ME246 Jan 3:0

Introduction to Robotics

Instructor

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Department: Mechanical Engineering

Course Time: Tue., Thu., 11:30-1:00

Lecture venue: ME Department Lecture Hall

Detailed Course Page:

Announcements

Brief description of the course

This course introduces the students to robotics. The course is aimed at Masters and Ph D students who are interested in kinematics, dynamics, control of serial and parallel robots. The course also introduces some advanced topics in robotics such as flexible robots and mobile robots. The course is primarily for mechanical engineering students although students from Aerospace, Electrical and Computer Science have also often take this course.

Prerequisites

Undergraduate mathematics, dynamics and familiarity with using computational tools such as Matlab.

Syllabus

Robot manipulators: representation of translation, rotation, links and joints, direct and inverse kinematics and workspace of serial and parallel manipulators, dynamic equations of motion, position and force control and simulation. Advanced topics

Course outcomes

The students will

a) learn how to model a robot and its components

b) learn how to derive and solve forward and inverse kinematics of serial and parallel manipulators

c) learn how to obtain equations of motion of a serial and parallel robot

d) different control techniques (linear and nonlinear) used to control the motion of a robot

e) be exposed to advanced topics such as flexible robots, mobile robots etc.

Grading policy

Mid term 1 -- 20%

Mini project -- 20%

Assignments -- 10%

Final -- 50%

Assignments

Typically 5 assignments are given three of which are computational.

Resources

Ghosal A, Robotics : Fundamental Concepts and Analysis, Oxford University Press 2006

NPTEL -- http://nptel.ac.in/courses/112108093/

Notes and recent research papers.