Year: II
Semester: III

1. **Name of the Faculty: Dr. Shweta Mongia** — **Course Code: CSAI1007**
2. **Course : Introduction to Artificial Intelligence** — **L: 2**
3. **Program : B. Tech – CSE (AIML)** — **T: 0**
4. **Target : Level 2** — **P: 2**
   C: 3

COURSE PLAN

Target	50% (marks)
Level-1	40% (population)
Level-2	50% (population)
Level-3	60% (population)

1. Method of Evaluation

UG
Quizzes/Tests, Assignments (30%)
Mid Examination (20%)
End examination (50%)

2. Passing Criteria

Scale	**UG**
Out of 10point scale	SGPA – "5.0" in each semester CGPA – "5.0" Min. Individual Course Grade – "C" Course Grade Point – "4.0"

3. Pedagogy: Lecture, project based learning and gamification

4. Topics introduced for the first time in the program through this course

- Nil

5. References:

Text Books	Web resources	Journals	Reference books
Introduction to Artificial Intelligence **(IBM ICE Publication).**	https://www.youtube.com/playlist?list=PL08885AEAE85EA836 https://nptel.ac.in/downloads/106106131/		1. Rich E., Artificial Intelligence, Tata McGraw Hills (2009). 2. George F. Luger, Artificial Intelligence: Structures and Strategies for Complex Problem Solving, Pearson Education Asia (2009).

Year: II
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Signature of HOD/Dean **Signature of Faculty**

Date: **Date:**

GUIDELINES TO STUDY THE SUBJECT

Instructions to Students:

1. Go through the 'Syllabus' in the Black Board section of the web-site(https://learn.upes.ac.in) in order to find out the Reading List.
2. Get your schedule and try to pace your studies as close to the timeline as possible.
3. Get your on-line lecture notes (Content, videos) at Lecture Notes section. These are our lecture notes. Make sure you use them during this course.
4. check your blackboard regularly
5. go through study material
6. check mails and announcements on blackboard
7. keep updated with the posts, assignments and examinations which shall be conducted on the blackboard
8. Be regular, so that you do not suffer in any way
9. C**ell Phones and other Electronic Communication Devices:** Cell phones and other electronic communication devices (such as Blackberries/Laptops) are not permitted in classes during Tests or the Mid/Final Examination. Such devices MUST be turned off in the class room.
10. **E-Mail and online learning tool:** Each student in the class should have an e-mail id and a pass word to access the LMS system regularly. Regularly, important information – Date of conducting class tests, guest lectures, via online learning tool. The best way to arrange meetings with us or ask specific questions is by email and prior appointment. All the assignments preferably should be uploaded on online learning tool. Various research papers/reference material will be mailed/uploaded on online learning platform time to time.
11. **Attendance:** Students are required to have minimum attendance of 75% in each subject. Students with less than said percentage shall NOT be allowed to appear in the end semester examination.

This much should be enough to get you organized and on your way to having a great semester! If you need us for anything, send your feedback through e-mail vijendra.singh@ddn.upes.ac.in Please use an appropriate subject line to indicate your message details.

There will no doubt be many more activities in the coming weeks. So, to keep up to date with all the latest developments, please keep visiting this website regularly.

UPES

Year: II
Semester: III

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   C: 3

RELATED OUTCOMES

1. The expected outcomes of the Program are:

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, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, 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 societal 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 multidisciplinary 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 multidisciplinary 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.

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2. The expected outcomes of the Specific Program are:

PSO1	Perform system and application programming using computer system concepts, concepts of Data Structures, algorithm development, problem solving and optimizing techniques.
PSO2	Apply software development and project management methodologies using concepts of front-end and back-end development and emerging technologies and platforms.
PSO3	Understand and apply Cloud Computing architecture for scalable, secure and dynamically provisioned business oriented environment with optimized performance tuning and data reliability.

3. **The expected outcomes of the Course are:**
On completion of this course, the students will be able to

CO 1	Understand the Fundamentals of Artificial Intelligence
CO 2	Analyze the logical, reasoning, problem solving and learning technique.
CO 3	Comprehend concept of machine learning, neural network and Evolutionary Intelligence.
CO 4	Analyze the real-life problem and write an algorithm to solve a problem in moderate complexity.

4. Co-Relationship Matrix
Indicate the relationships by1- Slight (low) 2- Moderate (Medium) 3-Substantial (high)

Program Outcomes / Course Outcomes	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO 3**
CO 1		1	2	2									2	3	
CO 2		3	2	2									2	3	
CO 3		3	2	3									2	3	
CO 4		3	2	3									2	3	
Average		2.8	1.8	2.16									2	2.5	

1=weak 2= moderate 3=strong

UPES

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   C: 3

5. **Course outcomes assessment plan:**

components / Course Outcomes	Assignment	Test/Quiz	Mid Semester	End Semester	Any other
CO 1		√	√	√	
CO 2	√	√	√	√	
CO 3	√	√	√	√	
CO 4		√		√	

UPES

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   C: 3

OVERVIEW OF COURSE DELIVERY/BROAD PLAN OF COURSE COVERAGE

Course Activities:

S. No.	Description	Planned			Actual			Remarks
		From	To	No. of Ses	From	TO	No. of Ses	
1.	Unit 1: Introduction to Artificial Intelligence	2/08/2021	10/08/2021	3				CO1
2.	Unit 2: Logical Approach to AI & Knowledge bases systems	11/08/2021	01/09/2021	6				CO1, CO2, CO4
3.	Unit 3: Probabilistic Approach to AI	02/09/2021	30/09/2021	8				CO1, CO2, CO4
4.	Unit 4: Evolutionaly Intelligence	01/10/2021	10/10/2021	3				CO3
5.	Unit 5: Neural Networks, Natural Language Understanding	11/10/2021	20/10/2021	3				CO1, CO3
6.	Unit 6: Introduction to Machine Learning	21/10/2021	04/11/2021	5				CO3, CO4
7.	Unit 7: Learning Deterministic Models	05/11/2021	05/12/2021	8				CO3, CO4

Total No. of Instructional periods available for the course: Sessions

Signature of HOD/Dean — **Signature of Faculty**

Date: — **Date:**

Year: II
Semester: III

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3. **Program : B. Tech – CSE (AIML)** **T: 0**
4. **Target : Level 2** **P: 2**
C: 3

SESSION PLAN

UNIT-I

Session Plan				Actual Delivery			
Lect.	Date	Topics to be Covered	CO Mapped	Lect.	Date	Topics Covered	CO Achieved
1		History of Artificial Intelligence	CO1				
2		What is AI? Emergence of AI	CO1				
3		Cognitive Science & AI	CO1				

Signature of faculty **Date:**

UPES

Year: II
Semester: III

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2. **Course : Introduction to Artificial Intelligence** **L: 2**
3. **Program : B. Tech – CSE (AIML)** **T: 0**
4. **Target : Level 2** **P: 2**
C: 3

SESSION PLAN

UNIT-II

Session Plan				Actual Delivery			
Lect.	Date	Topics to be Covered	CO Mapped	Lect.	Date	Topics Covered	CO Achieved
1		Basics of Propositional Logic: Syntax, Semantics, Tautologies and Logical Implication,	CO1				
2		Logical, Arguments, Derivation Systems,	CO1				
3		Resolution in normal forms, derivations using resolutions & resolution algorithm, Artificial Intelligence	CO1				
4		Applications: Knowledge-Based Systems, Wumpus World, Taxonomy	CO4				
5		Knowledge: Semantic Nets, Model of Human Organization of Knowledge, Frame data structure, planning using frames,	CO2				
6		Non-monotonic Logic: Circumscription, Default Logic, Difficulties	CO2				

Signature of faculty **Date:**

UPES

Year: II
Semester: III

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3. **Program : B. Tech – CSE (AIML)** **T: 0**
4. **Target : Level 2** **P: 2**
C: 3

SESSION PLAN

UNIT-III

Session Plan				Actual Delivery			
Lect.	Date	Topics to be Covered	CO Mapped	Lect.	Date	Topics Covered	CO Achieved
1		Probability Basics: Probability Spaces, Conditional Probability and Independence, Bayes' Theorem	CO1				
2		Meaning of probability, Relative frequency and subjective approaches, Random Variables	CO2				
3		Probability Distributions of Random Variables, Independence of Random Variables, Random variables in applications,	CO2				
4		Bayesian Networks -Definition, properties and representation	CO2				
5		Inference, Algorithms and packages, Inference using Netica; Casuality and Markov condition in networks, Networks with Continuous Variables:	CO2				
6		Gaussian Bayesian Networks, Hybrid Networks, Obtaining the Probabilities in a Bayesian Network:	CO2				
7		Difficulty Inherent in Multiple Parents, Basic & Leaky Noisy OR-Gate Model	CO2				
8		Large-Scale Application of Bayesian Networks: Promedas	CO4				

Signature of faculty **Date:**

Year: II
Semester: III

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2. **Course : Introduction to Artificial Intelligence** **L: 2**
3. **Program : B. Tech – CSE (AIML)** **T: 0**
4. **Target : Level 2** **P: 2**
C: 3

SESSION PLAN

UNIT-IV

Session Plan				Actual Delivery			
Lect.	Date	Topics to be Covered	CO Mapped	Lect.	Date	Topics Covered	CO Achieved
1		Genetics Review, Genetic Algorithms: Algorithm Description,	**CO3**				
2		Illustrative Examples, Travelling Salesperson Problem; Ant system, Ant colonies	**CO3**				
3		Artificial Ants in TSP, Flocks, application in Financial trading	**CO3**				

Signature of faculty **Date:**

Year: II
Semester: III

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3. **Program : B. Tech – CSE (AIML)** — **T: 0**
4. **Target : Level 2** — **P: 2**
   C: 3

SESSION PLAN

UNIT-V

Session Plan				Actual Delivery			
Lect.	Date	Topics to be Covered	CO Mapped	Lect.	Date	Topics Covered	CO Achieved
1		Understanding of Neural Networks, Functional structure of NN	**CO1**				
2		Understanding of Natural Language Understanding, Parsing	**CO3**				
3		Semantic Interpretation, Concept/Knowledge Interpretation	**CO3**				

Signature of faculty **Date:**

UPES

Year: II
Semester: III

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2. **Course : Introduction to Artificial Intelligence** — **L: 2**
3. **Program : B. Tech – CSE (AIML)** — **T: 0**
4. **Target : Level 2** — **P: 2**
   C: 3

SESSION PLAN

UNIT-VI

Session Plan				Actual Delivery			
Lect.	Date	Topics to be Covered	CO Mapped	Lect.	Date	Topics Covered	CO Achieved
1		Origins of Machine Learning, Uses & Abuses of Machine Learning	**CO3**				
2		How do Machines Learn? – Abstraction, Knowledge Representation, Generalization	**CO3**				
3		Assessing Success of Learning 4 Steps to Apply Machine Learning to Data	**CO3**				
4		Choosing ML Algorithm - Thinking about Input Data	**CO3**				
5		Types of ML Algorithms, Matching Data to Appropriate Algorithm	**CO4**				

UPES

Year: II
Semester: III

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3. **Program : B. Tech – CSE (AIML)** — **T: 0**
4. **Target : Level 2** — **P: 2**
   C: 3

Signature of faculty **Date:**

SESSION PLAN

UNIT-VII

Session Plan			Actual Delivery				
Lect.	Date	Topics to be Covered	CO Mapped	Lect.	Date	Topics Covered	CO Achieved
1		Supervised Learning: Concepts and Examples	**CO3**				
2		Regression: Simple Linear, Multiple Linear Regression	**CO3**				
3		Overfitting and Cross Validation, Parameter Estimation	**CO3**				
4		Estimating Parameters for Simple Linear Regression, Gradient Descent, Logistic Regression and Gradient Descent,	**CO4**				
5		Decision Tree: Information Theory, Information Gain and ID3 Algorithm	**CO4**				
6		Unsupervised Learning: Clustering, Automated Discovery	**CO4**				

Year: II
Semester: III

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4. **Target : Level 2** **P: 2**
   C: 3

7		Reinforcement Learning: Multi-Armed Bandit Algorithms, Dynamic Networks, Decision Trees, Influence diagrams, Risk Modelling, Sensitivity Analysis	**CO4**				
8		Structured Learning problems, score based structure learning, constraint based structure learning, Casual Learning – casual faithful assumption, embedded faithfulness	CO4				

Signature of faculty **Date:**

UPES

Year: II
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4. **Target : Level 2** — **P: 2**
   C: 3

PERIODIC MONITORING

Actual date of completion and remarks, if any

Components		From	To	From	To	From	To
Duration (Mention from and to dates)							
Percentage of Syllabus covered							
Lectures	Planned	36					
	Taken						
Tutorials/Discussions	Planned	2					
	Taken						
Test/quizzes	Planned	3					
	Taken						
	CO's Addressed						
	CO's Achieved						
Assignments	Planned	2					
	Taken						
	CO's Addressed						
	CO's Achieved						
Signature of Faculty							
Head of the Department							
A.M.R.C							

Signature of HOD/ Dean

Date

Signature of Faculty

Date

UPES

Year: II
Semester: III

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4. **Target : Level 2** — **P: 2**
   C: 3

PERIODIC MONITORING

Attainment of the Course (Learning) Outcomes:

Components	Attainment level	Action plan	Remark (AMC)
Assignment	CO1:		
	CO2:		
	CO3:		
	CO4:		
	CO5:		
	CO6:		
	CO7:		
Quiz/test	CO1:		
	CO2:		
	CO3:		
	CO4:		
	CO5:		
	CO6:		
	CO7:		
Mid Semester	CO1:		
	CO2:		
	CO3:		
	CO4:		
	CO5:		
	CO6:		
	CO7:		
End Semester	CO1:		
	CO2:		
	CO3:		
	CO4:		
	CO5:		
	CO6:		
	CO7:		
Any Other	CO1:		
	CO2:		
	CO3:		
	CO4:		
	CO5:		

UPES

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   C: 3

	CO6:		
	CO7:		

Signature of HOD/ Dean

Date

Signature of Faculty

Date

Year: II
Semester: III

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   C: 3

INDIRECT ASSESSMENT

Sample format for Indirect Assessment of Course outcomes:

NAME:
ENROLLMENT NO:
SAP ID:
COURSE:
PROGRAM:

Please rate the following aspects of course outcomes of ----------.
Use the scale 1-3*

course Outcomes	Statement	1	2	3
CO1				
CO2				
CO3				
CO4				
CO5				
CO6				

* 1 WEAK 2 MODERATE 3 STRONG

UPES

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   C: 3

INSTRUCTIONS FOR FACULTY

Instructions for faculty

- Faculty should keep track of the students with low attendance and counsel them regularly.
- Course coordinator will arrange to communicate the short attendance (as per UPES policy) cases to the students and their parents monthly.
- Topics covered in each class should be recorded in the table of RECORD OF CLASS TEACHING (Suggested Format).
- Internal assessment marks should be communicated to the students twice in a semester.
- The file will be audited by respective AcademicMonitoring and Review Committee (AMRC) members for theory as well as for lab as per AMRC schedule.
- The faculty is required to maintain these files for a period of at least three years.
- This register should be handed over to the head of department, whenever the faculty member goes on long leave or leaves the Colleges/University.
- For labs, continuous evaluation format (break-up given in the guidelines for result preparation in the same file) should be followed.
- Department should monitor the actual execution of the components of continuous lab evaluation regularly.
- Instructor should maintain record of experiments conducted by the students in the lab weekly.
- Instructor should promote students for self-study and to make concept diary, due weightage in the internal should be given under faculty assessment for the same.
- Course outcome assessment: To assess the fulfilment of course outcomes two different approaches have been decided. Degree of fulfillment of course outcomes will be assessed in different ways through direct assessment and indirect assessment. In Direct Assessment, it is measured through quizzes, tests, assignment, Mid-term and/or End-term examinations. It is suggested that each examination is designed in such a way that it can address one or two outcomes (depending upon the course completion). Indirect assessment is done through the student survey which needs to be designed by the faculty (sample format is given below) and it shall be conducted towards the end of course completion. The evaluation of the achievement of the Course Outcomes shall be done by analyzing the inputs received through Direct and Indirect Assessments and then corrective actions suggested for further improvement.

UPES

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CHECKLIST

Check listCourse Outcomes Attainment(COA)

SI.No	Description	Date of Submission	Checked	Remarks
1	Class Tests marks			
2	Quiz marks			
3	Assignment marks			
4	Mid Semester Marks			
5	End Semester Marks			
6	Check in COA format			
7	Whether respective CO of Class tests, Quiz's, Assignments, Mid and End semester maximum marks entered or not			
8	Ensure that all data got filled as per requirement			
9	Copy of quiz paper with the model answer and two/three answer sheets			
10	Copies of all test papers with two/three answer sheets			
11	Copies of all assignments with two or three model assignments			
12	Manual attendance sheet			
13	Copy of faculty time table			
14	Course Plan			

Year: II
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   C: 3

15	Class Tests, Quiz and assignment marks as per COs			
16	Copy of midterm examination paper and model solution			
17	Copy of end term examination paper and model solution			
18	List of minor/major project work given to the student			
19	Detailed internal assessment sheet			
20	Copy of final grade sheet (which was submitted to SRE) must be attached at the end of semester			
21	Copy of quiz /test conducted for lab			
22	Rubrics wise marks in Lab (Day to day evaluation sheet)			
23	Copy of course attainment sheet (both pages)			
24	Indirect Attainment Sheet			

Signature of HOD/ Dean **Signature of Faculty**

Date **Date**

UPES

Year: II
Semester: III

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   C: 3

Planning for Remedial Classes

Sl. No.	Name of Student	Roll No.	Sap ID	Mid Sem Marks	Remedial Classes Held							Class test on the basis of Remedial Classes	End Sem Marks	Improvement (Y/N)
					Date									
					Venue									
					Time									

Signature of HOD/ Dean

Date

Signature of Faculty

Date