

Course Code	ECE 670/CSE 633
Course Name	Introduction to robotics
Credits	4
Course Offered to	UG/PG
Course Description	The goal of this course is to provide comprehensive knowledge is robotic from theory to implementation. The course will cover transformations, planning in discrete and continuous spaces, collision avoidance, localization, and vision-based control. We will use ROS as the software platform on which the simulations will be carried out and the projects can be carried on hardware. ROS allows seamless integration from simulation to real-world implementation.

Pre-requisites		
Pre-requisite (Mandatory)	Pre-requisite (Desirable)	Pre-requisite(other)

*Please insert more rows if required

Post Conditions*(For suggestions on verbs please refer the second sheet)			
CO1	CO2	CO3	CO4
Students understand the working principles of different robotic and sensor systems	Students have a solid foundation in motion planning, navigation and vision based control	Students are able to program intelligence for a mobile robot (ground/aerial)	

Weekly Lecture Plan			
Week Number	Lecture Topic	COs Met	Assignment/Labs/Tutorial
1	Introduction to planning and sensors	CO1	Assignment
2	Discrete planning – A*, forward search, backward search, bidirectional search, value iteration	CO2	Assignment
3,4	Rigid body transformations and differential models	CO2	Assignment
5,6	Sampling based motion planning	CO2,CO3	Assignment
7	Feedback motion planning – navigation functions, potential fields, dynamic programming on continuous spaces	CO2,CO3	Assignment
8,9	Sequential decision theory	CO2,CO3	Assignment
10,11	Sensors and information spaces	CO2,CO3	Assignment
12,13	Vision-based control	CO2,CO3	Assignment

*Please insert more rows if required

Weekly Lab Plan			
Week Number	Laboratory Exercise	COs Met	Platform (Hardware/Software)
	NA		

*Please insert more rows if required

Assessment Plan	
Type of Evaluation	% Contribution in Grade

Homework	20
Mid-sem	25
Quiz	25
End-sem	30

*Please insert more row for other type of Evaluation

Resource Material	
Type	Title
Textbook	Planning Algorithms, Steven M. Lavalley, Cambridge University Press 2006 (available online) http://planning.cs.uiuc.edu/
Reference	Principles of Robot Motion: Theory, Algorithms, and Implementations, MIT press, 2005
	Probabilistic Robotics, MIT press