

Syllabus

Course Description

Course Title	Plant and Animal Biology
Course Code	40212
Course Title Additional	
Scientific-Disciplinary Sector	NN
Language	German
Degree Course	Bachelor in Sustainable Agriculture and Forestry in Mountain Environments
Other Degree Courses (Loaned)	
Lecturers	<p>Prof. Dr. Camilla Wellstein, Camilla.Wellstein@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/33786</p> <p>dr. Letizia Debertolis, Letizia.Debertolis@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/50321</p>
Teaching Assistant	
Semester	First semester
Course Year/s	1
CP	10
Teaching Hours	60
Lab Hours	40
Individual Study Hours	150
Planned Office Hours	30
Contents Summary	<p>Principles of Botany:</p> <p>Plant and fungal cell</p> <p>Fundamentals of photosynthesis</p> <p>Morphology, anatomy, histology, flowers, fruits,</p> <p>Reproduction, plant traits</p> <p>Systematics and taxonomy of gymnosperms and angiosperms</p>

	<p>Plant ecology</p> <p>Anatomy, Physiology and Animal Genetics:</p> <p>Evolution theory</p> <p>Taxonomy of animals</p> <p>Animal genetics (chromosome theory, Mendel's Laws, heritability etc.)</p> <p>Cytology: animal cell biology, macro-molecules, basics of animal metabolism</p> <p>Histology, anatomy and outlines of physiology of domestic animals divided per systems</p>
Course Topics	<p>Principles of Botany:</p> <ul style="list-style-type: none"> - structure and function of the plant and fungal cell - cell cycle, mitosis, meiosis - structure and function of plant organs and tissues - general plant metabolism; photosynthesis and respiration; CAM and C4 metabolism -transport processes - development and morphogenesis - reproduction, fruits, dispersal - evolution, systematics and taxonomy - plant functional traits - plant ecology - plant adaptation to the environment - plant determination - biodiversity <p>Anatomy, Physiology and Animal Genetics:</p> <p>I. Fundamentals of zoology and animal breeding</p> <ul style="list-style-type: none"> · History of evolutionary theory · Systematics of animals · Fundamentals of animal genetics: chromosome theory, heredity, Mendelian laws, heritability, selection and breeding progress <p>II. Cell biology and histology of animals</p> <ul style="list-style-type: none"> · Cytology: structure and function of animal cells, DNA, cell nucleus and cell cycle · Organic molecules in the animal body; from DNA to protein; energy, fat and protein metabolism · Histology: classification and properties of different types of tissue, fundamentals of histological techniques <p>III. Systematic anatomy and physiology of farm animals</p>

	<ul style="list-style-type: none"> · Musculoskeletal system · Digestive system · Blood and immune system · Circulatory system: heart and blood vessels · Respiratory system · Urinary system · Reproductive organs · Skin and skin appendages · Nervous system and sensory organs, behavioural physiology
Keywords	Biology, botany, zoology, cytology, histology, anatomy, physiology, taxonomy, evolution, biodiversity
Recommended Prerequisites	none
Propaedeutic Courses	no
Teaching Format	<p>Principles of Botany:</p> <p>The course comprises lectures, laboratory analyses and excursions. Media and methods used comprise power point presentations, white board, microscopes, binoculars, practical work, group work, schematic drawing, discussions and field excursions. Power point presentations will be available in the OLE database after each single lecture. Additional material will be provided by the professor.</p> <p>Anatomy, Physiology and Animal Genetics:</p> <p>The course combines lectures and exercises, using PowerPoint presentations and interactive elements as well as discussions or case studies to illustrate the course content.</p> <p>The practical part consists of laboratory activities, during which students can familiarise themselves with the anatomical structures of animals, as well as practical exercises in the laboratory, during which they observe the biological functions of the animal organism under a microscope. The PowerPoint presentations are available in the faculty's 'Reserve Collection' database before the lecture. Additional material is provided by the lecturer.</p>
Mandatory Attendance	no
Specific Educational Objectives and Learning Outcomes	<p>Knowledge and understanding:</p> <p>The degree course provides advanced knowledge for the training of professionals capable of carrying out management and coordination activities in mountain and forestry agriculture, as well as effectively preparing students for possible further studies.</p> <p>All these skills will be transmitted to the graduates by means of</p>

face-to-face lecturing, technical and practical laboratory exercises, field exercises and educational-scientific excursions. The elaboration of the experimental thesis may be carried out both in the faculty's laboratories and in companies and local authorities. At the end of their studies, the three-year graduate at Sustainable agriculture and forest management in mountain environment possesses basic knowledge of mathematics, physics, chemistry, statistics, and the biology of plant and animal organisms and microorganisms. The expected learning outcomes can therefore be summarised as:

- an understanding of the fundamental aspects of the biology, physiology and ecology of organisms with particular reference to those of agricultural and forestry interest, including their genetic improvement and relationships with beneficial or pathogenic organisms and micro-organisms
- being able to read and understand advanced texts relating to the various aspects characterising the agrarian and agro-forestry environment in mountainous areas
- being able to communicate and discuss issues relating to the training course in an appropriate manner in the three languages (Italian, English, German).

The knowledge and comprehension skills listed above are achieved through participation in lectures, practical exercises, seminars, and through guided personal and individual study as envisaged by the training activities offered. Some courses in the syllabus may be offered in a dual mode (lectures face-to-face and in video-recorded form and made available on the university intranet platform).

The assessment of the achievement of learning outcomes takes place mainly by means of exams and possible in -progress tests. The tests may be written and/or oral, and may also consist of reports and oral presentations of projects or seminars.

Ability to apply knowledge and understanding:

In addition to acquiring a solid scientific-technological foundation, the ability to tackle new problems, both practical and real, is stimulated, with the aim of enabling the student to acquire a working method. The three-year graduate in sustainable agriculture and forest management in a mountain environment, thanks to a technical-scientific training integrated with economic-managerial subjects, must:

- to know how to set up and manage sustainable

	<p>agricultural/forestry systems in mountain environmental contexts, based on knowledge of agricultural production systems and their economic and marketing aspects, considering environmental impact, product quality and consumer health;</p> <p>- The ability to apply knowledge is achieved through critical reflection on the texts proposed for individual study stimulated by classroom activities, the study of research and application cases shown by the lecturers, the performance of practical laboratory and field exercises, bibliographical research, individual and/or group projects as part of the fundamental and optional courses included in the teaching plan, as well as during the internship and preparation for the final examination. The tests carried out by means of written and/or oral examinations, reports and exercises include the performance of specific tasks in which the student demonstrates mastery of tools, methodologies and critical autonomy. In the internship activities, the verification takes place through the presentation of a report by the student to the teacher of reference.</p> <p>Making judgements:</p> <p>Autonomy of judgement is developed and verified through the exercise activities, the organised seminars, the preparation of papers as part of the teaching, as well as during the internship activity and the activity assigned by the lecturer for the preparation of the final examination.</p> <p>Communication Skills:</p> <p>The graduate has the ability to use the most modern and effective means of communication to disseminate the research carried out and the analyses relating to the problems of agro-forestry and forest management; he/she is able to deal with the production realities in the agro-forestry sector and to interact with figures from the sector and related sectors. Communication skills are particularly developed during exercises, the organised seminars, as well as during training activities that also involve the preparation of reports and written documents and the oral presentation of the same.</p> <p>Since the course is trilingual, graduates are able to communicate correctly, in written and oral form, in Italian and in two other languages (German and English).</p> <p>In tutorial activities and seminars, students are encouraged to</p>
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	<p>speak publicly in order to improve their ability to describe clearly and comprehensibly any doubts and/or requests for clarification on specific topics. The acquisition and evaluation/verification of the achievement of communication skills are also provided for during the internship and the final report, as well as when writing and discussing the final paper.</p> <p>Learning Skills:</p> <p>The degree course provides the basic cognitive tools indispensable for the continuous updating of knowledge, also with tools that make use of new communication and information technologies. The graduate is able to apply the developed learning methods and tools to update and deepen the studied contents, also in professional contexts and to undertake further studies.</p>
Specific Educational Objectives and Learning Outcomes (additional info.)	
Assessment	<p>The final grade is the average of the two modules.</p> <p>The examination in the Principles of Botany module is divided into two parts:</p> <ul style="list-style-type: none"> - Written final exam (70%) - Exercise protocols (30%) <p>The written final exam must be passed successfully (i.e., 18-30 points out of a maximum of 30). The written final exam assesses the content of the theory (lectures) and practical part (laboratory and excursion). Transfer questions are also included, which test the ability to apply the acquired knowledge and to make judgments. The exercise protocols assess the acquisition of communication skills.</p> <p>The examination in the Anatomy, Physiology and Animal Genetics module is covered by one part:</p> <ul style="list-style-type: none"> - Written final exam (100%) <p>The written final exam must be passed successfully (i.e., 18-30 points out of a maximum of 30). The written final exam assesses the content of the theory (lectures) and practical part (laboratory and excursion). Transfer questions are also asked to test the ability to apply the acquired knowledge and to make judgments.</p>
Evaluation Criteria	The criteria for assessing the individual parts of the examination

	<p>are:</p> <ul style="list-style-type: none"> - Presentation: quality of communicative and content - Written final examination: accuracy
Required Readings	<ul style="list-style-type: none"> • Nultsch – Allgemeine Botanik, Thieme Verlag. • Löffler, Gäbel - Anatomie und Physiologie der Haustiere (2013). Ulmer Verlag, 13. Edition <p>Selected chapters from:</p> <ul style="list-style-type: none"> • Strasburger – Lehrbuch der Botanik (2008), Springer-Verlag, 36. Aufl. • Ellenberg, Leuschner – Vegetation Mitteleuropas mit den Alpen (2010), Ulmer Verlag, 6. Aufl. • Burda - Allgemeine Zoologie (2005). Ulmer Verlag, ISBN 978-3-8252-2690-9. • Campbell NA, Reece JB (2009) Biologie, 8. Auflage. Pearson Studium, München, ISBN 978-3- 8273-7287-1 • Wehner R, Gehring W (2007) Zoologie, 24. Edition. Georg Thieme Verlag, Stuttgart, ISBN 978-3-13-367424-9
Supplementary Readings	
Further Information	
Sustainable Development Goals (SDGs)	Life on land

Course Module

Course Constituent Title	Principles of Botany
Course Code	40212A
Scientific-Disciplinary Sector	BIOS-01/C
Language	German
Lecturers	Prof. Dr. Camilla Wellstein, Camilla.Wellstein@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/33786
Teaching Assistant	
Semester	First semester

CP	5
Responsible Lecturer	
Teaching Hours	30
Lab Hours	20
Individual Study Hours	75
Planned Office Hours	15
Contents Summary	Plant and fungal cell Fundamentals of photosynthesis Morphology, anatomy, histology, flowers, fruits, Reproduction, plant traits Systematics and taxonomy of gymnosperms and angiosperms Plant ecology
Course Topics	<ul style="list-style-type: none"> - structure and function of the plant and fungal cell - cell cycle, mitosis, meiosis - structure and function of plant organs and tissues - general plant metabolism; photosynthesis and respiration; CAM and C4 metabolism -transport processes - development and morphogenesis - reproduction, fruits, dispersal - evolution, systematics and taxonomy - plant functional traits - plant ecology - plant adaptation to the environment - plant determination - biodiversity
Teaching Format	The course comprises lectures, laboratory analyses and excursions. Media and methods used comprise power point presentations, white board, microscopes, binoculars, practical work, group work, schematic drawing, discussions and field excursions. Power point presentations will be available in the OLE database after each single lecture. Additional material will be provided by the professor.
Required Readings	<ul style="list-style-type: none"> · Nultsch – Allgemeine Botanik, Thieme Verlag. Selected chapters from:

	<ul style="list-style-type: none"> · Strasburger – Lehrbuch der Botanik (2008), Springer-Verlag, 36. Aufl. · Ellenberg, Leuschner – Vegetation Mitteleuropas mit den Alpen (2010), Ulmer Verlag, 6. Aufl.
Supplementary Readings	- Fischer, Oswald, Adler (2008): Exkursionsflora von Österreich, Liechtenstein und Südtirol. 3. Aufl.

Course Module

Course Constituent Title	Anatomy, Physiology and Animal Genetics
Course Code	40212B
Scientific-Disciplinary Sector	AGRI-09/C
Language	German
Lecturers	dr. Letizia Debertolis, Letizia.Debertolis@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/50321
Teaching Assistant	
Semester	First semester
CP	5
Responsible Lecturer	
Teaching Hours	30
Lab Hours	20
Individual Study Hours	75
Planned Office Hours	15
Contents Summary	Evolution theory Taxonomy of animals Animal genetics (chromosome theory, Mendel's Laws, heritability etc.) Cytology: animal cell biology, macro-molecules, basics of animal metabolism Histology, anatomy and outlines of physiology of domestic animals divided per systems
Course Topics	I. Fundamentals of zoology and animal breeding · History of evolutionary theory

	<ul style="list-style-type: none"> · Systematics of animals · Fundamentals of animal genetics: chromosome theory, heredity, Mendelian laws, heritability, selection and breeding progress <p>II. Cell biology and histology of animals</p> <ul style="list-style-type: none"> · Cytology: structure and function of animal cells, DNA, cell nucleus and cell cycle · Organic molecules in the animal body; from DNA to protein; energy, fat and protein metabolism · Histology: classification and properties of different types of tissue, fundamentals of histological techniques <p>III. Systematic anatomy and physiology of farm animals</p> <ul style="list-style-type: none"> · Musculoskeletal system · Digestive system · Blood and immune system · Circulatory system: heart and blood vessels · Respiratory system · Urinary system · Reproductive organs · Skin and skin appendages · Nervous system and sensory organs, behavioural physiology
Teaching Format	<p>The course combines lectures and exercises, using PowerPoint presentations and interactive elements as well as discussions or case studies to illustrate the course content.</p> <p>The practical part consists of laboratory activities, during which students can familiarise themselves with the anatomical structures of animals, as well as practical exercises in the laboratory, during which they observe the biological functions of the animal organism under a microscope. The PowerPoint presentations are available in the faculty's 'Reserve Collection' database before the lecture. Additional material is provided by the lecturer.</p>
Required Readings	<ul style="list-style-type: none"> • Löffler, Gäbel - Anatomie und Physiologie der Haustiere (2013). Ulmer Verlag, 13. Edition <p>Selected chapters from following textbooks:</p> <ul style="list-style-type: none"> • Burda - Allgemeine Zoologie (2005). Ulmer Verlag, ISBN 978-3-8252-2690-9. • Campbell NA, Reece JB (2009) Biologie, 8. Auflage. Pearson Studium, München, ISBN 978-3- 8273-7287-1 Wehner R, Gehring

	W (2007) Zoologie, 24. Edition. Georg Thieme Verlag, Stuttgart, ISBN 978-3-13-367424-9
Supplementary Readings	<p>Breves, Engelhard. Physiologie der Haustiere (2009), Enke-Verlag, 3. Edition</p> <p>- Further bibliographical references - also regarding technical language and academic skills - will be provided in the lecture.</p>