University of Information Technology & Sciences (UITS)
Faculty of Science & Engineering
Department of CSE

Course Outline; Autumn 2025 (July-December)
Natural Science (Physics)

Part – A : General Information

Program	:Bachelor of Science in Computer Science and Engineering (B. Sc. in CSE)
Course Title	: Engineering Physics
Course Code	:PHY-0533111
Type of Course	: Non-Departmental Course
Offered to	: Department of CSE
Pre-requisite Course(s)	: N/A
Course Code	:PHY-0533111
Semester	: Autumn 2025
Level (Year $ Semester)	: 1st Year, 1st Semester
Section	: 1A
Credit Hour	: 3.0 Cr
Class Hours & Class Room No	: Tuesday10:00-11:00am, (Room No-510) : Thursday : 2:00pm-4:00 pm (Room No-509)
Consultation Hours(expected time)	: Sunday-Wednesday : 2:00pm-3:00 pm
Course Teacher's Name & Designation	: Dr. Mst. Muslima Zahan, Lecturer of Physics & Additional Director , UITS Research Center
Office / Room No	: 517-A [5th Floor] &606 [6th Floor]
Email	: muslima.zahan@uits.edu.bd
Mobile No	: 01911967130

Course Outline; Autumn 2025 (July-December)
Natural Science (Physics)

Part – A : General Information

Program	:Bachelor of Science in Computer Science and Engineering (B. Sc. in CSE)
Course Title	: Engineering Physics
Course Code	:PHY-0533111
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Offered to	: Department of CSE
Pre-requisite Course(s)	: N/A
Course Code	:PHY-0533111
Semester	: Autumn/ 2025
Level (Year $ Semester)	: 1st Year, 1st Semester
Section	: 1B
Credit Hour	: 3.0 Cr
Class Hours & Class Room No	: Sunday : 8:00-9:00am, (Room No-603) : &Thursday: 8:00-10:00 am (Room No-509)
Consultation Hours(expected time)	: Sunday-Wednesday : 2:00pm-3:00 pm
Course Teacher's Name & Designation	: Dr. Mst. Muslima Zahan, Lecturer of Physics & Additional Director , UITS Research Center
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Level (Year $ Semester)	: 1st Year, 1st Semester
Section	: 1C
Credit Hour	: 3.0 Cr
Class Hours & Class Room No	: Monday: 08:00 am-09:00 am(Room No-412) :Wednesday :11:00am-1:00pm, (Room No-202) : &Thursday: 01:00pm - 2:00pm (Room No-202)
Consultation Hours(expected time)	: Sunday-Wednesday : 2:00pm-3:00 pm
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Part-B : Structure of the Course Curriculum	
Start of Semester	: 01 July, 2025
End of Semester	: 30 December, 2025
Duration of Semester	: Six months
Total Class	: 18 Weeks; (54 Cr- hrs)

- Total time distribution for major academic activities

Segment	*Period*	*Length*
Classes	Week 1 to Week 7	7 Weeks
Mid Term	Week 8	1 Weeks
Classes	Week 9 to Week 15	7 Weeks
Preparatory leave and final examination	Week 16-18	3 Weeks

Part-C : Course Details

❖ Course Content

Waves and Oscillations: Waves and oscillation, Differential equation of SHM, Combinations of harmonic motions with special cases. Energy considerations in SHM, Spring-Mass system, Simple pendulum, Torsional pendulum, compound pendulum, Two-body oscillations, Reduced mass, forced oscillation and resonance, Progressive wave, Standing waves, construction of standing wave.

Heat and Thermodynamics: Temperature, heat and work, Zeroth law of thermodynamics, temperature scales, first law of thermodynamics with applications. Ideal gas, Thermodynamic processes, second law of thermodynamics, Carnot's theorem, Carnot's Cycle, Heat engine, calculation of entropy for reversible and irreversible processes. Third law of thermodynamics, T-S diagram, Thermodynamic functions, Maxwell relations, Clausius Clapeyron's equation.

Kinetic theory of Gases: Kinetic theory of gases, kinetic calculation of the pressure, kinetic interpretation of temperature, degrees of freedom, Maxwell's law of Equipartition of energy, mean free path. Maxwell's distribution of molecular speeds, Specific heat of an ideal gas.

Optics: Classification of lens, power of a lens, focal length, equivalent focal length, aberration. Theories of light, wave front, Hygen's principle of wave propagation with application. Double refraction, Critical angle, Total internal reflection, Snell's law, refractive index, Principle of superposition, Interference of light, Coherent source, different methods for producing coherent source, Young's double slit experiment, Condition of dark and bright fringe, Fresnel biprism, Michelson Interferometer, Newton's ring experiment, Diffraction, Fraunhofer diffraction by single slit and Double slit, condition of maxima and minima, Diffraction grating, resolving power, grating, dispersive power, Polarization, Classification of polarized light. Production and analysis of polarized light. Double refraction, Optical activity, Brewster's law, Malus Law.

- Course Objectives

Objective-1: To Develop logical and critical thinking with scientific knowledge of physical optics, waves & oscillation, and heat and thermodynamics required for the students of CSE.

Objective-2: To understand the different laws of Physics associated with physical optics, waves & oscillation, and heat and thermodynamics and apply them to solve the real life problems.

- Rationale of the Course

This course introduces the students to the basic concepts of waves, optics and thermal physics. To help students develop an understanding of the principles taught as well as analytical problem-solving ability. To Gain an understanding of the basic principles and the experimental basis of the various fields of physics and the logical relationships of the various fields.

❖ Course Learning Outcomes (CLO)

Upon completion of the subject, students will be able to:

CLO1	Relate position, velocity, and acceleration in simple harmonic motion.
CLO2	Describe laws of thermodynamics, kinetic theory of gases, waves and oscillation, reflection, refraction, interference, diffraction, polarization of light.
CLO3	Solve problems with moderate mathematical complexity related to propagation of periodic waves, thermodynamics, kinetic theory of gasses and properties of light.

❖ Mapping Course Learning Outcomes (CLOs) with the PLOs

Course Learning Outcomes (CLOs)	Program Learning Outcomes (PLOs)											
	1	2	3	4	5	6	7	8	9	10	11	12
CLO1	√											
CLO2	√											
CLO3		√										

❖ Mapping Course Learning Outcomes (CLOs) with the Teaching-Learning & Assessment Strategy

CLOs	Teaching-Learning Strategy	Assessment Strategy
CLO1	Lectures, Discussion with the students, Demonstration, Problem Solving in the class, Interactive teaching, Question and Answer.	Class Tests, Mid Term exam
CLO2	Lectures, Discussion with the students, Demonstration, Problem Solving in the class, Interactive teaching, Question and Answer.	Class Tests, Term Final Exam
CLO3	Lectures, Discussion with the students, Demonstration, Problem Solving in the class, Interactive teaching, Question and Answer.	Class Tests, Term Final Exam

Part-D: Evaluation

➢ Teaching Learning Strategy:Lecture, Hand notes, Books

➢ Assessment Strategy:

- Class Participation: Class participation and attendance will be recorded in every class.

- Continuous Assessment: Continuous assessment any of the activities such as class test, quizzes, assignment etc. The scheme of the continuous assessment for the course will be declared on the first day of the classes.
- Mid Term Examination: Mid Term examinationwill be held at the middle (3rdmonth) of the semester following the guideline of academic Council.
- Final Examination: A comprehensive term final examination will be held at the end of the term following the guideline of academic Council.

➢ Linkage of CO with Assessment Methods & their Weights:

CO	Assessment Method	(%)
1	Class Performance/ Attendance	10
1-3	Class Tests / Assignment	120
1-3	Mid-term Exam	20
1-3	Final Exam	50

➢ Marks Distribution on Cos and POs

Assessment method	Marks	Marks Distribution on Cos and POs				
		CO1	CO2	CO3		
		PO1	PO2	PO3		
Class Performance/ Attendance	10	10				
Class Tests / Assignment-1	20	3	7			
Class Tests / Assignment-2		2	8			
Mid-term Exam	20	2	18			
Final Exam	50	10	38	2		
Total	100				100	

Lesson Plan-

Week	Class No	Topic	Lesson	Method of Teaching	Activities
1-3	**1**	Introduction & Objective	Discussion on Discipline, Grading system, Exam protocol, Scholarship and stipend policy, course outline, Book references, Orientation, Objective of the course, Basic idea of waves & oscillations	Slide & Board	° Conducting Class ° student's class performance & feedback
	2-9 **9classes**	Waves and oscillations	❖ **Mathematical Orientation of Oscillatory systems and their development :** ° Differential equation of simple harmonic oscillator, ° combination of simple harmonic oscillations, ° types of wave, transverse and longitudinal nature of waves, ° Differential equation of stationary and standing (progressive) wave, ❖ **Energy distribution and two body of oscillatory systems:** ° total energy and average energy, , ° two body oscillation, ° reduced mass, ❖ **Situation under different conditions with different damping aspects:** ° damped oscillation, ° forced oscillation, ° resonance ❖ **Different measurable parameters (like time period) of different pendulums-** ° Simple pendulum, ° compound pendulum, ° Torsion pendulum, ° spring-mass etc.	Slide & Board	° Conducting Class ° student's class performance & feedback ° **Class Test/ Assignment-1**
Midterm Exam on Waves and Oscillations					

Week	Class No	Topic	Lesson	Method of Teaching	Activities
4-7	**10-21** **12 classess**	Heat & Thermo-dynamics	❖ **Thermal Physics with Kinetic theory of gases:** ° Kinetic theory of gases; ° Kinetic interpretation of temperature, ° specific heats of ideal gases, ° equipartation of energy, ° mean free path, ° Maxwell's distribution of molecular speeds, ❖ **Laws of Thermodynamics:** The first law, second law and third law of thermodynamics and their applications ❖ **Different Thermodynamics Process:** ° isothermal and adiabatic process, ° work done by gas, reversible and irreversible processes, ° Carnot's cycle, ° efficiency of Carnot engine, Carnot's theorem, ° entropy, ❖ **Functions with mathematical orientations & mathematical developments:** ° Thermodynamic functions, ° Maxwell relations, ° Clausius and Clapeyron equation. °	Slide & Board	° Conducting Class ° student's class performance & feedback ° **Class Test/ Assignment-2**

8-12	**22-31** **10 classes**	Optical Physics	❖ ❖ **Theories of light & behavior of light** ❖ **Properties of light as Interference**: ° Young's double slit experiment, ° Newton's rings, interferometers ❖ **Properties of light as Diffraction** ° Diffraction by single slit, ° diffraction at double slit and N-slits, ° diffraction grating,	,,	Conducting Class ° student's class performance & feedback ° **Class Test/ Assignment-3**
	32-36 **5classess**	,, ,,	❖ **Properties of light as Polarization (with respective theories and laws):** ° Production and analysis of polarized light, ° Brewster's law, ° Malus law, ° polarization by double refraction, ° **Polarization with device and tools:** ° Nicol prism, ° Polarimeters.	,, ,,	° Conducting Class ° student's class performance & feedback ° **Class Test/ Assignment-4**
13-15	**37-45**	**Revision of the course, problem solution, examination related discussion and feedback from students**			

Grading System		
Numerical Grade	**Letter Grade**	**Grade Point**
80 % & Above	**A^+ (A Plus)**	**4.00**
75% to less than 80%	**A (A regular)**	**3.75**
70% to less than 75%	**A^- (A minus)**	**3.50**
65% to less than 70%	**B^+ (B plus)**	**3.25**
60 % to less than 65%	**B (B regular)**	**3.00**
55 % to less than 60%	**B^- (B minus)**	**2.75**
50% to less than 55%	**C^+ (C plus)**	**2.50**
45% to less than 50%	**C (C regular)**	**2.25**
40% to less than 45%	**D**	**2.00**
less than 40%	**F**	**0.00**
	I	**Incomplete**

Recommended Books:

1. Physics, Vol . :1 by Resnick and Halliday / by - Resnick and Halliday and Krane

2. Waves & Oscillations, , by N Subrahmanyam and Brij Lal

3. Heat & Thermodynamics, , by N Subrahmanyam and Brij Lal

3. Optics, by N Subrahmanyam and Brij Lal

4. Physics for Engineeris by Prof. Dr. Giasuddin Ahmad

5. Hossain, T.: A Text Book on Heat

6. University Physics. By Young Freedman