COURSE DESCRIPTION FORM

INSTITUTION FAST School of Computing, National University of Computer and Emerging Sciences, Islamabad

PROGRAM(S) TO BE EVALUATED BS (CS,DS,AI,CYB,SE) Fall 2025

Course Description

(Fill out the following table for each course in your computer science curriculum. A filled out form should not be more than 2-3 pages.)

Course Code	NS 1001
Course Title	Applied Physics
Credit Hours	3
Prerequisites by Course(s) and Topics	Nil
Grading Policy	Absolute grading policy
Policy about missed assessment items in the course	Retake of missed assessment items (other than midterm/ final exam) will not be held. For a missed midterm/ final exam, an exam retake/ pretake application along with necessary evidence are required to be submitted to the department secretary. The examination assessment and retake committee decides the exam retake/ pretake cases.
Course Plagiarism Policy	Plagiarism in project or midterm/ final exam may result in F grade in the course. Plagiarism in an assignment will result in zero marks in the whole assignments category.
Assessment Instruments with Weights (homework, quizzes, midterms, final, programming assignments, lab work, etc.)	*100% Theory* Assessment items of Theory Part

Assessment Item	Number	Weight (%)
Assignments	5	10
Quizzes	6	10
Sessional 1	1	15
Sessional 2	1	15
Final Exam	1	50

Course Instructors	Mrs. Aisha Ijaz,Dr.Mehwish Hassan, Tashfeen Zehra, Kashif Ali
Lab Instructors (if any)	NA
Course Coordinator	Mrs.Aisha Ijaz
URL (if any)	
Current Catalog	Vectors, Newtonian Mechanics, Waves and Oscillations, Basics of EMT,

Description	Introduction of Semiconductors.
Textbook	***Halliday & Resnick* Fundamentals of Physics (Extended 10th Edition),** Jearl Walker, © 2013 John Wiley & Sons Inc.
Reference Material	**Physics for scientist and Engineers Randall D. Knight, 3rd ed.**
Course Learning Outcomes	**A. Course Learning Outcomes (CLOs)** At the completion of the course, the students shall be able to: CLO:1 Use knowledge of scalars and vectors quantities along with operation of basic operators on it to help them in computer graphics CLO:2 Use the Newtonian Mechanics having application in game programming along with simulations CLOL:3 Use oscillations and analyze different types of waves graphically & mathematically. CLO:4 Obtain understanding of basic concepts of electromagnetism. CLO:5 Define basic concepts of semiconductor physics to help them in advance course of digital logic design. After completion of the course, the students shall be able to: 1. **Discuss** the essential role of civic engagement in building strong and resilient communities. (C2) 2. **Propose** community service initiatives that promote national and societal benefits. (A3) 3. **Perform** a community service project that encompasses ethical considerations and civic responsibilities. (A2) 4. **Apply** collaborative skills, including negotiation, conflict resolution, and teamwork, for effective implementation of community service projects. (C3)

B. Program Learning Outcomes	
For each attribute below, indicate whether this attribute is covered in this course or not. Leave the cell blank if the enablement is little or non-existent.	
1. Academic Education	Completion of an accredited program of study designed to prepare graduates as computing professionals
2. Knowledge for Solving Computing Problems	Apply knowledge of computing fundamentals, knowledge of a computing specialization, and mathematics, science, and domain knowledge appropriate for the computing specialization to the abstraction and conceptualization of computing models from defined problems and requirements
3. Problem Analysis	Identify, formulate, research literature, and solve complex computing problems reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines

4. Design/ Development of Solutions	Design and evaluate solutions for complex computing problems, and design and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations
5. Modern Tool Usage	Create, select, adapt and apply appropriate techniques, resources, and modern computing tools to complex computing activities, with an understanding of the limitations
6. Individual and Team Work	Function effectively as an individual and as a member or leader in diverse teams and in multi-disciplinary settings
7. Communication	Communicate effectively with the computing community and with society at large about complex computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, and give and understand clear instructions
8. Computing Professionalism and Society	Understand and assess societal, health, safety, legal, and cultural issues within local and global contexts, and the consequential responsibilities relevant to professional computing practice
9. Ethics	Understand and commit to professional ethics, responsibilities, and norms of professional computing practice
10. Life-long Learning	Recognize the need, and have the ability, to engage in independent learning for continual development as a computing professional

C. Mapping of CLOs on PLOs
(CLO: Course Learning Outcome, PLOs: Program Learning Outcomes)

		PLOs									
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
CLOs	1	✔	✔								
	2	✔	✔								
	3	✔	✔								
	4	✔	✔								
	5	✔	✔								

Topics covered in the course with number of lectures on each topic (assume 15 weeks of instruction and 1.5 hour lecture duration)

Topics	Lectures
Graphical and Mathematical realization of vectors and its components,	2 Lectures
Vector operations, curl and divergence	2

		Lectures
	Linear Motion, free falling bodies	2 Lecture
	Motion in 2D/3D , Projectile motion, Uniform circular motion &relative emotion	2 Lectures
	Newton laws, contact forces , basic concept of force, mass , weight,	2 Lectures
	Application of Newton's laws	2 Lectures
	Oscillations(simple, harmonic, damped and forced), waves and its types	3 Lectures
	• *Principle of superposition, standing waves, Analogue and digital signals* • *Fundamental of electrostatics, field and forces,*	*2 Lectures* 3 LECTURES
	Current and current density, voltage and resistance, ohm's law	*2Lectures*
	Capacitor &Resistor and Kirchhoff's law ,	*2Lectures*
	Electric circuits, circuit element, DC	*2 Lectures*
	Semiconductor physics	*3Lectures*
	Transistors, logic gates	*2 Lectures*
	Each lecture is 1.5 hrs	

Laboratory Projects/Experiments Done in the Course	No			
Programming Assignments Done in the Course	No			
Class Time Spent per Week (in percentage)	**Theory (%)**	**Problem Analysis (%)**	**Solution Design (%)**	**Social and Ethical Issues (%)**
	60min	30min		
Oral and Written Communications	Every student is required to do problems given in class.			

COURSE CONTENTS

Weeks	Contents/ Topics	Courseware Events (Lab/ Case Study/ Quiz/ Assignment/ Project/ Presentation/ Research Report/ Term Paper etc.)	Comments (if any)
Week-01	Graphical and Mathematical realization of vectors and its components, unit vectors, vector operations (addition, subtraction/dot product)		
Week-02	Curl /divergence on vectors, problem solving, Linear motion (speed, distance, velocity , acceleration), free falling bodies, problem solving	Assignment 1,Quiz 1	
Week-03	Linear motion (speed, distance, velocity , acceleration), free falling bodies, problem solving Motion in 2D/3D, projectile motion, problem solving, uniform circular motion, relative motion		
Week-04	Motion in 2D/3D , projectile motion, problem solving, uniform circular motion, relative motion Newton's three laws, types of forces and related concepts, weight, mass, tension, spring force, friction, drag force, collision	Assignment 2,Quiz 2	
Week-05	Newton's three laws, types of forces and related concepts, weight, mass, tension, spring force, friction, drag force, collision Sessional Exam -1	Quiz 3	
Week-06	Applications of Newton's law	Sessional -I	
Week-07	Oscillations(simple harmonic, damped, forced), Waves(frequency, amplitude, phase, wavelength)types of waves, Mathematical representation of wave		
Week-08	Principle of superposition of waves, interference of waves, standing waves, Analogue and digital signal	Assignment 3, Quiz 4	
Week-09	Graphical representation of composite waves, analogue and digital signals, Frequency and amplitude and phase modulation		
Week-10	Electric charge, Coulomb's law and application, electric field, field due to point charges and dipole.	Assignment 4,Quiz 5	
Week-11	Current, voltage, resistance, Ohm's law, Capacitors, Resistors in series and in parallel, Kirchhoff' law		
Week-12		Sessional -II	
Week-13	Electric circuits(single/Multi loop), Circuit elements, Polarity, Direct current circuits	Assignment 5	
Week-14	Semiconductor physics , band theory, pn junctions, diodes	Quiz 6	
Week-15	Transistorslogic gates		
Week-16	logic gates		

Laboratory Projects/Experiments Done in the Course	-

Programming Assignments Done in the Course				
Class Time Spent on (in credit hours)	**Theory**	**Problem Analysis**	**Solution Design**	**Social and Ethical Issues**
	20	25		0
Oral and Written Communications				