

Syllabus

Kursbeschreibung

Titel der Lehrveranstaltung	Grundlagen der Land- und Forstingenieurwissenschaften
Code der Lehrveranstaltung	40235
Zusätzlicher Titel der Lehrveranstaltung	
Wissenschaftlich-disziplinärer Bereich	
Sprache	Italienisch
Studiengang	Bachelor in Nachhaltiger Land- und Forstwirtschaft in Berggebieten
Andere Studiengänge (gem. Lehrveranstaltung)	
Dozenten/Dozentinnen	Dr. Pasqualina Gloria Sacco, PasqualinaGloria.Sacco@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/48345 dr. Riccardo Zamboni, Riccardo.Zamboni@unibz.it https://www.unibz.it/en/faculties/engineering/academic-staff/person/51510 dr. Luigi Piemontese, Luigi.Piemontese@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/53798
Wissensch. Mitarbeiter/Mitarbeiterin	
Semester	Zweites Semester
Studienjahr/e	1
KP	9
Vorlesungsstunden	54
Laboratoriumsstunden	36
Stunden für individuelles Studium	135

Vorgesehene Sprechzeiten	27
Inhaltsangabe	Fundamentals of Physics and Agricultural Engineering: Kinematics, dynamics, Newton laws, equilibrium, work Mechanical energy, power, linear and angular momentum Fluid statics and dynamics Equation of state, ideal and real gases, 1st and 2nd law of thermodynamics Electromagnetism Topography and Digital Cartography: GIS (Geographic Information Systems) Vectors and platforms for remote sensing Global positioning systems Optical data for environmental analysis LiDAR for 3D terrain modeling Photogrammetry for estimating ecological variables
Themen der Lehrveranstaltung	The course, dedicated to the fundamentals of agricultural and forestry engineering, is structured into two modules: i) Fundamentals of Physics and Engineering; ii) Topography and Digital Cartography. The first module introduces basic concepts of physics and engineering, which are essential for understanding and managing technical applications in the agricultural and forestry sectors. The second module presents basic concepts of topography and digital cartography—including an introduction to photogrammetry and remote sensing—providing the foundation for understanding and using geospatial data.
Stichwörter	Physics, engineering, surveying, cartography, fundamental knowledge.
Empfohlene Voraussetzungen	Basic knowledge of Maths.
Propädeutische Lehrveranstaltungen	No
Unterrichtsform	Lectures, exercises, workshops, projects.
Anwesenheitspflicht	No
Spezifische Bildungsziele und erwartete	Knowledge and understanding: The degree course provides advanced knowledge for the training

Lernergebnisse	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. The knowledge and skills acquired provide graduates with planning, management, control, coordination and training skills in agriculture and forestry. 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: - understanding of the principles and laws of physics with particular reference to the statics and movement of fluids and gases - 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: The ability to apply knowledge is achieved through critical reflection on the texts proposed for individual study stimulated by
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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:

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.
Spezifisches Bildungsziel und erwartete Lernergebnisse (zusätzliche Informationen)	Knowledge and understanding: Knowledge and understanding of physical laws and engineering applications regarding: Mechanics Thermodynamics Electrodynamics Engineering fundamentals Knowledge and understanding of the fundamentals of geomatics: topography and land surveying, positioning systems, and digital cartography. Applying knowledge and understanding: Ability to analyze and solve problems related to the topics listed above. Making judgments: Students are expected to develop the ability to evaluate the plausibility of results. Communication skills: Further development of quantitative, technical, and scientific terminology to express ideas and opinions regarding the topics covered. Learning ability: Development of an analytical mindset enabling the student to break down a problem into sub-tasks that can be solved using previously acquired knowledge.
Art der Prüfung	The exam will be conducted separately for the two modules, but a

	single final grade will be awarded. For the first module, Fundamentals of Physics and Engineering, student assessment will be based on a written exam consisting of two parts: a first part (Problem 1) featuring qualitative questions testing the understanding of the topics covered, and a second part (Problems 2–6) comprising several numerical problems to be solved, covering various aspects of the subject matter. Students may bring a pen, pencil, dictionary, and non-programmable calculator to the exam. Necessary constants and equations will be provided along with the exam paper. All students are also permitted to bring one double-sided A4 sheet of handwritten notes. For the second module, Topography and Digital Cartography, the assessment consists of a written test featuring multiple-choice questions, designed to verify the acquisition of knowledge and the ability to apply the concepts and methods covered during the course.
Bewertungskriterien	The assessment criteria will be independent for the two modules. For the first module, Fundamentals of Physics and Engineering, the following assessment criteria will be applied: correctness of the approach and mathematical steps in the solution, calculation of numerical results, and correct use of physical quantities and units of measurement; correctness of the answers provided and their presentation, as well as the terminology used. The final score is the sum of the scores assigned to each exercise, with a maximum total of 33 points. To pass the exam, the final score must be 18 or higher. For scores exceeding 30, the distinction "with honors" is awarded. For the second module, Topography and Digital Cartography, the structured written test consists of 31 questions; 1 point is awarded for each correct answer and 0 for each incorrect answer; a score of 18 or higher is required to pass the exam, while a score of 31 earns the distinction "with honors."
Pflichtliteratur	Teaching resources and supplementary materials will be made available by the instructor via Microsoft Teams.

Weiterführende Literatur	Recommended books: • Elementi di fisica 1. Meccanica, termodinamica, Mazzoldi, Paolo; Nigro, Massimo; Voci, Cesare • Physics for scientist and Engineers with Modern Physics, Douglas C. Giancoli, Pearson, 4th edition, 2008 • Corso di Genio rurale. Topografia e territorio agrorurale. Volume base A. Lazzari M., Milani W., 1 edizione, 2024. Ed. REDA
Weitere Informationen	
Ziele für nachhaltige Entwicklung (SDGs)	Hochwertige Bildung, Nachhaltige Städte und Gemeinden, Industrie, Innovation und Infrastruktur

Kursmodul

Titel des Bestandteils der Lehrveranstaltung	Grundlagen der Physik und Agraringenieurwissenschaften
Code der Lehrveranstaltung	40235A
Wissenschaftlich-disziplinärer Bereich	AGRI-04/A
Sprache	Italienisch
Dozenten/Dozentinnen	dr. Riccardo Zamboni, Riccardo.Zamboni@unibz.it https://www.unibz.it/en/faculties/engineering/academic-staff/person/51510 dr. Luigi Piemontese, Luigi.Piemontese@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/53798
Wissensch. Mitarbeiter/Mitarbeiterin	
Semester	Zweites Semester
KP	6
Verantwortliche/r Dozent/in	
Vorlesungsstunden	36
Laboratoriumsstunden	24

Stunden für individuelles Studium	90
Vorgesehene Sprechzeiten	18
Inhaltsangabe	Fundamentals of Physics and Agricultural Engineering: Kinematics, dynamics, Newton laws, equilibrium, work Mechanical energy, power, linear and angular momentum Fluid statics and dynamics Equation of state, ideal and real gases, 1st and 2nd law of thermodynamics Electromagnetism
Themen der Lehrveranstaltung	The module introduces fundamental concepts of physics and engineering essential for understanding and managing technical applications in the agricultural and forestry sectors: Kinematics, dynamics, Newton's laws, equilibrium, work Mechanical energy, power, linear and angular momentum; fluid statics and dynamics Equation of state, ideal and real gases, first and second laws of thermodynamics Basic concepts of electromagnetism, electromagnetic radiation, and optics
Unterrichtsform	In person classes and exercises.
Pfichtliteratur	Teaching resources and supplementary materials will be made available by the instructor via Microsoft Teams.
Weiterführende Literatur	Books: • Elementi di fisica 1. Meccanica, termodinamica, Mazzoldi, Paolo; Nigro, Massimo; Voci, Cesare • Physics for scientist and Engineers with Modern Physics, Douglas C. Giancoli, Pearson, 4th edition, 2008

Kursmodul

Titel des Bestandteils der Lehrveranstaltung	Topografie und digitale Kartographie
Code der Lehrveranstaltung	40235B
Wissenschaftlich-	AGRI-04/C

disziplinärer Bereich	
Sprache	Italienisch
Dozenten/Dozentinnen	Dr. Pasqualina Gloria Sacco, PasqualinaGloria.Sacco@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/48345
Wissensch. Mitarbeiter/Mitarbeiterin	
Semester	Zweites Semester
KP	3
Verantwortliche/r Dozent/in	
Vorlesungsstunden	18
Laboratoriumsstunden	12
Stunden für individuelles Studium	45
Vorgesehene Sprechzeiten	9
Inhaltsangabe	Topography and Digital Cartography: GIS (Geographic Information Systems) Vectors and platforms for remote sensing Global positioning systems Optical data for environmental analysis LiDAR for 3D terrain modeling Photogrammetry for estimating ecological variables
Themen der Lehrveranstaltung	Purpose of topography in agricultural sciences Reference surfaces: geoid, ellipsoid, and topographic plane Topographic quantities, measurements, and measurement uncertainty Overview of various types of topographic surveying instruments Representation of topographic surveys Principles and applications of GNSS systems Principles of cartographic representation Technical and thematic cartography Structure and functions of a Geographic Information System (GIS) Vector and raster data Georeferencing and coordinate systems Basic concepts of data organization, analysis, and output in a GIS environment

	Overview of satellite and platform-based remote sensing Overview of photogrammetry
Unterrichtsform	Lectures. Practical exercises on the topics covered. Use of open-source GIS software.
Pflichtliteratur	Teaching resources and supplementary materials will be made available by the instructor via Microsoft Teams.
Weiterführende Literatur	Book: Corso di Genio rurale. Topografia e territorio agrorurale. Volume base A. Lazzari M., Milani W., 1 edizione, 2024. Ed. REDA