Weekly Detailed Lecture Breakup:

AI, Machine Learning, and Deep Learning Course

Week 1: Introduction, Linux & Python Fundamentals

Day 1

- Introduction to AI
- Motivational Lecture
- Course Overview: Job Market, Applications, Work Ethics
- Software Installation: Anaconda, VSCode, PyCharm

Day 2

- Linux Shell Scripting Basics: pwd, cd, ls, cat, sudo, etc.
- File management commands
- System operations: shutdown, restart, etc.
- Environment variables and package management

Day 3

- Python Basics: Values, expressions, numbers, strings
- Operators, variables, and keywords
- String operations, type casting, comments

Day 4

- Data Structures: Lists, Tuples, Dictionaries, Sets

Day 5

- Control flow: if/else, loops, list comprehension
- Iterators and iterables

Week 2: OOP in Python & Statistics Basics

Day 1

- Functions, scope, lambda, map, filter
- File & exception handling

Day 2

- OOP: Classes, Objects, Inheritance types, Constructors
- Access specifiers, inner classes, association types

Day 3

- Polymorphism, Dunder methods, Abstract classes
- Keyword arguments, data classes

Day 4

- Data Types: Structured/Unstructured, Quantitative/Qualitative
- Central Tendency: Mean, Mode, Median

Day 5

- Dispersion: Std dev, variance, skewness, kurtosis
- Position Measures: Z-score, percentiles, quartiles

Week 3: Probability & NumPy

Day 1

- Correlation, plotting (uni/bi/multi-variate)
- Probability overview

Day 2

- Joint, marginal, conditional probabilities
- Probability distributions: discrete, continuous, Bayesian

Day 3

- NumPy basics: array creation, attributes
- Array operations: sorting, concatenating, deleting

Day 4

- Data loading/saving
- Indexing, broadcasting, type casting, arithmetic ops

Day 5

- Pandas basics: Series, DataFrame
- Data manipulation and cleaning

Week 4: Pandas, Seaborn & ML Pipeline

Day 1

- Data merging, joining, grouping
- Pandas visualizations

Day 2

- Seaborn: distribution, categorical, and matrix plots

Day 3

- ML Introduction: Types, Pipeline

Day 4

- Supervised learning: regression, classification
- Linear regression (gradient descent)

Day 5

- Vectorized and non-vectorized linear regression

Week 5: Machine Learning I

Day 1

- Multivariate Linear Regression

Day 2

- Polynomial Regression

Day 3

- Logistic Regression (Binary)

Day 4

- Logistic Regression (Multiclass)

Day 5

- ML Code Practice

Week 6: NLP & ML II

Day 1

- NLP Basics, SpaCy/NLTK, pre-processing

Day 2

- Tokenization, POS, NER, WordNet, BoW, Document similarity

Day 3

- Evaluation metrics, imbalance datasets

Day 4

- SVM & Decision Trees

Day 5

- Random Forest

Week 7: Deep Learning I

Day 1

- Boosting

Day 2

- MLP Neural Networks: activation, backpropagation

Day 3

- Deep Learning APIs: TensorFlow, PyTorch, Keras

Day 4

- CNNs for image & text

Day 5

- Practice: Neural Network implementation

Week 8: Deep Learning II

Day 1

- RNNs

Day 2

- LSTM

Day 3

- LSTM Practice

Day 4

- GRU

Day 5

- GRU Practice

Week 9: Word Embeddings & Sequence Models

Day 1

- Word2Vec: CBOW, Skip-gram

Day 2

- Gensim, custom embedding

Day 3-5

- Sequence models: 1-1, 1-many, many-1, many-many

Week 10: Sequence Models & Project Setup

Day 1

- Bi-Directional RNN/LSTM

Day 2-3

- Attention Mechanism

Day 4-5

- Project selection, discussion, planning

Week 11: Microsoft Azure AI Services

Day 1-2

- Azure AI services for vision, speech, language, security

Day 3-4

- Resource creation, monitoring, CI/CD deployment
- Anomaly detection, content moderation, personalization

Day 5

- Image classification, object detection

Week 12: Azure NLP, Knowledge & Conversational AI

Day 1

- Video processing

Day 2

- Azure NLP: text analysis, speech, translation

Day 3-4

- Language models, question answering, knowledge mining

Day 5

- Conversational AI implementation