Course Structure: MLOps

Expt 1: Train ML model and deploy model to file (PKL FILE)

- Save using Pickle
- Verify that the model loads

Expt 2: Create backend for model inference (FASTAPI)

- Define /predict endpoint
- Use Pydantic for request & response schemas

Expt 3: Error handling and logging (FASTAPI LOGGING)

- Exception handlers
- Structured logging (request, response, errors)

Expt 4: Implement basic authentication (FASTAPI AUTHENTICATION)

- API Key OR JWT-based authentication
- Secure prediction endpoints

Expt 5: Create container for the FastAPI ML service (INSTALL DOCKER AND WSL2)

- Dockerfile

Expt 6: Verify and test API (INSTALL POSTMAN)

- Auth testing
- Input validation & error scenarios

Expt 7: Set up CI/CD pipeline (GITHUB ACTIONS)

- Docker image build & push
- Deployment trigger

Expt 8: Deploy Docker container to Cloud VM (AMAZON EC2)

- AWS EC2 / GCP VM / Azure VM / Any other of your choice
- Expose service using public IP / domain

Expt 9: Create frontend to visualize predictions using test data

- Charts & tables
- API integration

Expt 10: Create frontend with real-time user input

- Forms
- Live prediction results

Expt 11: Model monitoring using Prometheus & Grafana

Expt 12: Kubernetes setup for ML application