

1.	Title of the course	Introduction to Field and Service Robots
2.	Course number	ME538L
3.	Structure of credits (L-T-P-C)	3-0-0-3
4.	New course/modification to	New
5.	To be offered by	Mechanical Engineering
6.	Prerequisite	CoT
7.	<b>Course Objective(s):</b> To discuss different types of robots under field and service category. To understand the kinematics, dynamics, control, and applications of field and service robots.	
8.	<b>Course Content:</b> Field and service robots: classification, applications; Sensing and perception: General robot control, common sensors, characteristics, uncertainty, sensor fusion; Localisation and mapping: mobile robot localisation, autonomous map building, simultaneous localisation and mapping (SLAM), extended Kalman filter (EKF) SLAM; Autonomous mobile robots: kinematics, locomotion, perception, motion planning and control; Intelligent unmanned vehicles; Underwater robots: kinematics, dynamics, navigation, guidance and control, modelling and simulation; Aerial robots: basics of aerial robots, modelling and control of small unmanned aerial vehicles; Medical robots: design and control, tele-operated surgical robots, haptics for tele-operation.	
9.	<b>Textbook(s):</b> 1. Siegwart R and Nourbakhsh I R, Introduction to Autonomous Mobile Robots, 2nd Edition, The MIT Press (2011). 2. Antonelli G, Underwater Robots: Motion and Force Control of Vehicle-Manipulator Systems, 2nd Edition, Springer (2010).	
10.	<b>Reference(s):</b> 1. Rosen J, Hannaford B and Satava R M, Surgical Robotics: Systems, Applications and Visions, Springer (2011). 2. Anibal O and Maza I, Multiple Heterogeneous Unmanned Aerial Vehicles, Springer (2014). 3. Scicilliano B and Khatib O, Handbook of Robotics, Springer (2008).	