

University of Duisburg-Essen  
International Master of Science in

# COMPUTATIONAL MECHANICS



## KEY SUBJECTS

**Basics:** Tensor Calculus, Thermodynamics, Continuum Mechanics, Structural Mechanics, Numerical Methods, Material Science, Computer Languages, Laboratory Techniques. **Experiments:** Material Measuring Technique, Parameter Identification of Material Models. **Models:** Numerical Discretization and Solution Procedures, Finite Element Method (FEM), Optimization Procedures, Homogenization Techniques, Multiscale Modeling. **Simulations:** All Areas of Engineering Sciences and Engineering Practice. **Programs:** Commercial Codes (Abaqus, Ansys, Diana, Fluent, CAD) and Scientific Codes (FEAP, FETI-DP).

**Interdisciplinary Cooperating Departments:** Mechanics, Numerical Mathematics, Scientific Computing, Material Engineering, Material Science, Computer Science, Computational Fluid Dynamics, Structural Analysis, Soil Mechanics, Steel Construction, Environmental Engineering, Waste Management, Mechatronics, Metallurgy.

**International Curriculum:** **Duration:** 4 Semesters (2 years), **Start:** October, **Language:** Both, English and German are needed: English (1st year) and German (second year).

**Target Audience:** The program is attractive for both German and foreign students. **Academic Requirements:** Bachelor of Science or Dipl.-Ing. in engineering or natural sciences as well as an equivalent degree in these fields. **Language Requirements:** **German:** at least 240 lessons of German from Goethe-Institut or other recognized language institutes. **English:** at least TOEFL (min. 173 points, computer based) or equivalent certificates.

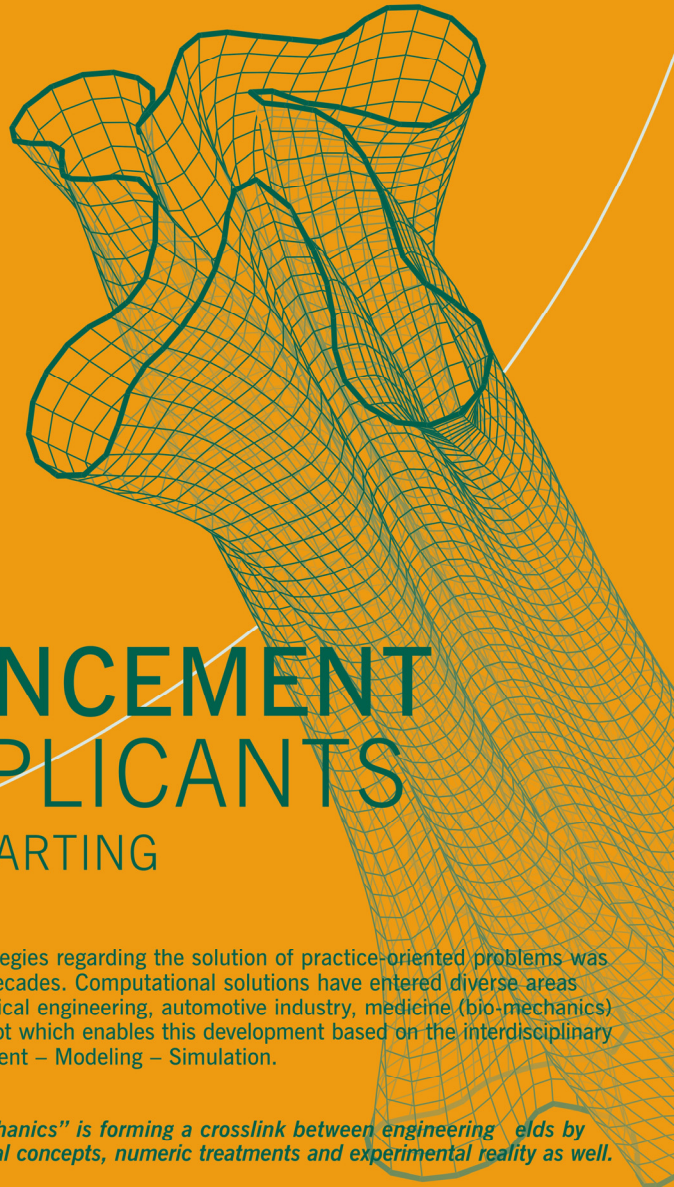
**Employment Opportunities:** The graduates find a far operating field in industry and research, e.g. environmental engineering, automotive and metal industry, software engineering, civil and mechanical engineering, manufacturing systems engineering etc.



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*An international program in the interdisciplinary field of numerical simulation  
with high-tech applications in engineering science and practice*



## ANNOUNCEMENT FOR APPLICANTS NEXT TURN STARTING ON OCTOBER

The use of computer-assisted strategies regarding the solution of practice-oriented problems was deeply increased during the last decades. Computational solutions have entered diverse areas such as building sciences, mechanical engineering, automotive industry, medicine (bio-mechanics) or biology. The fundamental concept which enables this development based on the interdisciplinary combination of the fields: Experiment – Modeling – Simulation.

*The program “Computational Mechanics” is forming a crosslink between engineering fields by combining experiences in theoretical concepts, numeric treatments and experimental reality as well.*

**The University of Duisburg-Essen: A strong partner in research and education.** Essen – the modern business, commercial and education metropolis in the heart of the Ruhr region with 580000 inhabitants and 34000 students. Culture capital of Europe 2010 with the World Heritage Site Zeche Zollverein. In the middle of the Ruhr district and approximately 5 million inhabitants, we have numerous Museums, Theatres, Opera, Varietés, Movie Theatres, Bars, Pubs, Cafés, Restaurants etc.



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