

Proposal for a new course

Course title: **Introduction to the mechanics of the Solar System**

Course no.: SPA XYZ

Proposer: Ishan Sharma, Sharvari Nadkarni-Ghosh

Department: Space, Planetary & Astronomical Sciences and Engineering (SPASE)

Credits: 5 (3-0-0-0)

Pre-requisite: Basic course in mechanics and adequate exposure to calculus.

Note: This **modular** course will be part of the PG **compulsory** course basket in the department.

Course description and contents:

This course helps describe various observed aspects of the Solar System employing relatively simple mechanical models. The same principles help further man's exploration of its immediate celestial neighbourhood. The lecture distribution is given below in terms of 50 minute lectures.

1. Introduction to the Solar System – 1 lecture
2. The 1- and 2- body problems; orbital elements; applications – 5 lectures
3. The restricted 3- body problems and their applications – 6 lectures
4. Rotational and tidal effects. Shapes of solar system bodies – 6 lectures
5. Secular perturbations and resonances – 3 lectures

Textbooks and references:

1. Bertotti, B., P. Farinella and D. Vokrouhlicky 2003. *Physics of the Solar System: Dynamics and Evolution, Space Physics, and Spacetime Structure*. Springer.
2. Danby, J. M. A. 1964. *Fundamental of Celestial Mechanics*. New York: Macmillan.
3. Diacu, F., and P. Holmes 1996. *Celestial Encounters*. Princeton U. Press.
4. Fitzpatrick, R. 2012. *An Introduction to Celestial Mechanics*. Cambridge U. Press
5. Gurzadyan, G. A. 1996. *Space Dynamics*. London: Taylor & Francis.
6. Murray, C. D., and S. F. Dermott 1999. *Solar System Dynamics*. Cambridge Univ. Press.
7. Roy, A. E. 2005. *Orbital Motion*, 4th ed. CRC Press.

Signature of the Proposer

This course is APPROVED/NOT APPROVED Convener, DPGC

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