COURSE		
	Name	: Robotics and Automation
	Code	: EE185541
	Credit(s)	: 2
	Semester	: (Elective Course)

Description of Course

The Robotics and Automation course discusses manipulators and mobile robots. In the first part, we discuss about manipulator forward and inverse kinematics, newton-euler & lagrangian dynamics, and motion planning. Manipulator control is more detailed about motion control, force / impedance control, impedance & interaction control, and coordinated motion control. Next, we discuss about mobile robot sensors, locomotion, kinematic models, and motion control. Next, discussed about mobile robot localization systems, map representation, and autonomous map building. In the final section we discuss the mobile robot path planning, obstacle avoidance, and navigation architectures.

Learning Outcomes

Knowledge

(P02) Mastering engineering concepts and principles to develop the necessary procedures and strategies for systems analysis and design in the areas of power systems, control systems, multimedia telecommunications, electronics, intelligent multimedia network, or telematics.

Specific Skill

(KK02) Being able to compose problem solving in engineering through depth and breadth of knowledge which adapts to changes in science and technology in power systems, control systems, multimedia telecommunications, electronics, intelligent multimedia network, or telematics.

General Skill

(KU07) Being able to improve the capacity of learning independently.

Attitude

(S09) Demonstrating attitude of responsibility on work in his/her field of expertise independently.

Course Learning Outcomes

Knowledge

Mastering the concepts of robotics and automation and their applications in various fields.

Specific Skill

Able to understand the overall system of manipulators and mobile robots.

General Skill

Able to design robotics and automation systems for particular applications.

Attitude

Demonstrate an independent, creative, and innovative attitude in problem solving.

Main Subjects

1. Introduction to robotics and automation
2. Manipulator of kinematics, dynamics and motion planning
3. Manipulator control
4. Mobile robot sensors, locomotion, kinematics, and motion control
5. Mobile robot localization
6. Mobile robot planning and navigation

Reference(s)

[1] Roland Siegwart, Illah R. Nourbakhsh, and Davide Scaramuzza, Introduction to Autonomous Mobile Robots, The MIT Press, 2011
[2] Farbod Fahimi, Autonomous Robots: Modeling, Path Planning, and Control, Springer Science+Business Media LLC, 2009
[3] Thomas R. Kurfess, Robotics and automation handbook, by CRC Press LLC, 2005

Prerequisite(s)

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