



Course guide

250MEA014 - 250MEA014 - Digitalization and Artificial Intelligence

Last modified: 26/06/2024

Unit in charge: Barcelona School of Civil Engineering
Teaching unit: 751 - DECA - Department of Civil and Environmental Engineering.
Degree: MASTER'S DEGREE IN ENVIRONMENTAL ENGINEERING (Syllabus 2024). (Optional subject).
Academic year: 2024 **ECTS Credits:** 5.0 **Languages:** Spanish

LECTURER

Coordinating lecturer: AGUSTÍ PÉREZ FOGUET
Others: AGUSTÍ PÉREZ FOGUET
Arias Vicente, Irene

TEACHING METHODOLOGY

Theoretical classes are devoted to exposing the concepts and basic materials of the subject, presenting examples and carrying out exercises.

Guided activities are carried out to consolidate general and specific learning objectives.

Support material in the form of a detailed teaching plan is provided using the virtual campus ATENEA: content, program of learning and assessment activities conducted and literature.

Although most of the sessions will be given in the language indicated, sessions supported by other occasional guest experts may be held in other languages.

LEARNING OBJECTIVES OF THE SUBJECT

STUDY LOAD

Type	Hours	Percentage
Hours medium group	9,8	7.83
Hours large group	25,5	20.38
Hours small group	9,8	7.83
Self study	80,0	63.95

Total learning time: 125.1 h



CONTENTS

Digitization and modeling

Description:

Control and automation. Hybrid modeling.

Full-or-part-time: 41h 40m

Theory classes: 8h 30m

Practical classes: 3h 15m

Laboratory classes: 3h 15m

Self study : 26h 40m

Learning

Description:

Learning. Neural networks.

Full-or-part-time: 41h 40m

Theory classes: 8h 30m

Practical classes: 3h 15m

Laboratory classes: 3h 15m

Self study : 26h 40m

Bayesian networks and influence diagrams.

Description:

Bayesian networks. Influence diagrams.

Full-or-part-time: 41h 40m

Theory classes: 8h 30m

Practical classes: 3h 15m

Laboratory classes: 3h 15m

Self study : 26h 40m

GRADING SYSTEM

The mark of the course is obtained from the ratings of continuous assessment. Continuous assessment consist in two activities and two written exam. Each part counts the 25% of the course.

The evaluation tests consist of a part with questions about concepts associated with the learning objectives of the course with regard to knowledge or understanding, and a part with a set of application exercises, including computing programming, results discussions, and oral and written presentation in predefined formats.

EXAMINATION RULES.

Failure to perform a continuous assessment activity in the scheduled period will result in a mark of zero in that activity.

The group activities can be qualified considering individual contributions.



BIBLIOGRAPHY

Basic:

- Hersh, M.A. Mathematical modelling for sustainable development. Berlin: Springer, 2006. ISBN 9783540242161.
- Kjærulff, U.B.; Madsen, A.L. Bayesian networks and influence diagrams: a guide to construction and analysis [on line]. Second edition. New York: Springer Science+Business Media, 2014 [Consultation: 17/09/2024]. Available on: <https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?pq-origsite=primo&docID=1030496>. ISBN 9781461451044.
- Greco, S.; Ehrogott, M.; Figueira, J.R. Multiple criteria decision analysis: state of the art surveys: volume 1 and 2 [on line]. 2nd ed. New York: Springer, 2016 [Consultation: 17/09/2024]. Available on: <https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?pq-origsite=primo&docID=4414645>. ISBN 9781493930944.
- Ugarte, M.D.; Militino, A.F.; Arnholt, A.T. Probability and statistics with R. Second Edition. Boca Raton: CRC Press, Taylor & Francis Group, 2016. ISBN 9781466504394.
- Sánchez-Marrè, M. Intelligent decision support systems [on line]. 1a ed. Cham: Springer International Publishing, 2022 [Consultation: 17/09/2024]. Available on: <https://link-springer-com.recursos.biblioteca.upc.edu/book/10.1007/978-3-030-87790-3>. ISBN 9783030877903.