



Karmaveer Bhaurao Patil University, Satara

Syllabus for

B. Sc. I Astrophysics

Under

Faculty of Science and Technology

(As per NEP 2020)

With effect from Academic Year 2024-2025

Preamble:

This syllabus is framed to give sound knowledge with understanding of Physics to undergraduate students at first year of three years of B.Sc. degree course.

Students will learn Physics as a separate subject from B.Sc. I. The aim of the syllabus is to make the study of physics interesting, encouraging and popular to the students for higher studies including research.

The new syllabus is based on a basic and applied approach with vigor and depth. At the same time precaution is taken to make the syllabus comparable to the syllabi of other universities and the needs of industries and research.

The syllabus is prepared after discussion at length with number of faculty members of the subject and experts from industries and research fields.

The units of the syllabus are well defined, taking into consideration the level and capacity of students.

General Objectives of the Program:

1. To nurture academicians with focus and commitment to their subject.
2. To shape good and informed citizens from the students entering into the program.
3. To create a skilled work force to match the requirements of the society.
4. To impart knowledge of science is the basic objective of education.
5. To develop scientific attitude is the major objective to make the students open minded, critical, curious.
6. To develop skill in practical work, experiments and laboratory materials and equipments along with the collection and interpretation of scientific data to contribute the science.

Program Outcomes (POs):

1. The student will graduate with proficiency in the subject.
2. The student will be eligible to continue higher studies in his subject.
3. The student will be eligible to pursue higher studies abroad.
4. The student will be eligible to appear for the examinations for jobs in government organizations.
5. The student will be eligible to appear for jobs with minimum eligibility as science graduate.
6. The student will be eligible to appear for industrial jobs with minimum eligibility as physics graduate.

Program Specific Outcomes (PSOs):

1. Understand the basics of physics.
2. Learn, design and perform experiments in the labs to demonstrate the concepts, principles and theories learned in the classrooms.
3. Develop the ability to apply the knowledge acquired in the classroom and laboratories to specific problems in theoretical and experimental Physics.
4. Identify their area of interest in academic, research and development.
5. Perform job in various fields' like science, engineering, education, banking, business and public

service, etc. or be an entrepreneur with precision, analytical mind, innovative thinking, clarity of thought , expression, and systematic approach.

1. Title: Astrophysics

2. Year of Implementation: The syllabus will be implemented from June 2024.

3. Duration: The course shall be a full time.

4. Pattern: Semester examination.

5. Medium of Instruction: English

6. Evaluation Structure:

Semester - I

Course Name	Course Code	Internal Evaluation			ESE	Total Marks	Credits
		CCE-I	CCE-II	CCE-III			
Fundamentals of Astronomy	BAPT111	10	10	10	30	50	2
The Earth and Positional Astronomy	BAPT112	10	10	10	30	50	2
Practical Course –I	BAPP 113	20			30	50	2

Semester – II

Course Name	Course	Internal Evaluation			ESE	Total Marks	Credits
		CCE-I	CCE-II	CCE-III			
Introduction toSpace Science	BAPT 121	10	10	10	30	50	2
Basic Physics for Astronomy	BAPT122	10	10	10	30	50	2
Practical Course – II	BAPT 123	20			30	50	2

CCE*- Out of three CCE marks best of two CCE marks consider

7. Eligibility: 12th Pass with Science, or equivalent.

- Any other eligibility prescribed by UGC, Government of Maharashtra, Karmaveer Bhaurao Patil University, Satara.

Medium of Instruction: The medium of instructions shall be in English.

Batch Size: B.Sc. I -20 students per batch

B.Sc. II -16 students per batch**8. Eligibility of the Core Faculty:**

- **Assistant Professor:** Master of Science with specialization in Physics and NET/ SET/ Ph.D.
- **Associate Professor:** Master of Science in Physics with NET/ SET/Ph.D.
- **Professor:** Master of Science in Physics with NET/ SET/Ph.D.

Eligibility for Professor of Practice or Professional Trainer:

Any other eligibility as per the Guidelines and Regulations Passed by the Board of Concerned Studies, Academic Council of the College / University and Rules and Regulations of Karmaveer Bhaurao Patil University, Satara, Government of Maharashtra, and UGC norms.

Eligibility for Adjunct Professor of Practice or Professional Trainer:

As per eligibility prescribed by UGC

9. Course Structure: (NEP2.0)

Sem (Level)				OE	VSC/ SEC	AEC/ VEC/ IKS	OJT/ FP/ CEP/ CC/ RP	Total Credits	Degree/ Cum. Cr. MEME	
	Course I	Course II	Course III							
Sem I (4.5)	DSC I (2)	DSC I (2)	DSC I (2)	OE I (2) (P)	-	IKS I (2) (Generic)	-	22	UG Certificate: 44	
	DSC II (2)	DSC II (2)	DSC II (2)							
	DSC P I (2)	DSC P I (2)	DSC P I (2)							
Sem II (4.5)	DSC III (2)	DSC III (2)	DSC III (2)	OE II (2) (P)	-	VEC I (2) DEGG and IIC	-	22		
	DSC IV (2)	DSC IV (2)	DSC IV (2)							
	DSC P II (2)	DSC P II (2)	DSC P II (2)							
Credits	12	12	12	4	-	4	-	44	Exit option: 4 Cr. NSQF/Intern ship/Skill Courses	

Chairman
BoS in Physics



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Physics

Programme: B.Sc. I

Semester – I

Type : DSC-I

Marks: 50

Credits : 02 (30 Hrs)

From: A. Y. 2026-27

Name of Course: BAPT 111: Fundamentals of Astronomy

Course Objectives: Students should be able to,

1. understand history of astronomy.
2. learn astronomical theories and paradigm shifts.
3. describe stellar distance and stellar distance measurement methods.
4. know luminosity, stellar temperature and stellar radii.

Course Outcomes: Students will be able to,

1. discuss history of astronomy.
2. analyze astronomical theories and paradigm shifts.
3. examine stellar distance and stellar distance measurement methods.
4. define basic astronomical parameters.

Module	Title and Contents	Hrs
Module -1	History of Astronomy-I	07
	1.1 The ancient study of astronomy	
	1.2 Connections between seven days of week and astronomical objects	
	1.3 Ptolemy's astronomical work	
	1.4 Copernican heliocentrism	
Module -2	1.5 Tycho Brahe's contribution to astronomy	08
	History of Astronomy-II	
	2.1 Confirmation of Copernican theory by Galileo, Galileo's discovery with telescope	
	2.2 Galileo and the church's opposition	
	2.3 Kepler's contribution, Kepler's three laws of planetary motion	
Module -3	2.4 The law of gravity by Isaac Newton	08
	2.5 Newton's reasoning on motion of the moon.	
	The Stellar Distances	
	3.1 Measurement of terrestrial distances	
	3.2 Distance of moon, distance of planets	
Module -4	3.3 Geocentric parallax	07
	3.4 Trigonometric parallax of stars	
	3.5 Cosmic Distance Ladder	
Module -4	Basic Astronomical Parameters	07
	4.1 Astronomical scales (Distance, Mass and Time)	
	4.2 Brightness	

	4.3	Radiant Flux and Luminosity	
	4.4	Apparent and Absolute magnitude scale	
	4.5	Distance Modulus	
	4.6	Measurement of Astronomical Quantities (Distances, Stellar Radii, Masses of Stars from binary orbits, Stellar Temperature, Color index of stars)	

Reference Books:-

1. Bradley W. Carroll, Dale A.O, *An Introduction to Modern Astrophysics*, (Cambridge University Press, 2017)
2. Dan .M., *Astrophysics in a Nutshell*, (Princeton University Press, 2016)
3. Jeffrey O. B., Megan O. D., Nicholas .S., and Mark .V., *The Cosmic Perspective*, (Pearson, 2016)
4. Andrew .L., *An Introduction to Modern Cosmology*, (Wiley, 2015)
5. Baidhnath Basu, *An Introduction to Astrophysics*, (New Delhi, PHI Course Pvt. Ltd. 2nd edition, 2014)
6. Thomas T. Arny, *Exploration – An Introduction to Astronomy*, (Mosley-Year Book Inc, 3rd edition 1994).
7. Jay M, *Astronomy – From the Earth to the Universe* (Pasachoff Books /Cole Thomson Course. W B Saunders Co Ltd; 4 th revised edition 1992)
8. Frank H. S, *The Physics of Astrophysics, Volume II: Gas Dynamics*, (University Science Books, 1992)
9. Frank H. S, *The Physics of Astrophysics, Volume I: Gas Dynamics*, (University Science Books, 1991)
10. R. Jastrow, M. H. Thomson, *Astronomy Fundamentals and Frontiers*, (John Wiley and Sons Publications, 4th revised edition 1984).

Evaluation Pattern: 40:60

Total Marks: 50

Internal Examination: 20 Marks

CCE- I: 10 Marks

CCE- II: 10 Marks

CCE- III: 10 Marks

(Best of two CCE)

End Semester Examination: Total- 50 Marks

Question -1 – Attempt any five (5 X 2 M =10 M)

Question -2 – Solve any two (2 X 10 M =20 M)

Question -3 – Solve any four (4 X 5 M =20 M)

(50 marks are converted to 30 marks)



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Board of Studies in Physics

Programme: B.Sc. I

Semester – I

Type : DSC-II

Marks: 50

Credits : 02 (30 Hrs)

From: A. Y. 2026-27

Name of Course: BAPT 112: The Earth and Positional Astronomy

Course Objectives: Students should be able to,

1. learn the motion of Earth in space.
2. understand different types of eclipses.
3. know different coordinate systems.
4. study celestial coordinates.

Course Outcomes: Students will be able to,

1. interpret the effects of rotation of Earth.
2. classify different types of eclipses.
3. describe different coordinate systems.
4. implement celestial coordinates for position of star.

Module	Title and Contents	Hrs
Module -1	The Earth in Space	07
	1.1 Motions of the Earth, rotation of Earth	
	1.2 Proof of the Earth's motion	
	1.3 The moon and the Earth	
	1.4 The phases of the moon	
	1.5 Moon rise and moonset	
Module -2	Eclipse	08
	2.1 Solar eclipse: total eclipse, the annual eclipse, the partial eclipse	
	2.2 lunar eclipse	
	2.3 The eclipse seasons	
	2.4 The lunar tide, the solar tide	
	2.5 Effect of tides on the rotation of the Earth	
Module -3	Introduction to Coordinate Systems	08
	3.1 Cartesian coordinate system	
	3.2 Non-Cartesian coordinate systems	
	3.3 Plane polar coordinates system (position vector, length, areal and volume element)	
	3.4 Spherical coordinate system (position vector, length, areal and volume element)	
	3.5 Cylindrical coordinates system (position vector, length, areal and volume element)	
Module -4	Basic concepts of positional astronomy	07
	4.1 Spherical Trigonometry	
	4.2 Celestial sphere	

	4.3	Latitude and longitude	
	4.4	Positions of stars	
	4.5	Horizontal system, the equatorial system	
	4.6	Elliptical system, the Galactic coordinates, Perturbation of coordinates,	
Reference Books:-			
1. Andrew .L. , An Introduction to Modern Cosmology , (Wiley, 2015) 2. Dan .M., <i>Astrophysics in a Nutshell</i> , (Princeton University Press, 2016) 3. Jeffrey O. B., Megan O. D., Nicholas .S., and Mark .V., <i>The Cosmic Perspective</i> ,(Pearson, 2016) 4. Andrew .L. , <i>An Introduction to Modern Cosmology</i> , (Wiley, 2015) 5. Baidhnath Basu, An Introduction to Astrophysics, (New Delhi, PHI Course Pvt. Ltd. 2nd edition, 2014) 6. Thomas T. Arny, Exploration – An Introduction to Astronomy, (Mosley-Year Book Inc, 3rd edition 1994). 7. Jay M, Astronomy – From the Earth to the Universe (Pasachoff Books /Cole Thomson Course. W B Saunders Co Ltd; 4 th revised edition 1992)			
Evaluation Pattern: 40:60			
Total Marks: 50			
Internal Examination: 20 Marks		End Semester Examination: Total- 50 Marks	
CCE- I: 10 Marks		Question -1 – Attempt any five (5 X 2 M =10 M)	
CCE- II: 10 Marks		Question -2 – Solve any two (2 X 10 M =20 M)	
CCE- III: 10 Marks		Question -3 – Solve any four (4 X 5 M =20 M)	
(Best of two CCE)		(50 marks are converted to 30 marks)	



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Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Physics

Programme: B.Sc. I

Semester – I

Type : DSC-P(I)

Marks: 50

Credits : 02 (60 Hrs)

From: A. Y. 2026-27

Name of Course: BAPP 113: Experimental Techniques in Astronomy Lab I (Based on the BAPT111 and BAPT112)

Course Objectives: Students should be able to,

1. develop fundamental experimental skills to perform an experiment.
2. learn the experimental setup and procedure to perform given experiment.
3. develop skills in taking readings/observations obtained from these instruments.
4. learn how to analyze and interpret experimental data, including error analysis, graphical representation.

Course Outcomes: Students will be able to,

1. demonstrate basic experimental skills by setting up laboratory equipment/ experiment set up safely and efficiently, instruments calibration, carry out experimental procedure, data collection, analysis and report it in a written sheet manner.
2. develop skills in taking precise and accurate measurement to minimize errors.
3. display practical skills in measuring focal length using experimental setups.
4. exhibit practical skills in comparing intensities of different bulbs using L.B. photometer.

Practical No.	Title and Contents	Hrs
1.	To determine intensity distribution curve of ordinary electric bulb using photo cell.	4
2.	To determine focal length of a convex lens by plane mirror method.	4
3.	To determine the refractive index of a glass slab using a travelling microscope.	4
4.	To determine percentage error and relative error.	4
5.	Determining light intensity with a Lummer Brodhum photometer.	4
6.	To measure light pollution at different places.	4
7.	To analyze the motion of a projectile and determine its range and maximum height using cartesian coordinates.	4
8.	Spectral analysis of light sources (mercury source, sodium source, hydrogen source, helium source)	4
9.	To determine particle size of lycopodium powder.	4
10.	Exploring Lunar Phases: Observing and Analyzing Moon Phases	4
11.	To observe and analyze the PLEIADS star cluster, noting its characteristics and identify individual stars within the cluster using software.	4
12.	To observe planet Venus, noting its characteristics and phases.	4
13.	To familiarize with Stellarium software.	4
14.	To understand variation in temperature at deferent altitude with given data.	4
15.	To calculate and design optimal paths for spacecraft to efficiently navigate and reach their intended destinations	4

Reference Books:-

1. Gupta S.L. and V. Kumar., Practical physics.(Meerut: Pragati Prakashan,29th Edition, 2017).
2. Chattopadhyay D. and P. C. Rakshit, An advanced course in practical physics (Calcutta: New Central Book, 8th Edition, 2013)
3. I. Prakash and Ramakrishna, A Textbook of Practical Physics, (Kitab Mahal,11th Edition ,2011)
4. Singh H. Harnam and Hemne P. S., B.Sc. Practical Physics, (New Delhi, S. Chand & Co. Ltd., 17th Edition, 2011)
5. White, Marsh W. and Kenneth V. Manning, Experimental college physics; a laboratory manual, (New York: McGraw-Hill Publication,3rd Edition, 1954)
6. Worsnop B.L. and H.T. Flint., Advanced practical physics for students, (London: Methuen & Co., Ltd, 9th Edition, 1951).

Evaluation Pattern: 40:60**Total Marks: 50****Internal Examination: 20****End Semester Examination: 30**



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Board of Studies in Physics

Programme: B.Sc. I

Semester – I

Type : DSC-III

Marks: 50

Credits : 02 (30 Hrs)

From: A. Y. 2026-27

Name of Course: BAPT 121: Introduction to Space Science

Course Objectives: Students should be able to,

1. explain Kepler's Laws of planetary motion
2. identify the major components and layers of Earth's atmosphere.
3. demonstrate the use of basic tools and instruments employed in space science and astronomy.
4. differentiate between fundamental particles

Course Outcomes: Students will be able to,

1. explain and classify the different layers and components of Earth's atmosphere.
2. understand tools for space science.
3. recall the fundamental particles and fundamental forces of nature.
4. distinguish and classify fundamental particles into mesons, leptons, and hadrons.

Module	Title and Contents	Hrs
Module -1	Introduction to Planetary and Interplanetary Space	07
	1.1 The Solar System and its components	
	1.2 Exploration of the Solar System using Ground-based and Space-based Telescopes	
	1.3 Kepler's Laws (Expression)	
	1.4 Introduction to Space Missions for Planetary Exploration	
	1.5 Space agencies	
Module -2	Earth's Atmosphere	08
	2.1 Structure of Earth's Atmosphere	
	2.2 Lower, Middle and Upper Troposphere (0-10 km)	
	2.3 Stratosphere (10-50km)	
	2.4 Ionosphere (50-1000 km), Protonosphere (10,000 to 60,000 km towards sun)	
	2.5 space (beyond 60,000 km towards the sun), Earth as a magnetic comet.	
Module -3	Tools for Space Science	08
	3.1 Sensors for the astronomical parameters	
	3.2 Observational and experimental tools for Space Science: kites	
	3.3 Whether Balloons	
	3.4 Aeroplanes,	
	3.5 Satellite payloads	
Module -4	Fundamental Particles and basic forces	07
	4.1 Protons, Electrons, Neutrons, Neutrinos	
	4.2 Mesons, leptons, hadrons	
	4.3 Fundamental forces: Gravitational force	

	4.4	Electromagnetic force	
	4.5	Strong nuclear force	
	4.6	Weak nuclear force	
Reference Books:-			
1. Jay M, Astronomy – From the Earth to the Universe (Pasachoff Books /Cole Thomson Course. W B Saunders Co Ltd; 4 th revised edition 1992) 2. Thomas T. Arny, Exploration – An Introduction to Astronomy, (Mosley-Year Book Inc, 3 rd edition 1994). 3. Frank H. S, The Physics of Astrophysics, Volume II: Gas Dynamics, (University Science Books, 1992) 4. Frank H. S, The Physics of Astrophysics, Volume I: Gas Dynamics, (University Science Books, 1991) 5. Davis.K., <i>Ionospheric Radio Propagation</i> (Institution of Engineering and Technology, 1990). 6. R. Jastrow, M. H. Thomson, Astronomy Fundamentals and Frontiers, (John Wiley and Sons Publications, 4 th revised edition 1984). 7. Odishaw.H., Sun, Upper Atmosphere and Space, (The MIT Press, 1 st Edition, 1964)			
Evaluation Pattern: 40:60			
Total Marks: 50			
Internal Examination: 20 Marks		End Semester Examination: Total- 50 Marks	
CCE- I: 10 Marks		Question -1 – Attempt any five (5 X 2 M =10 M)	
CCE- II: 10 Marks		Question -2 – Solve any two (2 X 10 M =20 M)	
CCE- III: 10 Marks		Question -3 – Solve any four (4 X 5 M =20 M)	
(Best of two CCE)		(50 marks are converted to 30 marks)	



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Board of Studies in Physics

Programme: B.Sc. I

Semester – I

Type : DSC-IV

Marks: 50

Credits : 02 (30 Hrs)

From: A. Y. 2026-27

Name of Course: BAPT 122: Basic Physics for Astronomy

Course Objectives: Students should be able to,

1. state properties of electromagnetic radiation
2. discuss optical properties of lenses and mirrors.
3. distinguish types of scattering and its effects.
4. explain different nuclear reactions.

Course Outcomes: Students will be able to,

1. recall the properties of electromagnetic radiation.
2. compare the optical properties of lenses and mirrors.
3. differentiate between different types of scattering and explain their effects.
4. explain different types of nuclear reactions.

Module	Title and Contents	Hrs
Module -1	Electromagnetic radiation	07
	1.1 The nature of light: light as an electric vibration,	
	1.2 Properties of electromagnetic wave	
	1.3 Electromagnetic spectra	
	1.4 Electromagnetic radiation from a heated object	
	1.5 Blackbody radiation Doppler shift blue shift red shift	
Module -2	Optics	08
	2.1 Reflection of light	
	2.2 Spherical mirrors, mirror formula	
	2.3 Refraction of light, refraction at spherical surfaces	
	2.4 Lenses, thin lens formula, lensmaker's formula	
	2.5 Magnification, power of a lens, combination of thin lenses in contact	
Module -3	Scattering of light	08
	3.1 Brief discussion on scattering of light	
	3.2 Types of scattering: Based on Size of the Scattering Particle	
	3.3 Types of scattering: Based on Energy Change elastic scattering	
	3.4 Types of scattering: Based on the Nature of the Scattering Medium	
	3.5 Blue color of sky and reddish appearance of the sun at sunrise and sunset.	
Module -4	Nuclear reaction	07
	4.1 Types of nuclear reactions	
	4.2 Controlled chain reaction	
	4.3 Nuclear reactor	

	4.4	Nuclear fusion reaction	
	4.5	Energy released in fusion reaction	
	4.6	Nuclear reactions in star	
Reference Books:-			
1. Ajoy Ghatak, Optics (McGraw Hill; Seventh edition, 2020) 2. Dikshitulu K. Kalluri, Principles of Electromagnetic Waves and Materials (CRC Press; 2nd edition, 2019) 3. Francis A. Jenkins and Harvey E. White, Fundamentals of Optics (McGraw Hill Education; 4th edition, 2017) 4. Thomas T. Arny, Exploration – An Introduction to Astronomy, (Mosley-Year Book Inc, 3rd edition 1994). 5. Frank H. S, The Physics of Astrophysics, Volume II: Gas Dynamics, (University Science Books, 1992) 6. B. B. Laud, Electromagnetics, (New Delhi: New age international (P) Ltd., 2nd Edition, 1987). 7. David Griffiths, Introduction to elementary particles, (John Wiley & Sons, Inc., 2nd Edition, 1987)			
Evaluation Pattern: 40:60			
Total Marks: 50			
Internal Examination: 20 Marks		End Semester Examination: Total- 50 Marks	
CCE- I: 10 Marks		Question -1 – Attempt any five (5 X 2 M =10 M)	
CCE- II: 10 Marks		Question -2 – Solve any two (2 X 10 M =20 M)	
CCE- III: 10 Marks		Question -3 – Solve any four (4 X 5 M =20 M)	
(Best of two CCE)		(50 marks are converted to 30 marks)	



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Board of Studies in Physics

Programme: B.Sc. I

Semester – I

Type : DSC-P(II)

Marks: 50

Credits : 02 (60 Hrs)

From: A. Y. 2026-27

Name of Course: BAPP 123: Experimental Techniques in Astronomy Lab II (Based on BAPT121 and BAPT122)

Course Objectives: Students should be able to,

1. develop fundamental experimental skills to perform an experiment.
2. learn the experimental setup and procedure to perform given experiment.
3. develop skills in taking readings/observations obtained from these instruments.
4. learn how to analyze and interpret experimental data, including error analysis, graphical representation

Course Outcomes: Students will be able to,

1. apply experimental and problem-solving skills to perform experiments and resolve technical challenges.
2. analyze experimental observations and readings using numerical calculations and graphical representation to draw appropriate conclusions.
3. evaluate experimental results by correlating theoretical concepts and calculated values with practical observations.
4. demonstrate collaborative skills while working effectively as part of a group to perform experiments.

Practical No.	Title and Contents	Hrs
1.	To determine the approximate size of the Sun using their angular diameter and known distance.	4
2.	To determine the approximate sizes of the Moon using their angular diameter and known distance.	4
3.	To determine size of the Sun and Moon using the eclipse Method.	4
4.	To explore and understand the relationship between the distance from a light source and the observed brightness.	4
5.	A simple night sky observation activity and identify key celestial objects visible to the naked eye.	4
6.	To simulate the use of a telescope and explore different astronomical objects.	4
7.	To observe and create a constellation map by identifying and drawing Orion constellation visible in the night sky.	4
8.	To use specific constellations to locate and determine the direction of the North Pole.	4
9.	To simulate and visualize the energy levels in the Bohr model of atomic physics using a software-based simulation tool.	4
10.	To observe and create a constellation map by identifying and drawing Taurus constellation visible in the night sky.	4
11.	Study of Michelson Morley interferometer.	4
12.	To analyze and interpret exoplanet transit data to detect and characterize exoplanets.	4

13.	To familiarize with Cassegrain telescope and make observation of moon	4
14.	To familiarize with Galilean telescope and make observation of moon.	4
15.	To use astrophysical techniques to collect data and gain insights into Earth's atmosphere.	4
Reference Books:-		
1. Gupta S.L. and V. Kumar., Practical physics.(Meerut: Pragati Prakashan,29th Edition, 2017). 2. Chattopadhyay D. and P. C. Rakshit, An advanced course in practical physics (Calcutta: New Central Book, 8th Edition, 2013) 3. I. Prakash and Ramakrishna, A Textbook of Practical Physics, (Kitab Mahal,11th Edition ,2011) 4. Singh H. Harnam and Hemne P. S., B.Sc. Practical Physics, (New Delhi, S. Chand & Co. Ltd., 17th Edition, 2011) 5. White, Marsh W. and Kenneth V. Manning, Experimental college physics; a laboratory manual, (New York: McGraw-Hill Publication,3rd Edition, 1954) 6. Worsnop B.L. and H.T. Flint., Advanced practical physics for students, (London: Methuen & Co., Ltd, 9th Edition, 1951).		
Evaluation Pattern: 40:60		
Total Marks: 50		
Internal Examination: 20		End Semester Examination: 30
