

**KRISHASAMY COLLEGE OF SCIENCE, ARTS, AND MANAGEMENT
FOR WOMEN**

Department of Physics

Academic Year – (2023-2024)

Program outcomes

To enter top educational and research institutes in India and abroad, there is a well-refined entrance test procedure. Several entrance tests are conducted at national level.

- After B.Sc. degree, students are eligible for the MRNAT / IIT-JAM exam conducted by various institutions. Another exam like Graduate Aptitude Test in Engineering (GATE) is also conducted by universities for admission in M.Tech programme.
- JEST exam is another entrance examination conducted by Science and Engineering Research Board (SERB) for admission in integrated MTech, Ph.D. courses in the institutes that demand JEST scores.
- Students having B.Sc. degree can enter M.Sc. programme based on JEST score. TIFR enrolls students in its master course in integrated course M.Sc. /Ph.D. by conducting a national level test.
- If the student is willing to go abroad for higher studies then he must clear the Graduate Record Examination (GRE) to get admission in a graduate programme abroad. From the job perspective, there are various jobs for a physics student that he can opt after completing his study. He can be a Physicist, a lecturer, a professor in university, a scientist in various research centres in the country, a radiologist, a scientific advisor, an entrepreneur, a researcher in a top organization mentioned earlier.

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COURSE OBJECTIVES AND COURSE OUTCOMES

**SUBJECT : PROPERTIES OF MATTER AND SOUND
SUBJECT CODE : 22UPHYC13**

COURSE OBJECTIVES

1. To expound the fundamentals of elastic properties of solids.
2. To understand the surface properties of liquids and the experimental methods.
3. To explain the viscous properties of liquids and gases, Poiseuille's formula.
4. To elaborate the SHM, resonance phenomena, determination of frequency and loudness.
5. To get an idea of the ultrasonic generation method, reverberation, acoustics of buildings and use in oil and gas industry.

COURSE OUTCOMES

On completion of the course, the student would have learn the following:

1. Theory of Elasticity and bending of beams, Couple per unit twist of a wire, Torsional pendulum ideas.
2. Have knowledge on surface properties of liquids and its determination methods.
3. Understood the viscous behavior of liquids and gasses.
4. understood the Physics of sound and its applications
5. Learned the method of producing ultrasonic waves and its applications. The concepts of acoustic comfort and the theories used in building acoustics, use of sound in oil industry

SUBJECT CODE: 22UPHYC14

SUBJECT : HEAT AND THERMODYNAMICS

COURSE OBJECTIVES

1. To get an idea about the specific heat capacity and its determination.
2. To understand the kinetic theory of gases and gas laws.
3. To get acquainted with transmission of heat and radiation laws.
4. To understand the low temperature Physics and Superconductivity.
5. To learn the thermodynamic system and its laws.

COURSE OUTCOMES

1. After the completion this Course, the student would acquire the following:
2. Get an idea about the specific heat capacity and its determination methods.
3. Understood the kinetic theory of gases and gas laws.
4. Get acquainted with transmission of heat process and radiation laws.
5. Understood the method of generating low temperature and Superconductivity.
6. Learnt the thermodynamic system and its associated laws.

SUBJECT CODE: 22UMATA0

SUBJECT : MATHEMATICS – I

COURSE OBJECTIVES

To acquire knowledge on finding roots of the Transcendental and Algebraic equations by Numerical methods, applications of matrices and Numerical methods for solving Simultaneous Linear equations. To understand the Computations of Eigen values ,Eigen vectors, differential calculus ,the evaluation of double and Triple integrals for finding Area and Volume.

COURSE OUTCOMES

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

- 1) Attain knowledge on finding approximate root for polynomial equations using Numerical methods.
- 2) Develop the skills of finding solutions of Simultaneous Linear equations.
- 3) Adopt techniques in solving problems involving Matrices
- 4) Provide skills on finding curvature and radius of curvature in Cartesian and polar co-ordinates.
- 5) Understand the applications of double and triple integration in real life situation.

SUBJECT CODE: 22UPHYC2

SUBJECT : MECHANICS

COURSE OBJECTIVES:

1. To learn the laws of conservation and collision of bodies
2. To understand and calculate the moment of inertia of different bodies
3. To know the laws of gravitation, variation of 'g' and gravitational field
4. To learn the central force motion, centre of mass, variable mass systems
5. To understand the friction, centre of gravity and flow of fluids

COURSE OUTCOME

After the completion of the Course the student would understand the following:

1. The laws of conservation and collision of bodies
2. Calculate the moment of inertia of rigid body systems
3. Laws of gravitation, variation of 'g' and gravitational field and potential
4. The central force motion, centre of mass and variable mass systems
5. The friction, centre of gravity and flow of fluids

SUBJECT CODE: 22UPHYP24

SUBJECT : PRACTICAL – I

COURSE OBJECTIVES

To understand and learn the measurement of

1. Elastic properties of solids.
2. Physical properties of liquids
3. Thermal properties of matter
4. Optical and electrical properties of materials and semiconductors
5. Frequency of vibration, relative density, and acceleration due to gravity

COURSE OUTCOMES

The student will be learn to determine the following physical properties:

1. Elastic properties of solids.
2. Physical properties of liquids
3. Thermal properties of matter
4. Optical and electrical properties of materials and semiconductors
5. Frequency of vibration, relative density, and acceleration due to gravity

SUBJECT CODE: 22UMATA02

SUBJECT : MATHEMATICS – II

COURSE OBJECTIVES

To expand trigonometric functions, solving partial differential equations and learn about vector differentiation and integration, also too familiar with physical interpretation of divergence and curl of a vector. Learning Finite differences and applications of Interpolations in real life situations.

COURSE OUTCOMES

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

- 1) Attain knowledge on finding the expansions of trigonometric functions and concept of hyperbolic and inverse hyperbolic functions.
- 2) Provide a basic knowledge of Partial Differential equations and develops knowledge on handle practical problems.
- 3) Adopt techniques in solving problems involving vector and scalar functions
- 4) Provide skills on finding derivatives and gradients on vector differentiation and Integration
- 5) Understand the applications of differentiation and integration in real life situation.

SUBJECT CODE :22UPHYE26-2

SUBJECT : FUNDAMENTALS OF PHYSICS

COURSE OBJECTIVES

1. To know the units, dimensions and measurement of various physical quantities.
2. To acquire knowledge on different states of matter and conversion between them.
3. To know different types of energy.
4. To know about pressure, temperature and their simple measuring devices.
5. To understand principles of mirrors and lenses

COURSE OUTCOMES

Students studying Fundamentals of Physics course would have learnt the following:

1. units and dimensions of various fundamental physical quantities
2. Different states of matter and conversion between them.
3. Types of energy and its conservation.
4. Pressure and temperature and their measurement using simple devices.
5. Principle and use of mirrors, lenses and scattering of light.

SUBJECT : OPTICS AND SPECTROSCOPY

SUBJECT CODE : 22UPHYC33

COURSE OBJECTIVES:

1. To understand the concept of lenses and its aberrations.
2. To know the meaning of the term interference of light.
3. To gain knowledge about diffraction of light.
4. To know the importance of polarization nature of light.
5. To understand the functioning of optical instruments.

COURSE OUTCOMES

On Completion of the course, the learner would well acquaint with the following:

1. The knowledge of geometric optics and aberrations in lens system helps in the practical design of optical systems and instruments.
2. The study of phenomena interference, thin films and its applications.
3. The knowledge about diffraction, Single Slit and Double Slit diffraction patterns.
4. Polarization lays the foundation for an understanding of concepts of Nicol Prism.
5. The knowledge of Spectroscopy helps to extract the dynamic information about the molecule.

SUBJECT : ALLIED CHEMISTRY-I

SUBJECT CODE: 22UCHEA35

COURSE OBJECTIVES

- 1) To impart wide knowledge about Metallurgy.
- 2) To invoke the knowledge in basic concepts of chemistry.
- 3) To provide a knowledge on chemical kinetics.
- 4) To familiarize the students about Industrial Chemistry.
- 5) To inculcate interest in nuclear chemistry.

COURSE OUTCOMES

- 1) Acquire thorough Knowledge about Metallurgy and Fundamental concepts in Organic chemistry.
- 2) Acquire an idea about Chemical Kinetics.
- 3) Identify the Importance of Nuclear chemistry and Metallic Bond.
- 4) Acquire Knowledge on Photochemistry
- 5) Extensive Knowledge about Fuels.

SUBJECT : MOBILE CELLULAR TECHNOLOGY

SUBJECT CODE: 22UPHYE37-1

COURSE OBJECTIVES

1. To learn the background information about cellular system.
2. To study the various mobile standards.
3. To teach the chip level information of mobile phones.
4. To expose the idea about trouble shooting of problems in mobile phones.
5. To acquire the knowledge about mobile service tools.

COURSE OUTCOMES

After completion of the above course material the student would have learnt the following:

1. Understand the cellular communication system.
2. Know the smart phones and various mobile standards like 1G,2G, etc.
3. Chip level information and soldering and de-soldering the various components.
4. The network problems and SIM card problems and to learn the trouble shooting process.
5. Know how to use the ultrasonic cleaner, mobile virus and other service tools.

SUBJECT : ELECTRICITY AND ELECTROMAGNETISM

SUBJECT CODE : 22UPHYC43

COURSE OBJECTIVES:

1. To provide comprehensive knowledge and understanding of electrostatics and applications
2. To acquire adequate knowledge of Kirchhoff's law, magnetic induction and their applications.
3. To get idea about electromagnetic induction, self-inductance and mutual inductance.
4. To understand the growth and decay of current in a circuit containing L, C, and R and their AC behavior.
5. To get acquainted with the electromagnetic waves and Maxwell's equations and their significance.

COURSE OUTCOMES

On completion of course students will be able to:

1. Explain the basic laws of electrostatics and their applications to capacitor.
2. Understood the use of Kirchhoff's law, magnetic induction and their applications.
3. Describe the laws of electromagnetic induction, self-inductance and mutual inductance.
4. Understand the phenomena of the growth and decay of current in a circuit containing L, C, and R and their AC behavior.
5. Get acquainted with the electromagnetic waves and Maxwell's equations and its implications.

SUBJECT : PRACTICAL - II

SUBJECT CODE : 22UPHYP44

CORE OBJECTIVES

This Practical course enables the students

1. To determine elasticity for given material.
2. To calculate wavelength and refractive index.
3. To calibrate the ammeter and calculate the figure of merit.
4. To learn to calculate magnetic Induction and moment.
5. To acquire skill to handle digital devices.

COURSE OUTCOMES

On completion of the course students will have the following capabilities:

1. Develop the skill to calculate material properties.
2. Calibrate ammeter and specific resistance of wire.
3. Usage of Ballistic Galvanometer to compare emfs of cells
4. Learn to construct voltage regulator
5. Construct and check the operation of digital logic gates with discrete components and ICs.

SUBJECT : ALLIED CHEMISTRY-II

SUBJECT CODE : 22UCHEA45

COURSE OBJECTIVES

- 1) Make the students familiar with Coordination Chemistry.
- 2) To acquire thorough knowledge about Carbohydrates and proteins.
- 3) Enable the students to acquire knowledge in Electrochemistry.
- 4) To have an idea about paint and varnishes.
- 5) To create about knowledge in medicinal chemistry.

COURSE OUTCOMES

- 1) Wide Knowledge about Coordination Chemistry.
- 2) Identify the importance of Carbohydrates, Amino acids and Proteins.
- 3) Acquire Knowledge about the action of drugs.
- 4) Able to understand about Paint and Varnishes.
- 5) Able to understand the concepts of pH and Buffers in living systems.

SUBJECT : ALLIED CHEMISTRY PRATICALS

SUBJECT CODE: 22UCHEAP46

COURSE OBJECTIVES

- 1) To help the students to develop the skills in Titrimetric Analysis
- 2) To learn the basic analytical method.
- 3) To know about various indicators and their significance.
- 4) To impart knowledge about primary standard solution.
- 5) To enhance knowledge about stoichiometric relationship for standardization.

COURSE OUTCOMES

- 1) Able to understand the techniques of Titrimetric Analysis.
- 2) Acquire knowledge in Analytical skills.
- 3) Analyse the given unknown solution and assess its normality.
- 4) Evaluate the amount of substance from the normality.
- 5) Predict the hardness of water samples using EDTA.

SUBJECT : ELECTRONICS TECHNOLOGY

SUBJECT CODE : 22UPHYS48

COURSE OBJECTIVES

1. To get acquainted with the specific skills in the testing of components.
2. To illustrate the functions and working of different power supply system and voltage regulation methods.
3. To know the principle and working of different domestic electrical and electronics appliances
4. To understand the various standard sockets, cables and modern communication standards.
5. To get to know the instruments and application in diagnosis, therapeutic treatment and imaging fields

COURSE OUTCOMES

After finishing the course, the student would have learnt the following:

1. Get acquainted with the specific skills in the testing of components.
2. The functions and working of different power supply system and voltage regulation methods.
3. the principle and working of different domestic electrical and electronics appliances
4. Understood the various standard sockets, cables and modern communication standards.
5. The principle of operation of instruments in diagnosis, therapeutic treatment and imaging fields and their applications.

SUBJECT : 22UPHYC51

SUBJECT CODE: ATOMIC AND MOLECULAR PHYSICS

COURSE OBJECTIVES:

1. To study the properties of cathode and positive rays, experiments for specific charge and mass spectrographs
2. To know the structure of the atom and to understand the spectral lines.
3. To understand effects of magnetic field on atomic spectra
4. To acquire the knowledge about photoelectric effect and derive the Einstein's photoelectric equation.
5. To get to know the various energy levels viz., rotational, vibrational etc. And to understand the principle of Infrared spectroscopy, Raman effect and Laser.

COURSE OUTCOMES

After completing this course, the learner would be capable of:

1. Knowing the properties of cathode and positive rays, the experiments for finding the specific charge, and the principle and working of mass spectrograph.
2. Understanding the structure of the atom and the spectral lines.
3. analyzing the effects of magnetic field on atomic spectra
4. Understanding photoelectric effect and derive the Einstein's photoelectric equation.
5. Recognizing various energy levels viz., rotational, vibrational etc. And learned the principle of Infrared spectroscopy, Raman effect and Laser.

SUBJECT : 22UPHYC52

SUBJECT CODE: RELATIVITY AND QUANTUM MECHANICS

COURSE OBJECTIVES

This course enables the students:

1. To understand the fundamentals of relativity and general theory of relativity.
2. To acquire knowledge about concepts of matter waves, phase and group velocity
3. To understand the Heisenberg's uncertainty principle
4. To derive Schrodinger time independent, dependent wave equation and application to various cases.
5. To interpret the concepts of operators and angular momentum in quantum mechanics.

COURSE OUTCOMES

On completion of the course the students would have:

1. obtained knowledge in concepts of special and general theory of relativity
2. obtained idea about dual nature of matter
3. Ability to derive Schrodinger wave equation and understood Heisenberg's uncertainty principle.
4. Understood the application of Schrodinger's wave equations.
5. Get expose to operators and their commutation relations.

SUBJECT : 22UPHYC

SUBJECT CODE: ANALOG ELECTRONICS

Course Objectives:

- 1) To understand the fundamental principles of semiconductors, p-n junction and special diodes
- 1) To acquire knowledge on transistor, its Characteristics and transistor amplifier
- 2) To understand the feedback principle, oscillators, and multi vibrators
- 3) To understand the operation and significance of some special semiconductor devices
- 4) To acquire knowledge on Operational Amplifier and its applications.

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.

SUBJECT : 22UPHYC54

SUBJECT CODE : DIGITAL ELECTRONICS

COURSE OBJECTIVES:

1. To understand the various number systems and their significance
2. To know the concepts of Boolean Algebra and basic logic gates.
3. To introduce the simplification methods of Boolean expression.
4. To get the idea of Karnaugh map simplification.
5. To acquire knowledge on combinational logic circuits.
6. To know the sequential logic systems, Shift registers and counters
7. To understand the working of DAC and ADCs.

COURSE OUTCOMES

1. On completion of this course, the student will get acquainted with the following ideas:
2. Various number systems and their significance, number conversions and the theorems of Boolean algebra and basic logic gates.
3. The simplification methods of Boolean expression by algebra and K map
4. Knowledge on combinational logic circuits, arithmetic, encoder, decoders etc.,
5. The different varieties of Flip flops, Shift registers and counters.

SUBJECT : 22UPHYC61

SUBJECT CODE: SOLID STATE PHYSICS

COURSE OBJECTIVES

1. To understand different types of bonding in solids
2. To understand the crystal structures and diffraction phenomenon on them.
3. To understand the magnetic and dielectric properties of crystalline structures.
4. To acquire knowledge on the basics of magnetic phenomena on materials and various types of magnetizations.
5. To know the phenomenon of superconductivity on the materials.

COURSE OUTCOMES

On completion of the course, the learner would be knowing the points listed below

1. The nature and behavior of bonding in solids
2. How crystalline materials are studied using diffraction techniques

3. The behavior of solids with their magnetic properties.
4. The concept of dielectric properties in solids
5. The importance of superconducting materials in engineering applications.

SUBJECT : NUCLEAR AND PARTICLE PHYSICS

SUBJECT CODE: 22UPHYC62

COURSE OBJECTIVES

This course enables the students

1. To impart knowledge about nuclear properties and nuclear models
2. To understand the concept of radioactivity.
3. To have a better understanding of matter interacting at nuclear level.
4. To understand the design of detectors and particle accelerators.
5. To acquire ideas about elementary particles.

COURSE OUTCOMES

On completion of the course students would have understood the following:

1. Gain knowledge of Nuclei and nuclear models
2. Obtain ideas about radioactivity and α , β , γ rays
3. Know about various types of detectors and accelerators.
4. the concept of nuclear models and reactors.
5. knowledge about the basic interaction of fundamental particles and quark model.

SUBJECT : APPLIED ELECTRONICS

SUBJECT CODE : 22UPHYC63

COURSE OBJECTIVES

To make the students understand the following:

1. Timer IC and its working modes, fixed voltage regulators, optoelectronic devices
2. Theory of modulation, AM and FM, side bands, detection methods
3. Types of antennae, principle of TV broadcasting
4. The principle behind light wave communication and systems
5. Various types of electronic communication and RADAR.

COURSE OUTCOMES

After completion of the course, the student would have understood the following:

1. Timer IC and its working modes, fixed voltage regulators, optoelectronic devices
2. Theory of modulation, AM and FM, side bands, detection methods
3. Types of antennae, principle of TV broadcasting
4. The principle behind light wave communication and systems
5. Various types of electronic communication and RADAR

SUBJECT : MICROPROCESSOR AND ITS APPLICATION
SUBJECT CODE: 22UPHYE64

COURSE OBJECTIVES

The student will be gotten to know the following topics:

1. To get to know the micro processor architecture, functions of pins
2. To get to know instruction set of 8085 microprocessor and practice programming skills
3. To get acquainted with the time delay programs and interfacing of memory devices
To know the Interfacing of I/O devices and their methods
4. To become familiar with interfacing of Data converters and to study PPI 8255 and its application.

COURSE OUTCOMES

On the completion of the course, students will be able to do the following:

1. understood the micro processor architecture, functions of pins
2. learned instruction set of 8085 microprocessor and practice programming skills
3. able to write time delay programs and would do interfacing of memory devices
4. perform and analyse the Interfacing of I/O devices and their methods
5. familiar with interfacing of Data converters and to use PPI 8255 IC

SUBJECT : GENERAL EXPERIMENT

SUBJECT CODE : 22UPHYP65

COURSE OBJECTIVES

To promote scientific temper and to learn physical concepts through these experiments

1. To estimate the elastic and optical properties, constants of materials
2. To determine electrical properties of passive components using ballistic galvanometer
3. To determine magnetic properties of coil using magnetometers
4. To estimate the inductance of a coil using an AC bridge
5. Converting galvanometer for Volt and Current measurements

COURSE OUTCOMES

After completing the above experiments, the learner would be able to:

1. estimate the elastic and optical properties of materials
2. determine electrical properties of passive components using ballistic galvanometer
3. determine magnetic properties of coil using magnetometers
4. estimate the inductance of a coil using an AC bridge
5. convert galvanometer for Volt and Current measurements

SUBJECT : ELECTRONICS EXPERIMENTS
SUBJECT CODE: 22UPHYP66

COURSE OBJECTIVES

To provide knowledge and skill in Electronics, Digital and Microprocessor programming.

1. To perform experiments to study the behavior of resonance, regulator, amplifier, oscillator, op amp application circuits
2. To perform experiment to study the characteristics of electronic devices
3. To study the working of some combinational circuits
4. To understand the operation of few sequential circuits
5. To learn the programming of microprocessor – Intel 8085.

COURSE OUTCOMES

After finishing the course, the learner would be capable of:

1. performing experiments to study the behavior of resonance, regulator, amplifier, oscillator, op amp application circuits
2. performing experiment to study the characteristics of electronic devices
3. studying the working of some combinational circuits
4. understanding the operation of few sequential circuits
5. knowing to program the microprocessor – Intel 8085