight**
Midterm Exam	30%
HW	25%
Final Exam	40%
Ethical issues	5%

Policy	
Student Behavior	Student Behavior: As students in a technical program are preparing for a professional career, all students are expected to conduct themselves, in both manner and dress, as professionals. Eating, drinking, or the consumption of any tobacco products is prohibited during class meetings (lecture hall, classroom, laboratory, or field). Doing so may result in the student's dismissal from that class period and will count as an unexcused absence. Cell phones, pagers, and similar devices must be turned off during the instruction time. Use of or disruption of the class by these devices will result in the confiscation of the device by the instructor and may result in the student's dismissal from that class period which will count as an unexcused absence. The confiscated device may be retrieved by University Police.
Attendence	Students are required to attend scheduled lectures, labs, and field trips; and to work on class and lab/field assignments as scheduled by the professor. Students are required to attend their scheduled sections for labs, lectures, and examinations (unless authorized by the professor). Since class sessions start on the hour, students are expected to be punctual. There will be no late entries once a class has begun. In this case, the student's absence will be counted as unexcused and will receive a zero for any assignments due. If a student must leave class early during a regularly scheduled meeting, he/she must discuss reasons with the professor. If a student must miss a scheduled class meeting due to an acceptable, verifiable time conflict, he/she must resolve the time conflict prior to class. Students failing to call ahead or discuss absences prior to the class will be unexcused. If a student accumulates four unexcused absences, he/she will be given the option of dropping the course or receiving a failing grade for the semester.
Honesty Policy & Discipline (Due Process)	Honesty and integrity are major elements in professional behavior and are expected of each student. Any assignment (including those in electronic media) submitted by a student must be of the student's original authorship. Representation of another's work as his/her own shall constitute plagiarism. Cheating, in any form, is considered unacceptable behavior within all University courses. Students having academic problems should consult with their adviser or a college counselor. Instances of cheating will be dealt with in accordance with University policy. Standards of academic honesty and due process procedures for JUST are located in the Rules, Regulations & Expectations section of the student handbook.

Safety Guidelines	Certain class assignments may require the student to be absent from the professor's immediate supervision. Whether the student is under immediate supervision or not, safe conduct and safe use of equipment shall be the ultimate rule. Failure to comply with prudent safety practices and/or willful disregard for class participants and/or equipment may be cause for immediate dismissal from that particular class session by the professor.
Students with-Disabilities	If you have a disability, (physical or psychological) and require reasonable accommodations to enable you to participate in this course, such as note-takers, readers, or extended time on exams and assignments, please contact the Physics Department Office, and also see me during the first two weeks of class to provide you with information and review appropriate arrangements for reasonable accommodations.

Date Printed: 2024-02-24