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

M.Sc. Physics
(Specialization in Astrophysics)

COURSE STRUCTURE

MSc in Physics (specialization in Astronomy and Astrophysics)

- **Program Objectives**
  1. To develop an in-depth understanding of astronomical phenomena, celestial mechanics, stellar evolution, galactic structures, and cosmology.
  2. To introduce advanced observational techniques and data analysis methodologies in astronomy and astrophysics.
  3. To enhance research skills through hands-on projects, computational methods, and practical sessions in observational astronomy.
  4. 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 astronomy and astrophysics.
  2. Analyze and interpret astrophysical data using modern computational and observational tools.
  3. Develop and apply mathematical models to understand complex phenomena in the universe, such as stellar dynamics, black holes, and cosmological theories.
  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 physics or astrophysics.

	M.Sc. Physics (with specialization in Astronomy & Astrophysics) 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	**PHM403**	Electrodynamics	**C**	4-0-0	4
3	**PHM405**	Quantum Mechanics-I	**C**	3-0-0	3
4	**PHM407**	Mathematical Physics	**C**	5-0-0	5
5	**PHM409**	Statistical Physics	**C**	4-0-0	4
6	**PHM411**	Physics Laboratory-I	**C**	0-0-8	4
		TOTAL		**20-0-8**	**24**
		Total Contact Hours		**28**	
	SEMESTER-II				
1	**PHM402**	Quantum Mechanics-II	**C**	3-0-0	3
2	**PHM404**	Solid State Physics	**C**	4-0-0	4
3	**PHM406**	Electronics	**C**	4-0-0	4
4	**PHM408**	Nuclear and Particle Physics	**C**	4-0-0	4
5	**PHM410/ PHUD412**	Optical metrology/ Fundamentals of Electrooptics & Photonics	**SEC**	**3-0-0**	**3**
6	**PHM414**	Physics Laboratory-II		**0-0-4**	**2**
7	**PHM416**	Computer Programming Laboratory		**0-0-4**	**2**
		TOTAL		**21-0-8**	**22**
		Total Contact Hours		**26**	
	SEMESTER-III				
1	**PHM501**	Atomic and Molecular Physics	**C**	4-0-0	4
	PHA503	Astrophysics	**C**	4-0-0	4
2	**PHA505**	General relativity and cosmology	**C**	4-0-0	4
3	**PHA507**	**Introductory Astronomy**	**C**	**3-0-0**	**3**
4		**General Elective**	**GE**	3-0-0	3
5	**PHP509**	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	**PHA506**	Stellar structure and evolution			3
3	**PHA508**	Fluid Dynamics			3
DISCIPLINE SPECIFIC ELECTIVES (DSE-II)					
1	**PHM510**	Quantum Field Theory			3
2	**PHM512**	Advanced Instrumental Methods for analysis			3
3	**PHA514**	Galaxies: Formation, Structure and Dynamics			3
4	**PHA516**	Nuclear Astrophysics			3
5	**PHA518**	Modern Astronomical techniques			3
6	**PHA520**	Astrostatistics			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.