Entry requirements

You are eligible for this degree programme if the following applies to you:

You have an undergraduate university degree in computer science or mathematics with a computer science/mathematics component of at least 120 ECTS credits.

Out of these 120 ECTS credits:

- at least 35 ECTS credits must have been earned in mathematics modules/courses, including theoretical computer science
- at least 40 ECTS credits must have been earned in computer science modules/courses

Your degree must have been earned over a course of study of a standard length of three years or more. The final grade for your first degree must be 2.7 or better under the German marking system, or the relevant equivalent final grade in a foreign marking system.

Unless English is the language of instruction for your prior university or secondary education, you should provide a language certificate at level B2 of the Common European Framework of Reference for Languages (CEFR).

Similarly, unless German is the language of instruction for your prior university or secondary education, you should provide proof of German language skills at level A1 CEFR (i.e. beginner's level). If you do not have German language skills at the time of application or enrolment, you will complete a compulsory, free German language course during the first two semesters of the programme.

Please visit **www.uni-passau.de/en/apply** for further information on the application process, including deadlines and required documents.

Degree awarded	Master of Science (M.Sc.)
Duration and ECTS	4 semesters; 120 ECTS credits
Starts in	April and October each year
Language of instruction	English

Further information and contact details

Programme profile on the web
www.uni-passau.de/en/msc-ai-eng

Faculty of Computer Science and Mathematics International Coordinator
Primary contact for prospective international students seeking advice on study options, entry requirements and admissions-related matters
E-mail: masters@fim.uni-passau.de

Academic Advice Service
Contact and advice for prospective students of all degree programmes
E-mail: advice@uni-passau.de
www.uni-passau.de/en/academic-advice

Student Registration Office
Contact for enquiries related to your application
www.uni-passau.de/en/student-registration-office

International Office
Assists international students with the immigration formalities and with getting settled in Passau
www.uni-passau.de/en/international

Language Centre
Offers a wide range of language courses
www.sprachenzentrum.uni-passau.de/en

Future: Careers and Competencies Section
Helps students seeking internships or career entry positions and offers transferable skills courses
www.uni-passau.de/en/zkk

iStudi Coach for job market induction
Provides job market orientation and advice on internship and job search to international students
www.uni-passau.de/en/iStudi

German Courses Passau
German language courses for international students
www.uni-passau.de/en/learn-german

Information about the University for int'l students
www.uni-passau.de/en/international

Costs and funding
www.uni-passau.de/en/costs-funding

UNIVERSITY OF PASSAU

Master of Science in
Artificial Intelligence Engineering

English-taught degree programme

Why study Artificial Intelligence Engineering at the University of Passau?

Artificial intelligence (AI) now permeates all areas of our lives and holds enormous potential for the future. Mathematics and computer science provide the foundations for understanding and developing core AI technologies.

In the Master of Science programme in Artificial Intelligence Engineering (AI Engineering) you will deal with scientific theories, algorithms and methods for designing and developing AI-based systems. You will also acquire the ability to integrate artificial intelligence into existing real-world systems (e.g. media systems, information systems, industrial processes) or to develop these yourself.

In addition, you will study artificial intelligence from the perspective of other academic disciplines, as the widespread use of AI-based systems raises not only technical but also legal, ethical, social and economic questions.

Features

- Research-oriented master's degree leading to excellent career opportunities in a multitude of industries
- Study a subject at the interface between computer science and mathematics and gain insights into a wide range of cross-disciplinary areas of application (e.g. media, Industry 4.0, mobility)
- Broad selection of state-of-the-art subjects with an international outlook
- Superb staff-student ratio: study in small learning groups
- The chairs and institutes maintain excellent relations with industrial and business partners
- The whole programme is taught in English

Career prospects

The demand for AI competencies in the labour market is increasing significantly. With a master's degree in Artificial Intelligence Engineering, you are able to work independently or take on executive positions and challenging jobs in the private and public sectors or academia. This degree opens up outstanding career opportunities in a wide range of industries, such as:

- systems development and data analysis in the area of digital media
- software engineering and IT systems development
- data analysis in the financial and service sectors
- development of AI-based solutions in the transport and mobility sector
- control of industrial plants; Industry 4.0
- the medical and pharmaceutical industries as well as life sciences
- insurance companies and banks

Finally, the degree opens up an academic career path if you continue studying for a doctorate in artificial intelligence development.

Programme syllabus

The M.Sc. AI Engineering programme is divided into compulsory and compulsory elective module areas.

In the compulsory area you will attend the Introduction to AI Engineering lecture (with accompanying exercise course) as well as an AI Engineering seminar. You will also write your **master's thesis** in this area.

Compulsory elective modules

The compulsory elective area is divided into the following six module groups:

1. **Algorithm Engineering and Mathematical Modelling**
   You will study the construction of deterministic and stochastic algorithms, their implementation, evaluation and optimisation as well as the modelling and complexity analysis of discrete and continuous problems using mathematical methods. In addition, you will acquire fundamental knowledge of mathematical logic, stochastics, functional analysis and discrete mathematics to enable a deeper algorithmic mathematical understanding of AI-based systems.

2. **Artificial Intelligence Methods**
   You will examine methods and algorithms of symbolic and sub-symbolic artificial intelligence and machine learning (e.g. reinforcement learning, knowledge representation and deduction systems). Furthermore, you will study underlying theories of learning systems and the application of algorithmic and mathematical principles for the realisation of artificial intelligence.

3. **Artificial Intelligence Systems Engineering**
   You will learn methods and structured process models for the development of AI-based systems. In particular, these include testing and evaluation strategies (e.g. generative adversarial testing or simulation), data and knowledge modelling methods, methods and systems for operationalising AI-based systems and the evaluation of properties such as security, traceability, reliability, explicability and transparency.

4. **Artificial Intelligence Applications**
   You will gain insight into different application areas and possibilities of artificial intelligence, such as speech, text and media analysis, business information systems or energy informatics. Also covered are the specific characteristics of the application domains and their influence on the selection of AI methods and the development of AI-based systems.

5. **Cross-Cutting Concerns**
   You will learn about the legal, ethical, social and economic considerations involved in using AI-based systems and reflect on the societal impact of AI. Language courses and writing workshops, soft-skills seminars and practical courses will complement your academic studies and prepare you for your professional life.

6. **Research Seminars**
   You will learn to familiarise yourself independently with the current state of research in the AI Engineering field, collate this information and deliver oral presentations. You will acquire in-depth knowledge of research work in the field of artificial intelligence and get the preparation for a future research role.