NPTEL Video Course - Mechanical Engineering - NOC:Design of Mechatronic Systems

Subject Co-ordinator - Prof. Prasanna Gandhi

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - Elements of Mechatronic Systems - Part I
Lecture 3 - Elements of Mechatronic Systems - Part II
Lecture 4 - Elements of Mechatronic Systems - Part III
Lecture 5 - CD-ROM - Part I
Lecture 6 - CD-ROM - Part II
Lecture 7 - CD-ROM - Part III
Lecture 8 - Scanner
Lecture 9 - Integrated Mechanical-Electronics Philosophy - Part I
Lecture 10 - Integrated Mechanical-Electronics Philosophy - Part II
Lecture 11 - Smart Sensors Concept
Lecture 12 - Compliant Mechanisms
Lecture 13 - Microprocessor Building Blocks I - Combinational Circuits
Lecture 14 - Microprocessor Building Blocks II - Sequential Circuits
Lecture 15 - Microprocessor Memory and Addressing
Lecture 16 - Timing and control unit: Primitive Microprocessor
Lecture 17 - Microcontroller Architecture - I
Lecture 18 - Microcontroller Architecture - II
Lecture 19 - Microcontroller Programming Philosophy
Lecture 20 - Hardware Interfaces
Lecture 21 - Interfacing Actuator using PWM in Tiva Microcontroller
Lecture 22 - Interfacing Encoder using QEI in Tiva Launchpad + ISR
Lecture 23 - Mathematical Modelling: Overview and Context
Lecture 24 - Modelling Friction in a System
Lecture 25 - Modelling DC Motor with loads
Lecture 26 - Lagrange formulation fundamentals
Lecture 27 - Lagrange formulation examples
Lecture 28 - Dynamics: 2-R Manipulator
Lecture 29 - Control formulation: Regulation and Tracking

Lecture 30 - Fundamentals of Simulation of dynamics using MATLAB
Lecture 31 - Selection of Sensors and Actuators - Part I
Lecture 32 - Selection of Sensors and Actuators - Part II
Lecture 33 - Concept of feedback
Lecture 34 - Closed loop control implementation in microcontroller
Lecture 35 - Mathematical representations of systems for control
Lecture 36 - Control design for linear systems
Lecture 37 - Application of control design for linear systems
Lecture 38 - Mathematical Preliminaries- Nonlinear Control
Lecture 39 - Fundamentals of Lyapunov theory
Lecture 40 - Application of Lyapunov stability analysis
Lecture 41 - Trajectory tracking controller: Robotic system
Lecture 42 - Fundamentals of sampling
Lecture 43 - Shannon sampling theorem and signal reconstruction
Lecture 44 - Signal processing
Lecture 45 - Digital system representation and filters for mechatronics
Lecture 46 - Case study: Development of 3D microprinting system
Lecture 47 - Case study: 3D microprinting via Bulk lithography
Lecture 48 - Case study: Hele-Shaw system for novel fabrication