

Course guide

270224 - TAED1 - Advanced Topics in Data Engineering 1

Last modified: 31/01/2025

Unit in charge: Barcelona School of Informatics
Teaching unit: 715 - EIO - Department of Statistics and Operations Research.

Degree: BACHELOR'S DEGREE IN DATA SCIENCE AND ENGINEERING (Syllabus 2017). (Compulsory subject).

Academic year: 2024 **ECTS Credits:** 6.0 **Languages:** Catalan, Spanish, English

LECTURER

Coordinating lecturer: EVA MARIA VIDAL LOPEZ

Others: Segon quadrimestre:
JORDI DOMINGO PASCUAL - 12
EVA MARIA VIDAL LOPEZ - 11, 12

PRIOR SKILLS

those obtained in the previous subjects

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Generical:

CG3. Work in multidisciplinary teams and projects related to the processing and exploitation of complex data, interacting fluently with engineers and professionals from other disciplines.

CG4. Identify opportunities for innovative data-driven applications in evolving technological environments.

CG5. To be able to draw on fundamental knowledge and sound work methodologies acquired during the studies to adapt to the new technological scenarios of the future.

Transversal:

CT2. Sustainability and Social Commitment. To know and understand the complexity of economic and social phenomena typical of the welfare society; Be able to relate well-being to globalization and sustainability; Achieve skills to use in a balanced and compatible way the technique, the technology, the economy and the sustainability.

CT3. Efficient oral and written communication. Communicate in an oral and written way with other people about the results of learning, thinking and decision making; Participate in debates on topics of the specialty itself.

CT4. Teamwork. Be able to work as a member of an interdisciplinary team, either as a member or conducting management tasks, with the aim of contributing to develop projects with pragmatism and a sense of responsibility, taking commitments taking into account available resources.

CT7. Third language. Know a third language, preferably English, with an adequate oral and written level and in line with the needs of graduates.

CT8. (ENG) Perspectiva de gènere. Conèixer i comprendre, des del propi àmbit de la titulació, les desigualtats per raó de sexe i gènere a la societat; Integrar les diferents necessitats i preferències per raó de sexe i de gènere en el disseny de solucions i resolució de problemes.

Basic:

CB2. That the students know how to apply their knowledge to their work or vocation in a professional way and possess the skills that are usually demonstrated through the elaboration and defense of arguments and problem solving within their area of ??study.

CB3. That students have the ability to gather and interpret relevant data (usually within their area of ??study) to make judgments that include a reflection on relevant social, scientific or ethical issues.

CB4. That the students can transmit information, ideas, problems and solutions to a specialized and non-specialized public.

CB5. That the students have developed those learning skills necessary to undertake later studies with a high degree of autonomy

TEACHING METHODOLOGY

Las primeras sesiones serán de introducción a la ética en el área de ciencia e ingeniería de datos. Las siguientes sesiones serán trabajadas por el estudiantado.

Cada semana tiene un tema asociado y un grupo de estudiantes asignado. Cada grupo se encarga de investigar el tema asignado en mayor profundidad. El grupo presenta el tema y realiza propuestas para el diálogo: argumentos a favor y en contra. El grupo organiza actividades para los compañeros y compañeras para que todos puedan adentrarse en la problemática ética que el tema representa.

LEARNING OBJECTIVES OF THE SUBJECT

1. Recognize and understand the social and environmental impact of data science and engineering, and the ethical issues involved in their applications.

STUDY LOAD

Type	Hours	Percentage
Hours large group	30,0	20.00
Hours small group	30,0	20.00
Self study	90,0	60.00

Total learning time: 150 h

CONTENTS

Data ethics. Introduction

Description:

Ethics and morals. Values. Ethical conflict. Deliberation. Engineering profession. Responsibility.

Laws, rules and codes

Description:

Codes of ethics.

National and international regulations.

Normative compliance.

Ethics self-assessment in research,

Broader impact statement on research articles.

Current Case Studies in Data Science and Engineering

Description:

Privacy, data origin, biases, alignment, virtual world, whistleblowers, environmental impact, ODS, manipulation, education, health, gender, neurorights, etc.

ACTIVITIES

Ethics in Data Science and Engineering. Introduction

Specific objectives:

1

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CT2. Sustainability and Social Commitment. To know and understand the complexity of economic and social phenomena typical of the welfare society; Be able to relate well-being to globalization and sustainability; Achieve skills to use in a balanced and compatible way the technique, the technology, the economy and the sustainability.

Full-or-part-time: 50h

Self study: 30h

Theory classes: 20h

Case study in data science and engineering.

Description:

Study, reflection, exposition, dialogue and conclusions of each case presented.

Specific objectives:

1

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Full-or-part-time: 100h

Self study: 60h

Theory classes: 10h

Laboratory classes: 30h

GRADING SYSTEM

The subject will be evaluated as follows:

Class participation: 25 %

Development of a theme and presentation: 75 %

In case of reassessment, an exam and additional work will be done.



BIBLIOGRAPHY

Basic:

- Harris, Charles E. Engineering ethics : concepts and cases. Sixth ed. Boston: Cengage, [2018]. ISBN 9781337554503.
- O'Neil, C. Weapons of math destruction: how big data increases inequality and threatens democracy. New York: Crown, 2016. ISBN 9780553418828.
- D'Ignazio, C.; Klein, L.F. Data feminism. Cambridge, Massachusetts: The MIT Press, 2020. ISBN 9780262358521.
- Crawford, Kate. Atlas of AI : power, politics, and the planetary costs of artificial intelligence [on line]. New Haven and London: Yale University Press, [2021] [Consultation: 28/02/2025]. Available on: <https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?pq-origsite=primo&docID=6478659>. ISBN 9780300252392.
- Coeckelbergh, Mark. AI Ethics [on line]. Cambridge: MIT Press, [2020] [Consultation: 28/02/2025]. Available on: <https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?pq-origsite=primo&docID=6142275>. ISBN 9780262357067.

Complementary:

- Peirano, Marta. El Enemigo conoce el sistema: manipulación de ideas, personas e influencias después de la economía de la atención. Barcelona: Debate, 2019. ISBN 9788417636395.
- Veliz, Carissa. Privacy is power: why and how you should take back control of your data. Brooklyn ; London: Melville House, 2021. ISBN 9781612199153.

RESOURCES

Hyperlink:

- <https://ict-ethics-upc.blogspot.com/> - <https://impacteambientaltic.blogspot.com/>
<https://sites.google.com/upc.edu/etica-gced/home>