Syllabus

Descrizione corso

Titolo insegnamento	Meccatronica e Automazione di Processo
Codice insegnamento	42628
Titolo aggiuntivo	
Settore Scientifico-Disciplinare	IIND-02/A
Lingua	Tedesco
Corso di Studio	Corso di laurea professionalizzante in Tecnologie del Legno
Altri Corsi di Studio (mutuati)	
Docenti	dr. Veit Gufler, Veit.Gufler@unibz.it https://www.unibz.it/en/faculties/engineering/academic-staff/person/38756
Assistente	
Semestre	Primo semestre
Anno/i di corso	3
CFU	3
Ore didattica frontale	30
Ore di laboratorio	0
Ore di studio individuale	45
Ore di ricevimento previste	9
Sintesi contenuti	• Introduction to mechatronic and automation systems • Data acquisition and sensing • Electrical actuators • Motor-transmission-load coupling • Power transmission systems • Hydraulics and pneumatics • Introduction to mechanics of robots.
Argomenti dell'insegnamento	Understanding and knowledge of the fundamentals of mechatronic systems and automated processes, covering both theoretical and

	practical aspects. This includes modeling and analysis of mechatronic components and their interactions, the use of sensors and actuators for data acquisition and control, and the integration of mechanical, electrical, and fluidic systems.
Parole chiave	mechatronics, sensing, drives, power transmission
Prerequisiti	Students should be familiar with the basic knowledge of physics and mathematical analysis.
Insegnamenti propedeutici	
Modalità di insegnamento	Frontal lectures, exercises.
Obbligo di frequenza	Strongly recommended.
Obiettivi formativi specifici e risultati di apprendimento attesi	The course aims at giving the fundamentals of mechatronics and process automation relevant to wood engineering. These include data acquisition and sensors, modeling and selection of electrically driven actuating elements, power transmission systems, hydraulic and pneumatic components, automatic machines, and robotics. Criteria and methods to analyze and design electro-mechanical systems, power transmission systems, hydraulic and pneumatic systems, and their integration in an industrial production line will be addressed. Learning outcomes Knowledge and understanding: • Know and understand the fundamentals of mechatronic systems and process automation • Know and understand the fundamentals of data acquisition and sensors, electrical actuators, and the fundamentals of motor-transmission-load coupling • Know and understand the operating principles and the sizing procedures of rigid and flexible power transmission systems, and the main concepts of pneumatic and hydraulic systems for automation • Know and understand the fundamentals of the mechanics of robots and the main robotic systems and characteristics as well as their application fields Applying knowledge and understanding: • Evaluate and understand different sensors and data acquisition systems for process automation and electrical actuators • Evaluate the properties of mechanisms, machines and transmission systems and apply knowledge to size mechanical

	transmission components or select them • Evaluate and understand the functioning of pneumatic and hydraulic systems • Apply knowledge and understanding to analyse and evaluate mechanical components and mechatronic/robotic systems Making judgments • Choose suitable and proper sensors, mechanical, hydraulic and pneumatic components, and robotic systems for mechatronic systems and industrial applications • Transfer the theoretical knowledge and methods to real-world practical applications Communication skills • Discuss technical documentation and case studies as well as communicate with technical language Learning skills • Ability to independently extend the knowledge acquired during the study course by reading and understanding scientific and technical documentation.
Obiettivi formativi specifici e risultati di apprendimento attesi (ulteriori info.)	
Modalità di esame	- Formative Assessment The exercises in the classroom as well as discussions with the professor during the lectures enables to assess and evaluate the student's ability to apply their knowledge and understanding of the topics covered during the course. - Summative Assessment The final exam consists of a written test on the main topics explained by the lecturer. Each section consists of exercises as well as theory questions about all the topics covered in the course.
Criteri di valutazione	The evaluation criterion of the exercises is the correctness of the solution. The evaluation criteria of the theory questions are based on the knowledge of the topics of the course, the clarity of the response and the properties of language of the student (in relation to the language of the course), the pertinence and the relevance of the response, and the autonomy of judgment. The relative score of each exercise and theory question will be specified on the final exam (written test).

Bibliografia obbligatoria	The course material is collected from various textbooks, lecture notes and research papers. The student can mainly refer to the lecture notes, research papers and readings provided by the professors.
Bibliografia facoltativa	
Altre informazioni	
Obiettivi di Sviluppo Sostenibile (SDGs)	Istruzione di qualità, Innovazione e infrastrutture, Energia rinnovabile e accessibile