Faculty of Mechanical Engineering and Economic Sciences

Subjects in mechanical engineering have been offered since Graz University of Technology was founded. The institutes of economic science take into account the fact that economic aspects are inseparably linked with technology. The Faculty is comprised of 17 institutes that offer more than 400 courses.
Recently, students have been offered the opportunity to receive an accredited bachelor's degree in Anglo-American countries. Teaching and research benefit from excellently equipped laboratories. Besides well-balanced contract research and co-operation with industry, a number of sponsored research projects and competence centers should be mentioned in particular, especially those in the areas of automobile engineering (virtual vehicle development, acoustics, large engines), in which the competences of the different institutes of Graz University of Technology are linked to those of industry of international standing in the surrounding area.

Mission:
We develop innovative and holistic solutions for the complete life-cycle of products in the fields of vehicles, power engineering and production plants.

Vision:
We have succeeded in modelling the service life cycle for energy, vehicle and production system products on an integrated and interdisciplinary basis as a result of training and research excellence in both the fundamentals and in the mechanical engineering and economic sciences areas. As a center with an international profile, we develop experimentally verified innovative concepts and tools with a specific focus on how these affect people and the environment.

Faculty of Mechanical Engineering and Economic Sciences

Deans (01.01.2020 – 31.12.2023)

Dean:
Univ.-Prof. DI Dr.techn. Franz Haas
Vice-Dean:
Univ.-Prof. DI Dr.techn. Siegfried Vössner

Dean of Studies:
Ao.Univ.-Prof. Dipl.-Ing. Dr.techn. Peter Sturm
Vice-Dean of Studies:
Assoc.Prof. DI DI Dr.techn. Bernd Zunk

Dean‘s Office

Inffeldgasse 23/1. OG, 8010 Graz
Office Hours: Monday - Thursday, 08:00 - 12:00 am

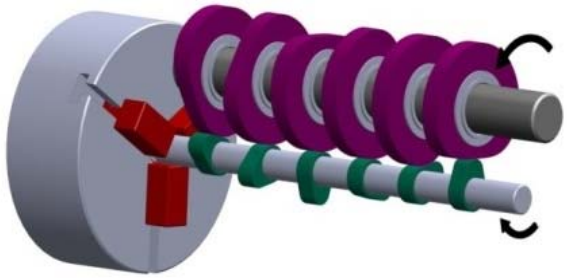
Mag. Helga Bretterklieber	+43 (0) 316 873-7111	bretterklieber@tugraz.at
Mag. Martina Halser	+43 (0) 316 873-7611	martina.halser@tugraz.at
Karin Kamper, MA	+43 (0) 316 873-7114	karin.kamper@tugraz.at (maternity leave)
DI Dr. Martina Ruplitsch	+43 (0) 316 873-7114	martina.ruplitsch@tugraz.at
Irene Wotava	+43 (0) 316 873-7115	wotava@tugraz.at

Institute of Production Engineering

Head: Univ.-Prof. Dipl.-Ing. Dr.techn. Franz Haas

Research:

- energy management of machine tools
- thermal behavior of machine tools
- RPM-synchronous noncircular grinding
- innovative methods for mechanical descaling
- hydrostatic bearing in machine tools
- mathematic model for preliminary design of internal gear pumps



Fields of Teaching:

- production technology
- machine tools
- CNC technology
- industrial robotics
- fluid technology

FoE:

Mobility & Production

Vision:

We strive for research and education on highest level in an international competitive environment.

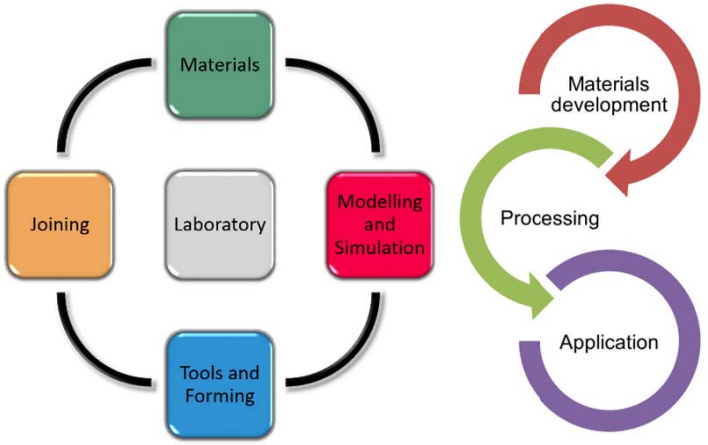
Mission:

We encourage our students to work with delight in the field of production technology.

Institute of Materials Science, Joining and Forming

Head: Univ.-Prof. Dipl.-Ing. Dr.techn. Christof Sommitsch

Research:

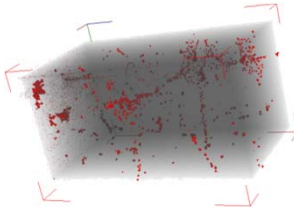
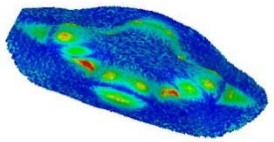
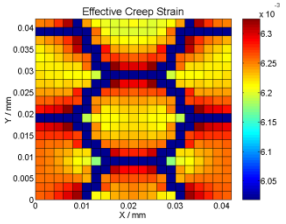


- High-performance materials design and production

- Casting
- Forming
- Joining
- Machining
- Heat treatment

- Service behavior
- Failure analysis
- Corrosion testing



Fields of Teaching:

Bachelor and Master Programs

- Mechanical Engineering
- Mechanical Engineering and Business Economics
- Advanced Materials Science
- Production Science and Management
- Technical Chemistry

Doctoral School Mechanical Engineering

IWE-International Welding Engineer

- Welding processes and facilities of equipment
- Materials and their behavior during welding
- Construction, design and calculation
- Manufacturing and application techniques

FoE:

- Advanced Materials Science
- Mobility & Production
- Human & Biotechnology

Vision:

We are an international centre for developing, modelling and joining socially relevant, future-oriented, high-performance structural materials. We transfer our expertise into teaching and services.

Mission:

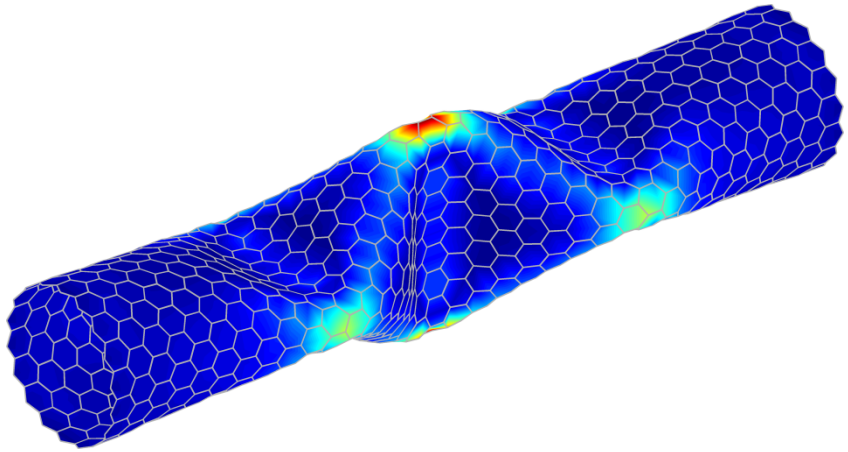
As a result of our high teaching standards coupled with the external funds we acquired, we have gradually created an exciting and stable working environment. This ensures a maximum of freedom for each staff and student member, supporting them to acquire and deepen their subject area knowledge with international standards.

Institute of Strength of Materials

Head: Univ.-Prof. Dipl.-Math.techn. Dr.-Ing. Thomas Hochrainer

Research:

The institute focuses on the further development of numerical methods in solid mechanics and investigates thermo-mechanical problems on the macro-, meso- and micro-level. This allows a realistic description and simulation of technological forming processes like rolling, forging, drawing and extruding.



Fields of Teaching:

We train undergraduate students in the basics of strength of materials. Graduate students are educated in both continuum mechanics and the finite element method applied to engineering problems. Furthermore, specialized lectures on structural mechanics, plasticity and tensor analysis are offered.

FoE:

Advanced Materials Science

Vision:

We are a strong partner to students and faculty and publish our research in refereed journals.

Mission:

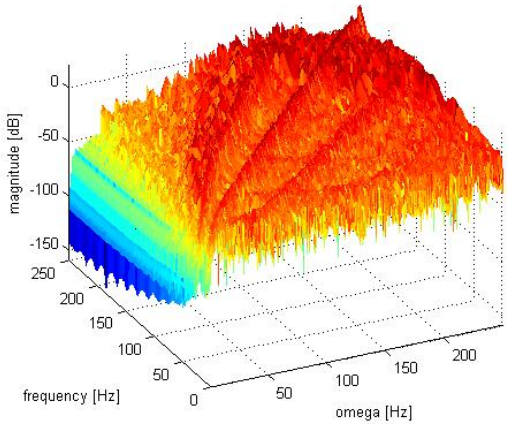
Our graduates are well-trained and conduct research motivated by top international universities.

Institute of Mechanics

Head: Univ.-Prof. Dr.-Ing. habil. Katrin Ellermann

Research:

Nonlinear and Stochastic Oscillations
Fault Detection of Nonlinear Systems
Nonlinear Rotordynamics
Flight- & Cockpit Environments
Human Machine Interface
Flight Simulation



Fields of Teaching:

Engineering Mechanics – Statics & Dynamics
Multibody Dynamics
Nonlinear Vibrations
Mobile Robots
Flight Simulation
Human Factors in Cockpit Systems

FoE:

Mobility, Sustainable Systems

Vision:

Creation – Coordination – Cooperation

Mission:

Practical Application & Theoretical Background

Institute of Logistics Engineering

Head: Univ.-Prof. Dipl.-Ing. Dr.techn. Hannes Hick (interim)

Research:

Intralogistics

- High performance Parcel handling, Availability, Energy efficiency, Sorting systems for unit loads, Material flow simulation

Logistic Technology

- Engineering, Innovative conveyor, Knowledge based development, Physical Internet (PI)

Urban Logistics

- Multimodal City-Hubs, Sustainable Delivery, Smart City Logistics, e-mobility-concepts

Fields of Teaching:

Lectures, tutorials and seminars in

- Material handling engineering,
- Industrial logistic systems
- Factory planning
- Industrial automation systems
- Material handling calculation, modeling und simulation
- Machine design, CAD, CAE
- Basics of Mechanical Engineering

closing operations, labor events, excursions

FoE:

Mobility & Production

Vision:

We are internationally accepted experts, who are developing solutions through our interdisziplinäre skills in the fields of intralogistics, logistic technologies and urban logistics.

Mission:

Functionality, sustainability and protection of resources through innovative and efficient logistic systems.

Institut für Wärmetechnik

TU Graz

Institute of Thermal Engineering

Head: Univ.-Prof. Dipl.-Ing. Dr.techn. Christoph Hochenauer
Ao.Univ.-Prof. Dipl.-Ing. Dr.techn. René Rieberer (Deputy Head)


Research:

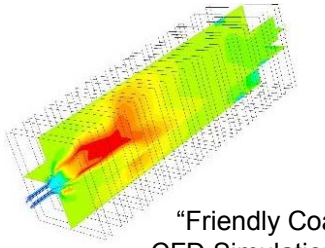
Thermal Energy Systems

- Power Plants
- Fuel Cells (SOFC)
- Energetic Use of Biomass
- Heat Pumping Technologies
- Solar Thermal Energy
- Thermal Storage
- Thermal Building & System Simulation
- Model Predictive Control

Heating, Refrigeration & Air-Conditioning

Energy-Efficient Buildings

Energy Efficiency
Environment. Friendly
Alternative Concepts
Systems
Components
Experiment
Simulation



"Friendly Coal" CFD Simulation

Multifunctional Plug&Play Façade [FIBAG/Stallhofen]

NH_3/H_2O-Absorption Heat Pumping System

Fuel Cell Laboratory

Fields of Teaching:

Bachelor & Master Programmes Mech. Engineering & Economics

- Thermal Engineering
- Heating, Ventilation and Air-Conditioning
- Energy and Environment related Measuring and Testing
- Informatics for Energy and Environment
- Solar Energy Use
- Heat Pumping Technologies
- Energetic Use of Biomass

Doctoral School Mechanical Engineering

FoE:

Sustainable Systems
Mobility & Production

Vision:

First choice partner for national and international R&D projects

Mission:

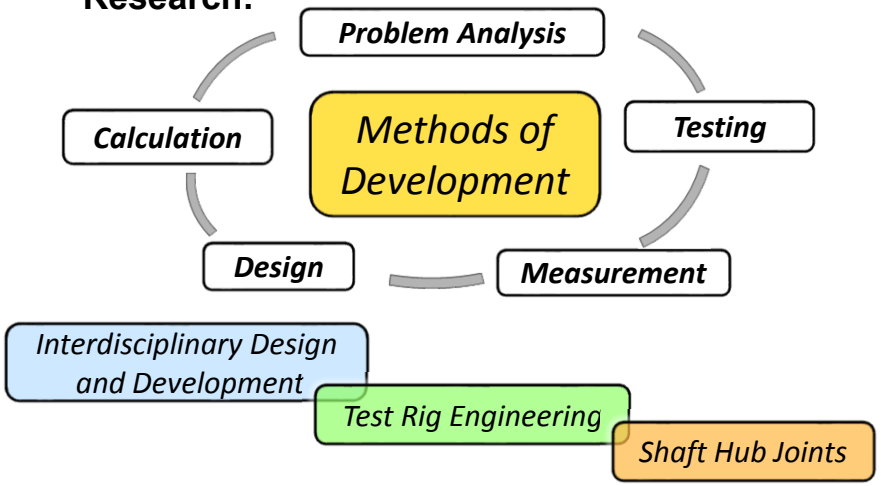
Highly motivated staff is doing superior research & teaching

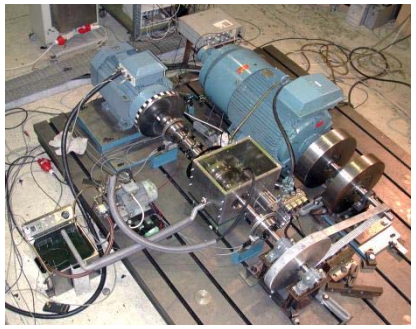
Institute of Machine Components and Methods of Development

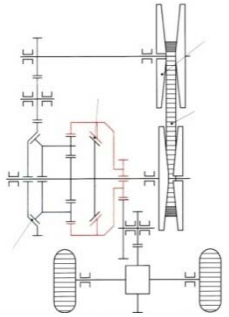
Head: Univ.-Prof. Dipl.-Ing. Dr.techn. Hannes Hick

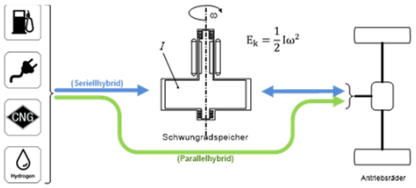
Assoc.Prof. Dipl.-Ing. Dr.techn. Michael Bader (Deputy Head)

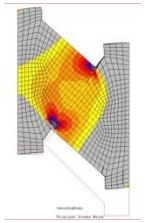
Research:











Fields of Teaching:

Calculation of Machine Components and Systems

Design of Machine Components and Systems

Methods of Development

FoE:

Mobility & Production

Sustainability Research

Vision:

Pushing the limits by a Holistic Development Approach

Mission:

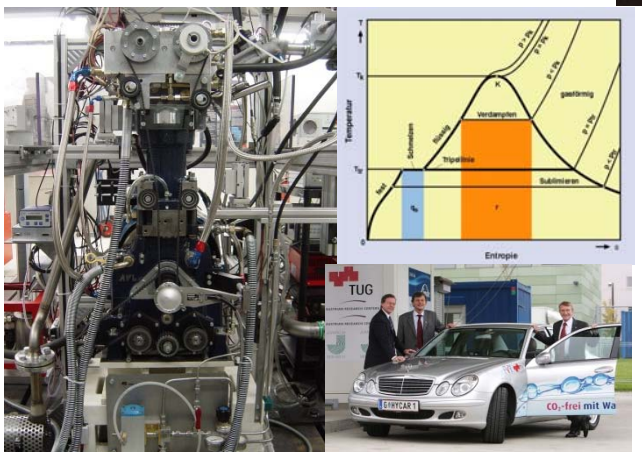
Optimization of the development process by versatile Researchers

Institute for IC Engines and Thermodynamics

Head: Univ.-Prof. Dipl.-Ing. Dr.techn. Helmut Eichlseder

Research:

Design of IC Engines
Analyses and Simulation of Engines („Virtual Engine“)
Combustion System Development
Thermodynamic Working Process of IC Engines
Alternative Fuels
Small and Large Engine Development
Thermodynamic Processes
Traffic and Air Quality



Fields of Teaching:

Thermodynamic: Basic and Advanced
IC Engines: Design, Thermodynamic working process, Emission, Functional development, Innovative propulsion systems
Specific Lectures Large Engines, Small Engines, Hydrogen in vehicle technology
Traffic and Air Quality
Laboratory
More than 50 lectures

FoE:

Mobility & Production

Vision:

The Institute is dedicated to providing innovative and internationally recognized teaching and research in the interconnected system energy, engines, traffic and environment

Mission:

The objectives of research activities at the Institute are to ensure its continuing scientific development and to offer an education that meets todays demands in the area of teaching

Institute for Hydraulic Fluid Machinery

Head: O.Univ.-Prof. Dipl.-Ing. Dr.techn. Helmut Jaberg

Research:

- Hydraulic Machinery and Systems - such as turbines, pumps including reversible pump turbines, valves, water hammer including water hammer protection and surge chambers and unsteady phenomena in systems
- Pumps for automotive applications (including hydrogen pumps), process industry and thermal power plants
- Wind energy such as numerical design of runner blades, flow inside and around support systems and nacelles
- 3D numerical optimisation of pumps and turbines by evolutionary algorithms
- Unsteady phenomena in intakes, pump sumps and inside and behind suction elbows
- Advanced numerical simulation of power plant components
- Acceptance tests of model turbines and pumps according to IEC 60193
- Flow visualisation of the runner stator interaction of reversible Francis pump turbines by means of 2D/3D PIV measurements (ensemble averaging as well as real time)
- Flow investigation of high pressure valves in thermal power plants

Fields of Teaching:

- Turbo machinery basics
- Hydraulic machinery
- Hydraulic machinery - improved design
- Pumps and compressors for the process industry
- Numerical design methods for hydraulic machines
- Laboratory for mechanical engineering and process engineering students
- Operational behaviour of hydro power plants
- Mechanical design methods for turbines and pumps

FoE:

Hydro power, sustainability, hydraulic machinery and systems

Vision:

Leading know-how center for all kinds of hydraulic machinery and systems

Mission:

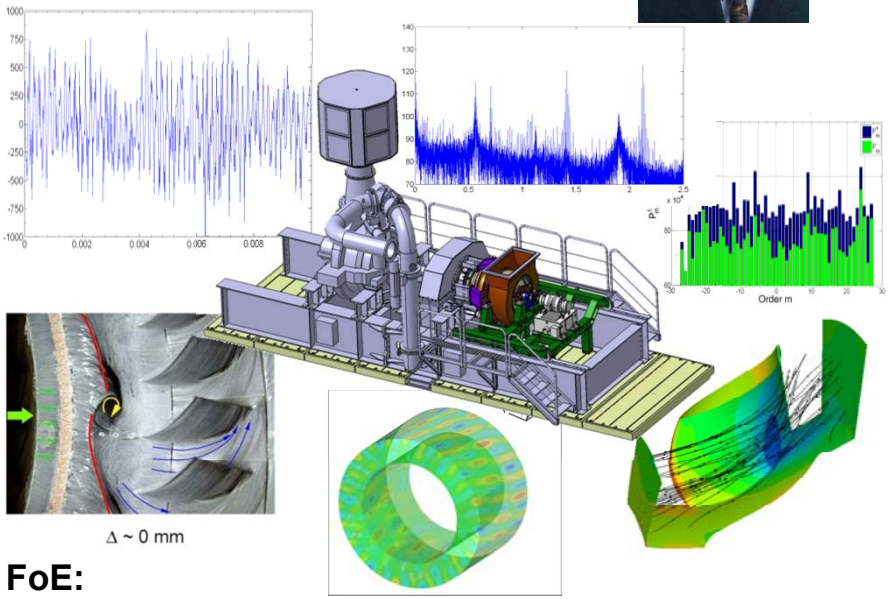
Educate capable engineers and find research results to be readily applied

Institute of Thermal Turbomachinery and Machine Dynamics

Head: Univ.-Prof. Dr.-Ing. Franz Heitmeir

Research:

The Institute specializes in research and education in the field of compressors, gas and steam turbines and their application in modern power plants, airplanes and vehicles. The second field of activity is machine dynamics, including acoustics. Large experimental facilities are available including a 5 MW air heater, a 3,3 MW and a 1,2 MW compressor station for supplying compressed air to the test turbines or the combustion chambers. For flow and vibration diagnostics various laser systems, an infrared camera system and standard diagnostic techniques are used. In parallel a variety of CFD codes are available.



Fields of Teaching:

Thermal Turbo Machinery (Steam, Gas, Aero Engines, Wind Turbines)

Machine Dynamics

Measurement Technique

CFD

Acoustics

Combustion in Gas Turbines

Power Plant Operation

FoE:

Sustainable Systems

Mobility and Production

Vision:

Clean, silent and safe energy conversion

Mission:

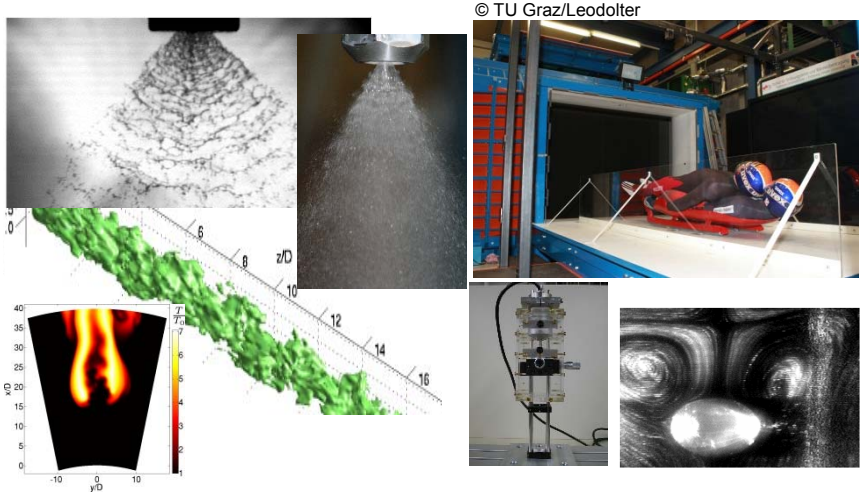
"Because we know, what we are doing"

Institute of Fluid Mechanics and Heat Transfer

Head: Univ.-Prof. Dr.-Ing. habil. Günter Brenn

Research:

Flow Measuring Techniques and Multiphase Flows	• Optical Measuring Techniques • Rheology and Rheometry • Multiphase Flow Physics
Aerodynamics	• Heat Transfer in Drying Machines • Aerodynamics in Sports • Wind Energy
Modelling and Numerical Simulation	• Direct Numerical Simulation • Large Eddy Simulation • Multiphase Flow Simulation
Heat and Mass Transfer	• Heat Transfer with Phase Change • Multi-Component Liquid Evaporation



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Fields of Teaching:

Bachelor and Master Programmes
- Mechanical Engineering
- Mechanical Engineering and Business Economics
- Process Engineering
- Fluid Mechanics and Heat Transfer
- Advanced Fluid Mechanics and Heat Transfer
- Aerodynamics and Building Aerodynamics
- Gas dynamics

NAWI Graz Chemical and Pharmaceutical Engineering
- Transport processes I – Fluid Mechanics
- Transport processes II – Heat and Mass Transfer

Doctoral School Mechanical Engineering

FoE:

Mobility & Production, Sustainable Systems
Human & Biotechnology

Vision:

Theory for Practice

Mission:

Transport Processes for Smart Technologies

FTG

TU Graz

Institute of Automotive Engineering

Head: Univ.-Prof. Dipl.-Ing. Dr.techn. Peter Fischer

Research:

- Automotive mechatronic systems,
- Driver assistance, vehicle dynamics and suspension systems,
- E-mobility and innovative drive trains,
- Virtual product development.

Fields of Teaching:

- Automotive Engineering I and II, Introduction
- Vehicle Dynamics incl. Modeling and Simulation
- Commercial Vehicle Technology
- Tire Technology, Vehicle-Track Interaction at Railway Vehicles*)
- CAx in Automotive and Engine Technology*)
- 3D-CAD Surface Design in Automotive Engineering
- Laboratory Practical Automotive Engineering
- Innovative Power Trains*), Integrated Safety*)
- Student Projects and laboratory courses

FoE:

Mobility and Production

Vision:

We will be recognized worldwide for our contributions to sustainable mobility of land vehicles

Mission:

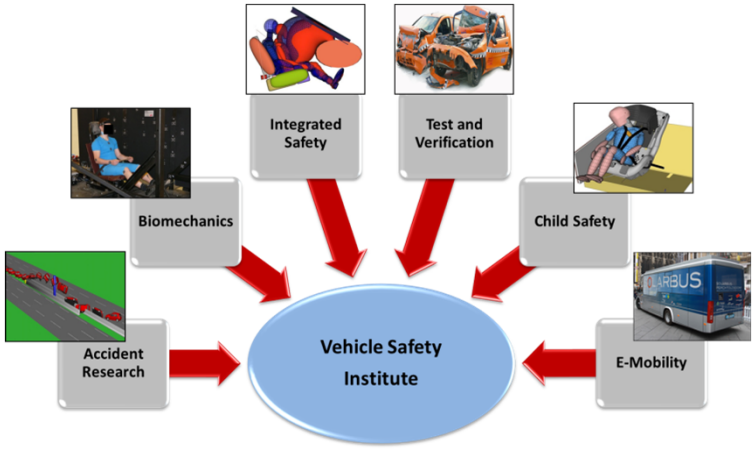
We are conducting outstanding research and teaching on experimentally verified virtual development methods, innovative vehicle technology and mobility concepts.

Vehicle Safety Institute - VSI

Head: Univ.-Prof. Dipl.-Ing. Dr.techn. Hermann Steffan

Research:

- Integrated Safety
- Accident Research
- E - Mobility
- Biomechanics
- Methodology Development
- Test and Verification
- Child Restraint Systems
- Pedestrian and Bicycle Safety



Fields of Teaching:

- Integrated Safety
- Accident Research
- Biomechanics
- Active and Passive Safety
- Simulation in the Area of Vehicle Safety
- Lab Exercises for Crash Tests and components
- Master Theses
- PhD Theses
- Master of Engineering in Traffic Accident Research

FoE:

Mobility & Production

Vision:

International High Quality Research in the Area of Mobility

Mission:

Research for a Safer Tomorrow

Institute of Innovation and Industrial Management

Head: Univ.-Prof. Dipl.-Ing. Dr.techn. Christian Ramsauer

Research:

Competitiveness of production – production strategy

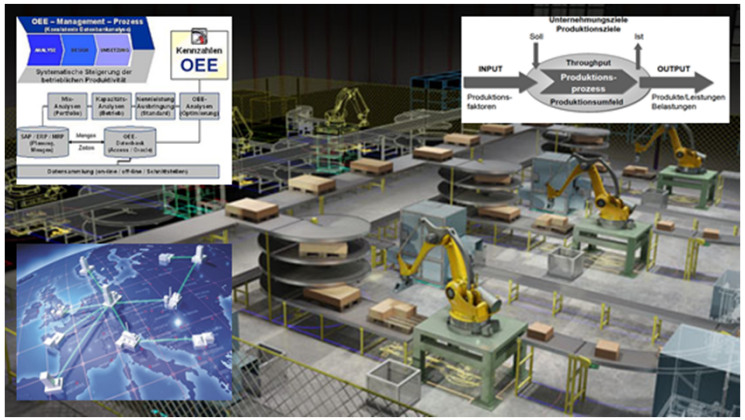
Energy efficient respectively resource efficient production

Simultaneous engineering (product- and process development eg. fibre-reinforced composites)

Open innovation and lead user approach

Barriers to innovation for E-mobility

Global supply chain and logistics



Source: www.cadalyst.com

Fields of Teaching:

Industrial Management	Industrial Engineering Industrial Management Logistics Management Quality Management Safety at work Energy Economics
Innovation	Innovation Management Creativity Techniques Knowledge Management Value Management Product Innovation Project

FoE:

Mobility and Production

Sustainable Systems

Vision:

We are one of the most attractive academic institutions in the field of industrial management in an international environment.

Mission:

Long-term collaboration with industry as well as maintenance and expansion of our regional and international partner network.

Institute of General Management and Organization

Head: Univ.-Prof. Dipl.-Ing. Dr. Stefan Vorbach

Research:

- **Structure:** organizational structures, ambidexterity
- **Strategy:** flexible strategies, sustainable strategies, business modelling
- **Process:** process management, technology and innovation management
- **People:** entre- and intrapreneurship, leadership
- **Cooperation:** organizational cooperations, knowledge and technology transfer
- **Transformation:** project management, systems engineering

Fields of Teaching:

- General Management and Organization
- Project Management
- Business Process Management
- Information Management
- Technology Management
- Entrepreneurship
- General Management Case Studies & Simulation

FoE:

Mobility and Production; Sustainable Systems; Information, Communication & Computing

Vision/Mission:

The General Management and Organization Institute (GMO) undertakes research on the topic of management in a broad spectrum of domains, integrating technological and business perspectives. Leveraging its expertise, GMO aims to make a substantial contribution to teaching within the "Mechanical Engineering and Business Economics" and “Production Science and Management” Study Program of Graz University of Technology.

Institute of Business Economics and Industrial Sociology

Head: O. Univ.-Prof. Dipl.Ing. Dr.techn. Ulrich Bauer

Assoc. Prof. DDipl.-Ing. Dr.techn. Bernd M. Zunk (Deputy Head)

Research:

Management of Technology has become one of the main fields of research of the institute. Our current research focuses on the following areas:

- Management Control, Accounting and Finance
- Industrial Marketing, Purchasing and Supply Management
- Human Resource Management and Industrial Sociology

The main research objective is to improve the holistic understanding of the complex processes within firms that provide technological goods and services in industrial markets to ensure the firms' future competitiveness and viability. In recent years, a lot of research projects performed by both academic researchers of the Institute of Business Economics and Industrial Sociology and commercial companies have been completed successfully.

Fields of Teaching:

Our graduates are equipped with a wide range of skills and knowledge that enable them to succeed in their future careers, including a comprehensive and well-founded knowledge of the technological basics combined with outstanding problem solving skills in business economics.

- Accounting
- Management Accounting
- Business Economics
- Industrial Sociology
- Management Control Systems
- Financial Management
- Purchasing and Supply Management
- Marketing Management

FoE:

The Institute of Business Economics and Industrial Sociology has an interdisciplinary approach and is therefore represented in all fields of expertise at Graz University of Technology.

Vision:

Creating value for a dynamic society through academic teaching and applied research in Business Economics, Management Accounting, Industrial Marketing and Purchasing.

Mission:

Our passionate teachers and researchers design techno- and socio-economic systems to support effectiveness and efficiency in technology firms acting on industrial markets.

Institute of Engineering- and Business Informatics

Head: Univ.-Prof. Dipl.-Ing. Dr.techn. Siegfried Vössner

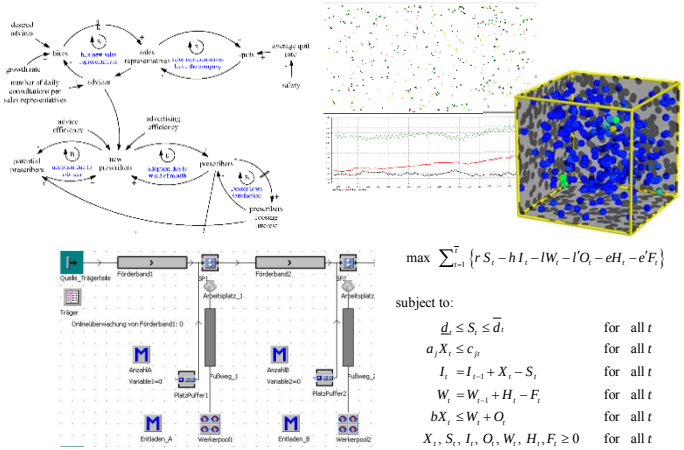
Research:

Production Planning and Optimization
Applications
- Production planning and scheduling
- Optimization of production

Business Modeling and Simulation
Applications
- Production planning
- Supply Chain Management
- Strategic Business Planning
- (Pricing, marketing strategies, capacity planning, etc.)
- Scenario analysis and planning

IT-Systems architecture and IT-Service Design
Applications
- Designing of IT-Services (IT-Service Design)
- IT-Systems architecture

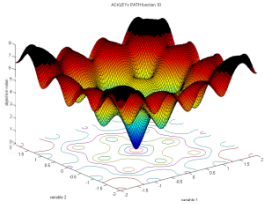
Systems- Architecture and Engineering
Applications
- Requirement analysis
- Weak point analysis
- Organizational development
- Development of Products/ concepts and integration
- Project management
- Risk management



$$\max \sum_{t=1}^{T} \left\{ r S_t - h I_t - l W_t - l' O_t - e H_t - e' F_t \right\}$$

subject to:

$$\begin{aligned}
\underline{d}_t \le S_t \le \overline{d}_t & \quad \text{for all } t \\
a_j X_t \le c_{jt} & \quad \text{for all } t \\
I_t = I_{t-1} + X_t - S_t & \quad \text{for all } t \\
W_t = W_{t-1} + H_t - F_t & \quad \text{for all } t \\
b X_t \le W_t + O_t & \quad \text{for all } t \\
X_t, S_t, I_t, O_t, W_t, H_t, F_t \ge 0 & \quad \text{for all } t
\end{aligned}$$



Fields of Teaching:

Bachelor und Master Study programs*
- Computational Engineering I and II
- Engineering- and Business Informatics
- AK Business Informatics – Social Media and Media
- IuK-Management in practice
- Production Planning and Control
- Modeling and Optimization in Production and Logistic Systems
- Optimization Methods for Operations Planning
- Quantitative Methods for Business
- Business Modeling and Simulation
- Systems Engineering

Doctoral School Technoökonomie

*) Mechanical Engineering, incl. Economic Sciences, Production Science and Management, NAWI-Graz - (IT molecular biologist)

FoE:

Information, Communication & Computing

Mobility & Production

Vision:

We are a community of researchers, lecturers, students and administrators united by an atmosphere of intellectual freedom and responsibility.

Mission:

Our mission is to foster positive development of society and environment grounded on our basic and applied research.