

Instruction plan: Artificial Intelligence

Edunet Foundation

Course Title	Artificial Intelligence
Course Orientation	<ol style="list-style-type: none">1. Domain knowledge2. Employment3. Gig Economy Marketplace4. Entrepreneurship

Learning outcomes:

1. Demonstrate fundamental understanding of the history of artificial intelligence and its foundations.
2. Apply the basic principles, models, and algorithms of AI to recognize, model, and solve problems in the analysis and design of information systems.
3. Analyze the structures and algorithms of a selection of techniques related to machine learning and Artificial Intelligence.
4. Able to design and implement various machine learning algorithms in a range of real-world applications.
5. Appreciate the underlying mathematical relationships within and across Machine Learning algorithms and the paradigms of supervised and un-supervised learning.
6. Be able to identify new application requirements in the field of computer vision using Deep Learning.

Handbook/Reference book:

Sr. No.	Title	Author	Edition	Publisher
1.	Student handbook on Artificial Intelligence	Team Edunet	1 st	Edunet Foundation
2.	Python Data science Notebook https://jakevdp.github.io/PythonDataScienceHandbook/	Jake Vanderplas	1 st	Oreilly

Other Reading Material (ORM) MS/SAP online courses:

Highly Recommended Courses (HRC)				
Sr. No.	Topic	Platform	Course link	Duration (Hours)
1	Get started with AI on Azure	MS	https://docs.microsoft.com/en-us/learn/modules/get-started-ai-fundamentals/	0.5
2	Take your first steps with Python	MS	https://docs.microsoft.com/en-us/learn/paths/python-first-steps/	4.5
3	Getting Started with Data Science	OpenSAP	https://open.sap.com/courses/ds1	18
4	Learning Data Visualization	LinkedIn	https://www.linkedin.com/learning/learning-data-visualization-3/welcome	3.8
5	Create no-code predictive models with Azure Machine Learning	MS	https://docs.microsoft.com/en-us/learn/paths/create-no-code-predictive-models-azure-machine-learning/	3.5
6	Introduction to machine learning with Python and Azure Notebooks	MS	https://docs.microsoft.com/en-us/learn/paths/intro-to-ml-with-python/	2.1
7	Explore computer vision in Microsoft Azure	MS	https://docs.microsoft.com/en-us/learn/paths/create-machine-learn-models/	2.9
8	Learning Data Analytics	LinkedIn	https://www.linkedin.com/learning/learning-data-analytics-2/welcome	1.5
9	Data Science in Action - Building a Predictive Churn Model	OpenSAP	https://open.sap.com/courses/ds2	16
10	Enterprise Deep Learning with TensorFlow	OpenSAP	https://open.sap.com/courses/ml2	18

Other Courses (OC)				
Sr. No.	Topic	Platform	Course link	Duration (Hours)
1	Exploring the world of AI	OpenSAP	https://open.sap.com/courses/ai1	40
2	Create a bot with bot Framework SDK	MS	https://docs.microsoft.com/en-us/azure/bot-service/python/bot-builder-python-quickstart?view=azure-bot-service-4.0	.5
3	Microsoft Azure AI Fundamentals	MS	https://docs.microsoft.com/en-us/learn/certifications/courses/ai-900t00	24
4	Discover Data Analytics	MS	https://docs.microsoft.com/en-us/learn/modules/data-analytics-microsoft/	23
5	Learning Python	LinkedIn	https://www.linkedin.com/learning/learning-python-2/learning-python	2.5
6	Data Fluency: Exploring and describing data	LinkedIn	https://www.linkedin.com/learning/data-fluency-exploring-and-describing-data/gather-greater-insight-and-make-better-decisions-with-your-data	4.2

7	Excel Statistics	LinkedIn	https://www.linkedin.com/learning/excel-statistics-essential-training-1-2/what-is-data	3.6
8	Build AI solutions with Azure Machine Learning	MS	https://docs.microsoft.com/en-us/learn/paths/build-ai-solutions-with-azure-ml-service/	10.2
9	How to Build Chatbots with SAP Conversational AI	OpenSAP	https://open.sap.com/courses/cai1	12
10	SAP Data Intelligence for Enterprise AI	OpenSAP	https://open.sap.com/courses/di1	6
11	Use SAP AI Business Services to Kick-Start Your Intelligent Processes	OpenSAP	https://open.sap.com/courses/sapai1	9
12	Introduction to Statistics for Data Science	OpenSAP	https://open.sap.com/courses/ds0	18
13	Enterprise Machine Learning in a Nutshell	OpenSAP	https://open.sap.com/courses/ml1	10
14	From Media Computation to Data Science	OpenSAP	https://open.sap.com/courses/snap2	24
15	Learning Excel: Data Analysis	LinkedIn	https://www.linkedin.com/learning/learning-excel-data-analysis-2/the-power-of-data-analysis-using-excel	2.1

Course content duration distribution:

Theory/Practical	Duration
Theoretical discussion	20 hours approx.
Practical/hands-on	59 hours approx.
Unit Assessment and Hands-on Evaluation	05 hours
Session Quiz	1 hour
Capstone project	40 hours
Employability skills	20 hours
Self-paced learning (SPL)	40 hours
Modular activities	12 hours
Total Duration	200 hours Approx.

Detailed Weekly Lecture Plan:

Week #	Topic	Section/chapter Handbook/reference book	Course activities Assign/conduct Quiz/Assessment/Bo otcamp/Expert talk	Pedagogical tool/demonstration/case study etc.	Activity Type	Duration (Minutes)
1	Course Motivation: ICE breaking session, introduction to course objectives and expectations from participants		NA	Instructor-led	Theory	20
1	Course structure, assessment and certification criteria, Introduction to capstone project, assessment and project guidelines		NA	Instructor-led	Theory	20
1	Artificial Intelligence market trends and opportunities	Chapter 1.1, 1.2, 1.3, 1.4	NA	Instructor-led	Theory	20
1	Introduction to Artificial Intelligence, Machine Learning, definition, classifications and applications	Chapter 1.5, 1.6 ORM 1	NA	Instructor-led	Theory	30
1	Evolution of AI	Chapter 1.7	NA	Instructor-led	Theory	30
1	Microsoft AI Demos – Text Analytics Microsoft Cognitive Services Sentiment Analysis API	Chapter 1.8	NA	Instructor-led	Practical	30
1	Language Understanding Understanding the base working of Voice Assistants	Chapter 1.8	NA	Instructor-led	Practical	30
1	Session quiz 1					5
1	What is a Chatbot?	Chapter 1.9	NA	Instructor-led	Practical	60

	Responsible conversational AI Human AI Interaction	SPL 1				
1	Image Recognition on Web Browser Computer Vision Demo	Chapter 1.10 SPL 14	NA	Instructor-led	Practical	60
1	Unit Assessment and Hands-on Evaluation 1					60
2	Getting started with Open-Source OS Linux Kernel and its distributions	Chapter 2.1 ORM 2	NA	Instructor-led	Theory	20
2	Installation of Ubuntu	Chapter 2.2	NA	Instructor-led	Practical	40
2	Linux Commands	Chapter 2.3	NA	Instructor-led	Practical	60
2	Shell Scripting	Chapter 2.4	NA	Instructor-led	Practical	30
2	Working on different text editors: nano, vi	Chapter 2.5	NA	Instructor-led	Practical	30
2	Managing Linux Files Managing User Permissions	Chapter 2.6	NA	Instructor-led	Practical	120
2	Session quiz -2					5
2	Capstone Project - 1		Capstone Project	Self-Paced	Capstone Project	240
3	Data Analysis Introduction Stages of Data Analytics Descriptive vs Predictive Analysis	Chapter 2.7 ORM 3, ORM 8	NA	Instructor-led	Theory	30
3	Anaconda Software Python Basics – Variables and Datatype	Chapter 2.8, 2.9 ORM 2 SPL 2	NA	Instructor-led	Theory	40

3	Installing Anaconda on Linux Kernel Anaconda Prompt Anaconda Navigator Packages in Anaconda	Chapter 2.10	NA	Instructor-led	Practical	20
3	Introduction to Jupyter Notebook Functions and Methods Conditions and Loop Constructs Advanced Datatypes in Python String and its methods String Formatting	Chapter 2.11, 2.12, 2.13, 2.14, 2.15	NA	Instructor-led	Practical	120
3	Libraries in Python Inbuilt and User Defined Libraries Installing Packages with pip Methods and Attributes	Chapter 2.16, 2.17	NA	Instructor-led	Practical	90
3	Unit Assessment and Hands-on Evaluation-2					60
3	Bootcamp -1		Bootcamp	Instructor-led	Bootcamp	120
4	Introduction to NumPy Module Basics of NumPy Arrays Min, Max and everything in between	Chapter 3.1,3.2,3.3	NA	Instructor-led	Theory	90
4	Random Number Generation Scalar, Vector and Matrix Matrix Multiplication	Chapter 3.4, 3.5	NA	Instructor-led	Practical	60
4	Statistical Concepts	Chapter 3.6, 3.7	NA	Instructor-led	Practical	60

	Measure of Central Tendency Mean, Median and Mode Variance and Standard Deviation Percentile and IQR	SPL 3				
4	Broadcasting Arrays Sorting Arrays Data Creation	Chapter 3.8, 3.9	NA	Instructor-led	Practical	90
4	Session quiz -3					5
4	Capstone Project -2		Capstone Project	Self-Paced	Capstone Project	240
5	Data Visualization Plotting and Visualization Figures and Subplots Colors, Markers and Line styles	Chapter 3.10, 3.11, 3.12, 3.13 ORM 4 SPL 9	NA	Instructor-led	Theory	60
5	Matplotlib Configuration Line Plots, Bar Plots, Scatter Plots Ticks, Labels and Legends, subplots	Chapter 3.14, 3.15, 3.16	NA	Instructor-led	Practical	90
5	Histograms and Binning Text and Annotations	Chapter 3.17, 3.18	NA	Instructor-led	Theory	60
5	Three-Dimensional Plotting in Matplotlib Pie Chart Composition Graph	Chapter 3.19	NA	Instructor-led	Practical	60
5	Visualizing with NumPy	Chapter 3.20	NA	Instructor-led	Practical	30
5	Expert Talk -1		Expert Talk	Instructor-led	Expert Talk	60

6	Data Manipulation with Pandas Introducing Pandas object Series and DataFrame	Chapter 3.21, 3.22	NA	Instructor-led	Theory	45
6	Setting up Python library Creating Series from simple datatypes	Chapter 3.23	NA	Instructor-led	Practical	30
6	Data Storage Formats CSV File and JSON File Reading data from files	Chapter 3.24, 3.25, 3.26 SPL 4	NA	Instructor-led	Theory	45
6	Creating Data frame from Storage format files Interacting with HTML file Web Scraping with HTML Tables	Chapter 3.26	NA	Instructor-led	Practical	30
6	Dropping entries from an axis Indexing and selection operators Arithmetic and conditional alignment Unique values and value counts Handling missing values	Chapter 3.26	NA	Instructor-led	Practical	60
6	Session quiz -4					5
6	Groupby Methods Pivot Tables	Chapter 3.27, 3.28	NA	Instructor-led	Theory	30
6	Data Preprocessing Pandas Plotting	Chapter 3.29 ORM 9	NA	Instructor-led	Practical	60

	Real World Data Analysis					
6	Unit Assessment and Hands-on Evaluation-3					60
6	Capstone Project-3		Capstone Project	Self-Paced	Capstone Project	240
7	Introduction to ML Real time applications of ML Classification techniques Scikit Learn library overview Regression vs Classification Least Square Method	Chapter 4.1, 4.2, 4.3, 4.4, 4.5	NA	Instructor-led	Theory	30
7	Linear Regression Mathematical Intuition Ordinary Least Square Method	Chapter 4.5	NA	Instructor-led	Theory	30
7	Linear Regression Practical Implementation Evaluation Techniques: MSE, MAE	Chapter 4.5	NA	Instructor-led	Practical	60
7	Azure ML No Code Platform Azure ML Studio Briefing	Chapter 4.6 ORM 5	NA	Instructor-led	Theory	15
7	Setting up an account Create Azure Machine Learning Workspace Training a ML model	Chapter 4.7, 4.8 ORM 6	NA	Instructor-led	Practical	15

7	Create a Regression model with Azure ML Studio	Chapter 4.9 ORM 8	NA	Instructor-led	Practical	30
7	Session quiz – 5					5
7	Logistic Regression Estimating probabilities	Chapter 4.10 SPL 15	NA	Instructor-led	Theory	30
7	Logistic Regression using Sklearn Normalization and Scaling ROC AUC Curve	Chapter 4.10 SPL 5	NA	Instructor-led	Practical	60
7	Logistic Regression model with ML Studio	Chapter 4.11 ORM 8	NA	Instructor-led	Practical	30
7	Bootcamp -2		Bootcamp	Instructor-led	Bootcamp	120
8	Fine tune your model GridSearch CV Hyperparamter optimization	Chapter 4.12 SPL 11	NA	Instructor-led	Theory	30
8	Decision Trees Gini Impurity or Entropy	Chapter 4.13, 4.14	NA	Instructor-led	Theory	30
8	Visualizing a Decision Tree Making Predictions	Chapter 4.14	NA	Instructor-led	Practical	120
8	Linear SVM Classification Support Vectors and Margins	Chapter 4.15	NA	Instructor-led	Theory	30
8	Practical Implementation of SVM using Sklearn	Chapter 4.15	NA	Instructor-led	Practical	90
8	Expert Talk 2		Expert Talk	Instructor-led	Expert Talk	60

8	Capstone Project Mid Term Assessment					240
9	Different distance methods Euclidean Distance, Minkowski Distance Geometric Intuition of KNN	Chapter 4.16, 4.17	NA	Instructor-led	Theory	60
9	Finding the value of K	Chapter 4.17	NA	Instructor-led	Practical	30
9	K Nearest Neighbors	Chapter 4.17	NA	Instructor-led	Practical	180
9	Decision Boundary		NA	Instructor-led	Practical	30
9	Session quiz – 6					5
10	Probability Theory Bayes Theorem	Chapter 4.18	NA	Instructor-led	Theory	60
10	Naïve Bayes Theorem Text Analytics using Pandas	Chapter 4.19	NA	Instructor-led	Practical	30
10	Bag of Words Approach Vectorization Technique: TFIDF Spam Ham Demonstration	Chapter 4.19	NA	Instructor-led	Practical	180
10	Lexicons for Sentiment Analysis Affin vs Textblob vs Vader	Chapter 4.19	NA	Instructor-led	Practical	30
10	Session quiz -7					5
10	Capstone Project -4		Capstone Project	Self-Paced	Capstone Project	240
11	Unsupervised Learning Clustering and its types	Chapter 4.20, 4.21, 4.22, 4.23	NA	Instructor-led	Theory	60
11	K Means Clustering	Chapter 4.24	NA	Instructor-led	Practical	30

	Centroid for Clusters					
11	Elbow Method for K value Silhouette Coefficient Rand Index for evaluation	Chapter 4.24	NA	Instructor-led	Practical	180
11	Customer Segmentation using Clustering	Chapter 4.24	NA	Instructor-led		30
11	Unit Assessment and Hands-on Evaluation-4					60
12	What is Deep Learning? Concept of Neural Networks Neurons, Weights and Bias Forward and Backward Propagation	Chapter 5.1, 5.2	NA	Instructor-led	Theory	120
12	Gradient Descent Loss Functions and Accuracy Metrics Cross Entropy vs MSE Tensorflow 2.0 and Keras API Dense and Flatten Layers What are Tensors?	Chapter 5.2 ORM 10 SPL 13	NA	Instructor-led	Practical	90
12	Creating an ANN	Chapter 5.2	NA	Instructor-led	Practical	90
12	Session quiz -8					5
12	Expert Talk 3		Expert Talk	Instructor-led	Expert Talk	60
13	Overfitting in Deep Learning	Chapter 5.3	NA	Instructor-led	Theory	30
13	Regularization techniques	Chapter 5.3	NA	Instructor-led	Practical	60
13	Drop-out layers and Custom Callbacks	Chapter 5.3	NA	Instructor-led	Practical	180

13	Importance of Validation split	Chapter 5.3	NA	Instructor-led	Theory	30
14	Computer Vision Basics Image Fundamentals: Pixels Grayscale vs Color	Chapter 5.4 ORM 7	NA	Instructor-led	Theory	30
14	Facial Recognition using Haar cascade Algorithms	Chapter 5.6	NA	Instructor-led	Practical	60
14	Bootcamp -3		Bootcamp	Instructor-led		120
14	Image Processing What are Filters and Kernels Blurring and Embossing Edge Detection Techniques	Chapter 5.5	NA	Instructor-led	Practical	210
	Capstone Project -5		Capstone Project	Self-Paced	Capstone Project	240
15	Convolutional Neural Networks	Chapter 5.7	NA	Instructor-led	Theory	60
15	Session quiz -9					5
15	Convolutional Layer Down sampling layer Max Pooling Layer Strides and Padding	Chapter 5.7	NA	Instructor-led	Practical	150
15	Image Classification	Chapter 5.8	NA	Instructor-led	Practical	90
16	Transfer Learning	Chapter 5.8 SPL 12	NA	Instructor-led	Theory	30
16	Session quiz -10					5

16	VGG16 vs ResNet vs MobileNet	Chapter 5.8	NA	Instructor-led	Practical	30
16	Optical Character Recognition using Tesseract	Chapter 5.9	NA	Instructor-led	Practical	240
16	Unit Assessment and Hands-on Evaluation-5					60
17	Capstone Project -6		Capstone Project	Self-Paced	Capstone Project	240
18	Expert Talk 4		Expert Talk	Instructor-led	Expert Talk	60
19	Capstone Project -7		Capstone Project	Self-Paced	Capstone Project	240
20	Capstone Project -8		Capstone Project	Self-Paced	Capstone Project	240
21	Expert Talk 5		Expert Talk	Instructor-led	Expert Talk	60
22	Capstone Project -9		Capstone Project	Self-Paced	Capstone Project	240
23	Expert Talk 6		Expert Talk	Instructor-led	Expert Talk	60
24	Capstone Project -10		Capstone Project Assessment	Instructor-led	Capstone Project Assessment	240

Note: This is an indicative timeline, actual delivery plan will be decided in consultation with the colleges, subject to availability of the students on weekly basis.