DIPARTIMENTO DI BIOLOGIA
UNIVERSITÀ DEGLI STUDI DI PADOVA

Teaching Activity 2025-2026

The training activities in our PhD Program are founded upon three primary pillars: course attendance, seminar participation, and involvement in the Journal Club activities.

Courses

The courses proposed by our PhD Programme are divided into Interdisciplinary Courses and Thematic Courses, the complete list is reported below. Students are required to enroll in each course they plan to attend by filling the **course enrollment form** that will be available in the moodle web platform and that will be opened by the PhD Office, at the beginning of each academic year. Once the student is enrolled in a course his/her attendance will be mandatory. For the courses proposed by our PhD Program, the **Course Certification of the Attendance** (available on moodle) will be signed and approved by the Instructor of the course.
In addition to these courses, external courses may also be considered after approval of a written request signed by the Student and the Supervisor and sent to the PhD Office. At the end of the course, in order to get recognition of attendance for external courses, students shall obtain a certificate of attendance signed by the Instructor.

Seminars

Seminars proposed by the PhD Programme are announced by email by the PhD Office. Seminars external to our Course may also be considered. In order to certificate the attendance of the seminar students shall bring with them the **Seminar Certificate of Attendance** sheet (available on moodle), fill it in with the required information and have it signed by the speaker.

Journal Club

Journal Club activity is mandatory and is organized by members of the Academic Board. Students have to critically present a recent paper to other PhD students. The topic of the paper has to be general enough to be of broad interest. Attendance to JC meetings must be at least 75%.

Requirements and duties

Teaching Activity requirements **for students from the 40° cycle onwards** are the following:

I year

- Minimum of 3 CFU for Courses/summer school
- 3 CFU for Journal Club
- Minimum of 2 CFU for Seminar Cycles

II year

- Minimum of 3 CFU for Courses/summer school
- 3 CFU for Journal Club
- Minimum of 2 CFU for Seminar Cycles

III year

- 3 CFU for Journal Club
- Minimum of 2 CFU for Seminar Cycles

Your training activities will be reported in a **Progress Report** document, which must be endorsed by your Supervisor and submitted following the indication provided by email by the PhD Office at the conclusion of each year (specific deadlines will be communicated via email by the PhD Office).

Index of Interdisciplinary Core Courses

Index of Thematic Courses

Course unit English denomination	Fellowship and grant writing
SS	course on trasversal skills
Teacher in charge (if defined)	Prof. Luca Scorrano
Teaching Hours	12
Number of ECTS credits allocated	3
Course period	June-July 2026
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (80% minimum of presence) ☐ No
Course unit contents	Basic principles on how to write convincing fellowship and grant applications.
Learning goals	Understanding the different types of funding opportunities Learning to write clear, concise, and compelling proposals. Structuring a proposal with a clear hypothesis and objectives. Communicating the significance of the research and its broader impacts. Developing a detailed and realistic budget plan.
Teaching methods	Lectures Workshops
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☐ Yes ☒ No
Prerequisites (not mandatory)	

Examination methods (if applicable)	Students are then asked to write a 2-page fellowship proposal on their topic of choice, using an EMBO fellowship like format.
Suggested readings	Not Applicable
Additional information	

Course unit English denomination	Fundamentals of Evolutionary Biology
SS	BIOS-03/A
Teacher in charge (if defined)	Prof Gil Guastoni Rosenthal
Teaching Hours	20
Number of ECTS credits allocated	3
Course period	November-December 2026
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (80% minimum of presence) ☐ No
Course unit contents	This course is designed to prepare PhD students across the life sciences with basic concepts in evolutionary biology, including microevolution, macroevolution, and evolutionary ecology, and with a perspective on the primary contemporary problems in the field.
Learning goals	Students will have a basic grasp of evolutionary biology, an awareness of contemporary techniques and controversies, and the quantitative framework to apply and develop new analytical tools.
Teaching methods	The course is organized as ten, three-hour lectures each featuring a critical reading from the scientific literature and a participatory in-class problem set
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No Priority will be given to Biosciences PhD students
Prerequisites (not mandatory)	

Examination methods (if applicable)	
Suggested readings	D. Futuyma, M. Kirkpatrick, *Evolution* (optional); papers as assigned.
Additional information	

Course unit English denomination	Gene Editing
SS	BIOS-14A
Teacher in charge (if defined)	Prof. Milena Bellin
Teaching Hours	12
Number of ECTS credits allocated	1
Course period	Spring 2026
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (80% minimum of presence) ☐ No
Course unit contents	1. History of genome editing: meganucleases, ZFN, TALEN, CRISPR-Cas9. 2. Discovery of CRISPR-Cas system. 3. CRISPR-Cas9 genome editing: DNA repair pathways, double-/single-cut editing. 4. CRISPR-Cas based genome editing tools: CRISPRi, CRISPRa, base editing, transposases, and prime editing.
Learning goals	Become familiar with the existing technologies that enable genome editing, learn the latest discoveries in the gene editing field and explain them with a short powerpoint presentation.
Teaching methods	Lectures and short powerpoint presentations from students on assignments (e.g. guided journal clubs), discussing the utilization of genome editing as possible treatment for human diseases.
Course on transversal, interdisciplinary, transdisciplinary skills	☐ Yes ☒ No
Available for PhD students from other courses	☒ Yes ☐ No PhD Programme in Biomedical Sciences

Prerequisites (not mandatory)	
Examination methods (if applicable)	
Suggested readings	Scientific papers and reviews will be indicated during the course
Additional information	

Course unit English denomination	High content imaging: from low to high throughput approaches
SS	BIOS-07/A
Teacher in charge (if defined)	Marta Giacomello
Teaching Hours	10
Number of ECTS credits allocated	2
Course period	January 2026
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (80% minimum of presence) ☐ No
Course unit contents	Students will learn the principle of high content fluorescence microcopy, and how to design and optimize a fluorescence microscopy experiment in high throughput settings.
Learning goals	Skills in high throughput imaging
Teaching methods	Frontal lessons, group work, classroom discussion, case study.
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No PhD Programme in Biomedical Sciences
Prerequisites (not mandatory)	
Examination methods (if applicable)	

Suggested readings	Scientific articles and reviews will be provided during the course
Additional information	

Course unit English denomination	How to design and perform an experiment
SS	course on trasversal skills
Teacher in charge (if defined)	Graziano Martello
Teaching Hours	12
Number of ECTS credits allocated	2
Course period	January 2026
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (80% minimum of presence) ☐ No
Course unit contents	The main critical points and possible mistakes made when designing an experiment will be described, as well as how to carry out an experiment accurately. How to present the results obtained will also be discussed.
Learning goals	Through group activities and classroom discussions, students will acquire the ability to plan an experiment, identifying key controls and possible strategies for estimating the various sources of experimental variability. Finally, the ability to present their results in an intuitive and clear manner will also be acquired.
Teaching methods	Introductory lecture, group activity involving the planning of an experiment, anticipating the different outcomes, critical points and how to present the data. Classroom discussion of the ‘experiments’ devised by the different groups.
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No

Available for PhD students from other courses	☒ Yes ☐ No PhD Programme in Biomedical Sciences
Prerequisites (not mandatory)	
Examination methods (if applicable)	Exercises during the classes
Suggested readings	PDF files provided by the teacher
Additional information	

Course unit English denomination	Notes for statistical data analyses
SS	STAT-01/A
Teacher in charge (if defined)	Federico Ferraccioli, Università Ca' Foscari Venezia
Teaching Hours	20
Number of ECTS credits allocated	3
Course period	January 2026
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (80% minimum of presence) ☐ No
Course unit contents	- Statistical inference: hypothesis testing, interpretation of p-value, types of errors, power. Confidence intervals. The problem of multiple tests. - Basic methods: inference on proportions and means, comparisons of two or more samples. Non-parametric alternatives (Wilcoxon, Kruskall-Wallis). - Advanced methods: One-way or two-way analysis of variance. Introduction to regression models. Introduction to principal component analysis.
Learning goals	- Ability to conduct statistical analyses using some of the widely used techniques and interpret the results. - Ability to critically understand the main statistical methods used in the biological literature.
Teaching methods	- Lectures - Case studies on real data
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No PhD Programme in Biomedical Sciences
Prerequisites	- Basics of probability

(not mandatory)	- Main probability distributions - Basic statistical concepts (mean, variance, correlation, etc.)
Examination methods (if applicable)	Multiple choice test
Suggested readings	Lecture slides and other teaching materials made available online.
Additional information	Books : M. C. Whitlock, D. Schluter, Analisi statistica dei dati biologici. -- Zanichelli, 2010. B. Shahbaba, Biostatistics with R. An introduction to Statistics Through Biological Data. - Springer, 2012

Course unit English denomination	Quantitative analysis of bioimages
SS	BIOS-06/A, BIOS-04/A
Teacher in charge (if defined)	Francesco Argenton Nicoletta Plotegher
Teaching Hours	10
Number of ECTS credits allocated	2
Course period	June – September 2026
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (80% minimum of presence) ☐ No
Course unit contents	Basic notions on microscopy image acquisition, including numerical aperture, linear and angular resolution and contrast. Physiological and psychological biases in image analysis. Principles of digital imaging, image pre-processing and processing for morphometry and densitometry. Image analysis methods and tools, including classical methods and deep-learning based methods. Use of most common softwares i.e. ImageJ and Ilastik.
Learning goals	To learn how to obtain quantitative information from bioimages, i.e. densitometry and morphometry
Teaching methods	classes
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No PhD Programme in Biomedical Sciences
Prerequisites (not mandatory)	

Examination methods (if applicable)	Excercises and case studies
Suggested readings	Slides on moodle
Additional information	

Course unit English denomination	The power of your experimental design: statistical aspects of your experimental design
SS	05/BIOS-08
Teacher in charge (if defined)	Prof. Chiara Romualdi
Teaching Hours	10
Number of ECTS credits allocated	2
Course period	February 2026
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (80% minimum of presence) ☐ No
Course unit contents	Basics of inferential statistics, statistical tests, and statistical power. Calculation of the proper sample size when you are planning a new experiment
Learning goals	- Learning about statistical power and its importance in experimental design. - Acquiring skills to calculate the appropriate sample size for new experiments. - Enhancing the ability to plan experiments with robust statistical considerations.
Teaching methods	Lezioni Workshops
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☐ Yes ☒ No
Prerequisites	Basic of statistics

(not mandatory)	
Examination methods (if applicable)	Homework / Quiz
Suggested readings	Slides of the Teacher
Additional information	Suggested: Laptop

Course unit English denomination	Topics in the interaction between evolution and conservation
SS	BIOS-04/A
Teacher in charge (if defined)	Not assigned yet
Teaching Hours	5
Number of ECTS credits allocated	1
Course period	Spring 2026
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (100% minimum of presence) ☐ No
Course unit contents	Effects of anthropic activities on wild populations Case studies on evolution under anthropogenic pressures and conservation.
Learning goals	The course aims at introducing students to topics related to the evolutionary effects of anthropic activities and the conservation consequences through different case studies. In addition, the course will promote discussion among PhD students and teachers about the role of research in filling gaps in our understanding of these processes and in contributing to conservation.
Teaching methods	Workshops
Course on transversal, interdisciplinary, transdisciplinary skills	☐ Yes ☒ No
Available for PhD students from other courses	☐ Yes ☒ No
Prerequisites (not mandatory)	

Examination methods (if applicable)	
Suggested readings	Slides of the teachers
Additional information	The entire event will be held in Chioggia

Course unit English denomination	Understanding DNA and RNA sequencing: theory and know how
SS	05/BIOS-14
Teacher in charge (if defined)	Dr Mirko Pegoraro (Liverpool University)
Teaching Hours	10
Number of ECTS credits allocated	2
Course period	Spring 2026
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (80% minimum of presence) ☐ No
Course unit contents	Theory and comprehension of next generation DNA/RNA sequencing. Practical comprehension of RNA-seq statistical analysis using Linux and R.
Learning goals	Understanding of DNA/RNA-seq output. Practical understanding of the statistical analysis of RNA-seq. Being able to statistically analyse RNA-seq. Being able to extract graphical representation of RNA-seq experiment (e.g. Volcano plot, heatmaps) Use of Linux and R.
Teaching methods	Lectures Workshops
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No PhD Programme in Biomedical Sciences
Prerequisites (not mandatory)	Basic knowledge of R (preferable but not necessary)

Examination methods (if applicable)	
Suggested readings	Not Applicable
Additional information	Necessary: Laptop with installed R/R Studio, Putty (or equivalent), Xming (or equivalent) and WinSCP (or equivalent), internet connection. The module lessons will introduce RNA/DNA seq and explain how to understand DNA/RNA-seq output. The lessons introduce the analysis scripts. The workshops analyze RNA-seq using linux and R.