

General information	
Academic subject	<b>Integrated Course: Rural buildings and Energy efficiency Module: Rural and Forest buildings</b>
Degree course	<b>Land and Environmental Science and Technology</b>
Academic Year	<b>III year</b>
European Credit Transfer and Accumulation System (ECTS)	<b>6 ECTS</b>
Language	<b>Italian</b>
Academic calendar (starting and ending date)	<b>I semester (September 2021 – January 2022)</b>
Attendance	<b>No</b>

Professor/ Lecturer	
Name and Surname	<b>Giacomo Scarascia Mugnozza</b>
E-mail	<b>giacomo.scarasciamugnozza@poliba.it</b>
Telephone	
Department and address	<b>Dipartimento DICATECh Politecnico di Bari</b>
Virtual headquarters	
Tutoring (time and day)	<b>Tuesday, Wednesday and Thursday from 11.30am to 13.30; other days by appointment to be defined by email</b>

Syllabus	
Learning Objectives	<b>Biosystems Engineering principles applications Design of Agro-forestry systems Engineering works for agricultural and forestry land management</b>
Course prerequisites	<b>Fundamentals of Mathematics, Fundamentals of Physics</b>
Contents	<b>Fundamentals of Strength of Materials. Stress-strain relation. Design and verification method. Compression and tensile stress, bending stress, shearing stress, combined compressive and bending stress. Statically determinate beams: resolution, design and verification. Short account of redundant beams. Fundamentals of Buildings construction. Materials: masonry, wood, steel, concrete, reinforced concrete. Floors. Supporting structures: wall and frame structures. Loading analysis. Foundations. Retaining walls. Fundamentals of Architectural Engineering. Lintels, arches, vaults and trusses. Roof trusses. Waterproofing. Underground walls. Design criteria for rural houses. Project drawings and administrative documents.</b>
Books and bibliography	<ul style="list-style-type: none"> <li>○ Notes of the lectures on PDF format and tables distributed during the course</li> <li>○ Ormea G.B. “Teoria e pratica nelle costruzioni” Hoepli</li> <li>○ Chiumenti R. “Costruzioni rurali” Edagricole</li> <li>○ Petrucci A. “Tecnologie dell’Architettura” Gorlich</li> <li>○ Belluzzi O. “Scienza delle costruzioni” Vol. I, Zanichelli</li> <li>○ Agricultural Buildings and Structure - The American Society of Agricultural and Biological Engineers (ASABE). MI-USA, 1996</li> </ul>
Additional materials	<ul style="list-style-type: none"> <li>○ <a href="http://www.architetto-online.it/">www.architetto-online.it / com</a></li> <li>○ <a href="http://www.edilportale.com/">www.edilportale.com/</a></li> <li>○ <a href="http://www.aiia.info/">http://www.aiia.info/</a></li> <li>○ <a href="http://www.eurageng.net/">http://www.eurageng.net/</a></li> <li>○ <a href="http://www.asabe.org/">http://www.asabe.org/</a></li> </ul>

Work schedule			
Total	Lectures	Hands on (Laboratory, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
<b>Hours</b>			
150	32	28	90
<b>ECTS</b>			
6	4	2	
Teaching strategy			
		<p>Lectures will take place by means of Power Point presentations.</p> <p>Practical exercises will concern construction materials specimen and examples of resolution, stress calculus, design and verification of statically determinate beams.</p> <p>Practical exercises will concern also the use of Autocad two-dimensional CAD software, carried out in the multimedia classroom organized into groups of students.</p> <p>According to the student, we recommend the project drawing of a new rural building or the survey of an existing one, of special architectural and spatial interest. Student's assistance will be provided during the drafting of the project drawing or survey. We recommend the students to install the CAD software on their own PC by downloading the Students version from <a href="https://www.autodesk.it/education/country-gateway">https://www.autodesk.it/education/country-gateway</a>.</p>	
Expected learning outcomes			
<b>Knowledge and understanding on:</b>		<ul style="list-style-type: none"> <li>○ Knowledge and understanding of stresses and of design and verification method of structural parts</li> <li>○ Knowledge and understanding of loaded statically determinate beams</li> <li>○ Knowledge and understanding of materials, structural elements and systems environmental sustainability for rural building</li> <li>○ Knowledge and understanding of the design criteria of the structural, construction and functional aspects of agricultural and forestry buildings</li> <li>○ Knowledge and understanding of CAD software for agricultural and forestry building design</li> </ul>	
<b>Applying knowledge and understanding on:</b>		<ul style="list-style-type: none"> <li>○ Resolution, stress calculus, design and verification of statically determinate beams</li> <li>○ Capacity to identify sustainable materials, structural elements and construction systems of rural building</li> <li>○ Capacity to identify techniques for the project drawing or for the survey of agricultural and forest buildings</li> <li>○ Capacity of CAD software design use</li> </ul>	
<b>Soft skills</b>		<ul style="list-style-type: none"> <li>• <i>Making informed judgments and choices</i> <ul style="list-style-type: none"> <li>○ Expertise of rural building materials and construction types classification</li> <li>○ Expertise to evaluate sustainable reuse of existing rural buildings</li> <li>○ Expertise to design agricultural and forestry buildings</li> </ul> </li> <li>• <i>Communicating knowledge and understanding</i> <ul style="list-style-type: none"> <li>○ Ability to communicate information, ideas, problems and solutions regarding agricultural and forestry buildings to both specialist and non-</li> </ul> </li> </ul>	

	<ul style="list-style-type: none"> <li>○ specialist audiences</li> <li>○ Ability to communicate information, ideas, problems and solutions regarding the sustainable design of agricultural and forestry buildings to both specialist and non-specialist audiences</li> <li>○ Ability of CAD software techniques for the project drawing or for the survey of agricultural and forest buildings</li> </ul> <ul style="list-style-type: none"> <li>● <i>Capacities to continue learning</i> <ul style="list-style-type: none"> <li>○ Capacity to continue learning future development of rural building new and sustainable materials, structural elements and systems</li> </ul> </li> </ul>
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Assessment and feedback	
Methods of assessment	
Evaluation criteria	<ul style="list-style-type: none"> <li>● <i>Knowledge and understanding</i> <ul style="list-style-type: none"> <li>○ Knowledge and understanding of stresses and of design and verification method of structural parts</li> <li>○ Knowledge and understanding of loaded statically determinate beams</li> <li>○ Knowledge and understanding of materials, structural elements and systems environmental sustainability for rural building</li> <li>○ Knowledge and understanding of the design criteria of the structural, construction and functional aspects of agricultural and forestry buildings</li> </ul> </li> <li>● <i>Applying knowledge and understanding</i> <ul style="list-style-type: none"> <li>○ Resolution, stress calculus, design and verification of statically determinate beams</li> <li>○ Capacity to identify sustainable materials, structural elements and construction systems of rural building</li> <li>○ Capacity to identify techniques for the project drawing or for the survey of agricultural and forest buildings</li> </ul> </li> <li>● <i>Autonomy of judgment</i> <ul style="list-style-type: none"> <li>○ Expertise of rural building materials and construction types classification</li> <li>○ Expertise to evaluate different solutions of agricultural and forestry buildings design</li> <li>○ Expertise to evaluate different solutions of sustainable reuse of existing rural buildings</li> </ul> </li> <li>● <i>Communicating knowledge and understanding</i> <ul style="list-style-type: none"> <li>○ Communicating knowledge and understanding about materials, structural elements and systems environmental sustainability for rural building</li> <li>○ Communicating knowledge and understanding about the design criteria of the structural, construction and functional aspects of agricultural and forestry buildings</li> </ul> </li> <li>● <i>Communication skills</i> <ul style="list-style-type: none"> <li>○ Ability to communicate information, ideas, problems and solutions regarding agricultural and forestry buildings</li> <li>○ Ability to communicate information, ideas, problems and solutions regarding the sustainable design of agricultural and forestry buildings</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>• <i>Capacities to continue learning</i> <ul style="list-style-type: none"> <li>○ Learning ability and overall correlation among various issues of the lectures</li> <li>○ Self-follow-up learning ability of future rural building development</li> </ul> </li> </ul>
<p>Criteria for assessment and attribution of the final mark</p>	<p><b>The final exam consists on an oral test with questions related to the course programme lectures and practical exercises. The final mark is expressed in thirtieths. The exam is passed if the mark is at least 18/30.</b></p> <p><b>We recommend the presentation and discussion during the exam of the project drawing, by means of AutoCAD two-dimensional CAD software, of a new rural building or the survey of an existing one, of special architectural and spatial interest.</b></p> <p><b>A partial test after the first part of the lectures will take place. The partial exam will consist on a written test regarding the fundamentals of Strength of Materials and the resolution, stress calculus, design and verification of statically determinate beams. The partial test mark is expressed in thirtieths. The partial test is passed if the mark is at least 18/30.</b></p> <p><b>Foreign students can take the exam in English language.</b></p>
<p><b>Additional information</b></p>	