Part A - Introduction			
Programme - B.Sc. (Computer Science - Major)	**Class – B.Sc. VIII** Semester	**Year-** 2025	**Session-** 2024-25
Course Type (Computer Science) – Major			
1	**Course Code**	S8-CSC1T	
2	**Course Title**	Artificial Intelligence	
3	**Pre – requisite (if any)**	To study this course, a student must have degree course in B.Sc.	
4	**Course Learning Outcomes (CLO)**	By achieving the following learning outcomes, student should be well-equipped with the theoretical foundation and practical skills necessary to engage in and contribute to the field of artificial intelligence: 1. Understand the basic concepts and interdisciplinary nature of AI. 2. Develop the problem-solving proficiency using AI. 3. Deeply understand the various search algorithms. 4. Develop skills in knowledge representation and their applications in handling uncertainty. 5. Gain a fundamental understanding of machine learning and their practical applications. 6. Acquire skill in Prolog programming. 7. Explore advanced knowledge representation techniques. 8. Develop an awareness of ethical considerations in AI. 9. Cultivate critical thinking skills to analyze and evaluate AI algorithms and systems. 10. Apply AI concepts and techniques to diverse domains.	
5	**Credit Value**	4 Credits	
6	**Total Marks**	Formative Assessment (CCE) – 40 Marks Summative Assessment (End Semester Exam) – 60 Marks Total 40+60= 100 Marks	**Minimum Pass Marks – 35**

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Part A - Introduction			
Programme - B.Sc. (Computer Science - Major)	Class – B.Sc. VIII Semester	Year- 2025	Session- 2024-25
Course Type (Computer Science) – Major			
Course Code	S8-CSC1T		
Course Title	Artificial Intelligence		

Part – B Content of the Course		
Total no. of lectures – As per UGC rules (1 Credit = 15 Lectures)		
S. No.	Topics	No. of Lectures
I	Introduction to AI: Importance, Application & Limitation, State Space Search, Water Jug Problem, Missionaries and Cannibals Problem, BFS, DFS.	10
II	Best First Search, A* Search, AO* Search, And or Graph, Constraints Satisfaction Problem, Minimax Search, Alpha- Beta, Cut Off, Branch and Bound.	10
III	Introduction to Knowledge Representation, Knowledge Agent, Predicate Knowledge, Frame, Scripts, Introduction to Rule Based System, Forward and Backward Chaining. Application of Rule-Based System. Application of Rule-Based System Uncertainty.	10
IV	HMM Model, Conceptual Dependency, Semantic Network, Resolution Principal, DST, Introduction to Machine Learning. Supervised learning, Unsupervised Learning, Evolution of Algorithm, NLP, Need and Justification of Expert Systems, Introduction to Expert System.	20
V	Introduction to Prolog, List in Prolog, Recursion in Prolog. Union and Intersection in Prolog, learning and planning, Parsing in AI.	10

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Part A - Introduction			
Programme - B.Sc. (Computer Science - Major)	Class – B.Sc. VIII Semester	Year- 2025	Session- 2024-25
Course Type (Computer Science) – Major			
Course Code	S8-CSC1T		
Course Title	Artificial Intelligence		

Part – C Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings:

Text Books:

1. Stuart Russell and Peter Norvig., "Artificial Intelligence: A Modern Approach", Pearson.
2. Ivan Bratko, "Prolog Programming for Artificial Intelligence, Addison-Wesley".
3. Tom M. Mitchell, " Machine Learning", McGraw Hill.

Suggested Digital Platforms Web Links:

1. Coursera: https://www.coursera.org/
2. edX: https://www.edx.org/
3. Udacity: https://www.udacity.com/
4. Kaggle: https://www.kaggle.com/
5. GitHub: https://github.com/
6. MIT OCW-Introduction to artificialIntelligence: https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2005
7. Stanford Online: Machine Learning - https://online.stanford.edu.courses soe-ymes-ai003
8. Machine Learning Book pdf: https://www.cin.ufpe.br/-cavmi/Machine 20-%20Learning%20-20Tom%20Mitchell.pdf
9. DeepLearning. AI - Andrew Ng's Specialization on Coursera: https://www.coursera.org/specializations/deep-learning
10. UCI Machine Learning Repository: https://archive.ics.uci.edu/ml/index.php
11. Rule-Based Systems on GitHub: https://github.com/
12. Natural Language Processing with NLTK- https://www.nltk.org
13. TensorFlow Tutorials:https://www.tensorflow.org/tutorials

Suggested Equivalent Online Courses:

1. https://onlinecourses.swayam2.ac.in/nou24_cs07

Part A - Introduction

Programme - B.Sc. (Computer Science - Major)	Class – B.Sc. VIII Semester	Year- 2025	Session- 2024-25
Course Type (Computer Science) – Major			
Course Code	S8-CSC1T		
Course Title	Artificial Intelligence		

Part – D Assessment and Evaluation

Internal Assessment: Continuous Comprehensive Evaluation (CCE)/ Formative Assessment: 40 Marks Formative Assessment shall be based on – Quiz, Seminar, Presentation, Written test, Case Study, Project, Assignment etc. The division of marks is as follows:			External Evaluation (Summative Assessment): End Semester Exam:60 Marks Time: 03 hours	
Test I	20 Marks		Section (A): 5 Objective Questions (1 mark each)	5 x 1= 5
Test II	20 Marks	Best two test Marks = (20 + 20)	Section (B): 5 Short Questions out of eight questions (200 words each) (7 Marks each)	5 x 7 = 35
Test III	20 Marks		Section (C): Two long questions out of four questions (500 Words each) (10 Marks each)	2 x 10 = 20
Total Internal Assessment (CCE) Marks		**40 Marks**	Total External Evaluation (Theory) Marks (A+B+ C)	**60 Marks**
Note:	1.	For Major, Minor, Open Elective, Foundation and Vocational Courses, Part D will be as per the scheme of marks given.		
	2.	The student should secure 35% marks in Internal Assessment (CCE) and External Evaluation (theory) combined.		

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H. D.
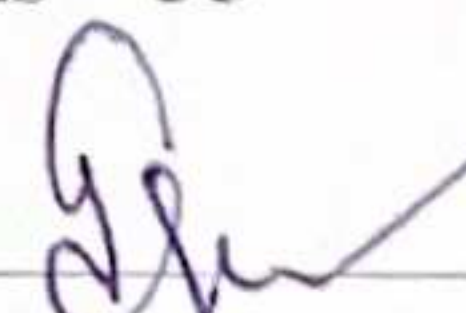Department of Computer Science
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Government Holkar (Model, Autonomous) Science College, Indore (M.P.)

Computer Science Department

Part A- Introduction (Practical)			
Programme - B.Sc. (Computer Science - Major)	**Class** – B.Sc. VIII Semester	**Year-** 2025	**Session-** 2024-25

Course Type (Computer Science) – Major

1.	Course Code	S8-CSC1TP
2.	Course Title	Artificial Intelligence Lab
3.	Pre-requisite (if any)	To study this course, a student must have degree course in B.Sc.
4.	Course Learning Outcomes (CLO)	After performing the exercise outlined in the course: The student will be well-prepared to apply AI concepts and techniques in practical settings and contribute meaningfully to the field of artificial intelligence.
5.	Credit Value	2 Credits
6	**Total Marks**	Formative Assessment (CCE) – 40 Marks Summative Assessment (End Semester Exam) – 60 Marks Total 40+60= 100 Marks	**Minimum Pass Marks** – 35

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Department of Computer Science

Govt H. Science College

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Part A- Introduction (Practical)			
Programme - B.Sc. (Computer Science - Major)	Class – B.Sc. VIII Semester	Year- 2025	Session- 2024-25

Course Type (Computer Science) – Major

1.	Course Code	S8-CSC1TP
2.	Course Title	Artificial Intelligence Lab

Part B- Content of the Course
Total no. of lectures – As per UGC rules: 30
Suggestive List of Practical

1.	Implement a simple state space search algorithm to solve problems like the Water Jug Problem.
2.	Apply Breadth-First Search (BFS) and Depth-First Search (DFS) to solve the Missionaries and Cannibals Problem.
3.	Implement the Hill Climbing algorithm to solve a problem with a heuristic function.
4.	Compare and implement Best First Search and A Search algorithms on a problem with an admissible heuristic.
5.	Build an And/Or graph and solve a problem using it.
6.	Implement a constraint satisfaction problem and solve it using backtracking.
7.	Create a game scenario and implement Minimax Search with Alpha Beta cut-off for efficient game tree traversal.
8.	Apply the Branch and Bound algorithm to solve a combinatorial optimization problem.
9.	Explore different knowledge representation techniques and implement them.
10.	Develop a rule-based system using both forward and backward chaining.
11.	Extend the rule-based system to handle uncertainty in decision making.
12.	Implement an HMM for a simple sequence prediction problem.
13.	Develop a system using conceptual dependency or semantic network for knowledge representation.
14.	Explore resolution principle and apply DST in a logical reasoning scenario.
15.	Implement a basic supervised learning algorithm on a dataset.
16.	Apply unsupervised learning algorithms on a dataset and analyze the results.
17.	Trace the historical development of machine learning algorithms and discuss their evolution.
18.	Implement a basic NLP task such as sentiment analysis or text classification.
19.	Discuss the need and justification for expert systems in various domains.

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B.Sc. VIII Semester Department of Computer Science, GHSC, Indore

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20.	Learn and implement basic Prolog programs for list manipulation.
21.	Apply recursion in Prolog and implement operations like union and intersection on sets.
22.	Explore how learning is integrated into planning in AI.
23.	Implement a basic parsing algorithm for a simple language.

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Course Type (Computer Science) – Major		
1.	Course Code	S8-CSC1TP
2.	Course Title	Artificial Intelligence Lab

Part – C Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings:

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1. Stuart Russell and Peter Norvig., "Artificial Intelligence: A Modern Approach", Pearson.
2. Ivan Bratko, "Prolog Programming for Artificial Intelligence, Addison-Wesley".
3. Tom M. Mitchell, " Machine Learning", McGraw Hill.

Suggested Digital Platforms Web Links:

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2. edX: https://www.edx.org/
3. Udacity: https://www.udacity.com/
4. Kaggle: https://www.kaggle.com/
5. GitHub: https://github.com/
6. MIT OCW-Introduction to artificialIntelligence: https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2005
7. Stanford Online: Machine Learning - https://online.stanford.edu.courses soe-ymes-ai003
8. Machine Learning Book pdf: https://www.cin.ufpe.br/-cavmi/Machine 20-%20Learning%20-20Tom%20Mitchell.pdf
9. DeepLearning. AI - Andrew Ng's Specialization on Coursera: https://www.coursera.org/specializations/deep-learning
10. UCI Machine Learning Repository: https://archive.ics.uci.edu/ml/index.php
11. Rule-Based Systems on GitHub: https://github.com/
12. Natural Language Processing with NLTK- https://www.nltk.org
13. TensorFlow Tutorials:https://www.tensorflow.org/tutorials

Suggested Equivalent Online Courses:

1. https://onlinecourses.swayam2.ac.in/nou24_cs07

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Part A- Introduction (Practical)

Programme - B.Sc. (Computer Science - Major)	Class – B.Sc. VIII Semester	Year- 2025	Session- 2024-25

Course Type (Computer Science) – Major

1.	Course Code	S8-CSC1TP
2.	Course Title	Artificial Intelligence Lab

Part D- Assessment and Evaluation

Suggested Continuous Evaluation methods:

Internal Assessment/Formative Examination(A):	40 Marks
Lab Record	15 Marks
Attendance in the Lab	05 Marks
Assignments (It can be in different modes)	20 Marks
End Semester External Evaluation (B):	**60 Marks**
Viva Voce on Practical	10 Marks
Practical Record File	10 Marks
Experiments	40 Marks
Total Marks (A+B)	(40 + 60 =100 Marks)

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