



# SWARNANDHRA COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

Narsapur, West Godavari District, A.P. 534280

## DEPARTMENT OF ROBOTICS

### TEACHING PLAN

Course Code	Course Title	Semester	Branches	Contact Periods /Week	Academic Year	Date of commencement of Semester
23RB6T02	ARTIFICIAL INTELLIGENCE IN ROBOTICS	VI	ROBOTICS	05	2025-26	10-12-2025

#### COURSE OUTCOMES

CO1	Identify problems that are amenable to solution by AI methods.. [K4]
CO2	Explain different planning methods used in AI for acting in real world. [K4]
CO3	Analyze probabilistic reasoning using various methods. [K4]
CO4	Demonstrate awareness and a fundamental understanding of AI techniques in Learning. [K4]
CO5	Summarize the mapping, movements, and dynamics. [K4]
CO6	Demonstrate proficiency developing applications in AI techniques in robots[K4]

UNIT	Outcomes / Bloom's Level	Topics No.	Topics/Activity	Text Book/ Reference	Contact Hour	Delivery Method
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#### INTRODUCTION

I	Identify problems that are amenable to solution by AI methods. [K4]	1.1	History of AI, State of the art	T1,T2	1	Chalk &Talk, PPT, Active Learning
		1.2	Need for AI in robotics	T1,T2	1	
		1.3	Thinking and acting humanly	T1,T2	1	
		1.4	Intelligent agents and structure of agents.	T1,T2	1	
		1.5	Solving problems by searching, Informed search and exploration	T1,T2	1	
		1.5.1	Greedy best-first search algorithm	T1,T2	1	
		1.5.2	A*search algorithm	T1,T2	1	
		1.5.3	Constraint satisfaction problem	T1,T2	1	
		1.5.4.1	Adversarial search-Minimax Algorithm	T1,T2	1	
		1.5.4.2	Alpha Beta Pruning	T1,T2	1	
		1.6	Knowledge and reasoning	T1,T2	1	
		1.6.1	Knowledge representation- Approaches	T1,T2	1	
		1.6.2	First order logic	T1,T2	1	

					Total	13
PLANNING						
II	Explain different planning methods used in AI for acting in real world. [K4]	2.1	Planning and state space search	T1,R3	1	Chalk &Talk, PPT, Video
		2.1.1	Forward state space search with example	T1,R3	1	
		2.1.2	Backward state space search	T1,R3	1	
		2.1.3	Heuristics for planning	T1,R3	1	
		2.2	Partial order planning	T1,R3	1	
		2.3	Planning graphs	T1,R3	1	
		2.3.1	Planning graphs for heuristic estimation	T1,R3	1	
		2.3.2	The GRAPHPLAN algorithm, Termination of GRAPHPLAN	T1,R3	1	
		2.4	Planning with propositional logic	T1,R3	1	
		2.5	Planning and acting in real world	T1,R3	1	
		2.5.1	Hierarchical planning	T1,R3	1	
		2.5.2	Planning and acting in non deterministic domains,	T1,R3	1	
		2.5.3	Multiagentplanning	T1,R3	1	
		TOTAL				
REASONING						
III	Analyze probabilistic reasoning using various methods. [K4]	3.1	Uncertainty-acting under uncertainty	T1,R3	1	Chalk &Talk, PPT
		3.2.1	Probabilistic reasoning	T1,R3	1	
		3.2.2	Conditional probability, Joint probability, marginal Probability	T1,R3	1	
		3.2.3	Bayes'theorem	T1,R3	1	
		3.2.4	Filtering and prediction	T1,R3	1	
		3.2.5	Hidden Markov models	T1,R3	1	
		3.2.6	Kalman filters	T1,R3	1	
		3.2.7	Dynamic Bayesian networks	T1,R3	1	
		3.2.8	Bayesian Network example problems	T1,R3	2	
		3.3	Speech recognition	T1,R3	1	
		3.4	Making decisions	T1,R3	1	
Total					12	
LEARNING						
		4.1	Learning-Introduction	T1	1	
		4.2	Forms of learning	T1	1	

IV	Demonstrate awareness and a fundamental understanding of AI techniques in Learning. [K4]	4.3	Knowledge in learning	T1	1	Chalk& Talk, Active Learning
		4.4	Statistical learning methods	T1	1	
		4.5	Reinforcement learning	T1,T2	1	
		4.5.1	Active and Passive Reinforcement learning	T1,T2	1	
		4.5.2	Applications of Reinforcement learning	T1,T2	1	
		4.6	Communication, Perceiving and acting	T1	1	
		4.6.1	Natural language Processing	T1,R3	1	
		4.6.2	Probabilistic language processing	T1,R3	1	
		4.6.3	Speech recognition	T1,R3	1	
		4.6.4	Perception using vision	T1	1	

#### AIINROBOTICS

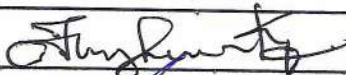
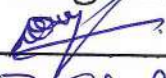


AI IN ROBOTICS						
V	Summarize the mapping, movements, and dynamics. [K4] Demonstrate proficiency developing applications in AI techniques in robots[K4]	5.1	Robotic perception	T1	1	Chalk &Talk, Seminar
		5.1.1	Localization	T1	1	
		5.1.2	Mapping	T1	1	
		5.2	Planning to Move-Configuration space	T1	1	
		5.3	Planning uncertain movements	T1	1	
		5.3.1	Robust Methods	T1	1	
		5.5	Moving- Dynamics and control of movement	T1	1	
		5.5.1	Potential field control	T1	1	
		5.5.2	Reactive Control, Reinforcement learning Control	T1	1	
		5.6.5	Ethics and risks of artificial intelligence in robotics	T1	1	

#### CUMULATIVEPROPOSEDPERIODS

**60**

#### TextBooks:

S.No.	AUTHORS,BOOKTITLE,EDITION,PUBLISHER,YEAROFPUBLICATION
T1	Stuart Russell, Peter Norvig, Stuart Russell, Peter Norvig, "Artificial Intelligence,A modern approach", 3 <sup>rd</sup> edition, Prentice Hall, 2016.
T2	WolfgangErtel,"IntroductiontoArtificialIntelligence",2 <sup>nd</sup> edition,Springer,2017

ReferenceBooks:			
S.No.	AUTHORS,BOOKTITLE,EDITION,PUBLISHER,YEAROF PUBLICATION		
R1	Miroslav Kubat," An Introduction to Machine Learning",3rd edition Springer,2016		
R2	Christopher M. Bishop, Christopher M. Bishop, "Pattern Recognition and Machine Learning"1 <sup>st</sup> edition, Springer, 2016.		
R3	Stephen Lucci and Danny Kopec,"Artificial Intelligence in the 21 <sup>st</sup> Century" 2 <sup>nd</sup> Edition, Mercury Learning and Information, 2015.		
WebDetails			
1	<a href="https://nptel.ac.in/courses/106105078">https://nptel.ac.in/courses/106105078</a>		
2	<a href="https://nptel.ac.in/courses/106105079">https://nptel.ac.in/courses/106105079</a>		
SNO	Details	Name	Signature
i.	Faculty	Dr.M.Francis Luther King M	
ii.	Course Coordinator	Mr.N.Bulli Raja	
iii.	Module Coordinator	Mr.B.MaheshKrishna	
iv.	Programme Coordinator	Dr.M.Francis Luther King M	



  
Principal