

**University School of Vocational Studies and Applied  
Sciences (USoVSAS)**

**Department of Applied Physics**

**M.Sc. Physics  
(Specialization in Energy Studies)**

**COURSE STRUCTURE**



## **M.Sc. in Physics (Specialization in Energy Studies)**

### **Objective:**

The **M.Sc. in Physics (Energy Studies)** program focuses on the fundamental principles of energy science, exploring renewable and non-renewable energy sources, energy conversion, and storage technologies. It integrates advanced materials, nanotechnology, and computational techniques to enhance energy efficiency and sustainability. The course emphasizes both theoretical and practical training, including experimental methods and policy analysis. Graduates are prepared for careers in research, industry, and policymaking, contributing to innovative and sustainable energy solutions.

### **Course Outcome:**

1. Develop a strong foundation in energy physics, covering principles of energy conversion, storage, and sustainable energy solutions.
2. Gain expertise in renewable and non-renewable energy technologies, including solar, wind, hydro, nuclear, and fossil fuels.
3. Acquire proficiency in advanced materials, nanotechnology, and computational techniques for energy applications.
4. Enhance research and experimental skills in energy storage systems, including batteries, supercapacitors, and thermos-electrics.
5. Analyze global energy policies, economic impacts, and environmental sustainability to address real-world energy challenges.
6. Prepare for careers in academia, industry, and policymaking by developing innovative solutions for efficient energy utilization.

<b>M.Sc. Physics (with specialization in Energy studies) Course Structure (w.e.f., Session 2025-26)</b>					
<b>S. No</b>	<b>CODE</b>	<b>COURSE NAME</b>	<b>Category</b>	<b>L-T-P</b>	<b>CREDITS</b>
<b>SEMESTER-I</b>					
1	<b>PHM401</b>	Classical Mechanics and Relativity	<b>C</b>	4-0-0	4
2	<b>PHM403</b>	Electrodynamics	<b>C</b>	4-0-0	4
3	<b>PHM405</b>	Quantum Mechanics-I	<b>C</b>	3-0-0	3
4	<b>PHM407</b>	Mathematical Physics	<b>C</b>	5-0-0	5
5	<b>PHM409</b>	Statistical Physics	<b>C</b>	4-0-0	4
6	<b>PHM411</b>	Physics Laboratory-I	<b>C</b>	0-0-8	4
<b>TOTAL</b>				<b>20-0-8</b>	<b>24</b>
Total Contact Hours				28	
<b>SEMESTER-II</b>					
1	<b>PHM402</b>	Quantum Mechanics-II	<b>C</b>	3-0-0	3
2	<b>PHM404</b>	Solid State Physics	<b>C</b>	4-0-0	4
3	<b>PHM406</b>	Electronics	<b>C</b>	4-0-0	4
4	<b>PHM408</b>	Nuclear and Particle Physics	<b>C</b>	4-0-0	4
5	<b>PHM410/PHUD 412/</b>	Optical Metrology/ <b>Fundamentals of Electro-optics &amp; Photonics</b>	<b>SEC</b>	3-0-0	3
6	<b>PHM414</b>	<b>Physics Laboratory-II</b>		0-0-4	2
7	<b>PHM416</b>	<b>Computer Programming Laboratory</b>		0-0-4	2
<b>TOTAL</b>				<b>21-0-8</b>	<b>22</b>
Total Contact Hours				<b>26</b>	
<b>SEMESTER-III</b>					
1	<b>PHM501</b>	Atomic and Molecular Physics	<b>C</b>	4-0-0	4
2	<b>PHE503</b>	Energy Technology & Energy Storage System	<b>C</b>	<b>4-0-0</b>	<b>4</b>
3	<b>PHE505</b>	Characterization of Materials	<b>C</b>	<b>4-0-0</b>	<b>4</b>
•	<b>PHE410</b>	Nano-science, Nano physics and Nanotechnology	<b>C</b>	3-0-0	3
5		General Elective	<b>GE*</b>	<b>3-0-0</b>	<b>3</b>
6	<b>PHE 507</b>	Physics Laboratory-III /Minor project	<b>C</b>	<b>0-0-8</b>	<b>4</b>
<b>TOTAL</b>				<b>18-0-8</b>	<b>22</b>
Total Contact Hours				<b>26</b>	
<b>SEMESTER-IV</b>					
1	<b>PHM502</b>	<b>Major Project</b>	<b>Project</b>	0-0-32	16
2		<b>DSE-I</b>	<b>DSE</b>	3-0-0	3
3		<b>DSE-II</b>	<b>DSE</b>	3-0-0	3
<b>TOTAL</b>				<b>6-0-32</b>	<b>22</b>
Total Contact Hours				<b>38</b>	
<b>Total credits for all semesters</b>					<b>90</b>
<b>* GENERIC ELECTIVE (GE): Course taken from other Departments</b>					
<b>S.No.</b>	<b>CODE</b>	<b>COURSE NAME</b>	<b>CREDITS</b>		
<b>DISCIPLINE SPECIFIC ELECTIVES (DSE-I)</b>					
1	<b>PHM504</b>	Computational Physics	3		
2	<b>PHE506</b>	Hydrogen Energy Systems	3		
3	<b>PHE508</b>	Polymer Science & Technology	3		
<b>DISCIPLINE SPECIFIC ELECTIVES (DSE-II)</b>					
1	<b>PHM510</b>	Quantum Field Theory	3		
2	<b>PHM512</b>	Advanced Instrumental Methods for analysis	3		
3	<b>PHE514</b>	Solar Thermal Energy	3		
4	<b>PHE516</b>	Soft Electronic Materials and Devices	3		

5	PHE518	Photovoltaics	3
6	PHE520	Thin Film Technology and Vacuum Science	3
<i>New course structure will be effective from admissions in 2025-2026. School/Department will not be bound to run all the courses. Minimum number of students may be fixed to run any elective course. New elective courses may be added as per requirement.</i>			