

## The challenge: Medical Engineering

Complex technology has entered medical routine over the last years rapidly and is frequently used for applications such as patient monitoring, life support, medical imaging for clinical diagnosis and therapy, as medical robotics for assisted surgical interventions. Consequently, there is an increasing demand for engineers with a strong foundation in physics, computational sciences and electrical engineering as well as a high level expertise in medical physics, biosciences and a detailed knowledge of medical applications and procedures.

What distinguishes the B.Sc. Program in Medical Engineering from similar programs offered by other universities is its focus on three areas of concentrations which are closely interconnected: Imaging, Signal Processing and Robotics.

## Fields of career:

Graduates of Medical Engineering are qualified for complex tasks in the areas of

- research and development (e.g. in industry, higher education and research centers)
- manufacturing and quality control
- marketing and sales
- teaching, training, education as well as skill development
- technical consulting
- etc.

## Topics of study:

In terms of Imaging, students familiarise themselves with a wide range of procedures for image acquisition, including Computer Tomography, Magnetic Resonance Tomography and Sonography. The university owns an unusually strong collection of medical imaging devices which are extensively used for research and teaching.

In the context of Signal Processing, students are introduced to signals which are perceived in and around the human body with the support of medical sensors. Important applications include functional diagnostics, the monitoring of vital signs as well as medical image processing.

Robotics deals with computer-based support systems for navigated and robot-assisted patient treatment.

In our Robotics Laboratory, students work with robots and navigation systems, which utilize – among other things – the results of imaging and signal processing procedures.

The contents of the degree course are carefully structured and clear high emphasis is placed on enabling students to complete the program within the suggested timeframe.

The basics in terms of mathematics and physics, computer science and engineering are covered during the first three semesters. In the fourth and fifth semesters, additional competencies in engineering and the specialization modules are offered – providing students with a profound and practice-oriented knowledge concerning various key areas of medical engineering.

The practical term, which is usually completed in a company or research institute, is followed by the final thesis.

## Admission requirements:

- Advanced technical college certificate (*Fachhochschulreife*), qualification for university entrance (*Abitur*) or recognized international equivalent.
- For non-native speakers of German: evidence of [proficiency in German](#)

Application for registration is possible for the summer or the winter term.

**Final degree:** Bachelor of Science (B.Sc.)

## Duration of study:

Students typically attain their degree after three years of study (180 ECTS – including a practical term and a final thesis).

## Contact:

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## Structure of the Course/Curriculum:

Semester 1	Semester 2	Semester 3	Semester 4	Semester 5	Semester 6
Mathematics I <sup>8</sup>	Mathematics II <sup>8</sup>	Mathematics III <sup>7</sup>	Clinical Chemistry <sup>7,5</sup>	Medical Imaging <sup>7,5</sup>	Practical Term <sup>15</sup>
Physics I <sup>8</sup>	Physics II <sup>7</sup>	Physics III <sup>5</sup>	Image Processing <sup>7,5</sup>	Physiological Testing and Monitoring <sup>7,5</sup>	
Information Technology <sup>5</sup>	Physics I <sup>2</sup>	Signal Processing <sup>7</sup>	Medical Device Technology <sup>7,5</sup>	Robotics <sup>7,5</sup>	Bachelor's Thesis <sup>12</sup>
Economics and Languages <sup>4</sup>	Inf. Technology <sup>2</sup>				
	Ec.&Languages <sup>2</sup>	Measurements and Sensors <sup>7</sup>	Digital Technology <sup>7,5</sup>	Control Engineering <sup>7,5</sup>	
Basics of Human Medicine <sup>5</sup>	Electrical Engineering <sup>9</sup>				

Please note that the B.Sc. programs in **Engineering** are also available for two other areas of specialisation (Sport-Medical Engineering, Optics and Laser Engineering). Please refer to the respective course descriptions for more information.

Successful completion of this B.Sc. degree qualifies a student for acceptance onto a Master's degree, e.g. our M.Sc. Program in Applied Physics. Specific regulations may apply.