www.m2i.es
info@m2i.es

Optimization and Control

ECTS: 6 ECTS

COORDINATOR: Aurea María Martínez Varela (aurea@dma.uvigo.es)

UNIVERSITY WHERE THE COORDINATOR IS: UVigo

HAVE YOU GIVEN PERMISSION TO RECORD YOUR CLASSES? Yes

LECTURER 1: Miguel Ernesto Vázquez Méndez (miguelernesto.vazquez@usc.es)

UNIVERSITY WHERE THE LECTURER 1 IS: USC

HAVE YOU GIVEN PERMISSION TO RECORD YOUR CLASSES? Yes

SUBJECT CONTENTS

Part I: Numerical Methods in Optimization

- Chapter 1: Introduction
- Chapter 2: Unconstrained Optimization
- Chapter 3: Constrained Optimization
- Chapter 4: Global Optimization

Part II: Optimal Control

- Chapter 5: Introduction
- Chapter 6: Optimal control problems governed by discrete systems
- Chapter 7: Optimal control problems governed by ordinary differential equations
- Chapter 8: Optimal control problems governed by partial differential equations: elliptic and parabolic systems.

METHODOLOGY

42 class hours where the contents are developed and some examples and exercises are solved.

The work in the classroom should be completed with personal work in order to get a good understanding of the subject.

LANGUAGE USED IN CLASS: Will depend on the audience.

IS IT COMPULSORY TO ATTEND CLASS? It is not compulsory.

BIBLIOGRAPHY

Optimization:

D. Bertsekas, Nonlinear Programming, Athena Scientific, 1999.

J.F. Bonnans - J.C. Gilbert - C. Lémarechal - C. Sagastizábal, Numerical Optimization : Theoretical and Practical Aspects, Springer, 2006.

J. Nocedal - S.J. Wright, Numerical Optimization, Springer, 2006.

Control:

E. Cerdá Tena, Optimización dinámica, Prentice Hall, 2001.

K. Ogata, Ingeniería de control moderna, Pearson-Prentice-Hall, 2010.

F.Tröltzsch, Optimal Control of Partial Differential Equations: Theory, Methods and Applications, AMS (Graduate Studies in Mathematics, Vol 112), 2010.

SKILLS

Basic:

CG1: To have knowledge that provide a basis or opportunity for originality in developing and / or applying ideas, often within a research context, knowing how to translate industrial needs in terms of R & D in the field of mathematics Industrial.

CG3: To be able to integrate knowledge in order to state opinions using information that even incomplete or limited, include reflecting on social and ethical responsibilities linked to the application of their knowledge.

CG4: To have the ability to communicate the findings to specialist and non-specialist audiences in a clear and unambiguous way.

CG5: To have the appropriate learning skills to enable them to continue studying in a way that will be largely self-directed or autonomous, and also to be able to successfully undertake doctoral studies.

Specific:

CE3: To determine if a model of a process is well made and well mathematically formulated from a physical standpoint.

CE5: To be able to validate and interpret the results, comparing them with visualizations, experimental measurements and functional requirements of the physical engineering system.

Modelling specialization

CM1: To be able to extract, using different analytical techniques, both qualitative and quantitative models.

WILL YOU BE USING A VIRTUAL PLATFORM? Yes. faitic.uvigo.es

WILL YOU BE USING ANY SPECIFIC SOFTWARE? Yes. MATLAB

CRITERIA FOR THE 1ST ASSESSMENT OPPORTUNITY

Students are evaluated by means of one (or several) individual projects and/or a final examination (see the official timetable).

CRITERIA FOR THE 2ND ASSESSMENT OPPORTUNITY

Students are evaluated by means of one (or several) individual projects and/or a final examination (see the official timetable).
