THE NATIONAL INSTITUTE OF ENGINEERING

(An Autonomous Institution under VTU, Belagavi)
Manandavadi Road, Mysuru – 570 008.
Estd:1946

Department of Information Science and Engineering

Course Plan for the term EVEN 2024-25

Course Instructor: Dr. CKV
Course Title: Machine Learning
LTP: 4:0:0

Term: 10/02/25 to 30/05/25
Course Code: BIS602
Semester: 6th A Sec

LESSON PLAN

Session No.	Planned Date	Content	Actual Date/s	Mode of Delivery (Classroom /Online)	Link for online content	Link for Course Content	Comments, if any by CI/HoD
1	10-2-25	Introduction to POs, Cos, syllabus and evaluation Pattern. Machine Learning – Past, Present and future (Brief Discussion leading why ML **)**		Classroom teaching by Course Instructor		https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
2	12-2-25	**Module 1:** Introduction to Machine Learning, The three different types of machine learning, Making predictions about the future with supervised learning. Classification for predicting class labels		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=z7RT6aAt_10 https://www.youtube.com/watch?v=07Qum_mpEL0	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
3	13-2-25	Regression for predicting continuous outcomes Solving		Classroom teaching by	https://www.youtube.com/wa	https://drive.google.com/drive/u/0/folders/1b9fV-	

		interactive problems with reinforcement Learning, Discovering hidden structures with unsupervised learning		Course Instructor	tch?v=qjdj49WytLs	Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
4	14-2-25	Finding subgroups with clustering Dimensionality reduction for data compression		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=MWijqCCuexU	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
5	17-2-25	An introduction to the basic terminology and notations, A roadmap for building machine learning systems Preprocessing– getting data into shape		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=P8ERBy91Y90	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
6	19-2-25	Training and selecting a predictive model Evaluating models and predicting unseen data instances.		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=JOArz7wggkQ	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
7	20-2-25	Artificial neurons – a brief glimpse into the early history of machine learning		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=ZZ2rkY--EEM	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
8	21-2-25	Implementing a perception learning algorithm in Python Training a perception model on the Iris dataset		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=ZZ2rkY--EEM	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
9	24-2-25	Implementing a perception learning algorithm in Python Training a perception model on the Iris dataset		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=ZZ2rkY--EEM	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
10	27-2-25	Adaptive linear neurons and the convergence of learning Minimizing cost functions With		Classroom teaching by Course	https://www.youtube.com/watch?v=ZZ2rkY	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zD	

		gradient descent.		Instructor	--EEM	Z3u5tv6z	
11	28-2-25	**Discussion and revision of module 1.** **Module 2:** A Tour of Machine Learning Classifiers Using Scikit-learn-Choosing a classification algorithm		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=EFHy0FIAK_Y	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
12	3-3-25	A Tour of Machine Learning Classifiers Using Scikit-learn - Choosing a classification algorithm		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=EFHy0FIAK_Y	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
13	5-3-25	A Tour of Machine Learning Classifiers Using Scikit-learn - Choosing a classification algorithm		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=EFHy0FIAK_Y	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
14	6-3-25	Training a logistic regression model with Scikit-learn		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=aL21Y-u0SRs	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
15	7-3-25	Modeling class probabilities via logistic regression Logistic regression intuition and Conditional probabilities.		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=aL21Y-u0SRs	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
16	10-3-25	Tackling over fitting via regularization		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=QjOILAQ0EFg	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
17	12-3-25	Maximum margin classification with support vector machines.		Classroom teaching by	https://www.youtube.com/wa	https://drive.google.com/drive/u/0/folders/1b9fV-	

		Maximum margin intuition.		Course Instructor	tch?v=uV5TnFc7eaE	Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
18	13-3-25	Maximum margin classification with support vector machines. Maximum margin intuition.		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=uV5TnFc7eaE	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
19	14-3-25	Dealing with the non linearly separable case using slack variables, Alternative implementations in Scikit-learn		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=kPuHAK4RCfM	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
20	17-3-25	Solving non linear problems using a kernel SVM, Using the kernel trick to find Separating hyperplanes in higher dimensional space.		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=uV5TnFc7eaE	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
21	19-3-25	**Discussion and revision of module 2.** **Module 3:** Decision tree learning, Maximizing information gain–getting the most bang for the buck, Building a decision tree		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=3vZo0ApLz0A	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
22	20-3-25	Combining weak to strong Learners via random forests, K-nearest neighbors–a lazy learning algorithm		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=ycyCtxZ0a9w	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
23	21-3-25	Building Good Training Sets–Data Preprocessing, Dealing with Missing Data		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=uDr67HBIPz8	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	

24	24-3-25	Eliminating samples or features with missing values Imputing missing values Understanding the scikit-learn estimator API.		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=uDr67HBIPz8	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
25	26-3-25	Eliminating samples or features with missing values Imputing missing values Understanding the scikit-learn estimator API.		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=uDr67HBIPz8	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
26	2-4-25	Handling categorical data Mapping ordinal features		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=G2iVj7WKDFk	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
27	3-4-25	Encoding class labels Performing one-hot encoding on nominal features		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=G2iVj7WKDFk	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
28	4-4-25	Partitioning A data set in training and test sets.		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=dSCFk168vmo	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
29	7-4-25	Bringing features onto the same scale, Selecting meaningful features		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=dSCFk168vmo	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
30	9-4-25	Sparse solutions with L1 regularization, Sequential feature selection algorithms.		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=76B5cMEZA4Y	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
31	11-4-25	**Discussion and revision of module 3**		Classroom teaching by	https://www.youtube.com/wa	https://docs.google.com/presentation/d/1U9YxwS0	

		Module 4: Compressing Data via Dimensionality Reduction, Unsupervised dimensionality reduction via Principal Component Analysis		Course Instructor	tch?v=FD4DeN81ODY	TWXb8pV-tftEyZ6heLTGUaY6r/edit#slide=id.p1	
32	12-4-25	Total and Explained variance, Feature transformation, Principal component analysis in scikit-learn,		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=QdBy02ExhGI	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
33	16-4-25	Supervised data compression via linear discriminant analysis, Computing the scatter matrices		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=azXCzI57Yfc	https://docs.google.com/presentation/d/1U9YxwS0TWXb8pV-tftEyZ6heLTGUaY6r/edit#slide=id.p1	
34	17-4-25	Selecting linear discriminants for the new feature Subspace, Projecting samples onto the new feature space		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=azXCzI57Yfc	BIS602_ML_M4.2.pptx	
35	21-4-25	LDA via scikit-learn		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=azXCzI57Yfc	BIS602_ML_M4.2.pptx	
36	23-4-25	Using kernel principal component analysis for nonlinear mappings, Kernel functions and the kernel trick		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=azXCzI57Yfc	https://sebastianraschka.com/Articles/2014_kernel_pca.html	
37	24-4-25	Implementing a kernel principal Component analysis in Python-Example1–separating half-moon shapes,		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=krlNdZx2Wv8	https://sebastianraschka.com/Articles/2014_kernel_pca.html	
38	25-4-25	Example2 –separating concentric circles.		Classroom teaching by	https://sebastianraschka.com/A	https://sebastianraschka.com/Articles/2014_kernel	

				Course Instructor	rticles/2014_kernel_pca.html	_pca.html	
39	28-4-25	Projecting new data points Kernel principal component analysis in scikit-learn.		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=kApPBm1YsqU	https://sebastianraschka.com/Articles/2014_kernel_pca.html	
40	2-5-25	Projecting new data points Kernel principal component analysis in scikit-learn.		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=kApPBm1YsqU	https://sebastianraschka.com/Articles/2014_kernel_pca.html	
41	5-5-25	**Discussion and revision of module 4** **Module 5:** Learning Best Practices for Model Evaluation and Hyper parameter Tuning-Streamlining workflows with pipelines,		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=DCk-p6MsiWA	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
42	7-5-25	Loading the Breast Cancer Wisconsin dataset, Combining transformers and estimators in a pipeline.		Classroom teaching by Course Instructor	https://github.com/bullor/Breast-Cancer-Classification-Problem-w-WISCONSIN https://archive.ics.uci.edu/dataset/17/breast+cancer+wisconsin+diagnostic	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
43	8-5-25	Using k-fold cross-validation to assess model performance		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=ivVeqv4oShk	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
44	9-5-25	The Hold out method, K-fold cross-validation.		Classroom teaching by Course	https://www.youtube.com/watch?v=ivVeqv4	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zD	

				Instructor	oShk	Z3u5tv6z	
45	15-5-25	Debugging algorithms with learning and validation curves-Diagnosing bias and variance problems with learning curves		Classroom teaching by Course Instructor	https://github.com/rasbt/python-machine-learning-book/blob/master/code/ch06/README.md	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
46	16-5-25	Debugging algorithms with learning and validation curves-Diagnosing bias and variance problems with learning curves		Classroom teaching by Course Instructor	https://github.com/rasbt/python-machine-learning-book/blob/master/code/ch06/README.md	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
47	19-5-25	Addressing overfitting and under fitting with validation curves.		Classroom teaching by Course Instructor	https://towardsdatascience.com/learning-curve-to-identify-overfitting-underfitting-problems-133177f38df5/	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
48	21-5-25	Looking at different performance evaluation metrics, Reading a confusion matrix		Classroom teaching by Course Instructor	https://www.youtube.com/watch?v=pGc0Ow0RpOM https://www.youtube.com/watch?v=07dtryhNGms	https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
49	22-5-25	Optimizing the precision and recall of a classification model		Classroom teaching by	https://www.youtube.com/wa	https://drive.google.com/drive/u/0/folders/1b9fV-	

				Course Instructor	tch?v=yEw9oDdJkT0	Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	
50	23-5-25	Plotting a receiver operating characteristic, The Scoring metrics for multi-class classification. **Discussion and revision of module 5** **Discussion of Model Question Paper.**		Classroom teaching by Course Instructor		https://drive.google.com/drive/u/0/folders/1b9fV-Ov9LA8jP6wj7rqsH9zDZ3u5tv6z	

Textbook:

1. Raschka, S., &Mirjalili, V. (2019). Python machine learning: Machine learning and deep learning with Python, scikit-learn, and TensorFlow 2 (3rd ed.). Packt Publishing.
2. Géron, A. (2019). Hands-on machine learning with Scikit-Learn, Keras, and TensorFlow: Concepts, tools, and techniques to build intelligent systems (2nd ed.). O'Reilly Media.

Reference Books:

1. Alpaydın, E. (2004). Introduction to machine learning. MIT Press.
2. Rogers, S., &Girolami, M. (2011). A first course in machine learning. Chapman & Hall/CRC.
3. Kelleher, J. D., Namee, B. M., & D'Arcy, A. (2015). Fundamentals of machine learning for predictive data analytics: Algorithms, worked examples, and case studies. MIT Press.

Content beyond curriculum for Self-study along with link for course content:

1. Introduction to Machine Learning by Sebastian Raschka (University of Wisconsin-Madison) https://sebastianraschka.com/blog/2021/ml-course.html
2. Neural Networks with Tensorflow by Sanasam Ranbir Singh (IIT Guwahati) https://www.iitg.ac.in/cseweb/osint/ml.php

Evaluation plan

CIE	Total no. of teaching hours
Portionsfor TEST -1	**21**
Session-01 to Session-21	
Portionsfor TEST-2	21
Session-22 to Session-43	
Portions for Quiz-1	25
Session 01 to Session 25	
Portions for Quiz-2	25
Session 26 to Session 50	
Experiential Learning	NA
Online course(5 Marks),Mini Project(Presentation) (10 Marks), Hackathon(15 Marks)	
SEE/SET	
20 marks from each Module with choice in two modules. Exam duration- 3 hours	

Evaluation pattern

BT Level	Test-1 (25 Marks)	Test-2 (25 Marks)	Quiz-1 (10 Marks)	Quiz-2 (10 Marks)	Experiential Learning (30 Marks)	SEE (100 Marks)
L1			10	10		
L2	10	10				50
L3	15	10			5	20
L4		5			10	20
L5					15	10
L6						

Signature of Course instructor Signature of Course Coordinator/Faculty Mentor Signature of HoD