Friedrich-Alexander University 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 science and industry. For more than 40 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.

### Facts and figures about FAU

- 4,174 students, including 4,631 from abroad
- 263 degree programmes
- 22 international degree programmes
- 7 international elite degree programmes in the Elite Network of Bavaria
- 600 international university partnerships in 70 countries
- 1,825 students, including 1,825 from abroad
- 4 international elite degree programmes in the Elite Network of Bavaria
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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. More information available at: www.erlangen.de and www.nuernberg.de

### Fields of action

ASC is focusing on concepts for advanced technologies in the areas of signal processing and communications such as: information theory, coding, statistical signal processing, machine learning, pattern recognition, optimization and game theory. Students deepen the broad interdisciplinary scope of these topics choosing from various areas of specialization.

- advanced technologies in the areas of signal processing and communications
- machine learning for image recognition, audio and video
- next-generation wireless systems (mobile and pervasive networks)
- intelligent networks (Smart Grids)
- distributed optimization and computing

### ASC and the local Metropolitan Region

According to the Shanghai ranking, FAU Erlangen-Nürnberg is first in Telecommunications Engineering within Germany. The ASC programme is embedded into this stimulating engineering school at FAU and is greatly enriched by the direct involvement of the International Audio Laboratories – a joint research unit of Fraunhofer IIS (‘Home of the mp3’) and the university. With numerous high-profile and world-renowned R&D institutions for audio, multimedia, communications, and medical systems (Siemens, Fraunhofer, Alcatel-Lucent, INTEL, Qualcomm, Continental, Bosch, Medical Valley, a.o.) nearby, theory meets practice on a daily basis, thereby offering many options for complementing studies and for starting an engineering career.
In future, society will face significant challenges associated with energy supply and ageing populations while digitalisation will continue to progress into all areas of life. Developing a society based on knowledge and innovation is essential to achieving economic competitiveness and sustainable development. Communications and multimedia technology will play a key role in every area of society, particularly for achieving goals of this nature. The purpose of the ASC Elite Master’s programme is to make a decisive contribution towards the stated objective by providing individualized training to particularly outstanding students.

In the program, students will learn about advanced signal processing and communications engineering with an emphasis on digitalization. The program is designed to prepare students for leadership roles in the digital and information age. Students will have the opportunity to work on cutting-edge research projects and gain practical experience through internships and industry collaborations. Upon completion, graduates will be well-equipped to pursue careers in academia, industry, or government roles, with a focus on innovation and sustainable development.


degree programme “ASC”

in the field of

• Digital Engineers
• Communication Engineers
• Electrical Engineers

Programme Information

Programme: ASC Elite Master’s Programme

Entry Requirements:

1. Outstanding Bachelor Degree
2. 4th semester: Master’s Thesis, Degree: Master of Science in Electrical Engineering, Communications Engineering, Computer Science, or Applied Mathematics
3. 1st semester: minimum GPA of 80%
4. Prior knowledge of software: MATLAB

Curriculum:

M.Sc. Advanced Signal Processing and Communications Engineering: 4 semesters

1st & 2nd semester: Deepening and widening of theoretical and practical background, German language courses for foreign speakers, technical courses, laboratories, Winter and Summer School
3rd semester: Research projects including self-directed reading, attending lectures, conducting experiments and paper writing.
4th semester: Master’s Thesis, degree: Master of Science

Prerequisites:

• Engineering math: linear algebra, complex analysis, Linear differential equations, Fourier transform, Laplace transform, z-transform
• Signals and Systems (Textbook, e.g., Oppenheim/Willsky: Signals and Systems)
• Communications (Textbook, e.g., Haykin, Communication Systems)
• Stochastic Signals (Textbook, e.g., Pillai/Papoulis: Probability, Random Variables, and Stochastic Processes)
• Software: MATLAB

In the future, society will face significant challenges associated with energy supply and ageing populations while digitalisation will continue to progress into all areas of life. Developing a society based on knowledge and innovation is essential to achieving economic competitiveness and sustainable development. Communications and multimedia technology will play a key role in every area of society, particularly for achieving goals of this nature. The purpose of the ASC Elite Master’s programme is to make a decisive contribution towards the stated objective by providing individualized training to particularly outstanding students. Digital engineers in Germany will exert a decisive influence on the ongoing rapid digitalization of ever greater amounts of information. Channel encoding, a key aspect of communication technology and its applications, in particular with regard to the emerging fifth generation (5G) communications systems and the Internet of Things.

Intensive and personalized supervision is considered decisive to the success of highly talented students and is therefore an intrinsic part of the degree programme. Each ASC student is assigned an individual mentor from the ASC teaching body as personal contact partner for the entire duration of the degree programme to ensure the stated objectives by providing individualized training to particularly outstanding students.

Research and Teaching Environment

When the preparation of the profile of the ASC Elite Master’s programme was undertaken, excellence criteria for research and teaching were defined. ASC is driven by the Institute of Digital Communications, the Chair of Multimedia Communications and Signal Processing, the Chair of Electronics, the Pattern Recognition Lab, the Chair of Computer Networks and Communication Systems, the Chair of Hardware-Software-Co-Design, the Chair of Economic Theory and the Chair of Economics – Discrete Optimization – Mathematics. ASC is also tightly linked to the International Institute of Audiolabs Erlangen, a joint research institute of the university and the Fraunhofer IE.

Career Prospects

The aim is to ensure programme graduates have an advanced level of personal development, in-depth knowledge of communication and multimedia technology, are able to employ well-structured academic working methods and have the core skills that will ensure they can be considered as the ‘brightest minds’ and ‘high potentials’ who merit appointment to executive posts in business and science. Thus, they will drive technological progress forward as disseminators in leadership positions with managerial responsibility in business and science and contribute sustainable towards social prosperity.

Furthermore the qualification provided by the ASC Elite Master’s programme also represents an outstanding starting point for acquiring a doctorate in the shortest possible time.

International Students

• Scholarships: Student jobs for all ASC-students are guaranteed to cover their cost of living, the average income being around €730 monthly.
• Tuition Fees: There is no tuition fee at FAU but every student should pay €114 per semester for student services and a semester ticket. Using the semester ticket, students can use bus transportation in Nuremberg, Erlangen and Fürth on weekends and also during the weeks from 7pm to 6am. They can promote their tickets to full time coverage by paying an extra fee.
• Visas: Before coming to Germany you need to check the visa requirements for your case. For further information see the Visa Information provided by DAAD.
• Residence Permit: If you are interested in complementing your financial resources by working in Germany, a working permit for student jobs or internships is quite easy to obtain.
• Health Insurance: In Germany you will generally need to be covered by health insurance. Several major insurance companies have branch offices in Erlangen. Accommodation: Accommodation in Erlangen costs between €250 to €400 monthly per person, depending on the size and type of room or apartment. The FAU accommodation support helps students to find an appropriate accommodation.
• Costs of Living: The minimum monthly cost of living (including accommodation and health insurance costs) in Erlangen is about €950 to €900.