



Course Specification

(Bachelor)

Course Title: Computational Physics

Course Code: PHYS 0475

Program: BSc in Physics

Department: Physics

College: Science

Institution: Majmaah University

Version: 2024

Last Revision Date: 20 /12/ 2024



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A. General information about the course:

1. Course Identification

1. Credit hours: 3(3, 0, 0)

(3 + 0 + 0)

2. Course type

A. University College Department Track Others

B. Required Elective

3. Level/year at which this course is offered:

4. Course General Description:

The course introduces important physics underlying semiconductor materials and devices. Discusses methods for phenomena and behavior of semiconductors and introduces the key technological important mechanism that counts in optimization of devices.

5. Pre-requirements for this course (if any):

AI in Physics PHYS 0374

6. Co-requisites for this course (if any):

None

7. Course Main Objective(s):

- Provide the student with a detailed understanding of the principles and operation of semiconductor devices.
- Enable the student to understand the methods by which semiconductors may be produced and characterized.
- Illustrate how groundbreaking physics has led to advanced technologies.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	45	100
2	E-learning		
3	Hybrid <ul style="list-style-type: none"> • Traditional classroom • E-learning 		
4	Distance learning		



3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	
5.	Others (specify)	
Total		45

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.3	To understand the Physics concepts at an advanced level for solving complex problems.	K3	<ul style="list-style-type: none"> Lectures Group Discussion Exercises 	<ul style="list-style-type: none"> Mid Exams Bb discussions & participations Final Exam Homework
2.0	Skills			
2.2	Apply the Physics theories and draw relations with research on related topics	S2		
2.4	Explain to a general audience and experts in the field with concepts and results	S4	<ul style="list-style-type: none"> Problem solving Class discussion 	<ul style="list-style-type: none"> Final Exam Homework Quizzes
3.0	Values, autonomy, and responsibility			
3.3	Work effectively in group	V3	<ul style="list-style-type: none"> Discussion with students Making students aware about time 	<ul style="list-style-type: none"> Presentation Discussion and Homework

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
			management in completing their assignments. <ul style="list-style-type: none"> Encourage students to help each other. Group presentation/ Group assignments	

C. Course Content

No	List of Topics	Contact Hours
1.	An Introduction to Scientific Computing	3
2.	Choosing a Programming Language	9
3	Matrices and Solutions to Linear Equations using a Programming Language	9
4	Numerical Solution of ODEs Equations using a Programming Language	9
5	Numerical Integration using a Programming Language	12
6	Review	6
7	Examinations	
Total		45

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Homework-1 (Assignment, Problem solving),	2	3
2.	Quiz -1	3	5
3.	Homework- 2 (Assignment, Problem solving)	4	4
4.	Mid-term-1 Examination	6	15
5.	Quiz -2	8	5
6.	Homework -3 (Assignment, Problem solving)	9	3
7.	Electronic Quiz	10	10
8.	Mid-term-2 Examination	12	15
9.	Final Exam	16-18	40
Total			100

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).





E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Computational Physics: Problem Solving with Computers, R. H. Landau and M. J. Páez, Publisher John Wiley & Sons Inc (11 August 1997)
Supportive References	Computational Physics 2nd Edition, Giordano and Nakanishi Publisher Pearson; 2nd edition (July 21, 2005)
Electronic Materials	Saudi Digital Library (SDL)
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
<p>facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)</p>	<ul style="list-style-type: none"> Classroom (must be same for same subject) Seminar room with multimedia
<p>Technology equipment (projector, smart board, software)</p>	<p>Computer lab for (e-Quiz)</p> <ul style="list-style-type: none"> Blackboard (BB) software / login White board MS software suite Origin Graphic software Smart board with maintains feedback
<p>Other equipment (depending on the nature of the specialty)</p>	<p>Laptop, Desktop and printer with accessories.</p> <p>Library, Seminar Room, and Wi-Fi /internet connections.</p>

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Internal Reviewer committee	Direct
Effectiveness of Students' assessment	Students	Indirect
Quality of learning resources	Peer Reviewer	Direct
The extent to which CLOs have been achieved	Qiyas Center, Stakeholder and Others	Direct
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Department council
REFERENCE NO.	16





DATE

30/12/2024

