

Course Number: 28049
Course Name: System Dynamics

Course Type:
Prerequisite:
Level: Graduate
Group: Applied mechanics

Type & Max Unit: 3
Corequisite:
First Presentation:
Last Edition:

Objectives:

Topics:

- Definition of systems dynamics, models, modelling and simulation, introducing different types of models
- Classification of elements of dynamic systems
- Unified vision of physical systems, definition of effort, flow, momentum, displacement and energy
- Characteristic equations of elements of dynamic systems, Inertia, capacity, Resistors, transformers, sources and multi-ports
- Mathematical model of dynamic systems in time and frequency domains
- Classical models for derivation of mathematical models in time and frequency domains
- Classical Methods for derivation of mathematical models, Block diagram, signal flow graph, State space equations, transfer functions, changing time domain differential equations to transfer functions
- Introduction to Bond Graphs, single ports and multi-ports
- Extracting system state space equations using Bond Graph
- Capacity fields, inertial fields and resistive fields, Junction structures
- Introduction to neural networks and its usage in system modelling.
- System Identification and using experimental data to extract system mathematical model
- System modelling using commercial software. Co-simulation for analysis of systems including thermos-fluid, vibrational and dynamic subsystems using

References: