

## UNIVERSITY & LOCATION

### FAU's Faculty of Engineering



The Friedrich-Alexander-University Erlangen-Nürnberg ([www.fau.de](http://www.fau.de)) consists of five faculties with the Faculty of Engineering being the second largest. Within the 50 years of its existence, it has earned an excellent reputation for ground-breaking research and high-quality education. Currently, 21 study programmes are offered, with some of them taught in English. As part of a global network of leading universities, research institutions, and high-tech industry, the School of Engineering can offer its students many opportunities to become part of the international scientific community and to establish links to industry.

#### Facts on FAU

39,414 Students  
244 Study Programmes  
6 Elite Study Programmes  
500 international university partnerships in 70 countries

#### Facts on the Faculty of Engineering

10,983 Students  
21 Study Programmes  
3 Elite Study Programmes  
220 co-operations in 48 countries

#### Erlangen and the Local Area

Erlangen, a cosmopolitan, highly developed and lively student town belongs to the dynamic metropolitan area Nürnberg-Erlangen-Fürth. With its 100.000 inhabitants (1/3 of them being students) Erlangen provides the perfect ambience for living and studying. Erlangen's best known and most loved attractions is the "Bergkirchweih", a beer festival in spring, which attracts around 1 million visitors from near and far.

For more extracurricular activities in and around Erlangen and Nürnberg see: [www.erlangen.de](http://www.erlangen.de) und [www.nuernberg.de](http://www.nuernberg.de)

## INFORMATION

### Course Guidance

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|-----------------|--|--|
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[www.techfak.fau.de](http://www.techfak.fau.de)



[www.cme.studium.fau.de](http://www.cme.studium.fau.de)

#### Journey



For the journey by car, train or bus you will find a detailed description here:

[www.techfak.fau.de/infocenter/campussuche](http://www.techfak.fau.de/infocenter/campussuche)



International Master's Engineering Programme

## Communications and Multimedia Engineering



[www.cme.studium.fau.de](http://www.cme.studium.fau.de)

## AREA OF STUDIES

### What is "Communications and Multimedia Engineering"

Since autumn 2011, the Faculty of Engineering at the Friedrich-Alexander-University Erlangen-Nürnberg (FAU) offers the international Master's programme 'Communications and Multimedia Engineering' (CME). CME is a 4-semester M.Sc. engineering programme taught in English and designed for Bachelors from Electrical Engineering, Communication Engineering, Computer Science, Applied Mathematics, or Physics. The programme is emphasizing the fundamental concepts of advanced communications and multimedia as a preparation for cutting-edge research and development.

#### Fields of Research

- advanced audio and video technologies (multimedia, robotics)
- intelligent networks 'Smart Grids'
- energy-efficient IT systems 'Green IT'
- next-generation digital transmission systems (mobile and pervasive networks)
- future medical technologies (medical imaging, hearing aids, ...)

The CME Master's study programme focuses on information and communication technology, whilst introducing the students to cutting-edge research and facilitating their development in the core areas of communications and multimedia technology and related interdisciplinary topics. Thereby, it is paving the way to research and advanced development in world-class academic institutions and industry for communications, audio and multimedia.

#### CME and the Local Metropolitan Region

The CME programme is embedded into a stimulating engineering school at the University Erlangen-Nuremberg and is greatly enriched by the direct involvement of the International Audio Laboratories – a joint research unit of Fraunhofer IIS ('Home of mp3') and the university. With numerous high-profile and world-renowned R&D institutions for audio, multimedia, communications, and medical systems (Fraunhofer, Dolby, Nokia, INTEL, Qualcomm, Siemens, a.o.) nearby, theory meets practice on a daily basis, thereby offering many options for complementing studies by internships and for starting an engineering career.

## FACTS

### Application and Admission

1. Entry requirement: Bachelor Degree
2. Start of programme: winter term (starting September / October)
3. Selection process: CME screening process and admission by the CME admission board
4. Formal admission by the Master's Office of the University
5. First application deadline: for Non-EU students March 15<sup>th</sup>; for EU students May 15<sup>th</sup>

### General Programme Structure

- **Expected BACHELOR Programme:**
  - Electrical Engineering, Communication Engineering, Computer Science, Applied Mathematics or Physics
  - Degree of Graduation: **Bachelor of Science**
- **M.Sc. Communications and Multimedia Engineering:** 4 Semester
  - 1.-2. Semester: Deepening and widening of theoretical and practical background, German Language Courses, Technical Courses, Laboratories
  - 3. Semester: Profiling by Technical and Non-Technical Electives, German Language Courses, Laboratories
  - 4. Semester: Master's Thesis, Degree: **Master of Science**

### Prerequisites

- Engineering math: problem-solving skills in linear algebra, complex analysis, linear differential equations, Fourier transform, Laplace transform, z-transform
- Signals and Systems (textbook, e.g., Oppenheim / Willsky: Discrete-time Signals and Systems)
- Communications (textbook, e.g., Haykin: Communication Systems)
- Stochastic Signals (textbook, e.g., Pillai / Papoulis: Probability, Random Variables, and Stochastic Processes)
- Software: C/C++, Matlab

## INTERNATIONAL M.Sc. PROGRAMME “COMMUNICATIONS AND MULTIMEDIA ENGINEERING”

### Curriculum

| Semester 1                | Semester 2                         | Semester 3             | Semester 4    |
|---------------------------|------------------------------------|------------------------|---------------|
| Digital Communications    | Speech and Audio Signal Processing | Research Internship    | Master Thesis |
| Information Theory        | Statistical Signal Processing      | Seminar                |               |
| Digital Signal Processing | Image and Video Compression        | Technical Courses      |               |
| Mobile Communications     |                                    |                        |               |
| Lab Course                | Lab Course                         | Lab Course             |               |
| Technical Electives       | Technical Electives                | Technical Electives    |               |
| Soft Skills, Languages    | Soft Skills, Languages             | Soft Skills, Languages |               |

The study programme should be completed within four semesters. Its structure complies with internationally recognized master programmes and meets the requirements for subsequent doctoral studies.

Communications and multimedia technologies have experienced a rapid growth within the last few years and have attained a high economic importance worldwide. This progress is mainly driven by theoretical achievements based on mathematical concepts and algorithms and by the application of modern abstract methods. Examples are numerous in digital speech, audio and video coding and processing, digital transmission and communication networks. In many cases, a few very young scientists with outstanding intellectual and creative abilities join in their efforts and drive technical progress to market success. With this in mind, CME wants to provide you with a solid basis for reaching out for your individual ambitious goals.

The four-semester curriculum starts in winter and includes a six-months thesis project. During the first two semesters, broadening and deepening the theoretical basis and establishing firm links with its application in communication and multimedia assumes priority. The third semester offers ample opportunity for pursuing individual interests by choosing from a broad spectrum of elective courses and for hands-on experience in a research internship. Finally, the master thesis project allows the students to apply the gained knowledge to highly topical research and development challenges.

All courses are taught in English and do not require prior knowledge of the German language. Nevertheless, acquiring German language knowledge is fundamental to open the door to a local career, and therefore German language courses are an important component of the CME curriculum.

### Research and Teaching Environment

CME has its home base in the Institute for Digital Communications, consisting of the Institute for Digital Communications, the Chair of Multimedia Communications and Signal Processing, and the Institute for Information Transmission. The programme is also tightly linked to the International Audiolabs Erlangen, a joint research institute of the university and the Fraunhofer IIS ("Home of mp3"). All lectures are taught by internationally recognized tenured faculty, including four IEEE Fellows and recipients of numerous other national and international awards.

## FURTHER INFORMATION

### Career Prospects

With Germany being one of the most productive industrial economies, engineers are always in high demand. Demographic developments and the ever-growing demand for young graduates familiar with latest technologies in communications and multimedia lead to plenty of openings with attractive salaries for CME graduates. Aside from the traditional employers in the communication industry, CME students can expect to find numerous opportunities in those industries whose competitiveness greatly depends on embedded information technology, such as medical technology, energy systems ("smart grids"), or automotive industry – and the metropolitan area including Erlangen-Nürnberg has many big players in all these fields.

### International Students

- **Tuition Fees:** In Erlangen, the fee amounts to 107 Euros per semester to be paid at the beginning of the semester.
- **Visa:** Before coming to Germany you need to check the visa requirements for your case. For further information you can consult the visa information provided by DAAD.
- **Working Permit:** If you are interested in complementing your financial resources by working in Germany it is quite easy to obtain a working permit for student jobs or internships.
- **Health Insurance:** In Germany you will generally need to be covered by a health insurance. Several major insurance companies have branch offices in Erlangen. For more information on the types of insurances offered and your eligibility, you should consult TF international office or FAU international office of the University Erlangen-Nürnberg. The Studentenwerk Erlangen also offers helpful advice.
- **Scholarships:** It is planned that CME will offer scholarships to outstanding students. Besides, CME students can also be employed as research or teaching assistants at the university.
- **Student Dormitory Places:** The FAU accommodation support will help you finding an inexpensive student dormitory place.