

# Course description: Mechanical / Materials / Process Engineering

What would you like to study?

Process Engineering

Which type of university/degree?

## Studying Mechanical-, Process- and Chemical Engineering in Germany

### Engineers design machinery and equipment and keep it running

An article by Madlen Ottenschl&auml;ger

#### That is what it's about

How do machines independently communicate with each other? What sounds like science fiction is already everyday life for mechanical engineers. The buzzword is called Industry 4.0. Machines are designed to collect, evaluate, learn from or even "talk" with one another. These can be machines in agriculture or tiny devices in medical technology. Another current topic is electro-mobility. But no matter whether mechanical engineers develop an e-bike or a coffee machine or even build a complete system in which, for example, tablets are manufactured industrially: "Mechanical engineers see the entire product life cycle," says Moniko Greif, a professor at RheinMain University of Applied Sciences and chair of the Mechanical Engineering department. They form a product based on the customer's requirements, select materials and components, and during the design and manufacture process, must consider the subsequent disposal. "Mechanical engineers have a broad technical knowledge and are therefore versatile in their deployment," says Elmar Moritzer, professor at the University of Paderborn and chairman of the Faculty for Mechanical and Process Engineering.

#### This is how the course runs

In the first semesters, it's all about the basics - in addition to mathematics, physics, electrical engineering and computer science - as well as engineering mechanics, materials technology, manufacturing technology, construction and business administration. Practical exercises are already part of the curriculum in the first semester at universities of applied sciences, but at universities they usually come a bit later. Students then work in teams and learn, for example, what components an engine consists of or how to get fuel cells to work. Questions of economics are also dealt with. There is a multi-week internship at universities of applied sciences, and a full internship semester for seven-semester study programs. Many students work in industry, for example in production or development. Some colleges already require proof of a preliminary internship when enrolling. The application of software such as CAD (Computer-Aided Design) provides a foretaste of professional practice. The students design machine parts in 3-D. Later, they learn to simulate and construct entire machines by computer. In the higher semesters, they can traditionally specialize in product development, energy technology or production engineering. Medical technology and computer-aided simulation methods are becoming more and more important - for example to test vehicle prototypes in a virtual wind tunnel.

#### Typical questions raised within the subject

- Which manufacturing process should be chosen so that the production makes sense technically and economically?
- How do you plan costs?
- How do you model components on a computer?
- What are the different forms of friction and how are they determined?
- How can you further reduce energy consumption in production?
- How will the product be disposed of later?

#### The subject suits you, ..

...if you if you enjoy developing new products and enjoy working as a team. Good previous knowledge in mathematics and physics make starting off easier. In the first semesters you have to deal with mathematics as well as thermodynamics and technical mechanics, two areas of physics. "It's best to work through the material in a learning group right from the start," says Elmar Moritzer. In addition to technical understanding, abstract thinking is required, for example to calculate the pressure loss of a turbine.

**Is there a numerus clausus?**

About one third of the degree programmes is occupied by an NC, which is about grade three.