Syllabus

Course Description

Course Title	Wood Chemistry
Course Code	42603
Course Title Additional	
Scientific-Disciplinary Sector	AGR/13
Language	German
Degree Course	Professional Bachelor in Wood Technology
Other Degree Courses (Loaned)	
Lecturers	Dott. Raphael Tiziani, Raphael.Tiziani2@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/38727
Teaching Assistant	
Semester	First semester
Course Year/s	1
CP	3
Teaching Hours	30
Lab Hours	0
Individual Study Hours	45
Planned Office Hours	9
Contents Summary	• The Atom • Organic chemistry • Plant cell • Wood • Cellulose • Hemicellulose • Lignin • Extractives
Course Topics	The Atom Introduction to the structure of matter: nucleus with protons and

	neutrons, electron shell, atomic models, and the significance for chemical reactions. Organic Chemistry Overview of the chemistry of carbon compounds: structural formulas, functional groups, and types of reactions. Plant Cell Structure and function of the plant cell, including cell wall, cell membrane, nucleus, chloroplasts, and vacuole, and their roles in growth and metabolism. Wood Anatomical and chemical structure of wood, growth zones, and cell types. Cellulose Structure and function of cellulose as the main component of plant cell walls, and its importance for the strength of wood. Hemicellulose Description of hemicelluloses as mixed polysaccharides, their integration into the cell wall structure, and their influence on elasticity. Lignin Chemical composition and function of lignin as the "glue" of cellulose fibers, contributing to lignification and resistance to biological degradation. Extractives Presentation of the non-structural components of wood such as resins, oils, tannins, and their impact on color, odor, and protective functions.
Keywords	Chemistry, Biology, Plant cell, Wood chemistry, Wood structure
Recommended Prerequisites	None.
Propaedeutic Courses	
Teaching Format	• Presentations • Frontal teaching

	• Seminars
Mandatory Attendance	Not mandatory.
Specific Educational Objectives and Learning Outcomes	Within the course on wood chemistry, students first learn the basics of inorganic and organic chemistry. They understand the structure of atoms, the structure of matter, and the chemical reactions that take place in biological and non-biological systems. The focus is on understanding chemical bonds, molecular structure, and the differences between inorganic and organic compounds. A solid basic knowledge of the various elements of the periodic table and their significance in the chemistry of wood and plant cells is imparted. Furthermore, students acquire knowledge about the structure of the plant cell, especially about the chemical processes taking place in the cell organelles. They learn the relationship between basic chemical building blocks such as carbohydrates, lipids, amino acids, and the specific components of the cell wall. This knowledge helps them understand the complex biochemical processes in the plant cell, including the formation and function of the cell wall. A special focus is on the chemical components of wood. Students deepen their knowledge about the main components of the wood structure: cellulose, hemicellulose, lignin, and extractives. Each of these compounds is treated in detail, including their chemical structure. Through this holistic approach, students understand the chemical relationships between the molecular building blocks of the plant cell and the physical and mechanical properties of wood. This enables them to analyze and assess the chemical reactions and transformations that take place during wood processing and utilization. Within the course on wood chemistry, students acquire sound knowledge of inorganic and organic chemistry, including atomic structure, chemical bonds and reactions. They understand the structure of the plant cell and its basic chemical building blocks such as carbohydrates, lipids and proteins, as well as their function in the cell wall. Furthermore, they learn about the most important chemical components of wood - cellulose, hemicellulose, lignin and extractives - in detail. They understand how these components influence the properties of wood and are able to analyze chemical processes during wood processing and assess their impact on material properties. Through this comprehensive approach,

	students gain a deep understanding of the chemical relationships between the molecular building blocks of the plant cell and the physical and mechanical properties of wood. This enables them to analyze and assess the chemical reactions and transformations that take place during wood processing and utilization.
Specific Educational Objectives and Learning Outcomes (additional info.)	
Assessment	Oral exam: a) Examination questions on the topics covered in the course 30 minutes per student.
Evaluation Criteria	In the exam, the clarity of the answers, the mastery of subject-specific language, the ability to synthesize information, judgment, and the ability to make connections to the topics covered and independently summarize topics will be assessed.
Required Readings	Presentations, studies and teaching materials, shared information during lecture.
Supplementary Readings	Literature will be shared.
Further Information	
Sustainable Development Goals (SDGs)	Industry, innovation and infrastructure, Sustainable cities and communities, Life on land, Climate action, Responsible consumption and production