

Why Optics and Laser Engineering?

The Bachelor program Optics and Laser Engineering is the answer of our university to the increased demand for engineers in the fields of laser development and laser and optics applications. This program is characterised by the extensive use of the latest equipment, a strong connection of practical training and applied research, as well as its internationality. The studies in laser medicine provide a direct link to the B.Sc. programs Medical Engineering and Sports Medical Engineering.

Fields of career:

Research and development (in industry, university and research centers)

- Development construction and installation of equipment
- Development of special laser and optical systems
- Marketing and sales in different positions within companies
- Manufacturing and quality control
- Production
- Optical communication and topics in information technology
- Marketing and Sales departments
- Teaching, training and skill development
- Self employment (engineering company, consulting)
- Project leadership in technical divisions

Topics of study:

During the basic study phase in the first three semesters, students are introduced to the basics of physics, mathematics and chemistry as well as skills in technical subjects such as computer programming, electrical and measurement engineering, electronics, technical mechanics and material science. During the following three semesters this knowledge is extended and deepened; the key aspects of the students' area of specialization are studied in greater detail.

Thus the students acquire the competence required for their practical Bachelor project work which may take place either at RheinAhrCampus, in industrial companies or other research sites.

The acquired theoretical knowledge is applied in extended practical laboratory work. The Bachelor program Optics and Laser Engineering thereby concentrates on fields that dominate the commercial applications: laser measurement technology, which includes holography, laser material processing, micro processing of materials by laser, laser lithography (which is highly important for the production of computer chips), optical communications technology (more and more important for information technology) and laser medicine with its increasing importance for diagnostics as well as therapy.

Admission requirements:

General qualification for university entrance (*Abitur*), advanced technical college certificate (*Fachhochschulreife*) or recognized international equivalent. Students whose native language is not German need to demonstrate their [proficiency in German](#). Application for enrolment is possible for the summer or the winter term.

Degree awarded:

Bachelor of Science (B. Sc.)

Duration:

This three-year program features three semesters of basic studies and three semesters focusing on advanced-level work and the specialization area. The final semester is reserved for a practical study phase and the B.Sc. 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 ⁸	Mathematics II ⁸	Mathematics III ⁷	Laser Measurement Technologies ^{7,5}	Laser Physics and Optical Wave Guides ^{7,5}	Practical Term ¹⁵
Physics I ⁸	Physics II ⁷	Physics III ⁵	Laser Material Processing ^{7,5}	Calculation of Optics ^{7,5}	
Information Technology ⁵	Physics I ²	Signal Processing ⁷	Optics ^{7,5}	Optical Analytics and Spectroscopy ^{7,5}	Bachelor's Thesis ¹²
	Inf. Technology ²				
Economics and Languages ⁴	Ec.&Languages ²	Measurements and Sensors ⁷	Digital Technology ^{7,5}	Control Engineering ^{7,5}	
Basics of Optics and Laser Technology ⁵	Electrical Engineering ⁹	Measurements and Sensors ⁷	Digital Technology ^{7,5}	Control Engineering ^{7,5}	Final Presentation ³

Please note that the B.Sc. programs in **Engineering** are also available for two other areas of specialisation (Medical Engineering, Sport-Medical 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.