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AI & ML — Complete Syllabus (Open Elective-3, Option 1)

BTEUP Diploma in Electronics Engineering • 5th Semester • Session 2026-27
Subject 5.6.1 — Open Elective-3, Option 1 (Practicum) • Qualifying (Q) • 2 Credits • L 1 - P 3 • Choose this OR IoT OR Industrial Automation & MES

Note: The PDF gives this subject as 7 numbered topic sections (not 5 units), with no unit-wise periods, no marks-distribution table and no reference-books list — so periods, weightages and books are not shown. The 5.6 scheme row is shared by all three Open Elective-3 options.

Examination Scheme

Code	Paper	Type	L - P	Credits	Internal	External	Total
5.6.1	Open Elective-3: AI & ML	Practicum (Q)	1 - 3	2	50	—	N/A (Q)
AI & ML Total				2	50	—	N/A (Q)

What This Subject Aims To Do

To equip students with the theoretical and practical skills needed to understand requirements, collect and pre-process data, and build and deploy machine learning and artificial intelligence solutions for real-world applications, with hands-on experience of the latest software.

Unit-Wise Complete Topic List

Note: no marks-distribution table is given for this subject in the official syllabus, so unit weightages are not shown.

Section 1 — Industrial Safety Practices

Topics: Fire Extinguishers & its Types; Safely handling Tools & Equipment; Use of proper Tools & Equipment & its maintenance; OSH & practices to be observed as a precaution

In simple words: Workshop safety: fire extinguishers, correct tool use and occupational safety and health.

Section 2 — Fundamentals required for AI and ML

Topics: Introduction to Artificial Intelligence and Machine Learning; Need of AI and ML; Basic Mathematical concepts related to AI and ML; Data Collection, Data Processing and Cleaning; Types of Data Sources — Structured Data, Unstructured Data, Semi Structured, Realtime Data, Open Data Set, Data Scraping; Data Acquisition Techniques — APIs (Application Programming Interfaces), Web Scrapping, Surveys and Forms, Sensor Data, Database and Data Warehouse; Data Integration — Combining Data from Multiple Sources, Data Merging, Data Aggregation; Data Pre-Processing — Data Cleaning, Outlier Detection and Removal, Duplicate Data

In simple words: The foundations: what AI and ML are, the maths behind them, and where data comes from and how it is cleaned and prepared.

Section 3 — Programming concepts for AI and ML

Topics: Python Basics; Python Structure; NumPy; Pandas; Matplotlib and Seaborn; Scikit-learn

In simple words: The Python toolkit for AI and ML: NumPy, Pandas, Matplotlib, Seaborn and scikit-learn.

Section 4 — Introduction to Supervised Machine Learning

Topics: Types of Machine Learning Techniques (Supervised, Unsupervised and Reinforcement Learning). Supervised Learning — Regression, Classification, Logistic Regression, Support Vector Machines, Decision Tree, Random Forest, K – Nearest Neighbors (KNN), Use cases of Regression and Classification. Introduction to Unsupervised Learning — Clustering: K – Means Clustering, Hierarchical Clustering, DBSCAN; Dimensionality Reduction; Anomaly Detection; Use cases of clustering and Dimensional Reduction; Building Machine Learning Model; Model Evaluation and Validation; Machine Learning Model Deployment

In simple words: Supervised learning (regression and classification) and unsupervised learning (clustering, dimensionality reduction, anomaly detection), and how a model is built, evaluated and deployed.

Section 5 — Deep Learning, Reinforcement Learning and Natural Language Processing

Topics: Fundamentals of Deep Learning; Convolutional Neural Networks (CNNs); Recurrent Neural Networks (RNNs); Natural Language Processing; Reinforcement Learning; TensorFlow and Kera. Generative AI — Understanding of Gen AI; Applications of Gen AI; Development of Gen AI model; Integration of Gen AI in Mobile App.; Deployment

In simple words: Deep learning (CNNs, RNNs), natural language processing, reinforcement learning, and generative AI — including building and deploying Gen AI models and apps.

Section 6 — Deep Learning Applications

Topics: Computer Vision; Natural Language Processing; Speech Recognition; Model Deployment

In simple words: Where deep learning is used: computer vision, language, speech recognition, and deploying models.

Section 7 — Ethics and Responsibility in AI and Machine Learning

Topics: Ethics in AI and ML; Accountability and Responsibility; Privacy and Data Protection; Social Impact of AI; Ethical Guidelines

In simple words: The responsible side of AI: ethics, accountability, privacy, data protection and social impact.

Practical Work

- Load a Dataset and perform basic preprocessing.
- Splitting of Dataset into Training and Testing Set.
- Explore Python Libraries Pandas, NumPy, Matplotlib etc.
- Build Machine Learning Model for Linear Regression Analysis for predict.
- Implement K – Means clustering to segment customer based on purchasing behaviour.
- Build a Machine Learning Model – Decision Tree.
- Build a Machine Learning Model – Random Forest.
- Build a Machine Learning Model for Anomaly Detection.
- Build SVM model and evaluate performance (Precision, Recall, F-Score and Confusion Matrix).
- Build a Neural Network using Keras or TensorFlow to classify the handwriting digits.
- Implement a Convolutional Neural Network to classify images using given dataset.
- Build a Recurrent Neural Network (RNN) for Sentiment Analysis.
- Implement a Chatbot using RNN.
- Compare two different Gen AI models.
- Integrate a Trained Machine Learning Model in Mobile APP for Prediction.
- Case Studies.
- Mini Project.

Reference Books

Reference books are not listed for this subject in the official syllabus.

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Source: BTEUP 3rd Year curriculum (folder2627), approved in C.D.C. meeting held on 16.07.2026. Topic lists follow the official syllabus; short explanations are the author's own plain-English summaries, not syllabus text.

Please confirm with your own polytechnic for any local changes.