

## Indian Institute of Technology, Kanpur Proposal for a New Course (Modular)

1. Course No: SPA624M
2. Course Title: Optical Instrumentation Laboratory
3. Lectures per week: 0 (L), Tutorial: 0 (T), Laboratory: 9 (P), Additional hours: (0-2): 0 (A), Credits (3\*L+2\*T+P+A): 5, Duration of Course: Half Semester (Modular)
4. Proposing Department: Space Planetary & Astronomical Sciences & Engineering (SPASE)
5. Proposing Instructors: Amitesh Omar & Prashant Pathak 6.

Others interested in teaching this course:

### 6. Course Description

(A) Objectives: The course aims to provide comprehensive knowledge on instrumentation techniques related to astronomy, planetary and space sciences and engineering via building some application modules in the laboratory.

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

Students will be required to build and demonstrate at least 2 application modules from the list provided below -

1. Low light-level Detection in the optical and near-infrared using CCD and CMOS cameras coupled with optical filters.
2. Setting up an optical telescope suitable for tracking celestial sources and carry out basic on-sky observations.
3. Setting up a polarimetry instrument and demonstrate an application in space sciences.
4. Setting up a spectrometer and demonstrate an application in space sciences.
5. Setting up a LIDAR and demonstrate an application in space sciences.
6. Setting up an optical interferometer and demonstrate its application in astronomy.
7. Setting up a wave-front sensing instrument and demonstrate its application in astronomy.

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(C) Pre-requisites: None

(D) Short summary for including in the Courses of Study Booklet:

The lab course aims at developing and demonstrating optical instrument modules related to Space sciences and Astronomy based on the technologies and components presently in use such as CCD, CMOS,

high-contrast nano-particle dispersed polarizers, holographic gratings, hyper and multi-spectral sensing, Shack-Hartmann wavefront sensor. This instrumentation course is application oriented. The modules will be related to detector, spectrometers, polarimetry, telescopes, interferometry and wave-front sensing. The students will learn techniques of building instruments and will get comprehensive exposure to instrumentation methods and observations techniques.

7. Recommended Books:

Necessary reading material and instruction documents will be provided during the course.

8. Any other remarks:

Dated: Proposer: (Amitesh Omar & Prashant Pathak) Dated:

DUGC/DPGC Convener:

The course is approved/not approved

Chairman, DUGC/DPGC

Dated: