COURSE FILE

ON

MACHINE LEARNING

Course Code – CS601PC

III B.Tech II-SEMESTER
A.Y.: 2022-2023

Prepared by

Mrs.N.SHILPA
Assistant Professor

Computer Science & Engg. Dept.
SRI INDU INSTITUTE OF ENGG & TECH.
Sheriguda(V), Ibrahimpatnam(M), R.R.Dist-501 1C.

PRINCIPAL
Sri Indu Institute of Engineering & Tech.
Sheriguda(Vill), Ibrahimpatnam
R.R. Dist. Telangana-501 510.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Academic Year	2022-2023
Course Title	MACHINE LEARNING
Course Code	CS601PC
Programme	B.Tech
Year & Semester	III year II-semester
Branch & Section	CSE-A
Regulation	R18
Course Faculty	Mrs. N.SHILPA, Assistant Professor

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Sri Indu Institute of Engineering & Technology

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

INSTITUTE VISION AND MISSION

Vision:

To become a premier institute of academic excellence by providing the world class education that transforms individuals into high intellectuals, by evolving them as empathetic and responsible citizens through continuous improvement.

Mission:

IM1: To offer outcome-based education and enhancement of technical and practical skills.

IM2: To continuous assess of teaching-learning process through institute-industry

collaboration..

IM3: To be a centre of excellence for innovative and emerging fields in technology

development with state-of-art facilities to faculty and students fraternity.

IM4: To create an enterprising environment to ensure culture, ethics and social responsibility

among the stakeholders

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

DEPARTMENT VISION AND MISSION

Vision:

To become a prominent knowledge hub for learners, strive for educational excellence with innovative and industrial techniques so as to meet the global needs.

Mission:

DM1 : To provide ambience that enhances innovations, problem solving skills, leadership qualities, decision making, team-spirit and ethical responsibilities.

DM2 : To impart quality education with professional and personal ethics, so as to meet the challenging technological needs of the industry and society.

DM3 : To provide academic infrastructure and develop linkage with the world class organizations to strengthen industry-academia relationships for learners.

DM4 : To provide and strengthen new concepts of research in the thrust area of Computer Science and Engineering to reach the needs of Government and Society.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

PROGRAM EDUCATIONAL OBJECTIVES

PEO1: To develop trained graduates with strong academic and technical skills of modern computer science and engineering.

PEO2: To promote trained graduates with leadership qualities and the ability to solve real time problems using current techniques and tools in interdisciplinary environment.

PEO3: To motivate the graduates towards lifelong learning through continuing education and professional development.

PROGRAM SPECIFIC OUTCOMES

PSO1 : **Professional Skills:** To implement computer programs of varying complexity in the areas related to Web Design, Cloud Computing, Network Security and Artificial Intelligence.

PSO2: **Problem-Solving Skills**: To develop quality products using open ended programming environment.

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PROGRAMME 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, review research literature, and analyse 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 modelling 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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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech. in COMPUTER SCIENCE AND ENGINEERING
III YEAR COURSE STRUCTURE AND SYLLABUS (R18)

Applicable From 2018-19 Admitted Batch

III YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	CS501PC	Formal Languages & Automata Theory	3	0	0	3
2	CS502PC	Software Engineering	3	0	0	3
3	CS503PC	Computer Networks	3	0	0	3
4	CS504PC	Web Technologies	3	0	0	3
5	CS515PE	Professional Elective -I	**3**	**0**	**0**	**3**
6		Professional Elective -II	3	0	0	3
7	CS505PC	Software Engineering Lab	0	0	3	1.5
8	CS506PC	Computer Networks & Web Technologies Lab	0	0	3	1.5
9	EN508HS	Advanced Communication Skills Lab	0	0	2	1
10	*MC510	Intellectual Property Rights	3	0	0	0
		Total Credits	**21**	**0**	**8**	**22**

III YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	CS601PC	Machine Learning	3	1	0	4
2	CS602PC	Compiler Design	3	1	0	4
3	CS603PC	Design and Analysis of Algorithms	3	1	0	4
4	CS615PE	Software Testing Methodologies(PE-III)	3	0	0	3
5		Open Elective-I	3	0	0	3
6	CS604PC	Machine Learning Lab	0	0	3	1.5
7	CS605PC	Compiler Design Lab	0	0	3	1.5
8		Professional Elective-III Lab	0	0	2	1
9	*MC609	Environmental Science	3	0	0	0
		Total Credits	**18**	**3**	**8**	**22**

*MC - Environmental Science – Should be Registered by Lateral Entry Students Only.

Note: Industrial Oriented Mini Project/ Summer Internship is to be carried out during the summer vacation between 6th and 7th semesters. Students should submit report of Industrial Oriented Mini Project/ Summer Internship for evaluation.

Professional Elective-I

CS511PE	Information Theory & Coding
CS512PE	Advanced Computer Architecture
CS513PE	Data Analytics
CS514PE	Image Processing
CS515PE	Principles of Programming Languages

Professional Elective – II

CS521PE	Computer Graphics
CS522PE	Advanced Operating Systems
CS523PE	Informational Retrieval Systems
CS524PE	Distributed Databases
CS525PE	Natural Language Processing

Professional Elective – III

CS611PE	Concurrent Programming
CS612PE	Network Programming
CS613PE	Scripting Languages
CS614PE	Mobile Application Development
CS615PE	Software Testing Methodologies

		L	**T**	**P**	**C**
III Year B.Tech. CSE – II Sem					
CS601PC: MACHINE LEARNING (C321)		**3**	**1**	**0**	**4**

Prerequisites

1. Data Structures
2. Knowledge on statistical methods

Course Objectives

1. This course explains machine learning techniques such as decision tree learning, Bayesian learning etc.
2. To understand computational learning theory.
3. To study the pattern comparison techniques.

UNIT - I

Introduction - Well-posed learning problems, designing a learning system, Perspectives and issues in machine learning- Concept learning and the general to specific ordering – introduction, a concept learning task, concept learning as search, find-S: finding a maximally specific hypothesis, version spaces and the candidate elimination algorithm, remarks on version spaces and candidate elimination, inductive bias.

Decision Tree Learning – Introduction, decision tree representation, appropriate problems for decision tree learning, the basic decision tree learning algorithm, hypothesis space search in decision tree learning, inductive bias in decision tree learning, issues in decision tree learning.

UNIT - II

Artificial Neural Networks-1– Introduction, neural network representation, appropriate problems for neural network learning, perceptions, multilayer networks and the back-propagation algorithm.

Artificial Neural Networks-2- Remarks on the Back-Propagation algorithm, An illustrative example: face recognition, advanced topics in artificial neural networks.

Evaluation Hypotheses – Motivation, estimation hypothesis accuracy, basics of sampling theory, a general approach for deriving confidence intervals, difference in error of two hypotheses, comparing learning algorithms.

UNIT - III

Bayesian learning – Introduction, Bayes theorem, Bayes theorem and concept learning, Maximum Likelihood and least squared error hypotheses, maximum likelihood hypotheses for predicting probabilities, minimum description length principle, Bayes optimal classifier, Gibs algorithm, Naïve Bayes classifier, an example: learning to classify text, Bayesian belief networks, the EM algorithm.

Computational learning theory – Introduction, probably learning an approximately correct hypothesis, sample complexity for finite hypothesis space, sample complexity for infinite hypothesis spaces, the mistake bound model of learning.

Instance-Based Learning- Introduction, k-nearest neighbour algorithm, locally weighted regression, radial basis functions, case-based reasoning, remarks on lazy and eager learning.

UNIT- IV

Genetic Algorithms – Motivation, Genetic algorithms, an illustrative example, hypothesis space search, genetic programming, models of evolution and learning, parallelizing genetic algorithms.

Learning Sets of Rules – Introduction, sequential covering algorithms, learning rule sets: summary, learning First-Order rules, learning sets of First-Order rules: FOIL, Induction as inverted deduction, inverting resolution.

Reinforcement Learning – Introduction, the learning task, Q–learning, non-deterministic, rewards and actions, temporal difference learning, generalizing from examples, relationship to dynamic programming.

UNIT - V

Analytical Learning-1- Introduction, learning with perfect domain theories: PROLOG-EBG, remarks on explanation-based learning, explanation-based learning of search control knowledge.

Analytical Learning-2-Using prior knowledge to alter the search objective, using prior knowledge to augment search operators.

Combining Inductive and Analytical Learning – Motivation, inductive-analytical approaches to learning, using prior knowledge to initialize the hypothesis.

Course Outcomes

1. Understand the concepts of computational intelligence like machine learning
2. Ability to get the skill to apply machine learning techniques to address the real time problems in different areas
3. Understand the Neural Networks and its usage in machine learning application.

TEXT BOOKS:

1. Machine Learning – Tom M. Mitchell, - MGH2.

REFERENCE BOOKS:

1. Machine Learning: An Algorithmic Perspective, Stephen Marshland, Taylor & Franciz.

Course Outcomes

Course: MACHINE LEARNING (C321)
Class: III – II SEM – A- Section

After completing this course, the student will be able to:

C321.1   Understand the concepts of hypothesis spaces, version spaces and decision tree in machine learning (comprehension)

C321.2   Possess the skill of Neural Networks and its usage in machine learning application (Application)

C321.3   Ability to analyse the Bayesian techniques for supervised classification and computational learning into real time applications. (Analysis)

C321.4   Ability to develop libraries and modern tools for instance based learning to compute the efficiency. (Create)

C321.5   Ability to get the skill to apply genetic algorithm, FOIL and reinforcement techniques to address the real time problems in different areas (Application)

C321.6   Identify the importance of analytical learning with prior knowledge (Comprehension)

Mapping of course outcomes with program outcomes:

High -3   Medium -2   Low-1

PO/PSO/ CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C321.1	3	-	2	-	-	-	-	-	-	-	-	1	-	2
C321.2	3	2	-	1	-	-	-	-	-	-	-	1	2	-
C321.3	2	3	3		2	-	-	-	-	-	-	-	3	1
C321.4	-	1	-	2	2	-	-	-	-	-	-	-	-	1
C321.5	1	1	-	-	1	-	-	-	-	-	-	-	1	-
C321.6	1	-	1	-	-	-	-	-	-	-	-	1	-	-
C321	2	1.75	2	1.5	1.6	-	-	-	-	-	-	1	2	1.33

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CO – PO / PSO Mapping Justification

Course: MACHINE LEARNING(C321)
Class: III – II SEM – A - Section

PROGRAMME 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, review research literature, and analyse 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 modelling to complex engineering activities with an understanding of the limitations.

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 **Professional Skills:** The ability to implement computer programs of varying complexity in the areas related to web design, cloud computing and networking.

PSO2 **Problem-Solving Skills:** The ability to develop quality products using open ended programming environment.

C321.1   Understand the concepts of hypothesis spaces, version spaces and decision tree
          in machine learning (Knowledge)

	Justification
PO1	Get the knowledge about learning concept and working model with their merits and demerits.
PO3	Design issues of hypothesis spaces, version space and decision tree learning in the machine learning.
PO12	Get knowledge about utilizing the algorithms in the day to day applications.
PSO2	Apply the gained knowledge in developing the intelligent system design.

C321.2   Possess the skill of Neural Networks and its usage in machine learning
          application (Application)

	Justification
PO1	Develop the various Neural Network algorithms and its implementation
PO2	Analyse the back-propagation algorithm into multilayer network to find efficiency.
PO4	Estimate the hypothesis accuracy using sampling theorem and confidence intervals for complex problems.
PO12	Learn the skill of advanced neural networks utilization in the applications.
PSO1	Develop the products using the neural network oriented operation in the real time problems.

C321.3   Ability to analyse the Bayesian techniques for supervised classification and
          computational learning into real time applications. (Analysis)

	Justification
PO1	Gain the Knowledge of Bayesian concepts and their importance.
PO2	Understand the investigation of probably learning of approximately correct hypothesis prediction.
PO3	Design a model to deal with naive bayes algorithms in the applications
PO5	
PSO1	Ability to use the computational algorithms for measuring networks performance.
PSO2	Discover the importance of the supervised classifier learning.

C321.4   Ability to develop libraries and modern tools for instance based learning to compute
           the efficiency. (Create)

	Justification
PO2	Develop more computing capability to utilizing the algorithm in Bayesian belief networks.
PO4	Create the effective learning to compute the performance.
PO5	Adopt the instance based algorithms like (KNN, regression, radial basis function, lazy and eager learning) deployment on modern tools.
PSO2	Understand the Programming library management and its usages.

C321.5   Ability to get the skill to apply genetic algorithm, FOIL and reinforcement techniques to address the real time problems in different areas (Apply)

	Justification
PO1	Acquire the knowledge of genetic algorithm and its implementation.
PO2	Analyse the importance of reinforcement learning.
PO5	To use Modern tool for FOIL on generated decision tree to find improved solutions of the problem.
PSO1	Understand the environment of genetic algorithm will be needs in real time application.

C321.6   Identify the importance of analytical learning with prior knowledge (Comprehension)

	Justification
PO3	Describe the learning through perfect domain theories like Prolog-EGB
PO1	Know the importance analytical algorithm implementation
PO12	State the advantages of analytical learning.

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ACADEMIC CALENDAR 2022-23

B. Tech./B. Pharm. III YEAR I & II SEMESTERS

I SEM

S. No	Description	Duration	
		From	To
1	Commencement of I Semester classwork	**09.09.2022**	
2	1st Spell of Instructions (including Dussehra Recess)	09.09.2022	10.11.2022 (9 Weeks)
3	Dussehra Recess	03.10.2022	08.10.2022 (1 Week)
4	First Mid Term Examinations	11.11.2022	17.11.2022 (1 Week)
5	Submission of First Mid Term Exam Marks to the University on or before	24.11.2022	
6	2nd Spell of Instructions	18.11.2022	12.01.2023 (8 Weeks)
7	Second Mid Term Examinations	16.01.2023	21.01.2023 (1 Week)
8	Preparation Holidays and Practical Examinations	23.01.2023	28.01.2023 (1 Week)
9	Submission of Second Mid Term Exam Marks to the University on or before	30.01.2023	
10	End Semester Examinations	30.01.2023	11.02.2023 (2 Weeks)

Note: No. of Working/ instructional days: 92

II SEM

| S. No	Description	Duration	
		From	To
1	Commencement of II Semester classwork	**13.02.2023**	
2	1st Spell of Instructions	13.02.2023	08.04.2023 (8 Weeks)
3	First Mid Term Examinations	10.04.2023	15.04.2023 (1 Week)
4	Submission of First Mid Term Exam Marks to the University on or before	22.04.2023	
5	2nd Spell of Instructions (including Summer Vacation)	17.04.2023	24.06.2023 (10 Weeks)
6	**Summer Vacation**	15.05.2023	27.05.2023 (2 Weeks)
7	Second Mid Term Examinations	26.06.2023	01.07.2023 (1 Week)
8	Preparation Holidays and Practical Examinations	03.07.2023	08.07.2023 (1 Week)
9	Submission of Second Mid Term Exam Marks to the University on or before	08.07.2023	
10	End Semester Examinations	10.07.2023	22.07.2023 (2 Weeks)

Note: No. of Working/ instructional days: 90

REGISTRAR
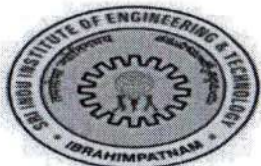
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TIME TABLE FOR A.Y 2022-23

Class: III-B. Tech CSE -A   **Semester: II**   **LH. NO: A-201**   **W.E.F:13-02-2023**

Period/ Day	1	2	3	4	1:00-1:30	5	6	7
	9:40-10:30	10:30-11:20	11:20-12:10	12:10-1:00		1:30-2:20	2:20-3:10	3:10-4:00
Monday	DAA	CD	LIB	STM	L U N C H	STM LAB(BATCH-I)/CD LAB(BATCH-II)		
Tuesday	STM	DAA	DAA/ML(T)	ML		FIOT	STM	SPORTS
Wednesday	FIOT	CD	INT	STM		ML/CD(T)	CO-C/SS/DAA	
Thursday	FIOT	ML LAB(BATCH-I)/STM LAB(BATCH-II)				DAA	CD	STM
Friday	CD	COUN	ML	FIOT		ML LAB(BATCH-II)/CD LAB(BATCH-I)		
Saturday	CD	FIOT	CD/DAA(T)	DAA		ML		DAA

(T) – Tutorial (concern faculty)

Subject Code	Subject Name	Name of the Faculty	Subject Code	Subject Name	Name of the Faculty
CS601PC	Machine Learning	Mrs N Shilpa		Fundamentals of Internet of Things	Mrs. M.Sruthi
CS602PC	Compiler Design	Dr. Sasikumar D	CS604PC	Machine Learning Lab	Mrs N Shilpa/ K.Manmadha / V. Divya
CS603PC	Design and Analysis of Algorithms	Mr A Vijay Kumar	CS605PC	Compiler Design Lab	Dr. Sasikumar D / Ms K Mounika/ P.Swathi
CS615PE	Software Testing Methodologies	Mrs E Rupa	CS625PE	Software Testing Methodologies Lab	Mrs E Rupa/ Mrs S Akhila / Mrs. M.Sruthi
	CO-C/SS/DAA/ Cyber Security	Mrs. M.Sruthi	LIB	Library	Mrs K.Manmadha
Sports	Sports	Mr A Vijay Kumar	COUN	Counselling	Mrs.A.Sudha
Internet	Internet	Mrs.A.Sudha	CS601PC	Machine Learning	Mr M Dattatreya Goud (Adjunct)
			MC609	Environmental Science(LE)	Mr D Nagaraju
Class In-Charge : Mrs N Shilpa		Mentor 1 : Mrs N Shilpa		Mentor 2: Mrs E Rupa	

Class In-Charge   HOD   PRINCIPAL

LESSON PLAN

Programme: B.Tech	Academic Year: 2022-23
Year: III	Semester: I
Course Title: MACHINE LEARNING	Course Code: CS601PC
Name of Faculty: N.SHILPA, Assistant Professor , CSE	

.

.**UNII-I**

S.No	Topics	No. of Sessions Planned	Teaching Method/ Aids	Reference
1	**Introduction:** Well-posed learning problems	2	BB	T1, R 1
2	Designing a learning system	1	BB	T1, R 1
3	Perspectives and issues in machine learning	1	BB	T1, R 1
4	**Concept learning and the general to specific ordering:** Introduction	1	BB	T1, R 1
5	A concept learning task- Concept learning as search	1	BB	T1, R 1
6	Find-S: finding a maximally specific hypothesis	1	BB	T1, R1
7	Version spaces and the candidate elimination algorithm	2	BB	T1, R1
8	Remarks on version spaces and candidate elimination, Inductive bias	1	BB	T1
9	**Decision Tree Learning:** Introduction, Appropriate problems for decision tree learning	2	BB	T1, R1
10	The basic decision tree learning algorithm, Hypothesis space search in decision tree learning	2	BB	T1, R1
11	Inductive bias in decision tree learning, Issues in decision tree learning	1	BB	T1

UNII -II

S.No	Topics	No. of Sessions Planned	Teaching Method/ Aids	Reference
1	**Artificial Neural Networks-1:** Introduction	1	BB	T1, R 1
2	Neural network representation, Appropriate problems for neural network learning	2	BB	T1, R 1
3	Perceptions, Multilayer networks and the back propagation algorithm	1	BB	T1, R 1
4	**Artificial Neural Networks-2:** Remarks on the Back-Propagation algorithm	1	BB	T1, R 1
5	An illustrative example: face recognition, Advanced topics in artificial neural networks	1	BB	T1, R 1
6	**Evaluation Hypotheses:** Motivation, Estimation hypothesis accuracy	1	BB	T1, R 1
7	Basics of sampling theory	2	BB	T1, R 1
8	A general approach for deriving confidence Intervals	1	BB	T1, R 1
9	Difference in error of two hypotheses	1	BB	T1, R 1
10	Comparing learning algorithms	1	BB	T1, R 1

UNII -III

S.No	Topics	No. of Sessions Planned	Teaching Method/ Aids	Reference
1	**Bayesian learning:** Introduction, Bayes theorem	1	BB	T1,R1
2	Bayes theorem and concept learning	2	BB	T1
2	Maximum Likelihood and least squared error hypotheses	2	BB	T1, R1
2	Maximum likelihood hypotheses for predicting probabilities	2	BB	T1, R1
2	Minimum description length principle	2	BB	T1, R1
1	Bayes optimal classifier, Gibbs algorithm	1	BB	T1, R`
1	Naïve Bayes classifier, An example: learning to classify text	1	BB	T1, R1
2	Bayesian belief networks, The EM algorithm	2	BB	T1, R1
1	**Computational learning theory:** Introduction, Probably learning an approximately correct hypothesis	1	BB	R1
1	Sample complexity for finite and infinite hypothesis space,	1	BB	T1, R1
1	The mistake bound model of learning	1	BB	T1
1	**Instance-Based Learning:** Introduction, k-nearest neighbour algorithm	1	BB	T1, R1
1	Locally weighted regression, Radial basis functions, Case-based reasoning	1	BB	T1
1	Remarks on lazy and eager learning	1	BB	T1

UNII -IV

S.No	Topics	No. of Sessions Planned	Teaching Method/ Aids	Reference
1	**Genetic Algorithms:** Motivation, Genetic algorithms	**1**	BB	T1, R 1
2	An illustrative example, Hypothesis space search, Genetic programming	1	BB	R1
3	Models of evolution and learning, Parallelizing genetic algorithms	1	BB	T1, R 1
4	**Learning Sets of Rules:** Introduction, Sequential covering algorithms	1	BB	T1, R 1
5	Learning sets of First-Order rules: FOIL, Induction as inverted deduction, Inverting resolution	2	BB	T1, R 1
6	**Reinforcement Learning:** Introduction, The learning task, Q–learning	2	BB	T1, R 1
7	Non-deterministic rewards and actions, Temporal difference learning,	1	BB	T1, R 1
8	Generalizing from examples, Relationship to dynamic programming	1	BB	T1, R 1

UNII -V

S.No	Topics	No. of Sessions Planned	Teaching Method/ Aids	Reference
1	**Analytical Learning-1:** Introduction, Learning with perfect domain theories: PROLOG-EBG	2	BB	T1, R 1
2	Remarks on explanation-based learning, Explanation-based learning of search control knowledge	1	BB	T1, R 1
3	**Analytical Learning-2:** Using prior knowledge to alter the search objective	1	BB	T1, R 1
4	Using prior knowledge to augment search operators	1	BB	T1, R 1
5	**Combining Inductive and Analytical Learning:** Motivation	2	BB	T1, R 1
6	Inductive-analytical approaches to learning	2	BB	T1, R 1
7	Using prior knowledge to initialize the hypothesis	1	BB	T1, R 1

Text Books	
Text 1	Machine Learning – Tom M. Mitchell, - Mc Graw Hill Education

Reference Books	
Ref 1	Machine Learning: An Algorithmic Perspective, Stephen Marshland, Taylor & Francis

WEB REFERENCES:

Websites	
W1	NOC: Machine Learning, ML (Video): https://nptel.ac.in/courses/106106202/
W2	https://www.geeksforgeeks.org/introduction-artificial-neural-network-set-2/
W3	https://www.javatpoint.com/bayes-theorem-in-machine-learning
W4	https://www.analyticsvidhya.com/blog/2019/04/introduction-deep-q-learning-python/
W5	https://www.javatpoint.com/genetic-algorithm-in-machine-learning

Lecture notes

Subject: Machine Learning

Unit 1 link:

https://drive.google.com/file/d/1fO8eFrUHA9zkXpfis85ZiATX0BLSHN8l/view?usp=sharing

Unit 2 link:

https://drive.google.com/file/d/1tLaHQ5KPLD_w2ydY3q19dXNC3gEoixDn/view?usp=sharing

Unit 3 link:

https://drive.google.com/file/d/15xbXoc3LYQaTqHRa-V-1ooPUxt7-uTP2/view?usp=sharing

Unit 4 link:

https://drive.google.com/file/d/1ef3dAG10FRagJI1M68P9qouA-K0H383G/view?usp=sharing

Unit 5 link:

https://drive.google.com/file/d/1rq903130Ik71lSx--FBg446rm3jFVnWQ/view?usp=sharing

Power point presentation

Subject: Machine Learning

Unit-I PPT link:

https://drive.google.com/file/d/19Fac57kaZmfCPt8I938sSiRp2TISa0FL/view?usp=sharing

Unit-II PPT link:

https://drive.google.com/file/d/1V_YzxkdqzUJ1fspXM5D89Ib_xus9Sp4R/view?usp=sharing

Unit-III PPT link:

https://drive.google.com/file/d/1_4QnwtTEX-45NdxCy2j4NCs14zsFovc3/view?usp=sharing

Unit-IV PPT link:

https://drive.google.com/file/d/1J3--eTOwZTZ4ejDd7pdNac28yuOPhFFF/view?usp=sharing

Unit-V PPT link:

https://drive.google.com/file/d/1OilrtRt7Zej8RH6p6eRwoyBviwvoPeDu/view?usp=sharing

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year II Semester Examinations, August/September - 2021
MACHINE LEARNING
(Computer Science and Engineering)

Time: 3 Hours   Max. Marks: 75

Answer any five questions All
questions carry equal marks

- - -

1.a) Define Well-Posed problem. Illustrate any four examples for Well-Posed problems.
  b) What do you mean by Candidate elimination? Explain.   [7+8]

2.a) What are the concepts of learning as search? Discuss.
  b) Discuss the appropriate problems for decision tree learning.   [8+7]

3.a) Contrast the hypothesis space search in ID3 and candidate elimination algorithm.
  b) Explain the Back propagation learning algorithm and its limitations.   [7+8]

4.a) How a multi layered network learns using a gradient descent algorithm? Discuss.
  b) Explain the methods for comparing the accuracy of two hypotheses.   [8+7]

5.a) State Bayes theorem. Illustrate Bayes theorem with an example.
  b) Describe the mistake bound model of learning.   [8+7]

6.a) Explain Gibs algorithm with an example.
  b) State and explain the Minimum Description Length Principle.   [8+7]

7.a) Discuss about Hypothesis space search in genetic algorithms.
  b) Write the basic algorithm for learning sets of First-Order Rules.   [8+7]

8.a) Discuss Explanation-Based learning of search control knowledge.
  b) Explain the inductive analytical approaches to learning.   [8+7]

---ooOoo---

Code No: 156BN

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year II Semester Examinations, February/March - 2022
MACHINE LEARNING
(Computer science and Engineering)

Time: 3 Hours   Max. Marks: 75

Answer any five questions
All questions carry equal marks
- - -

1.a)   Discuss about the basic Decision Tree Learning algorithm.
  b)   Briefly explain the need of Inductive Bias in decision Tree Learning.   [7+8]

2.a)   Explain the Find-S: Finding a Maximally Specific Hypothesis in detail.
  b)   Explain the issues in decision tree learning.   [10+5]

3.a)   Present the Backpropagation algorithm for feedforward networks and explain each step in it.
  b)   Explain how to estimate hypothesis accuracy.   [9+6]

4.a)   Define the terms estimation bias and confidence intervals.
  b)   Discuss the central limit theorem for deriving confidence intervals in detail.
  c)   Explain the representation of neural networks.   [5+5+5]

5.a)   Design the Brute Force Bayesian concept learning algorithm and elaborate.
  b)   Explain the Mistake Bound for the Halving Algorithm.   [8+7]

6.a)   Explain the Maximum Likelihood Hypotheses for predicting probabilities.
  b)   Elaborate the Locally Weighted Linear Regression.   [8+7]

7.a)   Explain the Q–learning with suitable example.
  b)   Explain about the hypothesis space search.   [8+7]

8.a)   Discuss about the Explanation-based Learning of Search Control Knowledge.
  b)   Explain how to initialize the hypothesis by using prior knowledge.   [8+7]

---ooOoo---

R18

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year II Semester Examinations, August - 2022
MACHINE LEARNING

(Computer Science and Engineering)

Time: 3 Hours   **Max.Marks:75**

Answer any five questions
All questions carry equal marks

1.a) Which disciplines have their influence on machine learning? Explain with examples.
  b) What are the different types of a Machine Learning models?   [8+7]

2.a) List the problems that can be solved using machine learning.
  b) Discuss the issues in decision tree learning algorithm in detail.   [8+7]

  Explain back-propagation algorithm in detail.
  b) Explain the following:
      i) General consistent hypothesis.
      ii) Closed concepts in path through the hypothesis.   [7+8]

4.a) Discuss the issues related to neural network learning.
  b) Write a detail note on sampling theory.   [8+7]

5.a) Describe the Naive Bayesian method of classification. What assumptions does this method make about the ribues and the classification? Give an example where this assumption is to justify.
  b) What is the Laplacian correction and why it is necessary?   [10+5]

6.a) Write the differences between Eager Learning and Lazy Learning approaches.
  b) State Bayes theorem. Illustrate Bayes theorem with an example.   [7+8]

7.a) Write the basic algorithm for learning sets of First-Order Rules.
  b) Apply inverse resolution in propositional form to the clauses C=A B, C1=A B G.
      Give at least two possible results for C2.
                                                                                  [7+8]

8.   What are the differences between inductive learning and analytical learning problems andexplain   the   same   with   an   example.
                                                                                  [15]

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year II Semester Examinations, September - 2022MACHINE LEARNING
(Common to EEE, ECE)

Time: 3 Hours   **Max.Marks:75**

Answer any five questions

All questions carry equal marks

- -

1.a) What is machine learning? Discuss the perspectives and issues in machine learning.
  b) Demonstrate the decision tree representation for a learning problem.   [8+7]

2.a) What are the well posed learning problems? Describe the design aspects of a learningsystem.
  b) Explain how hypothesis space search is carried in decision tree learning.   [8+7]

3.a) Write the basics of sampling theory.
  b) Illustrate the back-propagation algorithm with an example.   [7+8]

4.a) Describe the general approach for deriving confidence intervals.
  b) Compare and contrast different learning algorithms.   [8+7]

5.a) Explain k-nearest neighbor learning algorithm with an example.
  b) What is the significance of minimum description length principle? Explain.   [7+8]

6.a) Explain about Naïve Bayes classifier with an example.
  b) Differences between Eager Learning and Lazy learning approaches.   [7+8]

7.a) Explain genetic algorithm with an illustrative example.
  b) What is Reinforcement learning? Discuss the significance of Q-learning.   [7+8]

8.a) What are the inductive-analytical approaches to learning? Explain.
  b) Discuss explanation-based learning algorithm PROLOG-EBG with a suitable example.
                                                                                                             [7+8]

---oo0oo---

Year & Branch: III-CSE-A,B&C   Date: 02-05-22(FN)

Subject: Machine Learning   Marks: 10   Time: 60 min

Answer any **TWO** Questions. All Question Carry Equal Marks   2*5=10 marks

(This question paper is prepared with Course Outcome and BT's mapping)

1. Describe supervised, unsupervised and reinforcement learning with example (Knowledge) [C321.1]

2. Write the FIND-S and List Then Eliminate Algorithms.(Knowledge) [C321.1]

3. Define about the Back Propagation Algorithm.   (Understand)[C321.2]

4. Brief note on Artificial Neural Networks with example. (Create) [C321.2]
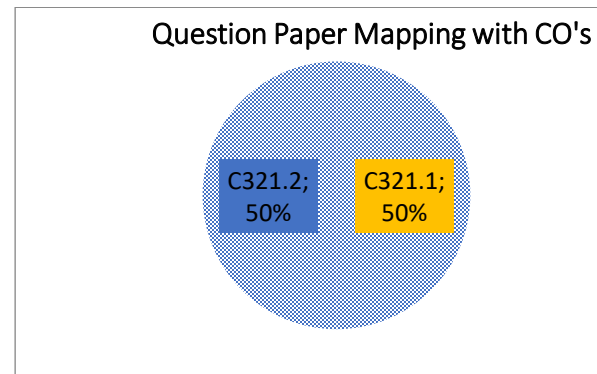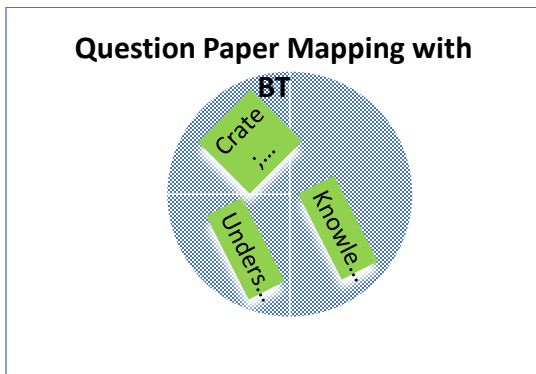
Question Paper Mapping with BT

Crate;...
Unders...
Knowle...

Question Paper Mapping with CO's

C321.2; 50%   C321.1; 50%

Sri Indu Institute of Engineering & Technology

Sheriguda (V), Ibrahimpatnam (M), R.R.Dist-501 510

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.TECH. III YEAR II SEM., Mid-I Term Examinations, May– 2023

MACHINE LEARNING

Objective Exam

Name:_____Hall Ticket No.

Answer All Questions. All Questions Carry Equal Marks.   Time: 20 Min. Marks: 10.

I Choose the correct alternative:

1. Which is the Well-posed learning problem classified?   [   ]
   a) Playing checkers learning problem
   b) Hand written recognition learning problem
   c) Robot driving learning problem
   d) All of these

2. What is the Attribute of Designing learning system   [   ]
   a) Choosing the training experience
   b) Non choosing the target function
   c) Non choosing a function approximation algorithm
   d) None of the these

3. LMS stands for. [CO3] (Understand)   [   ]
   a) Least mean square
   b) least mean sum
   c) least mean squares
   d) All

4. What is the final Design module?   [   ]
   a) Critic
   b) Performance system
   c) Generalizer
   d) All

5. FIND-S algorithm simply ignores   [   ]
   a) Every positive example
   b) Every negative example
   c) Both
   d) None of these

6. The LIST-THEN-ELIMINATE Algorithm represents   [   ]
   a) Version space
   b) Hypothesis space
   c) Both A & B
   d) None of these

7. FIND-S outputs the hypothesis h = (Sunny, Warm, ?, Strong, ?, ?) So what it is indicate[   ]
   a) It is accepting all negative attribute values
   b) It is accepting all positive attribute values
   c) Both
   d) None of these.

8. ID3 algorithm introduced by   [   ]
   a) Quinlan 1993
   b) Quinlan 1986

c) Quinlan 1989
d) None of these

9. What are the issues in decision tree learning [   ]
    a) Avoiding over fitting the data
    b) Reduced error pruning
    c) Rule post pruning
    d) All

10. Artificial neural networks provide [   ]
    a) Real-valued function
    b) Discrete-valued function
    c) Vector-valued function
    d) All of these

II. Fill in the blanks

1. Statistical property is called in machine learning _____

2. Information theory is called in machine learning_____

3. The BACK PROPAGATION algorithm learns _____

4. CASCADE-CORRELATlON algorithm begins by _____

5. Evaluation Hypothesis presents_____

6. _____, _____ are the
   two difficulties in evaluation hypothesis motivation?

7. Definition of CANDIDATE-ELIMINATION algorithm general boundary is
   _____

8. 18. Definition of CANDIDATE-ELIMINATION algorithm specific boundary is
   _____

9. _____, _____,
   _____are the different types of machine learning ways.

10 _____hypothesis. (H) and _____hypothesis. (h)

Sri Indu Institute of Engineering & Technology

Sheriguda (V), Ibrahimpatnam (M), R.R.Dist-501 510
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.TECH. III YEAR II SEM., Mid-I Term Examinations, May– 2023
MACHINE LEARNING
Key

Descriptive paper key link:

https://drive.google.com/file/d/1992CaT_avIqXP2e4Hceq07ldoCfYgaXF/view?usp=sharing

Objective/Quiz Key Paper

I Choose the correct alternative

1. D
2. A
3. C
4. D
5. B
6. A
7. C
8. B
9. D
10. D

II. Fill in the blanks

1. Information Gain

2. Entropy

3. The weights for a multilayer network

4. Constructing a network with no hidden units

5. An introduction to statistical methods for estimating hypothesis accuracy

6. Bias in the estimate, Variance in the estimate

7. The general boundary G, with respect to hypothesis space H and training data D, is the set of maximally general members of H consistent with D

8. The specific boundary S, with respect to hypothesis space H and training data D, is the set of minimally general (i.e., maximally specific) members of H consistent with D.

9. Supervised Learning, Unsupervised Learning, Reinforcement learning

10. Candidate model that approximates a target function for mapping inputs to outputs, Specific output

Sri Indu Institute of Engineering & Technology

Sheriguda (V), Ibrahimpatnam (M), R.R.Dist-501 510

II- Mid Examinations, JUNE-2023

Year & Branch: III-CSE-A,B&C   Date: 26-06-23(AN)

Subject: Machine Learning   Marks: 10   Time: 60 min

Answer any **TWO** Questions. All Question Carry Equal Marks   2*5=10 marks

(This question paper is prepared with Course Outcome and BT's mapping)

1. Discuss the Bayes theorem and Bayes optimal classification(Understand) [C321.3]

2. Write the Genetic algorithm with example program (Remember) [C321.4]

3. Demonstrate KNN algorithm with example program [Apply] [C321.3]

4. Demonstrate Q-learning algorithm with an example (Analysis) [C321.5]

Question Paper Mapping with BT
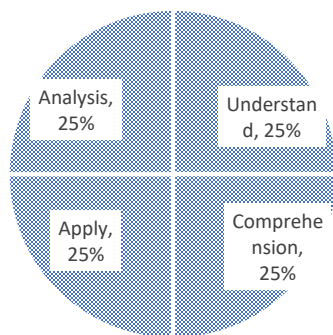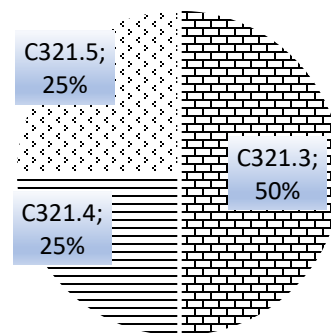
Analysis, 25%
Understand, 25%
Apply, 25%
Comprehension, 25%

Question Paper Mapping with CO's

C321.5; 25%
C321.3; 50%
C321.4; 25%

Sri Indu Institute of Engineering & Technology

Sheriguda (V), Ibrahimpatnam (M), R.R.Dist-501 510
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.TECH. III YEAR II SEM., II Mid Term Examinations, JUNE– 2023
MACHINE LEARNING
Objective Exam

Name:＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿Hall Ticket No.

Answer All Questions. All Questions Carry Equal Marks.   Time: 20 Min. Marks: 10.

I Choose the correct alternative:

1. Bayes rule can be used for:-   [CO3] (Understand)   [   ]
   a) Solving queries
   b) Increasing complexity
   c) Answering probabilistic query
   d) Decreasing complexity

2. PAC stand for   [CO3] (Remember)   [   ]
   a) Probably Approximate Correct
   b) Probably Approx Correct
   c) Probably Approximate Computation
   d) Probably Approx Computation

3. ＿＿＿＿means approximating a real-valued target function. [CO3] (Understand)   [   ]
   a) Residual
   b) Regression
   c) Kernel function
   d) None of the above

4. The sequential covering algorithm learns a ＿＿＿＿set of rules by first learning a single accurate rule. [CO4] (apply)
   [   ]
   a) Conjunctive
   b) Disjunctive
   c) Reflexive
   d) All

5. When to consider nearest neighbour algorithms? [CO4] (Remember)   [   ]
   a) Instance map to point in kn
   b) Not more than 20 attributes per instance
   c) Lots of training data
   d) all of these

6. Genetic algorithm is a   [CO5] (Remember)   [   ]
   a) Search technique used in computing to find true or approximate solution to optimization and search problem
   b) Sorting technique used in computing to find true or approximate solution to optimization and sort problem
   c) Both A & B
   d) None of these

7. Which of the following sentence is FALSE regarding reinforcement learning? [CO5] (Understand)   [   ]
    a. It relates inputs to
    b. It is used for
    c. It may be used for
    d. It discovers causal relationships.
8. PROLOG-EBG standsfor_____(Remember) [CO6]   [   ]
    a) Logic programming-Explanation Based Generalization
    b) Logarithmic- Program- Executable Generalization
    c) Logic programming Evolution Based Generalization
    d) None of these
9. _____uses prior knowledge represented by desired derivatives of the target function. (Understand) [CO6]   [   ]
    a) FOIL
    b) FOCL
    c) EBNN
    d) TANGENTPROP
10. _____uses the domain theory to alter the objective in searching the hypotheses space of possible weights for an artificial neural network. (Analysis) [CO6]   [   ]
    a) FOIL
    b) FOCL
    c) EBNN
    d) TANGENTPROP

Fill in the blanks

1. The compactness of the bayesian network can be described by _____ structured. [CO3] (Remember)

2. Probability provides a way of summarizing the_____that comes from our laziness [CO3] (understand)

3. The instance-based learner is a _____learner. [CO4] (Remember)

4. Specify any one of advantage(s) of Locally Weighted Regression_____. [CO4] (Apply)

5. _____ Produces two new offspring from two parent string by copying selected bits from each parent is called. [CO5] (Remember)

6. _____uses the domain theory to expand the set of candidates considered at each step in the search. [CO6] (Understand)

7. _____learning uses prior knowledge and deductive reasoning to augment the information provided by the training examples. [CO6] (Remember)

8. _____ learning that can acquire optimal control strategies from delayed rewards, even when the agent has no prior knowledge of the effects of its actions on the environment. [CO5] (Understand)

9. _____ Turing equivalent programming language in which programs are expressed as collections of Horn clauses. [CO6] (Analyse)

10. Reinforcement learning algorithms are related to _____algorithms frequently used to solve optimization problems. (Apply) [CO5]

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Sheriguda (V), Ibrahimpatnam (M), R.R.Dist-501 510
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.TECH. III YEAR II SEM., Mid-II Term Examinations, June– 2023
MACHINE LEARNING-KEY

Descriptive paper key link:

https://drive.google.com/file/d/1CCl2Ox2tBJc8H6QnD5Lt2bpY7uNxgl60/view?usp=sharing

Objective/Quiz Key Paper

I Choose the correct alternative

1. C
2. A
3. B
4. B
5. D
6. A
7. D
8. A
9. B
10. C

II Fill in the blanks

11. Locally
12. Uncertainty
13. Lazy
14. Good locally
15. Crossover
16. FOCL
17. Analytical learning
18. Q-Learning
19. PROLOG
20. Dynamic Programming

ASSIGNMENT- 1   SUBJECT: MACHINE LEARNING

1. Describe supervised, unsupervised and reinforcement learning with example

(Knowledge) [C321.1] 5M

2. Write a short note on Artificial Neural Networks with example. **(knowledge) [C321.2] 5M**

3. Write the FIND-S and List Then Eliminate Algorithms.**(Knowledge) [C321.1] 5M**

4.Illustrate the Bayesian algorithm with examples?   **(Comprehension) [C321.3] 5M**

5.Explain the Candidate Elimination Algorithm with example **(Comprehension) [C321.1] 5M**

Assignment 1 script link:

**https://drive.google.com/file/d/1OX8syq2j_HX7gcx5bqxrqKnmQkT
ZZFJC/view?usp=sharing**

ASSIGNMENT- 2   SUBJECT: MACHINE LEARNING

1. Demonstrate k-nearest neighbor algorithm for classification **(Knowledge) [C321.3] 5M**

2. Write the Sequential Covering algorithm for learning a disjunctive set of rules. .

   (knowledge) [C321.4] 5M

3. Discuss about the PROLOG-EBG algorithm. **(Evaluation) [C321.5] 5M**

4. Discuss the significance of locally weighted regression. **(Evaluation) [C321.3] 5M**

5. List the factors motivated the popularity of genetic algorithms **(Application) [C321.4]**

   5M

Assignment 2 script link:

**https://drive.google.com/file/d/1mlXSEEoYhMF0Jlckea3kdNQoZB8
XqENQ/view?usp=sharing**

Result Analysis:

Course Title	MACHINE LEARNING
Course Code	CS601PC
Programme	B.Tech
Year & Semester	III year II-semester, A sec
Regulation	R18
Course Faculty	Mrs N SHILPA, Assistant Professor,CSE

Slow learners:

S No	Roll no	No of backlogs	Internal-I Status	Internal-II Status
1	20X31A0503	6	19	18
2	20X31A0506	4	24	19
3	20X31A0507	6	22	20
4	20X31A0508	3	25	24
5	20X31A0511	5	19	14
6	20X31A0520	4	24	18
7	20X31A0526	5	17	18
8	20X31A0527	3	20	19
9	20X31A0530	3	21	20
10	20X31A0531	5	23	19
11	20X31A0533	5	16	19
12	20X31A0540	3	23	19
13	20X31A0541	3	25	17
14	20X31A0546	3	18	22
15	20X31A0554	3	21	21
16	20X31A0556	5	16	23
17	20X31A0557	3	22	23
18	20X31A0558	6	24	20
19	20X31A0559	5	21	22

Advanced learners:

S No	Roll No	Assigned Work
1	20X31A0501	
2	20X31A0502	
3	20X31A0504	
4	20X31A0510	
5	20X31A0512	
6	20X31A0513	
7	20X31A0514	
8	20X31A0515	
9	20X31A0516	
10	20X31A0518	
11	20X31A0519	
12	20X31A0522	
13	20X31A0523	
14	20X31A0529	Advanced concepts material is provided for advanced learners,
15	20X31A0534	subject seminars are presented by advanced learners in the class.
16	20X31A0535	
17	20X31A0537	
18	20X31A0538	
19	20X31A0539	
20	20X31A0542	
21	20X31A0544	
22	20X31A0545	
23	20X31A0549	
24	20X31A0550	
25	20X31A0551	
26	20X31A0553	
27	20X31A0556	
28	20X31A0560	
29	21X35A0501	
30	21X35A0502	

B.TECH –III-II-CSE-A RESULT ANALYSIS

ACADAMIC YEAR	COURSE NAME	NUMBER OF STUDENTS		QUESTION PAPER SETTING		PASS%
		APPEARED	PASSED	INTERNAL	EXTERNAL	
2022-23	MACHINE LEARNING	61	53	COURSE FACULTY	JNTUH	86.88

MACHINE LEARNING RESULT ANALYSIS
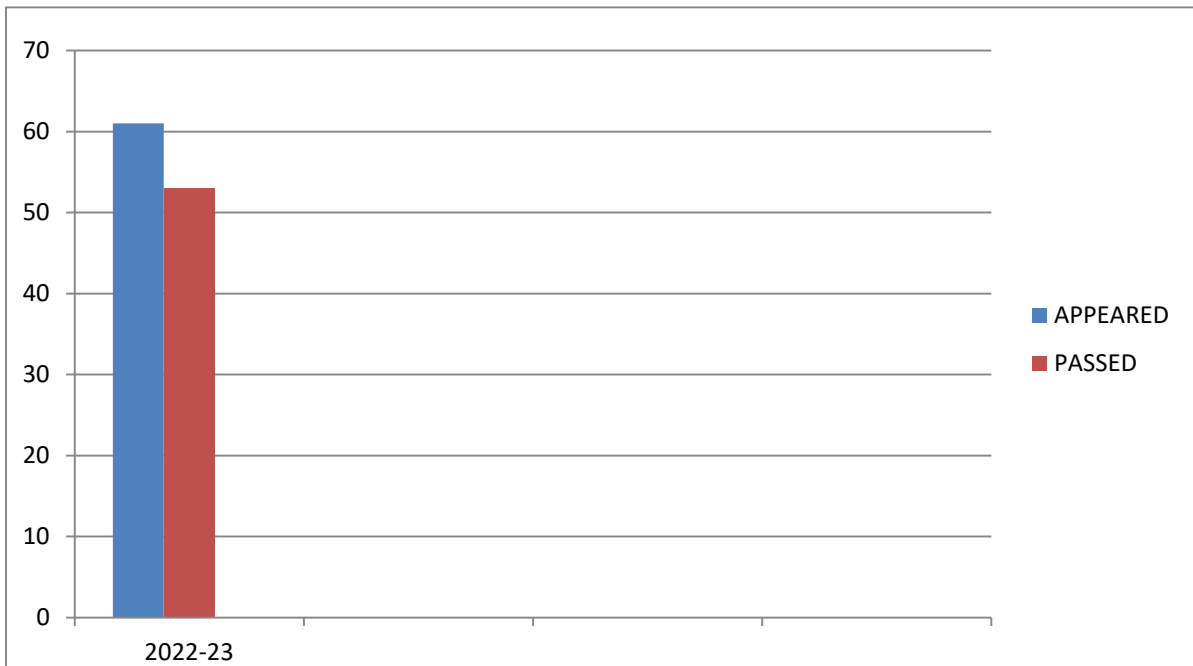
SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

(An Autonomous Institution under UGC)
Accredited by NAAC with A+ Grade, Recognized under 2(f) of UGC Act 1956
(Approved by AICTE, New Delhi and Affiliated to JNTUH, Hyderabad)
Khalsa Ibrahimpatnam, Sheriguda (V), Ibrahimpatnam (M), Ranga Reddy Dist., Telangana – 501 510
Website: https://siiet.ac.in/

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

REMEDIAL CLASSES TIME TABLE

A.Y 2022-23   SEMESTER-II

BRANCH/ SEC	MON 4.00 PM- 5.00 PM	TUE 4.00 PM-5.00 PM	WED 4.00 PM- 5.00 PM	THUR 4.00 PM- 5.00 PM	FRI 4.00 PM- 5.00 PM
II CSE-A	DM	JAVA	DBMS	BEFA	OS
II CSE-B	BEFA	DBMS	DM	OS	JAVA
II CSE-C	DBMS	OS	BEFA	JAVA	DM
III CSE-A	CD	ML	DAA	STM	FIOT
III CSE-B	DAA	FIOT	CD	ML	STM
III CSE-C	ML	STM	FIOT	CD	DAA
IVCSE-A	OB	TQM	DS	-	-
IV CSE-B	DS	OB	TQM	-	-
IV CSE-C	TQM	DS	OB	-	-

HOD
Computer Science & Engg. Dept.
SRI INDU INSTITUTE OF ENGG & TECH.
Sheriguda(V), Ibrahimnatnam/M), R.R.Dist-501 10

PRINCIPAL
PRINCIPAL
Sri Indu Institute of Engineering & Tech.
Sheriguda(Vill). Ibrahimpatnam
R R Dist Telangana -501 510

SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Computer Science and Engineering

Course Outcome Attainment (Internal Examination-1)

Name of the faculty : N.SHILPA   Academic Year: 2022-23

Branch & Section: CSE- A   Examination: I Internal

Course Name: MACHINE LERANING   Year: III   Semester: II

S.No	HT No.	Q1a	Q1b	Q1c	Q2a	Q2b	Q2C	Q3a	Q3b	Q3c	Q4a	Q4b	Q4c	Obj1	A1
Max. Marks ==>		5			5			3	2		5			10	5
1	20X31A0501				4						5			10	5
2	20X31A0502	5									5			10	5
3	20X31A0503										4			10	5
4	20X31A0504	5									5			10	5
6	20X31A0506				4						5			10	5
7	20X31A0507				4						3			10	5
8	20X31A0508				5						5			10	5
9	20X31A0509				4						5			10	5
10	20X31A0510				4						4			10	5
11	20X31A0511										4			10	5
12	20X31A0512	3									5			10	5
13	20X31A0513	3									5			10	5
14	20X31A0514	3									5			10	5
15	20X31A0515	4									5			10	5
16	20X31A0516	5									5			10	5
17	20X31A0517	1									5			10	5
18	20X31A0518	4									4			10	5
19	20X31A0519	4									5			10	5
20	20X31A0520	4									5			10	5
21	20X31A0521				5						5			10	5
22	20X31A0522				5						5			10	5
23	20X31A0523				5						5			10	5
24	20X31A0524								2		3			9	5
25	20X31A0525				4						5			10	5
26	20X31A0526										4			8	5
27	20X31A0527	4									3			8	5
28	20X31A0528	1									4			9	5
29	20X31A0529							5			5			10	5
30	20X31A0530				4			3						9	5
31	20X31A0531				4						4			10	5
32	20X31A0532										2			9	5
33	20X31A0533										2			9	5
34	20X31A0534				5						5			10	5
35	20X31A0535	5									5			10	5
36	20X31A0536				4						5			10	5
37	20X31A0537				5						5			10	5
38	20X31A0538	2									5			10	5
39	20X31A0539	4									5			10	5
40	20X31A0540	3									5			10	5
41	20X31A0541				5						5			10	5

S.No	Roll No	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Total	
42	20X31A0542	5			5									10	**5**
43	20X31A0543	5									5			10	**5**
44	20X31A0544				5						5			10	**5**
45	20X31A0545				5						5			10	**5**
46	20X31A0546				2			2						9	**5**
47	20X31A0547							3			3			10	**5**
48	20X31A0548							4						10	**5**
49	20X31A0549				5						5			10	**5**
50	20X31A0550							5			5			9	**5**
51	20X31A0551	5									5			8	**5**
52	20X31A0552							4			5			9	**5**
53	20X31A0553	4									4			8	**5**
54	20X31A0554				4						4			8	**5**
55	20X31A0555							4			5			9	**5**
56	20X31A0556										3			8	**5**
57	20X31A0557				4						4			9	**5**
58	20X31A0558													AB	**5**
59	20X31A0559				3						4			9	**5**
60	20X31A0560				5						5			9	**5**
61	21X35A0501										4			9	**5**
62	21X35A0502				4						4			10	**5**
63	21X35A0503				4						5			10	**5**
64	21X35A0504										2			10	**5**
66															
	Target set by the faculty / HoD	3.00	0.00	0.00	3.00	0.00	0.00	1.80	1.20	0.00	3.00	0.00	0.00	6.00	3.00
	Number of students performed above the target	18	0	0	26	0	0	9	0	0	55	0	0	62	63
	Number of students attempted	21	0	0	27	0	0	9	0	0	58	0	0	63	63
	Percentage of students scored more than target	86%			96%			100%			95%			98%	100%

CO Mapping with Exam Questions:

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12		
CO - 1	**Y**			**Y**									**Y**	**Y**
CO - 2							**Y**						**Y**	**Y**
CO - 3										**Y**			**Y**	**Y**
CO - 4														
CO - 5														
CO - 6														

CO Attainment based on Exam Questions:

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12		
CO - 1	86%			96%									98%	100%
CO - 2													98%	100%
CO - 3										95%			98%	100%
CO - 4														

CO - 5												
CO - 6												

CO	Subj	obj		Asgn	Overall		Level
CO-1	91%	98%		100%	96%		3.00
CO-2		98%		100%	99%		3.00
CO-3	95%	98%		100%	98%		3.00
CO-4							
CO-5							
CO-6							

Attainment Level	
1	40%
2	50%
3	>60%

Attainment (Internal 1 Examination) =   **3.00**

SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Computer Science and Engineering
Course Outcome Attainment (Internal Examination-2)

Name of the faculty N.SHILPA   Academic Year: 2022-23

Branch & Section: CSE- A   Examination: II Internal

Course Name: MACHINE LERANING   Year: III   Semester: II

S.No	HT No.	Q1a	Q1b	Q1c	Q2a	Q2b	Q2c	Q3a	Q3b	Q3c	Q4a	Q4b	Q4c	Obj4	A4
	Max. Marks ==>	5			5			5			5			10	5
1	20X31A0501	4						5						8	5
2	20X31A0502	5						5						9	5
3	20X31A0503	2						2						9	5
4	20X31A0504	5						5						9	5
5	20X31A0506	3						3						8	5
6	20X31A0507	3						3						9	5
7	20X31A0508	5						5						9	5
8	20X31A0509	5												8	5
9	20X31A0510	4						5						8	5
10	20X31A0511													5	5
11	20X31A0512	5												9	5
12	20X31A0513	5						5						9	5
13	20X31A0514	5						5						9	5
14	20X31A0515	5						5						9	5
15	20X31A0516	5						5						9	5
16	20X31A0517	4						5						9	5
17	20X31A0518	4						3						8	5
18	20X31A0519	4						3						9	5
19	20X31A0520	4												9	5
20	20X31A0521	4												9	5
21	20X31A0522	5						1						9	5
22	20X31A0523	5						5						9	5
23	20X31A0524	4									1			9	5
24	20X31A0525	5						4						9	5
25	20X31A0526	4												9	5
26	20X31A0527	5												9	5
27	20X31A0528	4												8	5
28	20X31A0529	5						5						10	5
29	20X31A0530	4						1						10	5
30	20X31A0531	5						1						8	5
31	20X31A0532	4												9	5
32	20X31A0533	5												9	5
33	20X31A0534	5						5						10	5
34	20X31A0535	5						5						10	5
35	20X31A0536	5						5						9	5
36	20X31A0537	5						5						8	5
37	20X31A0538	4						4						7	5
38	20X31A0539	5						5						10	5
39	20X31A0540	5												9	5
40	20X31A0541	3												9	5
41	20X31A0542	5									5			10	5
42	20X31A0543	5			5									9	5
43	20X31A0544	5						5						9	5

#	ID	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
44	20X31A0545	4			5									9	**5**
45	20X31A0546	4						4						9	**5**
46	20X31A0547	4						4						9	**5**
47	20X31A0548	4						4						9	**5**
48	20X31A0549	5												9	**5**
49	20X31A0550	5			4									9	**5**
50	20X31A0551	5						5						9	**5**
51	20X31A0552	5						4						9	**5**
52	20X31A0553	5						4						10	**5**
53	20X31A0554	4						2						10	**5**
54	20X31A0555	5			4									9	**5**
55	20X31A0556														**5**
56	20X31A0557	4			5									9	**5**
57	20X31A0558	4						2						9	**5**
58	20X31A0559	5						3						9	**5**
59	20X31A0560	5						5						9	**5**
60	21X35A0501														**5**
61	21X35A0502	5						4						8	**5**
62	21X35A0503	5									5			9	**5**
63	21X35A0504	5												9	**5**
64															
65															
66															
Target set by the faculty / HoD		3.00	0.00	0.00	3.00	0.00	0.00	3.00	0.00	0.00	3.00	0.00	0.00	6.00	3.00
Number of students performed above the target		59	0	0	5	0	0	33	0	0	2	0	0	60	63
Number of students attempted		60	0	0	5	0	0	39	0	0	3	0	0	61	63
Percentage of students scored more than target		98%			100%			85%			67%			98%	100%

CO Mapping with Exam Questions:

		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
CO - 1															
CO - 2															
CO - 3															
CO - 4		**Y**												**Y**	**Y**
CO - 5					**Y**						**Y**			**Y**	**Y**
CO - 6								**Y**						**Y**	**Y**

| % Students Scored >Target % | | 98% | | | 100% | | | 85% | | | 67% | | | 98% | 100% |

CO Attainment based on Exam Questions:

		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
CO - 1															
CO - 2															
CO - 3															
CO - 4		98%												98%	100%

CO													
CO - 5			100%					67%			98%	100%
CO - 6					85%						98%	100%

CO	Subj	obj		Asgn	Overall	Level
CO-1						
CO-2						
CO-3						
CO-4	98%	98%		100%	99%	3.00
CO-5	83%	98%		100%	94%	3.00
CO-6	85%	98%		100%	94%	3.00

Attainment Level	
1	40%
2	50%
3	>60%

Attainment (Internal Examination-2) = **3.00**

SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Computer Science and Engineering
Course Outcome Attainment (University Examinations)

Name of the faculty :	N.SHILPA	Academic Year: 2022-23
Branch & Section:	CSE- A	Year / Semester: III / II
Course Name:	MACHINE LERANING	

S.No	Roll Number	Marks Secured		S.No	Roll Number	Marks Secured
1	20X31A0501	46		36	20X31A0537	42
2	20X31A0502	50		37	20X31A0538	35
3	20X31A0503	16		38	20X31A0539	37
4	20X31A0504	50		39	20X31A0540	34
5	20X31A0506	33		40	20X31A0541	36
6	20X31A0507	1		41	20X31A0542	39
7	20X31A0508	38		42	20X31A0543	49
8	20X31A0509	41		43	20X31A0544	34
9	20X31A0510	43		44	20X31A0545	49
10	20X31A0511	21		45	20X31A0546	35
11	20X31A0512	32		46	20X31A0547	34
12	20X31A0513	37		47	20X31A0548	26
13	20X31A0514	42		48	20X31A0549	37
14	20X31A0515	41		49	20X31A0550	46
15	20X31A0516	38		50	20X31A0551	45
16	20X31A0517	31		51	20X31A0552	40
17	20X31A0518	43		52	20X31A0553	40
18	20X31A0519	36		53	20X31A0554	38
19	20X31A0520	34		54	20X31A0555	40
20	20X31A0521	34		55	20X31A0556	9
21	20X31A0522	45		56	20X31A0557	32
22	20X31A0523	48		57	20X31A0558	9
23	20X31A0524	34		58	20X31A0559	35
24	20X31A0525	47		59	20X31A0560	52
25	20X31A0526	-1		60	21X35A0501	-1
26	20X31A0527	19		61	21X35A0502	37
27	20X31A0528	35		62	21X35A0503	42
28	20X31A0529	39		63	21X35A0504	17
29	20X31A0530	13				
30	20X31A0531	16				
31	20X31A0532	27				
32	20X31A0533	11				
33	20X31A0534	47				
34	20X31A0535	40				
35	20X31A0536	35				
Max Marks		75				

Class Average mark	26	
Number of students performed above the target	51	
Number of successful students	29	

Attainment Level	% students
1	40%
2	50%

Percentage of students scored more than target	57%		3	>60%
Attainment level	**3**			

SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Computer Science and Engineering

Course Outcome Attainment

Name of the faculty N.SHILPA

Branch & Section: CSE- A

Course Name: MACHINE LERANING

Academic Year: 2022-23

Year: III

Semester: II

Course Outcomes	1st Internal Exam	2nd Internal Exam	Internal Exam	University Exam	Attainment Level
CO1	3.00		3.00	3.00	3.00
CO2	3.00		3.00	3.00	3.00
CO3	3.00		3.00	3.00	3.00
CO4		3.00	3.00	3.00	3.00
CO5		3.00	3.00	3.00	3.00
CO6		3.00	3.00	3.00	3.00
Internal & University Attainment:			3.00	3.00	
Weightage			30%	70%	
CO Attainment for the course (Internal, University)			0.90	2.10	
CO Attainment for the course (Direct Method)			3.00		

Overall course attainment level   **3.00**

Name of Faculty: N.SHILPA   Academic Year: 2022-23
Branch & Section: CSE- A   Year: III
Course Name: MACHINE LERANING   Semester: II

CO-PO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	2	-	-	-	-	-	-	-	-	1	-	2
CO2	3	2	-	1	-	-	-	-	-	-	-	1	2	-
CO3	2	3	3		2	-	-	-	-	-	-	-	3	1
CO4	-	1	-	2	2	-	-	-	-	-	-	-	-	1
CO5	1	1	-	-	1	-	-	-	-	-	-	-	1	-
CO6	1	-	1	-	-	-	-	-	-	-	-	1	-	-
Course	2	1.8	2	1.5	1.6	0	0	0	0	0	0	1	2	1.33

CO	Course Outcome Attainment
CO1	3.00
CO2	3.00
CO3	3.00
CO4	3.00
CO5	3.00
CO6	3.00
Overall course attainment level	**3.00**

PO-ATTAINMENT

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO Attainment	2.00	1.75	2.00	1.50	1.60	0.00	0.00	0.00	0.00	0.00	0.00	1.00

CO contribution to PO - 33%, 67%, 100% (Level 1/2/3)

ASSIGNMENTS AND REGISTERS

Attendance register link:

https://drive.google.com/file/d/1Rhay0z2lJBy7MhqRnuw8L8B6K1mptoUp/view?usp=sharing