

## ABOUT THE IIT(ISM) DHANBAD

The Indian School of Mines was formally opened on 9th December 1926, by Lord Irwin, the then Viceroy of India to address the need for trained manpower related to mining activities in the country with disciplines of Mining and Applied Geology. In 1967 it was granted the status of a deemed to be university under Section 3 of UGC Act, 1956. Under the IIT act 1961 it was granted the status of an IIT. Over the years, it has expanded to offer programs in engineering, science, management, and humanities. The institute is known for its strong research, academic rigor, and industry collaborations. It continues to play a key role in India's technological and industrial development.

## ABOUT THE DEPARTMENT

The Department is one of the key academic units that has emerged as part of the institute's broader academic growth. Presently, it is home to 32 faculty members, engaged in a wide array of research fields including Applied Mathematics, Pure Mathematics, Statistics, and Computer & Data Science. Our research efforts are supported and recognized by prominent national funding agencies such as CSIR, NBHM, DRDO, ISRO, and DST. The department offers the programs such as B. Tech (Mathematics & Computing), Integrated M.Tech (Mathematics & Computing), M. Sc (Mathematics & Computing) and M. Tech (Data Analytics). In addition, the department also offers a Ph.D. program currently engaging over 100 students in research.

## LIST OF SPEAKERS

1. Prof. Bhola Ishwar, BRAU, Muzaffarpur, India
2. Prof. S.N. Hasan, MANUU, Hyderabad, India
3. Dr. Priya Hasan, MANUU, Hyderabad, India
4. Prof. Mai Bando, Kyushu University, Japan
5. Prof. Massimiliano Vasile, University of Strathclyde, UK
6. Prof. Kanak Saha, IUCAA, Pune, India
7. Dr. Dipak K. Giri, IIT Kanpur, India
8. Dr. Gaurav Vaibhav, URSC, ISRO, Bangalore, India
9. Dr. M Xavier James Raj, VSSC, Trivandrum, India
10. Dr. Ram Kishor, Central University of Rajasthan, Ajmer, India
11. Pror. Pradyumn Kumar Sahoo, BITS, Hyderabad, India
12. Prof. Rashmi Bhardwaj, GGS Indraprastha University, Delhi, India.

## ABOUT THE WORKSHOP

The proposed workshop aims to bridge the gap between theoretical foundations with practical applications of celestial mechanics, dynamical astronomy, and modern space mission design. With the rapid advancements in space exploration, satellite deployment, and interplanetary mission planning, there is a growing need to gain a comprehensive understanding of both classical and contemporary techniques. A special module will focus on practical training using the General Mission Analysis Tool (GMAT). Participants will learn to model trajectories, simulate mission environments, apply optimization strategies, and visualize orbital transfers using GMAT. Overall, this workshop offers a multidisciplinary platform to enhance knowledge, promote hands-on learning, prepare participants for challenges in modern space research and mission design.

## TOPICS TO BE COVERED

### Celestial Mechanics and Dynamical Astronomy (CMDA):

Different physical models and dynamical aspects, Nature of trajectories, Dynamics via invariant manifolds, Resonance theory, Stability approaches, Long-term dynamics of celestial bodies and Regularization theory. Solar System, dynamical evolution of galaxy, Poincare surface section,

### Advancement in Trends and Techniques (ATT):

Advances in the techniques of satellite dynamics, ephemerides, Orbit determination with linkage methods and patched dynamics, Low-energy transfer trajectory, Low-thrust trajectory optimization, rendezvous and docking of spacecraft, spacecraft dynamics and control. AI/ML tools for detection, classification of asteroid and exoplanets.

### Space mission design through General Mission Analysis Tool (GMAT):

Resources and commands, trajectories design Fields and parameters, Dynamics and environment modelling, optimization and targets, plotting and visualization of orbit, examples of transfers and maneuvers. GMAT GUI and Script.

## Workshop

on

# Celestial Mechanics and Dynamical Astronomy: Advancement in Trends and Techniques

## October 13-17, 2025

### COORDINATORS:

Prof. Badam Singh Kushvah, Coordinator  
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DEPARTMENT OF MATHEMATICS AND COMPUTING  
Indian Institute of Technology (ISM), Dhanbad



## REGISTRATION

Use following link for registration:  
<https://forms.gle/15xWHzLffdpfAqU67>

### Registration Fee

Rs. 3,000/- for UG/PG Students & Research Scholars  
Rs. 5,000/- for Faculties/Scientists  
Rs. 8,000/- for Industry Personnels

## MODE OF PAYMENT

Payment can be done through:

- QR code for BHIM/UPI
- Transfer through RTGS/NEFT etc.

## BANK DETAILS

Account Name: IIT(ISM) SPECIAL FUND  
A/c No.: 0986101024892 (SB Account)  
Name of Bank: Canara Bank  
Branch Name: Saraidhela, Dhanbad  
Email: cb0986@canarabank.com  
RTGS/IFSC Code: CNRB0000986  
MICR Code: 826015003



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## ACCOMMODATION

- (a) EDC/SAH Guest House on Payment basis
  - @Rs. 700/- per person/day AC room (on sharing basis)
  - @Rs. 1400/- per person/day double bed AC room
- (b) Students Hostel on first come first serve basis
  - @Rs. 200/- per person/day