

Branch: Material Science and Engineering



Code: MASCEN

Option: Materials Science and Engineering

Level: Master

Prerequisites:

Opportunities:

Graduates have prospects both in the scientific field in research institutions and universities (research, development, teaching) and in interdisciplinary industries such as aerospace, energy industry, medical technology, testing, measurement and monitoring technologies and other industries in which interdisciplinary as well as risk- and uncertainty-aware engineering are essential aspects (research, development)

Description:

The MS&E Master's program is a new course of study that responds to the high demand for experts with an interdisciplinary background in the science and fundamentals of materials science/materials engineering disciplines. What is the focus of this study course?

The current development of major societal challenges shows an ever-increasing interpenetration of natural sciences and engineering. This poses a challenge to modern engineering education not only to train according to classical disciplines and to meet the needs of specific industries, but also to include more and more interdisciplinary aspects.

The MSc program in Materials Science and Engineering is one of the answers to this challenge. It is based on an interdisciplinary engineering education with a focus on materials science and engineering, involving a total of seven faculties (civil and environmental engineering, chemistry, electrical engineering and information technology, computer science, mechanical engineering, mathematics, physics). The central concern is, on the one hand, to enable students to physically and mathematically model complex technical-physical processes and systems, taking into account the materials to be used, i.e. to penetrate them theoretically with the basic disciplines of engineering sciences and to describe them chemically and physically. On the other hand, the current paradigm shift away from deterministic models towards predictive science is taken into account: students learn a probabilistic view of the material properties of physical and engineering systems and thus the need for stochastic modelling from the very beginning. This approach has not yet been consistently integrated into teaching, so it is one of the unique selling points of the MSc Materials Science and Engineering program.

Institutionally, the program is integrated into the Munich School of Engineering (MSE), an institution that has successfully emphasized interdisciplinary teaching since its foundation in 2010 by successively establishing corresponding programs at bachelor and master levels. Students in the Master of Materials Science and Engineering program thus benefit from proven structures and networks that enable an optimal study climate.

Quality and competences:

After successful completion of the MSc program in Materials Science and Engineering

Have a thorough understanding of modelling, calculation, prediction, control and testing of new material solutions for complex applications in all technology areas.

Recognize the need to quantify predictive performance, probability distributions of outcomes and the quantification of risk and uncertainty

Are able to design and scientifically process scientific and interdisciplinary projects in the field of materials science and materials science as applied to engineering disciplines

They have acquired, in particular, the methodological and cognitive skills that enable them to carry out successful development and research in this field and, above all, that allow them to make a smooth transition to a doctorate.