

1.	Title of the course	Wheeled Mobile Robots
2.	Course number	ME5222
3.	Status of the course	Elective
4.	Structure of credits	3-0-0-3
5.	Offered to	PG
6.	New course/modification to	New course
7.	To be offered by	Department of Mechanical Engineering
8.	To take effect from	July 2020
9.	Prerequisite	CoT
10.	Whether approved by the Department	Yes
11.	Course Objective(s): To introduce basic sensor systems related to state measurements, navigation and localization. To analyze different motion planning and navigation schemes related to mobile robots. To recognize and analyze the basic mechanical and electrical systems concerning robots' locomotion and manipulation. To analyze and design the basic mobile robotic systems.	
12.	Course Content: Mobile robots and mobile manipulators; Ground robots; Aerial robots; Underwater robots and water surface robots; Kinematics and dynamics of wheeled mobile robots; Sensors for localization and navigation: magnetic and optical position sensor, gyroscope, accelerometer, magnetic compass, inclinometer, tactile and proximity sensors, ultrasound rangefinder, laser scanner, infrared rangefinder, visual and motion sensing systems; Mobile robot navigation; Intelligent navigation schemes; Motion and path planning; Collision free path planning and sensor-based obstacle avoidance; Swarm robots and robot communication systems; Motion control of mobile robots; Lyapunov based motion control designs and intelligent motion control schemes.	
13.	Textbook(s): 1. Siegwart R, Nourbakhsh I R and Scaramuzza D, <i>Introduction to Autonomous Mobile Robots</i> , 2nd Edition, MIT Press (2011). 2. Tzafestas S G, <i>Introduction to Mobile Robot Control</i> , 1st Edition, Elsevier (2014).	
14.	Reference(s): 1. Dudek G and Jenkin M, <i>Computational Principles of Mobile Robotics</i> , 2nd Edition, Cambridge University Press (2010). 2. Kelly A, <i>Mobile Robotics: Mathematics, Models, and Methods</i> , 1st Edition, Cambridge University Press (2013).	