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Artificial Intelligence — Complete Syllabus

BTEUP Diploma in Mechanical Engineering (Production) • 5th Semester • Session 2026–27

Subject 5.6.3 (Open Elective-III, Qualifying) • 50 Marks Internal Only • 2 Credits • L 2 – P 0

Qualifying subject — read this first: you must PASS this subject, but its marks are **not** added to your awarded division or final marks. It is assessed internally for 50 marks only, with no external examination. It is an Open Elective-III option: you choose ONE of Computer Aided Design & Manufacturing, Reverse Engineering, Artificial Intelligence, Automobile Engineering, or any minimum-2-credit course (NPTEL/SWAYAM/AICTE-ELIS/C-DAC/IIT-NIT/ISRO/Tata Tech). **Note:** this is the Mechanical 5th-semester Artificial Intelligence elective (3 units). It is a different subject from the Electronics 5th-semester AI & Machine Learning subject, which has 7 sections including machine learning and programming.

Examination Scheme

Code	Paper	Type	L – P	Credits	Internal	External	Total
5.6.3	Artificial Intelligence	Qualifying	2 – 0	2	50	—	50†

What This Subject Aims To Do

Introducing AI at the diploma level enables students to understand the fundamentals of intelligent systems, machine learning, decision-making algorithms, and data-driven technologies. The subject provides insights into how machines can simulate human intelligence to perform tasks like speech recognition, vision processing, problem-solving, and autonomous control.

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Detailed Contents — 3 Units

Unit 1 — Introduction to Artificial Intelligence

Artificial Intelligence (AI) definition; goals of AI; history of AI; applications of AI.

Unit 2 — Agents, Environments & Algorithms Terminology

Agent terminology; types of agents (simple reflex agents, model based reflex agents, goal based agents); nature of environments; properties of environments. Brute force search strategies: breadth first search, depth first search. Heuristic search strategies; local search algorithms.

Unit 3 — Fuzzy Logic Systems & Neural Networks

Introduction to fuzzy logic and fuzzy systems; membership functions; fuzzification/ defuzzification. Basic structure of neural networks; perceptron; back-propagation.

Course Outcomes

At the end of the subject, the students will be able to:

- **CO1:** Explain the definition, goals, history, and applications of Artificial Intelligence in solving real-world problems.
- **CO2:** Analyze intelligent agents, environment properties, and apply brute-force, heuristic, and local search algorithms to problem-solving tasks.
- **CO3:** Apply fuzzy logic systems and neural network models, including perceptron and backpropagation algorithms, to develop basic intelligent systems.

The Five Study Units in the Notes

The official syllabus has only three units, but the matching notes and practice paper split them into five study units so the practice paper follows the board's five-question pattern. Nothing is added and nothing is dropped: **Study Unit 1** = Syllabus Unit 1, introduction to AI; **Study Unit 2** = Syllabus Unit 2, agents and environments; **Study Unit 3** = Syllabus Unit 2, search strategies; **Study Unit 4** = Syllabus Unit 3, fuzzy logic; **Study Unit 5** = Syllabus Unit 3, neural networks.

Note: the official syllabus prints no unit-wise periods and no marks-distribution table for this subject, so no weightage is shown here.

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How to Prepare

This is a qualifying subject — you must pass it, so take the internal assessment seriously even though the marks do not count towards your division. The two worked examples in the notes are the only numbers in the subject: the breadth-first and depth-first search orders on a small tree, and the perceptron firing test. Learn both by hand. Unit 2 rewards the three agent types in order of capability; Unit 3 rewards one clear example each for a fuzzy set and a membership function. Revise from the notes unit by unit, then write the likely question at the end of each unit.

Text and Reference Books (as listed in the syllabus)

- Artificial Intelligence By Example: Develop machine intelligence from scratch using real artificial intelligence use cases — Denis Rothman, Packt Publishing, ISBN 978-1788990547.
- Artificial Intelligence by E. Balagurusamy.
- Artificial Intelligence: A Simplified Approach by Sinha, P. Royston.
- Introduction to Artificial Intelligence by Dan W. Patterson.

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Source: BTEUP IRDT Kanpur NEP 2020 curriculum for Diploma in Mechanical Engineering (Production), effective session 2026-27, approved by the Board of Technical Education U.P. Lucknow in the C.D.C. meeting held on 16.07.2026 (urise.up.gov.in). Topic list 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.