Machine Learning

Week	Hours	Topic	Content to be covered
	2	Moving to Machine Learning	Why learn AI/ML? AI vs ML vs DL, Supervised vs Unsupervised learning, Classification vs Regression
	3	Linear Algebra	Introduction and why Linear Algebra, Fundamentals of Vectors and Matrices, Unit Vector, Matrices operations, Dot Product of vectors, Angle between two vectors, Projection of a vector onto another vector, Length of projection
	3	Probability	Introduction to probability, Random Experiment, Sample Space, Event, Axioms of Probability, Independent Events, Mutually Exclusive Events, Conditional Probability, Bayes Theorem
	3	Statistics	Introduction and Fundamentals of Statistics, Measure of Central Tendency - Mean, Median and Mode, Measure of Spread – Range, Variance, Standard Deviation and IQR, Covariance and Correlation
Week 1	3	Assignment	
	6	Numpy & Pandas	Features and applications of numpy, proof of efficiency, creating a numpy array, slicing and indexing, numpy maths and statistics Introduction to pandas, series and dataframes, creating a series and dataframes, data accessing using indexing, dataframe functionalities, working with .csv files
	6	Visualising Data with Matplotlib, Seaborn	Visualizing the data with Matplotlib and Seaborn. Univariate, Bivariate, Multivariate Analysis. Data Cleaning, Handling Missing values and Outliers. Case Study -> Performing EDA on a dataset.
Week 2	3	Assignment	
	12	Linear regression & Logistic Regression	Equation of hyper plane, Geometric Intuition, Mathematical Formulation of Ordinary Least Square, Simple linear regression, Multiple Linear regression, Code Implementation Distance of a point from a hyper plane, Deriving Logit from simple fundamentals of Linear Algebra, Introducing sigmoid function, Deriving logit using sigmoid function, code sample
Week 3	5	Assignment (Project)	
	10	Neural Networks	History of Neural Networks and Deep Learning, Biological Neurons vs Artificial Neurons, Applications, Perceptron, Activation Functions, Feed Forward Neural Networks, Back propagation
	2	Hands on	Tensorflow and Keras/Pytorch
Week 4	2	Assignment	

Web Development

Week	Hours	Topic	Content to be covered
Week 1	7	Introduction to HTML	Elements, Semantics, Attributes, Headings, Paragraphs, Formatting, Lists, Blocks, Classes, HTML Forms, HTML5 Semantics
	3	Introduction to CSS	Introduction to CSS, Syntax, Properties, Linking it with HTML(Blog)
	3	Assignment	
Week 2	5	CSS	Box Model, Positioning, Properties, Pseudo Classes, Responsiveness
	3	CSS	Combinators(child, adjacent and nth child), Media Queries Homepage Design using CSS propeties
	3	Assignment	
Week 3	4	Bootstrap	Introduction, Basics, Grids, Themes, CSS
	2	Assignment	
	6	JavaScript	Introduction to JS, Backgroud, Syntax, Variables, Identifiers, Datatypes, Operators, Methods, Scoping Loops - For, while, dowhile Conditional - If else, Switch
	2	Assignment	
Week 4	7	JavaScript continued	Functions - Arguments, returns Objects - Literals, Arrays, Methods, Pass by Reference Dom Manipulation - Methods, Changing styles, Adding Elements
	4	Assignment	
Week 5	7	Advance Javascript	ECMA 2015 - Variables, Scoping, Events, Fat arrows, Class, Destructuring, Import/Export Closures Hoisting Asynchronous Request, Callbacks, Callback hell, Promises, Async await, Ajax Request, API requests
	4	Assignment	

Data Science

Week	Hours	Topic	Content to be covered
Week1	12	Statistics	Descriptive Statistics - Mean, Median, Mode, SD, Variance, Percentiles, Quantiles, IQR, Spread, Covariance. Inferential Statistics - Probability Distribution, Sampling, CLT, Gaussian, Log Normal, Binomial & Other Distributions. Hypothesis Testing - Null & Alternative Hypothesis, Critical value and p - value.
	3		Assignment
Week2	8	Python for Data Science	Numpy - Introduction to Numpy, Numpy Arrays, Indexing & slicing, Numpy Operations Pandas - DataFrames, Creating and Manipulating DataFrames, Indexing & Slicing, Working with csv, tsv files.
	4	API	Introduction to APIs: How APIs work and some famous APIs that can be used to collect data. Requests library: how to hit APIs using python.
	3		Case Study
Week 3	12	Data Visualisation using Python	Libraries: matplotlib and seaborn, plotly. Types of Plots: Scatter Plots, Histogram, PDF, CDF, Box Plots, Violin plots, pair plots. About Plots: How to read Plots and get insights, plot components, subplotting, functionalities of a plot, Distributions: univariate and bivariate, Multivariate. categorical and time series data.
	3		Assignment
Week 4	12	DA using MySQL	Introduction: Installation, Execution of Statements About DDL, DML, DCL Commands: LIMIT, OFFSET, ORDER BY, DISTINCT, WHERE, Logical operators, COUNT, MIN, MAX, AVG, SUM, DML: INSERT, UPDATE, DELETE DDL: CREATE, ALTER, ADD, MODIFY, DROP, TRUNCATE DCL: GRANT, REVOKE GROUP BY, Ordering of Keywords, JOINS: Inner, Left, Right & Outer. Subqueries and Nested, Inner Queries
	3		Case Study