



Course unit English denomination	An introduction to information theory for stochastic biological systems
Teacher in charge (if defined)	Amos Maritan, Daniel M. Busiello, Giorgio Nicoletti (external)
Teaching Hours	24
Number of ECTS credits allocated	3
Course period	March-June 2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (50% minimum of presence) ☐ No
Course unit contents	Stochastic processes, introduction and general properties; Introduction to information theory and motivation; Thermodynamics of information; Information-theoretic approaches to study biological and multiscale systems
Learning goals	Fundamentals of stochastic calculus; modeling of biological and multiscale stochastic systems; use and interpretation of information-theoretic concepts and approaches; link between thermodynamics and information
Teaching methods	Lectures
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	-
Examination methods (in applicable)	Oral exam



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Suggested readings

Gardiner, Stochastic methods Vol. 4, Springer Berlin
Van Kampen, Stochastic processes in physics and chemistry, Elsevier
Cover, Elements of information theory, John Wiley & Sons
Course notes and various scientific papers

Additional information

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