

Coupled Multiphysical Modeling and Simulations					
Module-No./Abbreviation CE-WP15 / CMPMS	Credits 6 CP	Workload 180 h	Term 2 nd /3 rd Sem.	Frequency Winter/Summer term	Duration 1 Semester
Courses Coupled Multiphysical Modeling and Simulations			Contact hours 4 SWS / 60 h	Self-Study 120 h	Group Size: No Restrictions
Prerequisites Basic knowledge of continuum mechanics and mechanical modeling of materials is strongly recommended.					
Learning goals / Competences Students should develop a strong understanding of coupled multiphysical systems and their modeling. After successfully completing the module, the students shall be able to <ul style="list-style-type: none"> comprehend the properties and behavior of thermomechanical, electromechanical, and electromagnetic systems develop mathematical and numerical models for coupled systems implement and apply numerical methods for the computational solution of multiphysical systems utilize software to solve coupled problems, with a clear understanding of the underlying methods, properties, and limitations use machine learning techniques for surrogate modeling of complex multiphysical processes 					
Content <ul style="list-style-type: none"> Constitutive laws for thermomechanics, electromechanics, and electromagnetics Analytical methods for the mechanics of functional materials Numerical techniques for multiphysics coupling and simulation Non-linear electromechanical and electromagnetic material behavior Size-dependent effects in electromechanical systems Machine learning techniques applied to functional materials Practical implementation of the numerical models Simulation of real-world, industry-relevant problems 					
Teaching methods / Language Lecture (2h / week), Exercises (2h / week) / Homework (40) / English					
Mode of assessment Final oral test of 30 minutes (100%) / Bonus points for homework					
Requirement for the award of credit points Passed oral test and passed homework					
Module applicability MSc. Computational Engineering					
Weight of the mark for the final score 5 %					
Module coordinator and lecturer(s) Dr. S. Kozinov, Assistants					
Further information					