Python Full Stack Developer Course Syllabus.
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1. Core Python Programming
- Setting up Python environment (IDEs, pip, virtual env)
- Data types, variables, operators
- Control flow (if, loops, comprehensions)
- Functions, modules, packages
- Object-Oriented Programming (classes, inheritance, polymorphism)
- Exception handling
- File handling
- Python libraries (requests, datetime, os, sys)

2. Front-End Development
- **HTML5**: semantic tags, forms, multimedia
- **CSS3**: selectors, flexbox, grid, responsive design
- **Bootstrap / Tailwind**: rapid UI design
- **JavaScript (ES6+)**: DOM manipulation, events, promises
- **React.js:** components, props, state, hooks, routing

3. Back-End Development with Python
- **Flask** basics: routes, templates, Jinja2 or **Django** framework: MVT architecture, models, views, templates
- REST APIs with Django or Flask-RESTful
- Authentication & authorization (JWT, OAuth)
- Middleware, sessions, cookies

4. Databases
- **SQL**: queries, joins, normalization
- **MySQL**: relational DBs or **SQLite**: lightweight DB for dev
- **MongoDB**: NoSQL basics

5. Version Control & Collaboration
- Git basics: GitHub/GitLab workflows (pull requests, issues)

6. Deployment & Cloud
- Hosting apps on **AWS or Azure**
- Docker basics (containers, images)
- Nginx/Gunicorn for production
- Environment variables & secrets management

7. Advanced Topics(optional)
- WebSockets (real-time apps with Django Channels / Socket.IO)
- Caching (Redis, Memcached)
- Unit testing & pytest
- Security best practices (CSRF, XSS, SQL injection prevention)
- Performance optimization

8. Capstone Projects(optional)
- E-commerce site (React + Django REST + Stripe payments)
- Chat app (WebSockets + Redis)
- AI-powered app (integrating ML models with Flask/Django)

Machine Learning Course Syllabus

Core Concepts
- Introduction to Machine Learning
- Types of ML: Supervised, Unsupervised, Reinforcement Learning
- Applications of ML in real-world scenarios

Mathematical Foundations
- Linear Algebra
- Probability & Statistics
- Calculus (Gradient Descent, Optimization)

Algorithms & Models
- Linear Regression, Logistic Regression
- Decision Trees, Random Forests
- Support Vector Machines (SVM)
- K-Nearest Neighbors (KNN)
- Naive Bayes
- Clustering: K-Means, Hierarchical
- Dimensionality Reduction: PCA, t-SNE

Model Evaluation
- Cross-validation
- Bias-Variance Tradeoff
- Confusion Matrix, Precision, Recall, F1 Score
- ROC-AUC Curve

Tools & Programming
- Python (NumPy, Pandas, Scikit-learn)
- Jupyter Notebooks
- Data preprocessing and visualization (Matplotlib, Seaborn)

Projects & Case Studies
- Predictive analytics
- Customer segmentation
- Recommendation systems

Deep Learning Course Syllabus

Fundamentals
- Introduction to Neural Networks
- Perceptron, Activation Functions
- Forward and Backpropagation

Architectures
- Feedforward Neural Networks (FNN)
- Convolutional Neural Networks (CNN)
- Recurrent Neural Networks (RNN)
- Long Short-Term Memory (LSTM)
- Transformers (Intro level)

Advanced Topics
- Transfer Learning
- Generative Adversarial Networks (GANs)
- Attention Mechanisms
- Autoencoders

Model Training & Optimization

- Loss Functions
- Optimizers: SGD, Adam, RMSprop
- Regularization: Dropout, Batch Normalization

Tools & Frameworks
- TensorFlow
- Keras

Projects & Applications
- Image classification
- Natural Language Processing (NLP)
- Time series forecasting
- Object detection