

Introduction to Computing for AI and ML (ICAIML): DA-203-O

Computer Architecture and Object Oriented Programming		
		Concepts
7 Jan 2022	Course Details, Introduction to Computational and Data Sciences	Components in Data Science, Working definition in AI/ML, Data Science tools
8 Jan 2022	Fundamentals of digital storage of data	Bits, bytes, and represent of numbers and data in computer Errors in data representation in computers Computer Architecture development: History and recent trends
21 Jan 2022	Computer Architecture	Classification of computers SMP, DMP, Hybrid computer architectures
22 Jan 2022	Overview of Data Structures	(a) Linear Data Structures: Array, Linked list, Stack, Queue, (b) Hierarchical data structures: Binary Tree, BST, Heap and Hash (c) Graph, Trie, Segment Tree and Suffix Tree
28 Jan 2022	OOP in Python and C++	Object, Class, Inheritance, Polymorphism, Abstraction, Encapsulation
29 Jan 2022	Introduction to Algorithms	Common algorithms, algorithmic paradigms, basic performance measures and analysis techniques
Mathematical Foundation for Machine Learning and Data Science		
		Concepts
4 Feb 2022	Matrix Decomposition	Introduction, Least-Squares, LU, QR, Eigen decomposition
5 Feb 2022	Dimensionality Reduction	SVD, PCA, Applications of PCA (Algorithmic implementation), Page rank
11 Feb 2022	Optimization	Gradient Based Methods, Convergence, Stochastic GD
12 Feb 2022	Machine Learning Methods	Polynomial Regression, Logistic regression, Regularization (Ridge / Lasso)
18 Feb 2022	Machine Learning Methods	Artificial Neural Networks
19 Feb 2022	Machine Learning Methods	Deep Learning - implementation aspects
25 Feb 2022	Project presentation	
26 Feb 2022	Midterm	
ML System Design		
		Concepts
4 Mar 2022	Introduction to Python	Data types and operations, Strings, lists, tuples, Conditions, loops and block, objects and classes
5 Mar 2022	Tools for ML	Numpy, Matplotlib, Sympy
11 Mar 2022	Tools for ML	Pandas, Seaborn
12 Mar 2022	Tools for ML	Data Munging
18 Mar 2022	Tools for ML	Error metrics, Loss functions, Activation functions,
19 Mar 2022	Tools for ML	Modeling aspects of ANN, Hyperparameter selection
25 Mar 2022	Softwares for ML	Tensorflow
26 Mar 2022	Softwares for ML	Scikit-Learn
1 Apr 2022	Softwares for ML	PyTorch
2 Apr 2022	Recent advances in ML	Federated learning, ML on Edge
8 Apr 2022	Recent advances in ML	Model compression
9 Apr 2022	Recent advances in ML	Machine Learning in Scientific Computing: Physics Informed Neural Networks (PINNs)
16 Apr 2022	Project Presentation - I	
23 Apr 2022	Final Exam	