Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU) offers a range of subjects that is unique in its diversity in Germany. The Faculty of Engineering is one of FAU’s five faculties and has an excellent reputation in research and industry. For nearly 50 years, highly-qualified engineers and computer scientists have been graduating from more than 20 modern and interdisciplinary degree programmes and six Master’s programmes taught in English.

**Student counselling**

- **Contact:**
  - **Speaker:** Prof. Dr. Bernhard Schmauß
  - **Programme Manager:** Dr. Jürgen Großmann
  - **Phone:** +49 9131 8527213
  - **E-Mail:** bernhard.schmauss@fau.de
  - **Website:** www.aot.uni-erlangen.de
  - **Address:** Cauerstraße 9
  - **Internet:** www.aot.uni-erlangen.de

**Facts and figures on FAU**

- ~500 international university students
- 5 international doctoral programmes
- 22 international degree programmes
- 244 degree programmes

**International Students**

- Administrative fees: Students at FAU are required to pay Student Services fees of 107 euros per semester, which must be paid at the beginning of each semester.
- Visa: You need to check the individual visa requirements. For further information you can consult the MAOT office.
- Health insurance: In Germany you will generally need to be covered by health insurance. Several major insurance companies have branch offices in Erlangen. For more information please consult the MAOT office.
- Scholarships: There are some scholarships provided by the MAOT office.
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**Erlangen and the region**

Erlangen is a cosmopolitan, economically strong and vibrant student city, located in the Nuremberg Metropolitan Region. With more than 100,000 inhabitants (a third of which are students), Erlangen has the ideal size for social life, studies and relaxation. The diversity of events and leisure activities in the region leaves nothing to be desired by night owls, culture connoisseurs and sports fans.

Experts in optical technologies can find a particularly wide range of career opportunities in research and development, as well as in production and distribution. In addition to the optical industry — with many smaller, highly specialized technology companies — there are many areas in more traditional industries that require knowledge of optical technologies.

Erlangen has been well-known as a centre for optics and optical technologies for decades. Optics is one of the University’s research focus areas. Optical technologies research is carried out by all departments at the Faculty of Engineering, as well as the Department of Physics and the Faculty of Medicine, and is consolidated in SAOT – the Erlangen Graduate School in Advanced Optical Technologies. With its strong position as one of Europe’s leading competence centres for advanced optical technologies, the SAOT offers a wide range of experts in optical technologies outside the University.

**About Advanced Optical Technologies**

Optical technologies – which use light as a tool – are key technologies for industry and society in the 21st century. They are the foundation of information infrastructures in the modern world and their diverse applications in metrology and material processing can be found in many areas of large industries such as automotive, semiconductor production, medical engineering, and many more. As a relatively new area, optical technologies are experiencing constant innovation. Work in the field is highly interdisciplinary, involves a great deal of international collaboration, and relies on the high level of individual expertise of everyone involved. This makes optical technologies a pioneering example of collaborative work in modern industry.

**Applications**

- Optical data transmission – essential for the Internet
- Solar cells – a crucial part of modern energy technology
- Lasers – a versatile and indispensable tool e.g. for processing materials
- High-precision optical measuring technologies – microscopy, (laser) spectroscopy and many more
- Medicine – precise, less invasive diagnosis and treatment using light

**Advanced Optical Technologies in the Erlangen-Nuremberg region**

Erlangen has been part of the German government’s Excellence Initiative. The Max Planck Institute for the Science of Light was established in Erlangen in 2005. Optical technologies are also important areas of application at the Cluster of Excellence 'Engineering of Advanced Materials' (EAM), Helmholtz Institute Erlangen-Nürnberg and Medical Valley. MAA therefore offers its students opportunities for unique interdisciplinary collaboration and has contacts with a range of experts in optical technologies outside the University.

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More information available at www.erlangen.de and www.nuernberg.de
**Application and admission**

1. Good Bachelor’s degree in engineering or physics.
2. Previous experience with optical technologies desirable but not mandatory.
3. Proof of sufficient English language proficiency (no specific certificate required).
4. Pass in the qualification assessment process which includes a short interview.
5. Application deadline: 15 April for international applicants, 15 July for German applicants; programme can only be started in the winter semester.

**Degree programme structure**

- **REQUIRED BACHELOR’S DEGREE:**
  - Degree in engineering – e.g. electrical engineering, mechanical engineering or medical engineering – or physics
  - Type of degree: Bachelor of Science (BSc) /Bachelor of Engineering (BEng)

- **MASTER’S DEGREE PROGRAMME:** 4 semesters
  - 1st semester: foundations of optics and laser technology, numerical tools, applications of optical technologies
  - 2nd and 3rd semester: courses in two of seven possible majors (see below), project work, placement
  - 4th semester: Master’s thesis. Degree: Master of Science

- **DOCTORAL STUDIES:**
  - Graduates may pursue doctoral studies, for example at SAOT

**Study plan for the Master’s degree programme**

<table>
<thead>
<tr>
<th>Semester 1</th>
<th>Semester 2</th>
<th>Semester 3</th>
<th>Semester 4</th>
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</thead>
<tbody>
<tr>
<td>Fundamentals of Optics</td>
<td>Major Topic 1 (22.5 ECTS)</td>
<td>Major Topic 2 (17.5 ECTS)</td>
<td>Master’s thesis</td>
</tr>
<tr>
<td>Basics of Laser Technology</td>
<td></td>
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<tr>
<td>Numerical Tools</td>
<td>Free electives (10 ECTS)</td>
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<tr>
<td>Topics of Optical Technologies</td>
<td>Project work</td>
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**Examples of core subjects and majors**

**Optical Metrology**
- Optical Metrology
- Optical Material Processing
- Optical in Medicine
- Optical Manufacturing Metrology
- Optical Lithography
- Clinical Applications and Associated Fundamentals of Anatomy
- Diagnostic and Interventional Medical Image Processing
- Biosensing: Light-Tissue Interaction
- Diagnostic and Interventional Medical Image Processing
- Optical Manufacturing Metrology
- Optical Lithography
- Clinical Applications and Associated Fundamentals of Anatomy
- Diagnostic and Interventional Medical Image Processing

**Optics in Communication**
- Linear and Non-Linear Fiber Optics
- Optical Properties of Modern Materials
- Computational Optics
- Advanced Optical Communication Systems
- Advanced Electromagnetism
- Image Processing in Optical Nanoscopy
- Quantum Communication
- Advanced Laser
- Pattern Recognition

**Optics in Medicine**
- Photonic in Medical Engineering
- Clinical Applications and Associated Fundamentals of Anatomy
- Diagnostic and Interventional Medical Image Processing

**Career opportunities**

A significant proportion of the people who work in the optical industry have a university education, meaning there are many opportunities for highly qualified Master’s graduates. Furthermore, thanks to the many applications and increasing use of optical technologies in almost all areas of technology, graduates can pursue careers in many different areas of industry.

Germany is one of the world leaders in optical technologies alongside Japan and the United States. Erlangen is one of the leading centres for optics and optical technologies in Germany.

The constant innovation and many open research questions in this new area of technology mean that there are many opportunities for those wishing to pursue doctoral studies.

Since 2007 more than 60% of MAOT graduates have started a doctoral degree in Erlangen, at a German university or at an international university. Approximately 75% of graduates were from countries other than Germany. MAOT is an ideal starting point for a career in Germany for international applicants.