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

M.Sc. Physics (Specialization in Photonics)

COURSE STRUCTURE

M.Sc. in Physics (Specialization in Photonics)

- **Program Objectives**
    1. To develop an in-depth understanding of optical phenomena and modern optical techniques of measurements.
    2. To gain thorough knowledge of light-matter interaction and its applications in diverse fields of science and technology.
    3. To introduce advanced computational techniques and data analysis in photonics technology.
    4. To enhance research skills through hands-on projects.
    5. To foster problem-solving abilities, critical thinking, and scientific communication skills applicable to academic, research, and industry careers.

- **Expected Outcomes**

    Upon successful completion of the program, students will be able to:

    1. Demonstrate comprehensive knowledge of advanced physics and its applications to Photonics technology.
    2. To have thorough understanding of optical communications, Laser Physics, Optical information processing and optical sensing and metrology.
    3. Apply mathematical models to design and simulate photonic devices.
    4. Conduct independent research projects, presenting findings effectively in written and oral formats.
    5. Collaborate effectively in multidisciplinary teams, contributing to advancements in scientific knowledge and technology.
    6. Pursue further research or careers in academic, industrial, or governmental institutions focused on Photonics and nano-photonics.

		M.Sc. Physics (with specialization in Photonics) Course Structure (w.e.f., Session 2025-26)			
S. No.	**CODE**	**COURSE NAME**	**Category**	**L-T-P**	**CREDITS**
		SEMESTER-I			
1	**PHM401**	Classical Mechanics and Relativity	**C**	4-0-0	4
2	**PHM 403**	Electrodynamics	**C**	4-0-0	4
3	**PHM 405**	Quantum Mechanics-I	**C**	3-0-0	3
4	**PHM 407**	Mathematical Physics	**C**	5-0-0	5
5	**PHM 409**	Statistical Physics	**C**	4-0-0	4
6	**PHM 411**	Physics Laboratory-I	**C**	0-0-8	4
		TOTAL		**20-0-8**	**24**
		Total Contact Hours		**28**	
		SEMESTER-II			
1	**PHM 402**	Quantum Mechanics-II	**C**	3-0-0	3
2	**PHM 404**	Solid State Physics	**C**	4-0-0	4
3	**PHM 406**	Electronics	**C**	4-0-0	4
4	**PHM 408**	Nuclear and Particle Physics	**C**	4-0-0	4
6	**PHM 410/ PHUD412**	Optical metrology/ Fundamentals of Electrooptics & Photonics	**SEC**	**3-0-0**	**3**
7	**PHM 414**	Physics Laboratory-II		**0-0-4**	**2**
8	**PHM 416**	Computer Programming Laboratory		**0-0-4**	**2**
		TOTAL		**21-0-8**	**22**
		Total Contact Hours		**26**	
		SEMESTER-III			
1	**PHM 501**	Atomic and Molecular Physics	**C**	4-0-0	4
	PHP 503	Optical communication Systems	**C**	4-0-0	4
2	**PHP505**	Optical System Design	**C**	4-0-0	4
3	**PHP410**	Electromagnetic Theory of Optics	**C**	**3-0-0**	**3**
4		General Elective	**GE***	3-0-0	3
5	**PHP507**	Optical simulation and design lab/Minor project	**C**	0-0-8	4
		TOTAL		**18-0-8**	**22**
		Total Contact Hours		**26**	
		SEMESTER-IV			
1	**PHM502**	**Major Project**	**Project**	0-0-32	16
2		**DSE-I**	**DSE**	3-0-0	3
3		**DSE-II**	**DSE**	3-0-0	3
		TOTAL		**6-0-32**	**22**
		Total Contact Hours		**38**	
		Total credits for all semesters			**90**
		* GENERIC ELECTIVE (GE): Course taken from other Departments			
S.No.	**CODE**	**COURSE NAME**			**CREDITS**
		DISCIPLINE SPECIFIC ELECTIVES (DSE-I)			
1	**PHM504**	Computational Physics			3
2	**PHP506**	Laser Physics			3
3	**PHP508**	Fourier Optics and Holography			3
		DISCIPLINE SPECIFIC ELECTIVES (DSE-II)			
1	**PHM510**	Quantum Field Theory			3
2	**PHM512**	Advanced Instrumental Methods for analysis			3
3	**PHP514**	Nonlinear Optics			3
4	**PHP516**	Photonic materials and devices			3
5	**PHP518**	Plasmonics and Nano-photonics			3
6	**PHP520**	Statistical and Quantum Optics			3
		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.			