Syllabus

Descrizione corso

Titolo insegnamento	Fondamenti di produzioni vegetali
Codice insegnamento	40216
Titolo aggiuntivo	
Settore Scientifico-Disciplinare	NN
Lingua	Inglese
Corso di Studio	Corso di laurea in Agricoltura sostenibile e gestione forestale in ambiente montano
Altri Corsi di Studio (mutuati)	
Docenti	dr. Maria Dolores Asensio Abella, MariaDolores.AsensioAbella@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/45187 prof. Massimo Tagliavini, Massimo.Tagliavini@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/209 dr. Simon Josef Unterholzner, SimonJosef.Unterholzner@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/41647
Assistente	
Semestre	Secondo semestre
Anno/i di corso	1
CFU	10
Ore didattica frontale	60
Ore di laboratorio	40
Ore di studio individuale	150
Ore di ricevimento previste	30
Sintesi contenuti	Agricultural Ecology and Prin-ciples of Plant Production:

	Agrometeorology Soil (physical aspects) Crop productivity Interactions crops-physical environ-ment-organisms (e.g. competitions) Crop (monoculture, rotation, intercropping,…) and farming systems (organic, regenerative, agroecology,...) Management criteria (seed bed preparation, water/ nutrient supply, management of residues, …) Plant genetics: Classical genetics & molecular basics Regulation of gene expression Population genetics Plant breeding Biotechnology Functional genetics Developmental genetics
Argomenti dell'insegnamento	The course provides the basis for the comprehension of the functioning of agro-ecosystems by explainiong the principles of plant productivity and the characteristics of the genetic material. In details, the module Agricultural Ecology and Principles of Plant Production will cover the following topics: Agrometeorology Physical properties of agricultural soils Soil water relations and crop ET Plant photosynthesis, plant growth and development, phenological phases Crop and farming systems Seedbed preparation and cultural management techniques Criteria for managing irrigation, fertilization and weed control. In details, the module Plant Genetics will cover the following topics: Introduction to Plant Genetics Classical Genetics and Mendel's Laws Chromosome Theory Molecular Basis of Inheritance Genetic Variability Population Genetics

	Molecular Biotechnology Functional Genetics Developmental Genetics
Parole chiave	Agrometeorology, Crop productivity, Crop systems, Soil physics, Biotechnology, Plant breeding, Plant genetics,
Prerequisiti	
Insegnamenti propedeutici	no
Modalità di insegnamento	The course combines lectures, field visits, field and laboratory exercises.
Obbligo di frequenza	no
Obiettivi formativi specifici e risultati di apprendimento attesi	Knowledge and Understanding: 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. All these skills will be transmitted to the graduates by means of 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: - knowledge of the atomic-molecular constitution of bodies and the role of chemical bonds and structure on the properties of materials - understanding of the main chemical and biochemical reactions in plants and soils - 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: - know how to set up and manage sustainable 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. 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. Making judgements: At the end of their studies, graduates possess an awareness and autonomy of judgement that enable them to acquire the necessary information, and to assess its implications in a production, environmental and market context, to implement interventions to improve the quality, efficiency and sustainability of agricultural/forestry production processes. 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. Communication skills: 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. 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). In tutorial activities and seminars, students are encouraged to 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. Learning skills: 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.
Obiettivi formativi specifici e risultati di apprendimento attesi (ulteriori info.)	Knowledge and understanding of the functioning of the agricultural systems and their interactions with the environment. Knowledge and understanding of fundamentals from classical and molecular genetics and biotechnological plant breeding approaches. Applying Knowledge: Understanding through the analysis of environmental and management variables involved in agricultural production process and through the assessment of the agronomical solutions most suitable to the environmental situations. Applying knowledge and understanding by developing practical laboratory skills and the ability to draw information out of practical laboratory activities in support/integration to the theoretical lessons. Making judgments: To be able to judge the level of sustainability of agronomical techniques and teh suitable genetic material for a given crop in a given environment. Communication skills: Ability to present and discuss the acquired knowledge using a scientific terminology and sound arguments. Learning skills: Ability to extend autonomously the knowledge acquired during the course by critically reading of scientific literature.
Modalità di esame	The course examination for the module Agricultural Ecology and Principles of Plant Production is conducted on the basis of an oral test. The course examination for the module Plant Genetics is conducted on the basis of a written test (weight = 70%) and of outcomes of lab. exercises (30%). The final mark will be the average of the marks obtained from both modules. For both modules the assessemnt will test the knowledge acquired, its understanding and its application and transfer to applied cases.

Criteri di valutazione	Awarding a single final grade. Criteria for awarding the grade: the clarity of the answer, the appropriate use of the terminology, the ability to summarise, the argumentative pertinence, the autonomy of judgement and the ability to re-elaborate are assessed.
Bibliografia obbligatoria	Copy of the slides presented by the lecturers.
Bibliografia facoltativa	Book: Principles of Agronomy for Sustainable Agriculture. F. Villalobos e E. Fereres (Ed.). Springer 2016.
Altre informazioni	
Obiettivi di Sviluppo Sostenibile (SDGs)	Sconfiggere la povertà, Sconfiggere la fame, Utilizzo sostenibile della terra, Utilizzo responsabile delle risorse, Lotta contro il cambiamento climatico, Istruzione di qualità

Modulo del corso

Titolo della parte costituente del corso	Ecologia agraria e fondamenti di produzione vegetale
Codice insegnamento	40216A
Settore Scientifico-Disciplinare	AGRI-03/A
Lingua	Inglese
Docenti	prof. Massimo Tagliavini, Massimo.Tagliavini@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/209 dr. Maria Dolores Asensio Abella, MariaDolores.AsensioAbella@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/45187
Assistente	
Semestre	Secondo semestre
CFU	5
Docente responsabile	
Ore didattica frontale	30

Ore di laboratorio	20
Ore di studio individuale	75
Ore di ricevimento previste	15
Sintesi contenuti	Agrometeorology Soil (physical aspects) Crop productivity Interactions crops-physical environ-ment-organisms (e.g. competitions) Crop (monoculture, rotation, intercropping,…) and farming systems (organic, regenerative, agroecology,...) Management criteria (seed bed preparation, water/ nutrient supply, management of residues, …)
Argomenti dell'insegnamento	Introduction 1. Agricultural production, present and future challenges 2. Sustainability The crop environment 3. Climate and agricultural plants (25%)(radiation radiation balance, energy balance, temperature, wind, relative humidity and VPD, ..) 4. The agricultural soil (15%): soil texture, structure, mechanical resistance and physical properties, soil water 5. Water relations, ET. Plant productivity 6. From photosynthesis to plant productivity 7. Plant Growth and development, phenological phases (chil units, thermal time) 8. Plant response to environmental factors (light, temperature (frost), nitrogen, etc.) 9. Competitions and other interactions among organisms Crop and farming systems 10. Farming systems (organic, regenerative, agroecology,...); the agro-ecosystem and its stability 11. Agricultural systems (intercropping, monoculture, crop rotation….) 12. Soil tillage and main cultural management techniques 13. Criteria for managing irrigation, fertilization and weed control

	and management of residues. Field lab about agrometeorololgy, with the use of instruments (topics: frost; solar radiation, temperature, relative humidity, soil temperature aspects deepened during a field visit to the cultivation of asparagus) Field lab about agroecological aspects, soil moisture sensors, soil solution in-situ analysis, soil respiration and plant Pn. Field visits to rice paddies,and vegetable crops under tunnel and strawberry cultivation in the mountain environment with pratical examples of management of the crop environment and agroecological aspects. Lab of soil physic (topic: empirical method of detecting soil texture class) Exercise on how to schedule irrigation
Modalità di insegnamento	Lectures, tutorials, laboratory activities and excursion; face-to-face teaching
Bibliografia obbligatoria	Hand-outs of selected material presented during classes and available in the “reserve collection”. Trilingual technical dictionaries *ad hoc* prepared and made available.
Bibliografia facoltativa	Selected websites, articles, databases and photo collection. Book: Principles of Agronomy for Sustainable Agriculture. F. Villalobos e E. Fereres (Ed.). Springer 2016.

Modulo del corso

Titolo della parte costituente del corso	Genetica vegetale
Codice insegnamento	40216B
Settore Scientifico-	AGRI-06/A

Disciplinare	
Lingua	Inglese
Docenti	dr. Simon Josef Unterholzner, SimonJosef.Unterholzner@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/41647
Assistente	
Semestre	Primo semestre
CFU	5
Docente responsabile	
Ore didattica frontale	30
Ore di laboratorio	20
Ore di studio individuale	75
Ore di ricevimento previste	15
Sintesi contenuti	Genetica classica e basi molecolari Regolazione dell'espressione genica Genetica delle popolazioni Miglioramento genetico delle piante Biotecnologia Genetica funzionale Genetica dello sviluppo
Argomenti dell'insegnamento	Introduzione alla genetica vegetale Genetica classica e leggi di Mendel Teoria cromosomica Meccanismi molecolari dell'ereditarietà Variabilità genetica Genetica di popolazione Biotecnologia molecolare Genetica funzionale Genetica dello sviluppo
Modalità di insegnamento	Il corso combina lezioni frontali ed esercitazioni di laboratorio. Le attività di laboratorio saranno illustrate dal docente e/o dagli assistenti alla didattica. Le presentazioni PowerPoint delle lezioni saranno disponibili tramite Microsoft Teams.
Bibliografia obbligatoria	Slides delle lezioni forniti tramite Microsoft Teams.

Bibliografia facoltativa	