Short portrait of the study program

The Master's program "Mechanics of Sustainable Materials and Structures" is a multiple-degree diploma offered through joint training activities by the Faculty of Architecture and Civil Engineering of TU-Dortmund University (Germany), the Department of Civil, Environmental and Mechanical Engineering of the University of Trento (Italy) and the Department of Mechanics, Materials and Civil Engineering of the Ecole Centrale de Nantes (France).

This program is designed to train the next generation of civil engineers with the expertise to design and implement innovative building technologies with a focus on sustainable materials and structures. The goal of the master's program is to educate future leaders in the development of innovative solutions for sustainability and performance in the built environment by fostering creative and independent thinking and promoting low-impact oriented problem-solving.

This is done by providing a solid background in fundamental mechanics, coupled with cutting-edge research in innovative materials and structures, and a research and development environment in the private sector. This cocktail of solid fundamental skills, innovative research and link to the private sector is the perfect environment to train engineers who are able to provide innovative solutions to the global today's challenges.

The program qualifies graduates for research-related and technical professional activities in the areas of

- *Advanced Mechanics for Innovative Materials and Structures,*
- *Materials and Structures under Extreme Conditions,*
- *Materials and Structures in their Environment.*

It also prepares students for Ph.D. studies on advanced research topics related to the mechanics of materials and structures in the field of civil engineering.

Three Master's degrees in total – each university will award a separate Master's degree.

- **Master of Science in Bauingenieurwesen** in Germany
- **Laurea Magistrale in Ingegneria Civile** in Italy
- **Master sciences, technologies, santé, mention génie civil / Civil engineering** in France

Mechanics of Sustainable Materials and Structures (M.Sc.)

As of: 09/2023

1. Semester (WS)	Credits	2. Semester (SS)	Credits	3. Semester (WS)	Credits	4. Semester (SS)	Credits
technische universität dortmund		UNIVERSITÀ DI TRENTO		CENTRALE NANTES		**Master Thesis**	30 Cr
Engineering Mathematics	5 Cr					» Master Thesis at one of the three partner institutions » Possible collaboration with associate partners	
Advanced Continuum Mechanics	8 Cr			Coupled problems in mechanics	6 Cr		
Enriched Continua and Metamaterials	5 Cr	Modeling and Simulation of Structures	6 Cr	Homogenization Methods for Materials and Structures	5 Cr		
Nonlinear Structural Analysis	6 Cr	Stability of Structures	6 Cr	Mechanics of Porous Media	5 Cr		
		Mechanics of Solids and Structures under Extreme Conditions	6 Cr	Design and Behavior of Modern Concrete	5 Cr		
		Machine Learning for Wireless Structural Health Monitoring	6 Cr				
				Modern Languages	2 Cr		
				Summer School	2 Cr		
Elective Module I+II » Construction with trees in practice » "How sustainable can building materials be?" » Structural Systems in Engineering Practices » Organic design and structures	3+3 Cr	Elective Module III » Metastructures » Risk analysis and structural reliability	6 Cr	Elective Module IV » Durability and Structural Maintenance » Earthquake Engineering	5 Cr		
Credits (ETCS)	30	Credits (ETCS)	30	Credits (ETCS)	30	Credits (ETCS)	30
TU-Dortmund University		**University of Trento**		**Ecole Centrale de Nantes**		**One of the three**	