UNIVERSITÀ DI PAVIA

## Anno Accademico 2021/2022

# BIOLOGY OF POPULATIONS AND COMMUNITIES

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| **Enrollment year** | 2021/2022 |
| **Academic year** | 2021/2022 |
| **Regulations** | DM270 |
| **Academic discipline** | BIO/05 (ZOOLOGY) |
| **Department** | DEPARTMENT OF BIOLOGY AND BIOTECHNOLOGY "LAZZARO SPALLANZANI" |
| **Course** | EXPERIMENTAL AND APPLIED BIOLOGY |
| **Curriculum** | Biologia ambientale e biodiversità |
| **Year of study** | 1° |
| **Period** | 1st semester (01/10/2021 - 14/01/2022) |
| **ECTS** | 6 |
| **Lesson hours** | 48 lesson hours |
| **Language** | Italian |
| **Activity type** | ORAL TEST |
| **Teacher** | BONIZZONI MARIANGELA (titolare) - 3 ECTS<br>OMETTO LINO - 3 ECTS |
| **Prerequisites** | Knowledge of basic concepts of genetics and statistics. Some exercises involve the use of spreadsheets (Excel) and R, which will be used with the help of tutorials. |
| **Learning outcomes** | The Course aims to provide students with the tools (knowledge and methodologies) necessary to analyze the dynamics of populations according to their characteristics (genotypic and phenotypic). Furthermore, it will be analyzed how abiotic (e.g. environmental conditions, availability of resources) and biotic (e.g. competition, predation) components affect the probability of survival and reproduction and therefore the evolution of species and ecological communities. |
| **Course contents** | The course integrates concepts of ecology and evolution: |

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| | • Organisms: ecological niche concept<br>• Population and metapopulation<br>• Ecosystems<br>• Genotype-phenotype relationship and phenotypic plasticity<br>• Biological evolution<br>• What are mutations<br>• Hardy-Weinberg principle<br>• Principles of population genetics<br>• Natural selection and genetic drift<br>• Principles of phylogenetics<br>• Speciation<br>• Inter- and intra-specific competition<br>• Population growth patterns and life-tables<br>• Population dynamics, equations and prey-predator models. |
| **Teaching methods** | Frontal lessons. Discussion and data analysis lessons are also provided, to better understand the mathematical models used to describe population and evolutionary dynamics. |
| **Reccomended or required readings** | Neal Dick, Introduction to Population Biology, Cambridge University Press.<br>Begon M., Harper J.L., Townsend C.R. Ecology - Individuals, Populations and Communities. Blackwell Scientific Publications. |
| **Assessment methods** | Oral exam; students are also expected to give a presentation about e topic covered during the lessons. |
| **Further information** | Oral exam; students are also expected to give a presentation about e topic covered during the lessons. |
| **Sustainable development goals - Agenda 2030** | This course provides knowledge consistent with Goal 14: "Life below Water: Conservation and sustainable use of the oceans, seas and marine resources for sustainable development" and Goal 15 of the 2030 Agenda: "Life on Land: Protect, restore and promote sustainable use of the Earth's ecosystem".<br>$lbl_legenda_sviluppo_sostenibile |