

# Indian Institute of Technology, Kanpur

## Proposal for a New Course

1. Course No: SPA 6XX
2. Course Title: Introduction to Observational Techniques & Telescopes
3. Lectures per week: 3 (L), Tutorial: 0 (T), Laboratory: 0 (P), Additional hours: (0-2): 0 (A), Module Credits ( $3*L+2*T+P+A$ ): 5, Duration of Course: Half Semester
4. Proposing Department: Space Planetary & Astronomical Sciences & Engineering (SPASE)
5. Proposing Instructor: Prashant Pathak and Amitesh Omar
6. Course Description

(A) Objectives: The course aims to introduce basic ideas and concepts of various observational techniques focused to general X-ray, UV, optical and IR techniques.

(B) Contents (preferably in the form of 5 to 10 broad titles):

1. **Introduction:** Night sky, celestial sphere, Stellarium, motion of planets, moon and comets, constellation and nakshtras, sidereal time, calendars, Precession, proper motion and parallax, eclipses and transits, brightness, Flux, luminosity, magnitude scale, filters, Atmospheric transmission windows on Earth, atmospheric seeing, extinction. (7-lectures)
2. **Tools:** Observing tools in ancient astronomy, modern optical and infrared telescopes, equatorial and alt-az mounts, space observatories, detectors in X-ray, UV, optical and IR. (7-lectures)
3. **Measurement Techniques:** - Photometry, spectroscopy (doppler shift, spectral resolution, FWHM, convolution) fast imaging and timing of photon arrivals, speckle, adaptive and active optics, calibration. (7-lectures)

(C) Pre-requisites: None

(D) Short summary for including in the Courses of Study Booklet: This course will introduce students observational techniques and telescopes in all major wavebands along with detectors and calibration aspects in astronomy.

7. Recommended Books:

- Astrophysical Techniques: C. R. Kitchin
- To Measure the Sky: An Introduction to Observational Astronomy: Frederick R. Chromey
- Handbook of X-ray Astronomy: K. Arnaud, R. Smith, A. Siemig-nowska
- Handbook of Infrared Astronomy: I. S. Glass
- Handbook of CCD Astronomy: S. B. Howell

8. Any other remarks:

Dated:                      Proposer:

Dated:                      DUGC/DPGC Convener:

The course is approved/not approved

Chairman, SUGC/SPGC

Dated: