### 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