Silabus Kursus Lengkap: Data Science & Machine Learning

Total Durasi Kursus: 99 Jam 23 Menit

I. Fondasi Python & Pemrograman Dasar

1. Pengantar & Persiapan (4 pelajaran • 37m)

- Welcome To The Course (02:44)
- Complete Materials (00:04)
- Anaconda Installation (11:34)
- Getting Started With VS Code (12:53)

2. Python Programming Language (8 pelajaran • 1j 24m)

- Getting Started With VS Code (10:36)
- Different Ways of Creating Virtual Environment (08:21)
- Solve Conda Not Recognized Issue (00:04)
- Python Basics-Syntax And Semantics (20:17)
- Variables In Python (18:55)
- Basics Data Types In Python (09:52)
- Operators In Python (16:17)
- Coding Exercise And Assignments (00:07)

3. Python Control Flow (3 pelajaran • 49m)

- Conditional Statements (if, elif, else) (21:03)
- Loops In Python (28:03)
- Coding Exercise And Assignments (00:07)

4. Inbuilt Data Structures In Python (9 pelajaran • 2j 9m)

- List And List Comprehension In Python (37:07)
- Tuple In Python (22:34)
- Sets In Python (21:05)
- Dictionaries In Python (38:19)
- Real world Usecases Of List (09:50)

- **Latihan & Tugas (Practice & Assignments)**
    - Sum of List Elements, Largest Element, Remove Duplicate, Check Unique, Reverse List, Count Odd/Even, Subset Check, Max Difference, Merge Sorted List, Rotate List, Merge List to Dictionary, Merge Dictionaries, Word Frequency, Palindromic Tuple, Merge Dictionaries with Common Keys.

5. Functions In Python (6 pelajaran • 1j 22m)

- Getting Started With Functions (24:21)
- More Coding Example With Functions (28:03)
- Lambda Function In Python (09:44)
- Map Function In Python (11:08)
- Filter Function In Python (09:00)
- **Latihan & Tugas (Practice & Assignments)**
    - Celsius To Fahrenheit, Area of a Rectangle, Distance Covered by a Vehicle, Number of Rounds of Lift, Line Equation.

6. Modules, Packages, & File Handling (6 pelajaran • 1j 1m)

- Import Modules And Packages In Python (17:06)
- Standard Library Overview (17:44)
- File Operation In Python (17:07)
- Working With File Paths (08:43)

7. Exception Handling & OOP (13 pelajaran • 2j 21m)

- Exception Handling With try, except, else, and finally (25:00)
- Classes And Objects In Python (22:55)
- Inheritance In OOPS (19:00)
- Polymorphism In OOPS (19:08)
- Encapsulation In OOPS (22:12)
- Abstraction In OOPS (09:09)
- Magic Methods In Python (08:03)
- Operator Overloading In Python (08:32)
- Custom Exception Handling (07:05)

8. Advanced Python Concepts (6 pelajaran • 1j 17m)

- Iterators In Python (06:25)
- Generators With Practical Implementation (11:06)
- Function Copy, Closures And Decorators (21:15)
- Memory Management & Garbage Collection (20:47)
- Python Multi-Threading and Multi-Processing (56m)

II. Analisis Data, Statistik, & Probabilitas

9. Data Analysis & Visualization (9 pelajaran • 2j 44m)

- Numpy In Python (28:16)
- Pandas - DataFrame And Series (29:09)
- Data Manipulation With Pandas And Numpy (24:38)
- Reading Data From Various Data Source Using Pandas (15:04)
- Data Visualization With Matplotlib (30:35)
- Data Visualization With Seaborn (18:47)
- Working With Sqlite3 (CRUD Operation) (17:02)

10. Fundamental Statistics (13 pelajaran • 2j 24m)

- Introduction to Statistics & Its Application (09:02)
- Types Of Statistics (Descriptive & Inferential) (08:05)
- Population Vs Sample Data (04:02)
- Measure Of Central Tendency & Dispersion (22:29)
- Standard Deviation & Sample Variance (14:46)
- Variables (Random & Others) (17:05)
- Histograms, Percentile, Quartiles & 5 Number Summary (29:26)
- Correlation And Covariance (39:17)

11. Probability (15 pelajaran • 3j 22m)

- Addition & Multiplication Rule (21:49)
- PDF, PMF, And CDF Relationship (31:33)

- Probability Distributions (Bernoulli, Binomial, Poisson, Normal, Uniform, etc.) (1j 47m)
- Central Limit Theorem (10:52)

12. Inferential Statistics (15 pelajaran • 2j 31m)

- Hypothesis Testing & P-value (19:27)
- Z-Test & Student t-Distribution (32:21)
- Type 1 And Type 2 Error (05:00)
- Bayes Theorem (09:42)
- Confidence Interval (08:21)
- Chi-Square Test & ANOVA Test (50:11)

III. Machine Learning

13. Preprocessing & Feature Engineering (11 pelajaran • 3j 3m)

- Handling Missing Values & Imbalanced Dataset (SMOTE) (46:45)
- Handling Outliers (08:22)
- Data Encoding (Nominal, OHE, Label, Ordinal, Target Guided) (28:38)
- Exploratory Data Analysis (EDA) Projects (Red Wine, Flight Price, Google Playstore) (1j 39m)

14. Introduction To Machine Learning (5 pelajaran • 1j 1m)

- Types of ML, Instance vs Model-based learning (40:34)
- Equation of Line, Hyperplane & Distance from a point (20:44)

15. Supervised Learning: Regression

- **Linear, Multiple & Polynomial Regression (15 pelajaran • 4j 15m)**
- **Ridge, Lasso & ElasticNet Regression (8 pelajaran • 2j 10m)**

16. Supervised Learning: Classification

- **Logistic Regression (10 pelajaran • 2j 7m)**
- **Support Vector Machines (SVM/SVC/SVR) (9 pelajaran • 1j 44m)**
- **K-Nearest Neighbour (KNN) (3 pelajaran • 37m)**
- **Naive Bayes Theorem (3 pelajaran • 56m)**

17. Tree-Based Models & Ensemble Learning

- **Decision Tree Classifier & Regressor (10 pelajaran • 1j 47m)**
- **Random Forest (Bagging) (9 pelajaran • 1j 25m)**
- **AdaBoost (Boosting) (9 pelajaran • 1j 10m)**
- **Gradient Boosting (3 pelajaran • 34m)**
- **XGBoost (4 pelajaran • 1j 4m)**

18. Unsupervised Learning

- **Principal Component Analysis (PCA) (6 pelajaran • 1j 29m)**
- **K-Means Clustering (4 pelajaran • 49m)**
- **Hierarchical Clustering (3 pelajaran • 33m)**
- **DBSCAN Clustering (4 pelajaran • 25m)**
- **Silhouette Clustering (1 pelajaran • 9m)**
- **Anomaly Detection (Isolation Forest, DBSCAN, LOF) (3 pelajaran • 38m)**

IV. Deep Learning & Natural Language Processing (NLP)

19. Natural Language Processing (NLP) Fundamentals (34 pelajaran • 6j 25m)

- Text Preprocessing (Tokenization, Stemming, Lemmatization, Stopwords) (1j 25m)
- Feature Extraction (Bag of Words, N-Grams, TF-IDF) (1j 5m)
- Word Embeddings (Word2Vec, CBOW, SkipGram) (1j 13m)
- Project: Spam Classification & Sentiment Analysis (59m)

20. Artificial Neural Networks (ANN) & Deep Learning Basics (39 pelajaran • 6j 44m)

- Perceptron, ANN Intuition, Backpropagation (1j 18m)
- Activation Functions (Sigmoid, Tanh, ReLU, Softmax) (55m)
- Optimizers (SGD, Adam, RMSProp) & Loss Functions (1j 2m)
- Weight Initialization, Dropout, Exploding/Vanishing Gradients (55m)
- Convolutional Neural Networks (CNN) Introduction (1j 5m)

21. Recurrent Neural Networks (RNN) & Sequential Data

- **Simple RNN (4 pelajaran • 1j 43m)**

- **LSTM & GRU (8 pelajaran • 2j 6m)**
- **Bidirectional RNN (1 pelajaran • 23m)**

22. Advanced Architectures: Transformers (18 pelajaran • 6j 55m)

- Encoder-Decoder & Sequence to Sequence Architecture (41m)
- Attention Mechanism (29m)
- Transformers Architecture (Self-Attention, Multi-Head Attention, Positional Encoding, Layer Normalization) (5j 2m)

23. Deep Learning Projects

- **End to End Project Using ANN (8 pelajaran • 2j 17m)**
- **End to End Project With Simple RNN (7 pelajaran • 1j 19m)**
- **Predicting Next Word with LSTM/GRU (6 pelajaran • 46m)**