SYLLABUS

Course Name:	**AI in DevOps, DataOps, MLOps**
Course Code:	DDM501
No of credits:	03
Time Allocation:	Study hours (150h) *- Online (44h) + Offline: 3 slots of mentors* *- Self-study (106h)*
Prerequisite:	No

I. DESCRIPTION

Learn how to apply Machine Learning Operations (MLOps) to solve real-world problems. The course covers end-to-end solutions with Artificial Intelligence (AI) pair programming using technologies like GitHub Copilot to build solutions for machine learning (ML) and AI applications. This course is for people working (or seeking to work) as data scientists, software engineers or developers, data analysts, or other roles that use ML.

By the end of the course, you will be able to use web frameworks (e.g., Gradio and Hugging Face) for ML solutions, build a command-line tool using the Click framework, and leverage Rust for GPU-accelerated ML tasks.

Week 1: Explore MLOps technologies and pre-trained models to solve problems for customers.

Week 2: Apply ML and AI in practice through optimization, heuristics, and simulations.

Week 3: Develop operations pipelines, including DevOps, DataOps, and MLOps, with Github.

Week 4: Build containers for ML and package solutions in a uniformed manner to enable deployment in Cloud systems that accept containers.

Week 5: Switch from Python to Rust to build solutions for Kubernetes, Docker, Serverless, Data Engineering, Data Science, and MLOps.

II. MAIN OBJECTIVES

By the end of the course, students will:

- Build operations pipelines using DevOps, DataOps, and MLOps;
- Explain the principles and practices of MLOps (i.e., data management, model training and development, continuous integration and delivery, etc.);
- Build and deploy machine learning models in a production environment using MLOps tools and platforms.

Mapping CLOs to PLOs:

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9
CLO1	X								
CLO2	X	X	X						
CLO3		X	X						

III. TEACHING METHODS

In order to achieve the best course objectives, teaching methods and activities are used spontaneously, including:

- Teaching theory
- Group activities
- Group presentations

In addition, during the learning process, faculty can use different methods to achieve the teaching goals in the best way.

IV. STUDENT'S TASK

- Students must complete 1 MOOC course certificate
- Students are responsible for doing the final project given by instructor in class or at home and submitting it on time.
- Constantly follow announcements from training dept. for up-to-date course information.

V. TEACHING & LEARNING MATERIALS

MOOC courses:

https://www.coursera.org/learn/devops-dataops-mlops-duke

VI. SCHEDULE

Module	Content	CLO
1	**Introduction to MLOps** In this module, you will learn how to apply foundational skills in MLOps to build machine learning solutions and apply it by building microservices in Python	CLO2
2	**Essential Math and Data Science** In this module, you will learn how to apply essential skills in math and data science for MLOps and apply it by building simulations.	CLO3
3	**Operations Pipelines: DevOps, DataOps, MLOps** In this module, you will learn how to build operations pipelines and then apply these skills by building solutions for pre-trained Hugging Face models	CLO1, CLO2
4	**End to End MLOps and AIOps** In this module, you will learn how to build end to end MLOps and AIOps solutions and apply it by building solutions with pre-trained models from OpenAI while benefiting from using AI Pair Programming tools like GitHub Copilot	CLO1, CLO3
5	**Rust for MLOps: The Practical Transition from Python to Rust** In this module, you will learn how to switch from Python to Rust, a powerful and efficient systems programming language. This module will cover various practical applications of Rust, such as CLI, Web, and MLOps solutions, as well as cloud computing solutions for AWS, GCP, and Azure. You'll also	CLO3

	learn how to build Rust solutions for Kubernetes, Docker, Serverless, Data Engineering, Data Science, and Machine Learning Operations (MLOps). By the end of this module, you will have a strong understanding of Rust's key syntax and features, and be able to leverage Rust for GPU-accelerated machine learning tasks.	

VII. ASSESSMENT

Conditions for taking the final assessment (FE): Students must complete all the modules and receive a course completion certificate provided by Coursera.

Assessment type	Symbol	Weight	How
ON-GOING (Coursera)	C	40%	Recorded by Coursera
FINAL ASSESSMENT (Assignment)	FE	60%	- The assignment given by the lecturer - Minimum score: 4/10
Course grade = C x 40% + FE x 60% Completion Criteria: Course grade>=5 & Final assessment >=4 (Score:10) Detailed assessment in the Appendix			

APPENDIX: DETAILED ASSESSMENT

Assessment Category	Assessment Type	Weight	Minimum value to meet completion criteria	Duration	Learning outcomes	Number of questions	Scope of knowledge and skill of question	How
Assignment	Final	60	4		CLO1-CLO3	1	Summary of the content of all topics	Evaluation based on the requirements of the question