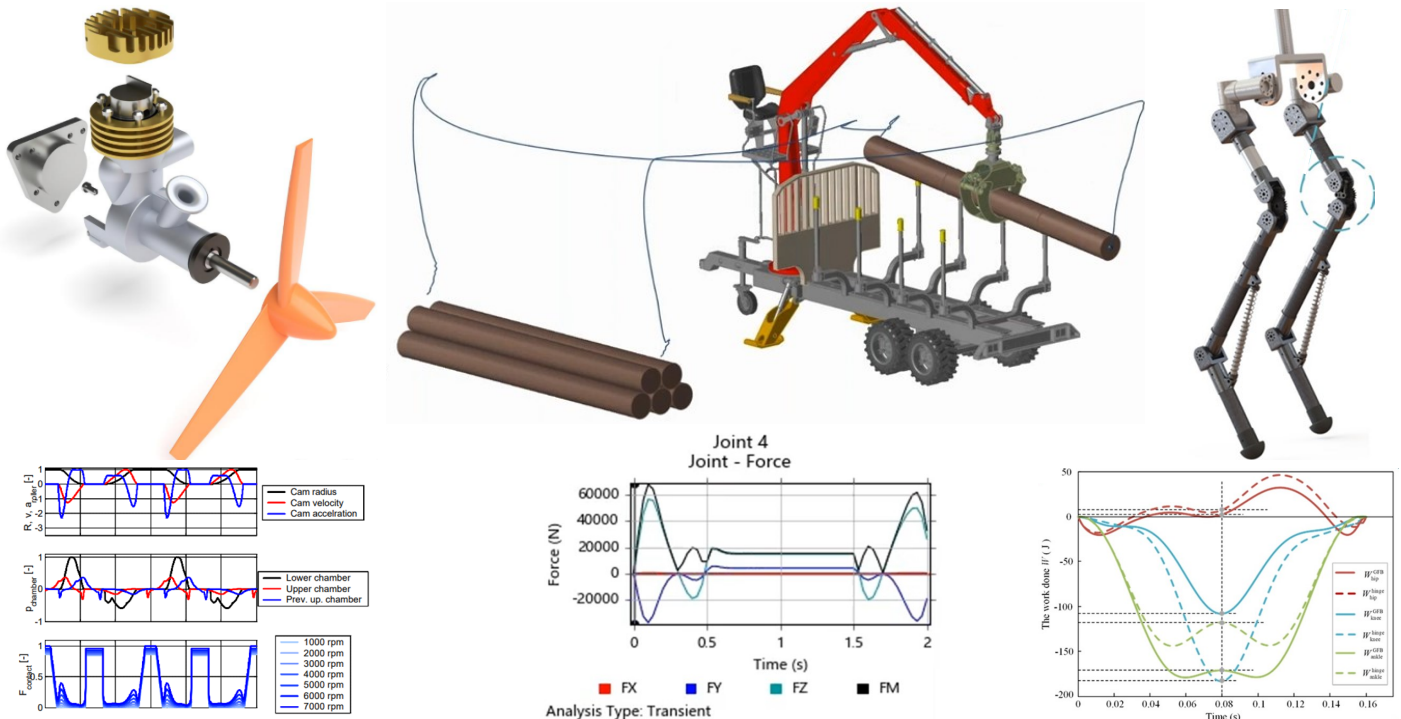




IIAS

Indian Institute for Autonomous Systems

HANDS-ON WORKSHOP ON MECHANISM DESIGN & ANALYSIS



Workshop Details

Schedule and Type:	Jan. 03 to Jan. 31, 2026; Instructor led interactive + demo + QA + hands-on practices
Workshop Duration:	50 Hours (10 hours online for foundation, 40 hours offline for hands-on practices), 1 month
Conduction Mode:	Online: 2:00 PM-4:00 PM on all working days; flexible timing slot based on batch request
Attendee Background:	Mech., Automotive, Aerospace and Robotics
Instructors:	Dr. Prashanth Dalawai
Registration Link:	www.ias-uv.in/services/training/workshops/
Registration Deadline:	Jan. 03, 2026 and <u>limited seats available</u>

Workshop Objective

In recent years, the mechanism design has drawn a huge attention, as it plays a vital role in the success of continuously emerging automation and robotics systems. The mechanism designers need to create the specific relative motion and force transmission systems required for a machine to perform its task. It involves predicting system behavior for factors like motion, load, vibration, and stress to improve safety, functionality, efficiency, and optimize before a physical prototype. The virtual testing is time and cost-effective, especially for complex or large-scale mechanisms, as physical testing is impractical. Mastering mechanism design and analysis demands an in-depth understanding of fundamentals and practical implementation skills to meet the current industry standards, so a comprehensive training is essential.

IIAS training division offers an advanced training program and workshop by providing both theoretical, computational and hands-on testing foundations and real-world case studies on automotive, aerospace and heavy engineering and other rotating machinery. These programs concentrate more on the faster adaptation of technology to the respective industries and reduce the training curve. The current workshop is carefully designed to give the essential fundamentals as well as practical implementation skills through the instructor, who has decades of experience in designing a variety of mechanisms in industry and teaching this course.

After attending, the participant will learn about how to design, assemble and simulate complex designs using the leading and latest PTC Creo software to create mechanisms and test them virtually. It also serves as a preparation exercise to step into the robotics design area. The graduating and fresh engineers, as well as practicing professionals, can benefit from this workshop. The fresh engineers can get ready for the industry and take career assistance support.

Workshop Content

Fundamentals of Mechanism Design and Analysis: Duration (Hrs.):10

Sl.	Topic	Date
1	Introduction: Terminology, kinematic diagrams, kinematic Inversion, mobility, links and joints, mobility and Grashof criteria, kinematic Inversions. Demonstrations	Jan. 03
	Mechanisms: Quick return, straight line and intermittent motions. Demonstrations.	
2	Position analysis: Techniques of mechanism analysis, position analysis basics of vectors, loop closure equation, finding absolute position of a point on coupler.	Jan. 05
	Velocity analysis: Velocity of a link, graphical and analytical velocity analysis. Demonstrations.	
3	Acceleration analysis: Basics of acceleration, advanced acceleration, acceleration analysis problems. Demonstrations.	Jan. 06
4	Drive analysis: Gear trains, cams and follower drives. Demonstrations.	Jan. 07
	Gyroscopic analysis: Couple and its effect, stability of a vehicles during taking a turn.	
5	Static force analysis: Force and torque analysis of mechanism with and without friction in joints. Demonstrations.	Jan. 08
	Dynamic force analysis: Inertia forces and D'alemberts principle, combined external and inertia forces. Demonstrations.	

Hands on Mechanism Design and Analysis Exercises: Duration (Hrs.):40

Sl.	Topic	Date
1	Mechanism design capabilities of commercial software's: Altair Inspire, CATIA Mechanism, MSC Adams, PTC Creo Mechanism, Siemens NX Motion, MotionGen and Python Mechanism 1.1.10. Demonstration	Jan. 09
2	Introduction to mechanism design using PTC Creo Mechanism 12.4.1.0: Capabilities, creating assemblies, simulating motion, advanced connections, servo motors and analyses, playback results and hands on mechanism analysis examples	Jan. 10
3	A ball throwing example	Jan. 12
4	A spring-mass system example	Jan. 13
5	A simple pendulum example	Jan. 14
6	A slider-crank mechanism example	Jan. 15
7	A compound spur gear train example	Jan. 16
8	Planetary gear train systems example	Jan. 17
9	Cam and follower example	Jan. 19
10	Assistive device example	Jan. 20
11	Kinematic analysis for a racecar suspension example	Jan. 21
12	In-line reciprocator example	Jan. 22
13	Spatial slider crank4-bar Dwell mechanism example	Jan. 23
14	3D spinner example	Jan. 24
15	Kostitsyn straight line linkage example	Jan. 26
16	Variable pitch propeller example	Jan. 27
17	Schmidt coupling for offset shafts example	Jan. 28
18	Stewart platform example	Jan. 29
19	Position velocity and acceleration analysis of foundation class demonstrations	Jan. 30
20	Static and dynamic force analysis of foundation class demonstrations	Jan. 31

Slots are flexible based on the batch request and resource availability.

Workshop Closure

Sl.	Topic	Date
1	Assessment and feedback, issuing of certificates and concluding the workshop.	Jan. 31

About IIAS

IIAS (Indian Institute for Autonomous Systems) is set up primarily to fill the gap between academia and industry in the development of machines, unmanned vehicles and autonomous systems, allied technologies, and to create a related skilled workforce. IIAS have personnel with extensive expertise in serving the leading industries and academia in the cutting-edge technologies. IIAS is located in the heart of the city with modern teaching aids, facilities, and resources for both creating and deploying design, analysis and control solutions for the machinery and vehicles.



About Instructor

Dr. Prashanth Dalawai has 30 years of experience in the R&D sectors of leading Indian and multinational companies and in a few of the oldest institutes in India. He holds a B.E. in mechanical from Karnatak University, M.Tech., and a Ph.D. in mechanics and design stream from IIT Kanpur in NVH techniques for controlling vehicle and engine health (IVHM).

He is serving as the founding director of IIAS. He served the leading MNCs such as AVL List GmbH, Cummins Inc., General Electric and Indian OEM in different roles, as well as automotive, aerospace and heavy engineering clients. He also served as the UGC approved faculty in the mechanical department and founding head of the aerospace engineering.

He has taught the Machines and Mechanism course to the undergraduates for six successive years. In his industrial and academic research career, he has extensively designed a variety of mechanisms such as crank-trains, valve trains, gear trains, ejection and flapping wing mechanisms, and synthesized the required geometric, force and torque profiles.



Contact Us

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