

Syllabus

Course Description

Course Title	Laboratory of Mechatronics and Process Automation
Course Code	42629
Course Title Additional	
Scientific-Disciplinary Sector	NN
Language	English
Degree Course	Professional Bachelor in Wood Technology
Other Degree Courses (Loaned)	
Lecturers	Dott. Chiara Nezzi, Chiara.Nezzi@unibz.it https://www.unibz.it/en/faculties/engineering/academic-staff/person/37957
Teaching Assistant	
Semester	First semester
Course Year/s	3
CP	3
Teaching Hours	30
Lab Hours	0
Individual Study Hours	45
Planned Office Hours	9
Contents Summary	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
Course Topics	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.
Keywords	Multibody Simulation Mechatronics Robotics
Recommended Prerequisites	Students should be familiar with the basic knowledge of physics, mathematical analysis and programming.
Propaedeutic Courses	
Teaching Format	Frontal lectures, exercises.
Mandatory Attendance	Strongly recommended.
Specific Educational Objectives and Learning Outcomes	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.
Specific Educational Objectives and Learning Outcomes (additional info.)	
Assessment	- 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.
Evaluation Criteria	Pass/Fail.
Required Readings	- Notes taken during lecture - Lecture slides
Supplementary Readings	Kaltjob, Patrick OJ. <i>Mechatronic systems and process automation: Model-driven approach and practical design guidelines</i> . CRC Press, 2018.
Further Information	
Sustainable Development Goals (SDGs)	Industry, innovation and infrastructure, Responsible consumption and production, Sustainable cities and communities