

Syllabus

Descrizione corso

Titolo insegnamento	Laboratorio di Meccatronica e Automazione di Processo
Codice insegnamento	42629
Titolo aggiuntivo	
Settore Scientifico-Disciplinare	NN
Lingua	Inglese
Corso di Studio	Corso di laurea professionalizzante in Tecnologie del Legno
Altri Corsi di Studio (mutuati)	
Docenti	dott. Chiara Nezzi, Chiara.Nezzi@unibz.it https://www.unibz.it/en/faculties/engineering/academic-staff/person/37957
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	The course provides the students with a general overview of real-world applications, applied examples and lab exercises related to automation and mechatronics, with a peculiar focus on the wood sector. - Automated solutions for wood sector - Simulation for mechatronics: examples and exercises - Motor-transmission sizing - Introduction to robotics - Lab exercise

Argomenti dell'insegnamento	The course introduces the fundamentals of multibody simulation, focusing on the kinematic modelling of open and closed chains, the definition of constraints, and the integration of actuators. Simulation of virtual prototypes, motor-gearbox combination selection and practical examples will be studied and developed during in-class exercises. The course concludes with a brief introduction to robotics and related laboratory hands-on sessions.
Parole chiave	Multibody Simulation Mechatronics Robotics
Prerequisiti	Students should be familiar with the basic knowledge of physics, mathematical analysis and programming.
Insegnamenti propedeutici	
Modalità di insegnamento	Frontal lectures, exercises.
Obbligo di frequenza	Strongly recommended.
Obiettivi formativi specifici e risultati di apprendimento attesi	The laboratory course provides students with hands-on experience in modelling and analysing mechatronic systems through simulation. Students learn to conduct kinematic and dynamic analyses and interpret simulation results. Moreover, students learn to apply knowledge on selecting and sizing geared motors. An introduction to sensors for automation and robotics applications is provided. By the end of the course, participants acquire the skills to design, simulate, finally analyse and interpret mechatronic systems' behaviour. This is achieved through practical examples and lab exercises, with a focus on wood engineering. Knowledge and understanding: • Know and understand how to model and simulate mechatronic systems • Know and understand how to size and select a motor gearbox combination that meet the application needs • Know and understand the basics of sensors and robotics for mechatronics applications Applying knowledge and understanding: • Apply knowledge and understanding to model real mechatronic systems, also related to wood engineering • Interpreting simulation results

	Making judgments - Choose suitable and proper simulation setup - Transfer the 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 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 an applied exercise in which students will deal with a real-world mechatronic system and will need to pursue a given task, based of the knowledge acquired during the course. The results must be presented with a 10 minutes talk supported by slides.
Criteri di valutazione	Pass/Fail.
Bibliografia obbligatoria	- Notes taken during lecture - Lecture slides
Bibliografia facoltativa	Kaltjob, Patrick OJ. <i>Mechatronic systems and process automation: Model-driven approach and practical design guidelines</i> . CRC Press, 2018.
Altre informazioni	
Obiettivi di Sviluppo Sostenibile (SDGs)	Innovazione e infrastrutture, Utilizzo responsabile delle risorse, Città e comunità sostenibili