CU 9.9: IMPLEMENTATION: BEST PRACTICES AND PATHOLOGIES

Director of studies: **Arnaud BESSERER**

General CU objectives:

• Be able to understand, analyse and remedy a building pathology or a quality defect of a timber product.

• Choose the materials and processing methods best suited to a use.

• Know the ongoing innovations regarding materials and their implementation

Consists of:

- Part 1: Best practices in the implementation of timber and timber-based materials
- Part 2: Biological expertise and diagnosis
- Part 3: Selection of materials and methods of implementation
- Part 4: Emerging materials

Hourly volume

In-person		*Self-directed study*
28.00 H	**Lectures**	**50.00 H**
32.00 H	**Tutorials**	
32.00 H	**Practicals**	

Positioning of the CU in the School reference system:

after semester 8

Units of skills

In accordance with the RNCP sheet

Updated on 4 December 2024

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Part 1: Best practices in the implementation of timber and timber-based materials	**Coefficient 1**
Session leaders: Arnaud BESSERER, Laurent BLERON, Valentin DUBOIS (B4C), Emmanuel FREDON, Ambre LE FERREC (ECOMAISON), Romain REMOND, Julien RUELLE (INRAE), Christophe PERRAULT (ARXADA), Hervé VAN OOST (FIBEX)	
Teaching assistants:	
Prerequisites: CU 5.3, CU 6.2	
Teaching materials: Course notes – Presentation slides – Visits	
Assessment methods: individual Online Assignment– Project	

Learning outcomes	**Description**	**Number of student hours (in-person)**		
		Lectures	**Tutorials**	**Practicals**
Know best practices and understand mistakes to avoid.	Overview of different types of timber with preservation treatment. A market and technical vision. New products (Christophe PERRAULT)	1.75		
	Intervention of the B4C cluster for the potential of French industrial players producing solutions of bio-based materials derived from timber in different applications (building, etc.) (Valentin DUBOIS)	1.75		
	Reminder of timber preservation (constructive prevention, choice of species, treatments) (Emmanuel FREDON, Arnaud BESSERER)		4.00	
	Timber drying for implementation in construction (Romain REMOND)		2.00	
	Timber grading (Laurent BLERON)	1.75		
	Timber recycling (Arnaud BESSERER + Ambre LE FERREC)	1.75	2.00	
	Contribution of the anatomy of wood in the assessment of its quality (Julien RUELLE)			4.00
	Visit to an industrial timber finishing company (Hervé VAN OOST, Arnaud BESSERER)			4.00
		7.00	**8.00**	**8.00**

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Part 2: Biological expertise and diagnosis	**Coefficient 1**
Session leaders: Edouard AUBRIAT (AUBRIAT), Nicolas BARTHES (BE BOIS BARTHES), Nathalie BERGERET (FCBA), Arnaud BESSERER, Bertrand CHAUVET (AQC), Safwan SAKER (CRITTbois)	
Teaching assistants:	
Prerequisites: CU 5.3, CU 6.2	
Teaching materials: Course notes – Presentation slides – Reading list	
Assessment methods: individual Online Assignment– Practical report– Photo contest grade	

Learning outcomes	**Description**	**Number of student hours (in-person)**		
		Lectures	**Tutorials**	**Practicals**
Be able to identify the causes of a particular pathology when it concerns water-timber relationships, finishing, timber preservation, and their interactions. Know the expertise tools and laboratory techniques to identify the main biological agents of degradation, understand the causes, imagine the solutions.	Presentation of the Agence Qualité Construction (tools and resources) (Bertrand CHAUVET) Presentation by the FCBA (Nathalie BERGERET) Claims in timber construction (case studies) (Nicolas BARTHES)	3.50	4.00	
	Commented and analysed visit to one or more sites with biological degradation of time or fibrous materials (curative timber treatment sites with a specialised company) (Edouard AUBRIAT, Arnaud BESSERER) Sampling	3.50		4.00
	Analysis of degraded timber according to laboratory expertise (Arnaud BESSERER, Safwan SAKER)		4.00	4.00
		7.00	**8.00**	**8.00**

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Part 3: Selection of materials and methods of implementation	**Coefficient 1**
Session leaders: Alain CELZARD, Noemi CORTIZAS MARTINEZ - Freelance CMF & Industrial Designer, YDEMAKER company.	
Teaching assistants:	
Prerequisites: CU 6.5	
Teaching materials: Course notes - Project Presentation slides – Database	
Assessment methods: individual and in groups Viva - Practical examination	

Learning outcomes	**Description**	**Number of student hours (in-person)**		
		Lectures	**Tutorials**	**Practicals**
Know how to find your way around the technical solutions offered to manufacturer a product. Be able to find the optimal materials and processes to meet specifications. Use multi-criteria databases	Main characteristics of the main families of materials and processes (Alain CELZARD)	1.75		
	Main selection strategies (materials and processes) and notion of performance indices (Noemi CORTIZAS MARTINEZ).	1.75	2.00	
	Application to the selection of multi-materials and their assembly methods (Noemi CORTIZAS MARTINEZ)	3.50	6.00	
	Practical applications through case studies (materials and parts to be designed for various applications) (Noemi CORTIZAS MARTINEZ)			8.00
		7.00	**8.00**	**8.00**

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Part 4: Emerging materials	**Coefficient 1**
Session leaders: Alain CELZARD, Nathalie CATTELAIN (AKTA sas), Cyril PELAINGRE (CIRTES), Quentin POUTREL (LRGP)	
Teaching assistants:	
Prerequisites: CU 6.2, CU 8.1	
Teaching materials: Course notes – Presentation slides	
Assessment methods: individual Class assignment– Practical examination	

Learning outcomes	**Description**	**Number of student hours (in-person)**		
		Lectures	**Tutorials**	**Practicals**
Know the main trends in innovation in the field of bio-based materials. Know how to move a material from the laboratory to market.	Latest generation composites, synthesis, properties and applications (Cyril PELAINGRE)	1.75	2.00	
	New bio-based materials for construction (Nathalie CATTELAIN), energy and the environment (Alain CELZARD)	1.75	2.00	4.00
	Bio-polymers and materials from recycling: opportunities and challenges (Quentin POUTREL)	1.75	2.00	4.00
	Problems related to the certification of new materials (Nathalie CATTELAIN)	1.75	2.00	
		7.00	**8.00**	**8.00**