Department of Mechanical & Industrial Engineering

Manipal Institute of Technology
Manipal, Karnataka, India

Intel® Unnati
Data-Centric Labs in Emerging Technologies

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AI Basics:
Essential Concepts
and Techniques

Unlocking the Power of Artificial Intelligence

Intel® Unnati
Data-Centric Labs in Emerging Technologies

Course Duration: 20 Hours

8 Hours using Intel®AI Toolkit

Assignments + Mini Project

Beginner

Department of Mechanical & Industrial Engineering
Manipal Institute of Technology, Manipal, Karnataka, India

AI Basics: Essential Concepts and Techniques

Course Structure

- Total Duration: 20 hours (4 modules, 3 hours each + 8 hours hands-on training)
- Tools Used: Intel® AI Toolkit
- Hands-on Training: Learn basic AI concepts and applications for engineers through practical projects
- Assessment: Assignment + Mini Project

Expertise Level: Beginner

Prerequisites

- No prior experience with AI needed
- Basic knowledge of engineering principles
- Familiarity with programming is helpful but not required

Outcomes

- Gain foundational knowledge of AI principles and techniques
- Understand the role of AI across different engineering fields
- Develop practical skills with beginner-level AI projects
- Earn a Intel®- MAHE certified course certificate

Module 1: Introduction to AI for Engineers — 3 hours

- Overview of artificial intelligence, machine learning, and their relevance to engineering
- Key AI concepts: Supervised learning, unsupervised learning, and reinforcement learning
- Basic AI tools and libraries: Intel® AI Toolkit
- Hands-on: Setting up the environment and exploring basic machine learning models

Module 2: AI Algorithms and Data Science for Engineers — 3 hours

- Introduction to algorithms: Linear regression, decision trees, and clustering
- Data science concepts: Data collection, pre-processing, and visualization
- Hands-on: Working with data sets to implement simple machine learning models

Module 3: Neural Networks and Deep Learning Basics — 3 hours

- Introduction to neural networks and how they mimic human brain functions
- Overview of deep learning and neural network architectures
- Hands-on: Building a simple neural network for engineering applications

Module 4: AI in Engineering Applications — 3 hours

- Case studies: AI in predictive maintenance, energy management, and robotics
- The role of AI in smart cities, autonomous vehicles, and manufacturing
- Hands-on: Implementing AI models for real-world engineering problems

Hands-on Training — 8 hours

- Part 1: Exploring beginner-level AI projects using Intel® AI Toolkit
- Part 2: Building basic AI models for engineering applications such as prediction, classification, and optimization

Assessment Plan

- Assignment
- Mini Project

Course Coordinator

Prof. Shwetha V
Department of Electrical Engineering
Manipal Institute of Technology, Manipal

Prof. Priya Kamath
Department of Computer Science Engineering
Manipal Institute of Technology, Manipal

Contact:

Intel® Artificial Intelligence Lab

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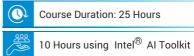Manipal Institute of Technology, Manipal, Karnataka, India

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AI for
Mechanical Engineers
Mechanical Engineering redefined

Intel® Unnati
Data-Centric Labs in Emerging Technologies

Course Duration: 25 Hours

10 Hours using Intel® AI Toolkit

Assignments + Mini Project

Intermediate

Department of Mechanical & Industrial Engineering
Manipal Institute of Technology, Manipal, Karnataka, India

AI for Mechanical Engineers

Course Structure:
- Total Duration: 25 hours (5 modules, 3 hours each + 10 hours hands-on training)
- Tools Used: Intel®AI Toolkit
- Hands-on Training: The course includes practical, real-world AI applications in respective fields using Intel AI tools
- Assessment: Assignment + Mini Project

Expertise Level: Intermediate

Prerequisites
- Basic knowledge of mechanical engineering principles
- Familiarity with programming and some understanding of AI/ML concepts
- Experience with simulation or modeling software used in mechanical engineering is beneficial

Outcomes
When you enrol in this course,
- Learn new concepts from trained experts from Intel
- Gain a foundational understanding of a subject or tool
- Develop relevant skills with hands-on projects
- Earn a Intel®- MAHE certified course certificate

Module 1: Introduction to AI in Mechanical Engineering — 3 hours

- Overview of AI and its role in mechanical engineering
- Case studies: Predictive maintenance and machine failure detection
- AI algorithms: Decision trees, Random Forest, and Support Vector Machines (SVM)
- AI tools from Intel: Introduction and setup

Module 2: AI for Predictive Maintenance — 3 hours

- Concepts of predictive maintenance using machine learning algorithms
- Sensors and data acquisition systems in mechanical engineering
- Data pre-processing, feature selection, and feature extraction
- Hands-on training: Building AI models for predicting machine failure using Intel tools

Module 3: AI in Robotics and Automation — 3 hours

- Role of AI in industrial robotics, automation systems, and smart manufacturing
- Use of neural networks for robotic control and automation
- AI-based optimization techniques for manufacturing processes
- Hands-on training: Developing AI algorithms for robotic applications

Module 4: AI for Quality Control and Defect Detection — 3 hours

- Application of computer vision and AI in quality inspection and defect detection
- Image classification and object detection in manufacturing
- Hands-on training: Implementing defect detection models using Intel's OpenVINO toolkit

Module 5: AI-Driven Energy Efficiency in Mechanical Systems — 3 hours

- AI for energy management and optimization in mechanical systems
- Machine learning models for energy consumption prediction and reduction
- Case studies: HVAC systems and energy-efficient machines
- Hands-on training: Creating AI models for energy optimization using Intel's AI tools

Hands-on Training — 10 hours

- Intensive lab session: Building and deploying AI models with Intel AI Analytics Toolkit, Intel Distribution of Python, and OpenVINO toolkit for various mechanical engineering applications such as predictive maintenance, defect detection, and energy management

Assessment Plan

- Assignment
- Mini Project

Course Coordinator

Prof. Suhas Kowshik CS
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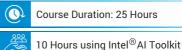
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Intel® Unnati
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AI for
Industrial Engineers
Optimizing Industrial Engineering Systems

Intel® Unnati
Data-Centric Labs in Emerging Technologies

Course Duration: 25 Hours

10 Hours using Intel®AI Toolkit

Assignments + Mini Project

Intermediate

Department of Mechanical & Industrial Engineering
Manipal Institute of Technology, Manipal, Karnataka, India

AI for Industrial Engineers

Course Structure:
- Total Duration: 25 hours (5 modules, 3 hours each + 10 hours hands-on training)
- Tools Used: Intel®AI Toolkit
- Hands-on Training: The course includes practical, real-world AI applications in respective fields using Intel AI tools
- Assessment: Assignment + Mini Project

Expertise Level: Intermediate

Prerequisites
- Knowledge of industrial engineering principles
- Understanding of manufacturing systems and processes
- Basic to intermediate skills in AI/ML and familiarity with Python or similar languages

Outcomes
When you enrol in this course,
- Learn new concepts from trained experts from Intel
- Gain a foundational understanding of a subject or tool
- Develop relevant skills with hands-on projects
- Earn a Intel®- MAHE certified course certificate

Module 1: AI in Operations Research and Optimization — 3 hours

- Role of AI in operations research and process optimization
- AI techniques for solving industrial problems: Linear programming, optimization algorithms
- Hands-on training: Applying AI optimization models to industrial processes

Module 2: AI for Supply Chain and Logistics — 3 hours

- AI in supply chain management, demand forecasting, and inventory control
- Case studies: AI-enabled supply chain optimization
- Hands-on training: Building predictive models for supply chain management using Intel AI tools

Module 3: AI in Production Scheduling and Planning — 3 hours

- AI-driven approaches to production scheduling and resource allocation
- Machine learning models for optimizing production workflows
- Hands-on training: Implementing AI-based scheduling models

Module 4: AI in Process Automation and Control — 3 hours

- AI applications in process automation, control, and workflow management
- Use of reinforcement learning in industrial control systems
- Hands-on training: Developing AI models for industrial control processes

Module 5: AI for Workforce Management — 3 hours

- AI in human resource management and workforce planning in industrial settings
- Machine learning models for employee performance evaluation and optimization
- Hands-on training: Applying AI for workforce planning and management
  Hands-on Training (10 hours)
- Using Intel AI tools for real-world industrial applications such as supply chain optimization, production scheduling, and process automation

Assessment Plan

- Assignment
- Mini Project

Course Coordinator

Prof. Nithesh Naik

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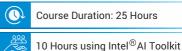
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Intel® Unnati
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AI for
Aerospace Engineers
Transforming Flight and Space Technologies

Intel® Unnati
Data-Centric Labs in Emerging Technologies

⊕	Course Duration: 25 Hours
🤲	10 Hours using Intel® AI Toolkit
⚙	Assignments + Mini Project
👤	Intermediate to Advanced

Department of Mechanical & Industrial Engineering
Manipal Institute of Technology, Manipal, Karnataka, India

AI for Aerospace Engineers

Course Structure:
- Total Duration: 25 hours (5 modules, 3 hours each + 10 hours hands-on training)
- Tools Used: Intel®AI Toolkit
- Hands-on Training: The course includes practical, real-world AI applications in respective fields using Intel AI tools
- Assessment: Assignment + Mini Project

Expertise Level: Intermediate to Advanced

Prerequisites
- Strong background in aerospace engineering concepts
- Knowledge of control systems, aerodynamics, and basic AI techniques
- Familiarity with data analysis and programming

Outcomes
When you enrol in this course,
- Learn new concepts from trained experts from Intel
- Gain a foundational understanding of a subject or tool
- Develop relevant skills with hands-on projects
- Earn a Intel®- MAHE certified course certificate

Module 1: AI for Aircraft Health Monitoring	3 hours

- AI applications in aircraft system diagnostics and health monitoring
- Predictive maintenance using AI algorithms for aerospace equipment
- Hands-on training: AI models for aircraft fault detection using Intel tools

Module 2: AI in Flight Path Optimization	3 hours

- Role of AI in optimizing flight paths for fuel efficiency and safety
- AI techniques for route planning and weather prediction in aerospace
- Hands-on training: Developing flight path optimization models using AI

Module 3: AI for Aerospace Materials Design	3 hours

- AI in designing and analyzing materials used in aerospace engineering
- Machine learning models for predicting material behavior under stress
- Hands-on training: AI models for aerospace material optimization

Module 4: AI in Autonomous Flight Systems — 3 hours

- AI applications in autonomous drones and unmanned aerial vehicles (UAVs).
- AI techniques for real-time decision-making and control in autonomous flight.
- Hands-on training: Building AI-based autonomous flight models using Intel tools

Module 5: AI in Space Exploration — 3 hours

- AI applications in satellite systems, space exploration, and mission planning
- Case studies: AI in Mars Rover and space station automation
- Hands-on training: AI models for space exploration and satellite management Hands-on Training (10 hours)
- Practical exercises using Intel's AI tools for aerospace applications such as flight path optimization, UAVs, and space exploration projects

Assessment Plan

- Assignment
- Mini Project

Course Coordinator

Dr. Pavan Hiremath

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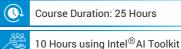✉ intelunnati.mit@manipal.edu

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AI for
Automobile Engineers

The Future of Intelligent Vehicles

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Data-Centric Labs in Emerging Technologies

Course Duration: 25 Hours

10 Hours using Intel®AI Toolkit

Assignments + Mini Project

Beginner

Department of Mechanical & Industrial Engineering

Manipal Institute of Technology, Manipal, Karnataka, India

AI for Automobile Engineers

Course Structure:
- Total Duration: 25 hours (5 modules, 3 hours each + 10 hours hands-on training)
- Tools Used: Intel®AI Toolkit
- Hands-on Training: The course includes practical, real-world AI applications in respective fields using Intel AI tools
- Assessment: Assignment + Mini Project

Expertise Level: Intermediate

Prerequisites
- Foundational understanding of automotive engineering
- Knowledge of autonomous vehicle technologies is helpful
- Basic experience in AI/ML applications and programming skills

Outcomes
When you enrol in this course,
- Learn new concepts from trained experts from Intel
- Gain a foundational understanding of a subject or tool
- Develop relevant skills with hands-on projects
- Earn a Intel®- MAHE certified course certificate

Module 1: AI for Autonomous Vehicles — 3 hours
- AI techniques for autonomous vehicle control, navigation, and safety systems
- Sensor data processing and AI-based decision-making in autonomous driving
- Hands-on training: Developing AI models for self-driving cars using Intel AI tools

Module 2: AI in Vehicle Maintenance and Diagnostics — 3 hours
- Predictive maintenance using AI for diagnosing vehicle issues before failure
- Machine learning models for real-time vehicle diagnostics
- Hands-on training: AI-based predictive maintenance models

Module 3: AI for Traffic Management and Route Planning — 3 hours
- AI in optimizing traffic management systems and reducing congestion
- AI models for intelligent route planning and vehicle routing
- Hands-on training: Building AI models for traffic prediction

Module 4: AI in Electric Vehicles — 3 hours
- Role of AI in enhancing battery management systems in electric vehicles
- AI-driven energy consumption prediction and optimization
- Hands-on training: Developing AI models for electric vehicle systems

Module 5: AI for In-Vehicle Infotainment and Driver Assistance — 3 hours

- AI in enhancing user experience with in-vehicle infotainment systems
- AI models for advanced driver assistance systems (ADAS)
- Hands-on training: Implementing AI-based driver assistance models

Hands-on Training — 10 hours

- Using Intel AI tools for building models for autonomous vehicles, vehicle maintenance, and traffic management systems

Assessment Plan

- Assignment
- Mini Project

Course Coordinator

Dr. Shilpa Suresh
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Prof. Nithesh Naik
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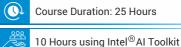✉ intelunnati.mit@manipal.edu

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Intel® Unnati
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AI for
Civil Engineers

Revolutionizing Civil Engineering

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Data-Centric Labs in Emerging Technologies

Course Duration: 25 Hours

10 Hours using Intel® AI Toolkit

Assignments + Mini Project

Beginner

Department of Mechanical & Industrial Engineering
Manipal Institute of Technology, Manipal, Karnataka, India

AI for Civil Engineers

Course Structure:
- Total Duration: 25 hours (5 modules, 3 hours each + 10 hours hands-on training)
- Tools Used: Intel®AI Toolkit
- Hands-on Training: The course includes practical, real-world AI applications in respective fields using Intel AI tools
- Assessment: Assignment + Mini Project

Expertise Level: Intermediate

Prerequisites
- Familiarity with civil engineering principles
- Basic understanding of data analysis, predictive modeling, and AI applications
- Python programming experience and knowledge of sensors or IoT technologies is beneficial

Outcomes
When you enrol in this course,
- Learn new concepts from trained experts from Intel
- Gain a foundational understanding of a subject or tool
- Develop relevant skills with hands-on projects
- Earn a Intel®- MAHE certified course certificate

Module 1: AI for Construction Site Management | 3 hours

- AI in managing construction site activities, resource allocation, and safety
- Use of computer vision and AI for monitoring construction progress
- Hands-on training: Developing AI models for site management

Module 2: AI for Structural Health Monitoring | 3 hours

- AI techniques for monitoring the health of civil structures like bridges, buildings, and dams
- Predictive maintenance for infrastructure using sensor data and AI
- Hands-on training: Implementing AI models for detecting structural anomalies using Intel AI tools

Module 3: AI in Transportation Engineering | 3 hours

- AI applications in transport systems for traffic management and road safety
- Use of machine learning models to predict traffic flow and optimize urban transport
- Hands-on training: Developing AI-based traffic prediction models using real-time data

Module 4: AI in Geotechnical Engineering — 3 hours

- AI in analyzing soil properties, seismic data, and foundation behavior
- AI models for landslide prediction and geotechnical risk assessment
- Hands-on training: Applying machine learning to geotechnical datasets using Intel tools

Module 5: AI for Smart Cities and Urban Planning — 3 hours

- Role of AI in designing smart cities and optimizing urban infrastructure
- AI-driven models for urban resource management and environmental monitoring
- Hands-on training: Building AI solutions for smart city applications

Hands-on Training — 10 hours

- Comprehensive lab session focused on implementing AI models for civil engineering applications, including traffic prediction, structural health monitoring, and smart city planning using Intel AI tools like Intel® Distribution of OpenVINO™ toolkit and Intel® AI Analytics Toolkit

Assessment Plan

- Assignment
- Mini Project

Course Coordinator

Dr. Balakrishna S Maddodi

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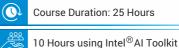
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AI for
Dental Professionals
- Part I
AI Applications in Dentistry

Intel® Unnati
Data-Centric Labs in Emerging Technologies

Course Duration: 25 Hours

10 Hours using Intel®AI Toolkit

Assignments + Mini Project

Beginner

Department of Mechanical & Industrial Engineering
Manipal Institute of Technology, Manipal, Karnataka, India

AI for Dental Professionals - Part I

Course Structure:
- Total Duration: 24 hours (4 modules, 3 hours each + 12 hours hands-on training)
- Tools Used: Intel®AI Toolkit
- Hands-on Training: Applications of AI in dentistry with real-world scenarios
- Assessment: Assignment + Mini Project

Expertise Level: Intermediate

Prerequisites
- Basic knowledge of dental practices and procedures
- Familiarity with basic programming or data analysis is beneficial but not required
- Understanding of dental imaging and diagnostics is helpful

Outcomes
- Understand AI's role and applications in modern dentistry
- Gain practical skills with AI tools relevant to dental professionals
- Develop and implement AI solutions for real-world dental challenges
- Earn a Intel®- MAHE certified course certificate

Module 1: Introduction to AI in Dentistry	3 hours

- Overview of AI and its relevance to dental practice
- Case studies: AI in diagnostics, treatment planning, and patient management
- Key AI concepts: Image recognition, predictive analytics, and decision support
- Tools and platforms used in dental AI

Module 2: AI for Diagnostic Imaging	3 hours

- Application of AI in interpreting dental X-rays, CT scans, and MRI
- Techniques in image enhancement and feature extraction
- Hands-on: Using AI tools to analyze and interpret dental imaging data

Module 3: AI in Treatment Planning and Personalization	3 hours

- AI-driven treatment planning and outcome prediction
- Personalized dental care through AI algorithms
- Hands-on: Developing AI models for treatment recommendations and patient-specific care

Module 4: AI for Patient Management and Workflow Optimization   3 hours

- AI tools for improving patient management and operational efficiency
- Use of AI in scheduling, patient communication, and record management
- Hands-on: Implementing AI solutions to streamline dental practice workflows

Hands-on Training   8 hours

- Part 1: Exploring AI tools for diagnostic imaging and treatment planning
- Part 2: Developing and applying AI models to real-world dental scenarios

Assessment Plan

- Assignment
- Mini Project

Course Coordinator

Dr. Vathsala

Department of Oral Medicine and Radiology
Manipal College of Dental Sciences, Manipal

Dr. Shilpa Suresh

Department of Mechatronics
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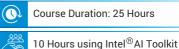
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AI for
Dental Professionals
- Part II
Advanced AI for Transforming Clinical Practice

Intel® Unnati
Data-Centric Labs in Emerging Technologies

Course Duration: 25 Hours
10 Hours using Intel®AI Toolkit
Assignments + Mini Project
Beginner

Department of Mechanical & Industrial Engineering
Manipal Institute of Technology, Manipal, Karnataka, India

AI for Dental Professionals - Part II

Course Structure:
- Total Duration: 25 hours (5 modules, 3 hours each + 10 hours hands-on training)
- Tools Used: Intel®AI Toolkit
- Hands-on Training: Advanced applications of AI in dentistry with practical, real-world scenarios
- Assessment: Assignment + Mini Project

Prerequisites
- Intermediate knowledge of dental practices and procedures
- Familiarity with AI concepts and basic programming skills
- Experience with dental imaging and data analysis is advantageous

Outcomes
- Master advanced AI techniques applicable to dental practice
- Develop sophisticated AI models for enhancing diagnostic and treatment processes
- Apply AI solutions to complex clinical scenarios and improve patient outcomes
- Earn a Intel®- MAHE certified course certificate

Module 1: Advanced AI in Dental Diagnostics — 3 hours

- In-depth exploration of AI in diagnostic imaging and anomaly detection
- Advanced algorithms for image segmentation and pattern recognition
- Hands-on: Implementing complex AI models for enhanced diagnostic accuracy

Module 2: AI for Predictive Analytics in Dentistry — 3 hours

- Techniques for predicting treatment outcomes and patient risk factors
- Using AI for long-term patient monitoring and trend analysis
- Hands-on: Developing predictive models for patient care and treatment planning

Module 3: AI and Machine Learning in Personalized Dentistry — 3 hours

- Tailoring treatments using AI to individual patient data and preferences
- Integration of machine learning with patient-specific factors for personalized care
- Hands-on: Creating AI-driven personalized treatment plans and recommendations

Module 4: AI for Workflow Optimization and Practice Management — 3 hours

- Advanced AI tools for optimizing dental practice operations and patient management
- Automation and efficiency improvements in administrative tasks and patient interactions
- Hands-on: Implementing AI solutions to streamline practice workflows and patient communication

Module 5: Emerging Trends and Future Directions in AI Dentistry — 3 hours

- Exploration of cutting-edge AI technologies and their potential impact on dentistry
- Future trends, ethical considerations, and integrating new AI advancements
- Hands-on: Prototyping innovative AI applications and discussing future possibilities

Hands-on Training — 10 hours

- Part 1: Advanced AI tools for diagnostic imaging, predictive analytics, and personalized care
- Part 2: Building and testing sophisticated AI models for real-world dental applications, including practice management and future trends

Assessment Plan

- Assignment
- Mini Project

Course Coordinator

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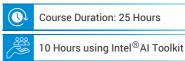✉ intelunnati.mit@manipal.edu

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AI for Radiologists for Radiodiagnosis

Enhancing Diagnostic Accuracy and Workflow

Intel® Unnati
Data-Centric Labs in Emerging Technologies

🕐	Course Duration: 25 Hours
🤲	10 Hours using Intel® AI Toolkit
⚙️	Assignments + Mini Project
🧍	Beginner

Department of Mechanical & Industrial Engineering
Manipal Institute of Technology, Manipal, Karnataka, India

AI for Radiologists for Radiodiagnosis

Course Structure:
- Summary of Course Structure
- Total Duration: 30 hours (6 modules, 3 hours each + 12 hours hands-on training)
- Tools Used: Intel®AI Toolkit
- Hands-on Training: Advanced applications of AI in radiology with practical, real-world scenarios
- Assessment: Assignment + Mini Project

Prerequisites
- Intermediate knowledge of radiology and radiodiagnosis
- Familiarity with basic AI concepts and machine learning
- Experience with radiological imaging and diagnostic procedures

Outcomes
- Master advanced AI techniques specific to radiology and diagnostic imaging
- Enhance diagnostic accuracy and workflow efficiency through AI
- Develop and implement AI solutions for real-world radiology applications
- Earn a Intel®- MAHE certified course certificate

Module 1: Introduction to AI in Radiology   3 hours
- Overview of AI applications in radiology and their impact on diagnostics
- Key AI concepts relevant to imaging: Convolutional Neural Networks (CNNs), Image segmentation, and Classification
- Tools and platforms used in radiology AI

Module 2: AI for Diagnostic Imaging Enhancement   3 hours
- Techniques for image enhancement and artifact reduction using AI
- Advanced algorithms for image processing and quality improvement
- Hands-on: Implementing AI models to enhance diagnostic imaging

Module 3: AI in Disease Detection and Classification   3 hours
- AI techniques for detecting and classifying diseases from imaging data
- Case studies: Cancer detection, cardiovascular diseases, and neurological disorders
- Hands-on: Developing AI models for disease detection and classification

Module 4: AI for Workflow Optimization and Efficiency   3 hours
- AI tools for optimizing radiology workflows and improving efficiency
- Automation of routine tasks: Image triage, report generation, and patient management
- Hands-on: Implementing AI solutions to streamline radiology operations

Module 5: Advanced AI Techniques in Radiology — 3 hours

- Deep learning approaches and their applications in complex diagnostic scenarios
- Integration of AI with radiology information systems (RIS) and picture archiving and communication systems (PACS)
- Hands-on: Creating and testing advanced AI models for complex imaging tasks

Module 6: Future Directions and Ethical Considerations in AI Radiology — 3 hours

- Emerging trends and future advancements in AI for radiology
- Ethical considerations and regulatory aspects of AI in clinical practice
- Hands-on: Prototyping innovative AI applications and discussing their potential impact

Hands-on Training (12 hours) — 12 hours

- Part 1: Using AI tools for image enhancement, disease detection, and classification in radiology
- Part 2: Building and deploying AI models for optimizing workflows and integrating with existing radiology systems

Assessment Plan

- Assignment
- Mini Project

Course Coordinator

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Manipal Institute of Technology, Manipal

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Intel® Unnati
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AI for
Healthcare Professionals

Future of Healthcare

Intel® Unnati
Data-Centric Labs in Emerging Technologies

Course Duration: 25 Hours
10 Hours using Intel® AI Toolkit
Assignments + Mini Project
Beginner

Department of Mechanical & Industrial Engineering
Manipal Institute of Technology, Manipal, Karnataka, India

AI for Healthcare Professionals

Course Structure:
- Total Duration: 25 hours (5 modules, 3 hours each + 8 hours hands-on training)
- Tools Used: Intel®AI Toolkit
- Hands-on Training: Practical applications of AI in healthcare with real-world scenarios relevant to MBBS students
- Assessment: Assignment + Mini Project

Prerequisites
- Basic knowledge of medical sciences and clinical practices
- Familiarity with fundamental AI and machine learning concepts is beneficial but not required
- Understanding of data analysis and healthcare data systems is helpful

Outcomes
- Gain practical knowledge of AI applications in healthcare
- Develop skills to apply AI tools and techniques in clinical settings
- Enhance understanding of how AI can improve patient care and medical decision-making
- Earn a Intel®- MAHE certified course certificate

Module 1: Introduction to AI in Healthcare — 3 hours
- Overview of AI applications and their impact on healthcare
- Key AI concepts: Machine learning, Natural language processing (NLP), and Data analytics
- Examples of AI in diagnostics, treatment planning, and patient management

Module 2: AI for Diagnostic Support and Decision-Making — 3 hours
- AI tools for enhancing diagnostic accuracy and clinical decision-making
- Case studies: AI in radiology, pathology, and medical imaging
- Hands-on: Using AI to analyze diagnostic data and support clinical decisions

Module 3: AI in Patient Management and Personalized Medicine — 3 hours
- AI applications in managing patient care and personalizing treatment plans
- Techniques for predictive analytics and patient monitoring
- Hands-on: Developing AI models for patient risk assessment and personalized treatment recommendations

Module 4: AI in Medical Research and Evidence-Based Medicine   3 hours

- Role of AI in accelerating medical research and systematic reviews
- Use of AI for data mining, literature review, and evidence synthesis
- Hands-on: Applying AI tools to conduct research and analyze medical data

Module 5: Ethical Considerations and Future Directions in AI Healthcare   3 hours

- Ethical issues and regulatory challenges associated with AI in healthcare
- Future trends and advancements in AI technologies
- Hands-on: Exploring innovative AI applications and discussing their implications

Hands-on Training   8 hours

- Part 1: Practical exercises with AI tools for diagnostic support, patient management, and research
- Part 2: Implementing AI models and analyzing real-world healthcare data to understand their practical applications

Assessment Plan

- Assignment
- Mini Project

Course Coordinator

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Manipal Institute of Technology, Manipal

Prof. Priya Kamath

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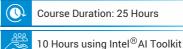
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Intel® Unnati

Data-Centric Labs in Emerging Technologies

AI in
Hospitality Industry

*Transforming Hotel Management
with Artificial Intelligence*

Intel® Unnati
Data-Centric Labs in Emerging Technologies

Course Duration: 25 Hours	
10 Hours using Intel® AI Toolkit	
Assignments + Mini Project	
Beginner	

Department of Mechanical & Industrial Engineering
Manipal Institute of Technology, Manipal, Karnataka, India

AI in Hospitality Industry

Course Structure:
- Total Duration: 25 hours (5 modules, 3 hours each + 8 hours hands-on training)
- Tools Used: Intel®AI Toolkit
- Hands-on Training: Practical applications of AI in hospitality with real-world scenarios relevant to hotel management
- Assessment: Assignment + Mini Project

Prerequisites
- Basic knowledge of hotel management principles and hospitality operations
- Familiarity with fundamental AI concepts and data analysis is beneficial but not required
- Understanding of customer service and operational workflows in hospitality is helpful

Outcomes
- Gain practical knowledge of AI applications in hotel management and guest services
- Develop skills to implement AI tools to enhance operational efficiency and guest experiences
- Understand how AI can drive innovation and improve service quality in the hospitality industry
- Earn a Intel®- MAHE certified course certificate

Module 1: Introduction to AI in Hospitality	3 hours

- Overview of AI technologies and their impact on the hospitality industry
- Key AI concepts: Machine learning, Natural language processing (NLP), and Predictive analytics
- Examples of AI applications in hotel management, guest services, and operational efficiency

Module 2: AI for Enhancing Guest Experience	3 hours

- AI tools for personalizing guest experiences and improving customer service
- Use of chatbots, virtual assistants, and recommendation systems
- Hands-on: Implementing AI-driven solutions for personalized guest interactions and service enhancements

Module 3: AI in Revenue Management and Pricing Strategies	3 hours

- AI applications in dynamic pricing, demand forecasting, and revenue optimization
- Techniques for analyzing booking trends and optimizing room rates
- Hands-on: Developing AI models for pricing strategies and revenue management

Module 4: AI for Operational Efficiency and Automation — 3 hours

- AI tools for streamlining hotel operations, inventory management, and staff scheduling
- Automation of routine tasks: Check-in/check-out processes, housekeeping management, and maintenance
- Hands-on: Applying AI solutions to enhance operational workflows and efficiency

Module 5: AI for Marketing and Customer Insights — 3 hours

- Leveraging AI for targeted marketing, customer segmentation, and campaign optimization
- Analyzing guest data to gain insights and drive marketing strategies
- Hands-on: Using AI tools for creating and evaluating marketing campaigns and customer insights

Hands-on Training — 8 hours

- Part 1: Practical exercises with AI tools for enhancing guest experiences, revenue management, and operational efficiency
- Part 2: Implementing AI solutions in real-world scenarios, including guest interaction systems, pricing models, and operational automation

Assessment Plan

- Assignment
- Mini Project

Course Coordinator

Prof. Anusha Pai
Welcomgroup Graduate School of Hotel Administration
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Prof. Maitri Manjunath
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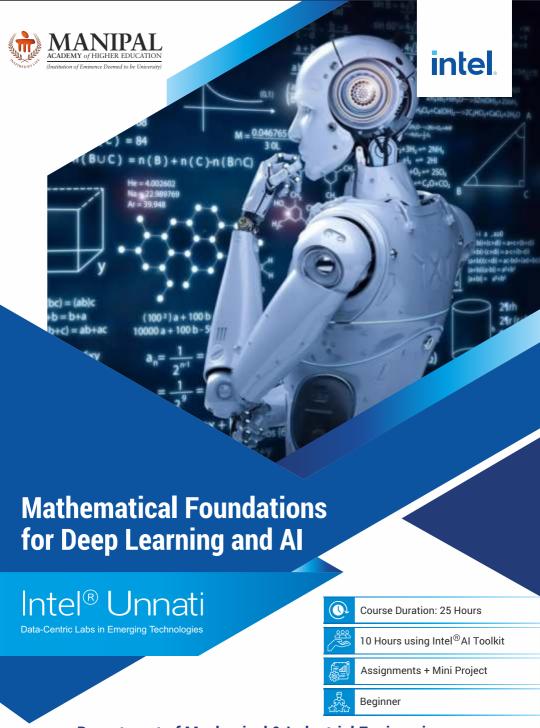Manipal Institute of Technology, Manipal, Karnataka, India

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ACADEMY *of* HIGHER EDUCATION
(Institution of Eminence Deemed to be University)
INSPIRED BY LIFE

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Mathematical Foundations for Deep Learning and AI

Intel® Unnati
Data-Centric Labs in Emerging Technologies

⊙	Course Duration: 25 Hours
	10 Hours using Intel®AI Toolkit
	Assignments + Mini Project
	Beginner

Department of Mechanical & Industrial Engineering
Manipal Institute of Technology, Manipal, Karnataka, India

Mathematical Foundations for Deep Learning and AI

Course Structure:
- Total Duration: 25 hours (5 modules, 3 hours each + 8 hours hands-on training)
- Tools Used: Intel®AI Toolkit
- Hands-on Training: Practical application of mathematical concepts in deep learning and AI models.
- Assessment: Assignment + Mini Project

Prerequisites
- No prerequisites required.
- A background in engineering principles and basic programming is beneficial.

Outcomes
- Gain practical knowledge of AI applications in Mathematical Foundation
- Develop skills to implement AI tools for Mathematical applications
- Earn a Intel®- MAHE certified course certificate

Module 1: Mathematical Foundations	3 hours

- Introduction to recurrent problems like the Tower of Hanoi and the Josephus Problem.
- Understanding sums, recurrences, and integer functions (Floor, Ceiling, Mod).

Module 2: Linear Algebra and Regression	3 hours

- Mathematical concepts in linear and logistic regression.
- Gradient descent and optimization algorithms.
- Exploring concepts like bias-variance tradeoff and data normalization.

Module 3: Dimensionality Reduction and Neural Networks	3 hours

- Principal Component Analysis (PCA) and its practical applications.
- Introduction to neural networks, activation functions, and vectorization.
- Fundamentals of back propagation and auto-differentiation.

Module 4: Deep Learning Basics	3 hours

- Overview of convolutional neural networks (CNNs).
- Practical implementation of CNNs with illustrative examples.

Module 5: Advanced Techniques	3 hours

- Applications of support vector machines (SVMs) and multi-class SVM.
- Case studies on underfitting, overfitting, and real-world problem-solving.

- Using the Intel AI Toolkit to build and analyze models.

Assessment Plan

- Assignment
- Mini Project

Course Coordinator

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