Course unit English denomination	**Theoretical and Practical Bioinformatics Approaches in Animal and Food**
Teacher in charge (if defined)	Piergiorgio Stevanato (DAFNAE, UNIPD)
Teaching Hours	32
Number of ECTS credits allocated	4
Course period	2-3-4 July 2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☐ Yes ☒ No
Course unit contents	1. Sequence analysis - Understanding a DNA sequence, basic concepts of sequence similarity, identity and homology, database searching: BLAST, FASTA and other sequence analysis tools to assign homology. Primer designing, PCR and Sanger sequence analysis. 2. Transcriptome analysis - Concepts in RNA-seq data analysis: data pre-processing and data-processing steps: mapping algorithms such as BWA and Bowtie2; differential gene expression analysis using RNA-seq data, statistical methods, relative merits of various platforms. Primer design for downstream validation. Measuring gene, lncRNA, siRNA from RNA-seq data. 3. Microbiome Analysis - 16s rRNA data analysis, clustering/phylogenetic tree based of alignment, clustering based on composition. Annotation based on databases, principal component analysis and other clustering tools. 4. SNP analysis - Resequencing of target genes or whole genomes, Gene prediction algorithms, identification of variants – SNPs/SNVs. Concepts behind genome wide association studies. Introduction to various
Learning goals	This class is to enable students with an understanding of concepts in the theory and practical of next generation sequencing and analysis of bioinformatics data. At the end of the course, the student is expected to have a good knowledge of various genome sequencing technologies and platforms and related data analysis of the genome, transcriptome, and microbiome.
Teaching methods	Lectures and videos explaining the theoretical concepts and practical online exercises on data analysis
Course on transversal, interdisciplinary, transdisciplinary skills	☐ Yes ☒ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites	Basic knowledge on molecular biology

(not mandatory)	
Examination methods (in applicable)	Surveys and online written tests
Suggested readings	Referenced scientific papers Teaching material in the form of videos will be shared with students
Additional information	None

Course unit English denomination	**Food Microbiota & Human microbiome**
Teacher in charge (if defined)	Chiara Nadai (DAFNAE, UNIPD)
Teaching Hours	8
Number of ECTS credits allocated	1
Course period	4-5 June 2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (70% minimum of presence) ☐ No
Course unit contents	Composition of microbial populations of main fermented foods Composition of the human microbiome Main functions of the human microbiome.
Learning goals	The course is aimed at familiarizing students with the composition of microbial populations living in foods and their main positive or negative activities. The concept of human microbiome will be also discussed, along with the description of the principal microbial categories and their main effects on human metabolism
Teaching methods	The course will consist of theoretical classes and a practical session devoted to the knowledge of main bioinformatic tools for the study of microbiomes
Course on transversal, interdisciplinary, transdisciplinary skills	☐ Yes ☒ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	Basic knowledge of microbiology
Examination methods (in applicable)	The final exam will consist in a written text
Suggested readings	Selected scientific papers All the material of the course will be provided online in the Moodle platform
Additional information	None

Course unit English denomination	**Nutrigenomics in livestock sector**
Teacher in charge (if defined)	Diana Giannuzzi (DAFNAE, UNIPD)
Teaching Hours	8
Number of ECTS credits allocated	1
Course period	11-12 November 2024
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (70% minimum of presence) ☐ No
Course unit contents	The course will cover the following aspects: Mechanisms of nutrient-genome interaction; Effect of bioactive chemicals in foods and supplements on animal metabolism and role on gene expression; Innovative, functional and nutraceutical feeds; Disease prevention and treatment using nutrition; Role of epigenetics in the differences of individual response to diet; Role of the microbiome in influencing gene expression; Overview of research and applications of nutrigenomics in the different domestic species.
Learning goals	The goal of the course is to provide the students with an understanding the meaning of nutrigenomic and nutrigenetic terms and their contextualization in livestock production, together with their applicability as a new exciting research field.
Teaching methods	Each topic/group of topics will consist of theoretical classes
Course on transversal, interdisciplinary, transdisciplinary skills	☐ Yes ☒ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	Basic knowledge of molecular biology (genome structure, control mechanisms of transcription and transduction)
Examination methods (in applicable)	Written examinations designed to test the knowledge acquired during the course
Suggested readings	The material used for the course will be made available to students through the Moodle platform some days before the beginning of the lessons
Additional information	None

Course unit English denomination	**Animal welfare assessment and risk management**
Teacher in charge (if defined)	Flaviana Gottardo (DAFNAE, UNIPD)
Teaching Hours	8
Number of ECTS credits allocated	1
Course period	23-24 January 2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (70% minimum of presence) ☐ No
Course unit contents	The course is developed in 4 lessons with final group work: 1) An introduction aimed at providing a brief summary of the evolution of the topic of animal welfare. 2) Identification of emerging issues in animal welfare during the breeding and rearing phase 3) Identification of emerging animal welfare issues during the transport phase of the process 4) Identifying emerging welfare issues during slaughter.
Learning goals	At the end of the course, the student should be familiar with the emerging issues relating to the welfare of farm animals during the breeding, transport and slaughter stages. Developments in positive welfare indicators and new animal-based welfare indicators should also be known.
Teaching methods	Lectures and discussion with the PHD students on the updats of the "Animal Welfare Science"
Course on transversal, interdisciplinary, transdisciplinary skills	☐ Yes ☒ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	Basic knowledge on farm animal rearing systems
Examination methods (in applicable)	Working in groups to collaborate on analysing a specific problem that will be presented and discussed with peers.
Suggested readings	PPT presentation as well as suggested readings will be provided to the students on Moodle platform

	Document produced by the EFSA Panel on Animal Health and Welfare (AHAW) EFSA
Additional information	None

Course unit English denomination	**Animal-based Vs. Plant-based foods**
Teacher in charge (if defined)	Massimo De Marchi (DAFNAE, UNIPD)
Teaching Hours	8
Number of ECTS credits allocated	1
Course period	19-20 February 2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (70% minimum of presence) ☐ No
Course unit contents	Chemical composition of milk and milk substitutes: fat, proteins, minerals, carbohydrates, and vitamins profiles; relevance of milk and milk substitutes in human nutrition and health. Chemical composition of meat and meat substitute: fat, proteins, minerals, carbohydrates, and vitamins profiles; traces of antibiotics and pollutants; relevance of meat and meat substitutes in human nutrition and health. Sustainability issues: pros and cons about sustainability of animal-derived food products and their plant-based substitutes. Writing a survey to pitch for public perception and consumer awareness on the topic of "Plant-based food: an alternative to animal-derived food?".
Learning goals	The course is aimed at comparing the intrinsic quality traits and sustainability of animal-derived food products (i.e., milk and meat) with their plant-based substitutes.
Teaching methods	Lectures for introducing theoretical concepts; interactive lectures to prepare the survey.
Course on transversal, interdisciplinary, transdisciplinary skills	☐ Yes ☒ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	None
Examination methods (in applicable)	Short report about public perception and consumer awareness on the topic of "Plant-based food: an alternative to animal-derived food?". The report will be based on the results of a public survey, which will be prepared during the course.
Suggested readings	The material (i.e., slides, papers, book chapters, videos and multimedia files) will be made available to students through Moodle platform.

Additional information	None

Course unit English denomination	**Integrated assessment of sustainability in livestock system**
Teacher in charge (if defined)	M. Berton, F. Bordignon, M. Schiavon (DAFNAE, UNIPD)
Teaching Hours	12
Number of ECTS credits allocated	1.5
Course period	19-20 November 2024
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (70% minimum of presence) ☐ No
Course unit contents	The course consists of a theoretical part introducing students to the sustainability concept and its application on livestock systems, and of a theoretical -practical part that allows students to acquire knowledge and skills on how to evaluate and manage sustainability in livestock farming systems, also with case studies and active-learning activities. The course will be divided into the following modules: 1. What is sustainability and which descriptors are useful to frame a livestock system 2. Relationship between animal production and natural environment and environmental matrices (water, soil, atmosphere) 3. How to measure emissions in the farm 4. Evaluating sustainability: Life Cycle Assessment and beyond 5. Sustainable livestock systems: ruminants (Berton); 6. Sustainable livestock systems: monogastrics and fish.
Learning goals	At the end of the course, students will have acquired knowledge on the different facets of sustainability in livestock systems, methods and tools for their evaluation and management.
Teaching methods	Lectures and group-working activities on specific case studies
Course on transversal, interdisciplinary, transdisciplinary skills	☐ Yes ☒ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	None
Examination methods (in applicable)	Class exercises assigned and supervised by the teachers.

Suggested readings	The material (i.e., slides, papers, book chapters, videos and multimedia files) will be made available to students through Moodle platform.
Additional information	None

Course unit English denomination	**Biostatistics and Clinical epidemiology**
Teacher in charge (if defined)	L. Desquilbet
Teaching Hours	16
Number of ECTS credits allocated	2
Course period	2026
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (70% minimum of presence) ☐ No
Course unit contents	The course is dedicated to basics in biostatistics and study design for causal inference. In detail the course is focused on train student to understand the results obtained from usual statistical tests, to critically read statistics presented in tables, to avoid miss-interpretation of the p-values, to appreciate the a priori statistical power of the study, to interpret the results from univariate survival analyses (Kaplan-Meier curves), to interpret the results from univariate and multivariate regression models and to identify the presence of confounding bias and to discuss the impact of such bias.
Learning goals	Participants will be able to analyse the consistency between the statistical methods used to obtain the results of published studies and the clinical message(s) based on these results. To reach this objective, participants will be able to understand the statistical analyses performed by scientists and to interpret the statistical results.
Teaching methods	This MasterClass is organized in 3 days, dedicated to basics in biostatistics and study design for causal inference. Lectures are during the first two days, practicals the last day. Practicals will be based on results presented in published papers. The examples will be drawn from veterinary medicine, but can easily be extended to clinical research in human medicine.
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	Having read scientific papers presenting results with p-values in (veterinary) clinical research. There are no prerequisites about being able to perform statistics.
Examination methods (in applicable)	None

Suggested readings	Guller, J Am Coll Surg, 2004 (Interpreting statistics in medical literature: a vade mecum for surgeons); Greenhalgh, BMJ, 1997 (Different types of data) (How to read a paper. Statistics for the non-statistician. I: Different types of data need different statistical tests); Greenhalgh, BMJ, 1997 (Significant relations) (How to read a paper. Statistics for the non-statistician. II: Significant" relations and their pitfalls).
Additional information	Available for all PhD students of Agripolis

Course unit English denomination	**Experimental design in Crop Science: principles**
Teacher in charge (if defined)	L. Marini (DAFNAE, UNIPD)
Teaching Hours	8
Number of ECTS credits allocated	1
Course period	18-19-20 February 2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (70% minimum of presence) ☐ No
Course unit contents	This course provides students with an opportunity to enhance their understanding of the principles and processes of experimental design in agricultural sciences. The course will provide students with a foundation in critical thinking, experimental design and data analysis that will be applicable to independent research projects. Students will also explore the practical requirements and limitations of scientific research. This practical activity will be mostly developed in groups of 3-4 PhD students and a final plenary session will be useful to discuss their experimental designs.
Learning goals	
Teaching methods	Class exercises assigned and supervised by the teachers.
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☐ Yes ☒ No
Prerequisites (not mandatory)	None
Examination methods (in applicable)	
Suggested readings	None
Additional information	None

Course unit English denomination	**Experimental design in Crop Science: from lab to field**
Teacher in charge (if defined)	L. Marini (DAFNAE, UNIPD)
Teaching Hours	8
Number of ECTS credits allocated	1
Course period	18-19-20 February 2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (70% minimum of presence) ☐ No
Course unit contents	The course covers fundamental principles and procedures of experimental designs in in many disciplines related to Crop Science PhD School. Emphasis will be on proper experimental designs when the researchers and PhD students are dealing with single or multiple factors, appropriate use of balanced and unbalanced designs, proper consideration of years and locations, the proper use of research data to determine association among variables versus the predictive value of variables, and problems associated with field experiments versus those associated with controlled environments such as greenhouses, growth chambers, and biotechnological and molecular genetics labs.
Learning goals	
Teaching methods	Class exercises assigned and supervised by the teachers.
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☐ Yes ☒ No
Prerequisites (not mandatory)	none
Examination methods (in applicable)	
Suggested readings	None
Additional information	None

Course unit English denomination	**Strategies and tools to reduce environmental impacts: the case of LCA methodology**
Teacher in charge (if defined)	M. Masiero, M. Zanetti, Tondi (TESAF, UNIPD)
Teaching Hours	28
Number of ECTS credits allocated	3,5
Course period	12-13-14-15 May 2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☐ Yes ☒ No
Course unit contents	The course consists of a theoretical part in which the LCA (Life Cycle Assessment) methodology will be presented and a practical part which consists of the use of software dedicated to LCA models building. Within the introduction part an overview of recent developments and current trends in tools to incorporate/deal with environmental impacts associated with production will be delivered, with an emphasis on policy and marketing tools and in particular standards and certification ones. Among them, LCA will be addressed in depth. LCA is a transversal technique applicable to all sectors of activity and research. The use of software allows to model the carbon and water footprint, energy, waste production, use of materials and natural resources, as well as costs along the entire supply chain and the entire cycle of life of the studied product or service. The LCA model construction is facilitated by the use of databases, as Ecoinvent, often integrated with the software. In the practical part, doctoral students will be able to use the software to assess the environmental impact of the product (or service) object of their project. The built model allows to identify the most impactful processes and propose reduction strategies.
Learning goals	At the end of the course, students will have acquired knowledge on the tools used to assess environmental impacts of a product (or service) and the strategies for reducing them.
Teaching methods	After an introduction on climate change and strategies and policies to reduce it, the students will learn how to use a LCA dedicated software. If she/he will, the student could apply LCA to its PhD research subject.
Course on transversal, interdisciplinary, transdisciplinary skills	☐ Yes ☒ No
Available for PhD students from other courses	☒ Yes ☐ No

Prerequisites (not mandatory)	None
Examination methods (in applicable)	Class exercises assigned and supervised by the teachers.
Suggested readings	The teacher will provide the course slides. Teaching materials and readings provided during the course.
Additional information	None

Course unit English denomination	**Introduction to Machine learning and its application to Veterinary Science**
Teacher in charge (if defined)	B. Di Camillo (DEI, UNIPD)
Teaching Hours	16
Number of ECTS credits allocated	2
Course period	8-9-16-20 May 2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☐ Yes (% minimum of presence) ☒ No
Course unit contents	After a brief introduction of the basic concepts (supervised and unsupervised learning, training-test and validations sets, typical learning frameworks) the course will be organized in 3 parts: i) data visualization; ii) clustering; iii) classification & regression.
Learning goals	The goal of the course is to provide the students with an understanding of basic machine learning concepts and methods, focusing on the potentiality and challenges of machine learning in veterinary science and providing the preliminary skills for this type of analysis in R.
Teaching methods	Frontal lessons, Task-based learning, Implementing (basic) solutions in R, Collaborative learning opportunities where students can participate by exploring, reflecting, and thinking critically together.
Course on transversal, interdisciplinary, transdisciplinary skills	☐ Yes ☒ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	Basic R scripting
Examination methods (in applicable)	“As an exam test, I ask to choose a dataset of interest and one or two methods among those seen in class. The students have to reproduce the (basic) analyzes seen in class on this dataset of your choice, taking care to do an appropriate preprocessing and explaining at each step the analysis choices. The analysis can be done in group”.
Suggested readings	T. Hastie, R. Tibshirani, J. Friedman, The Elements of Statistical Learning. Springer

Additional information	None

Course unit English denomination	**Navigating the peer review process**
Teacher in charge (if defined)	L. Marini (DAFNAE, UNIPD)
Teaching Hours	8
Number of ECTS credits allocated	1
Course period	28-29 November 2024
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (70% minimum of presence) ☐ No
Course unit contents	Background: Peer review is a crucial part of the scientific enterprise. However, the process often seems daunting and cumbersome when navigating it for the first time as a PhD student. Aim: The course aims to provide guidelines to help students navigating the peer review process both as an author and a reviewer. Concerning the author role, the students will learn how to select the right journal to publish their research, how to draft an effective cover letter, how to formally respond to the reviewers' comments after a decision, how to deal with conflicting comments, and finally how to revise the manuscript. Concerning the reviewer role, the students will learn the key qualities of a good reviewer, how to review a manuscript depending on the journal and how to write an effective report.
Learning goals	
Teaching methods	Teaching activities: After an introductory lesson the students will work on two case-studies. In the first one, the student will play the reviewer role and will be asked to produce a reviewer report for a manuscript in the relevant field of interest. In the second case study, the student will become an author that needs to respond reviewers' comments. The students will be assisted by senior scientists with experience as journal editors across different disciplines.
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☐ Yes ☒ No
Prerequisites (not mandatory)	No prior knowledge is required
Examination methods	

(in applicable)	
Suggested readings	None
Additional information	None

Course unit English denomination	**Econometric models to inform environmental resources management and food policies**
Teacher in charge (if defined)	M. Thiene, C. Franceschinis (TESAF, UNIPD)
Teaching Hours	8
Number of ECTS credits allocated	1
Course period	11 February 2025
Course delivery method	☐ In presence ☒ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☐ Yes ☒ No
Course unit contents	1. What methods can be used to provide policy makers with relevant information regarding management of natural resources, determinants of environmental services selection and food choice? 2. Basic theoretical background on discrete choice models 3. Discrete choice models estimation in R 4. Tutorial session on valuation and management of environmental resources and drivers of food demand
Learning goals	The course allows participants to: i) understand how to explore and identify factors that influence environmental resources/services management and demand for food; ii) acquire skills on data collection and data analysis concerning environmental services demand and food choices; iii) acquire knowledge on discrete choice models; iv) learn how to estimate discrete choice models in R; v) apply discrete choice models for the analysis of food and environmental services demand; vi) understand how to use results from econometric analysis to inform environmental resources management and food policies.
Teaching methods	The course will be held in Zoom. Participants will be explained how to collect and analyze data to investigate the factors that drive demand for food and environmental resources. Then, participants will be introduced to discrete choice models and they will estimate a variety of model specifications in R within a tutorial session focused on valuation and management of environmental resources and drivers of food demand.
Course on transversal, interdisciplinary, transdisciplinary skills	☐ Yes ☒ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	The course does not require any prerequisite. However, knowledge of descriptive statistics and basic knowledge of the R software (data import and basic syntax) could be helpful. Installation of R is required before the course (detailed installation instructions will be sent).

Examination methods (in applicable)	Students will have to hand-in a homework assignment to prove they are able to use the methods learned in the course.
Suggested readings	The course material will be made available in the Moodle platform.
Additional information	None

Course unit English denomination	**Climate change and forests**
Teacher in charge (if defined)	D. Castagneri, A. Prendin (TESAF, UNIPD)
Teaching Hours	12
Number of ECTS credits allocated	1,5
Course period	19-20 March 2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☐ Yes ☒ No
Course unit contents	The course allows participants to understand and get insights into: i) the different components of the climate system; ii) the variability of climate at different spatial and temporal scales; iii) the different types of responses of the climate components and the different feedback mechanisms involved in the process of change; iv) the role of extreme climate events and the effects of forest disturbances; v) the potential responses of tree species to changing climatic conditions; vi) the climate-driven risks to the climate mitigation potential of forests; vii) the European tree species responses to climate change; viii) the climate change effects at the temperature-limited vegetation systems and ix) the climate change responses across the tundra biome.
Learning goals	The CCF course provides a general background of the climate change and on its effects across scales in different environments and biomes.
Teaching methods	Frontal lessons with interactive activities (questions and discussion); group activities based on scientific literature.
Course on transversal, interdisciplinary, transdisciplinary skills	☐ Yes ☒ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	The course does not require any prerequisite. It addresses to PhD students at any levels
Examination methods (in applicable)	Assessment of students' capacity to analyze complex scientific topics and actively present and discuss them with peers and professors.
Suggested readings	The course material will be made available on Moodle platform.

Additional information	None

Course unit English denomination	**Course in Education in Ecology**
Teacher in charge (if defined)	Several experts (coordinator: T. Anfodillo) (TESAF, UNIPD)
Teaching Hours	24
Number of ECTS credits allocated	3
Course period	27-28-29 August 2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☐ Yes ☒ No
Course unit contents	It is a post-graduate training activity for the in-depth study of issues related to a discipline, now considered fundamental, that deals with the relationships between living organisms, between these organisms and the environment and, therefore, also the relationship between man and nature. The Course is held annually at the Centro Studi per l'Ambiente Alpino "Lucio Susmel" in San Vito di Cadore (BL), a branch of the TESAF Dep. It represents the training activity on this discipline with the longest tradition in Italy, and is an activity of excellence for the entire Alpine mountain region. The main goal of the Course is to present the most advanced research in the field to technicians, administrators, teachers and researchers. The specific theme chosen for the in-depth study changes every year in relation, also, to events of particular importance occurring in the mountain territory. This is due to the fact that the Course also seeks to give operational suggestions concerning problems that local communities have to face (e.g. the problem of road infrastructures, the damage caused by the windstorm Vaia, debris flows in the Boite Valley, to mention the topics discussed in the most recent editions). http://intra.tesaf.unipd.it/Sanvito/Index.asp
Learning goals	The student at the end of the module will be able to recognize main relationships between living organisms, between these organisms and the environment and, therefore, also the relationship between man and nature.
Teaching methods	The Course usually takes place over three days with approximately 6 hours/day of lectures. National or international invited speakers are assigned a full-length lecture. Generally, an outreach activity is also organised on the evening of the second day in the Conference Hall of the San Vito Municipality. It is organised in collaboration with the San Vito Municipality, the Belluno Province and the Boite Valley Mountain Union. In addition to these public authorities, depending on the theme chosen year by year, other types of collaboration are arranged with local organisations/businesses/associations such as "Dolomiti Contemporanee" or the "Angelini Foundation" in Belluno.
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No

Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	none
Examination methods (in applicable)	Final assignment uploaded online in Moodle, check by professors. Focus on the description of the new knowledge on ecology acquired during the course and how the participant plans to use them in his/her own research and professional applications.
Suggested readings	Suggested year by year, according to the topic and invited experts.
Additional information	None

Course unit English denomination	**The evolution of open spaces and urban greenery in urban design and planning: an excursus of Italian and international contexts**
Teacher in charge (if defined)	C. Dezio (TESAF, UNIPD)
Teaching Hours	8
Number of ECTS credits allocated	1
Course period	9 April 2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☐ Yes ☒ No
Course unit contents	The seminar aims to illustrate the contribution of urban greenery in the urban design and planning project. The seminar starts from the challenges of urban planning today: the environmental question, the social question, fragile marginal territories. It will briefly illustrate the history of the city and the territory in various international contexts, a fundamental step in understanding the reasons that led to a different interpretation of the contribution of open public spaces, depending on the context (Italian context and comparison with other European countries). Some of the most famous approaches to the reconquest of public space will then be illustrated, which have laid the foundations for a revision of urban planning (from housing to public space): reconquest of public space and the right to the city of Lefevbre (from 1968 to today); Jane Jacobs's Ideal City; Landscape urbanism (landscape approach to the city); 15-minute city. The seminar concludes by illustrating the contribution of urban planning to urban green design, with a focus on urban forestry: methods, tools, research and successful projects for different contexts (historic city, urban sprawl, etc).
Learning goals	The goal of the course is to provide a first approach to urban planning, with particular attention to the perspective of open spaces. The course will explain the reasons behind the current structure of Italian cities, in comparison with different international contexts, and the consequences on contemporary emergencies and, therefore, on new scenarios of multidisciplinary research.
Teaching methods	Theoretical lessons will be followed by practical examples, using video and movies. Proactive participation of the students is strongly recommended.
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No

Prerequisites (not mandatory)	None
Examination methods (in applicable)	The student will propose a design case study, arguing the choice.
Suggested readings	Bibliographic suggestions will be included in the slides available to the student Slides are provided by the teacher on the Moodle platform
Additional information	None

Course unit English denomination	**Statistics of extremes**
Teacher in charge (if defined)	M. Borga (TESAF, UNIPD)
Teaching Hours	8
Number of ECTS credits allocated	1
Course period	1st semester 2024-2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☐ Yes ☒ No
Course unit contents	Statistical extreme value theory is a field of statistics dealing with extreme values, i.e., large deviations from the median of probability distributions. The theory assesses the type of probability distribution generated by these processes. The course will provide an overview of the fundamental concepts of the Theory of Extreme Values and presents the statistical tools to apply this theory using data from geophysics and climate sciences. We illustrate the power of the theory by means of four applications to climate data from different parts of the world: rainfall data, wind data, streamflow data.
Learning goals	The goals of the course are: 1) to introduce the extreme value theory in the time series context. The main focus will be on heavy-tail phenomena, where extremes are particularly severe, for geophysical events like precipitation, temperature, wind, discharges; 2) To provide suitable statistical tools for analyzing the aforementioned phenomena; 3) to provide relevant knowledge to PhD students about extreme behavior of random systems in contrast to their average behavior
2) Teaching methods	Theoretical lessons will be followed by practical examples. Proactive participation of the students is strongly recommended.
Course on transversal, interdisciplinary, transdisciplinary skills	☐ Yes ☒ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	None
Examination methods	The students will propose a case study, arguing the choice.

(in applicable)	
Suggested readings	Bibliographic suggestions will be included in the slides available to the student
Additional information	None

Course unit English denomination	**Special topics for LERH research**
Teacher in charge (if defined)	Professors/experts changing year by year, depending on the fields of interest of the new PhD students
Teaching Hours	8
Number of ECTS credits allocated	1
Course period	2nd semester 2024-2025
Course delivery method	☒ In presence or ☒ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☐ Yes ☒ No
Course unit contents	The main goal of the Course is to offer special insights on advanced research in one or two fields that are particularly relevant to the specific group of PhD students enrolled into the LERH doctoral programme every year. This is due to the fact that LERH is a high multidisciplinar PhD programme, and specific topics of interest may vary significantly year by year, depending on the students who will be selected. The fields of research within LERH include ecology, mechanization, economy, policy, patology, hydrology, silviculture, land planning, remote sensing and more both in urban, peri-urban and rural contexts, in the domains of agriculture, forest, food and agri-food, rural development and tourism sectors. This Course offers also the possibility to take advantage of the presence of visiting professors, who can offer seminars on their specific discipline and field of specialisation.
Learning goals	Acquiring deeper knowledge on each specific topic, either from a theoretical or practical point of view.
Teaching methods	Frontal lessons, plenary discussion, individual work - varying year by year, according to the topic and invited experts.
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☐ Yes ☒ No
Prerequisites (not mandatory)	None
Examination methods (in applicable)	In continuum evaluation during the activities, possibly complemented by a final quiz if needed - depending on professor and topic.
Suggested readings	Suggested year by year, according to the topic and invited experts.

Additional information	None

Course unit English denomination	**Analysis and interpretation of transcriptomic data**
Teacher in charge (if defined)	Giovanni Battista Tornielli (DAFNAE, UNIPD)
Teaching Hours	16
Number of ECTS credits allocated	2
Course period	23-24-25-26 June 2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☐ Yes ☒ No
Course unit contents	The course will focus on the informative potential of the analysis of gene expression in crop species, from the single gene to the genome-wide level. The most used platforms for transcriptomic analysis will be described and the different methods to organize transcriptomic datasets and to process transcriptomic data will be illustrated. The course will focus in particular on approaches to biologically interpret transcriptomic data by integrating different information. Representative case studies will be used as illustrative examples.
Learning goals	The course aims to provide the student with the tools to understand and interpret transcriptomic studies applied to crop species, and to plan the application of transcriptomics in the design of an experiment.
Teaching methods	Lectures and interactive discussions.
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	Basic knowledge of plant biology and genetics
Examination methods (in applicable)	Evaluation of students' presentation of a research article on transcriptomics applied to crop species
Suggested readings	Articles, book chapters, and slides provided by the teacher
Additional information	None

Course unit English denomination	**Modeling and big data for biological systems**
Teacher in charge (if defined)	Mario Putti (DAFNAE) - Elena Bachini (Dipartimento di Matematica Tullio LeviCivita)
Teaching Hours	24
Number of ECTS credits allocated	3
Course period	4-5-6 and 10-11-12 December 2024
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☐ Yes ☒ No
Course unit contents	- Introduction to Mathematical Modeling: general principles (conservation, minimum energy, least action) and simple mathematical models - 8 hours - Computational modeling with examples: simple numerical solutions of biological models and calibration methods - 8 hours - Machine Learning and Big Data with examples; explanation of student projects - 8 hours
Learning goals	Significance and importance of mathematical models in biology and how they can be used; understanding the relationship between data and models; practical experience in using observational data to feed simple models for classification and forecast; role of machine learning within this framework; practical experience with simple machine learning algorithms.
Teaching methods	Lectures dedicated to theoretical aspects; lectures dedicated to practical exercises at the computer; discussion on project development.
Course on transversal, interdisciplinary, transdisciplinary skills	☐ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	Typical first-year mathematical calculus: functions, derivatives, minimima and maxima, integrals
Examination methods (in applicable)	Performance assessment based on project results and its presentation/discussion by the student
Suggested readings	A textbook list will be provided by the teachers upon request on specific topics of student interest

	Notes and slides prepared by the teachers; research papers and reports provided by the teachers
Additional information	None

Course unit English denomination	**Scientific Writing in English**
Teacher in charge (if defined)	M.E. Olson (external expert)
Teaching Hours	32
Number of ECTS credits allocated	4
Course period	26-27-28-29-30 May 2025
Course delivery method	☐ In presence ☒ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (70% minimum of presence) ☐ No
Course unit contents	This course is tailored for PhD students who wish to improve their writing skills in English. The course emphasizes the importance of simplicity, clarity, and brevity to communicate science in an effective manner. During the course, participants will develop a critical approach towards the recognition of elements that make written communication weaker or stronger. Participants will improve their self-confidence towards the writing of scientific manuscripts, and the communication of science as a whole.
Learning goals	The course is structures around the following learning goals: - How and why to publish in high impact factor journals - Scientific writing is a group process -Scientific writing follows a simple formula -The "Winning Formula" to structure your manuscript -The importance of the "reasearch gap" - Paragraph structure - Connecting paragraphs and sentences - Traps that English sets for non-native speakers -Titles, abstracts, cover letters, and replying to reviewers
Teaching methods	Lectures and interactive discussions.
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	No prior knowledge is required
Examination methods (in applicable)	In continuum evaluation during the activities, based on random selection of students' drafts of documents presented and discussed during the classes.

	Successful achievement of the credit point is based on course attendance and completion of assigned work.
Suggested readings	All the material of the course will be provided online in the Moodle platform some days before the beginning of the lessons.
Additional information	Available for all PhD students of Agripolis

Course unit English denomination	**Basic Statistics**
Teacher in charge (if defined)	Giulia Zuecco, Simone Iacopino (TESAF, UNIPD)
Teaching Hours	16
Number of ECTS credits allocated	2
Course period	17-18-19-20 December 2024
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (70% minimum of presence) ☐ No
Course unit contents	Part I: Descriptive statistics: 1.1 Introduction: descriptive statistics and statistical inference 1.2 Variable types 1.3 Tables and graphical presentation of data 1.4 Measure of central tendency, measure of variation Part II: Normal distribution: normal distribution and the empirical law, Z table, The Central Limit Theorem Part III: Statistical inference: parametric statistics and hypothesis testing Part IV: Linear relationship between two variables: Pearson correlation coefficient, simple linear regression.
Learning goals	The goal of the course is to provide the students with an understanding of basic statistical terms, learn methods for describing statistical data and provide basic skills in hypothesis testing and statistical inference.
Teaching methods	The course will be done in classroom with the use of own laptop Each topic will consist of a theoretical class followed by practical exercises in Excel
Course on transversal, interdisciplinary, transdisciplinary skills	☐ Yes ☒ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	Basic knowledge of mathematics and of Excel
Examination methods (in applicable)	Written examinations based on exercises designed to test the basic knowledge acquired dusing the course

Suggested readings	The material used for the course will be made available to students through the Moodle platform of the Ph.D. School
Additional information	None

Course unit English denomination	**Applied Statistics with applications in R**
Teacher in charge (if defined)	A.Cecchinato, S. Pegolo (DAFNAE, UNIPD)
Teaching Hours	16
Number of ECTS credits allocated	2
Course period	20-21/Jan./2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (70% minimum of presence) ☐ No
Course unit contents	Introduction to hypothesis testing How to state a null hypothesis and alternative hypothesis How to identify type I and type II errors and interpret the level of significance Analysis of variance (ANOVA): One-way ANOVA Two-way ANOVA Two-way ANOVA and interactions ANCOVA Exercises and applications with R software
Learning goals	The overall course goal is to give the participants knowledge on statistical methods and data analysis, with particular emphasis on the application of Analysis of Variance techniques using R software
Teaching methods	The course will be done in classroom with the use of own laptop Each topic will consist of a theoretical class followed by practical exercises in R
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	Basic knowledge of descriptive statistics and R programming language
Examination methods (in applicable)	Team Project: Data will be provided to a team composed of two to three students and asked to employ techniques learned throughout this course to analyze the data set, interpret and report results.

	Final Exam: Written examinations. A written examination consists of exercises designed to test the basic knowledge acquired during the course.
Suggested readings	Crawley, M. J. (2012). The R book. John Wiley & Sons. Kabacoff, R. I. (2010). R in Action. manning. Eventual additional material will be provided during the course. The material used for the course will be made available to students through the Moodle platform of the Ph.D. School at https://elearning.unipd.it/scuolaamv/login/index.php
Additional information	Available for all PhD students of Agripolis

Course unit English denomination	**Experimental design with R: from theory to practice**
Teacher in charge (if defined)	R. Mantovani, I. Piccoli (DAFNAE, UNIPD)
Teaching Hours	12
Number of ECTS credits allocated	1,5
Course period	4-5-6-7 February 2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (70% minimum of presence) ☐ No
Course unit contents	Planned scientific experiments vs. field experiments Experimental designs and test of hypotheses Orthogonal contrasts and comparison of means Randomized block design, Complete and incomplete factorial designs, Latin square design, Nested models, Split-plot model and analysis of longitudinal data
Learning goals	The overall course goal is to give the participants knowledge on experimental designs and their statistical data analysis
Teaching methods	Each lessons will consist in a teorethical part followed by practical examples and exercises in R. Students will use their own laptop and will have internet access in the classroom to access the course material and share exercises files
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	Basics of R programming languages, the previous courses of Applied Statistics with R (Proff. Cecchinato & Pegolo)
Examination methods (in applicable)	Students will be asked to solve some practical exercises during the lessons, with the possibility to do it in small groups and under the assistence of the teacher. The final exam will consist in a written text including some short questions and some practical exercises similar to the ones proposed during the lessons

Suggested readings	Crawley, M. J. (2012). The R book. John Wiley & Sons Kabacoff, R. I. (2010). R in Action. Manning
Additional information	All the material of the course will be provided online in the Moodle platform some days - Available for all PhD students of Agripolis

Course unit English denomination	**Advanced Statistics with R: Mixed models**
Teacher in charge (if defined)	C. Sartori (DAFNAE, UNIPD)
Teaching Hours	16
Number of ECTS credits allocated	2
Course period	28-29-30-31 January and 3 February 2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (70% minimum of presence) ☐ No
Course unit contents	Mixed models theory (including some basics of Matrix Algebra) Mixed models vs. general linear models (GLM) Mixed models analysis with R Mixed models for experimental design: Randomized Block Design, Nested Design Mixed models and longitudinal data: designs with repeated measurements
Learning goals	The course is aimed to provide knowledge about mixed models and their application in experimental plans and data analysis. Animal science and crop science case studies will be proposed. Participants will achieve some skill to solve mixed models analysis using R software
Teaching methods	Each lessons will consist in a teorethical part followed by practical examples and exercises in R. Students will use their own laptop and will have internet access in the classroom to access the course material and share exercises files
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	Basics of R programming languages, the previous courses of Applied Statistics with R (Prof. Cecchinato)
Examination methods (in applicable)	Students will be asked to solve some practical exercises during the lessons, with the possibility to do it in small groups and under the assistence of the teacher. The final exam will consist in a written text including some short questions and some practical exercises similar to the ones proposed during the lessons
Suggested readings	Crawley, M. J. (2012). The R book. John Wiley & Sons. Kabacoff, R. I. (2010). R in Action. manning.

Additional information	All the material of the course will be provided online in the Moodle platform some days before the beginning of the lessons - Available for all PhD students of Agripolis

Course unit English denomination	**Geostatistics**
Teacher in charge (if defined)	M. Borga, G. Zuecco (TESAF, UNIPD)
Teaching Hours	16
Number of ECTS credits allocated	2nd semester 2024-2025
Course period	
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☐ Yes ☒ No
Course unit contents	1. Basic on spatial statistics and interpolation methods, 2. Exercises on interpolation methods (inverse distance weighted and spline), 3. Basic on optimal spatial estimation methods and kriging, 4. Exercises on kriging.
Learning goals	The goal of the course is to learn the most common interpolation methods, how to apply them to different spatial datasets and obtain a basic knowledge on optimal spatial estimation methods.
Teaching methods	Theory is followed by practical examples. Exercises on interpolation methods are carried out in a computer room using ArcGIS, under the supervision of the teachers. Group work is optional; students can also work on their datasets and discuss them with the teachers.
Course on transversal, interdisciplinary, transdisciplinary skills	☐ Yes ☒ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	Students should have a basic knowledge of ArcGIS, and should know how to import raster and vector data in ArcGIS.
Examination methods (in applicable)	Class exercises assigned and supervised by the teachers.
Suggested readings	
Additional information	Slides, text and solutions of the exercises are provided by the teachers by the Moodle platform and email.

Course unit English denomination	**Introduction to GIS**
Teacher in charge (if defined)	R. Rossi (UNIPD)
Teaching Hours	16
Number of ECTS credits allocated	2
Course period	27-28 March and 10-11 April 2025
Course delivery method	☐ In presence ☒ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☐ Yes ☒ No
Course unit contents	The course will be based on ArcGIS platform, for which University of Padova students and PhD Student have a free license. Students will use ArcGIS Online (the cloud GIS) and ArcGIS Pro (the desktop GIS software), taking advantage of the integration of the two tools. Contents: 1. Introducing ArcGIS suite and ArcGIS Online GIS definitions. ArcGIS family: ArcGIS Pro and ArcGIS Online. ArcGIS Online: Organizations, Groups, Maps, Contents. Tons of data ready to use: Using Web. Service (WMS, REST, Tiled Internet Layer). Why to use Cloud GIS: WebApps, Dashboards, StoryMaps. Preparing a map for data collection (ArcGIS Field Maps Web App). Collect data with a Mobile Map (ArcGIS Field Maps Mobile App). Take a look to the data collected. Build a WebApp and a Dashboard with data 2. Using vector data in ArcGIS Pro How ArcGIS Pro works: Ribbon, Panes, Views. Loading and exploring data in ArcGIS Pro. Representing vector data (Symbology and Labels). Selecting Features. Analysing data (Geoprocessing). Essentials of Vector Analysis Tools. Exercise on Vaia Storm data 3. Using raster data in ArcGIS Pro Raster model: What is a raster, how is it done? Essentials of interpolation methods. Digital Terrain Models (DTM). Surface analysis (slope, aspect, hillshade). Working with Map Algebra. Suitability modelling. Exercise: identification of the ideal conditions to plant a vineyard 4. Automating workflows using ModelBuilder What is Model builder and why to use it. Model elements: Variable (Data, Values) and Tools. Exercise: Building a model for the identification of the ideal conditions to plant a vineyard. Automating workflows using iterators. Questions and Answers During the course PhD students (and their supervisors) can ask for particular GIS analysis needs.
Learning goals	The PhD student at the end of the course will be able to use a Geographic Information System for visualizing maps, use web services, make simple spatial analysis, build models, share WebMaps and WebApps, make a simple survey using smartphones

Teaching methods	The course will be held by a Online real-time Zoom class. The course will consist on theoretical basis and exercises with the GIS software
Course on transversal, interdisciplinary, transdisciplinary skills	☐ Yes ☒ No
Available for PhD students from other courses	☐ Yes ☐ No
Prerequisites (not mandatory)	Ability to manage simple database (CSV, XLS format), basic knowledge on Coordinate Systems, basic knowledge on Excel
Examination methods (in applicable)	PhD Students, at the end of the course, will be asked to produce a Map obtained with Spatial Analysis
Suggested readings	Slides, exercise text and data will provided during the course. It would be very useful to complete these 2 free web courses before attending the lab: https://learn.arcgis.com/en/projects/get-started-with-arcgis-online/ https://learn.arcgis.com/en/projects/get-started-with-arcgis-pro/
Additional information	None

Course unit English denomination	**Geomatics and Earth surface modelling**
Teacher in charge (if defined)	F. Pirotti (TESAF, UNIPD)
Teaching Hours	16
Number of ECTS credits allocated	2
Course period	13-14-17 March 2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☐ Yes ☒ No
Course unit contents	Short introduction and theory on 3D Earth surface surveying and modelling: photogrammetry and laser scanning - From imagery to 3D - structure from motion and deep image matching Introduction and theory on land-cover/land-use mapping through satellite and close-range multispectral imagery Importing-exporting the geo-formats Software for viewing and analysing data and integration in R - code optimization and tips for automatization of processes Introduction and demo on Google Earth Engine (GEE) - interoperability between QGIS, R and GEE Further advanced tools - machine learning (AI) for classification and regression through training/validation in R
Learning goals	Students will gain proficiency in R programming for spatial data analysis, interfacing R with Google Earth Engine; processing will include modelling using spatial data and rigorous accuracy assessment of classification and regression tasks.
Teaching methods	Theoretical lectures will be followed by practical examples. Students will have the possibility of experimenting such examples directly on their computers
Course on transversal, interdisciplinary, transdisciplinary skills	☐ Yes ☒ No
Available for PhD students from other courses	☐ Yes ☐ No
Prerequisites (not mandatory)	Background knowledge on basic statistics and in basic R programming; basic GIS knowledge is recommended (if you do not know what GIS stands for maybe this course is not for you); basic cartography is a plus, e.g. what are coordinate reference systems, how they differ etc...

Examination methods (in applicable)	Students will have to hand-in homework assignments that will be assessed in order to verify that students have acquired the knowledge of the topics addressed.
Suggested readings	Online slides. Interactive webpages Scientific articles provided during the course Slides and other course materials will be provided during the course.
Additional information	Slides and other course materials will be provided during the course.

Course unit English denomination	**Introduction to R for statistical analysis**
Teacher in charge (if defined)	G. Zuecco (TESAF, UNIPD)
Teaching Hours	4
Number of ECTS credits allocated	0,5
Course period	13 January 2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (70% minimum of presence) ☐ No
Course unit contents	1. Basic information on R and RStudio; 2. Basic syntax; 3. Numerical operations with vectors and matrices; 4. Import of data sets; 5. Descriptive statistics; 6. Graphical representation of data (histograms, boxplots and scatter plots).
Learning goals	The goal of the course is to: introduce the participants to R programming language and software environment, learn how to import data sets and compute descriptive statistics in R.
Teaching methods	The participants will be introduced to the various topics, and examples and practical exercises will be presented using R. The course will be done in classroom with the use of own laptop.
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	Knowledge of descriptive statistics, variable types and graphical representation of data, see also the content of the course Basic Statistics (L. Picco, G. Zuecco). Installation of R and RStudio is requested before the start of the course.
Examination methods (in applicable)	The examination will consist of practical exercises assigned to the participants during the course.
Suggested readings	R tutorials can be found at https://www.tutorialspoint.com/r/index.htm and https://www.statmethods.net/r-tutorial/index.html
Additional information	The material used for the course and supplementary readings for self-study will be made available through the Moodle platform. Available for all PhD students of Agripolis.

Course unit English denomination	**Basic data analysis with R for Veterinary Science**
Teacher in charge (if defined)	E. Giaretta (BCA, UNIPD)
Teaching Hours	8
Number of ECTS credits allocated	1
Course period	11-12 February 2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (70% minimum of presence) ☐ No
Course unit contents	The collection of the data. Installation of R and Rcmdr plugin. Descriptive statistics with R. Parametric and non-parametric test. Correlation and linear regression. Exercises and applications with R software
Learning goals	The course aims at training the participants on the use of R for data handling, descriptive statistics and basic statistical inference. Participants will develop R programming skills necessary to perform data analysis.
Teaching methods	Theoretical lectures will be followed by practical examples
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	Microsoft Excel. Fundamental concepts of centrality and dispersion measures.
Examination methods (in applicable)	Team Project: Data will be provided to a team composed of two to three students and asked to employ techniques learned throughout this course to analyze the data set, interpret and report results. Final Exam: Written examinations in R. It consists of exercises in R on the different databases, designed to test the basic knowledge acquired during the course.
Suggested readings	Crawley MJ Statistics. An introduction using R. John Wiley & Sons Ltd, 2005; Crawley MJ The R book. John Wiley & sons Ltd, 2007; Murrell PR graphics. Chapman & Hall/CRC-Taylor and Francis, 2006; Larson-HallJ. A guide to doing statistics in second

	language research using R. Taylor and Francis. PetrieA. & Watson P. Statistics for veterinary and animal science. Blackwell publishing, 2006
Additional information	The material used for the course and supplementary readings for self-study will be made available through the Moodle platform. Available for all PhD students of Agripolis.

Course unit English denomination	**The role of principal investigator**
Teacher in charge (if defined)	G. Renella (DAFNAE, UNIPD)
Teaching Hours	8
Number of ECTS credits allocated	1
Course period	22 January 2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☐ Yes ☒ No
Course unit contents	The course illustrate the profile of Post-docs as Principal Investigators (P.I.) as defined by the EU Environmental Research Area.
Learning goals	The course illustrates the profile of Post-docs as Principal Investigators (P.I.) as defined by the EU Environmental Research Area guidelines, its roles in research planning, conduction, administration of research grants, cooperative agreements, training of young scientists, and reporting, as well as responsibilities and obligations towards research institutions. The course will train PhD aspirants to build up scientific credit, identify potential mentors, and create a network within the scientific community during the PhD period. During the course, examples of excellent young scientist academic records, Research Institution rankings, and statistics on P.I. recruitment in European Union and Italy will illustrated.
Teaching methods	The course will be held in presence, compatibly with the SARS-COVID pandemic limitations
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	None
Examination methods (in applicable)	At the end of the course all attendees will be requested to prepare their own career development plan
Suggested readings	None

Additional information	Slides presented during the course and detailed sitography will be available on the Moodle platform.

Course unit English denomination	**Introduction to your enterpreneurial post-doc life**
Teacher in charge (if defined)	A. Leonardi (external expert)
Teaching Hours	2.5
Number of ECTS credits allocated	0.3
Course period	10 June 2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (70% minimum of presence) ☐ No
Course unit contents	The goal of the course is to introduce the participants to various options and pathways they can explore after completing their PhD studies for developing an entrepreneurial carrier that takes advantages of the PhD experience and knowledge. The course will focus on entrepreneurial skills, characteristics and successful factors for establishing and running spin-offs, searching for research and technology transfer funds, with examples taken from the practice (case-study: ETIFOR srl, a successful spin-off of the University of Padova founded in 2011).
Learning goals	The course will introduce the concept and use of value proposition and business canvas applied to the research context. These tools will help students to better identify the utility of research, key beneficiaries and potential commercial and business interests related to the research findings
Teaching methods	In presence seminar, 3 hours. Frontal lesson + Q&A session.
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	None
Examination methods (in applicable)	The student will be asked to develop a value proposition map of the research activity.
Suggested readings	And have a look at the Etifor website: www.etifor.com https://www.strategyzer.com/library/the-value-proposition-canvas
Additional information	None

Course unit English denomination	**Spatial statistics in regional economics**
Teacher in charge (if defined)	F. Pagliacci (TESAF, UNIPD)
Teaching Hours	16
Number of ECTS credits allocated	2
Course period	10-12-13-14 February 2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☐ Yes ☒ No
Course unit contents	1 Introduction to economic geography and regional economics; spatial statistics and types of spatial data; 2 Lattice data, regions, and space modelling (proximity and spatial weights matrices); 3 Measures of global spatial autocorrelation; Spatial effects and Introduction to spatial econometrics; 4 Exercitation with R
Learning goals	The goal of the course is to provide PhD students with foundational knowledge of economics and statistics that may be applied in resolving geographic (i.e., spatially based) problems. Firstly, students will examine some basic economic theories (e.g., core-periphery models) that explain the existence of regional disparities and socioeconomic differences. Secondly, students will apply statistics to spatial and territorial data, also receiving a short introduction to spatial econometrics. At the end of the course, students will be able to: understand socio-economic divides across spatial regions, analyze lattice (regional) data characterized by spatial dependence; represent socio-economic data using choropleth maps; and make a critical comparison between various models.
Teaching methods	Theoretical lessons will be followed by practical examples, using the software R. Proactive participation of the students is strongly recommended.
Course on transversal, interdisciplinary, transdisciplinary skills	☐ Yes ☒ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	Basic notions of statistics and econometrics. Basic knowledge and use of R.
Examination methods (in applicable)	Students will develop a short project (i.e., a short report), applying the techniques learnt in the course unit. The report will be evaluated by the teacher after the end of the course unit.

Suggested readings	Slides provided by the teacher will represent the "textbook". Additional readings are suggested on the Moodle platform
Additional information	Slides are provided by the teacher on the Moodle platform

Course unit English denomination	**Media Training**
Teacher in charge (if defined)	K. Leech
Teaching Hours	4
Number of ECTS credits allocated	0.5
Course period	19 March 2025 (to be confirmed; students will be informed)
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☐ Yes ☒ No
Course unit contents	This training helps prepare researchers and Institutes on how to communicate the animal research that they carry out. It will help you put in place a communications strategy, so that you can (and at the pace you find comfortable) begin to communicate and defend the research you carry out. The course will give participants skills to proactively engage with the media and how to react to media interest. Participants will also learn how to prepare robust mechanisms in advance of potential communication crisis situations, such as the undercover filming at the Max Planck Institute in Germany. By studying past examples of infiltrations in the UK and Europe, the steps taken by the organisations involved, the media coverage that followed them and the results of official investigations into the infiltrators claims, we will work with participants to understand what makes a successful media and communications response. We show openness and proactive communications can help to lessen the chances of negative publicity and how each person working in an animal facility can help to prevent problem scenarios developing in the first place.
Learning goals	knowledge mastery, reasoning, critical thinking, communications/media skills
Teaching methods	In presence.
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	
Examination methods (in applicable)	Individual and Group feedback, recommendations for further understanding

Suggested readings	None
Additional information	Available for all PhD students of Agripolis.

Course unit English denomination	**A better PhD experience: practical tools to improve your impact and self-efficacy**
Teacher in charge (if defined)	A. Moriggi (TESAF, UNIPD)
Teaching Hours	16
Number of ECTS credits allocated	2
Course period	25-26-27-28 February 2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (3/4 modules) ☐ No
Course unit contents	The course aims at offering conceptual frameworks, practical tools, as well as strategies and tips for early-stage career researchers. The aim is to increase self-efficacy and resilience, ideally contributing to maximizing wellbeing, impact, and efficiency. The course takes inspiration by the lecturer's own experience, including in securing EU- funded Marie Curie grants for "developing talents and advancing excellent research". Topics include: leadership, reflexivity and positionality, effective writing, strategic planning, the academic eco-system, relations in the workplace, non-violent communication, psychological safety, etc. The course draws from theories of: organizational change and management, leadershipdevelopment, social psychology, transformative social innovation, systems theory, philosophy of science, etc. It uses a transformative and transdisciplinary learning approach, combining methods from diverse disciplines (e.g. design thinking, participatory research, system thinking, feminist critical thinking, project management, etc.). It also draws from research-driven empirical evidence and methods (e.g. on future thinking) developed within the MCSA IF project "VERVE". The course will be structured in four modules, all highly participatory and interactive. Participation to at least three out of the four modules is mandatory to access the course. The first module is mandatory for all.
Learning goals	Expected learning outcomes: - Strengthened awareness bout own's research journey, objectives, and skills; - Enhanced sense of leadership, motivation, and morale; - Stronger awareness about structural issues in the academic system and its impacts at individual level; - Enhanced capacities in critical thinking, reflexivity, and active listening; - Improved ability to plan, focus and prioritize; - Transversal hands-on tools and resources for impactful research (e.g. time management, productive writing, alliance building, etc.); - Innovative techniques for peer-to-peer coaching and support, and for effective and nurturing teamwork.

Teaching methods	Frontal lectures, plenary discussions, individual work, teamwork, peer-to-peer coaching.
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	no prerequisite needed; the course can be taken by Early-Stage Career Researchers of all levels (PhD candidates of first/second/third year; Post-doc researchers; Borsisti and Assegnisti).
Examination methods (in applicable)	In continuum check over the course, based on active participation during the in-class sessions (individually, in groups, and in plenary) and through completion of the individual exercises assigned along the course (mainly at the end).
Suggested readings	"The Research Impact Handbook" and "The productive researcher" by Matt Reed (Publisher: Fast Track Impact) Mandatory readings: Dore E. and Richards A. 2022. "Empowering early career researchers to overcome low confidence." International Journal for Academic Development. https://www.tandfonline.com/doi/full/10.1080/1360144X.2022.2082435 Zocchi B. 2021. "Be Brave but be Smart. Can PhD researchers be epistemically disobedient?" Decolonial Subversions. https://www.academia.edu/67108642/Be_Brave_but_Be_Smart_Can_PhD_Researchers_be_Epistemically_Disobedient Powell K. 2016. "Young, talented and fed-up: scientists tell their stories". Nature. https://www.nature.com/articles/538446a
Additional information	None

Course unit English denomination	**Project design and management**
Teacher in charge (if defined)	T. Rogelja (TESAF, UNIPD)
Teaching Hours	8
Number of ECTS credits allocated	1
Course period	31 March and 1 April 2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☐ Yes ☒ No
Course unit contents	The course aims at offering an overview and basic knowledge of key practical approaches, tools and strategies to identify, develop and apply a research proposal which could be admitted and granted. What are the key tips to be effective, understanding what indicators are in the framework of research design, planning and implementing.
Learning goals	Expected learning outcomes: i) basic knowledge of key project components: problems, goals-objectives, targets, activities, outputs, outcomes, impacts; the role of coordinator and project partners; ii) key information on the most important funding programs for research and innovation of the European Union: basics on call identification and understanding, basics aspects to check (eligibility, co-financing, etc.); key considerations for building the project Consortium (project design); iii) the importance of project monitoring and evaluation through the use of process and outcomes indicators.
Teaching methods	Frontal lectures, plenary discussions, individual work, teamwork, peer-to-peer coaching.
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	No prerequisite needed
Examination methods (in applicable)	In continuum evaluation over the course, based on presentation and discussion of drafts by randomly selected students, and direct feedback from professors and peers.

Suggested readings	Slides used during the classes provided online in Moodle. Funding and Tenders portal of the European Union https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/
Additional information	None

Course unit English denomination	**How to prepare and present a scientific paper**
Teacher in charge (if defined)	S. Segato (DAFNAE, UNIPD), D. Pettenella (TESAF, UNIPD)
Teaching Hours	12
Number of ECTS credits allocated	1.5
Course period	5-6-7/March/2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☐ Yes ☒ No
Course unit contents	The course is organized in various modules, including How to design and structure a scientific paper; Preparation of Power Points, Organisation & order, Set the place, Personal attitude and behaviour, Preparing visuals that are useful
Learning goals	The course will provide knowledge on how to organize the structure, select the contents and the editing format tor an effective process to develop a scientific paper and oral communication of scientific contents
Teaching methods	Frontal lectures with open discussion. Case studies. One practical exercises
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	None
Examination methods (in applicable)	The assessment will be carried out asking each student to prepare: i. an experimental flow chart; ii. ii. a presentation with PP or similar SW
Suggested readings	See on Moodle, included: Writing and Presenting Scientific Papers by Birgitta Malmfors, Phil Garnsworthy and Michael Grossman, 2nd ed., Nottingham University Press (2004)
Additional information	In the Moodle platform some manuals and links are available

Course unit English denomination	**Dissemination of science: contents and tools**
Teacher in charge (if defined)	M. Polidoro
Teaching Hours	12
Number of ECTS credits allocated	1.5
Course period	17-18 February 025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (70% minimum of presence) ☐ No
Course unit contents	Talking about technical topics to lay audiences may look easy, but it actually requires the ability to "translate" complex ideas into accessible concepts. It is something that some do naturally, but often it is also feared by many. We will see how to prepare and structure a speech, how to choose the contents, how to organize a conference, how to structure a narration, how to use story-telling techniques to make your presentation more engaging, and also how to prepare effective slides and how to avoid the most common mistakes. We will also discuss how to manage body movements in order to communicate more effectively
Learning goals	Understanding and acquisition of fundamental skills in science communication and public speaking.
Teaching methods	1. General introduction to dissemination of science. 2. Public speaking
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	No prior knowledge is required
Examination methods (in applicable)	Brief presentation to verify the acquired skills in science communication and public speaking
Suggested readings	None
Additional information	Available for PhD students of Agripolis

Course unit English denomination	**Ethics in writing and reviewing**
Teacher in charge (if defined)	M.Borga (TESAF, UNIPD)
Teaching Hours	4
Number of ECTS credits allocated	0.5
Course period	2nd semester 2024-2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (70% minimum of presence) ☐ No
Course unit contents	Four main topics will be examined: 1. plagiarism; 2. multiple submissions; 3. conflict of interest; 4. authorship. Guidelines for the review activity will be discussed with the class
Learning goals	This course will provide a guide on ethical issues in scientific publishing and reviewing
Teaching methods	
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	
Examination methods (in applicable)	Each student will be assigned a case study, with the request to provide indications on the emerging ethical issues
Suggested readings	Committee on publication ethics. Available from: https://publicationethics.org/ accessed on 08/08/18.
Additional information	Available for all PhD students of Agripolis.

Course unit English denomination	**The evaluation of research output**
Teacher in charge (if defined)	L. Cei (TESAF, UNIPD)
Teaching Hours	8
Number of ECTS credits allocated	1
Course period	27 January 2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☐ Yes ☒ No
Course unit contents	The course will cover the evaluation of the research output from a twofold perspective, in the Italian context: the individual researcher (ASN and career positions) and the university (VQR). The indicators, methodologies and procedures used to evaluate research output will be critically analysed, examining their strengths and their weaknesses. The international debate over the evaluation of research and researchers (e.g., DORA, Leiden manifesto) will be presented and used to set the stage for a critical discussion with students.
Learning goals	Students will be aware on the system of research quality assessment which periodically evaluates researchers communities, including PHD courses
Teaching methods	Lectures and discussion with the PHD students on implications for their research output
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	
Examination methods (in applicable)	In continuum evaluation during the activities, based on active participation and on interactive multiple choices tests. In addition, students will be asked to provide a brief final report.
Suggested readings	PPT presentation as well as suggested readings will be provided to the students (available on the Moodle platform)
Additional information	Available for all PhD students of Agripolis.

Course unit English denomination	**Choose, design, write and present PhD research projects and results**
Teacher in charge (if defined)	L.Secco, M. Masiero, M. Borga, F. Marinello (TESAF, UNIPD), R. Da Re (external expert)
Teaching Hours	32
Number of ECTS credits allocated	4
Course period	26-27-28 November and 5 December 2024
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (70% minimum of presence) ☐ No
Course unit contents	The logic of doing research. Types of research. How to identify knowledge gaps and formulate problem statements. How to formulate general and specific research objectives. How to link research objectives with research questions, hypothesis, data and methodological tools. How to structure a PhD thesis. How to draft and present Research Synopsis and scientific papers.
Learning goals	Students will be assisted in developing and refining their own PhD project, with focusing on how to develop a literature review and design a Reseach Synopsis. Also, they will understand what types of results can be achieved from their research, and what are the main tools they can use in the initial phases of their research planning.
Teaching methods	Frontal lessons, plenary discussions, students' self-work and student's presentation of his/her research plans (Power Point presentations orally explained to all the PhD students and the Professors involved), feeback on contents, structures, possible improvements, additional materials. Use and explanation of templates and best practices (example of PhD thesis).
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☒ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	
Examination methods (in applicable)	In continuum evaluation during the activities. Check that feedback and suggestions provided by the Professors and fellows during the activities are integrated in a final, revised version of each student's PhD plan.

Suggested readings	PPT presentation as well as suggested readings will be provided to the students (available on the Moodle platform)
Additional information	None

Course unit English denomination	**Exploring with humans: from individual to collective data collection tools and techniques**
Teacher in charge (if defined)	L. Secco, E. Pisani, A. Moriggi (TESAF, UNIPD), R. Da Re (external expert)
Teaching Hours	24
Number of ECTS credits allocated	3
Course period	14-15-16 April 2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☐ Yes ☒ No
Course unit contents	1. Introduction on basic concepts: e.g. recap on sampling design, the total survey error and the bias generated by measurement error, data collection strategies. 2. Ethical issues and ethical protocols: motivations, procedures, examples and Ethical Committtes at UNIPD. 3. Knowledge co-production, creative methods and online tools for participatory research; 3. Questionnaires design and question wording. 3. Participatory observation. 4. The interviewer effect. 5. Group interview and participatory techniques, with a focus on Focus Group. 6. Expert interview: Delphi method. 7. Examples of applications.
Learning goals	The course is focused on data collection through questionnaires, individual and group interviews and knowledge co-creation techniques.
Teaching methods	Frontal lessons, group work, "experiments" (simulation of interviews and Focus Groups), individual work on own PhD data collection plans.
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	No prior knowledge is required
Examination methods (in applicable)	In continuum evaluation during the activities. Level of engagement and pro-active participation in the classes. Completion of preparatory home assignment (online participatory boards like Mural or similar) and in class assignment (focus on "How could I apply these tools, tecnhiques, methods in my own PhD research?") - discussions during the classes.
Suggested readings	Materials (slides, manuals, links) will be suggested and uploaded in Moodle.

Additional information	Available for all PhD students of Agripolis.

Course unit English denomination	**Research Ethics and Animals**
Teacher in charge (if defined)	B. De Mori, (BCA, UNIPD) P. Biasetti (UNIPD)
Teaching Hours	16
Number of ECTS credits allocated	2
Course period	7-8-9-17 April 2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (70% minimum of presence) ☐ No
Course unit contents	Part One: Research Ethics (1 CFU) Basic knowledge on the main ethical issues in carring out scientific research. General introduction to ethics of science, research misconduct (falsification, fabrication, plagiarism, conflicts of interests), responsible authorship and peer review, mentorship issues, data management issues, basics regarding animal and human research. During the course each student will be assigned an exercise based on literature review and class discussion. Part two: Research Ethics with Animals (1CFU) Basic Knowledge of the main ethical issues of animal care and welfare in research General Introduction to: a) the 3Rs Tenet and protocol design and evaluation; b) the Harm-benefit analysis; c) the Ethics Committee reviewing process. During the course students will be assigned an exercise based on research protocols review and class discussion
Learning goals	Ethical responsible science practices; ethical responsible animal studies design and management
Teaching methods	lecture and problem-based methodologies
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	
Examination methods (in applicable)	Groups exercise and case studies discussion evaluation

Suggested readings	None
Additional information	None

Course unit English denomination	**Research integrity**
Teacher in charge (if defined)	M. Giantin (BCA, UNIPD), A. Squartini (DAFNAE, UNIPD)
Teaching Hours	8
Number of ECTS credits allocated	No ECTS
Course period	1st semester - Every three years (2025-26)
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☐ Yes ☒ No
Course unit contents	The program offers a new blended-learning course open to PhD students. The following contents are planned: - Self declaration approach - Debate and dialogue - Middle position - Dilemma game - Virtues and norms.
Learning goals	The program aims to foster the internalization of the principles of European Code of Conduct for Research Integrity and strives to facilitate the cultivation of scientific virtues among trainers and researchers.
Teaching methods	The course will be held face-to-face in Agripolis. The course will be given in English or in Italian (in Italian if only Italian students will be present)
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	To have a background in research
Examination methods	The course is divided into three sessions. The first session should preferentially be carried out online independently by each participant before the second session with teachers will begin.

(in applicable)	Participants are then expected to fill three exercises independently, before the third session with teachers, in which personnel experiences will be directly presented and discussed by participants. The activity with teachers comprehends a short presentation of the contents followed by work in groups and plenary discussions.
Suggested readings	Lecture: The varieties of goodness (http://www.giffordlectures.org/books/varieties-goodness) Participants are expected to carefully read/listen to the following online modules, which will be used for training: (1) The European Code of Conduct for Research Integrity https://www.allea.org/wp-content/uploads/2017/05/ALLEA-European-Code-of-Conduct-for-Research-Integrity-2017.pdf (2) Introduction to research integrity - a module that introduces the basic principles of research integrity and asks you to apply the European Code of Conduct to your own context. https://embassy.science/wiki/Instruction:6ceba4e4-fb32-4953-9138-5436807fcde6 Read carefully all the text and look/listen to the video: http://courses.embassy.science/introduction_to_research_integrity/story.html (3) Introduction of Virtue Ethics to Research Integrity - a module that introduces the relevance of virtue ethics to research integrity and asks you to reflect about research integrity issues. https://embassy.science/wiki/Instruction:86f47366-a189-4395-9301-36ddb6d1fc68 Read carefully all the text and look/listen to the video: http://courses.embassy.science/introduction_of_virtue_ethics_to_research_integrity/story.html (4) Virtue ethics applied under current research conditions - a module that addresses more systemic issues, like performative pressures in research, and relates these to virtue ethics and the individual experience of the researcher. https://embassy.science/wiki/Instruction:43c900ea-a317-4528-8ece-1f3fb3564867 Read carefully all the text and look/listen to the video: http://courses.embassy.science/virtue_ethics_applied_under_current_research_conditions/story.html
Additional information	None

Course unit English denomination	**Welcome to research (AFS and CS)**
Teacher in charge (if defined)	N. Bertin
Teaching Hours	4
Number of ECTS credits allocated	No ECTS
Course period	22 November 2024
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (100% minimum of presence) ☐ No
Course unit contents	Decision making, Communication, Project Management
Learning goals	Understanding the role and responsibilities of a doctoral student, Developing effective communication, Managing the complexities of research projects, Decision-making skills relevant to research
Teaching methods	Lectures and presentations, Group discussions and case studies, Role-playing exercises for communication scenarios, Hands-on activities for decision-making practice
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☐ Yes ☒ No
Prerequisites (not mandatory)	None
Examination methods (in applicable)	Participation in class discussions and activities, Written assignments on communication strategies and decision-making processes
Suggested readings	None
Additional information	Available for PhD students of Animal and Food Science, Crop Science

Course unit English denomination	**International short course on Animal and Food Science**
Teacher in charge (if defined)	G. Rosa, J. Dorea
Teaching Hours	40
Number of ECTS credits allocated	5
Course period	2nd semester
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (70% minimum of presence) ☐ No
Course unit contents	The course will cover key concepts and techniques related to statistics and machine learning applied to high-dimensional data in livestock, including data from sensors, imaging, genomics, farm-recorded data from management software, and publicly available datasets. Topics: Big Data and Data Science in Livestock; Planning Research Studies in Animal Sciences; Database Management; Multidimensional Regression and Classification; Machine Learning Techniques; Image Processing and Analysis; Infrared Spectroscopy and Hyperspectral Imaging; Wearable Sensing Technology; Deep Learning; Genomics Data; Mining Operational Farm data; Cloud Computing
Learning goals	Graduate level course (PhD and advanced MS) for researchers working in all areas of animal sciences, such as nutrition and physiology, management, genetics and reproduction, in industry or academia. Statisticians, computer scientists, and data scientists interested on learning about potential applications in animal science can also benefit from the course.
Teaching methods	The course is structured with 4 sessions per day, Monday through Friday – except on Wed afternoon (free time to foster discussion and networking among participants), including expositive lectures and demos with real data and useful software and algorithms that will be shared with the participants.
Course on transversal, interdisciplinary, transdisciplinary skills	☐ Yes ☒ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	Basic statistics and basic R scripting

Examination methods (in applicable)	Written examinations. A written examination consists of exercises designed to test the basic knowledge acquired during the course.
Suggested readings	Materials will be suggested and/or uploaded in Moodle
Additional information	None

Course unit English denomination	**Living organisms as biorefineries toward a more sustainable future**
Teacher in charge (if defined)	Van Zyl
Teaching Hours	4
Number of ECTS credits allocated	0.5
Course period	Every 2 years (Next 2025-26)
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☐ Yes ☒ No
Course unit contents	The course has the following framework: - We are heading towards an unsustainable future, of which climate change is but one aspect; - If we strive to a sustainable future, what actions are required?; - What are biorefineries? Why are they required? What are the major challenges for biorefineries?; - How do you start putting together a biorefinery? If successful, what can they offer as sustainable alternatives to industry in the future?
Learning goals	The student acquires general knowledge on: Modern societal challenges in striving towards a sustainable future; A basic understanding of biorefineries and bioprocessing, particularly using microorganisms as microbial cell factories; A basic understanding of bio-products produced in biorefineries that could partially replace products from crude oil and coal refineries.
Teaching methods	The evaluation will take into account the student's attendance and active participation to the teaching activity and response to the course during the short test.
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	The student should have basic science and biology knowledge

Examination methods (in applicable)	Perform a short test with multiple choices exercises to test the basic understanding and critical thinking around biorefineries and how they can contribute to a sustainable future.
Suggested readings	A selection of scientific reading material (general reviews on the topic) will be provided as optional supplementary readings.
Additional information	None

Course unit English denomination	**Biotechnological approaches in the biorefinery concept**
Teacher in charge (if defined)	Van Zyl
Teaching Hours	4
Number of ECTS credits allocated	0.5
Course period	Every 2 years (Next 2025-26)
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☐ Yes ☒ No
Course unit contents	The course has the following framework: - Briefly discuss the definition of biorefineries by highlighting existing examples, such as Borregaard (Norway) and Domsjö (Sweden); - What are the typical components, principles and design of a biorefinery and the role of microbial cell factories? Discuss bacteria, yeast and fungi as microbial cell factories in biorefineries?; - How would biorefineries of the future look like, what are the major challenges to overcome, what technologies need to be harmonized to have successful biorefineries. Discuss examples of advanced metabolic engineering to produce high value biochemicals and pharmaceuticals as part of future biorefineries; - Discuss the role of markets and consumer behaviour in a future bioeconomy that would be crucial for biorefineries to be commercially viable?
Learning goals	The student acquires general knowledge on: What are the typical components of a biorefinery, using existing biorefineries as examples; How would sustainable biorefineries of the future look like, incorporating and harmonizing state of the art bio technologies and thermochemical processes; The impact of markets and consumer behaviour to make future biorefineries commercial viable and fulfilling their crucial role towards a sustainable future.
Teaching methods	The evaluation will take into account the student's attendance and active participation to the teaching activity and response to the course during the short test.
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No

Prerequisites (not mandatory)	The student should have a undergraduate level understanding of microbiology/biotechnology/bioengineering
Examination methods (in applicable)	Perform a short test with multiple choices exercises to test the basic understanding and critical thinking around biorefineries of the future, what they will look like and how their products will contribute to a sustainable future.
Suggested readings	A selection of scientific reading material (general reviews on the topic) will be provided as optional supplementary readings.
Additional information	None

Course unit English denomination	**Science communication: Public speaking**
Teacher in charge (if defined)	External expert
Teaching Hours	4
Number of ECTS credits allocated	0.5
Course period	10 March 2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☐ Yes ☒ No
Course unit contents	Researchers and PhD students often have to speak in public and to different audiences, with the goal of effectively communicating their researcher outputs and scientific advancements also to non-experts, such as citizens, possible donors and investors, public institutions, policy makers. Part of the impact of their research and options to find project partners and participants depend on the quality of their pitch. This seminar will provide the basic elements of public speaking, with a first theoretical part and a practical test (simulation). How to select the core information and message; how to combine data, number and images.
Learning goals	Expected learning outcomes: i) introduction ideas on the motivations in terms of awareness and scientific knowledge; ii) basic capacity on how to effectively speak to the public: body language, the issue of simplifying complex concepts; ii) communicating complex topics to non experts audiences: tips and tools; how to select the key concepts to communicate.
Teaching methods	Frontal lesson, experiments, plenary discussion, peer-to-peer feedback.
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	
Examination methods (in applicable)	In continuum evaluation during the seminar: students will be asked to make a 3-minute elevator pitch on a topic related to their PhD research. Teacher(s) will evaluate them providing direct feedback on their performance and tips to improving it.

Suggested readings	None
Additional information	None

Course unit English denomination	**Science communication: Social media**
Teacher in charge (if defined)	External expert
Teaching Hours	4
Number of ECTS credits allocated	0.5
Course period	11 March 2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☐ Yes ☒ No
Course unit contents	Social media are indispensable tools in the communication of science today. They are flexible and extensively used tools that can help researchers to promote their work in various ways, to share their research activities, performances and results, e.g. during conferences and project meetings, when a new paper is released and as effective dissemination tools. Social media and related networks allow researchers to remain connected with colleagues who have the same research interests and are more and more indispensable tools for communicating about European-funded and other international and national research projects. Some of the most common social media will be described, e.g. Facebook, Instagram, LinkedIn, with a focus on scientific research. Focus on selection of the appropriate language and wording, selection and use of images.
Learning goals	Expected learning outcomes: i) basic knowledge on why and how to use social media for research advancements and outputs communication; ii) how to select and use the most appropriate social media and related tools to keep engaged various audiences (general public, policy makers, other esearchers, investors and donors, companies and industries, civil society); iii) how to use social media in European-funded and other research projects.
Teaching methods	Frontal lessons, practical exercises, plenary discussion and peer-to-peer analysis.
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	None

Examination methods (in applicable)	In continuum evaluation during the seminar: students will be asked to make a draft message/post related to their PhD research for a social media they are more interested in. Teacher(s) will evaluate them providing direct feedback on their performance and tips to improving it.
Suggested readings	None
Additional information	None

Course unit English denomination	**THE AI ACCELERATION: Opportunities and Challenges of Large Language Models & Foundation Models for Academic Research and Education**
Teacher in charge (if defined)	C. Furlanello (HK3 Lab, Orobix Life - Rovereto/Bergamo) (external expert)
Teaching Hours	4
Number of ECTS credits allocated	0.5
Course period	21 May 2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☐ Yes ☒ No
Course unit contents	1. Introduction: we are all data processing experts; 2. The new AI Spring (2023): foundation and Large Language Models (Big data, Algorithms and Computing power); 3. Opportunities and challeges of using AI models, with a special focus on academic research and education.
Learning goals	Expected learning outcomes: 1) basic knowledge of theoretical concepts and practical tools of the application of AI in PhD research projects; 2) awareness of opportunities and challenges for using AI in PhD research; 3) capacity to recognise and differentiate various types of AI; 4) get an overview of examples of application in academic research and education.
Teaching methods	Frontal lesson, plenary discussion, individual reflection.
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☐ Yes ☐ No
Prerequisites (not mandatory)	None
Examination methods (in applicable)	In continuum evaluation during the seminar, with live interactions between teacher and students (plenary discussion, quiz on key concepts as acquired at the end of the seminar).
Suggested readings	Additional material and useful links will be suggested during the classes. Slides will be uploaded in Moodle (page with restricted access only to enrolled students).

Additional information	None

Course unit English denomination	**Introduction to climate change**
Teacher in charge (if defined)	G. Fosser (IUSS Pavia, External expert)
Teaching Hours	8
Number of ECTS credits allocated	1
Course period	2nd semester 2024-2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☐ Yes ☒ No
Course unit contents	1. Climate change vs climate variability; 2. Climate change drivers; 3. GCM, RCM and CPM explaining the differences and when/where to use one or the other one; 4. Uncertainty.
Learning goals	Expected learning outcomes: i) capacity to differentiate climate change and climate variability; ii) awareness of the importance of planning research taking into consideration climate change and its challenges; iii) basic knowledge of key technical concepts about climate change and their interpretation/adaptation to the specific fields of study of the PhD students.
Teaching methods	Frontal lesson, plenary discussion, individual work.
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	None
Examination methods (in applicable)	In continuum evaluation during the seminar, based on pro-active interaction teachers-students and final oral and/or written quiz on key concepts.
Suggested readings	None
Additional information	Material and slides of the seminar will be provided in Moodle.

Course unit English denomination	**Introduction to sustainability**
Teacher in charge (if defined)	A. Moriggi (TESAF, UNIPD)
Teaching Hours	8
Number of ECTS credits allocated	1
Course period	6-7 May 2025
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☐ Yes ☒ No
Course unit contents	1. Conceptual frameworks on sustainability. 2. The three plus one pillars of sustainability concept. 3. Sustainability in theory and in practice: examples and discussion. 4. SDGs of the UN Agenda 2030, with details of their application in the specific PhD research: reflections, measurements, impacts; 5. Critical views and next steps.
Learning goals	Expected learning outcomes: i) acquiring basic knowledge of the meaning and possible interpretation of the "sustainability" concept; ii) increasing awareness of the complexity of the concept, explored with a multidisciplinar and system thinking approach: the three pillars + one, trade-offs; iii) the Sustainable Development Goals of the United Nations Agenda 2030: goals, targets, indicators - how to consider them in research; iv) examples of tools to measure sustainability of research, both in its process and results.
Teaching methods	Frontal lesson, plenary discussion (e.g. via brainstorming tecnique), peer-to-peer and expert feedback.
Course on transversal, interdisciplinary, transdisciplinary skills	☒ Yes ☐ No
Available for PhD students from other courses	☒ Yes ☐ No
Prerequisites (not mandatory)	
Examination methods (in applicable)	In continuum evaluation during the seminar, with an interaction between the teacher and the PhD students on examples of guiding practices for sustainability in relation to the PhD planned activities.
Suggested readings	Material and slides of the seminar will be provided online in Moodle.

	PhD students are encouraged to follow the online "Lesson 0" on Sustainability (planned by the Third Mission and Research Valorisation Office of the University of Padova, from September 2024, to any student who will enroll into UNIPD).
Additional information	None