

SCIENCE ■ PASSION ■ TECHNOLOGY



ME+ES

FACULTY OF  
**MECHANICAL ENGINEERING  
AND ECONOMIC SCIENCES**



# Faculty of Mechanical Engineering and Economic Sciences (ME+ES)

**B**y combining mechanical engineering and economics, our Faculty provides a modern and at the same time sustainable range of courses for students. Intensive links with leading partners in industry allow for education at the highest level, which means that our graduates are excellently positioned both nationally and internationally.

The Faculty is composed of both engineering science institutes and economic science institutes. In this way, we can offer a holistic approach to technological, social and economic aspects in teaching and research to seek solutions to the challenges of our time.

The Faculty consists of 20 institutes which altogether offer over 400 courses. Beside lecture halls and seminar rooms furnished with the latest facilities, we can also draw on superbly equipped research laboratories in which we conduct a broad range of research projects in close cooperation with our scientific partners.

We also give special attention to intensive collaboration with institutes selected from national and international universities in order to open up new research fields and develop resources. This leads to an excellent high-level education and is reflected in the large number of Competence Centres and research facilities at our Faculty.

## OUR MISSION:

To develop innovative, holistic solutions for the complete life-cycle of products in the field of automotive, power and production engineering.

## OUR VISION:

Through excellence in education and research – both basic and applied – in the field of mechanical engineering and economic sciences, it is possible for us to model the life-cycle of products in the areas of power, automotive and production engineering consistently at an interdisciplinary level. As a centre with international visibility, we develop experimentally proven innovative concepts and tools while at the same time taking into special consideration the effects on humankind and the environment.





# ME + ES Teaching

## BACHELOR'S PROGRAMMES

Graz University of Technology can look back on a long tradition of educating engineers, has an excellent reputation and is highly respected in science and industry. The Faculty offers two bachelor's programmes, three master's programmes and one doctoral programme.

### BACHELOR'S PROGRAMMES IN MECHANICAL ENGINEERING AND IN MECHANICAL ENGINEERING AND BUSINESS ECONOMICS

The bachelor's programmes in Mechanical Engineering and Mechanical Engineering and Business Economics have a duration of six semesters. Students can take advantage of a well-founded basic education and create their own profile by choosing specializations. Theoretical analyses and practical design work are finely balanced. The inclusion of a variety of simulation methods and computer-supported development methods ensures a course of studies in tune with the pulse of the times. In the Mechanical Engineering and Business Economics programme, the mechanical engineering part of the programme is supplemented by a basic knowledge of economics, especially in the field of techno economics.

## MASTER'S PROGRAMMES

Taking as a basis the bachelor's programmes Mechanical Engineering and Mechanical Engineering and Business Economics, the Faculty offers three master's programmes which end in the degree of "Diplom-Ingenieur" or Master of Science. They impart more knowledge in the basic subjects and in-depth knowledge in the chosen field of study.

**MASTER'S PROGRAMME IN MECHANICAL ENGINEERING**  
The main content of the master's programme in Mechanical Engineering comprises innovative technology concepts, design and development methodologies, materials and manufacturing processes as well as their theoretical background and numerical methods for calculation and simulation. The programme offers specializations in:

- Production technology
- Computational engineering and mechatronics
- Engine and propulsion technology
- Automotive engineering and safety
- Power and environmental engineering

### MASTER'S PROGRAMME IN MECHANICAL ENGINEERING AND BUSINESS ECONOMICS

The master's programme in Mechanical Engineering and Business Economics offers a specialization in the field of techno economics. Engineers acquire an in-depth knowledge in creating and providing products and services. This also includes product development, production, sales and marketing.





## MASTER'S PROGRAMME IN PRODUCTION SCIENCE AND MANAGEMENT

The master's programme in Production Science and Management combines the focuses of mechanical engineering, economics and social competence with special attention placed on imparting an entrepreneurial approach and management expertise. The programme has a strong international orientation: courses are held exclusively in English and a placement abroad is offered.

## DOCTORAL PROGRAMME IN TECHNICAL SCIENCES

The doctoral programme in technical sciences lasts six semesters and ends in the degree of Doctor of Technical Sciences (Dr.techn.) The course aims are to impart to students the ability to undertake independent scientific work and to develop in-depth knowledge in the specialist areas of engineering, sciences and economics in their research fields and neighbouring areas. The Faculty operates two doctoral schools – in mechanical engineering and techno economics.

## LIFE LONG LEARNING

The Faculty contributes attractive content to the Life Long Learning continuing educational programme. In respect of this, the Faculty makes available its knowledge in the fields of technical sciences and techno economics in order to ensure continuing education at the cutting edge in science, economics and technology.

# ME + ES Research

## ENERGY

Environmental pollution and the scarcity of fossil energy sources are forcing us to deal with energy in an ecologically compatible way. Faculty institutes represent broad areas of the energy conversion sector and the application of useful energy. They thus pursue a resource-saving use of conventional and regenerative energy sources by increasing efficiency and innovative system solutions in the following areas: thermal energy plants in power stations and buildings (e.g. power-heat coupling, fuel cells, heat pumps, solar thermal energy, building service engineering), continuous-flow thermal machines (e.g. steam turbines, stationary gas turbines and aircraft propulsion) as well as continuous-flow hydraulic machines (e.g. water turbines, boiler-feed and cooling-water pumps, pressure surge balancing and valves).

## MOBILITY

Owing to the growing world population and an increasing need for mobility, energy consumption is constantly increasing. The finiteness of fossil-fuel energy and the CO<sub>2</sub> emissions associated with their use necessitate alternative concepts for mobility and energy supply. Beside global issues and different forms of individual mobility, a variety of concepts for water, air and land vehicles and their propulsion systems are investigated at Graz University of Technology, conceptually prepared and implemented in pilot projects. The band width of concepts ranges from alternative fuels, such as hydrogen and natural gas to partially and fully electrified drive systems.



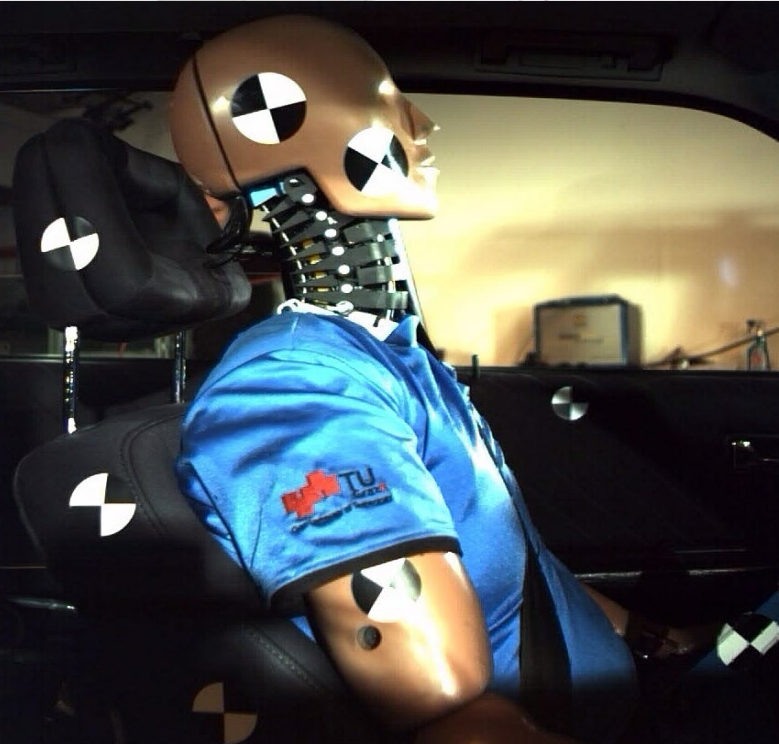
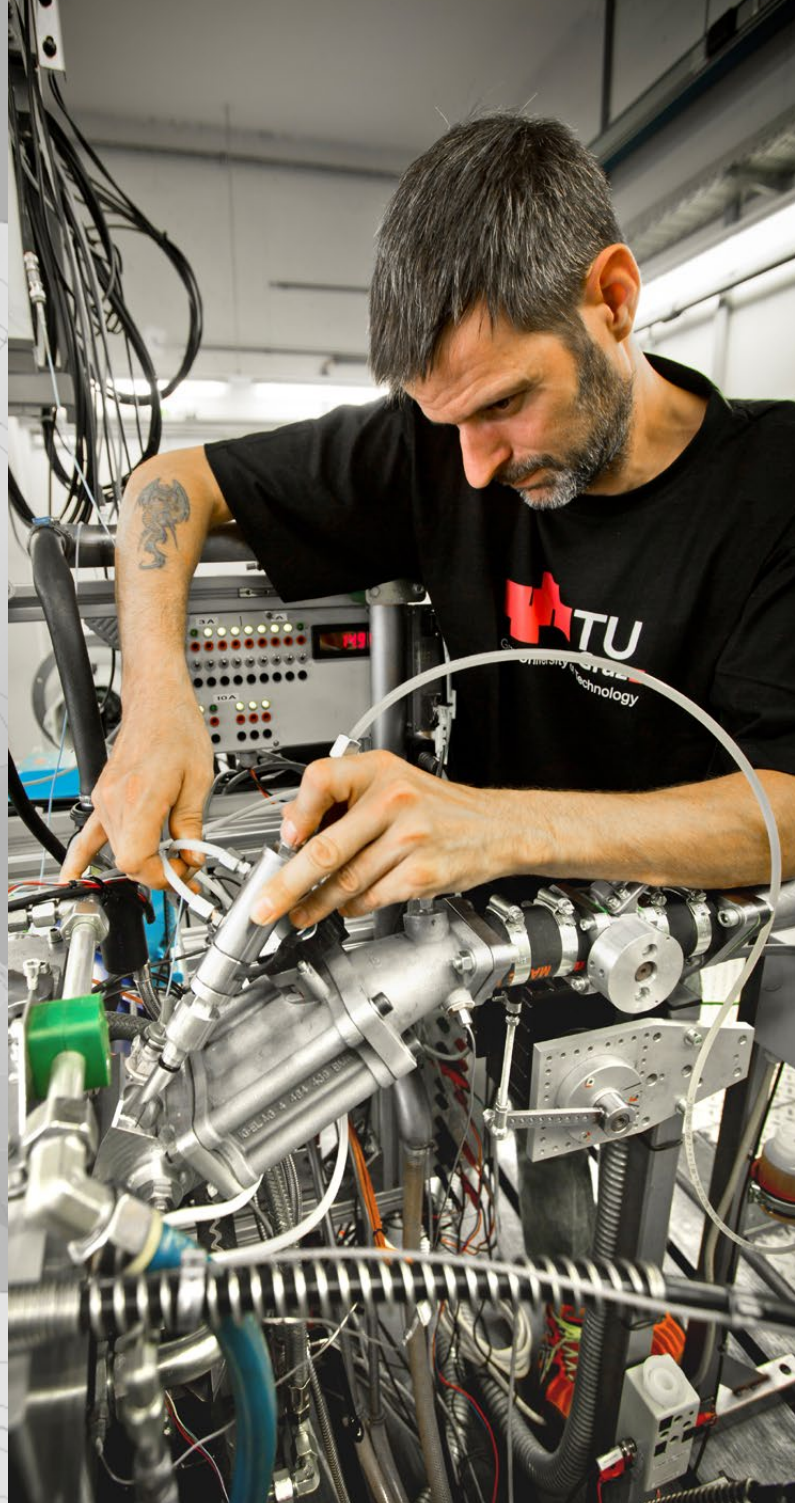


## TECHNO ECONOMICS

Techno economics is a research area at the interface of technology and economics. It deals with questions encompassing the whole value creation process from product idea and production to recycling and includes, for instance, determining customer needs and designing services based on those identified needs, product development, sourcing and production strategies, system design and modelling as well as sales and service strategies. Research in techno economics focuses not only on scientifically- but also on practice-relevant topics from industry and thus contributes to safeguarding Austria as an attractive business location.

## PRODUCTION: SMART PRODUCTION GRAZ

The responsible use of resources – in particular raw materials and energy – for the production of goods is an unavoidable precondition for long-term protection of business locations in high-wage countries. The advantages which can be expected from efficiency of resources are greater than those which can be brought about by increasing labour productivity. This is in accordance with the social philosophy of today's Europe. Smart Production Graz is an initiative of the Faculty which has as its aim sustainability and protection of resources through innovative and efficient production technology. For this purpose, we consider the whole production process in all its technical, economic and social aspects.



## Strategic Research Partnerships

Strategic research partnerships are of great importance for Graz University of Technology. The Faculty is a leading participant in a number of international research projects, Christian-Doppler Laboratories and Competence Centres. Deserving of special mention here is the University's public-private partnership which is unique in Austria – a teaching and research co-operation with industry which forges a bridge between science, education and industry.





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