Astronomy
B. Sc. Semester III
(Applicable from July 2019)

Paper I: Spherical Astronomy

Unit I

Parallax: Geocentric parallax, Annual parallax, Parallax of Moon, the Sun, the planets and stars.

Unit II

Aberration: Diurnal, Annual, Planetary

Unit III

Precession and Nutation, Eclipses of the Sun and the Moon.

Unit IV

Determination of position, Proper motion of stars; Transit instrument.

Books recommended:

- Spherical Astronomy by W. M. Smart
- Textbook on Spherical Astronomy by Gorakh Prasad

Practical B. Sc. Semester III Astronomy

1. Determination of absolute magnitude of a star given its apparent magnitude and parallax.
2. Problem on mass-luminosity relationship.
3. Determination of combined magnitude of a binary system.
4. Calculation of relative brightness of one star with respect to other given their magnitudes.
5. Calculation of bolometric magnitude, diameter, distance and the mass of a star.
6. Determination of stellar position at an epoch, given its position at another epoch, applying corrections for precession.

7. Computation of the elements of the true orbit of a visual binary by Zwier's method.
8. Computation of the elements of the true orbit of a spectroscopic binary by Lehman-Filhes method.
9. Determination of azimuth of the Sun from its altitude by theodolite, the latitude of the place being known.
10. Determination of azimuth of the Sun from its altitude by theodolite, the time being known.

Books recommended:

- Practical Astronomy by W. Schroeder
- Practical Astronomy by J. J. Nassau
- Practical Astronomy by G. L. Hosmer and J. M. Rubbins
- Practical Astronomy With Your Calculator by Peter Duffett-Smith

Astronomy
B. Sc. Semester IV
(Applicable from January 2020)

Paper I: Stellar Astronomy I

Unit I

Elementary ideas about formation of spectral lines, spectra, Laws of radiation and their application.

Unit II

Spectral classification, Luminosity classification, HR diagram, Elementary ideas about stellar evolution.

Unit III

Characteristics of stellar spectra, Description of peculiar stellar spectra, Effects of temperature and luminosity, Explanation on the basis of Saha and Boltzman equations.

Unit IV

Astronomical utility of Doppler effect, Astronomical utility of Zeeman effect, Measurements of Stellar magnetic fields, Polarization measurements, causes of polarization, Stellar populations: their classification and characteristics.

Books recommended:

- Introduction of Astronomy by Fredrick and Baker
- Introduction to Astronomy by C. Payne Gaposhkin
- Structure and Evolution of Stars by M. Schwarzchild
- Atmospheres of Sun and Stars by L. H. Aller
- Astronomical Techniques by Hiltner

Paper II: Stellar Astronomy II

Unit I
Binaries: Visual, Spectroscopic and Eclipsing binaries, Determination of orbit of a visual binary by Zwier's method, Lehman-Filhes method of determining spectroscopic binary orbital elements, Information available from binary stars.

Unit II
Intrinsic variable stars: Study of RR-Lyrae stars, Cepheids, Novae and Super Novae, Energy involved in eruptions, T-Tauri stars, Pulsars.

Unit III
Extragalactic Nebulae, Hubble classification of galaxies and its modifications.

Unit IV
X-Ray binaries, Black holes and their elementary properties.

Books recommended:

- Textbook on Spherical Astronomy by W. M. Smart
- Introduction of Astronomy by Fredrick and Baker
- Introduction to Astronomy by C. Payne Gaposhkin
- Astrophysics: Stars and Galaxies by K. D. Abhyankar
- Physics Astronomy frontiers by Fred Hoyle and Jayant Narlikar