University of Kerala

Discipline	**PHYSICS**				
Course Code	**UK2MDCPHY102**				
Course Title	**BEYOND THE SKY**				
Type of Course	**MDC**				
Semester	**II**				
Academic Level	**100 - 199**				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours/Week
	3	3 Hrs	-	-	3 Hrs
Pre-requisites					
Course Summary	This course provides a comprehensive overview of astronomy, covering foundational concepts such as the scientific method and observational techniques. Students explore topics ranging from the formation of the solar system to the evolution of stars and galaxies. By the end of the course, students will have a deeper understanding of the cosmos and its wonders, from the smallest planets to the largest galaxies.				

BOOKS FOR STUDY:

1. Astrophysics: Stars and Galaxies, K. D. Abhayankar - University Press 2001
2. An Introduction to Astrophysics, Baidyanadh Basu – PHI Learning Private Limited 2010
3. Introduction to Astronomy and Cosmology – Ian Morison, Wiley 2008
4. Modern Physics, R Murugeshan and Kiruthiga Sivaprasath, S. Chand & Company Pvt. Ltd. 2014
5. From Dust to Life: The Origin and Evolution of our Solar System, John Chambers and Jacqueline Mitton, Princeton University Press 2017\

BOOKS FOR REFERENCE:

1. An Introduction to Modern Astrophysics – Carroll & Ostlie, Latest Edition
2. Weinberg, S. The First Three Minutes: A Modern View of The Origin Of The Universe (Basic Books, 1993)
3. Minding the Heavens by Leila Belkora
4. The Amateur Astronomer by Sir Patrick Moore

WEB REFERENCES

1. https://science.nasa.gov/solar-system/
2. https://spaceplace.nasa.gov/
3. A brief history of the big bang theory (https://www.worldscientific.com/doi/pdf/10.1142/9789811229442_0001)

DETAILED SYLLABUS: THEORY

Module	Unit	Content	Hrs	CO No
I		**Introduction to Astronomy (Book 1 - Chapter 1,3 & 4)**	**9**	
	1	Introduction –Importance of Astronomy	1	1
	2	Methods of Astronomy and Astrophysics –The Scientific Method - Scope of Astronomy	2	1
	3	Brightness Measurement 1. Magnitude Scale 2. Measurement of Apparent Luminosity 3. Corrections for Observed Magnitudes	3	1
	4	Distance Measurement 1. Measurement of Distances Within Solar System 2. Method of Parallax 3. The Method of Luminosity Distance	3	1
II		**Observational Astronomy (Book 1 - Chapter 19, Web Link -1,2)**	**10**	
	5	Optical Photometry and Spectroscopy, Astronomical Instruments - Optical Telescopes, Radio Telescopes, Space Telescopes - Hubble Space Telescope	6	2
	6	Night Sky 1. Stars and Planets in Night Sky 2. Comets and Meteors	4	2

		3. Familiarization with Common Constellations 4. Eclipses 5. Phases of the Moon		
III	**Solar System (Book-3, Chapter 2 & 3, Book-2, Chapter-5, Web Link-1,3)**		**9**	
	7	Formation of the Solar System	2	3
	8	The Sun –Photosphere - Chromosphere - Solar Corona – Prominences – Sunspots and Solar Cycle- Solar Flares	4	3
	9	The planets of the Solar System - Kuiper Belt – Oort Cloud	3	3
IV	**Stellar Evolution (Book-3, Chapter 7, Book-4, Chapter -78)**		**8**	
	10	Classification of Stars 1. Spectral Types of Stars - The Harvard Classification System 2. Hertzsprung—Russell Diagram	1	4
	11	Stellar Evolution - Low Mass Stars: 0.05–0.5 Solar Masses, Mid Mass Stars: 0.5–~8 Solar Masses, High Mass Stars in the Range 8 Solar Masses	5	4
	12	White Dwarfs - Chandrasekhar Limit, Neutron Stars, Black Holes, Supernova Explosion	2	4
V*	**Galaxies and Beyond (**Book-2 Chapter 21, 22, Book-3 Chapter 8 & 9**)**		**9**	
	13	Milky Way Galaxy - Size, Shape and Structure of the Milky Way	1	5
	14	Hubble Classification of Galaxies, Expanding Universe	2	5
	15	Big Bang Models of the Universe, The Cosmic Microwave Background	3	5
	16	Extrasolar Planetary Systems, Habitable Planets	3	5

COURSE OUTCOMES

No.	Upon completion of the course the graduate will be able to	Cognitive Level	PSO addressed
CO-1	Understanding the Foundations of Astronomy	R, U	PSO-1,2,3

CO-2	Exploring Observational Astronomy	U, Ap	PSO-1,2,3
CO-3	Understand the constituents and formation of the solar system	R, U	PSO-1,2,3
CO-4	Understanding Stellar Evolution	R, U	PSO-1,2,3
CO-5	Exploring Galaxies and Cosmology	R, U	PSO-1,2,3

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

Name of the Course: BEYOND THE SKY

Credits: 3:0:0 (Lecture: Tutorial: Practical)

CO No.	**CO**	**PO / PSO**	**Cognitive Level**	**Knowledge Category**	**Lecture (L)/ Tutorial (T)**	**Practical (P)**
CO-1	Understanding the Foundations of Astronomy	PO 1,4,8/ PSO 1,2,3	R, U	F, C	L	-
CO-2	Exploring Observational Astronomy	PO 1,2,4,6/ PSO 1,2,3	U, Ap	F, C, P	L	-
CO-3	Understand the constituents and formation of the solar system	PO 2,4/ PSO 1,2,3	R, U	F,C	L	-
CO-4	Understanding Stellar Evolution	PO 4/ PSO 1,2,3	R,U	F,C	L	-
CO-5	Exploring Galaxies and Cosmology	PO 4,8/ PSO 1,2,3	R,U	F,C	L	-

F-Factual, C- Conceptual, P-Procedural, M-Metacognitive

Mapping of COs with PSOs and POs :

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
CO-1	3	3	3	-	-	-	-	-	1	-	1	-	-	-	3
CO-2	3	3	3	-	-	-	-	1	1	-	1	-	2	-	-
CO-3	3	3	3	-	-	-	-	-	1	-	1	-	-	-	-
CO-4	3	3	3	-	-	-	-	-	-	-	1	-	-	-	-
CO-5	3	3	3	-	-	-	-	-	-	-	2	-	-	-	3

Correlation Levels:

Level	-	1	2	3
Correlation	Nil	Slightly / Low	Moderate / Medium	Substantial / High

Assessment Rubrics:

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

Mapping of COs to Assessment Rubrics:

CO No	Internal Exam	Assignment	Project Evaluation	End Semester Examinations
CO-1	✓	✓	-	✓
CO-2	-	-	-	✓
CO-3	-	-	-	✓
CO-4	✓	-	-	✓
CO-5	✓	✓	-	-