



**Indo-American College**

Not just another college

Permanently Affiliated to THIRUVALLUVAR UNIVERSITY, Vellore.

Accredited by NAAC with 'B' Grade

Recognised Under Section 2 (f) & 12 (b) of UGC Act.

T.N. Govt. G. O. MS. No.172, Higher Education Dept, dt.27-4-1998

**DEPARTMENT OF PHYSICS  
PROGRAMME OUTCOMES (B. Sc)**

<b>PO1:</b>	Attempt to identify and analyse scientific reasoning of Nature.
<b>PO 2:</b>	Learn the fundamentals of physics through practical and theoretical approaches.
<b>PO 3:</b>	Develop mathematical skills by learning different physics concepts and problem-solving approaches.
<b>PO 4:</b>	The necessity of measurement accuracy, as well as laboratory techniques, will be emphasised.
<b>PO 5:</b>	Develop critical and logical thinking abilities to succeed various competitive exams.
<b>PO 6:</b>	. Develop computational, software, and programming skills.
<b>PO 7:</b>	Create an awareness of the impact of physics, society, and development outside the scientific community.
<b>PO 8:</b>	Develop an understanding of your environmental and societal responsibilities.

## COURSE OUTCOMES

S. NO	Course Code	Course Name	Course Outcomes
1	FPH11	Mechanics (Core paper-1)	<ul style="list-style-type: none"> <li>• The student will be able to know:</li> <li>• LO1. The fundamentals of vectors and able to formulate the expression for projectiles.</li> <li>• LO2. To study the dynamics of rigid bodies in terms of moment inertia and also able to find the moment of inertia of different systems.</li> <li>• LO3. To define work, power and energy and also able to understand the oblique impact between smooth spheres.</li> <li>• LO4. To learn the elastic property of the solid materials and also derive the relation between elastic moduli.</li> <li>• LO5. To explain the concept of gravitation and able to know the principles of rocket and satellite.</li> </ul>
2	FPH21	Heat and Thermodynamics (Core Paper-2)	<ul style="list-style-type: none"> <li>• The student will be able to know:</li> <li>• LO1. The fundamentals of specific heat capacity and able to explain the kinetic theory of gases.</li> <li>• LO2. To describe the conduction and radiation of heat and also able to study the Joule-Kelvin effect based on the low temperature phenomenal and its applications.</li> <li>• LO3. To cite the laws of thermodynamics and their applications.</li> <li>• LO4. To explore the equations governing second law of thermodynamics and entropy.</li> <li>• LO5. To explain Phase-space, micro and macrostates and able to distinguish MB, FD and BE statistics.</li> </ul>
3	FPPH22	Practical-I (Core Practical-1)	<ul style="list-style-type: none"> <li>• The students, after they have performed all of their experiments,</li> <li>• LO1. To understand the importance of elasticity of materials like bending of beams, shearing and twisting of metals etc.,</li> <li>• LO2. Develop the knowledge about the principles of light and sound and to find the value of Frequency of tuning fork Focal length of the Lenses</li> <li>• Refractive index of the glass materials</li> <li>• LO3. Acquired knowledge of mechanical importance</li> </ul>

			<p>of liquids like surface tension, viscosity, and their applications in modern life.</p> <ul style="list-style-type: none"> <li>• LO4. To obtain the knowledge of electrical instruments (e.g. voltmeter) and to find their calibrations using potentiometer.</li> <li>• LO5. To understand thermal properties of materials like conductivity of solids, specific heat capacity of liquids etc.</li> <li>• Second year: Semester III &amp; IV</li> </ul>
4	FPH31	Electricity, Magnetism & Electromagnetism (Core Paper-3)	<ul style="list-style-type: none"> <li>• After studied this Course, The student will be able :</li> <li>• LO1. To know fundamentals coulomb's law and Gauss's law and also able to derive the expression for electric potential, capacitance of a parallel plate capacitor.</li> <li>• LO2. To derive the expression for temperature coefficient resistance of a coil using Carey Foster's Bridge and able to know how to calibrate the ammeter and voltmeter. Also able to learn the thermo electricity concept.</li> <li>• LO3. To explain the concepts of self and mutual inductance using electromagnetic induction phenomenon.</li> <li>• LO4. To distinguish the dia, para and ferro magnetic materials based on different theories.</li> <li>• LO5. To formulate the expression for displacement current and Maxwell's equations.</li> </ul>
5	FSPH32	Electrical Technology (Skill Based paper -1)	<ul style="list-style-type: none"> <li>• After studied this course, the student will be able to know,</li> <li>• LO1. The principle of Voltage, Current, Resistance, Ohm's law and Electrical safety.</li> <li>• LO2. Distinguish between cells and batteries and able to explain the different types of batteries.</li> <li>• LO3. To understand the Wheastone's bridge, Thevenin and Norton's theorem and also able to describe the function of DC generator and motor.</li> <li>• LO4. The fundamentals of alternating currents and voltages and able to differentiate the single phase and three phase connections.</li> <li>• LO5. To acquire the principle and construction of transformers and its types and also able to demonstrate the function ac generator.</li> </ul>
6	FPH41	Waves and Optics (Core paper-4)	<ul style="list-style-type: none"> <li>• After studied this course, the student will be able:</li> <li>• LO1. To formulate the equation for plane progressive wave and able to understand the concept of simple harmonic motion and other types of waves</li> </ul>

			<ul style="list-style-type: none"> <li>• LO2. To study the property of surface tension of a liquid and know how the surface tension varies with temperature and also able to explain the property of viscosity of a liquid.</li> <li>• LO3. To describe the different optical of a lens system and able to design the eyepieces. Also able to know the phenomenon of interference and its applications.</li> <li>• LO4. To distinguish between Fresnel class of diffraction and Fraunhofer class of diffraction. Also formulate the expression for resolving power of telescope, microscope, prism and grating.</li> <li>• LO5. To explain the phenomenon of polarization and able to study the double refraction in uniaxial crystals. Also they can define optical activity, specific rotation and know the applications of polaroids.</li> </ul>
7	FSPH42	Workshop Skills (Skill Based Subject -2)	<ul style="list-style-type: none"> <li>• After studied this course, the student will be able</li> <li>• LO1. To test the instruments with specific skills</li> <li>• LO2. To express the functions and working of linear power supply.</li> <li>• LO3. To know the basics of analytical instruments and how to calibrate it.</li> <li>• LO4. To explain mobile communication and radar communication system.</li> <li>• LO5. To demonstrate the principle and working of various biomedical equipment.</li> </ul>
8	FPPH44	Practical -II (Core Practical-2)	<ul style="list-style-type: none"> <li>• The students, after they have completing all of their experiments,</li> <li>• LO1. To understand the importance of elasticity and to find the bending of beams by Young's modulus uniform bending Pin and microscope &amp; Scale and Telescope methods.</li> <li>• LO2. Develop the knowledge about the principles of light and sound and to calculate the value of,</li> <li>• Frequency of AC mains</li> <li>• Refractive index of the glass materials by i-d curve method</li> <li>• Wavelength of the visible spectrum using grating normal incidence method</li> <li>• Thickness of a thin wire by Air wedge method</li> <li>• LO3. Acquired knowledge of mechanical importance of liquids like surface tension, viscosity, and their applications in modern life.</li> <li>• LO4. Acquired basic electrical and electronic knowledge and to obtained,</li> <li>• Calibration of high range Ammeter using potentiometer</li> <li>• Resistance and specific resistance of a wire</li> </ul>

			<ul style="list-style-type: none"> <li>• Current and voltage sensitivity of Galvanometer</li> <li>• Bridge Rectifier-Using a Zener diode and IC7805</li> <li>• Logic gates-AND, OR (using diodes) and NOT (using transistor) and NAND &amp; NOR Universal gates</li> <li>• LO5. To understand magnetic properties of materials like pole strength of bar magnet, Earth magnetic induction BH by magnetometers in Tan–C position.</li> <li>• Third year: Semester V &amp; VI</li> </ul>
9	FPH51	Atomic and Molecular Physics (Core paper-5)	<ul style="list-style-type: none"> <li>• After studied this course, the student will be able</li> <li>• LO1. To know the properties of cathode rays and positive rays. Also will be able to study the determination of specific charge of an electron.</li> <li>• LO2. To know the different atom models and can get an idea about coupling schemes.</li> <li>• LO3. To study the Zeeman effect, Paschen Back effect and Stark effect.</li> <li>• LO4. To know the basic idea of photoelectric effect and can able to derive the equation for Einstein's photoelectric equation.</li> <li>• LO5. To study the rotational and vibrational energy of a molecule and also learn the Infrared spectra, Raman Effect and Laser.</li> </ul>
10	FPH52	Relativity and Quantum Mechanics (Core paper-6)	<ul style="list-style-type: none"> <li>• After studied this course, the student will be able</li> <li>• LO1. To know the frames of reference and able to formulate the Galilean Transformation equations and Lorentz Transformation equations.</li> <li>• LO2. To understand the matter waves and can derive an equation for de Broglie wavelength. Also able to distinguish between phase velocity and group velocity and demonstrate Davison &amp; Germer experiment.</li> <li>• LO3. To state the Heisenberg's Uncertainty Principle and able to derive the time dependent and time independent Schrödinger's equations.</li> <li>• LO4. To know the basic idea of photoelectric effect and can able to derive the equation for Einstein's photoelectric equation.</li> <li>• LO5. To learn postulates of quantum mechanics and also able to acquire knowledge on Dirac's bra and ket notations.</li> </ul>
11	FPH53	Basic and Applied Electronics (Core paper-7)	<ul style="list-style-type: none"> <li>• After studied this course, the student will be able</li> <li>• LO1. To classification of solids on the basis of band theory and know the construction, working and applications of semiconducting diodes and transistors.</li> <li>• LO2. To design the RC-coupled amplifier and to study its frequency response curve. Also students will be able to</li> </ul>

			<p>classify the power amplifiers, to learn the h-parameters and to able to design oscillator circuits.</p> <ul style="list-style-type: none"> <li>• LO3. To understand the multi vibrators using transistors and can able to study the different wave shaping circuits.</li> <li>• LO4. To know the basic idea of integrating circuits and able to fabricate diode, transistors, resistor and capacitors. Also students will be study the structure of operational amplifier and its parameters.</li> <li>• LO5. To analyze the different applications of op-amp circuits like adder, subtractor etc., and also able to demonstrate 555 Timer and its applications.</li> </ul>
12	FEPH54	Digital Electronics (Elective Paper-1)	<ul style="list-style-type: none"> <li>• After studied this course, the student will be able</li> <li>• LO1. To gain knowledge between different types of number systems, and their conversions. Also able to study the various Binary codes and to design basic logic gates.</li> <li>• LO2. To describe laws of Boolean Algebra, De Morgan's theorems. Also able to demonstrate K-Map and simplification of logic expressions and to design universal gates using NAND and NOR gates.</li> <li>• LO3. To explain the Multiplexer, Demulti plexer and Decoder. Students can know the functions of various Flip-Flop circuits.</li> <li>• LO4. To conceptualize the classification of registers and counters.</li> <li>• LO5. To know how to convert digital and analog to digital using different methods.</li> </ul>
13	FSPH55	Cell Phone Technology (Skill based Paper-3)	<ul style="list-style-type: none"> <li>• After studied this course, the student will be able</li> <li>• LO1. To understand the cellular communication system.</li> <li>• LO2. To study the smart phones and various mobile standards like 1G, 2G, etc.</li> <li>• LO3. To learn chip level information and soldering and desoldering the various components.</li> <li>• LO4. To understand the network problems and SIM card problems and to learn the trouble shooting process.</li> <li>• LO5. To know how to use the ultrasonic cleaner, mobile virus and other service tools.</li> </ul>
14	FPH61	Nuclear and Particle Physics (Core Paper-8)	<ul style="list-style-type: none"> <li>• After studied this course, the student will be able</li> <li>• LO1. To obtained clear idea about the fundamentals of nucleus and its structure.</li> <li>• LO2. To understood the concept of radioactivity.</li> <li>• LO3. To obtained clear understanding of the design and working of particle accelerators and detectors.</li> <li>• LO4. To understanding about the nuclear reactions and nuclear reactors.</li> </ul>

			<ul style="list-style-type: none"> <li>• LO5. To gained adequate knowledge about the elementary particles like pions, muons, hyperons etc.</li> </ul>
15	FPH62	Solid state physics (Core Paper-9)	<ul style="list-style-type: none"> <li>• After studied this course, the student will be able,</li> <li>• LO1. To Distinguish between crystalline and amorphous solids, Classify the crystal systems and able to understand the crystal structure</li> <li>• LO2. To Relate the X-ray diffraction with crystal structure and explain the various differences in properties of solids due to crystal imperfections</li> <li>• LO3. To understand the different types of bonding in crystals, apply this to understand the optical , specific heat capacity of solids</li> <li>• LO4. To gain the knowledge of magnetism in materials and able to distinguish different magnetic materials. Also able to understand the phenomena of superconductivity and their applications</li> <li>• LO5. To explain the electric polarization in dielectric materials and also gain the knowledge in dielectric breakdown mechanisms in a dielectric material.</li> </ul>
16	FEPH63A	Fundamentals of Microprocessor-8085 (Elective Paper-2)	<ul style="list-style-type: none"> <li>• After studied this course, the student will be able</li> <li>• LO1. To know the evolution of microprocessor, pin and architecture of 8085 microprocessor in detail.</li> <li>• LO2. To describe different types of instructions like data transfer, arithmetic, logical and branching instructions with examples and it will be used for writing the assembly language programs.</li> <li>• LO3. To write assembly language programs for simple arithmetic operations and hence they can apply it for interfacing applications.</li> <li>• LO4. To learn the memory interface and peripheral interface devices.</li> <li>• LO5. To know how to interface the peripheral device with microprocessor 8085 and they are able to write the programs for LED and Temperature control interface system.</li> </ul>
17	FEPH64C	Astrophysics (Elective Paper-3)	<ul style="list-style-type: none"> <li>• After studied this course, the student will be able</li> <li>• LO1. To study the different types of optical instruments like telescopes and spectrographs will be used for observing/recording the space objects.</li> <li>• LO2. To describe big bang theory, different types of galaxies, milky way and astronomical unit.</li> <li>• LO3. To explain about stars, constellations, asteroids, meteorites and comets.</li> <li>• LO4. After studied unit-4, the student will be able to know the details of solar system and able to know the formation eclipse due to sun, moon and earth.</li> </ul>

			<ul style="list-style-type: none"> <li>• LO5. To understanding the different space programmers/missions carried out by our Indian Space Research Organization (ISRO) and also to study the lunar and solar calendars.</li> </ul>
18	FSPH65	Weather forecasting (Skill based Paper-4)	<ul style="list-style-type: none"> <li>• After studied this course, the student will be able,</li> <li>• LO1. To study the atmosphere and its physical structure and also to know the variation of pressure and temperature with height.</li> <li>• LO2. To describe the measurement of wind speed, direction humidity, rainfall and can state the radiation laws.</li> <li>• LO3. To explain the global wind systems and able to know thunderstorms and cyclones.</li> <li>• LO4. To conceptualize the classification of climate, ozone depletion, acid rain and environmental hazards due to climate change.</li> <li>• LO5. To understand the analysis and historical background of weather forecasting and know the predictability, probability of forecasts.</li> </ul>
19	FPPH67	Practical-IV-Electronics Practical (Core practical-4)	<ul style="list-style-type: none"> <li>• After completion of the experiments students should be able to,</li> <li>• LO1. Understand the importance of elasticity of materials like bending of beams, shearing and twisting of metals etc by, Koenig's method – Uniform and non- uniform bending method</li> <li>• Bifilar Pendulum</li> <li>• LO2. Develop the knowledge about the principles of light and how to use them to calculate the value of, Refractive index of the glass materials using i-i curve method, small angled prism in normal incident method and Newton's ring method.</li> <li>• Dispersive power of prism and grating</li> <li>• LO3. To understand magnetic properties of materials like pole strength of bar magnet, Earth magnetic induction BH by deflection and vibration magnetometers.</li> <li>• LO4. Using potentiometer to obtained the results of, EMF of a Thermo couple Calibration of High range Voltmeter Conversion of galvanometer into Voltmeter and Ammeter</li> <li>• LO5. Using Ballistic galvanometer (BG) obtained the results of Absolute capacitance of a capacitor, Comparison mutual inductances and internal resistance of a cell.</li> </ul>
20	FPPH66	Practical-III-General Practical (Core practical-3)	<ul style="list-style-type: none"> <li>• When the students have completed all of their experiments,</li> <li>• LO1. Gain the knowledge about the oscillator and</li> </ul>



			<p>amplifier using transistor, FET and UJT; they performed Phase shift oscillator, Wien bridge oscillator and Relaxation oscillator.</p> <ul style="list-style-type: none"> <li>• LO2. Acquired knowledge in logic and arithmetic circuits by, Verifying De-Morgans theorem K-Map reduction and logic circuit implementation Adder and subtractor (Half/full) using NAND gates</li> <li>• RS, Clocked RS, and D Flip Flops using NAND gate</li> <li>• LO3. Using OP-AMP perform all mathematical operations Voltage follower, Adder, Subtractor, Averager Differentiator and Integrator Inverting amplifier with frequency gain response</li> <li>• Astable multivibrator.</li> <li>• LO4. Using Microprocessor 8085 perform arithmetic operations of 8 bit addition, Subtraction -using BCD &amp; Hexadecimal Sum of N elements Number conversion-8 bit-BCD to binary-Binary to BCD</li> <li>• LO5. To understand working of Flip Flops, Ripple counter and shift registers.</li> </ul>
21	FPPH 68	Project with viva voce (Group/Individual Project)	<ul style="list-style-type: none"> <li>• Students successfully complete the Project will be able to:</li> <li>• LO1. Students develop the skills of creativity, problem identification, formulation, solution and project writing knowledge.</li> <li>• LO2. Students will demonstrate physics principles and hypotheses, as well as their own ideas in recent science and technology.</li> <li>• LO3. The project motivates students to develop a research attitude higher education.</li> <li>• LO4. To evaluate scientific literature as well as their own results.</li> <li>• LO5. To do research and write a project report as a result of their efforts. The project will test student's organisational skills, initiative, teamwork, and practical skills, as well as bring together crucial Physics knowledge.</li> </ul>