

B.Sc. Astronomy

Programme Outcomes

This B.Sc. Programme in astronomy is designed to develop in the students the following competency set:

- i) Familiarize and appreciate the field of astronomy and its relation with various allied fields of Science viz., Physics, Biology, Chemistry, Mathematic, Geology, meteorology etc. as it is multidisciplinary in nature.
- ii) Communicate about celestial objects such as parent star, planets, dwarf planets, satellites etc.
- iii) Describe the classification of stars, stellar evolution, interstellar matter, galaxies etc.
- iv) Current understanding and investigation of the basic knowledge about cosmic threats viz., comets, asteroids, meteoroids.
- v) Explain practical application of observational techniques,
- vi) Solve problems with scientific reasoning and critical thinking skills.
- vii) Understand the impact of astronomical bodies and formations on earth and climate.
- viii) Communicate astronomical concepts and theories effectively.
- ix) Prepare graduates with strong foundation to pursue advanced degree in Astronomy or Physics /Astrophysics or seek career in observatory /science education.

Programme Specific outcomes

- i) Acquire knowledge of the Physical universe and its evolution.
- ii) Define and use fundamental principles and techniques of astronomy and astrophysics.
- iii) Understand and apply basic physics and computational techniques to solve problems in astrophysics, and interpret the results.
- iv) Familiarize with the basic principles and theories of new emerging area of astrophysics and astrobiology.
- v) Attain the knowledge of evolution, classification, formation of, stars, planets, satellites, and theory of interstellar medium.
- vi) Familiarize with the structure and population of the Milky Way galaxy, properties of galaxies and its classifications.
- vii) Demonstrate the ability to link observation and theory.
- viii) Learn theoretical and practical aspects of modern observational astronomy. Photometry, spectroscopy, stellar classification, detectors, and basic information of telescopes.

Course Structure of B.Sc. (Astronomy) Semester I - IV	
B.Sc. Semester I	B.Sc. Semester II
Paper I : Spherical Astronomy I Paper II: General Astronomy I	Paper I : General Astronomy II Practical
B.Sc. Semester III	B.Sc. Semester IV
Paper I : Spherical Astronomy II Paper II: Stellar Astronomy I	Paper I : Stellar Astronomy II Practical

B.Sc. Semester I

Paper I: Spherical Astronomy I

Course Outcomes:

The course describes the science of cosmology and its relation to other fields of science.

Course specific Outcomes: At the end of this course, students will be able to

1. Learn and use new vocabulary words (great circle, spherical angle, spherical triangle, Euclidean geometry).
2. Discover facts about spherical triangles.
3. To understand the different coordinated systems to locate the celestial object in space.
4. Effect of the refraction phenomena for the celestial objects
5. Understand Kepler's Three Laws of Planetary Motion.
6. Visualize the effect of the three laws on the orbits of planets, asteroids, and comets
7. Understand how the phase of the Moon is controlled by the relative positions of the Sun and Moon in the sky.

Paper II: General Astronomy I

Course Outcomes:

The course describes the science of cosmology and its relation to other fields of science.

Course specific Outcomes: At the end of this course, students will be able to

1. To understand the importance of the mother planet and its atmosphere.
2. To understand the importance of the earth's magnetosphere.
3. Understand the formation of moon and its surface features.
4. To get knowledge of Earth moon system.
5. To explore the parent Star Sun and its importance for sustaining life on the earth.

6. Techniques to explore the solar surface temperature.
7. Understand the solar atmosphere and its effect on the Earth and other planets.
8. To understand the origin of the solar system.
9. To explore the Terrestrial and Jovian planets.
10. Study of Comets and Meteoroids and why they are threats for the earth.

B.Sc. Semester II

Paper I: General Astronomy II

Course Outcomes:

The course describes the science of cosmology and its relation to other fields of science.

Course specific Outcomes: At the end of this course, students will be able to

1. Basic information about the formation of stars, their magnitudes and luminosity
2. Study of distances of stars, stellar mass and temperature
3. Knowledge of astronomical instrument, telescopes, its mountings and image defects
4. Elementary idea of dispersion and resolution via spectrograph, prisms and grating and photoelectric photometers

Practical

Learning Objectives:

1. Learning the conversion of time. Sidereal time to mean time and vice e versa.
2. How to calculate the shortest distance between the places on the surface of the earth...
3. To know the terrestrial longitude latitude and celestial longitude.
4. To know the rising and setting time of celestial objects by mathematical calculations.
5. Use of the sextant to study about different celestial objects.

B.Sc. Semester III

Paper I: Spherical Astronomy II

Course Outcomes:

The course describes the science of cosmology and its relation to other fields of science.

Course specific Outcomes: At the end of this course, students will be able to

1. To understand the phenomenon of parallax in the celestial objects
2. Effect of the aberration in celestial objects.
3. Causes of the precessional motion of the earth.
4. To learn the precession and Nutation effect.
5. To understand the phenomenon of the solar and lunar eclipses.
6. Study of the Binaries, its formation and detecting techniques.
7. Usages of the Astronomical transit instruments.

Paper II: Stellar Astronomy I

Course Outcomes:

The course describes the science of cosmology and its relation to other fields of science.

Course specific Outcomes: At the end of this course, students will be able to

1. Learning of stellar spectra and stellar radiations with its applications
2. Study of variation of stellar luminosities with stellar classes and life cycle of a star
3. To know the effect of temperature on stellar spectra and basics of its quantitative analysis
4. Understand the variation in frequencies of light with the observer and its applications
5. To study the importance of stellar magnetic fields, stellar populations and their classification.

B.Sc. Semester IV

Paper I: **Stellar Astronomy II**

Course Outcomes:

The course describes the science of cosmology and its relation to other fields of science.

Course specific Outcomes: At the end of this course, students will be able to

1. Knowledge of the basic properties and classifications of binaries and their detecting techniques.
2. Knowledge of formation of intrinsic variable stars and their types.
3. Study of formation of Novae, Supernovae and Pulsars
4. Understanding of basic properties of galaxies and its modification.
5. Learning of formation of black holes and their properties

Practical**Learning Objectives:**

1. To calculate the orbital elements of visual binary to fix the true orbit of the binary.
2. Problem based on the magnitudes of the star, absolute and apparent magnitudes.
3. To study the azimuth of Sun by theodolite.