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SARVAJANIK UNIVERSITY
Sarvajanik College of Engineering and Technology
Bachelor of Technology

Year: B. Tech II (Semester IV)

Subject Name: Introduction to Artificial Intelligence and Machine Learning **Subject Code:** BTEA19451
Type of course: Minor (Group: Artificial Intelligence and Machine Learning/Data Science)
Prerequisite (if any): -

Rationale:

- To review and strengthen important mathematical concepts required for AI & ML.
- Introduce the concept of learning patterns from data and develop a strong theoretical foundation for understanding state of the art Machine Learning algorithms.

Teaching and Examination Scheme:

Teaching Scheme				Theory Marks			Practical Marks		Total
L	T	P	C	TEE	CA1	CA2	TEP	CA3	
3	0	2	4	60	25	15	30	20	150

CA1: Continuous Assessment (assignments/projects/open book tests/closed book tests) CA2: Sincerity in attending classes/class tests/ timely submissions of assignments/self-learning attitude/solving advanced problems TEE: Term End Examination TEP: Term End Practical Exam (Performance and viva on practical skills learned in course) CA3: Regular submission of Lab work/Quality of work submitted/Active participation in lab sessions/viva on practical skills learned in course

Content:

Sr. No.	Contents	Total Hours
1.	**Module 1:** Defining Artificial Intelligence, Defining AI techniques, Using Predicate Logic and Representing Knowledge as Rules, Representing simple facts in logic, Computable functions and predicates, Procedural vs Declarative knowledge, Logic Programming, Mathematical foundations: Matrix Theory and Statistics for Machine Learning	12
2.	**Module 2:** Idea of Machines learning from data, Classification of problem – Regression and Classification, Supervised and Unsupervised learning.	08
3.	**Module 3:** Linear Regression: Model representation for single variable, Single variable Cost Function, Gradient Decent for Linear Regression, Gradient Decent in practice.	10
4.	**Module 4:** Logistic Regression: Classification, Hypothesis Representation, Decision Boundary, Cost function, Advanced Optimization, Multi-classification (One vs All), Problem of Overfitting.	09
5.	**Module 5:** Discussion on clustering algorithms and use-cases cantered around clustering and classification.	06

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Suggested Specification table with Marks (Theory): (For B.Tech only)

Distribution of Theory Marks					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
20	20	10	10	-	-

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

Sr no	Title of book /article	Author(s)	Publisher and details like ISBN	Year of publication	Publication Edition
1	Artificial Intelligence	Saroj Kaushik	Cengage Learning	2011	1st Edition
2	Practical Workbook Artificial Intelligence and Soft Computing for beginners	Anindita Das Bhattacharjee	Shroff Publisher-X team Publisher		
3	Python Machine Learning by Example	Yuxi (Hayden) Liu	Packet Publishing Limited	2017	
4	Machine Learning	Tom Mitchell	McGraw Hill	2017	
5	Pattern Recognition and Machine Learning,	Christopher M. Bishop	Springer	2011	
6	The Elements of Statistical Learning,	T. Hastie, R. Tibshirani, J. Friedman.		2011	6th Edition

Course Outcomes:

Sr. No.	CO statements
CO-1	Design and implement machine learning solutions to classification, regression and clustering problems
CO-2	Evaluate and interpret the results of the different ML techniques.
CO-3	Design and implement various machine learning algorithms in a range of Real-world applications

List of Open learning website:

- Artificial Intelligence, https://swayam.gov.in/nd2_cec20_cs10/preview.

FOR LAB SESSIONS:

List of Experiments:

Sr. No	Practical
1	Implementation of logical rules in Python
2.	Using any data apply the concept of: a. Liner regression b. Gradient decent c. Logistic regression
3.	To add the missing value in any data set.
4..	Perform and plot under fitting and overfitting in a data set
5 .	Implementation of clustering and classification algorithms.