SARVAJANIK UNIVERSITY
SarvajanikCollege of Engineering and Technology
Bachelor of Technology

B.Tech.IV Semester 7	
Subject Artificial Intelligence Techniques	**Subject Code: BTEL14752**

Type of course:	**Professional Elective courses (Electrical)**
Prerequisite:	Basics of Computer Programing, Mathematics& Statistics
Rationale:	The main objective of this course is to provide fundamental knowledge of Machine Learning Algorithms and Artificial Intelligence. On successful completion of the course- students will acquire knowledge of Machine Learning Algorithms such as Supervised- Unsupervised- Ensemble learning along with AI strategies.

Teaching and Examination Scheme:

TEACHING SCHEME				Theory Marks			Practical Marks		Total
L	T	P	C	TEE	CA1	CA2	TEP	CA3	100
3	0	0	3	60	25	15	0	0	

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.

Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1.	**Machine Learning Basics** Introduction to Machine Learning, AI, ML and Data Science, Training and Testing- Algorithm and Model, ML importance and techniques, Various Application areas of ML, Inferential and Descriptive models with example implementations, performance tuning techniques in the model fit.	9	20%
2.	**Supervised Learning** Supervised Learning approach- Characteristics of Supervised learning- K-fold cross validation-Classification Techniques: KNN- Naive Bayes- Support Vector Machine and Logistic Regression Techniques: Simple Linear Regression- Multiple Linear Regression- Lasso- Ridge and Elastic Net Regression- Types.	9	20%
3.	**Unsupervised Learning** Unsupervised Learning approach- characteristics of unsupervised learning- Apriori Algorithm- Association Rule Generation- Dimensionality Reduction with Principal Component Analysis- Various Clustering Methods-K-means-	9	20%

	Hierarchical Regularization and Penalization techniques.		
4.	**Introduction to AI:** Introduction to Artificial Intelligence, Background and Applications, Turing Test and Rational Agent approaches to AI, Problems, Problem Spaces, Search: State space search – Production Systems – Problem Characteristics – Issues in design of Search. .	**9**	**20%**
5	**Problem Solving and Searching Techniques** Problem Characteristics, Production Systems, Control Strategies, Breadth First Search, Depth First Search, Hill climbing and its Variations, Heuristics Search Techniques: Best First Search, Constraint Satisfaction Problem, Means-End Analysis.	**9**	**20%**

Suggested Specification table with Marks (Theory/Practical):

% Distribution of Marks					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
20	**20**	**30**	**10**	**10**	**10**

Legends: R: Remembrance, **U:** Understanding; **A:** Application, **N:** Analyze, **E:** Evaluate **C:** Create and above Levels **(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 the above table.

Reference Text Books:

Sr. No.	Title of book /article	Author(s)	Publisher and details like ISBN	Year of publication	Publication Edition
1	Machine Learning for Absolute Beginners: A Plain English Introduction	O. Theobald	Scatterplot Press-	2017	2nd Ed.
2.	Fundamentals of Machine Learning for Predictive Data Analytics	J. D. Kelleher	MIT Press	2020	2nd Ed.
3.	Artificial Intelligence,	Elaine Rich and Kelvin Knight,	TMH	2018	2nd Ed.
4	Introduction to A.I and Expert Systems	DAN.W. Patterson,	PHI	2017	--
5	Machine Learning: The Art and Science of Algorithms that Make Sense of Data	P. Flach-	Cambridge University Press-	2012.	1st Ed
6	Artificial Intelligence	E. Rich and K. Knight	New York: TMH	2019	3rd Ed.

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Course Outcome:

Sr. No.	CO Statement After learning this subject, students will be able to	Marks % weightage
CO-1	Describe Machine Learning fundamentals and various models of Machine Learning.	10%
CO-2	Demonstrate various ML techniques of Supervised and Unsupervised learning algorithms.	30%
CO-3	Applicability of various techniques of Artificial Intelligence Strategies.	30%
CO-4	Outline the roles and requirements of artificial intelligence in practical applications	20%
CO-5	Identify and define data-oriented problems and data-driven decisions in real life,	10%

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO-1	2	2	1		1		1	1		2	1	1			2
CO-2	3	3	3	1	2	1	1		2	1	1	1	3	2	1
CO-3	3	2	3	2	3	1	2		2	2	2	1	3	2	3
CO-4	2	3	3	2	3	1	3	1	2	1	2	1	3	1	3
CO-5	1	1	1		1		1	1		1	1	2	1		1