

Syllabus

Course description

Course title	Material Sciences
Course code	42312
Scientific sector	ING-IND/22
Degree	Bachelor in Wood Engineering
Semester	I
Year	II
Academic Year	2019-20
Credits	6
Modular	no

Total lecturing hours	36
Total lab hours	-
Total exercise hours	24
Attendance	Participation is not mandatory, but strongly recommended
Prerequisites	-
Course page	https://www.unibz.it/de/faculties/sciencetechnology/bachelor-industrial-mechanical-engineering/course-offering/?academicYear=2018

Specific educational objectives	The aim of the course is the knowledge, the design and verification of timber structures. The topics that will be dealt with are: material properties and characteristics, issues related to design and verification of the most popular building timber structures.
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Lecturer	Chiara Tardini
Scientific sector of the lecturer	
Teaching language	English
Office hours	By e-mail appointment
Teaching assistant (if any)	
Office hours	
List of topics covered	<p>Physical and mechanical properties of wood necessary for the design of timber structures.</p> <p>Moisture effects, time-dependent effects, size effects. Wood as a building material.</p> <p>Strength grading. Solid timber, glulam, LVL. Safety verification, limit state design and safety format.</p> <p>Actions on timber structures, serviceability and ultimate limit states. Durability.</p> <p>Standard documents (Italian regulations and European Standards).</p> <p>Structural components. Structural assemblies. Buckling of beams and columns.</p> <p>Timber connections: dowel-type fasteners; nailed, screwed and bolted joints; ring and shear-plate connector joints;</p>

	toothed-plate connector joints; punched metal plate connectors. Design of the connections. Detailing for durability.
Teaching format	Lectures and class training

Learning outcomes (ILOs)	<p>The learning outcomes need to refer to the Dublin Descriptors:</p> <p><u>Knowledge and understanding</u></p> <p>1. At the end of the course, the student will have learned the behavior of timber as a structural building material, how to design the durability of the structure and different types of structural strengthening.</p> <p><u>Applying knowledge and understanding</u></p> <p>2. At the end of the course, the student should be able to design simple timber elements and connections considering also the design of durability.</p> <p><u>Making judgements</u></p> <p>3. Students will be able to take decisions about the proper structural solution, to solve situations or making proposals to solve them.</p> <p><u>Communication skills</u></p> <p>4. Students will be able to understand European and National standards related to structural dimensioning of both elements and connections. Moreover they should have tenuous grasp of the language both written and oral.</p> <p><u>Ability to learn</u></p> <p>5. Students will be able to understand the mechanical properties and the behavior of materials adopted in timber structures (metal for the connections, concrete for floors, Glass or Carbon Reinforced Polymer for strengthening) and the best suitable applications for each of them. They are able to understand and use in practice structural codes for timber elements and connections dimensioning. They will also be able to study on their own.</p>
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Assessment	Formative assessment		
	Form	Length/duration	ILOs assessed
	Lectures	42 h	Knowledge of

			mechanical and structural properties of timber; knowledge of structural code (both National and European) for element and connection dimensioning.	
Summative assessment				
	Form	%	Length/ duration	ILOs assessed
	Lectures	50	42 h	Knowledge of timber as a structural material. Knowledge of structural code and of elements and connections dimensioning.
	Exercises	50	18 h	Dimensioning and verification of one structural element and one connection according to European Code EC5. Strengthening of a traditional connection.
Assessment language	English			
Evaluation criteria and criteria for awarding marks	The exam is made of two parts: a written one (related to the solution of simple exercise about wood element and connection dimensioning) and an oral one (about the knowledge on wood as building material and on the design and reinforcement of timber elements and connections made during classes). To access to the oral exam it is necessary to pass the written test. Final evaluation will be the outcome of the written and the oral parts, equally balanced. A very good evaluation of the exercise made during the semester, will give a higher final grade.			
Required readings	Blaas H.J. Timber Engineering STEP 1 – Basis of design, material properties, structural components and joints, 1995 Blaas H.J. Timber Engineering STEP 2– Design, details, and structural systems, 1995			
Supplementary readings	Piazza M. Tomasi R., Modena R., Strutture in legno – Materiale, calcolo e progetto secondo le nuove normative europee, Hoepli, 2005 Further references will be indicated during classes.			

