

## **B.Tech AI & Machine Learning**

### **About the Program:**

By 2025, It is estimated that there will be 463 exabytes of data created each day globally – equivalent of 212,765,957 DVDs per day. By using a combination of Artificial Intelligence and Machine Learning, businesses will increasingly base their decisions on data to solve challenging problems in the area of image analysis, language translation and speech recognition with a phenomenal accuracy.

This has generated significant interest in developing Artificial Intelligence (AI) and Machine Learning based tools and solutions in most of the industry verticals such as Healthcare, Agriculture, Education, Smart Cities and Infrastructure, Smart Mobility and Transportation, Banking and Financial Services, Manufacturing Sector. With the digital revolution, Data science and AI has ability of machines to perform cognitive tasks like thinking, perceiving, learning, problem solving and decision making.

**B.Tech Artificial Intelligence and Machine Learning** is an undergraduate programme which is an essential complements and supplements human intelligence and enrich the way people live and work. The objective of this course is to equip students in developing skills, competencies, stimulate critical thinking through Service-Learning Modules. The Curriculum and Syllabus is designed so as to meet the industry 4.0 expectations. The program encompasses students to get expertise in critical skills for industrial adoption, digital technologies such as Robotics, Image Processing & Computer Vision, AI, Cloud computing, cyber physical systems, big data Analytics and Mathematical modeling, natural language processing, etc. Students will get expertise in machine learning pipeline, data, models, algorithms and empirics. This programme aims at to achieve technology leadership in AI, ambitious explorations that aim to push the technology frontier and that would require the pursuit of world class technology development and leadership in applying AI technologies to solve some of the biggest challenges.

By this programme, the students will gain inter-disciplinary skills such as statistics, visualization, processes, algorithms to extract knowledge and insights from varied data.

## **Program Educational Objectives**

We have program educational objectives for our Artificial Intelligence and Machine Learning Program. Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.

Our program educational objectives are:

The graduates of the Program will:

- I. Have knowledge and analytical skills, including mathematics, science and basic engineering.
- II. Have in-depth learning skills to function productively as leadership role or as supportive members in multidisciplinary teams with effective communication
- III. Have extensive knowledge in state-of the- art frameworks in Artificial Intelligence to design industry accepted AI solutions using modern tools for allied domains with realistic constraints or pursue higher studies and continue to develop their professional knowledge.
- IV. Practice the profession with ethics, integrity, leadership and social responsibility

## **PROGRAM OUTCOMES**

On successful completion of the B.Tech (AI&ML) programme the student will be able to:

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering, Machine learning fundamentals, and artificial intelligence to solve complex engineering problems.

PO2: Problem analysis: Identify, formulate, review research literature and analyze complex engineering problems to create solutions using the first principles of mathematics, engineering sciences, and data science.

PO3: Design/development of solutions: Design solutions Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems: Apply research methods including design of experiments, statistical analysis and business

interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage: Create, select, and apply appropriate Artificial intelligence principles, techniques, modern engineering and IT tools including prediction and modelling to model complex engineering activities with an understanding of the limitations.

PO6: The engineer and society: Apply reasoning using contextual knowledge to assess the needs of societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to Machine learning engineering practice.

PO7: Environment and sustainability: Understand the impact of artificial intelligence solutions in societal and environmental contexts, and demonstrate the knowledge for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and to execute responsibilities and adhere to norms of the engineering profession.

PO9: Individual and team work: Execute professional functions effectively as an individual, as well as a leader or member in diverse multidisciplinary teams.

PO10: Communication: Communicate effectively with the engineering community and with society in solving complex problems in terms of being able to comprehend and write effective reports, make effective presentations, as well as execute and receive clear instructions.

PO11: Project management and finance: Demonstrate an ability to use management principles and apply these to one's own work, as a member and lead projects and build cost models in an interdisciplinary professional setting.

PO12: Lifelong learning: Recognize the need for and develop learning mechanisms and inculcate the ability to prepare for lifelong learning in the context of technological change.

## **PROGRAM SPECIFIC OUTCOMES**

PSO1: Develop AI based software applications/solutions as per the needs of Industry and society

PSO2: Adopt new and fast emerging technologies in Artificial Intelligence and Machine Learning

## **Curriculum**

**Curriculum divided in to 4 parts, namely, Math, Core-CSE, Core-AI, and Applications**

- Core-CSE courses for placement
- Core-AI and Math courses for research/higher studies
- Application courses to encourage Entrepreneurship

### **Core-CSE**

- Programming: C, Python, OOP, Software engineering
- Hardware: Digital, CO, OS
- Data Structures, DAA, DBMS
- Networks: Cyber Physical Systems, Computer Networks, Cyber security, Distributed computing, Cloud computing, web technologies
- Industry 4.0

### **Core-AI course**

- Foundations
- AI, Machine Learning
- Big Data
- Deep learning

### **Applications**

- Image and video
- Text (NLP, Machine Translation)
- Speech (ASR, TTS, S2S)
- Medical
- Robotics

### **Math courses**

- Linear Algebra and Matrix analysis
- Probability and Random process
- Statistics
- Discrete Mathematics
- Optimization Techniques

## **Career Opportunities**

Apart from the regular job offers for the computer science and engineering graduates, the list of job profiles for a graduate in this program would be:

- Full Stack AI developer
- Analyst-Machine Learning Engineer
- Software Developer for Machine Learning Projects
- Speech Scientist for NLP Projects
- Image processing Engineer for Surveillance Projects
- Researcher in Machine Learning Projects
- AI Data Analyst
- AI Expert
- Big Data Engineer