COURSE DATA

DATA SUBJECT

Code: 46580
Name: Productivization and implementation
Cycle: Master's Degree
ECTS Credits: 3
Academic year: 2026-27

STUDY (S)

Degree	Center	Acad. year	Period
2262 - Master's Degree in Data Science	Escola Tècnica Superior d'Enginyeria	1	Second quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
2262 - Master's Degree in Data Science	Productivization and implementation	COMPULSORY

COORDINATION

SORIA OLIVAS EMILIO

SUMMARY

This course focuses on the necessary aspects to take a machine learning project from its conceptualization to its production and subsequent maintenance. The course will address the topic of MLOps, a practice that combines general DevOps concepts adapted for data-based systems to ensure an efficient and effective transition of models to a production environment. Key aspects such as model registration, pipeline execution, inference servers, and model monitoring will be covered. The course includes a module on code change management with GIT. Concepts of productionalization in the AWS cloud will be presented and applied, using tools such as SageMaker and its integration with Spark, Debugger, and concepts about continuous integration in AWS. Lastly, concepts about project management (Coordination, supervision, risk management) applied to machine learning will be introduced.

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

There are no specified enrollment restrictions with other subjects of the curriculum.

OTHER REQUIREMENTS

No prerequisites needed

COMPETENCES / LEARNING OUTCOMES

2262 - Master's Degree in Data Science

Be able to assess the need to complete their technical, scientific, language, computer, literary, ethical, social and human education, and to organise their own learning with a high degree of autonomy.

Be able to defend criteria with rigor and arguments and to present them properly and accurately.

Capacidad de organización y planificación de actividades de investigación, desarrollo y consultoría en el área de ciencia de datos.

Capacidad para trabajar en equipo para llegar a soluciones de problemas interdisciplinarios usando técnicas de análisis de datos.

Diseñar y poner en marcha soluciones basadas en análisis de datos teniendo en cuenta los requisitos específicos para cada aplicación.

Saber realizar las labores propias de su profesión incluyendo, entre otras, la adquisición y clasificación de datos de forma eficiente, aplicación de las técnicas de análisis de datos avanzado para llegar a la extracción de información (científica, de mercado,
etc.) a partir de los mismos.

Seleccionar, atendiendo a criterios de eficiencia, escalabilidad, tolerancia a fallos y adecuación al entorno de producción el paradigma de datos adecuado.

Ser capaces de acceder a herramientas de información (bibliográficas y de empleo) y utilizarlas apropiadamente.

Ser capaces de asumir la responsabilidad de su propio desarrollo profesional y de su especialización en uno o más campos de estudio, aplicando los conocimientos adquiridos en la identificación de salidas profesionales y yacimientos de empleo.

Students should be able to integrate knowledge and address the complexity of making informed judgments based on incomplete or limited information, including reflections on the social and ethical responsibilities associated with the application of their knowledge and judgments.

Students should communicate conclusions and underlying knowledge clearly and unambiguously to both specialized and non-specialized audiences.

Students should possess and understand foundational knowledge that enables original thinking and research in the field.

DESCRIPTION OF CONTENTS

1. Introduction

Life cycle of a machine learning project.
Ideation, goal setting.
Data life cycle.
Model life cycle, operations.

2. MLOps principles

Machine learning operations.
Principles, levels of MLOps.
Roles involved.
General concepts.

3. Basic Tools

Inference servers.
Model registration.
Pipelines.
Monitoring.

4. Managing a machine learning project.

Definition of the scope of the project.
Stakeholder management.
Risk management.
Communication and documentation.
Agile methodology, time and resource management.

5. Change Trackings tools

Git client.
Change Tracking and GitHub.
Codecommit

6. AWS tools for ML

AWS SageMaker.
Amazon algorithms, capabilities and functions.
AWS Debugger, algorithm monitoring.
AWS SageMaker and integration with Spark.
Continuous Integration

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	8,00
Theoretical and practical classes	4,00
Laboratory	18,00
Total hours	**30,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	1,00
Individual or group project	11,50
Independent study and work	10,00
Preparation of lessons	10,00
Preparation for assessment activities	5,00
Resolution of case studies	7,50
Total hours	**45,00**

TEACHING METHODOLOGY

Theoretical activities. Expository development of the subject with the participation of the student in the reso specific questions. Carrying out individual evaluation questionnaires.

Practical activities. Learning through problem solving, exercises and case studies through which skills are acq different aspects of the subject.

Work in laboratory and/or computer classroom. Learning by carrying out activities carried out individually or in sma and carried out in computer classrooms

EVALUATION

Objective test, consisting of one or more exams that will include both theoretical-practical questions and problems (20%).

Assessment of practical activities based on the development of reports or assignments, oral presentations, and the use of the University's e-learning tools (80%).

The same evaluation method will be applied in the second examination session.

REFERENCES

- Practical MLOps: Operationalizing Machine Learning Models 1st Edición. Gift, N., Deza, A. O Reilly 2021.
- Introducing MLOps: How to Scale Machine Learning in the Enterprise. Treveil,M. et alt. OReilly, 2021.
- Engineering MLOps: Rapidly Build, Test, and Manage Production-Ready Machine Learning Life Cycles at Scale. Raj, E. Packt Publishing, 2021.
- Practical Machine Learning with AWS: Process, Build, Deploy, and Productionize Your Models Using AWS. Singh, H. Apress 2020.
- Beginning MLOps with MLFlow : deploy models in AWS Sagemaker, Google Cloud, and Microsoft Azure. Alla, S., Adari, S. Apress 2021.