

# 250005 Open Science: Principles, Practices and Challenges for Responsible Research

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## Organising centre/area leading the course

Deusto International Research School (DIRS) – PhD program in Engineering for the Information Society and Sustainable Development

## Training category

Methodology and research techniques

## Professor/Coordinator of the training course

Dr. Diego López de Ipiña González de Artaza (Engineering faculty)

Dr. Diego Casado-Mansilla (Engineering faculty)

## Priority group

First-year, second-year, third-year PhD students

## Competences

- Define and explain Open Science's core principles and dimensions (OS).
- Understand Open Access, Open Data, Open Peer Review, and other key pillars of OS.
- Critically analyse the opportunities and challenges of implementing OS in different disciplines.
- Identify and apply strategies for responsible data management and FAIR principles.
- Understand legal and ethical implications related to OS (e.g., copyright, data privacy, AI-generated content).
- Explore the connection between Open Science and policy frameworks, including the EU's Open Science agenda.
- Design a research approach integrating Open Science practices tailored to students' disciplines.

## Pre-requisites / prior knowledge

Familiarity with the scientific method, academic publishing, and fundamental data analysis tools.

## Contents

### Unit 1: Introduction to Open Science

- Definitions, history, and motivations
- The 'Open Science movement' and its global emergence
- Overview of the pillars: Open Access, Open Data, Open Methodology, Open Source, Open Peer Review, Open Education
- European Commission and UNESCO policies on Open Science
- Resources: FOSTER Open Science Toolkit, UNESCO Recommendation on Open Science, EU Open Science Monitor
- Citizen Science as an integral element of participatory Open Science, enabling non-professionals to contribute to scientific knowledge production.
- Introduction to the ECSA 10 Principles of Citizen Science as a foundational framework for public involvement in research.

### Unit 2: Open Science in Practice – Tools, Platforms, and Workflows

- OS tools and infrastructures (e.g., Zenodo, OSF, GitHub, ROpenSci, OpenAIRE)
- FAIR Data Principles (Findable, Accessible, Interoperable, Reusable)
- Data management plans (DMPs) and reproducibility practices
- Licenses: Creative Commons, Open Data Commons
- Case studies of Open Science projects in different fields

### Unit 3: Challenges and Ethical Considerations

- Data privacy, GDPR, and sensitive research data
- Intellectual Property and Copyright in OS
- Open Science and research integrity
- Misinformation risks in public-driven science and how to mitigate them through Open Science integrity practices.
- The digital divide and equitable access to OS practices

### Unit 4: Open Science and Societal Impact

- OS as a driver of innovation, transparency, and societal engagement
- Citizen Science as a powerful vehicle for societal engagement, aligning with the Responsible Research and Innovation (RRI) framework.
- Links to Sustainable Development Goals (SDGs)
- Open Science and policy-making: Horizon Europe, EOSC

### Unit 5: Team Project – OS Integration in Research

- Students form groups (3–4 members)
- Each group proposes integrating Open Science practices in a research case study, optionally including Citizen Science elements to enhance public participation or data collection.

- Presentation of case study, with reflections on ethical, practical, and Responsible research implications

### **Level of the course**

Introductory/foundational

### **Methodology**

Blended approach combining short lectures, case study discussions, and project-based learning

### **Language of instruction**

English

### **Mode of instruction**

In-class and/or virtual attendance

### **Number of places**

PhD students: 20

### **Assessment**

Team project: concept note, presentation, and peer review. Optional individual reflection journal (max 1 page).

### **Number of hours**

6 hours total (2 sessions of 3 hours)

### **Campus / Dates**

Bilbao Campus

Proposed Dates: 20 & 21 May 2026

Time: 15:00–18:00