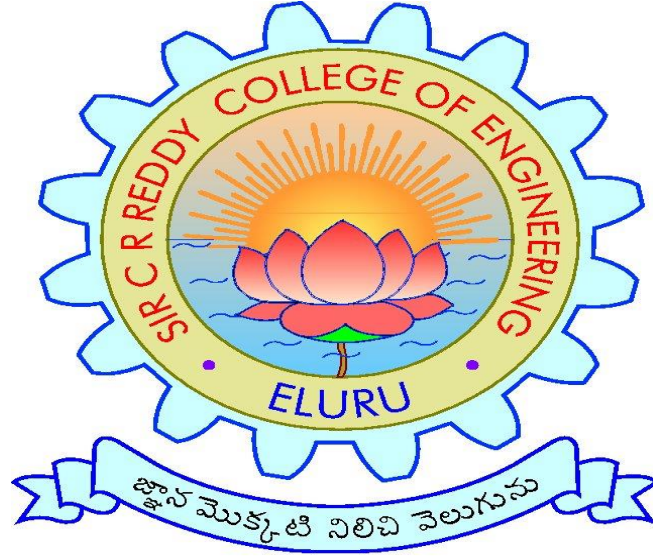


SIR C.R.REDDY COLLEGE OF ENGINEERING, ELURU
DEPARTMENT OF INFORMATION TECHNOLOGY
COURSE HANDOUT



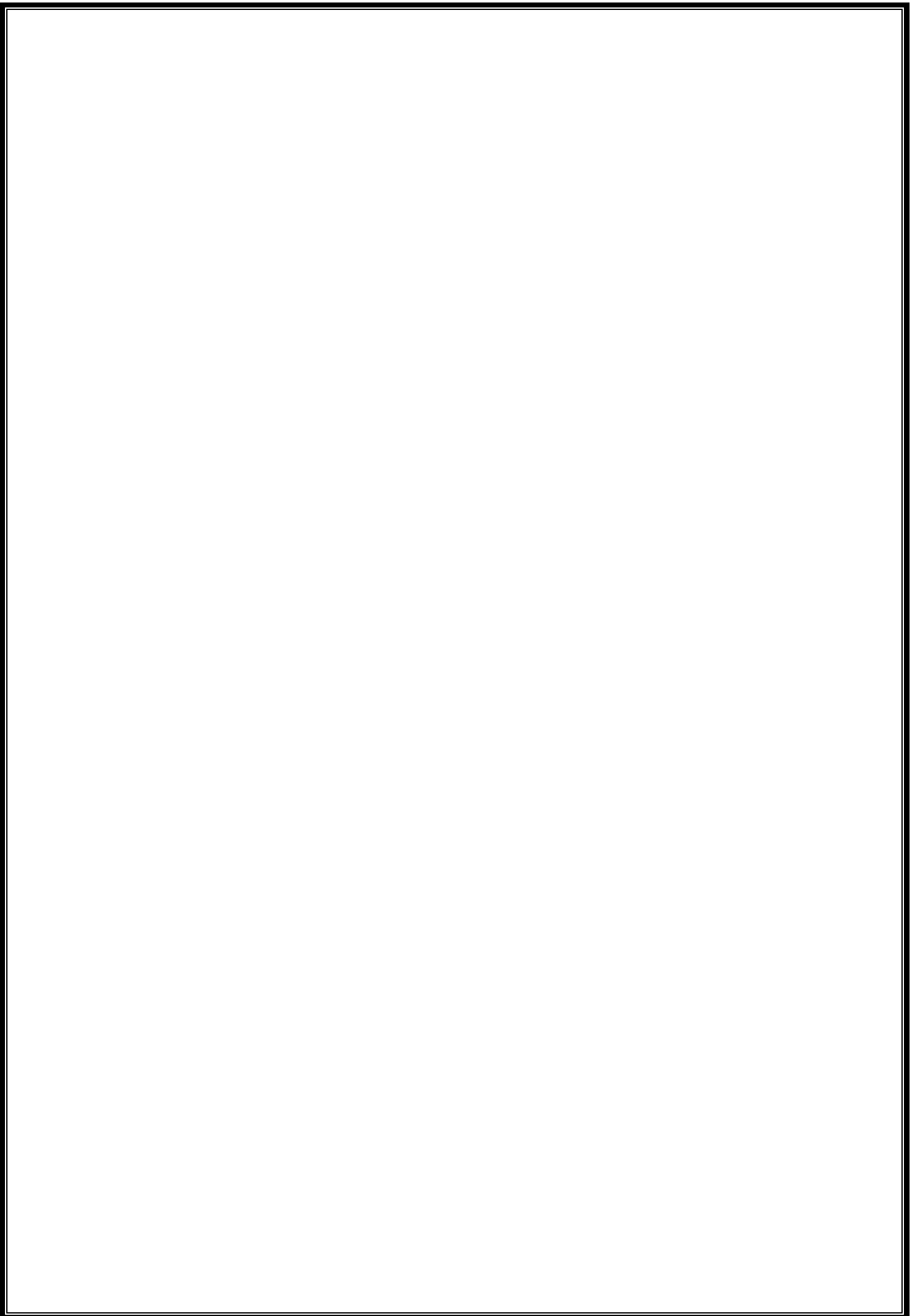
SUBJECT: ARTIFICIAL INTELLIGENCE (PE-1)

CLASS: III/IV B.Tech.

I SEMESTER A.Y.2022-23

INSTRUCTORS : Dr. S. KRISHNA RAO (B – SEC)

Dr. G.CHAMUNDESWARI (A – SEC)



Course Handout Index

S.No	Description	Page
1	College Vision & Mission	4
2	Department Vision & Mission	4
3	Program Educational Objectives (PEOs)	4
4	Program Outcomes (POs)	5
5	Program Specific Outcomes (PSOs)	6
6	JNTUK Academic Calendar	7
7	Department Academic Calendar	8
8	Course Description	8
9	Course Objectives	8
10	Course Outcomes	9
11	Lesson Plan	9
12	Evaluation Pattern	11
13	TimeTable	12
14	Unit wise Questions	12

COLLEGE VISION

To emerge as a premier institution in the field of technical education and research in the state and as a home for holistic development of the students and contribute to the advancement of society and the region.

COLLEGE MISSION

To provide high quality technical education through a creative balance of academic and industry oriented learning; to create an inspiring environment of scholarship and research; to instill high levels of academic and professional discipline; and to establish standards that inculcate ethical and moral values that contribute to growth in career and development of society in general.

VISION OF THE DEPARTMENT

To be a premier Department in the region in the field of Information Technology through academic excellence and research that enable graduates to meet the challenges of industry and society

MISSION OF THE DEPARTMENT

- ❖ To Provide dynamic teaching-learning environment to make the students industry ready and advancement in career;
- ❖ To inculcate professional and leadership quality for better employability and entrepreneurship;
- ❖ To make high quality professional with moral and ethical values suitable for industry and society

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Solve real world problems through effective professional skills in Information Technology industry and academic research.

PEO2: Analyze and develop applications in Information Technology domain and adapt to changing technology trends with continuous learning.

PEO3: Practice the profession in society with ethical and moral values.

PROGRAM OUTCOMES (POs)

PO1: Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem Analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using the first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/Development of Solutions: Design solutions for complex engineering problems and system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, society, and environmental considerations.

PO4: Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and Sustainability: Understand the impact of the professional engineering solutions in society and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multi-disciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project Management and Finance: Demonstrate knowledge and understanding of the

engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multi-disciplinary environments.

PO12: Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: Design and develop software in the area of relevance under realistic constraints.

PSO2: Adopt new and fast emerging technologies in the field of Information Technology.

Website: www.jntuk.edu.in
Email: dap@jntuk.edu.in



Phone: 0884-2300991

Directorate of Academic Planning
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
KAKINADA-533003, Andhra Pradesh, INDIA
(Established by AP Government Act No. 30 of 2008)

Lr. No. DAP/AC/III Year /B. Tech/B. Pharmacy/2022

Date 14.07.2022

Dr. KVSG Murali Krishna,
M.E. Ph.D.,
Director, Academic Planning
JNTUK, Kakinada

To
All the Principals of Affiliated Colleges,
JNTUK, Kakinada.

**Academic Calendar for III Year - B. Tech/B. Pharmacy for the AY 2022-23
(2020-21 Admitted Batch)**

I SEMESTER			
Description	From	To	Weeks
Community Service Project	15.07.2022	30.07.2022	2W
I Unit of Instruction	01.08.2022	24.09.2022	8W
I Mid Examinations	26.09.2022	01.10.2022	1W
II Unit of Instructions	03.10.2022	26.11.2022	8W
II Mid Examinations	28.11.2022	03.12.2022	1W
Preparation & Practicals	05.12.2022	10.12.2022	1W
End Examinations	12.12.2022	25.12.2022	2W


* As per the APCSHE Guidelines Out of the Total 180 hours of Community Service Project leading to 4 Credits, two weeks will be offline and remaining project work can be done during the III-I semester weekends and holidays.


Director, 14.7.22
Academics & Planning, JNTUK

Copy to the Secretary to the Hon'ble Vice Chancellor, JNTUK
Copy to Rector, Registrar, JNTUK
Copy to Director Academic Audit, JNTUK
Copy to Director of Evaluation, JNTUK

Director
Academic Planning
JNTUK Kakinada

Department Academic Calendar

		Department of Information Technology III/IV B.Tech Academic Calendar for 2022-23																																		
		2022-23	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M				
Jul 22						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Aug 22		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31				
Sep 22					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		
Oct 22						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Nov 22			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30				
Dec 22					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
Jan 23	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31					
Feb 23				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28					
Mar 23				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		
Apr 23					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		
May 23		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31				
Jun 23					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		
List of Holidays	Oct 9: Maulud Nabi			Mar 22: Ugadhi			Mid exams																													
July 10: Bakrid	Oct 24: Diwali			Mar 30: Srirama Navami			End Examinations																													
Aug 9: Moharum	Dec 25: Christmas			Apr 5: Babu Jaggivan Ram Jayanti			Commencement of Class work																													
Aug 15: Independence day	Jan 14-16: sankranti			Apr 7: Good Friday			Workshops																													
Aug 31: Ganesh Chaturdi	Jan 26: Republic Day			Apr 14: Ambedkar Jayanthi			Department fest/Elite																													
Oct 2: Gandhi Jayanthi	Feb 18: Sivaratri			Jun 29: Bakrid																																
Oct 5: Vijayadasami	Mar 8: holi																																			
HoD																																				
Department of IT																																				

Course Description

Artificial intelligence (AI) is a field of study in which computers mimics human brain. how to realize the intelligent human behaviors on a computer. The main research topics in **AI** include: problem solving, reasoning, knowledge representations, applications of search strategies and problem reductions using mathematical logic concepts. Building, rule-based expert systems and application of expert system is another arena of AI.

Course Objectives

The main objectives of this course are the student will be able to:

1. Know the methodology of Problem solving.
2. Implement the basic AI algorithms
3. Design and carry out the empirical evolution of different algorithms on a problem formalization.

Course Outcomes

Students are able to

CO No's	COs	Level
CO1	Understand Fundamental concepts of Artificial Intelligence.	L2
CO2	Apply various logic concepts and search strategies in representing knowledge for various problems.	L3
CO3	Analyze the applications of search strategies and problem reductions.	L4
C04	Evaluate the knowledge representations in Artificial Intelligence and fuzzy logic systems	L6

CO-PO Mapping

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-	1	1
CO3	-	3	-	-	-	-	-	-	-	-	-	-	1	1
CO4	-	-	-	2	-	-	-	-	-	-	-	-	1	1
Avg	3	3	-	2	-	-	-	-	-	-	-	-	1	1

Lesson Plan

S.No	Unit	Description	Teaching Aids	CO
1.	I	Introduction, history	BB	CO1
2.		Intelligent systems	BB	CO1
3.		Foundations of AI a	BB	CO1
4.		AI applications	BB	CO3
5.		Tic-tac-toe game playing	BB	CO1
6.		Development of AI languages	PPT	CO1
7.		Current trends in AI	BB	CO1
8.		State-space search and control strategies- Introduction	BB	CO1

9.	II	General problem solving	PPT	CO2
10.		Characteristics of a Problem	BB	CO1
11.		Search strategies: Introduction	BB/PPT	CO1
12.		Exhaustive searches	BB/PPT	CO2
13.		Heuristic search techniques: Branch and bound, Hill climbing	BB/PPT	CO2
14.		Best first search, Beam Search	BB	CO1
15.		A* and Optimal solution by A*	PPT	CO3
16.		Iterative-deepening A*	BB	CO3
17.		Constraint satisfaction	BB	CO1
18.	III	Logic concepts: Introduction	BB	CO1
19.		Propositional calculus	BB/PPT	CO2
20.		Propositional logic	BB/PPT	CO1
21.		Natural deduction system	BB/PPT	CO2
22.		Axiomatic System	PPT	CO1
23.		Tableau system in propositional logic	BB	CO1
24.		Predicate logic: Predicate calculus	BB	CO2
25.		First order predicate calculus	PPT	CO1
26.		Interpretation of formulae in FOL	BB	CO3
27.		Satisfiability and unsatisfiability in FOL	BB	CO2
28.		Transformation of a formulae to PNL	BB	CO1
29.	Conversion of PNF to its Standard Form	BB	CO2	
30.	IV	Knowledge Representation	BB	CO1
31.		Approaches to knowledge representation: Relational knowledge	BB/PPT	CO1
32.		Knowledge represented as logic	BB	CO1
33.		Procedural knowledge	BB/PPT	CO1
34.		Knowledge Representation using Semantic Network	BB/PPT	CO2
35.		Inference Rules	BB	CO1
36.		Deduction in Extended semantic networks	BB/PPT	CO2
37.		Examples illustrating inferencing methods	BB/PPT	CO2

38.		Inheritance, implementation	BB	CO1
39.		Advanced knowledge representation techniques: an Introduction	BB	CO1
40.		Conceptual dependency theory,	BB/PPT	CO1
41.		Script structure	BB	CO2
42.	V	Expert Systems and Applications: Introduction	BB	CO1
43.		Phases in building expert systems	BB	CO1
44.		Expert systems versus traditional systems	BB/PPT	CO1
45.		Rule based expert system : Expert system shell in Prolog	BB/PPT	CO1
46.		Problem independent forward chaining	BB/PPT	CO2
47.		ES shells and Tools, MYCIN Expert system and various shells	BB	CO3
48.		Blackboard systems: knowledge sources, blackboard, control component	BB/PPT	CO1
49.		Knowledge source execution method	BB/PPT	CO1
50.		Issues in Blackboard systems for problem solving	BB/PPT	CO1
51.		Blackboard System versus Rule-based system	BB/PPT	CO3
52.		Truth Maintenance system: Monotonic system, Non-monotonic system and logic	BB/PPT	CO2
53.		Monotonic and non-monotonic TMS	BB/PPT	CO2
54.		Applications of TMS and Expert /systems	BB/PPT	CO3
55.		List of Shells and Tools, conclusion	BB	CO1
Total Classes			55	

Evaluation Pattern

S. No	Components	Internal	External	Total
1	Theory	30	70	100
2	Engineering Graphics/Design/Drawing	30	70	100
3	Practical	15	35	50
4	Mini Project/Internship/Industrial Training/ Skill Development programmes/Research Project	-	50	50
5	Project Work	60	140	200

Marks Range Theory (Max – 100)	Marks Range Lab (Max – 50)	Level	Letter Grade	Grade Point
≥ 90	≥ 45	Outstanding	A+	10
≥80 to <89	≥40 to <44	Excellent	A	9
≥70 to <79	≥35 to <39	Very Good	B	8
≥60 to <69	≥30 to <34	Good	C	7
≥50 to <59	≥25 to <29	Fair	D	6
≥40 to <49	≥20 to <24	Satisfactory	E	5
<40	<20	Fail	F	0
-		Absent	AB	0

TIME TABLE

Day/Time	09.00- 09.50	09.50- 10.40	11.00- 11.50	11.50- 12.40	01.40- 02.30	02.30- 03.20	03.20- 04.10	04.10- 05.00
Mon		AI (A)	AI (B)					
Tue	AI (A)		AI (B)					
Wed		AI (B)			AI (A)			
Thu			AI (A)					
Fri	AI (B)					AI (A)		
Sat		AI (B)						

UNIT WISE Important Questions

UNIT - I

Short Answer Questions:

1. Define AI.
2. What are the advantages & disadvantages of AI?
3. List the goals of AI.

Essay Questions:

1. List out various applications of AI.
2. Explain the major characteristics of ELIZA.
3. Categorize intelligent systems based on their working principle.
4. Describe the components of AI program.
5. Elaborate the implementation of Tic-Tac-Toe game with 3 approaches.
6. Briefly explain about the history of AI. 7. Describe the foundations of AI. 8. Explain the current trends in AI.

UNIT – II

Short Answer Questions:

1. Write any two advantages and disadvantages of exhaustive searches.
2. Write the disadvantages of Hill Climbing approach.
3. Write the importance of heuristic function to solve an AI problem.
4. Define production system.
5. Define State Space Search. Explain 8-puzzle problem.
6. Differentiate between forward chaining & backward chaining.
7. List the two-player perfect information games.

Essay Questions:

1. Write the productions involved in solving a Water-Jug Problem.
2. Elaborate the working of A* Algorithm with an example.
3. Write the importance of Constraint Satisfaction in AI.
4. Trace Best First Search algorithm with an example. 2
5. Differentiate between exhaustive search and heuristic search.
6. Explain the procedure to implement Hill Climbing.
7. Write the procedure to implement Beam Search.
8. Explain Alpha-Beta pruning in game playing.
9. Discuss the implementation of all the exhaustive searches with examples.
10. Elaborate the significance of AO* Algorithm.
11. Explain MINIMAX algorithm in AI.
12. List & explain the characteristics of problem.
13. Explain Problem Reduction (AND-OR graph) in AI.
14. Explain about the Nim Game problem.

UNIT – III

Short Answer Questions:

1. Differentiate between Predicate and Propositional logic.
2. List out rules used in Semantic Tableau System.
3. Define Propositional Logic.
4. Define Predicate Logic.
5. Define Resolution.

Essay Questions:

1. Trace the Resolution Algorithm by taking an example.
2. Compare and Contrast Axiomatic System with Semantic Tableau.
3. Discuss the procedure of converting WFF to the clause form.
4. Consider the following sentences: Marcus was a man Marcus was a Pompeian Marcus was born in 40 AD All men are mortal All Pompeians died the Volcano erupted in 79 AD No mortal lives for more than 150 years

- (i) Convert the above WFF'S to clause form.
- (ii) Answer the question "Is Marcus dead now?" in two different ways.
- 5. Discuss the significance of Natural Deduction System with an example. 3
- 6. Explain Propositional Calculus (PC).
- 7. Explain Propositional Logic (PL).
- 8. Explain the Unification Algorithm.

UNIT – IV

Short Answer Questions:

- 1. List the approaches to Knowledge Representation (KR).
- 2. Define Conceptual Dependency (CD).
- 3. Define Script.
- 4. Define Frame.
- 5. List three primitives used in Conceptual Dependency with their usability.
- 6. Write the Conceptual Dependency representations for the following statements
(i) John Ran (ii) John is tall.
- 7. Write the importance of Conceptual Dependency in representing knowledge.
- 8. Write the advantages and disadvantages of Semantic Networks.
- 9. List the 6 cases in Case Grammars.

Essay Questions:

- 1. Discuss the procedure to represent knowledge using Semantic Network.
- 2. Explain extended Semantic Networks for Knowledge Representation.
- 3. Write about Conceptual Dependency theory. How it will be used for Knowledge Representation?
- 4. How do you represent visiting a restaurant in the form of a Script? Explain.
- 5. Write the significance of using CYC in capturing human commonsense database.
- 6. How inheritance is represented in Semantic Net? Explain the same with an example.
- 7. How knowledge representation can be done using Frames? Explain.

UNIT – V

Short Answer Questions:

- 1. Define Expert System?
- 2. List the characteristics of an Expert System.
- 3. List out the applications of an expert system.
- 4. What are the advantages & disadvantages of Expert System?

Essay Questions:

- 1. How Truth Maintenance System (TMS) is used for general problem solving?
- 2. Explain various phases involved in designing an Expert System.
- 3. Differentiate Expert Systems versus Traditional Systems.
- 4. Explain the architecture of Expert System (or) Rule based Expert System.
- 5. Explain the Blackboard System. 6. Explain Expert System building tools.