

Course guide

2703140 - ESC - Ethics and Scientific Communication

Last modified: 10/07/2026

Unit in charge: Barcelona School of Informatics
Teaching unit: 723 - CS - Department of Computer Science.
Degree: BACHELOR'S DEGREE IN BIOINFORMATICS (Syllabus 2024). (Compulsory subject).
Academic year: 2026 **ECTS Credits:** 6.0 **Languages:** English

LECTURER

Coordinating lecturer: ITZIAR DE LECUONA RAMÍREZ - ALFREDO VELLIDO ALCACENA

Others:

PRIOR SKILLS

No previous requirement but those of the Bioinformatics degree.

LEARNING RESULTS

Knowledges:

K6. Recognise the ethical issues raised by advances in the knowledge and application of biological concepts and their computational processing.

Skills:

S5. Communicate information, ideas, problems and solutions from bioinformatics and computational biology to a general audience.

S6. Identify and interpret relevant data within the field of study in order to make judgements that include social, scientific and ethical considerations.

Competences:

C1. Apply knowledge in a professional and integrated manner in one's work or vocation and behave in a manner consistent with ethical and responsible professional practice, taking into account the human and fundamental rights of individuals and respecting the principles of universal accessibility.

C2. Recognise the complexity of the economic and social phenomena typical of a welfare society and relate welfare to globalisation, sustainability and climate change in order to use techniques, technology and principles of economics and sustainability in a balanced and compatible way.

C3. Communicate orally and in writing with others in English about learning outcomes, thought processes and decision making.

C7. Detect, in the field of the degree, inequalities due to sex and gender in society, and incorporate needs and preferences due to sex and gender into the design of solutions and problem solving.

TEACHING METHODOLOGY

The course is taught online and in English, through a combination of synchronous and asynchronous classes.

In synchronous classes, theoretical lectures will be combined with applied practical exercises and assignments to be completed individually and in groups, based on the theoretical content. Asynchronous classes may include theory videos, as well as practical assignments to be completed within predetermined deadlines.

This approach will promote:

- the implementation of a continuous assessment model for the course.
- guided and independent work by students.

In the Ethics activities, the emphasis will be put on the reflection and report of practical cases.

LEARNING OBJECTIVES OF THE SUBJECT

- 1.Explaining the ethical relevance of scientific communication in relation to individuals, society, and the planet.
- 2.Identifying and classifying key ethical problems in scientific communication, including misconduct, authorship disputes, citation practices, peer review failures, social responsibility, and AI-related risks
- 3.Analyzing the causes, consequences, and prevention of unethical practices in research and publication
- 4.Applying principles and codes of research integrity to practical cases involving publication ethics, co-authorship, peer review, citation, and public communication of science.
- 5.Justifying ethical decisions using the European Code of Conduct for Research Integrity and the UPC Code of Integrity in Research
- 6.Learning approaches to scientific visualization
- 7.Understanding scientific communication as a narrative process in society
- 8.Understanding the different communication strategies of different media.
- 9.Exploration of the different internet resources related to scientific communication.
- 10.Learning AI resources to facilitate scientific communication as well as the trappings of their inadequate use.
- 11.Learning the fundamentals of effective oral scientific communication
- 12.Learning the structure and settings of a scientific paper

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

Bioethics and the Ethics of Scientific Communication

Description:

Advances in science and technology raise major ethical questions when they intersect with individuals, society, and all of us who inhabit the planet. Ethics in scientific communication involves much more than simply avoiding fraud: it entails fostering a culture of integrity, transparency, responsible authorship, rigorous peer review, and respectful dialogue with society.

Ethical Problems of Scientific communication

Description:

Students will deal with ethical questions related to scientific communication. The range of topics range cover central questions of research ethics, publication ethics, co-authorship, scientific discourse, citation, peer review, social responsibility, and the use of AI. Reasons, consequences and prevention measures will be discussed.

Principles and Codes of ethics

Description:

Students will study and apply principles and codes of ethics to practical cases. Codes subject of study will be:

- European Code of Conduct for Research Integrity <https://allea.org/code-of-conduct/>
- UPC Code of Integrity in Research:

<https://govern.upc.edu/ca/consell-de-govern/consell-de-govern/sessio-03-2022-del-consell-de-govern/comissio-de-recerca/aprovacio-del-codi-dintegritat-en-la-recerca/aprovacio-del-codi-dintegritat-en-la-recerca/@@display-file/visiblefile/12.1.%20Codi%20d'integritat%20en%20la%20Recerca.pdf>



Foundations of Scientific Narrative

Description:

An introduction to the concept of scientific communication and the social contract between the scientist and its audience. The scientist as a narrator.

Visual communication and the visual scientist

Description:

Fundamentals of data and information visualization. Visual communication in science. The scientific data journalist.

Scientific writing

Description:

The different levels of scientific writing. The structure of a scientific paper.

Oral communication in science

Description:

The importance of oral communication in science. Oral communication in conferences, seminars and lectures. The scientific debate. Communicating to a broader audience.

Broadening the scope: scientific communication in media and the arts.

Description:

Beyond scientific communication among peers. Scientific communication in media: radio, television, newspapers and magazines; divulgative science. Scientific communication and the arts: film and fiction.

The scientific web: internet and scientific communication

Description:

Internet and scientific communication: the web. Data and information repositories, data curation, scientific databases, scientific code repositories, scientific social networks.

The impact of AI in scientific communication

Description:

The use of AI Large Language Models and its impact on information sources, knowledge management and human communication.

ACTIVITIES

Development of the topic "Foundations of Scientific Narrative", in the first week and a half of the course

Description:

Development of the topic "Foundations of Scientific Narrative", in the first week and a half of the course, including practical activities

Specific objectives:

7

Full-or-part-time: 12h

Theory classes: 3h

Practical classes: 3h

Self study: 6h

Development of the topic "Scientific writing" in one week of the course

Description:

Development of the topic "Scientific writing" in one week of the course, with practical activity

Specific objectives:

12

Full-or-part-time: 8h

Theory classes: 2h

Practical classes: 2h

Self study: 4h

Development of the topic "Visual communication and the visual scientist" in two weeks of the course

Description:

Development of the topic "Visual communication and the visual scientist" in two weeks of the course, with practical activities

Specific objectives:

6

Full-or-part-time: 20h

Theory classes: 4h

Practical classes: 4h

Self study: 12h

Development of the topic "Broadening the scope: scientific communication in media and the arts" in a week and a half of the course

Description:

Development of the topic "Broadening the scope: scientific communication in media and the arts" in a week and a half of the course, with practical activities

Specific objectives:

8

Full-or-part-time: 12h

Theory classes: 3h

Practical classes: 3h

Self study: 6h

Development of the topic "The scientific web: internet and scientific communication" in one week.

Description:

Development of the topic "The scientific web: internet and scientific communication" in one week, including practical activities

Specific objectives:

9

Full-or-part-time: 8h

Theory classes: 2h

Practical classes: 2h

Self study: 4h

Development of the topic "The impact of AI in scientific communication" in one week and a half

Description:

Development of the topic "The impact of AI in scientific communication" in one week and a half, including practical activities

Specific objectives:

10

Full-or-part-time: 12h

Theory classes: 3h

Practical classes: 3h

Self study: 6h

Development of the topic "Oral communication in science" in one week of the course

Description:

Development of the topic "Oral communication in science" in one week of the course, including practical activities

Specific objectives:

11

Full-or-part-time: 12h

Theory classes: 3h

Practical classes: 3h

Self study: 6h

Oral presentation of a proposed task

Description:

Oral presentation of a proposed task

Specific objectives:

6, 7, 11

Full-or-part-time: 16h

Self study: 16h

Development of the topic "Bioethics and the Ethics of Scientific Communication"

Description:

Development of the topic "Bioethics and the Ethics of Scientific Communication" in one week of the course, including practical activities

Specific objectives:

1, 2

Full-or-part-time: 18h

Theory classes: 4h

Practical classes: 4h

Self study: 10h

Development of the topic "Ethical problems of Scientific Communication"

Description:

Development of the topic "Ethical problems of Scientific Communication" in one week of the course, including practical activities

Specific objectives:

3

Full-or-part-time: 18h

Theory classes: 4h

Practical classes: 4h

Self study: 10h

Development of the topic "Principles and Codes of Ethics"

Description:

Development of the topic "Principles and Codes of Ethics" in one week of the course, including practical activities

Specific objectives:

4, 5

Full-or-part-time: 14h

Theory classes: 2h

Practical classes: 2h

Self study: 10h

GRADING SYSTEM

The course will be assessed continuously, without theoretical exams, using practical assignments:

50% of the grade comes from individual assignments and projects,

50% of the grade comes from group assignments and projects.

The reevaluation grade (for students who fail the subject) will be determined by an oral exam.

BIBLIOGRAPHY

Basic:

- Schimel, Joshua. Writing Science. Oxford University Press, 2011. ISBN 978-0-19-976023-7.
- Baron, Nancy. Escape from the Ivory Tower. Island Press, 2010. ISBN 978-1-59726-663-5.
- Gastel, Barbara; Day, Robert A. How to write and Publish a Scientific Paper. Santa Barbara: Greenwood, 2022. ISBN 978-1-4408-7882-4.
- Wilke, Clau O.. Fundamentals of Data Visualization [on line]. Beijing: O'Reilly, 2019 [Consultation: 14/07/2026]. Available on: <https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?pq-origsite=primo&docID=5734202>. ISBN 9781492031079BEIJING.
- Casado, María ; Puigdomenech, Pere. Document sobre els aspectes ètics del diàleg entre ciència i societat [on line]. Barcelona: Universitat de Barcelona, 2018 [Consultation: 14/07/2026]. Available on: https://www.bioeticayderecho.ub.edu/sites/default/files/documents/doc_ciencia-sociedad.pdf. ISBN 978-84-9168-116-8.
- "Ten simple rules for scientists engaging in science communication". Ten simple rules for scientists engaging in science communication.
- CASADO, María, et al. Declaració sobre integritat científica en recerca i innovació responsable. Edicions de la Universitat de Barcelona, 2016. ISBN 9788447540334.
- "La integridad científica en las instituciones de educación superior en el siglo XXI.". La integridad científica en las instituciones de educación superior en el siglo XXI..

Complementary:

- Casado, María; López Baroni; Manuel Jesús. Handbook of secular bioethics (I) : key issues [on line]. Barcelona: Edicions de la Universitat de Barcelona, 2020 [Consultation: 13/07/2026]. Available on: <https://lectura-unebook-es.recursos.biblioteca.upc.edu/viewer/9788491683377/1>. ISBN 9788491683377.
- Kelly, A. How Scientists communicate [on line]. New York, New York: Oxford University Press, 2020 [Consultation: 14/07/2026]. Available on: <https://academic-oup-com.recursos.biblioteca.upc.edu/book/36912>. ISBN 0197521029.
- Karthikeyan, B., & Thulasingham, M. "Ethical Pitfalls in Scientific Publishing". International Journal of Advanced Medical and Health Research [on line]. 11(2), 140-144 [Consultation: 14/07/2026]. Available on: https://www.ovid.com/jnls/ijamr/fulltext/10.4103/ijamr.ijamr_265_24~ethical-pitfalls-in-scientific-publishing.

RESOURCES

Hyperlink:

- <https://comite-etica.upc.edu/ca/documentacio/guia-i-codis/codi-integritat-ceupc/> <https://doi.org/10.26356/ECOC-https://www.csic.es/en/ai-decalogue>