

MDC - DEPARTMENT OF PHYSICS
ASTRONOMY AND STARGAZING
PHY2F M 106

CO	CO Statement	Cognitive level	Knowledge category	Evaluation tools used
CO1	Introduction to Astronomy and an overview of ancient models to the modern astronomical theories.	U	C	Instructor-created exams / Quiz
CO2	Apply observational techniques and methods to effectively navigate the night sky. Understanding the milky way galaxy, planets and phases of the moon	Ap	P	Instructor-created exams / Quiz
CO3	Understanding the solar system and Its formation. Understanding how seasons happen. Overview about solar eclipse.	U	C	Observational Home Assignment / Viva Voce
CO4	Overview of constellations and stars, Seasonal sky gazing	Ap	P	Demonstration Skills / Viva Voce
CO5	Foster an interest in science. Develop a scientific temper, curiosity and a sense of wonder about the universe.	Ap	P	Instructor-created Home Assignments

* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C)

- Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)

Module	Unit	Content	Hrs (36 +9)	Marks (50)
I	Astronomy- an overview		10	15
	1	Ancient Astronomy- Astronomy around the World, Early Greek and Roman Cosmology, Ptolemy's Model of the Solar System, Astrology and	2	

		Astronomy- The Beginnings of Astrology, The Horoscope, Astrology Today		
	2	The Celestial Sphere, Celestial Poles and Celestial Equator, Rising and Setting of the Sun, Fixed and Wandering Stars, Constellations	2	
	3	The Birth of Modern Astronomy-Copernicus, The Heliocentric Model, Galileo and the Beginning of Modern Science, Galileo's Astronomical Observations, Kepler's Laws of Planetary Motion, Orbits in the Solar System	3	
	4	Telescopes, How Telescopes Work, Formation of an Image by a Lens or a Mirror	1	
	5	The Nature of Astronomy, The Nature of Science, The Laws of Nature, Numbers in Astronomy, A Tour of the Universe, The Universe on the Large Scale, The Universe of the Very Small, A Conclusion and a Beginning	2	
	Sections 1.1-1.4, 1.6-1.9, 2.1-2.4, 3.1,3.4, 6.1 of Book 1			
II	Step into the Sky		6	10
	6	Darkness and Light, Finding Your Way around the Sky, Cosmic Protractor, Special Effects, Night Vision, The Milky Way	2	
	7	Moon: Phases of Moon, Characteristics, Moonrise, Moonset, Moon Illusion	1	
	8	Sightseeing on the moon, Lunar topography, Formation	2	
	9	Lunar Eclipse	1	
	Chapter 1 & 2 of Book 2			
III	Sun and Planets		10	12
	10	Sun, How seasons happen, Sun paths, Telling time by the Sun	1	
	11	A visit to the sun, Power house, Storms on Sun, How the Sun formed, Our sun is born	2	

	12	Solar Eclipse, How Are Eclipse of the Sun and Moon the Same-and Different? Why Can't We Look at the Sun? What to take eclipse-watching?	1	
	13	Planets: Earth's siblings in the sky, Star or Planet? Sky Wanderer, Roaming around Solar system	2	
	14	Terrestrial & Jovian Planets, Small solar system Bodies, Meet the eight planets	2	
	15	How the Solar System Formed, Comets, Other suns and their Solar Systems	2	
	Chapter 3 & 4 of Book 2			
IV	Stars, constellations & stellar evolution		10	13
	16	Stars and Constellations: How stars move during the night, North star	2	
	17	North & South Using the Stars, The Zodiac and the Ecliptic, Rasis & Nakshatras	2	
	18	Seasonal Sky gazing Northern Hemisphere - November, December & January Stars. (Constellations Orion, Canis Major, Lepus, Taurus, Gemini, Auriga)	3	
	19	How Stars Are Born, Live, and Die, Meteor Shower. Deep Sky Objects.	3	
	Chapter 5 of Book 2 and Chapter 3 & 10 of Book 3			
V	Open Ended Module: Hands-on Astronomy		9	
	1	<ul style="list-style-type: none"> ● Demonstrations using Stellarium or any other sky guide apps – constellations, eclipses, planetary alignment etc. <p>https://va-iitk.vlabs.ac.in/?page=expl</p> <ul style="list-style-type: none"> ● Citizen science projects like Galaxy-zoo ● Smartphone Astrophotography 		
	References 4-7			

Books and References:

1. Astronomy 2e by Andrew Fraknoi, David Morrison, and Sidney C. Wolff, OpenStax CNX (Book 1)
<https://open.umn.edu/opentextbooks/textbooks/390>
2. Sky Gazing- A Guide to the Moon, Sun, Planets, Stars, Eclipses, and Constellations by Meg Thacher, Storey Publishing. (Book 2)
3. The Joy of Skywatching by Biman Bose, National Book Trust , India. (Book 3)
4. <https://stellarium.org/>
5. <https://va-iitk.vlabs.ac.in/?page=expl>
6. <https://www.zooniverse.org/projects/zookeeper/galaxy-zoo/>
7. A Guide to Smartphone Astrophotography by Dr. Sten Odenwald, a free e-book from NASA
<https://spacemath.gsfc.nasa.gov/SMBooks/AstrophotographyV1.pdf>