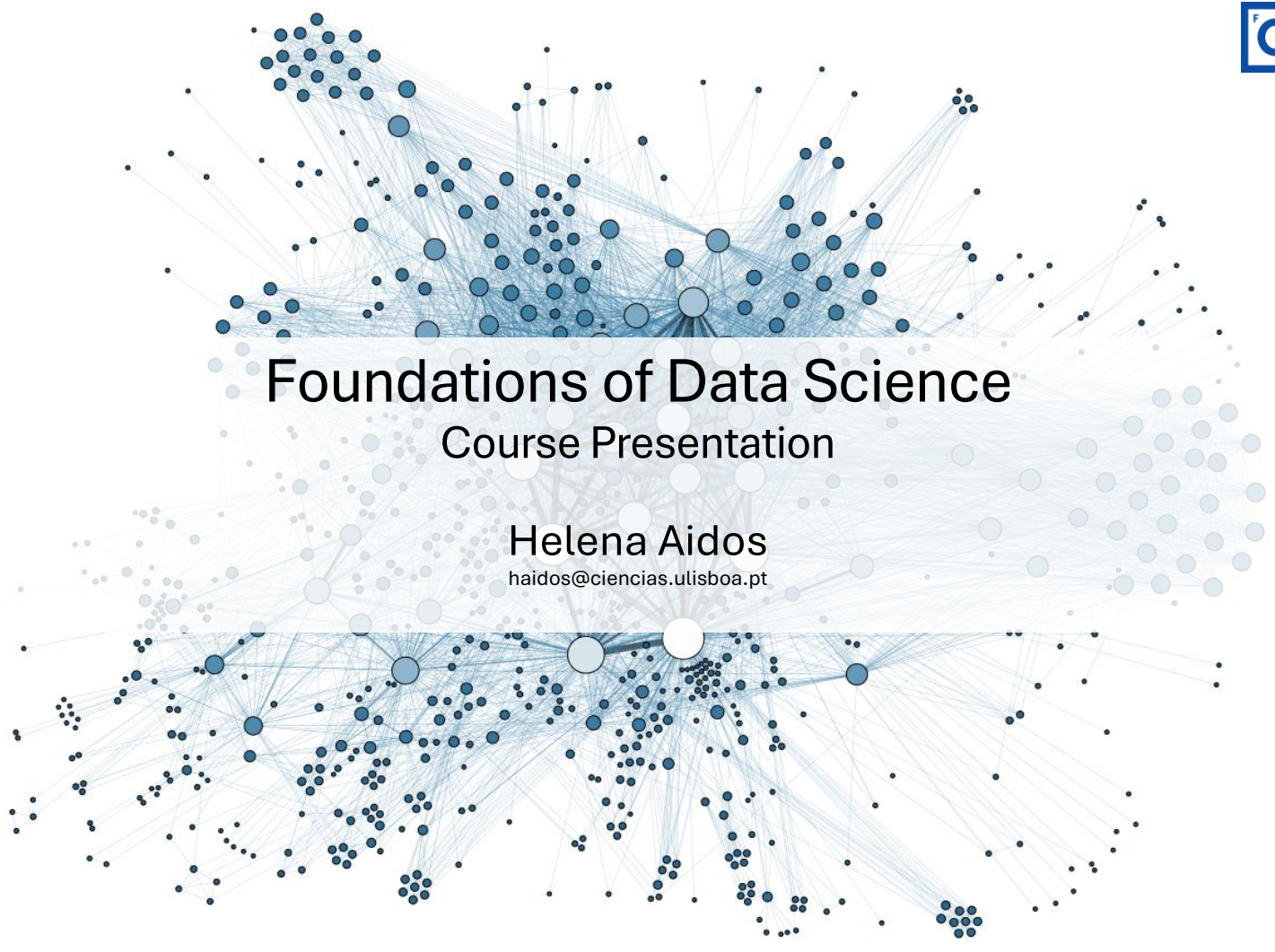


A complex network graph with numerous nodes of varying sizes and colors (blue, grey, white) connected by thin lines, forming a dense web. The graph is centered on the slide, with the text overlaid on it.

Foundations of Data Science

Course Presentation

Helena Aidos

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Faculty



Helena Aidos
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6.1.08



Catia Pesquita
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6.3.15



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Webpage and communication

- Moodle
 - <https://moodle.ciencias.ulisboa.pt/course/view.php?id=6974>
- Communication
 - Forum
 - email (put [FCD] in your subject)
- Office hours
 - Helena Aidos: Tuesday, 10:00, room 6.1.08
 - send an email before coming
 - Cátia Pesquita: TBA

Goals

- This course provides a broad and introductory view on data science.
- Covers the foundations of data science; data collection and management; data ethics; fundamentals of statistics, data analytics visualization; and research topics in data science.
- Complements MDS with **transversal topics** not specifically covered in other courses
- At the end of this course, the student should demonstrate a broad knowledge of data science, including fundamentals, tools and application scenarios.

Topics

1. **Introduction to Data Science:** intro, applications, the data science toolkit
2. **Data management:** data sources and types, data gathering and pre-processing, fairness and bias
3. **Statistics:** foundation of statistical concepts for data science
4. **Data Analytics:** mining, learning, and visualization

Program

#	Date	Professor	T Class
1	17/09/2026	Helena Aidos	Welcome
2	24/09/2026	Helena Aidos	Introduction to Data Science; Applications and Challenges. Role of a data scientist; overview of disciplines and interdisciplinary contributions; applications across domains; emerging trends; societal and ethical challenges.
3	01/10/2026	Eunice Carrasquinha	Data Science Techniques I: Statistical Modelling. Overview of statistical modelling and its role in the data science workflow.
4	08/10/2026	Helena Aidos	Data Science Techniques II: Data Mining and Machine Learning. Overview of data engineering, data mining and machine learning.
5	15/10/2026	Helena Aidos	Designing a Data Science Project. Frameworks for project design and evaluation; defining objectives and success metrics.
6	22/10/2026	Helena Aidos	Data Readiness and Reliability. Data collection, preprocessing, quality assessment and reproducibility.
7	29/10/2026	Helena Aidos	Formative Assessment I
8	05/11/2026	Catia Pesquita	Invited Lecture: Interdisciplinary Insights. Interdisciplinary applications of data science.
9	12/11/2026	Catia Pesquita	Ethical Frameworks in Data Science. Fairness, bias, ethical dilemmas and accountability in practice.
10	19/11/2026	Catia Pesquita	Challenges in Model Building and Deployment. Uncertainty, concept drift, inductive bias and deployment considerations.
11	26/11/2026	Catia Pesquita	Trust, Uncertainty and Resilience. Privacy, security, uncertainty quantification and risk management.
12	03/12/2026	Catia Pesquita	Understandability and Transparency. Interpretability, explainability, causality and auditability.
13	10/12/2026	Catia Pesquita	Formative Assessment II
14	17/12/2026	Catia Pesquita / Helena Aidos	Final Project Presentation and Reflection. Presentation of projects; reflection on methodological and ethical choices, trust, uncertainty and future implications.

Evaluation

- Two short quizzes (20% each)
 - Multiple-choice questions – individual
- One project (60%)
 - Paper (25%) – group
 - Code (10%) – group
 - Presentation (10%) – individual
 - Questions & Answers (15%) – individual

Important dates

- Quizz 1 – 29/Oct
- Quizz 2 – 10/Dec
- Project phase 1
 - Presentation & discussion – 19/Nov
- Project phase 2
 - Presentation & discussion – 17/Dec

Bibliography

+ Slides and other materials available on course website

