Course Name: MLOps
Course Code: TE7941
Faculty: Engineering
Course Credit: 3
Course Level: 3
Sub-Committee (Specialization): Artificial Intelligence and Machine Learning
Learning Objectives:

Students will be able to - 1. Learn fundamental concepts of MLOps
2. Get insights into the ML lifecycle process
3. Explore MLOPs API techniques
4. Understand various cloud-based API for MLOps such as GCP, AWS, etc
5. Explore ML Deployment pipelines

Books Recommended:

Book	Author	Publisher
Engineering MLOps: Rapidly Build, Test, and Manage Production-ready Machine Learning Life Cycles at Scale	Raj, E. 2021	Packt Publishing
Introducing MLOps	Treveil, M., Omont, N., Stenac, C., Phan, D., Miyazaki, M., Heidmann, L., Lavoillotte, A., Lefevre, K., Zentici, J.	Taiwan: OReilly Media

Course Outline:

Sr. No.	Topic	Actual Teaching Hours	Contact Hours Equivalence
1	**Introduction to MLOps** What is MLOps amp; MLOps Motivation, Solutions and Future Trends, MLOps Components, Different Roles involved in MLOps MLEngineering Operations , Machine Learning Life Cycle, MLOps VsDevOps, Major Phases what it takes to master MLOps, Different tools for MLOps, MLOps Maturity Model Levels, MLOps - Stages Of CI / CD	**8**	**8**
2	**Overview of the ML Lifecycle and Deployment** Collecting, Labeling, and Validating data, Implement feature engineering, transformation, and selection with TensorFlow Extendedby encoding structured and unstructured data types and addressingclass imbalances, Understand the data journey over a productionsystems lifecycle and leverage ML metadata and enterprise schemas to address quickly evolving data, Combine labeled and unlabeled data to improve ML accuracy and augment data to diversify your training set	**8**	**8**
3	**Introduction to ML API Development and Deployment** What Does it Take to Deploy an ML Model Runtime Environments, Adaptation from Development to Production Environments, Data Access Before Validation and Launch to Production, Model Risk Evaluation, Quality Assurance for Machine Learning-Reproducibility and Auditability, Machine Learning Security, Introduction to FLASK API, MLFlow, etc	**10**	**10**
4	**ML Deployment and Pipelines**	**10**	**10**

	CI/CD Pipelines, Building ML Artifacts, whats in an ML Artifact, The Testing Pipeline, Deployment Strategies, Categories of Model Deployment, Considerations When Sending Models to Production, Maintenance in Production, Containerization, Scaling Deployments, Requirements and Challenges		
5	**Model Governance** Who Decides What Governance the Organization Needs , Matching Governance with Risk Level, Current Regulations Driving MLOps Governance, The Emergence of Responsible AI, Key Elements of Responsible AI	**9**	**9**
	Total	**45**	**45**

Pre Requisites:

None

Evaluation:

A) Continuous Assessment

1. Quizzes/Assignments/Class Tests
2. Capstone Project
3. Viva-voce

B) End Semester Examination

Pedagogy:

1. Lectures
2. Seminars
3. Hands-on activities

Expert:

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