

# Syllabus

## *Descrizione corso*

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| <b>Titolo insegnamento</b>              | Scienza delle costruzioni                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Codice insegnamento</b>              | 42637                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Titolo aggiuntivo</b>                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Settore Scientifico-Disciplinare</b> | CEAR-06/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Lingua</b>                           | Tedesco                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Corso di Studio</b>                  | Corso di laurea professionalizzante in Tecnologie del Legno                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Altri Corsi di Studio (mutuati)</b>  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Docenti</b>                          | dott. Thomas Franz Xaver Moosbrugger,<br>ThomasFranzXaver.Moosbrugger@unibz.it<br><a href="https://www.unibz.it/en/faculties/engineering/academic-staff/person/42499">https://www.unibz.it/en/faculties/engineering/academic-staff/person/42499</a>                                                                                                                                                                                                                                                                                                                               |
| <b>Assistente</b>                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Semestre</b>                         | Primo semestre                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Anno/i di corso</b>                  | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>CFU</b>                              | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Ore didattica frontale</b>           | 40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Ore di laboratorio</b>               | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Ore di studio individuale</b>        | 60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Ore di ricevimento previste</b>      | 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Sintesi contenuti</b>                | <ol style="list-style-type: none"> <li>1. mechanics <ol style="list-style-type: none"> <li>a. Equilibrium of forces</li> <li>b. Internal forces for single-span beams</li> </ol> </li> <li>2. modeling of structures <ol style="list-style-type: none"> <li>a. Modeling of load-bearing structures</li> <li>b. Solid wall girders vs. truss girders</li> </ol> </li> <li>3. material science</li> <li>4. stress determination <ol style="list-style-type: none"> <li>a. Bending, tensile stress and compressive stress</li> </ol> </li> <li>5. carpentry constructions</li> </ol> |

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|                                                                          | 6. engineered timber construction<br>7. fundamentals of structural design EC 0<br>8. actions according to EC 1<br>a. Load distribution (g, p, s, w)<br>b. Load combination<br>9. principles of design according to EC 5<br>a. ULS: normal stresses, bending stresses and shear stresses<br>b. SLS: Deformation<br>10. fasteners in timber construction<br>a. Dowels, offsets, nails, screws and adhesive joints<br>11. special beam shapes for bending<br>a. Gable roof beams, beams with variable cross-sectional height and composite cross-sections<br>12. columns<br>a. Single-member and multi-member<br>13. load-bearing systems<br>a. Frame joints and three-hinge systems<br>14. timber-concrete composite<br>15. basics of concrete construction incl. connections to the foundation. |
| <b>Argomenti dell'insegnamento</b>                                       | Elaboration of the fundamentals for the design of timber structures based on the basic mechanical principles of elastostatics. Insight into the essential standards of Eurocode 0, 1, and 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Parole chiave</b>                                                     | Statics, structural design, ULS and SLS verification, timber construction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Prerequisiti</b>                                                      | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Insegnamenti propedeutici</b>                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Modalità di insegnamento</b>                                          | Lecture: The entire content of the lecture will be worked through on the blackboard together with the students; photographs will be taken of all the blackboard notes, and these will be made available at the end of the lecture if requested; a detailed list of relevant reading material is provided.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Obbligo di frequenza</b>                                              | Recommended.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Obiettivi formativi specifici e risultati di apprendimento attesi</b> | The course aims to teach participants the basic formal relationships of structural design, primarily in timber construction, and practical methods for solving problems in these contexts.<br><br>Knowledge and understanding:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

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|                                                                                            | <ul style="list-style-type: none"> <li>• Understanding of the basic design concept for load-bearing structures - based on limit states - and the necessity of safety factors.</li> <li>• Basic knowledge of modeling buildings and load-bearing structures in structural engineering.</li> </ul> <p>Applying knowledge and understanding:</p> <ul style="list-style-type: none"> <li>• Basic knowledge of real load-bearing behavior and necessary simplified model approaches</li> <li>• Application of theoretical content through exercises, case studies and project work as well as understanding the problems presented. Theoretical content is illustrated by means of calculation exercises using practical examples.</li> </ul> <p>Making judgments:</p> <ul style="list-style-type: none"> <li>• Based on what they have learned, students are able to describe the function of real load-bearing systems.</li> </ul> <p>Communication skills:</p> <ul style="list-style-type: none"> <li>• The students are able to actively participate in subject-specific discussions using the specific terminology based on what they have learned.</li> </ul> <p>Learning skills</p> <ul style="list-style-type: none"> <li>• Students learn the subject matter both through frontal teaching (theoretical part) and through exercises in the lecture hall (practical exercises)</li> <li>• Students are able to expand their acquired knowledge through self-taught self-study and consultation of scientific and technical texts.</li> </ul> |
| <b>Obiettivi formativi specifici e risultati di apprendimento attesi (ulteriori info.)</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Modalità di esame</b>                                                                   | Oral examination (small group with written preparation).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Criteri di valutazione</b>                                                              | <p>The assessment is based on a single final mark.</p> <p>The final mark is determined 100% from the results of the oral examination in the small group.</p> <p>Criteria for the assessment: correctness of the answers, impression of the presentation in the context of answering subject-specific questions.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

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| <b>Bibliografia obbligatoria</b>                | Personally prepared transcript of the lecturer's lecture notes and study sheets. I list of relevant reading material                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Bibliografia facoltativa</b>                 | <p>Colling, F.: Holzbau: <i>Grundlagen und Bemessung nach EC 5</i>, Springer Vieweg; Auflage: 5., überarb. und akt. Aufl. 2016 (7. Oktober 2016), ISBN-10: 3658142324</p> <p>Niemz, P., Sonderegger, Walter, U.: 2011, <i>Physik des Holzes</i>. Hanser Fachbuchverlag, ISBN 978-3-446-876 44526-0, doi:10.3139/9783446445468.</p> <p>ÖNORM EN 1995-1-1 2019 06 01: <i>Eurocode 5: Bemessung und Konstruktion von Holzbauten - Teil 1-1: Allgemeines - Allgemeine Regeln und Regeln für den Hochbau (konsolidierte Fassung)</i>, 2019.</p> |
| <b>Altre informazioni</b>                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Obiettivi di Sviluppo Sostenibile (SDGs)</b> | Innovazione e infrastrutture                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |