

COURSE TITLE	AI & MACHINE LEARNING IN MOBILE APPS
COURSE CODE	05MB0306
COURSE CREDITS	2

Objective:

- 1 Understand the fundamentals of Artificial Intelligence and Machine Learning in the context of mobile application development.
- 2 Explore ML model integration in Android and iOS apps using tools like TensorFlow Lite and CoreML.
- 3 Learn to process and visualize mobile data for building intelligent mobile experiences.
- 4 Implement use-cases like face detection, text recognition, recommendation systems, and predictive analytics in mobile apps.
- 5 Gain knowledge of on-device ML vs. cloud-based ML and the trade-offs involved in mobile deployment.

Course Outcomes: After completion of this course, student will be able to:

- 1 Define the core concepts of AI & ML and explain their application in mobile environments.
- 2 Differentiate between various types of learning models and mobile ML platforms.
- 3 Demonstrate usage of pre-trained ML models for tasks such as face detection, OCR, and translation.
- 4 Build and integrate custom-trained models into mobile apps using TensorFlow Lite and CoreML.
- 5 Optimize ML models for mobile deployment and address ethical concerns around mobile AI.

Pre-requisite of course: Basic programming knowledge, Understanding of mobile app development (Android/iOS or cross-platform)

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
2	0	0	50	30	20	0	0

Contents : Unit	Topics	Contact Hours
1	Introduction to AI & ML in Mobile Apps Overview of AI & ML: Concepts and Applications in Mobile Apps , AI vs. ML vs. Deep Learning, Supervised vs. Unsupervised Learning, Introduction to Mobile ML Platforms: TensorFlow Lite, CoreML, ML Kit, On-Device ML vs Cloud-based ML – Performance, Latency & Security, Data Collection, Preprocessing & Model Training Basics, Types of Models used in Mobile Apps: Classification, Regression, Object Detection, Introduction to Mobile Data Handling & Feature Engineering	15
2	Machine Learning Models in Mobile Apps Using Pre-trained Models in Android/iOS using TensorFlow Lite/CoreML, ML Kit for Firebase – Use Cases & Setup, Hands-on ML Features, Face Detection, Text Recognition (OCR), Language Translation, Image Labeling, Barcode Scanning, Creating Custom Models: Training and Conversion for Mobile, Model Optimization for Mobile – Quantization, Pruning, Ethical AI & Bias in Mobile AI Systems, Case Studies: Chatbots, Recommendation Engines, Smart Notifications	15
Total Hours		30

Textbook :

- 1 AI and Mobile Devices: A Practical Guide to Implementing AI on Mobile Devices, Gerardus Blokdyk, 5STARCOOKS, 2020
- 2 AI and Machine Learning for Mobile Developers: Leverage TensorFlow Lite, ML Kit, and Core ML, B. M. Harwani, Apress, 2022

References:

- 1 Hands-On Machine Learning with TensorFlow Lite on Android , Hands-On Machine Learning with TensorFlow Lite on Android , Anubhav Singh, Packt Publishing, 2020
- 2 Mobile Deep Learning with TensorFlow Lite, ML Kit and Flutter , Mobile Deep Learning with TensorFlow Lite, ML Kit and Flutter , Karthik Ramasubramanian, Packt Publishing, 2020

Suggested Theory Distribution:

The suggested theory distribution as per Bloom’s taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery					
Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking / Creative
10.00	20.00	25.00	25.00	10.00	10.00

Instructional Method:

- 1 Board Work, PPT

Supplementary Resources:

- 1 <https://developers.google.com/ml-kit>
- 2 <https://www.tensorflow.org/lite>