MECHANICAL ENGINEERING

MODELLING AND SIMULATION OF DYNAMIC SYSTEMS

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TYPE OF COURSE : Rerun | Elective | UG/PG
INTENDED AUDIENCE : B. Tech/M.Tech students or Professionals.
INDUSTRIES APPLICABLE TO : Railways, DRDO
COURSE DURATION : 8 weeks (28 Jan'19 - 22 Mar'19)
EXAM DATE : 31 Mar 2019

COURSE OUTLINE :

The term modeling refers to the development of a mathematical representation of a physical system while the term simulation refers to the procedure of solving the equations that resulted from model development. The quality or usefulness in a model is measured by its ability to capture the governing physical features of the problem. Here, the expertise of the modeler is useful. The model is amenable to manipulation which would be impossible, too expensive, or too impractical to perform on the system which it portrays. This feature makes it a very useful tool to study system behavior.

ABOUT INSTRUCTOR :

Dr. Pushparaj Mani Pathak is currently Associate Professor at IIT Roorkee. He graduated from N.I.T., Calicut in 1988 in Mechanical Engineering. He completed his M. Tech in Solid Mechanics and Design from IIT Kanpur in 1998. Later he was awarded the PhD degree from IIT Kharagpur in 2005. His areas of research are Robotics, Dynamics, Control, and Bond Graph Modelling. He has served in different industries from 1989 to 1994. He is in teaching profession since 1994. He is serving in Mechanical and Industrial Engineering Department, IIT Roorkee since 2006. He has co-authored one book on Intelligent Mechatronic Systems: Modeling, Control and Diagnosis published by Springer, London and has published more than 40 papers in International Journals in the field of Robotics and Control. He has supervised 34 M. Tech theses and 7 PhD theses in different areas.

COURSE PLAN :

Week 01 : Introduction to Modelling and Simulation
Week 02 : Bond Graph Modelling of Dynamic Systems
Week 03 : Basic System Models
Week 04 : System Models of Combined Systems
Week 05 : Dynamic Response and System Transfer Function
Week 06 : Block diagram/Signal flow diagram/State Space formulation and Frequency response.
Week 07 : Simulation and Simulation application
Week 08 : Parameter Estimation, System Identification and Optimization

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