

**MARIS STELLA COLLEGE (AUTONOMOUS),
VIJAYAWADA**

A College with Potential for Excellence

NAAC Accredited & ISO 9001: 2015 Certified



PROGRAMME REGISTER

2020-2023

DEPARTMENT OF PHYSICS

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UG PROGRAMMES OFFERED

S.No.	Programme	Combination offered	Programme Code
1	B.Sc	Mathematics, Physics, Chemistry (MPC)	301
2		Mathematics, Physics, Computer Science (MPCs)	303

PROGRAMME OUTCOMES (POs)

2020-2023

At the end of the programme students will have:

PO1: Essential Knowledge:

Comprehensive discipline knowledge and understanding, the ability to engage with different schools of thought and to apply their knowledge in practice including in multi-disciplinary or multi-professional contexts.

PO2: Creative and critical thinking and problem solving abilities:

Be effective problem solvers, able to apply critical and evidence-based thinking to conceive innovative responses to future challenges.

PO3: Teamwork and communication skills:

Be able to convey ideas and information effectively to a range of audiences for a variety of purposes and contribute in a positive and collaborative manner to achieving common goals.

PO4: Motivation and preparation in life-long learning:

Exhibit life-long skills; broad based multiple career oriented general skills; self and field based learning skills; digital skills; social responsibility and compassionate commitment; preparedness for living, learning and working in any environment

PO5: Professionalism and leadership readiness:

Be able to engage in professional behaviour and have the potential to be entrepreneurial and take leadership roles in their chosen occupations and communities.

PO6: Intercultural and ethical competency:

Be responsible and effective global citizens whose personal values and practices are consistent with their roles as responsible members of society.

PO7: Self-awareness and emotional intelligence:

Be self-aware and reflective, flexible and resilient and act with integrity and take responsibility for their actions as empowered women.

PO8: Social responsibility:

Be sensitive to and demonstrate agency in matters of environment, gender and other social issues to promote an equitable society.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

2020-2023

At the end of the programme students will be able to:

PSO1: Interpret principles, classifications, concepts, theories and mechanisms.

PSO2: Analyse hypothesis, procedures, properties, experimental facts and draw conclusions.

PSO3: Apply techniques in solving problems, results, sample analysis and production.

PSO4: Develop communicative competence, creative and critical thinking, practical, technical and employability skills, social sensibility and responsibility.

Course Outcomes (COs)

2020-2023

S.No.	Sem	Course Code	Course Title	Course Outcomes (COs)
1	I	20PHCCMW13	Mechanics, Waves & Oscillations	CO1: Describe the motion of rockets and their applications.
				CO2: Outline the concepts of central forces, and the basics of the global positioning system.
				CO3: Explain the postulates and various concepts of the theory of relativity.
				CO4: Distinguish undamped, damped, and forced oscillations, concepts of resonance, and quality factor.
				CO5: Explain harmonics and overtones in a stretched string, basics of ultrasonics, and their applications in life.
2	I	20PHP1MW12	Mechanics, Waves & Oscillations- Practical	CO1: List out, identify and handle various instruments related to Mechanics, Waves & Oscillations.
				CO2: Describe the operational procedures of various experiments in Mechanics, Waves & and Oscillations.
				CO3: Demonstrate experimental skills and determine the respective physical parameters.
3	II	20PHCCWO23	Wave Optics	CO1: Explain the principles and theory of interference and its applications.
				CO2: Distinguish between the concepts of Fraunhofer and Fresnel diffraction.
				CO3: Summarize the concepts of polarization, specific rotation, and applications.
				CO4: Relate different types of aberrations in lenses, minimizing techniques and fundamentals of fiber optics.

				CO5: Outline the characteristics, working principles of LASERS and Holography and their applications.
4	II	20PHCCWO22	Wave Optics - Practical	CO1: List out, identify and handle various optical instruments.
				CO2: Describe the operational procedures of various experiments in Wave Optics.
				CO3: Demonstrate experimental skills and determine the respective physical parameters.

5	III	20PHCCHT33	Heat & Thermodynamics	CO1: Describe the postulates of the kinetic theory of gases and transport phenomena.
				CO2: Outline the fundamental ideas, laws of thermodynamics, reversible and irreversible processes, the entropy of the universe, and their applications.
				CO3: Describe thermodynamic potentials and derive Maxwell's equations and their applications.
				CO4: Summarize the fundamentals of low-temperature physics and their applications.
				CO5: Discuss the postulates of the Quantum theory of radiation and their applications.
6	III	20PHP3HT32	Heat & Thermodynamics- Practical	CO1: List out, identify and handle various instruments related to Heat & Thermodynamics.
				CO2: Describe the operational procedures of various experiments in Heat & Thermodynamics.
				CO3: Demonstrate experimental skills and determine the respective physical parameters.
7	IV	20PHCCEM43	Electricity, Magnetism & Electronics	CO1: Apply Gauss's law to get relations connecting dielectric parameters and their applications.
				CO2: Derive expressions for the magnetic field at a point due to current carrying conductors using Biot Savart Law.
				CO3: Distinguish self and mutual inductance phenomena and their real-time applications.

				<p>CO4: Compute Maxwell's electromagnetic wave equations and their role in communications.</p>
				<p>CO5: Summarize the basic concepts of semiconductors and digital electronics and their applications.</p>
8	IV	20PHP4EM42	Electricity, Magnetism & Electronics-Practical	<p>CO1: List out, identify and handle various instruments related to Electricity, Magnetism & Electronics.</p>
				<p>CO2: Describe the operational procedures of various experiments in Electricity, Magnetism & Electronics.</p>
				<p>CO3: Demonstrate experimental skills and determine the respective physical parameters.</p>
9	IV	20PHCCMP43	Modern Physics	<p>CO1: Apply the knowledge of vector atom model to explain various experiments and their applications in Atomic & Molecular Physics.</p>
				<p>CO2: Relate the applications of de Broglie concept of matter waves and Heisenberg's uncertainty Principle in Modern scientific fields.</p>
				<p>CO3: Describe the energies and wave functions of a particle in a one dimensional potential box of infinite height using Schrodinger wave equation.</p>
				<p>CO4: Summarize the general properties of nuclei and radioactivity decays in Nuclear Physics.</p>
				<p>CO5: Outline the basics of Nano materials and the phenomenon of Superconductivity and its applications.</p>
10	IV	20PHP5MP42	Modern Physics - Practical	<p>CO1: List out, identify and handle various instruments related to Modern Physics.</p>
				<p>CO2: Describe the operational procedures of various experiments in Modern Physics.</p>
				<p>CO3: Demonstrate experimental skills and determine the respective physical parameters.</p>
11	V/VI	20PHSEC11OI3	Optical	<p>CO1: Summarize the construction and working principles of various optical instruments.</p>

	Set 1		Instruments & Optometry	<p>CO2: Explain the various defects of eye and their correcting methods with suitable lenses.</p> <p>CO3: Demonstrate experimental skills by performing experiments using microscope and telescope.</p> <p>CO4: Outline the various techniques used in optometry and computer based eye testing.</p> <p>CO5: Comprehend the various applications of microscopes and telescopes.</p>
12	V/VI Set 1	20PHP611OI2	Optical Instruments & Optometry- Practical	<p>CO1: List out, identify and handle various optical instruments.</p> <p>CO2: Describe the operational procedures of various experiments in Optical Instruments & Optometry.</p> <p>CO3: Demonstrate experimental skills and determine the respective physical parameters.</p>
13	V/VI Set 1	20PHSEC12OP3	Optical Imaging & Photography	<p>CO1: Identify different types of cameras and camera lenses according to different purposes.</p> <p>CO2: Determine focal length of the different types of lenses.</p> <p>CO3: Outline the natural and artificial sources of light and their application in Photography.</p> <p>CO4: Demonstrate skills on camera usage especially Digital Cameras.</p> <p>CO5: Outline the concept of different shooting techniques, techniques of Image development and editing.</p>
14	V/VI Set 1	20PHP712OP2	Optical Imaging & Photography- Practical	<p>CO1: List out, identify and handle various instruments related to optical imaging and Photography.</p> <p>CO2: Describe the operational procedures of various experiments in Optical Imaging & Photography.</p> <p>CO3: Demonstrate experimental skills and determine the respective physical parameters.</p>
15	V/VI Set 2	20PHSEC21LT3	Low Temperature Physics & Applications	<p>CO1: Summarize the procedures of various methods and techniques used to produce low temperatures in the Laboratory.</p>

				<p>CO2: Explain the principles of refrigeration, air conditioning and cold storage.</p>
				<p>CO3: Describe the working of refrigeration, air conditioning and cold storage.</p>
				<p>CO4: Outline the classification, properties of refrigerants and their effects on the environment.</p>
				<p>CO5: Comprehend the applications of Low Temperature Physics.</p>
16	V/VI Set 2	20PHP621LT2	Low Temperature Physics & Applications- Practical	<p>CO1: List out, identify and handle various instruments related to Low Temperature Physics.</p>
				<p>CO2: Describe the operational procedures of various experiments in Low Temperature Physics & Applications.</p>
				<p>CO3: Demonstrate experimental skills and determine the respective physical parameters.</p>
17	V/VI Set 2	20PHSEC22SE3	Solar Energy & Applications	<p>CO1: Summarize the basic concepts of solar radiation principles, collecting techniques and its storage.</p>
				<p>CO2: Explain the principles and working of solar thermal collectors and applications.</p>
				<p>CO3: Describe the fundamental concepts and working of solar cells and applications.</p>
				<p>CO4: Outline the types of solar cells, characteristics, fabrication steps and modules.</p>
				<p>CO5: Comprehend the knowledge on solar photovoltaic systems and applications.</p>
18	V/VI Set 2	20PHP722SE2	Solar Energy & Applications- Practical	<p>CO1: List out, identify and handle various instruments related to Solar energy.</p>
				<p>CO2: Describe the operational procedures of various experiments in Solar Energy & Applications.</p>
				<p>CO3: Demonstrate experimental skills and determine the respective physical parameters.</p>
19	V/VI	20PHSEC31AE3		<p>CO1: Identify various components present in Electricity & Electronics Laboratory.</p>

	Set 3		Applications of Electricity & Electronics	<p>CO2: Discuss the function of each component like resistors, capacitors, inductors, power sources etc.and their utility.</p> <p>CO3: Demonstrate skills of constructing simple electronic circuits consisting of basic circuit elements.</p> <p>CO4: Explain the need & functionality of various DC & AC Power sources.</p> <p>CO5: Comprehend the design, applications and practices of various electrical & Electronic devices and also their trouble shooting.</p>
20	V/VI Set 3	20PHP631AE2	Applications of Electricity & Electronics - Practical	<p>CO1: List out, identify and handle various instruments related to Electricity & Electronics.</p> <p>CO2: Describe the various operational procedures of various experiments in Applications of Electricity & Electronics.</p> <p>CO3: Demonstrate experimental skills and determine the respective physical parameters.</p>
21	V/VI Set 3	20PHSEC32EI3	Electronic Instrumentation	<p>CO1: Identify various facilities required to set up a basic instrumentation Laboratory.</p> <p>CO2: Summarize the knowledge of various electrical Instruments used in the Laboratory.</p> <p>CO3: Demonstrate skills of using instruments like CRO, Function Generator, Multimeter etc.</p> <p>CO4: Explain the principle and operation of different display devices used in the display systems and different transducers.</p> <p>CO5: Comprehend the applications of various biomedical instruments in daily life like B.P. meter, ECG, Pulse oxymeter etc. and know the handling procedures with safety and security.</p>
22	V/VI Set 3	20PHP732EI2	Electronic Instrumentation-Practical	<p>CO1: List out, identify and handle various instruments related to Electronic instrumentation.</p> <p>CO2: Describe the operational procedures of various experiments in Electronic Instrumentation.</p>

				CO3: Demonstrate experimental skills and determine the various physical and physiological parameters.
23	V/VI Set 4	20PHSEC41AD3	Analog & Digital Electronics	CO1: Summarize the basics of operational amplifiers (IC 741), its parameters and its practical applications in electronic circuits.
				CO2: Describe the internal architecture IC 555 Timer and its application as astable and monostable multivibrator.
				CO3: Compile simple logic operations and code conversions using combinational logic circuits.
				CO4: Outline the working of sequential logic circuits and conversion of Flip flops.
				CO5: Analyze the concept of registers & Counters.
24	V/VI Set 4	20PHP641AD2	Analog & Digital Electronics- Practical	CO1: List out, identify and handle various Analog and Digital Electronics instruments.
				CO2: Describe the operational procedures of various experiments in Analog & Digital Electronics.
				CO3: Demonstrate experimental skills and determine the respective physical parameters.
25	V/VI Set 4	20PHSEC42EE3	Electrical & Electronic Instrumentation	CO1: Explain the capabilities and limitations of test instruments and measurement practices in terms of validity and accuracy.
				CO2: Summarize measurement principles involved in the determination of basic electrical parameters using multimeters and CRO.
				CO3: Outline the functioning of transformers and their applications in electronic circuits and electrical power transfer systems in daily life.
				CO4: Explain the characteristics of transducers and their applications.
				CO5: Describe the working of Display Devices and their applications.
26	V/VI	20PHP742EE2	Electrical &	CO1: List out, identify and handle various electrical and electronic instruments.

	Set 4		Electronic Instrumentation-Practical	<p>CO2: Describe the operational procedures of various experiments in Electrical & Electronic Instrumentation.</p> <p>CO3: Demonstrate experimental skills and determine the various physical parameters.</p>
27	I	20SDCEA2	Low Temperature Electrical Appliances	<p>CO1: Describe the working principles of refrigeration and air conditioning.</p> <p>CO2: Explain the working principles of cold storage units.</p>
28	II	20SDCSE2	Solar Energy	<p>CO1: Describe solar radiation principles, collecting techniques and its storage.</p> <p>CO2: Summarize the solar photovoltaic technology principles and their fundamentals.</p> <p>CO3: Outline the working principles of solar appliances like Solar cookers, Solar hot water systems, Solar dryers, Solar Distillation, Solar greenhouses.</p>

Mapping of COs with PSOs & POs

S.No	Sem	Course Code	Course Title	COs	PSOs	POs
1	I	20PHCCMW13	Mechanics, Waves & Oscillations	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
2	I	20PHP1MW12	Mechanics, Waves & Oscillations - Practical	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
3	II	20PHCCWO23	Wave Optics	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
4	II	20PHCCWO22	Wave Optics-Practical	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
5	III	20PHCCHT33		CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4

			Heat & Thermodynamics	CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
6	III	20PHP3HT32	Heat & Thermodynamics - Practical	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
7	IV	20PHCCEM43	Electricity, Magnetism & Electronics	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
8	IV	20PHP4EM42	Electricity, Magnetism & Electronics- Practical	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
9	IV	20PHCCMP43	Modern Physics	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4

				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
10	IV	20PHP5MP42	Modern Physics-Practical	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
11	V/VI Set 1	20PHSEC11OI3	Optical Instruments & Optometry	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
12	V/VI Set 1	20PHP611OI2	Optical Instruments & Optometry-Practical	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
13	V/VI Set 1	20PHSEC12OP3	Optical Imaging & Photography	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4

				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
14	V/VI Set 1	20PHP712OP2	Optical Imaging & Photography-Practical	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
15	V/VI Set 2	20PHSEC21LT3	Low Temperature Physics & Applications	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
16	V/VI Set 2	20PHP621LT2	Low Temperature Physics & Applications-Practical	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
17	V/VI Set 2	20PHSEC22SE3	Solar Energy & Applications	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4

				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
18	V/VI Set 2	20PHP722SE2	Solar Energy & Applications-Practical	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
19	V/VI Set 3	20PHSEC31AE3	Applications Of Electricity & Electronics	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
20	V/VI Set 3	20PHP631AE2	Applications Of Electricity & Electronics-Practical	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
21	V/VI Set 3	20PHSEC32EI3	Electronic Instrumentation	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4

				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
22	V/VI Set 3	20PHP732EI2	Electronic Instrumentation-Practical	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
23	V/VI Set 4	20PHSEC41AD3	Analog & Digital Electronics	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
24	V/VI Set 4	20PHP641AD2	Analog & Digital Electronics-Practical	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
25	V/VI Set 4	20PHSEC42EE3	Electrical & Electronic Instrumentation	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO4	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4

				CO5	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
26	V/VI Set 4	20PHP742EE2	Electrical & Electronic Instrumentation- Practical	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
27	I	20SDCEA2	Low Temperature Electrical Appliances	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
28	II	20SDCSE2	Solar Energy & Applications	CO1	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO2	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4
				CO3	PSO1, PSO2, PSO3, PSO4	PO1, PO2, PO3, PO4

Mapping of Courses with PSOs

Course Title	Course Code	PSO1	PSO2	PSO3	PSO4
Mechanics, Waves & Oscillations	20PHCCMW13	✓	✓	✓	✓
Mechanics, Waves & Oscillations- Practical	20PHP1MW12	✓	✓	✓	✓
Wave Optics	20PHCCWO23	✓	✓	✓	✓
Wave Optics-Practical	20PHP2WO22	✓	✓	✓	✓
Heat and Thermodynamics	20PHCCHT33	✓	✓	✓	✓
Heat and Thermodynamics-Practical	20PHP3HT32	✓	✓	✓	✓
Electricity, Magnetism & Electronics	20PHCCEM43	✓	✓	✓	✓
Electricity, Magnetism & Electronics- Practical	20PHP4EM42	✓	✓	✓	✓
Modern Physics	20PHCCMP43	✓	✓	✓	✓
Modern Physics-Practical	20PHP5MP42	✓	✓	✓	✓
Optical Instruments & Optometry	20PHSEC11OI3	✓	✓	✓	✓
Optical Instruments & Optometry- Practical	20PHP611OI2	✓	✓	✓	✓
Optical Imaging & Photography	20PHSEC12OP3	✓	✓	✓	✓
Optical Imaging & Photography-Practical	20PHP712OP2	✓	✓	✓	✓
Low Temperature Physics & Applications	20PHSEC21LT3	✓	✓	✓	✓

Low Temperature Physics & Applications-Practical	20PHP621LT2	✓	✓	✓	✓
Solar Energy & Applications	20PHSEC22SE3	✓	✓	✓	✓
Solar Energy & Applications-Practical	20PHP722SE2	✓	✓	✓	✓
Applications of Electricity & Electronics	20PHSEC31AE3	✓	✓	✓	✓
Applications of Electricity & Electronics-Practical	20PHP631AE2	✓	✓	✓	✓
Electronic Instrumentation	20PHSEC32EI3	✓	✓	✓	✓
Electronic Instrumentation-Practical	20PHP732EI2	✓	✓	✓	✓
Analog & Digital Electronics	20PHSEC41AD3	✓	✓	✓	✓
Analog & Digital Electronics-Practical	20PHP641AD2	✓	✓	✓	✓
Electrical & Electronic Instrumentation	20PHSEC42EE3	✓	✓	✓	✓
Electrical & Electronic Instrumentation-Practical	20PHP742EE2	✓	✓	✓	✓
Low Temperature Electrical Appliances	20SDCEA2	✓	✓	✓	✓
Solar Energy	20SDCSE2	✓	✓	✓	✓

Mapping of Courses with POs

Course	PO1 Essential Knowledge	PO2 Creative and critical thinking and problem solving abilities	PO3 Teamwork and communication skills	PO4 Motivation and preparation in life-long learning	PO5 Professionalism and leadership readiness	PO6 Intercultural and ethical competency	PO7 Self- awareness and emotional intelligence	PO8 Social Responsibility
MW	✓	✓	✓	✓	-	-	-	-
MW-P1	✓	✓	✓	✓	-	-	-	-
WO	✓	✓	✓	✓	-	-	-	-
WO-P2	✓	✓	✓	✓	-	-	-	-
HT	✓	✓	✓	✓	-	-	-	-
HT-P3	✓	✓	✓	✓	-	-	-	-
EM	✓	✓	✓	✓	-	-	-	-
EM-P4	✓	✓	✓	✓	-	-	-	-
MP	✓	✓	✓	✓	-	-	-	-
MP-P5	✓	✓	✓	✓	-	-	-	-
OI	✓	✓	✓	✓	-	-	-	-
OI-1P6	✓	✓	✓	✓	-	-	-	-
OP	✓	✓	✓	✓	-	-	-	-
OP-1P7	✓	✓	✓	✓	-	-	-	-
LT	✓	✓	✓	✓	-	-	-	-
LT-2P6	✓	✓	✓	✓	-	-	-	-

SE	✓	✓	✓	✓	-	-	-	-
SE-2P7	✓	✓	✓	✓	-	-	-	-
AE	✓	✓	✓	✓	-	-	-	-
AE-3P6	✓	✓	✓	✓	-	-	-	-
EI	✓	✓	✓	✓	-	-	-	-
EI-3P7	✓	✓	✓	✓	-	-	-	-
AD	✓	✓	✓	✓	-	-	-	-
AD-4P6	✓	✓	✓	✓	-	-	-	-
EE	✓	✓	✓	✓	-	-	-	-
EE-4P7	✓	✓	✓	✓	-	-	-	-
EA	✓	✓	✓	✓	-	-	-	-
SE	✓	✓	✓	✓	-	-	-	-