

## A. Course Handout

Institute/School Name	Chitkara University Institute of Engineering and Technology		
Department Name	Department of Computer Science & Engineering		
Programme Name	Bachelor of Engineering (B.E.), Computer Science & Engineering		
Course Name	Artificial Intelligence and Machine Learning	Session	2022-2023
Course Code	22CS015	Semester/Batch	4 <sup>th</sup> /2022
L-T-P (Per Week)	3-0-2	Course Credits	04
Course Coordinator	Dr. Kiran Deep Singh		

<b>CLO01</b>	Explain the basic concept and evolution of artificial intelligence and machine learning.
<b>CLO02</b>	Study Python programming and utilize essential libraries such as NumPy for numerical computing and Pandas for data manipulation and pre-processing.
<b>CLO03</b>	Explore the concepts and theories of descriptive statistics and exploratory data analysis (EDA) for machine learning.
<b>CLO04</b>	Examine the algorithms behind the supervised and unsupervised learning.
<b>CLO05</b>	Apply knowledge and skills to real-world problems via group projects, analysing case studies, and presenting practical AI and ML applications.

### 1. Objectives of the Course

The scope of the course is to provide a foundational understanding of the key aspects of machine learning, encompassing principles and practical implementation. Students will gain a theoretical understanding of data statistics; exploring the intricate details of machine learning algorithms and methodologies. The course aims to introduce students to the intricacies of machine learning algorithms, methodologies, and practical implementation, ensuring their readiness for Industry Certifications.

- To cultivate a comprehensive understanding of the basic concepts and evolution of Artificial Intelligence and Machine Learning
- To equip students with proficient Python programming skills and the ability to use essential libraries like NumPy and Pandas for numerical computing, data manipulation, and pre-processing.
- To encourage exploration of concepts and theories related to descriptive statistics and exploratory data analysis (EDA) for effective application in machine learning.
- To facilitate an examination of the algorithms underlying both supervised and unsupervised learning, enhancing students' ability to implement and evaluate machine learning models.
- To enable the practical application of acquired knowledge and skills by actively engaging in group projects, analysing case studies, and presenting real-world applications.

### 2. Course Learning Outcomes

After completion of the course, student should be able to:

	Course Learning Outcome	*POs	**CL	***KC	Sessions
<b>CLO01</b>	Explain the basic concept and evolution of Artificial Intelligence and Machine Learning	PO1, PO2, PO3, PO5, PO12	K2	Factual Conceptual	<b>12</b>
<b>CLO02</b>	Study Python programming and utilize essential libraries such as NumPy for numerical computing and	PO1, PO3, PO4, PO5	K3	Conceptual Procedural	<b>15</b>

	Pandas for data manipulation and pre-processing.				
<b>CLO03</b>	Explore the concepts and theories of descriptive statistics and exploratory data analysis (EDA) for machine learning.	PO1, PO2, PO3, PO4, PO5, PO7, PO11	K3	Conceptual Procedural	<b>15</b>
<b>CLO04</b>	Examine the algorithms behind the supervised and unsupervised learning.	PO3,PO4,PO5	K4	Procedural	<b>15</b>
<b>CLO05</b>	Apply knowledge and skills to real-world problems via group projects, analysing case studies, and presenting practical AI and ML applications	PO4, PO5	K3	Conceptual Procedural	<b>15</b>
<b>Total Contact Hours</b>					<b>72</b>

Revised Bloom's Taxonomy Terminology

\* PO's available at ([shorturl.at/cryzF](http://shorturl.at/cryzF))

\*\*Cognitive Level =CL

\*\*\*Knowledge Categories = KC

Course Learning Outcomes	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CLO01	H	H		H								
CLO02	H	H										
CLO03	H		M									H
CLO04	H	H										M
CLO05	H	H	H		M	M	M				M	H

H=High, M=Medium, L=Low

### 3. ERISE Grid Mapping

Feature Enablement	Level(1-5, 5 being highest)
Entrepreneurship	1
Research	3
Innovation	2
Skills	5
Employability	4

### 4. Recommended Books:

#### Text Books:

**B01:** "Introduction to Machine Learning with Python", Published by O'Reilly Media.

**B02:** "Machine Learning", Published by Oxford University Press.

**B03:** "AI and Machine Learning for Coders: A Programmer's Guide to Artificial Intelligence", Published by O'Reilly Media.

**B04:** "Machine Learning, 1e", Published by Pearson.

## Reference Books:

**B05:** "Data Science and Machine Learning using Python", Published by McGraw Hill; Standard Edition.

## E-Resources:

<https://library.chitkara.edu.in/subscribed-books.php>

## 5. Other readings and relevant websites:

Serial No	Link of Journals, Magazines, websites and Research Papers
1.	Journal of Artificial Intelligence Research (JAIR): [JAIR Website]( <a href="https://www.jair.org/">https://www.jair.org/</a> )
2.	AI Magazine by AAAI: [AI Magazine]( <a href="https://www.aaai.org/Magazine/magazine.php">https://www.aaai.org/Magazine/magazine.php</a> )
3.	MIT Technology Review ( <a href="https://www.technologyreview.com/topic/artificial-intelligence/">https://www.technologyreview.com/topic/artificial-intelligence/</a> )
4.	The AI Report by VentureBeat: [VentureBeat AI]( <a href="https://venturebeat.com/category/ai/">https://venturebeat.com/category/ai/</a> )
5.	OpenAI Blog: [OpenAI Blog]( <a href="https://www.openai.com/blog/">https://www.openai.com/blog/</a> )
6.	Towards Data Science on Medium: [Towards Data Science]( <a href="https://towardsdatascience.com/">https://towardsdatascience.com/</a> )
7.	KDNuggets: [KDNuggets]( <a href="https://www.kdnuggets.com/">https://www.kdnuggets.com/</a> )

## 6. Recommended Tools and Platforms

<https://www.coursera.org/learn/machine-learning-capstone>

## 7. Course Plan:

Lecture Number	Topics	Text Book
1	<b>Detail Discussion of Course Handout (CHO)</b>	B01-Chpater-1
2-3	<b>Introduction to AI and ML</b> Understanding the basics of Artificial Intelligence and Machine Learning	B01-Chapter-1
4-8	Overview of popular ML applications Python recap and essential libraries (NumPy, basic data structures)	B01-Chapter-1
9-11	<b>Data Manipulation with Pandas</b> Introduction to Pandas and its data structures (Series, DataFrame)	B01-Chapter-1 B01-Chapter-2
12-15	Reading and writing data in different formats (CSV, Excel, SQL)	B01-Chapter-1
16-19	Data cleaning and preprocessing with Pandas	
19-22	<b>Descriptive Statistics with Python</b> Introduction to basic statistical concepts Descriptive statistics using Python (mean, median, mode, variance, standard deviation)	B01-Chapter-1 B01-Chapter-2
23-26	Exploratory Data Analysis (EDA) techniques	
27-30	<b>Visualization Libraries in Python</b> Introduction to Matplotlib, Seaborn & plotly	B01-Chapter-1
31-34	Creating various types of plots (line plots, bar plots, scatter plots, histograms, box plot) Data visualization best practices	
35-37	<b>Introduction to Machine Learning</b> Overview of supervised and unsupervised learning	B01-Chapter-2 B01-Chapter-8
38-40	Basic concepts: features, labels, training, testing Introduction to scikit-learn library	B01-Chapter-8
	<b>ST-1 (Syllabus = (Lecture number 1-40)</b>	
41-44	<b>Supervised Learning Algorithms</b> <b>Linear Regression</b> Understanding the basics Implementation of Linear and Multi Linear Regression using scikit-learn	B01-Chapter-5

45-48	Regression Evaluation metrics (R-squared, Mean Squared Error)	B01-Chapter-5
49-52	<b>Logistic Regression</b> Basics and applications Implementation for Binary and Multiclass Classification using scikit-learn	B01-Chapter-5
53-56	Classification Evaluation metrics (Confusion Matrix, Precision, recall and Accuracy)	B01-Chapter-5
57-60	<b>Support Vector Machines</b> Basics and applications Implementation for Classification and Regression using scikit-learn	B01-Chapter-2
61-64	Classification and Regression Evaluation metrics.	B01-Chapter-2
65-68	<b>Decision Tree Classification and Regression</b> Basics and applications Implementation for Classification and Regression using scikit-learn	B01-Chapter-2
69-72	Classification and Regression Evaluation metrics.	B01-Chapter-2
<b>ST-2 (Syllabus = (Lecture number 41-72))</b>		
73-76	<b>Artificial Neural Networks</b> Basics and applications Implementation Neural Network Architecture and Multi Layered Perceptron using scikit-learn	B01-Chapter-2 B01-Chapter-8
77-80	Classification and Regression Evaluation metrics.	
81-84	<b>Unsupervised Learning Algorithms</b> <b>K-Means Clustering</b> Introduction to clustering Implementing K-Means in scikit-learn	B01-Chapter-3
85-88	Evaluation of clustering results.	B01-Chapter-3
89-92	<b>Principal Component Analysis (PCA)</b> Dimensionality reduction Implementing PCA in scikit-learn	B01-Chapter-3
93-96	Visualization of reduced dimensions	B01-Chapter-3
<b>ST-3 (Syllabus = (Lecture number 73-96))</b>		
	<b>Project (Real-world Applications and Use Cases)</b> Case studies and practical applications of AI and ML in various industries	
	<b>Group projects:</b> Students work on a small project applying learned concepts	
<b>ETE (Syllabus = (Lecture number 1-96))</b>		

## 8. Delivery/Instructional Resources

Lecture No.	Topics	Web References	Audio-Video
	<b>Detail Discussion of Course Handout (CHO)</b>		
2-3	<b>Introduction to AI and ML</b> Understanding the basics of Artificial Intelligence and Machine Learning	<a href="https://developer.ibm.com/articles/cc-beginner-guide-machine-learning-ai-cognitive/">https://developer.ibm.com/articles/cc-beginner-guide-machine-learning-ai-cognitive/</a>	<a href="https://www.youtube.com/watch?v=ukzFI9rgwfU">https://www.youtube.com/watch?v=ukzFI9rgwfU</a>
4-8	Overview of popular ML applications Python recap and essential libraries (NumPy, basic data structures)	<a href="https://faculty.washington.edu/otoomet/machinelearning-py/numpy-and-pandas.html">https://faculty.washington.edu/otoomet/machinelearning-py/numpy-and-pandas.html</a>	<a href="https://www.youtube.com/watch?v=ukzFI9rgwfU">https://www.youtube.com/watch?v=ukzFI9rgwfU</a>

9-11	<b>Data Manipulation with Pandas</b> Introduction to Pandas and its data structures (Series, DataFrame)	<a href="https://faculty.washington.edu/otoomet/machinelearning-py/numpy-and-pandas.html">https://faculty.washington.edu/otoomet/machinelearning-py/numpy-and-pandas.html</a>	<a href="https://www.youtube.com/watch?v=CmorAWRsCAw&amp;list=PLeo1K3hjS3uuASpe-1LjfG5f14Bnozjwy">https://www.youtube.com/watch?v=CmorAWRsCAw&amp;list=PLeo1K3hjS3uuASpe-1LjfG5f14Bnozjwy</a>
12-15	Reading and writing data in different formats (CSV, Excel, SQL)	<a href="https://faculty.washington.edu/otoomet/machinelearning-py/numpy-and-pandas.html">https://faculty.washington.edu/otoomet/machinelearning-py/numpy-and-pandas.html</a>	<a href="https://www.youtube.com/watch?v=CmorAWRsCAw&amp;list=PLeo1K3hjS3uuASpe-1LjfG5f14Bnozjwy">https://www.youtube.com/watch?v=CmorAWRsCAw&amp;list=PLeo1K3hjS3uuASpe-1LjfG5f14Bnozjwy</a>
16-19	Data cleaning and preprocessing with Pandas	<a href="https://faculty.washington.edu/otoomet/machinelearning-py/cleaning-data.html">https://faculty.washington.edu/otoomet/machinelearning-py/cleaning-data.html</a>	<a href="https://www.youtube.com/watch?v=CmorAWRsCAw&amp;list=PLeo1K3hjS3uuASpe-1LjfG5f14Bnozjwy">https://www.youtube.com/watch?v=CmorAWRsCAw&amp;list=PLeo1K3hjS3uuASpe-1LjfG5f14Bnozjwy</a>
19-22	<b>Descriptive Statistics with Python</b> Introduction to basic statistical concepts Descriptive statistics using Python (mean, median, mode, variance, standard deviation)	<a href="https://realpython.com/python-statistics/">https://realpython.com/python-statistics/</a>	<a href="https://www.youtube.com/watch?v=h8EYEJ32oQ8&amp;list=PLU5aQXLWR3_yYSOZYRA-5g5YSSYLNZ6Mc">https://www.youtube.com/watch?v=h8EYEJ32oQ8&amp;list=PLU5aQXLWR3_yYSOZYRA-5g5YSSYLNZ6Mc</a>
23-26	Exploratory Data Analysis (EDA) techniques	<a href="https://www.analyticsvidhya.com/blog/2021/08/exploratory-data-analysis-and-visualization-techniques-in-data-science/">https://www.analyticsvidhya.com/blog/2021/08/exploratory-data-analysis-and-visualization-techniques-in-data-science/</a>	<a href="https://www.youtube.com/watch?v=h8EYEJ32oQ8&amp;list=PLU5aQXLWR3_yYSOZYRA-5g5YSSYLNZ6Mc">https://www.youtube.com/watch?v=h8EYEJ32oQ8&amp;list=PLU5aQXLWR3_yYSOZYRA-5g5YSSYLNZ6Mc</a>
27-30	<b>Visualization Libraries in Python</b> Introduction to Matplotlib, Seaborn & plotly	<a href="https://www.geeksforgeeks.org/data-visualisation-in-python-using-matplotlib-and-seaborn/">https://www.geeksforgeeks.org/data-visualisation-in-python-using-matplotlib-and-seaborn/</a>	<a href="https://www.youtube.com/watch?v=9GvnrQv138s&amp;list=PLjVLYmrlmjGcC0B_FP3bkJ-JIPkV5GuZR">https://www.youtube.com/watch?v=9GvnrQv138s&amp;list=PLjVLYmrlmjGcC0B_FP3bkJ-JIPkV5GuZR</a>
31-34	Creating various types of plots (line plots, bar plots, scatter plots, histograms, box plot) Data visualization best practices	<a href="https://www.geeksforgeeks.org/data-visualisation-in-python-using-matplotlib-and-seaborn/">https://www.geeksforgeeks.org/data-visualisation-in-python-using-matplotlib-and-seaborn/</a>	<a href="https://www.youtube.com/watch?v=9GvnrQv138s&amp;list=PLjVLYmrlmjGcC0B_FP3bkJ-JIPkV5GuZR">https://www.youtube.com/watch?v=9GvnrQv138s&amp;list=PLjVLYmrlmjGcC0B_FP3bkJ-JIPkV5GuZR</a>
35-37	<b>Introduction to Machine Learning</b> Overview of supervised and unsupervised learning	<a href="https://www.analyticssteps.com/blogs/introduction-machine-learning-supervised-and-unsupervised-learning">https://www.analyticssteps.com/blogs/introduction-machine-learning-supervised-and-unsupervised-learning</a>	<a href="https://www.youtube.com/watch?v=4dwsSz_fNSQ">https://www.youtube.com/watch?v=4dwsSz_fNSQ</a>
38-40	Basic concepts: features, labels, training, testing Introduction to scikit-learn library	<a href="https://scikit-learn.org/stable/tutorial/basic/tutorial.html">https://scikit-learn.org/stable/tutorial/basic/tutorial.html</a>	<a href="https://www.youtube.com/watch?v=4dwsSz_fNSQ">https://www.youtube.com/watch?v=4dwsSz_fNSQ</a>
41-44	<b>Supervised Learning Algorithms Linear Regression</b> Understanding the basics Implementation of Linear and Multi Linear Regression using scikit-learn	<a href="https://www.simplilearn.com/tutorials/scikit-learn-tutorial/sklearn-linear-regression-with-examples">https://www.simplilearn.com/tutorials/scikit-learn-tutorial/sklearn-linear-regression-with-examples</a>	<a href="https://www.youtube.com/watch?v=4dwsSz_fNSQ">https://www.youtube.com/watch?v=4dwsSz_fNSQ</a>
45-48	Regression Evaluation metrics (R-squared, Mean Squared Error)	<a href="https://www.simplilearn.com/tutorials/scikit-learn-tutorial/sklearn-linear-regression-with-examples">https://www.simplilearn.com/tutorials/scikit-learn-tutorial/sklearn-linear-regression-with-examples</a>	<a href="https://www.youtube.com/watch?v=4dwsSz_fNSQ">https://www.youtube.com/watch?v=4dwsSz_fNSQ</a>
49-52	<b>Logistic Regression</b> Basics and applications Implementation for Binary and Multiclass Classification using scikit-learn	<a href="https://www.datacamp.com/tutorial/understanding-logistic-regression-python">https://www.datacamp.com/tutorial/understanding-logistic-regression-python</a>	<a href="https://www.youtube.com/watch?v=J5bXOOmkopc">https://www.youtube.com/watch?v=J5bXOOmkopc</a>

53-56	Classification Evaluation metrics (Confusion Matrix, Precision, recall and Accuracy)	<a href="https://www.datacamp.com/tutorial/understanding-logistic-regression-python">https://www.datacamp.com/tutorial/understanding-logistic-regression-python</a>	<a href="https://www.youtube.com/watch?v=J5bXOOmkopc">https://www.youtube.com/watch?v=J5bXOOmkopc</a>
57-60	<b>Support Vector Machines</b> Basics and applications Implementation for Classification and Regression using scikit-learn	<a href="https://www.datacamp.com/tutorial/svm-classification-scikit-learn-python">https://www.datacamp.com/tutorial/svm-classification-scikit-learn-python</a>	<a href="https://www.youtube.com/watch?v=xLkk6MUrvrw">https://www.youtube.com/watch?v=xLkk6MUrvrw</a>
61-64	Classification and Regression Evaluation metrics	<a href="https://www.datacamp.com/tutorial/svm-classification-scikit-learn-python">https://www.datacamp.com/tutorial/svm-classification-scikit-learn-python</a>	<a href="https://www.youtube.com/watch?v=xLkk6MUrvrw">https://www.youtube.com/watch?v=xLkk6MUrvrw</a>
65-68	<b>Decision Tree Classification and Regression</b> Basics and applications Implementation for Classification and Regression using scikit-learn	<a href="https://scikit-learn.org/stable/modules/tree.html">https://scikit-learn.org/stable/modules/tree.html</a>	<a href="https://www.youtube.com/watch?v=ZVR2Way4nwQ">https://www.youtube.com/watch?v=ZVR2Way4nwQ</a>
69-72	Classification and Regression Evaluation metrics	<a href="https://scikit-learn.org/stable/modules/tree.html">https://scikit-learn.org/stable/modules/tree.html</a>	<a href="https://www.youtube.com/watch?v=ZVR2Way4nwQ">https://www.youtube.com/watch?v=ZVR2Way4nwQ</a>
73-76	<b>Artificial Neural Networks</b> Basics and applications Implementation Neural Network Architecture and Multi Layered Perceptron using scikit-learn	<a href="https://stackabuse.com/introduction-to-neural-networks-with-scikit-learn/">https://stackabuse.com/introduction-to-neural-networks-with-scikit-learn/</a>	<a href="https://www.youtube.com/watch?v=EYef2e2IKEo">https://www.youtube.com/watch?v=EYef2e2IKEo</a>
77-80	Classification and Regression Evaluation metrics	<a href="https://stackabuse.com/introduction-to-neural-networks-with-scikit-learn/">https://stackabuse.com/introduction-to-neural-networks-with-scikit-learn/</a>	<a href="https://www.youtube.com/watch?v=EYef2e2IKEo">https://www.youtube.com/watch?v=EYef2e2IKEo</a>
81-84	<b>Unsupervised Learning Algorithms K-Means Clustering</b> Introduction to clustering Implementing K-Means in scikit-learn	<a href="https://www.datacamp.com/tutorial/k-means-clustering-python">https://www.datacamp.com/tutorial/k-means-clustering-python</a>	<a href="https://www.youtube.com/watch?v=EltlUEPClzM">https://www.youtube.com/watch?v=EltlUEPClzM</a>
85-88	Evaluation of clustering results	<a href="https://www.datacamp.com/tutorial/k-means-clustering-python">https://www.datacamp.com/tutorial/k-means-clustering-python</a>	<a href="https://www.youtube.com/watch?v=EltlUEPClzM">https://www.youtube.com/watch?v=EltlUEPClzM</a>
89-92	<b>Principal Component Analysis (PCA)</b> Dimensionality reduction Implementing PCA in scikit-learn	<a href="https://www.kdnuggets.com/2023/05/principal-component-analysis-pca-scikitlearn.html">https://www.kdnuggets.com/2023/05/principal-component-analysis-pca-scikitlearn.html</a>	<a href="https://www.youtube.com/watch?v=8klqIM9UvAc">https://www.youtube.com/watch?v=8klqIM9UvAc</a>
93-96	Visualization of reduced dimensions	<a href="https://www.kdnuggets.com/2023/05/principal-component-analysis-pca-scikitlearn.html">https://www.kdnuggets.com/2023/05/principal-component-analysis-pca-scikitlearn.html</a>	<a href="https://www.youtube.com/watch?v=8klqIM9UvAc">https://www.youtube.com/watch?v=8klqIM9UvAc</a>

## 9. Lab Component:

S. No.	Experiments	Learning Resource
1	Capstone Project Evaluation	<a href="https://www.coursera.org/learn/machine-learning-capstone">https://www.coursera.org/learn/machine-learning-capstone</a>

## 10. Action plan for different types of learners

Slow Learners	Average Learners	Fast Learners
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<ul style="list-style-type: none"> <li>• Remedial Classes on Saturdays</li> <li>• Encouragement for improvement using Peer Tutoring</li> <li>• Use of Audio and Visual Materials</li> <li>• Use of Real-Life Examples</li> </ul>	<ul style="list-style-type: none"> <li>• Workshops</li> <li>• Formative Exercises used to highlight concepts and notions</li> <li>• E-notes and E-exercises to read ahead of the pedagogic material.</li> </ul>	<ul style="list-style-type: none"> <li>• Engaging students to hold hands of slow learners by creating a Peer Tutoring Group</li> <li>• Design solutions for complex problems</li> <li>• Design solutions for complex problems</li> <li>• Presentation on topics beyond those covered in CHO</li> </ul>
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## 11. Evaluation Scheme & Components:

Evaluation Component	Type of Component	No. of Assessments	Weightage of Component	Mode of Assessment
Component 1	Capstone Project Evaluation	01*	20%	Offline
Component 2	Sessional Tests (STs)	03**	40%	Online
Component 3	End Term Examinations	01	40%	Online
<b>Total</b>			<b>100%</b>	

\*Sample Capstone Project reference Link <https://www.coursera.org/learn/machine-learning-capstone>

\*Student will have to appear in all sessional tests.

Make up examinations will compensate for either ST1 or ST 2 (Only for genuine cases, based on Dean's approval).

## 12. Syllabus of the Course:

S.No.	Topic (s)	No. of Sessions	Weightage %
1	<b>Introduction to AI and ML</b> Understanding the basics of Artificial Intelligence and Machine Learning, Overview of popular ML applications, Python recap and essential libraries (NumPy, basic data structures), <b>Data Manipulation with Pandas</b> Introduction to Pandas and its data structures (Series, DataFrame), Reading and writing data in different formats (CSV, Excel, SQL), Data cleaning and preprocessing with Pandas. <b>Descriptive Statistics with Python</b> Introduction to basic statistical concepts, Descriptive statistics using Python (mean, median, mode, variance, standard deviation), Exploratory Data Analysis (EDA) techniques, <b>Visualization Libraries in Python</b> Introduction to Matplotlib, Seaborn & plotly, Creating various types of plots (line plots, bar plots, scatter plots, histograms, box plot), Data visualization best practices, <b>Introduction to Machine Learning Overview of supervised and unsupervised learning</b> Basic concepts: features, labels, training, testing, Introduction to scikit-learn library.	40	40%
<b>ST-1 (Covering 40% syllabus)</b>			
2	<b>Supervised Learning Algorithms Linear Regression</b> Understanding the basics, Implementation of Linear and Multi Linear Regression using scikit-learn, Regression Evaluation metrics (R-squared, Mean Squared Error). <b>Logistic Regression</b> Basics and applications, Implementation for Binary and Multiclass Classification using scikit-learn, Classification Evaluation metrics (Confusion Matrix, Precision, recall	32	35%

	and Accuracy). <b>Support Vector Machines</b> Basics and applications, Implementation for Classification and Regression using scikit-learn, Classification and Regression Evaluation metrics, Decision Tree <b>Classification and Regression</b> Basics and applications, Implementation for Classification and Regression using scikit-learn, Classification and Regression Evaluation metrics		
<b>ST-2 (Covering 75% syllabus)</b>			
3	<b>Artificial Neural Networks</b> Basics and applications, Implementation Neural Network Architecture and Multi Layered Perceptron using scikit-learn, Classification and Regression Evaluation metrics. <b>Unsupervised Learning Algorithms</b> K-Means Clustering, Introduction to clustering, Implementing K-Means in scikit-learn, Evaluation of clustering results <b>Principal Component Analysis (PCA)</b> Dimensionality reduction, Implementing PCA in scikit-learn, Visualization of reduced dimensions.	24	25%
	<b>Project (Real-world Applications and Use Cases)</b> Case studies and practical applications of AI and ML in various industries. <b>Group projects:</b> Students work on a small project applying learned concepts		
<b>End Term (Covering (40%+ 35%+ 25%=)100% syllabus)</b>			

\*As per Academic Guidelines minimum 85% attendance is required to become eligible for appearing in the End Semester Examination.

This Document is approved by:

Designation	Name	Signature
Course Coordinator	Dr. Kiran Deep Singh	
Head-Academic Delivery	Dr. Vikas Khullar	
Dean	Dr. Rishu Chhabra	
Dean Academics	Dr. Monit Kapoor	
Date	03.01.2024	