KRISHASAMY COLLEGE OF SCIENCE, ARTS, AND MANAGEMENT FOR WOMEN, CUDDALORE-607109

Department of Physics

Academic Year – (2023-2026)

Course Outcomes& Mapping

Semester I

Subject : Properties of Matter and Acoustics
Subject Code : 23UPHYC13
Course Outcome

After attending the course, the student will be able to

CO1	Relate elastic behavior in terms of three moduli of elasticity and working of torsion pendulum.
CO2	Able to appreciate concept of bending of beams and analyze the expression, quantify, and understand nature of materials.
CO3	Explain the surface tension and viscosity of fluid and support the interesting phenomena associated with liquid surface, soap films provide an analogue solution to many engineering problems.
CO4	Analyze simple harmonic motions mathematically and apply them. Understand the concept of resonance and use it to evaluate the frequency of vibration. Set up experiment to evaluate frequency of ac mains
CO5	Understand the concept of acoustics, importance of constructing buildings with good acoustics. Able to apply their knowledge of ultrasonics in real life, especially in medical field and assimilate different methods of production of ultrasonic waves

Mapping with Program Outcomes

Map course outcomes **(CO) for** each course with program outcomes **(PO)** in the 3-pointscaleof STRONG (**S**), MEDIUM (**M**) and LOW (**L**).

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	M	M	S	M	M	S	M	S
CO2	M	S	S	S	M	M	S	M	S	S
CO3	S	M	S	M	S	S	M	S	S	S
CO4	S	S	S	S	S	M	S	M	M	M
CO5	M	M	S	S	M	S	S	S	S	M

Subject : Practical - I
Subject Code : 23UPHYP14

At the end of the course, the student will be able to:

CO1	Understand and determine accurately the length, radius by using screw gauge and vernier calipers.
CO2	Grasp and find the Young's modulus, rigidity modulus of solid materials
CO3	Recognize and estimate the surface tension and interfacial properties two immiscible liquids.
CO4	Appreciate and measure the internal friction between the layers of the liquid.
CO5	perform experiments in sonometer and verification of laws of transverse vibrations.

Mapping with Program Outcomes

Map course outcomes **(CO)** for each course with program out comes **(PO)** in the 3-point scale of STRONG (**S**), MEDIUM (**M**) and LOW (**L**).

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	S	S	S	S	S	M	S	M
CO2	M	S	S	S	M	S	S	M	M	M
CO3	S	S	S	M	S	S	S	M	S	M
CO4	S	S	S	S	S	S	S	M	M	M
CO5	S	M	S	S	S	S	S	M	M	S

Subject : Chemistry for Physical Sciences–I

Subject Code: 23UCHEE15

Course Outcomes

At the end of the course, the student will be able to:

CO1	Gain in-depth knowledge about the theories of chemical bonding, nuclear reactions and its applications.
CO2	Evaluate the efficiencies and uses of various fuels and fertilizers
CO3	Explain the type of hybridization, electronic effect and mechanism involved in the organic reactions.
CO4	Apply various thermodynamic principles, systems and phase rule
CO5	Explain various methods to identify anappropriate method for th separation of chemical components

Mapping with Program Outcomes

Map course outcomes **(CO)** for each course with program out comes **(PO)** in the 3-point scale of STRONG (**S**), MEDIUM (**M**) and LOW (**L**).

CO/PSO	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**

CO1	3	3	3	3	3
CO2	3	3	3	3	3
CO3	3	3	3	3	3
CO4	3	3	3	3	3
CO5	3	3	3	3	3
Weightage	15	15	15	15	15
Weighted percentage of Course Contribution to POs	3.0	3.0	3.0	3.0	3.0

Subject : Chemistry for Physical Science Practical –I
Subject Code: 23UCHEEP1
Course Outcomes

At the end of the course, he student will be able to:

CO1	How to be safe in chemistry laboratory and handle chemicals carefully
CO2	To gain an understanding of the use of standard flask and volumetric pipettes, burette
CO3	To carryout, record an interpret the results of volumetric titration.
CO4	Apply their skill in the analysis of water / hardness
CO5	Describe the various methods to identify an appropriate method for the separation of chemical components

Mapping with Program Outcomes Map course outcomes **(CO)** for each course with program out comes **(PO)** in the
3-point scale of STRONG (**S**), MEDIUM (**M**) and LOW (**L**).

CO/PSO	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**
CO1	3	3	3	3	3
CO2	3	3	3	3	3
CO3	3	3	3	3	3
CO4	3	3	3	3	3
Weightage	12	12	12	12	12
Weighted percentage of Course Contribution to PSOs	3.0	3.0	3.0	3.0	3.0

Course : (Foundation Course) Introductory Physics
Course Code : 23UPHYF17
Course Outcomes:
At the end of the course, the student will be able to:

CO	**CO1**	Apply concept of vectors to understand concepts of Physics and solve problems

	CO2	Appreciate different forces present in Nature while learning about phenomena related to these different forces.
	CO3	Quantify energy in different process and relate momentum, velocity, and energy
	CO4	Differentiate different types of motions they would encounter in various courses and understand their basis
	CO5	Relate various properties of matter with their behaviour and connect them with different physical parameters involved.

Mapping with Program Outcomes

Map course outcomes **(CO)**for each course with program outcomes**(PO)**inthe3-pointscaleofSTRONG(**S**),MEDIUM(**M**)and LOW(**L**).

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	S	S	S	S	S	M	S	M
CO2	M	S	S	S	M	S	S	M	M	M
CO3	S	S	S	M	S	S	S	M	S	M
CO4	S	S	S	S	S	S	S	M	M	M
CO5	S	M	S	S	S	S	S	M	M	S

Semester II

Course: Heat, Thermodynamics and Statistical Mechanics
Course Code: 23UPHYC23
Course Outcomes:

At the end of the course, the student will be able to:

COURSEOUTCOMES	**CO1**	Acquires knowledge on how to distinguish between temperature and heat. Introduce him/her to the field of thermometry and explain practical measurements of high temperature as well as low temperature physics. Student identifies the relationship between heat capacity and specific heat capacity. The study of Low temperature Physics sets the basis for the students to understand cryogenics, superconductivity, superfluidity and Condensed Matter Physics
	CO2	Derive the efficiency of Carnot's engine. Discuss the implications of the laws of Thermodynamics in diesel and petrol engines
	CO3	Able to analyze performance of thermodynamic systems viz efficiency by problems. Gets an insight into thermodynamic properties like enthalpy, entropy
	CO4	Study the process of thermal conductivity and apply it to good and bad conductors. Quantify different parameters related to heat, relate them with various physical parameters and analyse them
	CO5	Interpret classical statistics concepts such as phase space, ensemble, Maxwell-Boltzmann distribution law. Develop the statistical interpretation of Bose-Einstein and Fermi-Dirac. Apply to quantum particles such as photon and electron

Mapping with Program Outcomes

Map course outcomes **(CO)** for each course with program outcomes**(PO)**inthe3-pointscaleofSTRONG(**S**),MEDIUM(**M**)and LOW(**L**).

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	M	S	M
CO2	M	S	S	S	M	S	S	M	M	M
CO3	S	S	S	M	S	S	S	M	S	M
CO4	S	S	S	S	S	S	S	M	M	M
CO5	S	S	M	S	S	S	M	M	S	M

Course: Practical – II
Course Code: 23UPHYP24
Course Outcomes:

At the end of the course, the student will be able to:

COURSEOUTCOMES	**CO1**	Understand and determine accurately the elevation, depression of a loaded wooden bar using travelling microscope.
	CO2	Grasp and find the Young's modulus, rigidity modulus of some selected solid materials
	CO3	Recognize and estimate the density and frequency of AC supply using sonometer.
	CO4	Appreciate and measure the thermal properties such as specific heat and thermal conductivity of solids.
	CO5	perform experiments in potentiometer, Melde's apparatus, and deflection magnetometer

Mapping with Program Outcomes
Map course out comes **(CO)** for each course with program out comes **(PO)** inthe3-pointscaleofSTRONG(**S**), MEDIUM (**M**) and LOW (**L**).

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	M	S	M
CO2	M	S	S	S	M	S	S	M	M	M
CO3	S	S	S	M	S	S	S	M	S	M
CO4	S	S	S	S	S	S	S	M	M	M
CO5	S	M	S	S	S	S	S	M	M	S

Course Learning Outcomes (for Mapping with Pos and PSOs)
On completion of the course the students should be able to

CO1: Write the IUPAC name for complex, different theories to explain the bonding in coordination compounds and water technology
CO2: Explain the preparation and property of carbohydrate, amino acids and nucleic acids.
CO3: Apply/demonstrate the electrochemistry principles in corrosion, electro plating and fuel cells.
CO4: Identify the reaction rate, order for chemical reaction and explain the purpose of a catalyst.

CO5: Outline the various type of photo chemical process.

Level of Correlation between PSO's and CO's

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	3	3	3	3	3
CO2	3	3	3	3	3
CO3	3	3	3	3	3
CO4	3	3	3	3	3
CO5	3	3	3	3	3
Weightage	15	15	15	15	15
Weighted percentage of Course Contribution to PSOs	3.0	3.0	3.0	3.0	3.0

Course: Chemistry for Physical Sciences–II
Course Code: 23UCHEE25
Course Outcomes:

At the end of the course, the student will be able to:

COURSEOUTCOMES	CO1	Write the IUPAC name for complex, different theories to explain the bonding in coordination compounds and water technology.
	CO2	Explain the preparation and property of carbohydrate, amino acids and nucleic acids.
	CO3	Apply/demonstrate the electro chemistry principles in corrosion, electroplating and fuel cells.
	CO4	Identify the reaction rate, order for chemical reaction and explain the purpose of a catalyst.
	CO5	Identify the reaction rate,order for chemical reaction and explain the purpose of a catalyst.

Mapping with Program Outcomes

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5

CO1	3	3	3	3	3
CO2	3	3	3	3	3
CO3	3	3	3	3	3
CO4	3	3	3	3	3
Weightage	12	12	12	12	12
Weightedpercentageof CourseContribution toPSOs	3.0	3.0	3.0	3.0	3.0

Level of Correlation between PSO's and CO's

CO/PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	3	3	3	3	3
CO2	3	3	3	3	3
CO3	3	3	3	3	3
CO4	3	3	3	3	3
Weightage	12	12	12	12	12
Weightedpercentageof CourseContributiontoPOs	3.0	3.0	3.0	3.0	3.0

Semester III

Course: Optics and Laser Physics
Course Code: 23UPHYC33
Course Outcomes:

At the end of the course, the student will be able to:

COURSE OUTCOMES	**CO1**	Outline basic knowledge of methods of rectifying different defects in lenses, articulate technological applications of eyepieces
	CO2	Discuss the principle of superposition of wave, use these ideas to understand the wave nature of light through working of interferometer
	CO3	Extend the knowledge about nature of light through diffraction techniques; apply mathematical principles to analyse the diffraction.
	CO4	Interpret basic formulation of polarization and gain knowledge about polarimeter, appraise its usage in industries
	CO5	Relate the principles of optics to field of Laser and understand their operation and application in industries

Mapping with Program Outcomes

Map course outcomes **(CO)** for each course with program outcomes **(PO)** in the 3-point scale of STRONG(**S**), MEDIUM (**M**) and LOW (**L**).

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	M	S	M	M	M	S	S	M	M
CO2	M	S	M	S	M	S	M	M	S	S
CO3	S	M	S	S	S	M	S	S	M	M
CO4	S	M	S	M	M	S	M	M	S	M
CO5	S	M	S	M	S	S	M	S	S	S

Course: Mathematics 1

Course Code: 23UMATE35

Course Outcomes:

Mapping with Program Out Comes:
Map course outcomes **(CO)** for each course with program outcomes **(PO)** in the3-point scale of STRONG (**S**), MEDIUM (**M**) and LOW (**L**).

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	M	S	S	S	S	S	M	S	S
CO2	M	S	M	S	M	M	S	M	M	M
CO3	S	M	S	M	S	M	M	S	S	S
CO4	S	S	S	S	M	S	S	M	M	M
CO5	S	M	M	S	S	M	S	M	M	S

Course: Skill Enhancement Course-4 Home Electrical Installation

Course Code: 23UPHYS36

Course Outcomes:
At the end of the course, the student will be able to:

COURSE OUTCOMES	**CO1**	Understand the use of electrical meters, passive devices
	CO2	Know the production and transmission of electricity
	CO3	Appreciate domestic wiring and household appliances
	CO4	Be aware of power rating and energy calculations
	CO5	To realize the precautions and safety measures while handling electricity.

Mapping with Program Outcomes

Map course outcomes **(CO)** for each course with program outcomes **(PO)** in the 3-point scale of STRONG (**S**), MEDIUM (**M**) and LOW (**L**).

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	M	S	M
CO2	M	S	S	S	M	S	S	M	M	M
CO3	S	S	S	M	S	S	S	M	S	M
CO4	S	S	S	S	S	S	S	M	M	M
CO5	S	M	S	S	S	S	S	M	M	S

Semester IV

Course: Core Industry Module Electricity, Magnetism and Electromagnetism

Course Code: 23UPHYC43

Course Outcomes:

At the end of the course, the student will be able to:

COURSEOUTCOMES	**CO1**	Describe capacitors, various thermo-electric effects and their properties.
	CO2	Apply Biot and Savart law to study the magnetic effect of electric current.
	CO3	Use Faraday and Lenz laws in explaining self and mutual inductance.
	CO4	Analyze the time variation of current and potential difference in AC circuits.
	CO5	Relate different physical quantities used to explain magnetic properties of materials and describe electromagnetic wave.

Mapping with Program Outcomes

Map course out comes **(CO)** for each course with programme outcomes **(PO)** in the 3-point scale of STRONG(**S**), MEDIUM (**M**) and LOW (**L**).

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	M	S	M
CO2	M	S	S	S	M	S	S	M	M	M
CO3	S	S	S	M	S	S	S	M	S	M
CO4	S	S	S	S	S	S	S	M	M	M
CO5	S	S	M	S	S	S	M	M	S	M

Course: Mathematics 2

Course Code: 23UMATE45

Course Outcomes:

On successful completion of the course, the students will be able to

CO1: Attain knowledge on finding the expansions of trigonometric functions and concept of hyperbolic and inverse hyperbolic functions.

CO2: Provide a basic knowledge of Partial Differential equations and develops knowledge on handle practical problems.

CO3: Adopt techniques in solving problems involving vector and scalar functions

CO4: Provide skills on finding derivatives and gradients on vector differentiation and Integration.

CO5: Understand the applications of differentiation and integration in real life situation.

Outcome Mapping:

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	2
CO2	3	2	3	3	2
CO3	3	3	3	3	2
CO4	3	3	3	3	2
CO5	2	3	3	3	2

1-Low 2-Moderate 3- High

Course: Skill Enhancement Course – 6: Astrophysics
Course Code: 23UPHYS46
Course Outcomes:

At the end of the course, the student will be able to:

COURSE OUTCOMES	**CO1**	Understand the principle of telescopes and their operation and parameters, types of telescopes, detectors and image processing and advanced space telescopes.
	CO2	Grasp the ideas behind Solar system, inter planetary distances, meteors, meteorites, comets, asteroids, belt, cloud, gravitational waves and recent advances in astrophysics.
	CO3	Recognize the Physics behind Eclipses and types of eclipses, solar and lunar eclipse, structure of the Sun.
	CO4	Appreciate the Stellar Evolution process,birth & death of star, pulsars, black holes, supernovae, Galaxies, dark matter, evolving universe.
	CO5	perform any three of the activities related to the astrophysics.

Mapping with Program Outcomes
Map course outcomes **(CO)** for each course with program outcomes **(PO)** in the 3-point scale of STRONG (**S**), MEDIUM (**M**) and LOW (**L**).

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	S	S	S	S	S	M	S	M

CO2	M	S	S	S	M	S	S	M	M	M
CO3	S	S	S	M	S	S	S	M	S	M
CO4	S	S	S	S	S	S	S	M	M	M
CO5	S	M	S	S	S	S	S	M	M	S

Semester V

Course: General Mechanics And Classical Mechanics

Course Code: 23UPHYC51

Course Outcomes:

At the end of the course, the student will be able to:

COURSEOUTCOMES	**CO1**	Understand the Newton's Law of motion, understand general theory of relativity, Kepler's laws and realize the basic principles behind planetary motion
	CO2	Acquire the knowledge on the conservation laws
	CO3	Apply conservation law and calculate energy of various systems, understand, and differentiate conservative and non-conservative forces
	CO4	Gain knowledge on rigid body dynamics and solve problems based on this concept
	CO5	Appreciate Lagrangian system of mechanics, apply D' Alemberts principle

Mapping with Program Outcomes

Map course outcomes **(CO)** for each course with program outcomes **(PO)** in the3-point scale of STRONG(**S**), MEDIUM (**M**) and LOW (**L**).

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	S	M	S	S	S	M	S	S
CO2	S	S	S	M	S	M	S	S	S	M
CO3	S	S	S	S	S	S	M	S	M	S
CO4	M	S	S	S	M	S	S	M	S	S
CO5	S	S	M	S	S	M	S	S	S	M

Course: ATOMIC AND NUCLEAR PHYSICS

Course Code: 23UPHYC52

Course Outcomes:

At the end of the course, the student will be able to:

COURSEO UTCOMES	**CO1**	**Define** Pauli's exclusion principle **and know about Vector atom model and** different coupling sachems.
	CO2	**Outline**origin of atomic spectra, explain Zeeman effect – Paschen-Back effect – Stark effect.

	CO3	**Explain the properties of alpha beta and gamma rays and their spectra**
	CO4	**Explain**liquid drop model and the shell mode of a nucleus outline the artificial radioactivity and applications of radio isotope.
	CO5	**Understand the concept of elementary particles know about**quarks and cosmic rays.

Mapping with Program Outcomes:

Map course outcomes **(CO)** for each course with program outcomes **(PO)** in the 3-point scale of STRONG(**S**), MEDIUM (**M**) and LOW (**L**).

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	S	S	S	S	S	M	S	M
CO2	S	S	M	S	M	S	S	M	M	M
CO3	S	S	S	M	S	S	M	S	S	S
CO4	M	S	S	S	S	M	S	M	M	M
CO5	S	M	S	S	M	S	S	M	M	S

Course: Analog Electronics

Course Code: 23UPHYC53

Course Outcomes:

On completion of the course the students will be able to:

1. work with semiconductors, p-n junction and special diodes
2. know the transistor, its Characteristics and transistor amplifier
3. apply feedback principle, understand oscillators and multivibrators
4. understand the operation and importance of some special semiconductor devices
5. acquire idea on Operational Amplifier IC and its applications

Mapping with Program Outcomes

Map course outcomes **(CO)** for each course with program outcomes **(PO)**inthe3-pointscaleof STRONG (**S**),MEDIUM(**M**)and LOW(**L**).

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**

CO1	S	S	S	M	S	S	S	M	S	S
CO2	S	S	S	M	S	M	S	S	S	M
CO3	S	S	S	S	S	S	M	S	M	S
CO4	M	S	S	S	M	S	S	M	S	S
CO5	S	S	M	S	S	M	S	S	S	M

Course: Communication Physics

Course Code: 23UPHYE56-1

Course Outcomes:

Upon successful completion of this course, students will be able to

CO1	understand the wireless radio communication and modulation methods and receiver principles.
CO2	Know the physical idea behind optical fiber communication, transmission losses and advantages over conventional copper cables.
CO3	recognize the different types of Radar equipment and their operation.
CO4	explain the satellite communication, transponder assembly, Indian satellites.
CO5	Describe mobile cellular communication 4G, fax, VSAT, IPTV, Wireless fidelity.

Mapping With Program Out Comes:

Map course outcomes **(CO)** for each course with program outcomes **(PO)** in the 3-point scale of STRONG (**S**), MEDIUM (**M**) and LOW (**L**).

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	S	M	S	S	S	M	S	S
CO2	S	S	S	M	S	M	S	S	S	M
CO3	S	S	S	S	S	S	M	S	M	S
CO4	M	S	S	S	M	S	S	M	S	S
CO5	S	S	M	S	S	M	S	S	S	M

Course: Lasers and Fiberoptics

Course Code: 23UPHYE56-3

Course outcomes:

Upon successful completion of this course, students will be able to

CO1	know the principle of Laser mechanism.

CO2	study the different varieties of Laser and their operation.
CO3	recognize the applications Laser in in industry and medical fields.
CO4	know more about transmission of signal fiber optic cable, different types of fiber and their characteristics.
CO5	speak about the cable losses, cable splicing equipment.

Mapping with Program Outcomes

Map course outcomes **(CO)** for each course with program outcomes **(PO)** in the3-pointscaleofSTRONG(**S**),MEDIUM(**M**) and LOW(**L**).

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	M	S	S	S	S	S	M	S	S
CO2	M	S	M	S	M	M	S	M	M	M
CO3	S	M	S	M	S	M	M	S	S	S
CO4	S	S	S	S	M	S	S	M	M	M
CO5	S	M	M	S	S	M	S	M	M	S

Semester VI

Course: Relativity and Quantum Mechanics

Course Code: 23UPHYC61

Course Outcomes:

On completion of the course students

1. Gain knowledge in concepts of special theory of relativity and Einstein's mass energy relation
2. To learn the importance of transformation equations and also to differentiate between special and general theory of relativity
3. Obtain ideas about dual nature of matter and understand Heisenberg's uncertainty principle.
4. Derive Schrodinger wave equations and to get exposed to operators and their commutation relations
5. Understand application of Schrodinger wave equations in one dimension and higher dimension.

Mapping with Program Outcomes

Map course outcomes **(CO)** for each course with program outcomes **(PO)** in the 3-point scale of STRONG (**S**), MEDIUM (**M**) and LOW (**L**).

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	S	M	S	S	S	M	S	S
CO2	S	S	S	M	S	M	S	S	S	M
CO3	S	S	S	S	S	S	M	S	M	S
CO4	M	S	S	S	M	S	S	M	S	S
CO5	S	S	M	S	S	M	S	S	S	M

Course: Solid State Physics

Course Code: 23UPHYC62

Course Outcomes:

On completion of the course students

1. Gain knowledge in types of bonding, miller indices, crystal structures.
2. To learn the importance of dynamics of crystal lattice.
3. Obtain ideas about various magnetic properties of solids.
4. Understand the dielectric properties of materials.
5. Understand ferroelectric and superconducting properties of materials.

Mapping with Program Outcomes

Map course outcomes **(CO)** for each course with program outcomes **(PO)** in the 3-point scale of STRONG (**S**), MEDIUM (**M**) and LOW (**L**).

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	S	M	S	S	S	M	S	S
CO2	S	S	S	M	S	M	S	S	S	M
CO3	S	S	S	S	S	S	M	S	M	S
CO4	M	S	S	S	M	S	S	M	S	S
CO5	S	S	M	S	S	M	S	S	S	M

Course: Digital Electronics and Microprocessor 8085

Course Code: 23UPHYC63

Course Outcomes:

On completion of the course students

1. Gain knowledge of the idea behind of number systems and inter-conversions.
2. To know the working and importance of arithmetic circuits.
3. Obtain ideas about elements of Sequential circuits and organization of memory.
4. Explain the architecture and pin out of 8085 MPU
5. Understand addressing modes and the way of writing assembly level programs in 8085 MPU.

Mapping with Program Outcomes
Map course outcomes **(CO)** for each course with program outcomes **(PO)** in the 3-point scale of STRONG (**S**), MEDIUM (**M**) and LOW (**L**).

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	S	M	S	S	S	M	S	S
CO2	S	S	S	M	S	M	S	S	S	M
CO3	S	S	S	S	S	S	M	S	M	S
CO4	M	S	S	S	M	S	S	M	S	S
CO5	S	S	M	S	S	M	S	S	S	M

Course: Advanced Mathematical Physics
Course Code: 23UPHYE65-1

Course Outcomes:

After successful completion of this course, students will be able to:

1. **CO1:** Understand and apply concepts of matrices, including special types, eigenvalues, eigenvectors, diagonalization, and the Cayley–Hamilton theorem to solve mathematical and physical problems.
2. **CO2:** Apply vector calculus concepts such as gradient, divergence, curl, and integral theorems (Gauss and Stokes) to analyze vector fields and solve problems in physics.
3. **CO3:** Evaluate and utilize special functions like Beta and Gamma functions, and understand their interrelation and applications in mathematical physics.
4. **CO4:** Solve second-order differential equations using the Frobenius method and analyze special functions such as Legendre and Hermite polynomials, including their properties like orthogonality and generating functions.
5. **CO5:** Solve partial differential equations using separation of variables and apply them to physical systems such as heat flow, electrostatics (Laplace's equation), and wave motion in stretched strings.

MAPPING WITH PROGRAM OUT COMES:
Map course outcomes **(CO)** for each course with program outcomes **(PO)** in the3-point scale of STRONG (**S**), MEDIUM (**M**) and LOW (**L**).

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	M	S	S	S	S	S	M	S	S
CO2	M	S	M	S	M	M	S	M	M	M
CO3	S	M	S	M	S	M	M	S	S	S
CO4	S	S	S	S	M	S	S	M	M	M
CO5	S	M	M	S	S	M	S	M	M	S

Course: MATERIALS SCIENCE
Course Code: 23UPHYE65-2

COURSEOUTCOMES:

Course Outcomes (COs)

After successful completion of this course, students will be able to:

1. **CO1:** Explain different types of crystal imperfections (point, line, surface, and volume defects) and analyze their effect on material properties.
2. **CO2:** Understand elastic, inelastic, and viscoelastic behavior of materials and apply these concepts in material design and engineering applications.
3. **CO3:** Analyze plastic deformation mechanisms, creep behavior, and apply various strengthening methods such as strain hardening, grain refinement, and precipitation strengthening.
4. **CO4:** Understand optical properties of materials and explain the working principles and applications of optical materials, LEDs, and liquid crystal displays.
5. **CO5:** Evaluate material properties using destructive and non-destructive testing methods, including modern techniques like ultrasonic testing and thermography.

MAPPING WITH PROGRAM OUT COMES:

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	2	–	–	1	–
CO2	3	2	3	–	–	1	–
CO3	3	3	3	1	–	1	–
CO4	3	2	3	–	2	–	1
CO5	3	3	2	3	3	–	1

3 – High correlation, 2 – Medium correlation, 1 – Low correlation

Course: NANOSCIENCE AND NANOTECHNOLOGY
Course Code: 23UPHYE65-3

COURSEOUTCOMES:

On completion of the course students

1. Understand nanoscale science, types of nanostructures (0D, 1D, 2D), quantum confinement, and carbon nanostructures.To know the working and importance of arithmetic circuits.
2. Explain mechanical, optical, electrical, magnetic, and electrochemical properties of nanomaterials.
3. Understand fabrication methods including top-down and bottom-up approaches and various deposition techniques.
4. Analyze nanomaterials using characterization techniques like SEM, TEM, XRD, AFM, and spectroscopy.
5. Apply nanomaterials in medicine, energy, sensors, and nanoelectronics.

Mapping with Program Outcomes:

Map course outcomes **(CO)** for each course with program outcomes **(PO)** in the 3-point scale of STRONG (**S**), MEDIUM (**M**) and LOW (**L**).

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	S	M	S	S	S	M	S	S
CO2	S	S	S	M	S	M	S	S	S	M
CO3	S	S	S	S	S	S	M	S	M	S
CO4	M	S	S	S	M	S	S	M	S	S
CO5	S	S	M	S	S	M	S	S	S	M