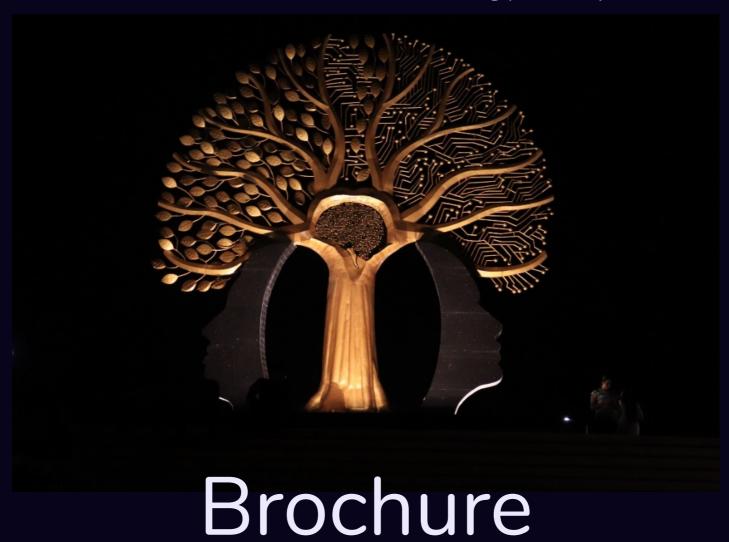**Department of Computer Science and Engineering
Indian Institute of Technology Jodhpur**

# Brochure

# Executive Programs in AI for Working Professionals

# Introduction

Artificial Intelligence (AI) is a branch of computer science that aims to create machines to act with higher levels of intelligence and emulate human capabilities of sense, comprehension and action. Core problems of artificial intelligence include programming computers for certain traits such as Knowledge, Reasoning, Problem-solving, Perception, Learning and Planning. AI technology development and applications are evolving rapidly with major implications for economies and societies. As the demand for such applications increases, there is also an increasing need for building the future workforce for AI.

From January 2020, the Department of Computer Science and Engineering, IIT Jodhpur started the Executive M.Tech. in AI program for working professionals. From 2022, this program transcends to its stackable avatar - in line with the New Education Policy 2020 for working professionals. The primary goal of this program is to train and enhance the skills of working professionals with strong foundations of Artificial Intelligence (AI) and state-of-the-art AI tools and techniques, and make them more industry-competent. For developing the AI ecosystem, this program will be executed in synergy with other M.Tech programs running in IIT Jodhpur, such as Sensors & IoT, Cyber-Physical Systems, and Advanced Manufacturing and Design.

# Features of the Program

1. An initiative to cater to the stackable program ideology of NEP2020 for working professionals
2. Classes are conducted on the weekends or in the evening of the weekdays in online mode and students attend in a synchronous interactive audio-visual mode
3. The credit requirement per semester is flexible. Students can register for as many courses as they want (satisfying the minimum and maximum credit requirements) every semester
4. Program elective and open elective courses may be chosen from a wide variety of courses offered across the departments and schools including Computer Science & Engineering, Electrical Engineering, School of AIDE, Mathematics, Mechanical Engineering
5. Industry oriented courses such as ML-Ops and DL-Ops
6. Recorded lectures and teaching materials are made available online
7. Course management and discussions are enabled via widely-used tools like Google Classroom, Piazza, & Moodle
8. There are mandatory two contact weeks in a semester Students attend lectures and discussion sessions with instructors, participate in offline evaluations, and experience the IIT environment in person
9. Contact weeks may be organized in remote locations, subject to higher demand
10. Students can do their M. Tech. projects (funded by Govt. funding agencies & industries) on state-of-the-art research topics across departments

# Program Details

**Course structure for: Certificate, Diploma and Degree program-categories**

a. Certificate program requires a minimum 6 to 8 credits and 64 hours of contact hours
b. Diploma requires minimum 128 contact hours (around 16-18 credits)

**Certificate and Diploma as part of the stackable MTech AI programs**

a. The certificate and diploma can be obtained as an exit option from M.Tech. AI
b. The certificate and diploma can also be registered by the student individually. If the student follows the continuation CGPA requirements, he/she can stack up credits to earn the next higher degree, finally leading to an M.Tech. AI

# Program Details (contd.)

| PROGRAM | NAME | COURSES | CREDIT REQUIREMENT | CGPA REQUIREMENTS FOR CONTINUATION |
|---|---|---|---|---|
| Certificate Course | Introduction to AI and ML (Minimum 1 semester) | Artificial Intelligence Machine Learning Optimization | Total: 8 credits | 5.0 |
| Diploma | Diploma in AI and ML (3 semesters) | Artificial Intelligence Machine Learning Optimization ML-Ops Deep Learning 2 courses from PE | Total: 18 credits | 6.0 (Continuation from Certificate to Diploma) |
| MTech | AI | As per approved program document** | Total: 62 credits | 7.0 (Continuation from Diploma to MTech) |

** https://cse.iitj.ac.in/images/pdf/ex_mtech-ai/Course_Structure-Executive-MTech-AI.pdf

# Program Details (contd.)

Additional certificate and diploma options for students with Machine Learning background.

| PROGRAM | NAME | COURSES | CREDIT REQUIREMENT |
|---|---|---|---|
| Executive Certificate Course | Dependable ML (2 semesters) | Dependable AI Deep Learning Advanced ML | Total: 9 credits |
| Diploma Course | Dependable ML (2-3 semesters) | Optimization DL-Ops Deep Learning Dependable AI Advanced ML 2 PE courses | Total: 18 credits |

# Curriculum Details

| Cat | Code | Course Title | L-T-P | Cr |
|---|---|---|---|---|
| **Semester 0** | | | | |
| Bridge Course on DSA | | | | |
| | | **I Semester** | | |
| C | MAL7070 | Optimization | 2-0-0 | 2 |
| C | CSL7610 | Artificial Intelligence | 3-0-0 | 3 |
| C | CSL7560 | Advanced Data Structures and Algorithms | 2-0-0 | 2 |
| C | CSL7620 | Machine Learning | 3-0-0 | 3 |
| C | CSP7040 | ML-Ops | 0-0-2 | 1 |
| PE | xxxxx | Program Elective 1 | 3-0-0 | 3 |
| NG | HSN7010 | Technical Communication | 1-0-0 | 1 |
| Total Credits: 15 | | | | |

| Cat | Code | Course Title | L-T-P | Cr |
|---|---|---|---|---|
| | | **II Semester** | | |
| C | CSL7590 | Deep Learning | 3-0-0 | 3 |
| C | CSL7030 | DL-Ops | 0-0-2 | 1 |
| C | CSL7580/ | Core Bucket: Advanced Artificial Intelligence/ Autonomous Systems | 3-0-0 | 3 |
| PE | xxxxx | Program Elective 2 | 3-0-0 | 3 |
| PE | xxxxx | Program Elective 3 | 3-0-0 | 3 |
| OE | xxxxx | Open Elective 1 | 3-0-0 | 3 |
| NG | HSN7020 | Ethics and Professional Life | 1-0-0 | 1 |
| Total Credits: 17 | | | | |

| Cat | Code | Course Title | L-T-P | Cr |
|---|---|---|---|---|
| | | **III Semester** | | |
| P | CSD7010 | Major Project – Part 1 | 0-0-10 | 5 |
| PE | xxxxx | Program Elective 4 | 3-0-0 | 3 |
| PE | xxxxx | Program Elective 5 | 3-0-0 | 3 |
| OE | xxxxx | Open Elective - 2 | 3-0-0 | 3 |
| NG | OAN7010 | System Engineering and Project Management | 1-0-0 | 1 |
| Total Credits: 15 | | | | |

| Cat | Code | Course Title | L-T-P | Cr |
|---|---|---|---|---|
| | | **IV Semester** | | |
| P | CSD7050 | Major Project – Part 2 | 0-0-22 | 11 |
| PE | xxxxx | Program Elective 6 | 3-0-0 | 3 |
| NG | OAL7010 | Intellectual Property | 1-0-0 | 1 |
| Total Credits: 15 | | | | |

| | Credit Distribution | | | | List of Prescriptive Electives |
|---|---|---|---|---|---|
| 1 | Program Core | 18 credits | 1 | | Linear algebra for data science |
| 2 | Program Electives | 18 credits | 2 | | Statistics for Data Science |
| 3 | Open Electives | 6 credits | | | |
| 4 | Project | 16 credits | | | |
| 5 | Non-graded | 4 credits | | | |
| | Total | 62 credits | | | |

# Curriculum Details (contd.)

**Some Interdisciplinary courses (offered by Dept. EE, Maths, School of Management and Liberal Arts) registered by current Exec. M.Tech AI students**

| | |
|---|---|
| Psychophysics<br>Modern Communication Networks<br>Special Drives for Electric Vehicles | Statistical Models and Regression<br>Energy economics and policy<br>System Engineering and Project Management<br>Quantum Machine Learning |

**Link to the Executive M.Tech AI program**

https://cse.iitj.ac.in/index.php/executive-mtech-ai

**Courses Offered by the Department of Computer Science and Engineering in Semester I (2022-2023)**

https://cse.iitj.ac.in/index.php/courses-odd-semester-2022-23

# Fee Structure

Rs 7,500/- per credit registered in a semester. For example, if a student registers for 10 credits in a semester, the fee will be Rs 75,000/- for the semester. The total credit requirement is 62 for the executive MTech in AI program. For the certificate and the diploma, one has to complete a minimum of 8 and 18 credits respectively

# Existing Executive M.Tech. AI Student Ensemble