

# Modeling, Design, and Control of Robotic Mechanisms

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## Author Information

**Professor Han Sung Kim**  
Kyungnam University, Korea

## Course Details

### Description

This course contains kinematic and dynamic modeling of planar robots using MATLAB and SimMechanics. It also includes control of planar robots using Simulink and xPC Target, as well as mechatronics and robotics projects using Arduino. These course materials can be used partially or fully in robotics, control design, mechatronics system, and capstone design classes.

### Original Course Documents

[Source file URL](#)

## Course Contents

### Lectures

- [Chapter 0: Summary Lectures](#)

### Projects

- [List of Practice Exercises](#)

### [Chapter 1: Analysis of Planar Robots](#)

- [Position Analysis with MATLAB](#)
- [Jacobian Analysis with MATLAB](#)
- [Dynamics Analysis with MATLAB](#)

### [Chapter 2: SimMechanics](#)

- Forward dynamics simulation practice of a 2-DOF serial robot
- Inverse dynamics simulation of planar robot
- [Simulink models for simulation practice](#)

### [Chapter 3: Control](#)

- Introduction to xPC Target and speedgoat controller
- Development of robot manipulators and controllers
- [Simulink models for control practice](#)

## **Chapter 4: Projects**

- [How to use Arduino Mega 2560](#)
- Input/output interface program
- Position control of DC motors (AX-12W)
- 2-DOF robot arm control project (AX-12A)
- [Walking robot project using Arduino Mega 2560](#)
- [2-DOF haptic device project](#)

## **Additional Resources**

- [Link to video clips](#)



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