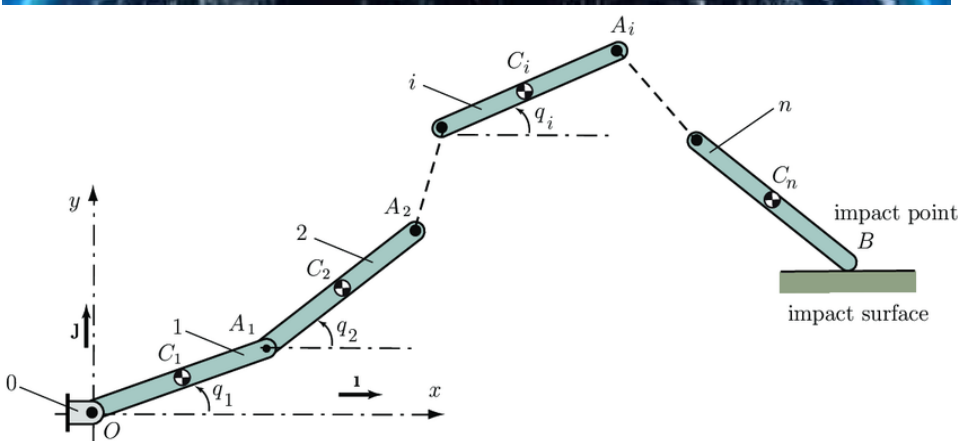# Applied Mechanics -1 (Orbital Mechanics)

Name of the PMRF student

Ishfaq Zahoor Bhat

Required background of the students taught

Postgraduate/ Undergraduate course: Mechanical / Aerospace / Electrical and Electronics Engineering students having basic knowledge of mechanics and mathematics

Details of the content of the module

The module will be completed in 18 lectures for a duration of 36 hours .

This module is divided into two sections:

A. Modelling and simulating different dynamical systems

 1. Introduction, and review of vector operation **2.** Modelling and simulation of spring mass system **3**. Dynamics of system of particles **4**. Langrange, Euler and DAE methods **5**. Rigid body dynamics **6**. Rotation matrix and introduction to tensors **7**.3D rotation and Rodrigues formula **8**.rigid body dynamics 3D **9.** Intermediate axis theorem and its simulation

B. Orbit design and modelling and attitude control

 1. Two body problem **2**. Orbit equations **3.**preliminary orbit determination **4.**MATLAB implementation **5** dynamics of a satellite relative another one **6** CW/Hills equations**7**. Spacecraft attitude dynamics**8** transport theorem **9**.eulers equation of motion and conclusion

 Note: This module will serve as introductory to the next module namely space mechanics

Schedule of the module

Start date : 20ᵗʰ April 2024

Tentative End date :17ᵗʰ August 2024 (tentative)

*The lectures will either be recorded and uploaded or presented live every Saturday at 8pm IST

Meeting link : Will be shared later

Contact email ID: ishfaqbhat@iisc.ac.in

 Registration link:
https://forms.gle/P63QgjNQgdSXSVB57