Course unit English denomination	Intrinsically Disordered Proteins: structural and functional characterization and their key role in human diseases
SS	05/BIOS-07 - BIOCHEMISTRY
Teacher in charge (if defined)	Maria Cristina Aspromonte
Teaching Hours	10
Number of ECTS credits allocated	2
Course period	
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (80% minimum of presence) ☐ No

Course unit contents	This course will cover both theoretical and practical aspects of Intrinsically Disordered Proteins (IDPs) and Intrinsically Disordered Regions (IDRs), with a focus on their biological significance and computational analysis. The main topics include:
	1) Introduction to IDPs and IDRs. Definition and characteristics of IDPs and IDRs; structural and functional properties.
	2) IDPs and IDRs in Biological Processes and Diseases
	3) Role of IDPs/IDRs in phase separation and biomolecular condensates.
	4) IDPs/IDRs and their implications in neurodegenerative diseases, cancer, and other disorders.
	5) Computational Approaches for IDP/IDR Analysis.
	   a) Databases and bioinformatics tools for IDP/IDR prediction and annotation.
	   b) Identification of disorder-related features and molecular interaction.
	   c) Practical Training and Hands-on Sessions
	6) Using in silico tools and databases to retrieve and analyze IDP/IDR-related data.
	7) Case studies on IDP/IDR function, regulation, and disease involvement.

Learning goals	Participants will receive training in a multidisciplinary environment and acquire knowledge of integrative methodologies required to study Intrinsically Disordered Proteins (IDPs) and Intrinsically Disordered Regions (IDRs), emphasizing their crucial role in human diseases.The goal of this course is to provide participants with:
	1. Fundamental knowledge to understand the key aspects of IDPs and IDRs.
	2. Insight into IDPs/IDRs involvement in key biological phenomena such as phase separation, other cellular processes, and disease mechanisms.
	3. An overview of computational resources available for studying IDPs/IDRs.
	4. Hands-on experience in applying databases, *in silico* resources, and computational tools to:
	  a) Analyze relevant biological data in context.
	  b) Using integrative methodologies for studying intrinsically disordered proteins
	  c) Investigate the IDPs of wild-type and mutant proteins in physiology and disease.

Teaching methods	This course will combine theoretical knowledge with practical applications, equipping participants with essential skills for studying IDPs/IDRs in biomedical research.
Course on transversal, interdisciplinary, transdisciplinary skills	☐ Yes ☒ No
Available for PhD students from other courses	☒ Yes Classes are open to doctoral students only in the following courses: Biosciences ☐ No
Prerequisites (not mandatory)	
Examination methods (if applicable)	Final multiple-choice exam to assess knowledge acquisition.
Suggested readings	Scientific Article and Slides shared by the teacher
Additional information	