Double Master's Degrees programme between MSc. in Numerical Methods in Engineering (MNME) at Barcelona School of civil Engineering (UPC) and Computational Mechanics of Materials and Structures (COMMAS) at University of Stuttgart.

Semester 1 (Q1)		**Semester 2 (Q2)**		**Semester 3 (Q3)**		**Semester 4 (Q4)**	
UPC Students at UPC	U Stuttgart Students at U Stuttgart	UPC Students at UPC	U Stuttgart Students at U Stuttgart	UPC Students at U Stuttgart	U Stuttgart Students at UPC	UPC Students at U Stuttgart	U Stuttgart Students at UPC
Compulsory Modules: Numerical Methods for Partial Differential Equations (5 ECTS) Finite Element Method (5 ECTS) Continuum Mechanics (5 ECTS) Advanced Fluid Mechanics (5 ECTS) Computational Mechanics Tools (5 ECTS) **Transversal mandatory modules:** Communication Skills 1 (5 ECTS) Entrepeneurship (5 ECTS)	**Compulsory Modules:** Continuum Mechanics (6 ECTS) Computational Mechanics of Materials (6 ECTS) Computational Mechanics of Structures (6 ECTS) Discretization Methods and Scientific Programming (6 ECTS) Optimization of Mechanical Systems (3 ECTS) Engineering Materials I: Metals, Concrete, Soils (3 ECTS)	**Compulsory Modules:** Computational Solid Mechanics (5 ECTS) Computational Structural Mechanics and Dynamics (5 ECTS) Finite Elements in Fluids (5 ECTS) Industrial training (15 ECTS)	**Compulsory Module:** Communication oriented modules from Language Center (6 ECTS) **Elective Modules**[1] (24 ECTS)	**Compulsory Modules:** Implementation and Algorithms for Finite Elements (6 ECTS) (=Domain Descomposition and Large Scale Scientific Computing, 5 ECTS) **Transversal mandatory modules:** Communication oriented modules from Language Center (6 ECTS) **Elective Modules** (18 ECTS)	**Compulsory Modules:** Industrial training (15 ECTS) Communication Skills 2 (5 ECTS) Entrepeneurship (5 ECTS) Advanced Fluid Mechanics (5 ECTS)	**Master's Thesis**[2] (30 ECTS)	**Master's Thesis** (30 ECTS)
ECTS = 35	ECTS = 30	ECTS = 30	ECTS = 30	ECTS = 30	ECTS = 30	ECTS = 30	ECTS = 30

1) Academic Board will review and guarantee the equivalence of elective modules with MNME study plan compulsory courses.
2) Master Thesis defence will meet the UPC rules.

List of elective modules at the University of Stuttgart	ECTS
Selected Topics in the Theories of Plasticity and Viscoelasticity	6
Elements of non-linear Continuum Thermodynamics	6
Introduction to Continuum Mechanics of Polyphase Materials	6
Geometrical Methods of Non-Linear Continuum Mechanics and Continuum Thermodynamics	6
Micromechanics of Smart and Multifunctional Materials	6
Theoretical and Computer-Oriented Materials Theory	6
Optimal Control	6
Continuum Biomechanics	6
Non-linear Dynamics	6
Fuzzy Methods	6
Advanced Numerics of Partial Differential Equations	6
Simulation Methods in Physics for SimTech I	6
Simulation Methods in Physics for SimTech II	6
Multiphase Modeling in Porous Media	6
Numerical Methods for Differential Equations	6
Nonlinear Methods for Differential Equations	6
Nonlinear Dynamics of Mechanics Systems	6
Nonsmooth Dynamics	6
Implementation and Algorithms for Finite Elements	6
Introduction to model order reduction of mechanical systems	6
Non-linear Computational Mechanics of Structures	6
Computational Methods for Shell Analysis	6
Micromechanics of Materials and Homogenization Methods	6
Numerical Modeling of Soils and Concrete Structures	6
Visualization in Science and Engineering	6
Foundation of Continuum Thermodynamics for Single- and Multiphasic Materials	6
Computational Contact Mechanics	6
Computational Dynamics for Robotics	6
Metals and Computational Materials Science	6
Simulation of multi-phase and multi-scale materials with homogenization approaches	6
Simulation of coupled problems with the Finite Element Methods	6
Variational methods in Structural Dynamics	6
Data Processing for Engineers and Scientists	6