



STUDY GUIDE

BIOPHYSICS

Organised by

University of Catania





1. IDENTIFYING DATA.

• Course Name.	<i>Biophysics</i>
• Coordinating University.	<i>University of Catania</i>
• Partner Universities Involved.	
• Course Field(s).	<i>Applied Physics</i>
• Related Study Programme.	<i>Physics</i>
• ISCED Code.	<i>0533 Physics</i>
• SDG.	<i>Good Health and Well Being</i>
• Study Level.	<i>M</i>

• Number of ECTS credits allocated.	<i>6</i>
• Mode of Delivery.	<i>"on-campus"</i>
• Language of Instruction.	<i>English</i>
• Course Dates.	<i>from 01/10/2024 to 18/01/2025</i>
• Schedule of the course.	<i>42 h</i>
• Key Words.	<i>Fluorescence Spectroscopy, Fluorescence Microscopy, Imaging</i>
• Catchy Phrase.	<i>Illuminate the invisible: biophysical techniques to explore life at the molecular level!</i>

• Prerequisites and co-requisites.	<i>Knowledge of Physics (optics and structure of matter)</i>
• Number of EUNICE students that can attend the Course.	<i>no restriction</i>
• Course inscription procedure(s).	<i>EUNICE website</i>

2. CONTACT DETAILS.

• Department.	<i>Physics and Astronomy</i>
• Name of Lecturer.	<i>Luca Lanzano'</i>
• E-mail.	<i>luca.lanzano@unict.it</i>
• Other Lecturers.	



3. COURSE CONTENT.

Description of biophysical methods based on fluorescence spectroscopy and microscopy (confocal microscopy, FLIM, FRET and FCS techniques, super-resolution microscopy techniques) and their application to the investigation of biological macromolecules and the cell as a complex physical system.

4. LEARNING OUTCOMES.

- Knowledge and understanding of advanced biophysical methods based on fluorescence spectroscopy and microscopy
- Ability to apply physical methods to biological problems.
- Ability to present one's own research activity or a review topic both to an expert and to a non-expert audience.
- Ability to access to specialized literature in the Biophysics field and in closely related fields.

5. OBJECTIVES.

Critical understanding of biophysical methods based on fluorescence spectroscopy and microscopy (confocal microscopy, FLIM, FRET and FCS techniques, super-resolution microscopy techniques) and their application to the investigation of biological macromolecules and the cell as a complex physical system.

6. COURSE ORGANISATION.

UNITS

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| 1. | <i>Introduction: what is Biophysics?</i> |
| 2. | <i>Fluorescence spectroscopy</i> |
| 3. | <i>Fluorescence microscopy</i> |
| 4. | <i>Imaging in multiple dimensions</i> |
| 5. | <i>Fluorescence Correlation Spectroscopy</i> |
| 6. | <i>Super-resolution microscopy</i> |

LEARNING RESOURCES AND TOOLS.

Materials provided during the course.

PLANNED LEARNING ACTIVITIES AND TEACHING METHODS.

Lectures, seminars



7. ASSESSMENT METHODS, CRITERIA AND PERIOD.

Oral examination on the topics of the course. Students should start the exam with the description of a topic of choice. The topic of your choice should be exposed through a presentation (e.g. powerpoint), in order to also evaluate their communication skills. All the topics covered during the course will be examined.

OBSERVATIONS.

8. BIBLIOGRAPHY AND TEACHING MATERIALS.

Materials provided during the course.