Sri Indu Institute of Engineering & Technology

Recognized Under 2(f) of UGC Act 1956
Approved by AICTE, New Delhi
Affiliated to JNTUH, Hyderabad.

COURSE FILE

ON

MACHINE LEARNING

Course Code –CS800OE

IV B.Tech II-SEMESTER

A.Y.: 2022-2023

Prepared by

K.Hephsibah

Assistant Professor

Head of the Department
Electronics and Communication Engg. Dept
SRI INDU INSTITUTE OF ENGG & TECH
Sheriguda(V), Ibrahimpatnam(M), R.R.Dist-501 510

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

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Academic Year	2022-2023
Course Title	Machine learning
Course Code	CS800OE
Programme	B.Tech
Year & Semester	IV year II-semester
Branch & Section	ECE-C
Regulation	R18
Course Faculty	K.Hephsibah,Assistant Professor(CSE Dept.)

Index of Course File

S. No.	Name of the content
1	Institute vision and mission
2	Department vision and mission
3	Program Educational Objectives/ Program Specific Outcomes
4	Program Outcomes
5	Course Syllabus with Structure
6	Course Outcomes (CO)
7	Mapping CO with PO/PSO and Justification
8	Academic Calendar
9	Time table - highlighting your course periods including tutorial
10	Lesson plan with number of hours/periods, TA/TM, Text/Reference book
11	Web references
12	Lecture notes
13	List of Power point presentations
14	University Question papers
15	Internal Question papers, Key with CO and BT
16	Assignment Question papers mapped with CO and BT
17	Tutorial topics
18	Result Analysis to identify weak and advanced learners - 3 times in a semester
19	Result Analysis at the end of the course
20	Remedial class for weak students - schedule and evidences
21	CO, PO/PSO attainment sheets
22	Attendance register
23	Course file (Digital form)

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.

Head of the Department
Electronics and Communication Engg. Dept
SRI INDU INSTITUTE OF ENGG & TECH
Sheriguda(V), Ibrahimpatnam(M), R.R.Dist-501 510

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

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

DEPARTMENT VISION AND MISSION

Vision:

To become a recognized center in the field of Electronics and Communication Engineering by producing creative engineers with social responsibility and address ever-changing global challenges.

Mission:

DM1: To facilitate an academic environment that enables student's centric learning.

DM2: To provide state-of-the-art hardware and software technologies to meet industry requirements.

DM3: To continuously update the Academic and Research infrastructure.

DM4: To Conduct Technical Development Programs for overall professional caliber of Stake Holders.

Head of the Department
Electronics and Communication Engg. Dept
SRI INDU INSTITUTE OF ENGG & TECH
Sheriguda(V), Ibrahimpatnam(M), R.R.Dist-501 510

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

PROGRAM EDUCATIONAL OBJECTIVES

Program Educational objectives are to Promote:

PEO1: Graduates with a strong foundation in Electronics and Communication Engineering, Science and Technology to become successful in the chosen professional career.

PEO2: Graduates with ability to execute innovative ideas for Research and Development with continuous learning.

PEO3: Graduates inculcated with industry based soft-skills to enable employability.

PEO4: Graduates demonstrate with ability to work in interdisciplinary teams and ethical professional behavior.

PROGRAM SPECIFIC OUTCOMES

PSO 1: Design Skills: Design, analysis and development a economical system in the area of Embedded system & VLSI design.

PSO 2: Software Usage: Ability to investigate and solve the engineering problems using MATLAB, Keil and Xilinx.

Head of the Department
Electronics and Communication Engg. Dept
SRI INDU INSTITUTE OF ENGG & TECH
Sheriguda(V), Ibrahimpatnam(M), R.R.Dist-501 510

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

PROGRAM OUTCOMES

1. **ENGINEERING KNOWLEDGE**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. **PROBLEM ANALYSIS**: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **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.

4. **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.

5. **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.

6. **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.

7. **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.

8. **ETHICS**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **INDIVIDUAL AND TEAM WORK**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **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, give and receive clear instructions.

11. **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.

12. **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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech. in ELECTRONICS AND COMMUNICATION ENGINEERING
IV YEAR COURSE STRUCTURE AND SYLLABUS (R18)

Applicable From 2018-19 Admitted Batch

IV YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	EC701PC	Microwave and Optical Communications	3	0	0	3
2		Professional Elective-III	3	0	0	3
3	EC723PE	Professional Elective-IV(Network Security and Cryptography)	3	0	0	3
4		Open Elective-I	3	0	0	3
5	SM702MS	Professional Practice, Law& Ethics	2	0	0	2
6	EC703PC	Microwave and Optical Communications Lab	0	0	2	1
7	EC704PC	Industrial Oriented Mini Project/Summer Internship	0	0	0	2*
8	EC705PC	Seminar	0	0	2	1
9	EC706PC	Project Stage -I	0	0	6	3
		Total Credits	**14**	**0**	**10**	**21**

IV YEAR II SEMESTER

S. No.	**Course Code**	**Course Title**	**L**	**T**	**P**	**Credits**
1		Professional Elective-V	3	0	0	3
2		Professional Elective-VI	3	0	0	3
3	CS800OE	Open Elective-III(Machine learning)	3	0	0	3
4	EC801PC	Project Stage -II	0	0	14	7
		Total Credits	**9**	**0**	**14**	**16**

***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 – V

EC811PE	Satellite Communications
EC812PE	Radar Systems
EC813PE	Wireless Sensor Networks

Professional Elective – VI

EC821PE	System On Chip Architecture
EC822PE	Test and Testability
EC823PE	Low Power VLSI Design

CS800OE: MACHINE LEARNING (Open Elective – III)

B.Tech. CSE/IT IV Year II Sem

L	T	P	C
3	0	0	3

Prerequisites:

1. Course on "Data Structures".
2. Knowledge on statistical methods.

Course Objectives:

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

Course Outcomes:

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

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.

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.

TEXT BOOKS:

Machine Learning-Tom M,Mitchell,-MGH

REFERENCE BOOKS:

Machine Learning:An Algorithmic Perspective,Stephen Marshald,Taylor and Francis

.

SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

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/

COs and Mapping with PO/PSO

Course: MACHINE LEARNING (C423) **Class: IV ECE-C**

Course Outcomes

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

C423.1: Understand decision tree learning.[Analysis]

C423.2: Understand Artificial Neural Networks [Analysis, Evaluation]

C423.3:Analyze Bayesian learning [Analysis, Evaluation]

C423.4: Implement Computational learning theory.[Analysis]

C423.5: Learn set of rules in learning. [Analysis]

C423.6: Understand Analytical learning. [Analysis]

Mapping of course outcomes with program outcomes:

High -3 Medium -2 Low-1

Course Name:
Machine Learning

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C423.1	2	2	2	3	-	-	-	-	-	-	-	2
C423.2	-	2	3	2	-	-	-	-	-	-	-	-
C423.3	-	2	2	2	-	2	-	-	-	-	-	-
C423.4	-	2	2	2	2	-	-	-	-	-	-	-
C423.5	-	2	2	-	-	-	-	-	-	-	-	3
C423.6	-	-	-	-	-	-	-	-	-	-	-	-
AVG	**2**	**2.00**	**2.20**	**2.25**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**2.5**

SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

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 – 501510

Website: https://siiet.ac.in/

Course:MACHINELEARNING(C423) **Class:IVECE-C**

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

PO2.PROBLEM ANALYSIS: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using 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 t h e specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmentalconsiderations.

PO4.CONDUCTINVESTIGATIONSOFCOMPLEXPROBLEMS: Useresearch-based knowledge and research methods including design ofexperiments, analysis and interpretation of data, and synthesis ofthe 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.THEENGINEERANDSOCIETY:Applyreasoninginformedbythecontextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilitiesrelevanttotheprofessionalengineeringpractice.

PO12.LIFE-LONG LEARNING: Recognize the need for, and have the preparation and ability to engageinindependentandlife-longlearninginthebroadestcontextoftechnologicalchange

CO-PO mapping Justification

C423.1: Understand decision tree learning.[Analysis]

	Justification
PO1	Understanding decision tree learning requires a solid foundation in mathematics, especially in the areas of probability and information theory. This mathematical knowledge is vital when designing and optimizing decision tree algorithms.
PO2	Once a problem is identified, the ability to formulate it effectively is enhanced by the understanding of decision tree learning. This involves defining the problem in terms of input features, target variables, and the desired outcome, which aligns with the input-output structure inherent in decision tree models.
PO3	Decision tree learning involves grasping the principles and algorithms used to construct models for predicting outcomes based on input features. It includes understanding concepts like entropy, information gain, and the recursive splitting of data to create decision nodes and leaf nodes.
PO4	Understanding decision tree learning is essential for applying research-based knowledge. Decision tree algorithms are a product of research and have been refined through experimentation and analysis. Engineers need to understand these algorithms to use them effectively in their research.
PO12	Decision tree learning is a part of the broader field of machine learning, which is subject to constant innovation and change. Engineers who understand decision tree learning are better prepared to adapt to technological changes and integrate new developments into their knowledge base, aligning with the need for continuous learning.

C423.2: Understand Artificial Neural Networks [Analysis, Evaluation]

	Justification
PO2	Understanding Artificial Neural Networks is crucial for identifying engineering problems where ANNs can be applied effectively. ANNs are powerful tools for tasks such as pattern recognition, classification, regression, and decision-making. Engineers need to recognize situations where ANNs can provide solutions.
PO3	ANNs, when applied to engineering problems, can have implications for public health and safety. For example, in healthcare, ANNs can be used for medical diagnosis and treatment recommendations. Understanding Artificial Neural Networks is crucial to designing solutions that prioritize public health and safety considerations.
PO4	ANNs are often used in various experimental designs to analyze and understand complex systems. Understanding the principles of ANNs is crucial for designing experiments that involve the application of neural networks. This aligns with the experimental design component.

C423.3:Analyze Bayesian learning [Analysis, Evaluation]

	Justification
PO2	Analyzing Bayesian learning is crucial for identifying engineering problems where Bayesian methods can be effectively applied. Bayesian learning is particularly useful in situations with uncertainty, limited data, and the need to continuously update beliefs based on new information. Engineers need to recognize such situations where Bayesian learning can provide valuable insights.
PO3	The application of Bayesian learning may have cultural, societal, and environmental impacts. Engineers, when designing solutions, must consider these factors. Understanding Bayesian learning helps in making informed decisions about the application and customization of methods to align with cultural, societal, and environmental considerations in the design process.
PO4	Bayesian methods provide engineers with a powerful and principled framework for handling uncertainty, designing experiments, analyzing data, and synthesizing information to derive valid conclusions in their research endeavors. Engineers can leverage their understanding of Bayesian learning to contribute to the synthesis of information and provide substantiated conclusions in complex engineering scenarios.
PO6	Analyzing Bayesian learning is relevant to assessing societal and health issues in engineering practice.Bayesian methods are often used in fields such as healthcare, where probabilistic reasoning is applied to medical diagnosis, treatment decisions, and health risk assessments.

C423.4: Implement Computational learning theory.[Analysis]

	Justification
PO2	In summary, implementing computational learning theory is justified in the context of identifying, formulating, researching, and analyzing complex engineering problems. Computational learning methods provide engineers with powerful tools for solving complex problems, and understanding their theoretical foundations is crucial for effective application in engineering practice.
PO3	Implementing computational learning theory involves integrating machine learning models as components in larger systems to enhance decision-making processes. Engineers must understand the principles of computational learning theory to design system components or processes that effectively utilize these models.
PO4	Computational learning theory includes synthesizing information from the data and model outputs to make informed decisions. This process aligns with the synthesis of information required. Engineers use machine learning models to synthesize knowledge from data and draw conclusions about patterns, trends, and predictions.
PO5	Computational learning theory is fundamentally connected to prediction and modeling. Machine learning models, derived from this theory, are used for predicting outcomes and creating models that capture patterns in data. The application of prediction and modeling aligns directly with po5, which emphasizes the use of these tools in complex engineering activities.

C423.5: Learn set of rules in learning. [Analysis]

	Justification
PO2	Learning a set of rules in learning is justified in the context of identifying, formulating, researching, and analyzing complex engineering problems.The knowledge of specific rules or methodologies equips engineers with the tools to recognize, articulate, and analyze engineering problems effectively, aligning with the analytical and problem-solving skills required.
PO3	Engineers can leverage this knowledge to design solutions that are not only technically sound but also responsive to the broader societal and environmental context.
PO12	Learning algorithms and methodologies are subject to constant innovation and improvement. Engineers who have learned a set of rules in learning are inherently prepared to engage in life-long learning, recognizing the need to stay updated with advancements in learning algorithms and related technologies.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

ACADEMIC CALENDAR 2022-23

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

I SEM

S. No	Description	Duration	
		From	To
1	Commencement of I Semester classwork	**29.08.2022**	
2	1st Spell of Instructions (including Dussehra Recess)	29.08.2022	31.10.2022 (9 Weeks)
3	Dussehra Recess	03.10.2022	08.10.2022 (1 Week)
4	First Mid Term Examinations	01.11.2022	07.11.2022 (1 Week)
5	Submission of First Mid Term Exam Marks to the University on or before	12.11.2022	
6	2nd Spell of Instructions	09.11.2022	03.01.2023 (8 Weeks)
7	Second Mid Term Examinations	04.01.2023	10.01.2023 (1 Week)
8	Preparation Holidays and Practical Examinations	11.01.2023	19.01.2023 (1 Week)
9	Submission of Second Mid Term Exam Marks to the University on or before	17.01.2023	
10	End Semester Examinations	*20.01.2023*	02.02.2023(2 Weeks)

Note: No. of Working/instructional days: 94

II SEM

S. No	Description	Duration	
		From	To
1	Commencement of II Semester classwork	**03.02.2023**	
2	1st Spell of Instructions	03.02.2023	31.03.2023 (8 Weeks)
3	First Mid Term Examinations	01.04.2023	08.04.2023 (1 Week)
4	Submission of First Mid Term Exam Marks to the University on or before	15.04.2023	
5	2nd Spell of Instructions	10.04.2023	17.06.2023 (10 Weeks)
6	**Summer Vacation**	15.05.2023	27.05.2023 (2 Weeks)
7	Second Mid Term Examinations	19.06.2023	24.06.2023 (1 Week)
8	Preparation Holidays and Practical Examinations	26.06.2023	01.07.2023 (1 Week)
9	Submission of Second Mid Term Exam Marks to the University on or before	01.07.2023	
10	End Semester Examinations	03.07.2023	15.07.2023 (2 Weeks)

Note: No. of Working/ instructional days: 91

REGISTRAR

SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Accredited by NAAC with A+ Grade, Recognized under 2(f) of UGC Act 1956
(Approvedby AICTE, New Delhi and Affiliated to JNTUH, Hyderabad)
Khalsa Ibrahimpatnam, Sheriguda (V), Ibrahimpatnam (M), Ranga Reddy Dist., Telangana – 501510
Website: https://siiet.ac.in/

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Class Timetable

CLASS: IV-B.Tech ECE-C **A.Y:2022-23** **SEMESTER: II** **LH: B-202**

TIME/ DAY	I 9:40-10:30	II 10:30 -11:20	III 11:20-12:10	IV 12:10-1:00	1:00-1:30	V 1:30-2:20	VI 2:20-3:10	VII 3:10-4:00
MON	ML	WSN	ML	LPVLSID	LUNCH	ML	WSN	COUN
TUE	WSN	ML	LPVLSID	ML		LIB	LPVLSID	SPORTS
WED	LPVLSID	ML	WSN	ML		LPVLSID	WSN	INT
THU	LPVLSID	WSN	CO-CU/DAA			WSN	ML	LPVLSID
FRI	PROJECT STAGE-II					PROJECT STAGE-II		
SAT	PROJECT STAGE-II					PROJECT STAGE-II		

*(T) – Tutorial Concern Faculty

Course Code	Course Name	Name of the Faculty	Course Code	Course Name	Name of the Faculty
EC813PE	WSN-Wireless Sensor Networks (Professional Elective-V)	A.Swetha	COUN	Counseling	S.Alekhya/P.Krishna Rao/G.Anitha
EC823PE	LPVLSID-Low Power VLSI Design (Professional Elective-VI)	K.Padma	SPORTS	Sports	P.Krishna Rao
CS800OE	ML-Machine Learning (Open Elective-III)	K.Hephsibah	CO-CU/ DAA	Co-Curricular/ Dept.Assoc.Activities	K.Srikanth/Y.Raju/M.Ganesh
EC801PC	PROJECT STAGE-II	Dr.S.Anjaneyulu/ P.Sumana/B.Ashwini P.Meena	LIB	Library	P.Srilatha
			INT	Internet	K.Mallaiah

Swethy
Class Incharge

Head of The Department

SRI INDU INSTITUTE OF ENGG & TECH
Sheriguda(V), Ibrahimpatnam(M), R.R.Dist-501 510.

Principal
Sri Indu Institute of Engineering & Technology
Sheriguda (Vill), Ibrahimpatnam
R R Dist Telangana -501 510

SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

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 – 501510
Website: https://siiet.ac.in/

LESSON PLAN

Programme:B.Tech	Academic Year: 2022-2023
Year: IV	Semester: II
Course Title: Machine learning	Course Code: CS800OE
Name of the Faculty:K.Hephsibah	Number of lectures per week:5

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.

No. of Sessions Planned	Topics	Reference	Teaching Method/ Aids
2	Introduction – Well-posed learning problems	T1,R1	BB
1	Designing a learning system	T1	BB
2	Perspectives and issues in machine learning	T1	BB
2	Concept learning and the general to specific ordering-Introduction, a concept learning task	T1	BB
1	Concept learning as search	T1	BB
2	find-S: finding a maximally specific hypothesis	T1	BB
2	Version spaces and the candidate elimination algorithm	T1	BB
1	Remarks on version spaces and candidate elimination,	T1	BB
2	Inductive bias. Decision Tree Learning – Introduction,	T1,W1	BB
1	Decision tree representation,	T1,R1	BB
1	Appropriate problems for decision tree learning	T1	BB
1	Issues in decision tree learning.		

Gap beyond syllabus(if any):
Gap within the syllabus(if any)

Course Outcome 1: Student have understood that what is decision tree learning.

*Session Duration: 50minutes
*Total Number of Hours/Unit:18

SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

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/

Course Title: Machine learning	Course Code: CS800OE

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

No. of Sessions Planned	Topics	Reference	Teaching Method/ Aids
1	Artificial Neural Networks-1 Introduction	R1	BB
2	Neural network representation,appropriate problems for neural network	R1,W2	BB
2	Perceptions,multilayer networks and the back-propagation algorithm	R1,W3	BB
2	Artificial Neural Networks-2 -Remarks on the Back-Propagation algorithm	R1	BB
1	An illustrative example:face recognition	R1	BB
2	Advanced topics in artificial neural networks.	R1	BB
1	Evalaution Hypotheses-Motivation	R1	BB
1	estimation hypothesis accuracy,basics of sampling theory	R1	BB
1	A general approach for deriving confidence intervals	R1	BB
2	Difference in error of two hypotheses,comparing learninng algorithms	R1	BB

Gap beyond syllabus(if any):
Gap within the syllabus(if any)
Course Outcome 1: Student able to Understand Artificial Neural Networks.

*Session Duration: 50minutes

*Total Number of Hours/Unit: 15

SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Accredited by NAAC with A+ Grade, Recognized under 2(f) of UGC Act 1956

(Approvedby 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/

Course Title: Machine learning	Course Code: CS800OE

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, Naive 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.

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

1	Remarks on lazy and eager learning	T1	BB

Gap beyond syllabus(if any):
Gap within the syllabus(if any)
Course Outcome 1: Student were able to understand and Analyze Bayesian learning

*Session Duration: 50minutes
*Total Number of Hours/Unit: 22

Course Title: Machine learning	Course Code: CS800OE

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.

No. of Sessions Planned	Topics	Reference	Teaching Method/ Aids
1	Genetic Algorithms – Motivation	T1	BB
2	Genetic algorithms, an illustrative example	T1	BB
1	Hypothesis space search, genetic programming,	T1	BB
1	Models of evolution and learning	T1	BB
2	Parallelizing genetic algorithms. Learning Sets of Rules – Introduction	T1	BB
2	Sequential covering algorithms	T1	BB
1	Learning rule sets: summary, learning First-Order rules	T1	BB
1	Learning sets of First-Order rules: FOIL	T1	BB
2	Induction as inverted deduction, inverting resolution	T1	BB
1	Reinforcement Learning – Introduction	T1	BB
1	The learning task, Q-learning, non-deterministic	T1	BB
1	Rewards and actions, temporal difference learning	T1	BB
1	Reneralizing from examples	T1	BB
1	Relationship to dynamic programming.	T1	BB

Gap beyond syllabus(if any):
Gap within the syllabus(if any)
Course Outcome 1: Student able to design synchronous and asynchronous counters. Analyze and differentiate the sequential machines.

*Session Duration: 50minutes
*Total Number of Hours/Unit:18

Course Title: Machine learning	Course Code: CS800OE

UNIT – V

AnalyticalLearning-1-Introduction,learningwith perfect domain theories:PROLOG-EBG,remarks onexplanation-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.

No. of Sessions Planned	Topics	Reference	Teaching Method/ Aids
2	Analytical Learning-1-Introduction	T1	BB,PPT
2	Learning with perfect domain theories:PROLOG-EBG	R1	BB,PPT
1	Remarks on explanation-based learning	R1	BB,PPT
1	Explanation-based learning of search control knowledge	R1	PPT
1	Analytical Learning-2-Using prior knowledge to alter the search objective	R1	BB,PPT
2	Using prior knowledge to augment search operators	R1	BB,PPT
2	Combining Inductive and Analytical Learning-Motivation	R1	PPT
1	Inductive-analytical approaches to learning	R1,T1	BB,PPT
1	Using prior knowledge to initialize the hypothesis	R1,T1	BB,PPT

Gap beyond syllabus(if any):
Gap within the syllabus(if any)
Course Outcome 1: Students have Understood Analytical learning

*Session Duration: 50minutes

*Total Number of Hours/Unit:13

TEXT BOOKS:

T1. Machine Learning-Tom M,Mitchell,-MGH

REFERENCE BOOKS:

R1.Machine Learning:An Algorithmic Perspective,Stephen Marshald,Taylor and Francis

.

WEB REFERENCES:

W1. https://www.baeldung.com/cs/ml-inductive-bias
https://www.javatpoint.com/machine-learning-decision-tree-classification-algorithm
W2. https://www.ritchieng.com/neural-networks-representation/
https://www.expertsmind.com/questions/appropriate-problems-for-ann-learning-30115492.aspx
W3. https://machinelearningmastery.com/neural-networks-crash-course/

SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

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/

Lecture notes

Unit 1 link:

https://drive.google.com/file/d/1HWiUiwenWlduqXZ8_SGtgYX4_HuiGuBu/view?usp=sharing

Unit 2 link:

https://drive.google.com/file/d/1ooF44dFf6TffT0d7OkM_LqbK6pJ0A4JA/view?usp=sharing

Unit 3 link:

https://drive.google.com/file/d/1ZV7HoCIXg0p4OsVRGq4X5fGdjTziqZQR/view?usp=sharing

Unit 4 link:

https://drive.google.com/file/d/1ieNPH5Gh-PPJmD_7qSAw9u2BBaHLVqD6/view?usp=sharing

Unit 5 link:

https://drive.google.com/file/d/1KHgVRiAde2Dfy4xUHsBc42NGmsfsWkIp/view?usp=sharing

SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

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/

Power point presentation

PPT link:

1. https://docs.google.com/presentation/d/1IaohMPvfS6sTl0LjL9QkZqXJ1xw0t1v2/edit?usp=sharing&ouid=109450353678166106917&rtpof=true&sd=true
2. https://docs.google.com/presentation/d/1_gSKPOcUhYZFXUML3BsAgQBakafuajzB/edit?usp=sharing&ouid=109450353678166106917&rtpof=true&sd=true

SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Accredited by NAAC with A+ Grade, Recognized under 2(f) of UGC Act 1956

(Approvedby 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/

Code No: 137DV **R16**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year I Semester Examinations, December - 2019MACHINE LEARNING

(Computer Science and Engineering)

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

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

1.a) List the basic design issues to machine learning. [2]

State version space representation theorem. [3]

b) What is the representational power of perceptrons? [2]

c) How to compute expected value and variance of a random variable? [3]

d) State Bayes theorem. [2]

e) Under what conditions is successful learning possible? [3]

f) How to use entropy as evaluation function? [2]

g) What factors contribute to the popularity of genetic algorithm? [3]

h) What is the essential difference between analytical and inductive learning methods? [2]

i) What are the limitations of explanation based learning? [3]

PART – B

(50 Marks)

2. Which disciplines have their influence on machine learning? Explain with examples. [10]

OR

3.a) Contrast the hypothesis space search in ID3 and candidate elimination algorithm.

b) Illustrate the impact of overfitting in a typical application of decision tree learning. [5+5]

4. Discuss how a multi layer network learns using a gradient descent algorithm. [10]

OR

5.a) Distinguish between inductive bias and estimation bias.

b) Explain the methods for comparing the accuracy of two hypotheses. [4+6]

6.a) Explain the features of Bayesian learning methods.
b) Discuss the relationship between the maximum likelihood hypothesis and the least-squared error hypothesis. [6+4]

OR

7.a) Prove Є-exhausting the version space theorem.
b) With suitable example discuss a radial basis function network. [5+5]

8. Describe the representation of hypotheses and genetic algorithms used in this. [10]

OR

9.a) How rules are post pruned? Explain with an example.
b) What is Q function? Write an algorithm for learning Q. [5+5]

10. Explain an algorithm for regressing a set of literals through a single horn clause. [10]

OR

11. Describe the TANGENTPROP algorithm to train a neural network to fit both trainingvalues and training derivatives. [10]

---ooOo--

Code No: 158DN **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year II Semester Examinations, July/August - 2022

MACHINE LEARNING
(Electronics and Communication Engineering)

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

Answer any five questions All questions carry equal marks

- - -

1.a)Is machine learning a multi-disciplinary field? Justify your answer.
b)Illustrate the basic design issues and approaches to machine learning. [8+7]

2.a)Explain an algorithm for finding a maximally specific hypothesis.
b)What types of problems are appropriate for decision tree learning? [8+7]

3.a)Discuss the representational power of a perceptron.
b)Make a comparison of standard gradient descent and stochastic gradient descent. [7+8]

4.a)What are recurrent networks? How are they get trained?
b)Describe the approaches for comparing two machine learning algorithms when limiteddata is available. [8+7]

5.a)State Bayes theorem and explain Naïve Bayes classifier.
b)Discuss the relationship between the maximum likelihood hypothesis and the least-squared error hypothesis in Bayesian learning. [7+8]

6.a)What is PAC learnability? How to verify it?
b)"The distance-weighted k-NN algorithm is a highly effective inductive inferencemethod for many practical problems." Support this statement with suitable discussions. [8+7]

7.a)What is the motivation for genetic algorithms? Illustrate offspring generation fromgiven population.
b)Describe the sequential covering algorithm for learning a disjunctive set of rules. [7+8]

8.a)Differentiate between inductive learning and analytical learning.How to combine these two learning approaches.
b)Give the remarks on explanation based learning. [7+8]

---oo0oo---

R18

Code No: 158DN

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year II Semester Examinations, September - 2022

MACHINE 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---

SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

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/

Set – II

I Mid Examinations, MAY-2023

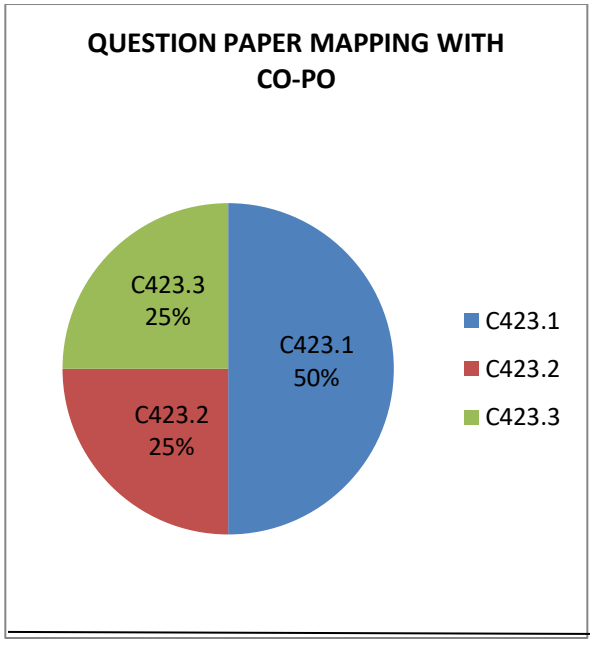
Year &Branch: IVECE (A,B&C) Date:09-05-2023 FN

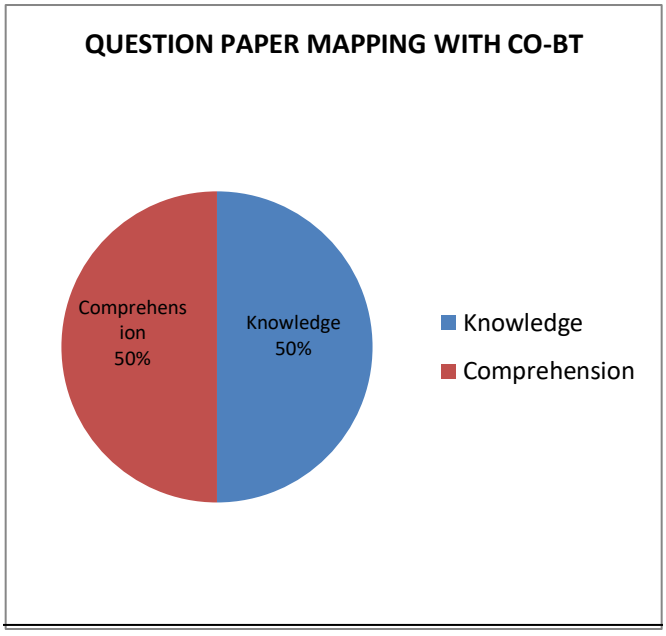
Subject: Machine Learning Marks: 10 Time: 60 min

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. Write the FIND-S and List Then Eliminate Algorithms**.(Knowledge)[C423.1] 5M**
2. Explain the Candidate Elimination Algorithm with example**(Comprehension)[C423.1] 5M**
3. Describe the remarks on the Back Propagation Algorithm.**(Knowledge)[C423.2] 5M**
4. Illustrate the Bayesian algorithm with examples? **(Comprehension)[C423.3] 5M**





Sri Indu Institute of Engineering & Technology

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

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

B.TECH. IV 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.

_____hypothesis. (H) and _____hypothesis. (h)

Machine Learning Mid 1 descriptive answer key link

https://drive.google.com/file/d/1nn613LevRlmyN6Hm6N4ie0Dcq45ZxD6L/view?usp=sharing

Sri Indu Institute of Engineering & Technology

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

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

B.TECH. IV YEAR II SEM., Mid-I Term Examinations, April– 2022

MACHINE LEARNING

Objective Key

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

Set – I

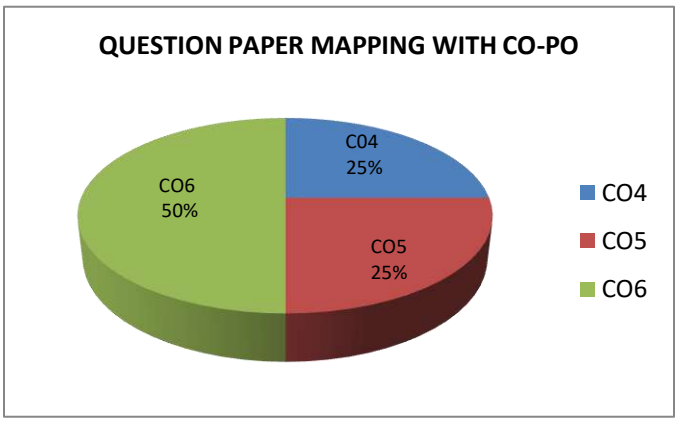
Year &Branch: IV-ECE-A,B&C Date:21/06/2023

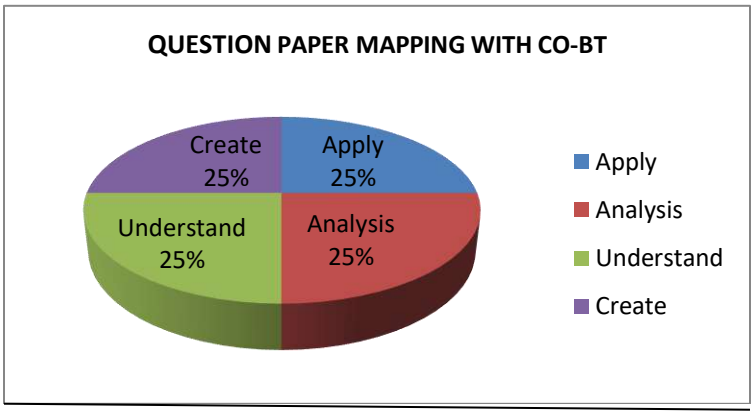
Subject: Machine Learning Marks: 10 Time: 60 min

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. Demonstrate KNN algorithm for classification with example program (Apply) [CO4]
2. Write the Sequential Covering algorithm for learning a disjunctive set of rules. (Analysis) [CO5]
3. Discuss about the Bayes optimal classification with example program. (Understand)[CO6]
4. Create the method to implement EBNN approach. (Create) [CO6]





Sri Indu Institute of Engineering & Technology

Sheriguda (V), Ibrahimpatnam (M), R.R.Dist-501 510
B.TECH. IV 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:- [ ]
   e) Solving queries b) Increasing complexity
   c) Answering probabilistic query d) Decreasing complexity
2. PAC stand for [ ]
   e) Probably Approximate Correct b) Probably Approx Correct
   c) Probably Approximate Computation d) Probably Approx Computation

3. _____means approximating a real-valued target function. [ ]
   e) 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. [ ]
   e) Conjunctive b) Disjunctive
   c) Reflexive d) All

5. When to consider nearest neighbour algorithms? [ ]
   e) Instance map to point in kn
   f) Not more than 20 attributes per instance
   g) Lots of training data
   h) all of these
6. Genetic algorithm is a [ ]
   e) Search technique used in computing to find true or approximate solution to optimization and search problem
   f) Sorting technique used in computing to find true or approximate solution to optimization and sort problem
   g) Both A & B
   h) None of these
7. Which of the following sentence is FALSE regarding reinforcement learning? [ ]
   a) It relates inputs to b) It is used for
   c) It may be used for d) It discovers causal relationships

8. PROLOG-EBG stands for_____ [ ]
   e) Logic programming-Explanation Based Generalization
   f) Logarithmic- Program- Executable Generalization
   g) Logic programming Evolution Based Generalization
   h) None of these
9. _____uses prior knowledge represented by desired derivatives of the target function. [ ]
   e) FOIL
   f) FOCL

g) EBNN
h) TANGENTPROP

10. _____uses the domain theory to alter the objective in searching the hypotheses space of possible weights for an artificial neural network. [ ]
    e) FOIL
    f) FOCL
    g) EBNN
    h) TANGENTPROP

Fill in the blanks

1. The compactness of the bayesian network can be described by _____ structured.
2. Probability provides a way of summarizing the_____that comes from our laziness
3. The instance-based learner is a _____learner.
4. Specify any one of advantage(s) of Locally Weighted Regression_____.
5. _____ Produces two new offspring from two parent string by copying selected bits from each parent is called.
6. _____uses the domain theory to expand the set of candidates considered at each step in the search.
7. _____learning uses prior knowledge and deductive reasoning to augment the information provided by the training examples.
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. _____ Turing equivalent programming language in which programs are expressed as collections of Horn clauses.
9. Reinforcement learning algorithms are related to _____algorithms frequently used to solve optimization problems.

SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Accredited by NAAC with A+ Grade, Recognized under 2(f) of UGC Act 1956

(Approvedby 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/

Machine Learning Mid 2 descriptive answer key link

https://drive.google.com/file/d/1yVyo1psGeqcXq775lNgUWWM6JYRuvv8h/view?usp=sharing

SRI INDU INSTITUTE OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
Sheriguda, Ibrahimpatnam, Rangareddy, TS-501510

Subject: Machine Learning **Objective Key:** MID II Paper Objective/Fill in the blanks

1. C
2. A
3. B
4. B
5. D
6. A
7. D
8. A
9. B
10. C
11. Locally
12. Uncertainty
13. Lazy
14. Good locally
15. Crossover
16. FOCL
17. Analytical learning
18. Q-Learning
19. PROLOG
20. Dynamic Programming

SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

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/

SUBJECT: MACHINE LEARNING

ASSIGNMENT-1

1. Describe supervised,unsupervised and reinforcement learning with example.(C423.1) (Knowledge)
2. Explain Decision Tree learning algorithm with example. (C423.1) (Knowledge)
3. Write a short note on Artificial neural networks with example.(C423.1) (Knowledge)
4. Describe the back propagation Algorithm. (C423.1)(Knowledge)
5. Illustrate the Bayesian algorithm with example.(C423.1)(Knowledge)

ASSIGNMENT-1 ANSWER KEY LINK

https://drive.google.com/file/d/14ec4xXrPgcaEysY_p4e60VWY-j2qOTs1/view?usp=sharing

SUBJECT:MACHINE LEARNING

ASSIGNMENT-2

1.Create the method to implement EBNN approach. (C423.1)((Knowledge).
2.Write the sequential covering algorithm for learning a disjunctive set of rules. (C423.1)((Knowledge).
3.Demonstrate KNN algorithm for classification with example program. (C423.1)((Knowledge).
4.Discuss about the Bayes optimal Classification with example program. (C423.1)((Knowledge).
5.Write the genetic algorithm with example program. (C423.1)((Knowledge).

ASSIGNMENT –2 ANSWER KEY LINK

https://drive.google.com/file/d/1MnptTE-gdBRMMA8r5nDzwDnZDseuG3kN/view?usp=sharing

Result Analysis:

Course Title	MACHINE LEARNING
Course Code	CS800OE
Programme	B.Tech
Year & Semester	IV year II-semester, C sec
Regulation	R18
Course Faculty	K.Hephsibah, Assistant Professor.

Slow learners:

S No.	Roll no	No of backlogs	Internal-I Status	Internal-II Status
1	18X31A0403	4	15	14
2	18X31A0413	5	14	14
3	18X31A0454	8	15	14
4	18X31A04D4	8	14	14
5	18X31A04F1	5	15	14
6	18X31A04H2	3	14	22
7	18X31A04H7	3	15	14
8	19X31A04B5	3	22	21
9	19X31A04B7	5	14	18
10	19X31A04C3	5	14	17
11	19X31A04D2	4	22	20
12	19X31A04D3	4	15	17
13	19X31A04D8	3	19	18
14	19X31A04E5	5	20	19
15	20X31A0425	4	15	18
16	20X31A0426	5	15	22

SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Accredited by NAAC with A+ Grade, Recognized under 2(f) of UGC Act 1956

(Approved by AICTE,New Delhi and Affiliated to JNTUH, Hyderabad)

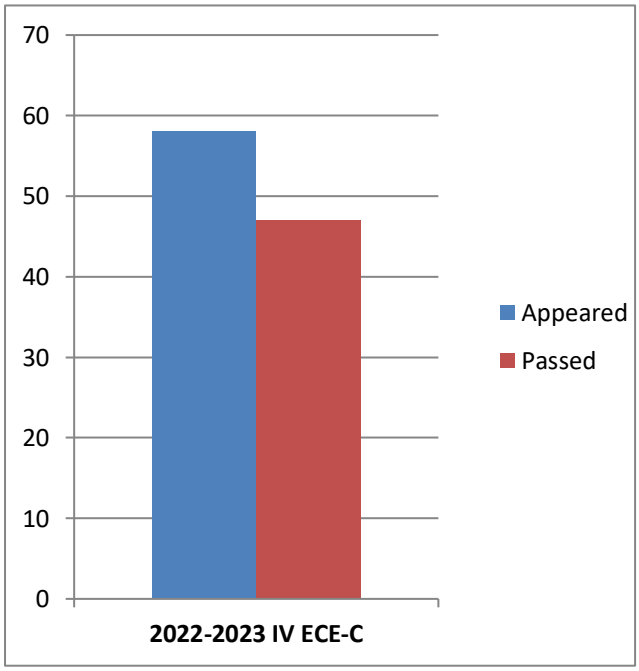
Khalsa Ibrahimpatnam, Sheriguda (V), Ibrahimpatnam (M), Ranga Reddy Dist., Telangana – 501 510

Website: https://siiet.ac.in/

BATCH ECE-IV BTECH II SEM ECE-C RESULT ANALYSIS

ACADAMIC YEAR	COURSE NAME	NUMBER OF STUDENTS		QUESTION PAPER SETTING		PASS%
		APPEARED	PASSED	INTERNAL	EXTERNAL	
2022-23	MACHINE LEARNING	58	47	COURSE FACULTY	JNTUH	81.03%

MACHINE LEARNING (C423) 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 ELECTRONICS AND COMMUNICATION 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 ECE-A	EMF&W	LTNM	A&DC	LICA	ECA
II ECE-B	LICA	A&DC	EMF&W	ECA	LTNM
III ECE-A	DSP	VLSID	A&P	ESD	IM
III ECE-B	A&P	ESD	DSP	IM	VLSID
III ECE-C	IM	A&P	ESD	VLSID	DSP
IV ECE-A	WSN	ML	LPVLSID	-	-
IV ECE-B	ML	LPVLSID	WSN	-	-
IV ECE-C	LPVLSID	WSN	ML	-	-

HOD Department
Head of the Department
Electronics and Communication Engg. Dept
SRI INDU INSTITUTE OF ENGG & TECH
Sheriguda(V), Ibrahimpatnam(M), R.R.Dist-501 510

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 Electronics and Communication Engineering

Course Outcome Attainment (Internal Examination-1)

Name of the faculty : K.Hephsiba Academic Year: 2022-23
Branch & Section: ECE-C Examination: I Internal
Course Name: MACHINE LEARNING Year: IV Semester: II

S.No	HT No.	Q1a	Q1b	Q2a	Q2b	Q3a	Q3b	Q4a	Q4b	Obj1	A1
Max. Marks ==>		5		5		5		5		10	5
1	18X31A0403					5				5	5
2	18X31A0413							5		4	5
3	18X31A0454			3				3		5	5
4	18X31A04D4			4						5	5
5	18X31A04F1	2		4						5	5
6	18X31A04H2	3		1						5	5
7	18X31A04H7					5				5	5
8	19X31A04A1					5				6	5
9	19X31A04A2					5				8	5
10	19X31A04A3					5		5		8	5
11	19X31A04A4							5		5	5
12	19X31A04A5			5						10	5
13	19X31A04A6	5		5						4	5
14	19X31A04A7			5		5				10	5
15	19X31A04A8					5		4		10	5
16	19X31A04A9			3		4				10	5
17	19X31A04B0					4		4		10	5
18	19X31A04B1	4		4						10	5
19	19X31A04B2			4		4				10	5
20	19X31A04B3					5				10	5
21	19X31A04B4					4		3		10	5
22	19X31A04B5			4		5				8	5
23	19X31A04B6	5		5						8	5
24	19X31A04B7			5						4	5
25	19X31A04B8	5		4						10	5
26	19X31A04B9	4		5						10	5
27	19X31A04C0			5						10	5
28	19X31A04C1	5				4				10	5
29	19X31A04C2					5		5		9	5
30	19X31A04C3					5				4	5
31	19X31A04C4			5		5				10	5
32	19X31A04C5			5		5				7	5
33	19X31A04C6	5		5						9	5
34	19X31A04C7	5								9	5
35	19X31A04C8			5						10	5
36	19X31A04C9			5		5				10	5
37	19X31A04D0					5		4		10	5
38	19X31A04D1					5		5		10	5
39	19X31A04D2			4		5				8	5
40	19X31A04D3			5						5	5

41	19X31A04D4					5		5		9	5
42	19X31A04D5			5				5		9	5
43	19X31A04D6	2						4		10	5
44	19X31A04D7	5								10	5
45	19X31A04D8	5								9	5
46	19X31A04D9			5						4	5
47	19X31A04E0			5		5				10	5
48	19X31A04E1			5		5				9	5
49	19X31A04E2	5		5						9	5
50	19X31A04E3	4		5						10	5
51	19X31A04E4	5		4						10	5
52	19X31A04E5			4		3				8	5
53	20X35A0421					5		5		10	5
54	20X35A0422			4		5				8	5
55	20X35A0423			5		5				9	5
56	20X35A0424					5		5		9	5
57	20X35A0425	5								5	5
58	20X35A0426			5						5	5.00
Target set by the faculty / HoD		3.00	0.00	3.00	0.00	3.00	0.00	3.00	0.00	6.00	3.00
Number of students performed above the target		15	0	32	0	30	0	15	0	43	57
Number of students attempted		17	0	33	0	30	0	15	0	57	57
Percentage of students scored more than target		88%		97%		100%		100%		75%	100%

CO Mapping with Exam Questions:

CO - 1	Y						Y		Y	Y
CO - 2					Y				Y	Y
CO - 3			Y						Y	Y
CO - 4										
CO - 5										
CO - 6										

% Students Scored >Target %	88%		97%		100%		100%		75%	100%

CO Attainment based on Exam Questions:

CO - 1	88%						100%		75%	100%
CO - 2					100%				75%	100%
CO - 3			97%						75%	100%
CO - 4										
CO - 5										
CO - 6										

CO	**Subj**	obj	Asgn	Overall	Level
CO-1	94%	75%	100%	90%	3.00
CO-2	100%	75%	100%	92%	3.00
CO-3	97%	75%	100%	91%	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 Electronics and Communication Engineering

Course Outcome Attainment (Internal Examination-2)

Name of the faculty : K.Hephsiba Academic Year: 2022-23
Branch & Section: ECE-C Examination: II Internal
Course Name: MACHINE LEARNING Year: IV Semester: II

S.No	HT No.	Q1a	Q1b	Q2a	Q2b	Q3a	Q3b	Q4a	Q4b	Obj4	A4
Max. Marks ==>		5		5		5		5		10	5
1	18X31A0403	3		2						4	5
2	18X31A0413			2		3				4	5
3	18X31A0454			5						4	5
4	18X31A04D4	3				2				4	5
5	18X31A04F1	5								4	5
6	18X31A04H2	5				5				7	5
7	18X31A04H7	2				2				5	5
8	19X31A04A1	4		3						7	5
9	19X31A04A2					5				8	5
10	19X31A04A3			5		5				7	5
11	19X31A04A4			5		4				7	5
12	19X31A04A5					5				7	5
13	19X31A04A6	5				4				7	5
14	19X31A04A7	5				5				8	5
15	19X31A04A8	5				5				7	5
16	19X31A04A9	5				5				7	5
17	19X31A04B0	5				5				7	5
18	19X31A04B1	5				5				7	5
19	19X31A04B2	5				5				5	5
20	19X31A04B3	4		5						8	5
21	19X31A04B4	5						5		7	5
22	19X31A04B5	4						5		7	5
23	19X31A04B6							5		7	5
24	19X31A04B7									7	5
25	19X31A04B8	5				5				7	5
26	19X31A04B9	4				5				7	5
27	19X31A04C0	4				5				7	5
28	19X31A04C1	5				5				7	5
29	19X31A04C2					5		5		7	5
30	19X31A04C3					5				7	5
31	19X31A04C4					5		5		7	5
32	19X31A04C5	5				5				8	5
33	19X31A04C6					5				7	5
34	19X31A04C7					2		5		7	5
35	19X31A04C8			5						7	5
36	19X31A04C9			5						7	5
37	19X31A04D0	5				5				7	5
38	19X31A04D1			5		5				7	5
39	19X31A04D2	5				3				7	5
40	19X31A04D3			5						7	5
41	19X31A04D4	5								7	5
42	19X31A04D5			4		5				5	5
43	19X31A04D6			5		5				4	5
44	19X31A04D7					5		5		5	5

45	19X31A04D8	5								7	5
46	19X31A04D9	5								8	5
47	19X31A04E0					5		5		7	5
48	19X31A04E1	5				5				7	5
49	19X31A04E2	5				5				7	5
50	19X31A04E3	5				5				7	5
51	19X31A04E4	4				5				7	5
52	19X31A04E5					4		3		7	5
53	20X35A0421	4				5				7	5
54	20X35A0422	5				5				7	5
55	20X35A0423	5				5				7	5
56	20X35A0424			5				5		7	5
57	20X35A0425							5		8	5
58	20X35A0426	5				5				7	5
Target set by the faculty / HoD		3.00	0.00	3.00	0.00	3.00	0.00	3.00	0.00	6.00	3.00
Number of students performed above the target		31	0	12	0	36	0	11	0	47	55
Number of students attempted		32	0	12	0	39	0	11	0	55	55
Percentage of students scored more than target		97%		100%		92%		100%		85%	100%

CO Mapping with Exam Questions:

CO - 1										
CO - 2										
CO - 3										
CO - 4	Y						Y		Y	Y
CO - 5			Y						Y	Y
CO - 6					Y				Y	Y

% Students Scored >Target %	97%		100%		92%		100%		85%	100%

CO Attainment based on Exam Questions:

CO - 1									
CO - 2									
CO - 3									
CO - 4	97%						100%	85%	100%
CO - 5			100%					85%	100%
CO - 6					92%			85%	100%

CO	Subj	obj	Asgn	Overall	Level
CO-1					
CO-2					
CO-3					
CO-4	98%	85%	100%	95%	3.00
CO-5	100%	85%	100%	95%	3.00
CO-6	92%	85%	100%	93%	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 Electronics and Communication Engineering

Course Outcome Attainment (University Examinations)

Name of the faculty : K.Hephsiba Academic Year: 2022-23

Branch & Section: ECE-C Year / Semester: IV / II

Course Name: MACHINE LEARNING

S.No	Roll Number	Marks Secured
1	18X31A0403	
2	18X31A0413	0
3	18X31A0454	
4	18X31A04D4	
5	18X31A04F1	
6	18X31A04H2	45
7	18X31A04H7	26
8	19X31A04A1	30
9	19X31A04A2	28
10	19X31A04A3	26
11	19X31A04A4	37
12	19X31A04A5	34
13	19X31A04A6	48
14	19X31A04A7	41
15	19X31A04A8	39
16	19X31A04A9	40
17	19X31A04B0	31
18	19X31A04B1	37
19	19X31A04B2	28
20	19X31A04B3	31
21	19X31A04B4	29
22	19X31A04B5	31
23	19X31A04B6	43
24	19X31A04B7	2
25	19X31A04B8	48
26	19X31A04B9	26
27	19X31A04C0	30
28	19X31A04C1	39
29	19X31A04C2	26
30	19X31A04C3	5
31	19X31A04C4	38
32	19X31A04C5	31
33	19X31A04C6	51
34	19X31A04C7	29
35	19X31A04C8	26
Max Marks		75

S.No	Roll Number	Marks Secured
36	19X31A04C9	50
37	19X31A04D0	42
38	19X31A04D1	60
39	19X31A04D2	8
40	19X31A04D3	26
41	19X31A04D4	28
42	19X31A04D5	37
43	19X31A04D6	36
44	19X31A04D7	26
45	19X31A04D8	26
46	19X31A04D9	31
47	19X31A04E0	37
48	19X31A04E1	43
49	19X31A04E2	42
50	19X31A04E3	33
51	19X31A04E4	53
52	19X31A04E5	16
53	20X35A0421	34
54	20X35A0422	35
55	20X35A0423	45
56	20X35A0424	52
57	20X35A0425	36
58	20X35A0426	15

Class Average mark	31
Number of students performed above the target	32
Number of successful students	51
Percentage of students scored more than target	63%
Attainment level	**3**

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

SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electronics and Communication Engineering

Course Outcome Attainment

Name of the faculty : K.Hephsiba
Branch & Section: ECE-C
Course Name: MACHINE LEARNING

Academic Year: 2022-23
Examination: I Internal
Year: IV
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			25%	75%	
CO Attainment for the course (Internal, University)			0.75	2.25	
CO Attainment for the course (Direct Method)			3.00		

Overall course attainment level **3.00**

SRI INDU INSTITUTE OF ENGINEERING & TECHNOLOGY

Department of Electronics and Communication Engineering

Program Outcome Attainment (from Course)

Name of Faculty:	K.Hephsiba	Academic Year:	2022-23
Branch & Section:	ECE-C	Year:	IV
Course Name:	MACHINE LEARNING	Semester:	II

CO-PO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PO12	PSO1	PSO2
CO1	2	2	2	3								2	3	2
CO2		2	3	2									3	3
CO3		2	2	2		2							3	3
CO4		2	2	2	2								2	3
CO5		2	2									3	2	3
CO6													2	2
Course	**2.00**	**2.00**	**2.20**	**2.25**	**2.00**	**2.00**						**2.50**	**2.50**	**2.67**

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	PSO1	PSO2
CO Attainment	**2.00**	**2.00**	**2.20**	**2.25**	**2.00**	**2.00**						**2.50**	**2.50**	**2.67**

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

SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

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 – 501510

Website: https://siiet.ac.in/

MACHINE LEARNING-IV ECE-C REGISTER

https://drive.google.com/file/d/1LMVmgwhRv07GYrOuh1BK_0mD74B4oPy9/view?usp=sharing