IIT Madras Centre for Indian Knowledge Systems

COURSE TITLE: ASTRONOMY IN INDIA

Focus Area/Subject Area: History and Development of Astronomy in India

Course Frequency: 3 Hrs/Week (Total: 42 Hrs)

Eligibility: Undergraduate Degree

Prerequisite: High School with Maths and Basic Sanskrit

Details of the Instructor:

Dr. Aditya Kolachana

Course Objectives:

This course will introduce students to the numerous advances made in theoretical as well as observational astronomy in India over the course of history, and examine their scientific and pedagogical significance in the modern context.

Learning Outcome:

The students will gain an understanding of the history and development of astronomy in India. They will be familiarized with some of the fundamental algorithms of astronomy developed by Indian astronomers, the underlying mathematical rationale, as well as applications in the preparation of calendars, etc.

SYLLABUS

Unit 1: Astronomy before Āryabhaṭa
  a) Astronomical references in the Vedas
  b) Astronomical model and algorithms of the Vedāṅga-jyotiṣa
  c) The Pañca-siddhāntikā of Varāhamihira

Unit 2: Important astronomers and texts
  a) A brief historical overview
  b) Āryabhaṭīya of Āryabhaṭa
  c) Tantrasaṅgraha of Nīlakaṇṭha Somayājī

Unit 3: Calendrical computations
  a) Construction of the Indian luni-solar calendar
  b) Important astronomical instruments described in Indian texts
  c) Indian records of astronomical observations (inscriptions, copper plates, texts etc.)

References:
1. The Science of the Śulba, B. Datta, University of Calcutta, 1932
2. History of Hindu Mathematics: A Source Book, B. Datta and A. N. Singh, Asia Publishing House, 1962
3. Āryabhaṭīya of Āryabhaṭa, K. S. Shukla and K. V. Sarma, Indian National Science Academy, 1976
4. Geometry in Ancient and Medieval India, T. A. Sarasvati Amma, Motilal Banarasidass, 2007
5. Gaṇita-yukti-bhāṣā of Jyeṣṭhadeva, K. V. Sarma et. al., Hindustan Book Agency, 2008
6. Studies in Indian Mathematics and Astronomy: Selected Articles of Kripa Shankar Shukla, Kolachana et. al. (eds.), Culture and History of Mathematics 12, HBA, 2019
7. Līlāvatī of Bhāskarācārya, H. T. Colebrooke, ed. by H. C. Banerji, Kitab Mahal, 1967
8. Mathematics in India: From Vedic Period to Modern Times, M. D. Srinivas and K. Ramasubramanian and M. S. Sriram, NPTEL course