



SRI VENKATESWARA UNIVERSITY
II Year Syllabus for 4-Year UG Honours in BCA. (Artificial Intelligence)
as Major in consonance with the Curriculum framework w.e.f. AY 2026-27

II Year III Semester

Sl. No.	Category	Course No.	Course Name	No. of Hours		Total No. of Hours	No. of Credits		Total No. of Credits
				Theory	Practical		Theory	Practical	
1	Major-Core	5	Mathematical and Statistical Foundation	5	0	5	4	0	4
2	Major-Core	6	OOPS Through JAVA	3	2	5	3	1	4
3	Major-Core	7	Foundations of Artificial Intelligence	3	2	5	3	1	4
4	Minor	1		4	0	4	4	0	4
5	AECC	1	English	4	0	4	3	0	3
6	AECC	1	MIL (Telugu/Hindi/Sanskrit)	4	0	4	3	0	3
7	MDC	2	-	2	0	2	2	0	2
8	SEC	3	SEC: Design Thinking/Problem solving/ others	2	0	2	2	0	2
				27	4	31	24	2	26

Note:

The number of instructional hours shall be five (5) for courses involving problem-solving, and four (4) for courses comprising only theory.


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Year	Semester	Course	Title of the Course	No. of Hrs /Week	No. of Credits
II	III	5	Mathematical and Statistical Foundation	5	4
		6	OOPS Through JAVA	3	3
			OOPS Through JAVA Lab	2	1
		7	Foundations of Artificial Intelligence	3	3
			Foundations of Artificial Intelligence –Practical	2	1

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BCA. (Artificial Intelligence) Honours
II Year III Semester
COURSE 7: Foundations of Artificial Intelligence

Theory

Credits: 3

3 hrs/week

Course Objectives

- To introduce fundamental concepts of Artificial Intelligence and various approaches to knowledge representation.
- To develop understanding of rule-based systems, logic programming, and inference mechanisms.
- To explore Natural Language Processing techniques including language models, parsing, and machine translation.
- To understand the architecture, development, and applications of Expert Systems.
- To analyze different expert system models such as rule-based systems, blackboard systems, and truth maintenance systems.

Course Outcomes

At the End of the Course, The Students will be able to:

- Explain different approaches to knowledge representation including semantic networks and frames.
- Apply rule-based reasoning methods using forward and backward chaining techniques.
- Analyze Natural Language Processing techniques including syntactic analysis and machine translation.
- Describe the structure, components, and categories of expert systems.
- Design simple expert system models using rule-based or blackboard architecture concepts.

UNIT-I

Knowledge Representation: Introduction, Approaches to Knowledge Representation, Knowledge Representation using Semantic Network, Extended Semantic Networks for KR, Knowledge Representation using Frames

UNIT-II

Representing Knowledge Using Rules: Procedural Versus Declarative Knowledge, Logic Programming, Forward Versus Backward Reasoning, Matching, Control Knowledge.

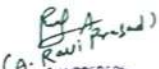
UNIT-III

Natural Language Processing: Language Models, Text Classification, Information Retrieval, Information Extraction.

Natural Language for Communication: Phrase structure grammars, Syntactic Analysis, Augmented Grammars and semantic Interpretation, Machine Translation, Speech Recognition.

UNIT-IV

Introduction: Introduction to Expert System, Definitions, Importance of Expert System, Characteristic features of Expert System, Applications of Expert System, Different Categories of Expert Systems.


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UNIT-V

Expert System and Applications: Introduction, Phases in Building Expert Systems, Expert System Architecture, Expert Systems versus Traditional Systems, Rule Based Expert Systems, Blackboard Systems, Truth Maintenance Systems

Text Books:

1. Artificial Intelligence: A Modern Approach, Stuart Russell and Peter Norvig, Pearson Education.
2. Artificial Intelligence, Elaine Rich and Kevin Knight, Tata McGraw-Hill.
3. Expert Systems: Principles and Programming, Joseph C. Giarratano and Gary Riley, Thomson.

Reference Books:

1. Natural Language Processing with Python, Steven Bird, Ewan Klein, Edward Loper, O'Reilly.
2. Artificial Intelligence and Expert Systems, Patterson, PHI Publications.
3. Speech and Language Processing, Daniel Jurafsky and James H. Martin, Pearson.

Activities:

Outcome: Explain and apply different knowledge representation techniques including semantic networks and frames.

Activity: Students will design a knowledge representation model for a real-world domain (e.g., Hospital Management or Library System) using:

- Semantic Networks
- Frame Representation

Evaluation Method: Rubric-based evaluation (10 Marks):

- Correct use of nodes and relationships
- Proper frame slots and inheritance
- Logical consistency
- Clarity of diagram representation

Representing Knowledge Using Rules

Outcome: Apply forward and backward reasoning techniques in rule-based systems.

Activity: Students will:

- Develop IF-THEN rules for a simple expert system (e.g., Disease Diagnosis).
- Demonstrate forward chaining and backward chaining using flow diagrams or pseudo-code.

Evaluation Method (10 Marks):

- Correct rule formulation
- Proper inference mechanism demonstration
- Logical reasoning steps
- Oral explanation

Outcome: Analyze and implement basic NLP tasks including text classification and syntactic analysis.

Activity: Students will:

- Perform text classification using simple datasets.
- Draw phrase structure trees for given sentences.
- Demonstrate syntactic parsing using CFG (Context Free Grammar).

Evaluation Method (10 Marks):

- Accuracy of classification
- Correct grammar rules
- Parse tree construction
- Clarity in explanation

Outcome: Describe architecture, characteristics, and applications of expert systems.

Activity: Group presentation on:

- Applications of expert systems in Medicine, Agriculture, Banking, and Education.
- Identification of components (Knowledge Base, Inference Engine, User Interface).

Evaluation Method (10 Marks):

- Content accuracy
- Understanding of expert system components
- Real-world examples
- Presentation skills

Outcome: Design and compare different expert system architectures.

Activity: Students will:

- Draw architecture diagrams of:
 - Rule-Based Expert System
 - Blackboard System
 - Truth Maintenance System
- Compare Expert Systems with Traditional Systems in tabular format.

Evaluation Method (10 Marks):

- Diagram correctness
- Clear differentiation of architectures
- Logical comparison
- Written explanation

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SEMESTER-III

COURSE 7: Foundation of Artificial Intelligence

Practical

Credits: 1

2hrs/week

List of Experiments:

1. Write a program to implement DFS
2. Write a program to implement BFS.
3. Write a program to implement BST.
4. Write a program to implement Towers of Hanoi problem.
5. Write a Program to find the solution for travelling salesman Problem
6. Write a program to implement 8 puzzle problem.
7. Write a program to implement A*Algorithm
8. Write a program to implement Hill Climbing Algorithm
9. Write a program to implement Simulated Annealing Algorithm
10. Build a Chatbot using Whatsapp


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BCA Artificial Intelligence Honours
II Year III Semester
COURSE 7 : Foundations of Artificial Intelligence

Time : 3 Hrs

Max Marks : 75

SECTION - A

Answer any FIVE of the following

5 X 3= 15 Marks

1. Short answer question from unit-I
2. Short answer question from unit-I
3. Short answer question from unit-II
4. Short answer question from unit-II
5. Short answer question from unit-III
6. Short answer question from unit-III
7. Short answer question from unit-IV
8. Short answer question from unit-IV
9. Short answer question from unit-V
10. Short answer question from unit-V

SECTION-B

Answer FIVE of the following.

5 X 12=60 Marks

11. a) Essay question from Unit-I
OR
b) Essay question from Unit-I
12. a) Essay question from Unit-II
OR
b) Essay question from Unit-II
13. a) Essay question from Unit-III
OR
b) Essay question from Unit-III
14. a) Essay question from Unit-IV
OR
b) Essay question from Unit-IV
15. a) Essay question from Unit-V
OR
b) Essay question from Unit-V


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