



TEACHING PLAN

Course Code	Course Title	Semester	Branches	Contact Periods /Week	Academic Year	Date of commencement of Semester
23RB7T01	MOBILE ROBOTS	VII	ROBOTICS	06	2026-27	15-06-2026
COURSE OUTCOMES						
1	Differentiate different types of robots. [K2]					
2	Analyze the mobile robot kinematics and dynamics [K2]					
3	Summarize the different types of localization approach [K3]					
4	Apply sensor models for localization[K3]					
5	Design collisions free path planning. [K2]					
6	Summarize the different types of Swarm robots, Cooperative and Collaborative robots. [K2]					
UNIT	Outcomes / Bloom's Level	Topics No.	Topics/Activity	Text Book / Reference	Contact Hour	Delivery Method
Introduction to Mobile Robots						
I	CO1: Differentiate different types of robots. [K2]	1.1	Introduction to mobile robots	T1,T2	1	PPT/ FCR/Videos/TPS/ PBL
		1.2	Introduction to mobile manipulators	T1,T2	2	
		1.3	Principle of locomotion	T1,T2	2	
		1.4	Types of locomotion	T1,T2	1	
		1.5	Types of mobile robots	T1,T2	1	
		1.6	Ground robots (wheeled and legged robots)	T1,T2	2	
		1.7	Aerial robots and underwater robots	T1,T2	1	
		1.8	Water surface robots	T1,T2	1	
		CBS	Recent advancements in Wheeled Mobile robots types.	T1,T2	1	
Total					12	
Kinematics and Dynamics						
II	CO2:Analyze the mobile robot kinematics and dynamics [K2]	2.1	Kinematics of wheeled mobile robot	T1,T2	1	PPT/ FCR/Videos/TPS/
		2.2	Degree of freedom and maneuverability	T1,T2	2	
		2.3	Generalized wheel model	T1,T2	1	
		2.4	Different wheel configurations	T1,T2	1	
		2.5	Holonomic and non-holonomic robots	T1,T2	1	



		2.6	Dynamics of mobile robot	T1,T2	2	PBL
		2.7	Lagrange-Euler	T1,T2	2	
		2.8	Newton-Euler methods	T1,T2	2	
		2.9	Computer based dynamic	T1,T2	1	
		2.10	Numerical simulation of different wheeled mobile robots	T1,T2	1	
TOTAL					14	
Localization and Mapping						
III	CO3:Summarize the different types of localization approach [K3] CO4:Apply sensor models for localization[K3]	3.1	Magnetic and optical position sensor	T1,R1	1	PPT/ FCR/Videos/TPS/ PBL
		3.2	Mapping (SLAM)	T1,R1	1	
		3.3	Gyroscope, accelerometer	T1,R1	1	
		3.4	Magnetic compass, inclinometer, tactile and proximity sensors	T1,R1	1	
		3.5	Ultrasound rangefinder, laser scanner, infrared rangefinder	T1,R1	1	
		3.6	Visual and motion sensing systems	T1,R1	1	
		3.7	Localization, Map based localization	T1,R1	1	
		3.8	Markov localization,	T1,R1	2	
		3.9	Kalman filter localization Error propagation model	T1,R1	2	
		3.10	Probabilistic map based localization	T1,R1	1	
		3.11	Autonomous map building	T1,R1	1	
		3.12	Simultaneous localization	T1,R1	1	
		CBS	Advances in Localization and Mapping.	T1,R1	1	
Total					15	
Motion Control						
IV	CO5:Design collisions free path planning. [K2]	4.1	Collisions free path planning	T2,R1	2	PPT/ FCR/Videos/TPS/ PBL
		4.2	Sensor-based obstacle avoidance	T2,R1	2	
		4.3	Motion controlling methods	T2,R1	2	
		4.4	Kinematic control	T2,R1	2	
		4.5	Dynamic control	T2,R1	2	
		4.6	Cascaded control.	T2,R1	2	
Total					12	
V	CO6: Summarize the different types of Swarm robots, Cooperative and	Modern Mobile Robots				PPT/ FCR/Videos/TPS/ PBL
		5.1	Introduction to Modern Mobile Robots	T1,T2	3	
		5.2	Swarm robots	T1,T2	2	
		5.3	Cooperative and collaborative	T1,T2	3	



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	Collaborative robots. [K2]		robots			
		5.4	Mobile manipulators	T1,T2	2	
		5.5	Autonomous mobile robots	T1,T2	2	
					Total	12
CUMULATIVE PROPOSED PERIODS						65
Text Books:						
S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION					
T1	Kelly, A “Mobile Robotics: Mathematics, Models, and Methods”, Cambridge University Press, USA, 2013.					
T2	Dudek, M Jenkin, Computational Principles of Mobile Robotics, Cambridge University Press, USA, 2010					
Reference Books:						
S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION					
R1	Tzafestas, “Introduction to Mobile Robot Control, Elsevier”, USA, 2014.					
R2	Siegwart,R Nourbakhsh, and Scaramuzza, “Introduction to Autonomous Mobile Robots”, MIT Press, USA, 2011.					
R3	Choset, Lynch, S. Hutchinson, G. Kantor, W. Burgard, L. E. Kavraki, and S. Thrun, “Principles of Robot Motion:Theory, Algorithms, and Implementations”, MIT Press, 2005.					
R4	Thrun, W Burgard, D Fox, Probabilistic Robotics, MIT Press, USA, 2005.					
Web Details						
1	https://nptel.ac.in/courses/112106298					
2	https://archive.nptel.ac.in/courses/112/106/112106298/					
3	https://ftp.idu.ac.id/wp-content/uploads/ebook/tdg/DESIGN%20SISTEM%20DAYA%20GERAK/Designing%20Autonomous%20Mobile%20Robots%20Inside%20The%20Mind.pdf					

SNO	Details	Name	Signature
i.	Course Coordinator	Dr. R. Lalitha Narayana	
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iii.	Programme Coordinator	Dr. Francis Luther King M	

Principal