

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

**M.Sc. Physics  
(Specialization in Quantum Technology)**

**COURSE STRUCTURE**



## **MSc in Physics (Specialization in Quantum Technology)**

### ***Program Objectives:***

**Core Proficiency:** To provide a comprehensive understanding of fundamental and advanced physics concepts.

**Analytical Skills:** To develop strong analytical and problem-solving abilities applicable to diverse physical phenomena.

**Research Readiness:** To prepare students for research careers through exposure to advanced topics and practical laboratory experience.

**Specialized Knowledge:** To offer specialized knowledge in areas like quantum computation and applied photonics through elective courses.

### ***Program Outcome:***

**Foundational Mastery:** Graduates will demonstrate a deep understanding of classical and quantum mechanics, electrodynamics, statistical physics, and related mathematical tools.

**Experimental Competence:** Graduates will be proficient in conducting physics experiments and analyzing data through laboratory courses and projects.

**Advanced Application:** Graduates will be able to apply advanced physics concepts to specialized areas such as quantum optics, quantum computation, and photonics.

**Research and Problem-Solving:** Graduates will possess the skills necessary to conduct independent research and solve complex problems in physics and related fields.

<b>M.Sc. Physics (specialization in Quantum Technology) : Course Structure &amp; Syllabus (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/ PHUD412</b>	Optical metrology/ Fundamentals of Electrooptics & Photonics	<b>SEC</b>	3-0-0	3
6	<b>PHM414</b>	Physics Laboratory-II		0-0-4	4
7	<b>PHM416</b>	Computer Programming Laboratory		0-0-4	0
<b>TOTAL</b>				<b>21-0-8</b>	<b>22</b>
Total Contact Hours				26	
<b>SEMESTER-III</b>					
1	<b>PHM501</b>	Atomic and Molecular Physics	<b>C</b>	4-0-0	4
2	<b>PHQ503</b>	Quantum Optics and Quantum Communication	<b>C</b>	4-0-0	4
3	<b>PHQ505</b>	Quantum Metrology and Quantum Sensing	<b>C</b>	4-0-0	4
4	<b>PHQ410</b>	Quantum Computation	<b>C</b>	3-0-0	3
5		General Elective	<b>GE*</b>	3-0-0	3
6	<b>PHQ507</b>	Quantum Simulation Lab/Minor project	<b>C</b>	0-0-8	4
<b>TOTAL</b>				<b>18-0-8</b>	<b>22</b>
Total Contact Hours				26	
<b>SEMESTER-IV</b>					
1	<b>PHM502</b>	Major Project	<b>Project</b>	0-0-32	16
2		DSE-I	<b>DSE</b>	3-0-0	3
3		DSE-II	<b>DSE</b>	3-0-0	3
<b>TOTAL</b>				<b>6-0-32</b>	<b>22</b>
Total Contact Hours				38	
<b>Total credits for all semesters</b>					<b>90</b>
<b>* GENERIC ELECTIVE (GE): Course taken from other Departments</b>					
<b>S.No. CODE COURSE NAME CREDITS</b>					
<b>DISCIPLINE SPECIFIC ELECTIVES (DSE-I)</b>					
1	<b>PHM504</b>	Computational Physics			3
2	<b>PHP506</b>	Laser Physics			3
<b>DISCIPLINE SPECIFIC ELECTIVES (DSE-II)</b>					
1	<b>PHM510</b>	Quantum Field Theory			3
2	<b>PHP514</b>	Nonlinear Optics			3
3	<b>PHM512</b>	Advanced Instrumental Method for analysis			3
4	<b>PHP516</b>	Photonic Materials and Devices			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>					