**Machine Learning Operations**

# Course Code: Credits:

**L: P: T: S: CIE Marks:**

# Exam Hours: SEE Marks:

**Total Hours:**

# Course objectives:

1. To introduce Machine Learning lifecycle – Research to Production

2. Create a production ready project along with the project structure

3. To familiarize stages of deployment

4. Create automation pipeline.

5. Introduction to ML Observability

# Course Outcomes: At the end of the course, student will be able to:

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| CO1 | Understand Machine Learning Life Cycles and the tools ecosystem. Create a production ready application based on ML binary classification model. |
| CO2 | Understand Code Version Controls, Prepare the Production environment |
| CO3 | Experiment tracking, Model training, test and service strategies |
| CO4 | Establishing the CI / CD pipeline, containerization, Orchestration |
| CO5 | Post Deployment Monitoring |

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| **Unit** | **Contents of the Unit** | **Hours** | **CO’s** |
| 1. | What is MLOps, Machine Learning Life Cycle, MLOps ecosystem, MLOps Stages and challenges, MLOps features – Production ready project, Development, Deployment strategies and Requirements, Monitoring, Governance, **Create a Production ready Binary Classification application, Model packaging with FLASK, Streamlit, .exe**  **Intro to Virtual Environment**  **Intro to Auto ML** | 10 | **CO1** |
| 2. | MLOps Principles, MLOps components, **Version Control, Creating the first DevOps project, Preparing environment for production, YAML Crash Course** | 08 | **CO2** |
| 3. | **Experiment tracking, Model registries, Building ML artifacts,** Establishing Deployment strategies, **Deployment to production** | 08 | **CO3** |
| 4. | Explain ability - SHAP and LIME, **Containerization and Orchestration,** Introduction to Docker and Kubernetes, | 08 | **CO4** |
| 5. | **Monitoring and Feedback loop, Drift detection** and retraining strategy, Model Governance, Responsible AI | 08 | **CO5** |

**Text Book(s):**

1. Introducing MLOps by Mark Treveil
2. Practical MLOps by Noah Gift
3. [Engineering MLOps](https://www.packtpub.com/product/engineering-mlops/9781800562882) by [Emmanuel Raj](https://www.linkedin.com/in/emmanuelraj7/)