

**Beginning Machine Learning with Python**

Learn to create python projects, explore and analyze data, understand and implement supervised machine learning models with python

Course Instructor:

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**Course Objectives**

* Understand how computer program works from higher level abstraction to machine code
* Have a foundation on how to think like a programmer
* Understand python data structures
* Create console-based projects with functional programming with python
* Numerical computations with numpy
* Exploratory data analysis with pandas and matplotlib
* Grasp theory and working mechanism of supervised machine learning algorithms
* Able to preprocess data and gain insights on feature engineering
* Create and use supervised machine learning models in real world applications

**Course structure**

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| **Sessions** | **Topics** |  |
| Session1 | **How computer program works**   * Flow of Program * Choice of programming languages * Installation of python3 idle and anaconda |  |
| Session2 | **Variables, memory and collections**   * Variables * Pointers and memory addresses * Collections data type * Assignment 1 overview |  |
| Session 3 | **Python data types**   * Review and discussion on assignment 1 * Python data types * Iteration and recursion * Assignment 2 overview |  |
| Session 4 | **Conditional and object methods**   * Review and discussion on assignment 2 * Nested loops and dimensions * Branching with conditional statements * Python objects and methods * Assignment 3 overview |  |
| Session 5 | **Quality code, file and exception handling**   * Assignment 3 review and discussion * Streams with file operation * Interrupts * Exception handling * Writing quality codes * Project 1 overview |  |
| Session 6 | **Project1 review**   * Project 1 review and discussion * Pseudocode and program design * Code optimization |  |
| Session 7 | **Numerical Computation**   * List revisited * Need of alternative data structure * Multidimensional array * Numpy introduction * Array operation and functions * Numpy arithmetic * Random module with numpy * Indexing and slicing * Mathematical operations * Boolean and sorting * Advanced array techniques * Concatenation * Assignment 4 overview |  |
| Session 8 | **Data analysis with pandas**   * Assignment 4 review and discussion * Introduction to pandas * Series * Dictionary revisited * Data Frame * Index and reindex * Sorting and filtering * GroupBy mechanisms * Exploring datasets * Assignment 5 overview |  |
| Session 9 | **Visualization**   * Assignment 5 review and discussion * Matplotlib introduction * Figure and subplots * Line plots * Bar plot * Scatter plots * Histogram * Data visualization with pandas * Assignment 6 overview |  |
| Session 10 | **Machine Learning**   * Introduction and application of machine learning * Challenges of Machine Learning * Introduction to scikit-learn library |  |
| Session 11 | **Machine Learning Algorithms**   * Linear Regression * Naive Bayes * Decision Trees * Support Vector Machines |  |
| Session 12 | **Training and evaluating Models**   * Data Preprocessing * Training different models * Evaluating the performance * Project 2 overview |  |
| Session 13 | **Project Review**   * Project 2 review and discussions * Select among various machine learning models * What next? |  |