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MASTER (M.SC.) COMPUTER SCIENCE

Computer Science is at the centre of our daily lives, transforming the way we live, work, travel, and much more. Developments in this area are rapidly changing many industries and if you become an expert in computer science, you could start an exciting career in a field of your choosing. Many people enjoy the interaction between computer science and the human experience, so use their degree to gain great positions in companies at the forefront of technological advancements. Whether mobility, medicine, design, or communications, with this degree, you can become a central key in creating and developing new systems and tech for a better, faster, more efficient world. In IU's Master in Computer Science, you continue your journey with a focus on data science, cyber security, and artificial intelligence and elective modules of your choosing. This will give you all the skills you need to get started in the international job market and in a career that speaks to your interests.

Degree
Master of Science (M.Sc.)

Study start
Start (online studies): Anytime
Start (on campus): each October or April

Study model and accreditation
- Online Studies or on Campus
- German accredited institution, recognised by ZFU (German Central Office for Distance Learning)

Duration
Online: 24, 36, 48 months
On Campus: 24 months

Credits
120 ECTS

iu INTERNATIONAL UNIVERSITY OF APPLIED SCIENCES

Study Content (120 ECTS)

1. PRESENCE TIMEFRAME	2. PRESENCE TIMEFRAME	MODULE TITLE	SEMESTER	CREDITS (ECTS)	TEST TYPE
Oct/Nov/Dec		Advanced Mathematics	1	5 ECTS	E
Oct/Nov/Dec		Algorithmics		5 ECTS	E
Oct/Nov/Dec		Cyber Security and Data Protection		5 ECTS	OA
Jan/Feb/Mar		Seminar: Computer Science and Society		5 ECTS	WARE
Jan/Feb/Mar		Artificial Intelligence		5 ECTS	E
Jan/Feb/Mar		Advanced Statistics		5 ECTS	AWB
Apr/May		Data Science	2	5 ECTS	E
Apr/May		Big Data Technologies		5 ECTS	OA
Apr/May		Programming with Python		5 ECTS	WAWA
Jul/Aug		Software Engineering: Software Processes		5 ECTS	OA
Jul/Aug		Project: Software Engineering		5 ECTS	PO
Jul/Aug		Networks and Distributed Systems		5 ECTS	E
Oct/Nov/Dec	Apr/May	Seminar: Current Topics in Computer Science	3	5 ECTS	WARE
Oct/Nov/Dec	Apr/May	Project: Computer Science Project		5 ECTS	P
Jan/Feb/Mar	Jul/Aug	Electives A		10 ECTS	
Apr/May	Oct/Nov/Dec	Electives B		10 ECTS	
Online		Master Thesis	4	30 ECTS	WAMT & PC

E = Exam, OA = Oral assignment, PC = Presentation: Colloquium, WB = Workbook, BWB = Basic Workbook, AWB = Advanced Workbook, WABT = Written assessment: Bachelor thesis, WACS = Written assessment: Case study, WAMT = Written assessment: Master thesis, WAPR = Written assessment: Project report, WARE = Written assessment: Research essay, WAWA = Written assessment: Written assignment, OPR = Oral project report, P = Portfolio, POP = Proof of Participation

CHOOSE YOUR ELECTIVES

Electives on Campus: Those elective modules where the minimum number of participants is not reached will not be offered on campus but only online (distance learning). However, IU ensures that there are always electives on campus.

You'll have the chance to choose electives in subjects you're interested in. These will amount to 20 ECTS of your overall degree.

Choose one elective from "Electives A" list:

- Advanced Cyber Security and Cryptology
- Blockchain and Quantum Computing
- IT Governance and Service Management
- UI/UX Expert

Choose one elective from "Electives B" list:

- Business Analyst
- Data Engineer
- Internship*
- Machine Learning and Deep Learning
- Technical Project Lead
- Use Case Identification and Evaluation for Analytical Applications

*Only available for on campus study programmes.

ELECTIVES

All of our study programmes offer a wide selection of industry-focused elective courses for you to choose from. Below you'll find more details on a select number of these courses—for the full list of electives available in this programme, please check the Course Schedule.

The elective courses that are a part of this study programme, are a cluster of courses dedicated to diving deep into a specific topic related to the programme. When choosing an elective, you get to explore a potential future career path, or just develop a strong knowledge base about a topic that particularly interests you.

In semester 3 of this programme, you'll choose two electives, amounting to 20 ECTS.

You have a wide range of options to choose from, according to your interests and ambitions. Some of the electives offered are:

BUSINESS ANALYST

Master the basics of business analysis, acquaint yourself with various use cases, and understand the characteristics of relevant types of data. Become accustomed to different techniques for modelling and circulating data. You will work on current topics debated in the business analysis field, and develop real-world solutions based on relevant academic literature. The business analyst specialisation is designed to prepare you for writing your Master's thesis

DATA ENGINEER

Explore the infrastructure of data science: from data storage to provision. Start out by covering the basics of data engineering, and advance to modern architectures such as microservices, along with a variety of other relevant topics. Take your first steps into the ever-important world of cloud computing, data protection and management, and DataOps.

TECHNICAL PROJECT LEAD

If you're considering a career that combines technical knowledge with managerial skills, then this specialisation is the right choice for you. Here, you'll develop the skill set required for owning and managing IT projects across different industries.

You'll start by learning the basic principles of project management, and how they apply to IT projects. You'll then be acquainted with common challenges faced by IT managers, how to identify them and what solutions to offer. You'll round out your expertise by exploring IT project organisation and planning, cost management and staffing and team leadership topics.

BLOCKCHAIN AND QUANTUM COMPUTING

Blockchain technology is becoming increasingly popular in many different fields, and technology professionals who understand how to work with it are now in high demand. In this module, you'll cover the foundations of this technology and its potential uses, such as BitCoin. You'll gain real world familiarity with important professional aspects, advantages and difficulties that relate to working with Blockchain.

In addition, you'll learn the basic principles behind quantum mechanics, and how they relate to quantum computer technology. Discover the common calculation models and mathematical concepts behind quantum computing, and test your skills by developing programmes in the Qiskit system framework.

ADVANCED CYBER SECURITY AND CRYPTOLOGY

This specialisation offers an advanced analysis of current cyber security topics. You'll gain the skills necessary for successfully developing a career in data protection in cyber security, as well as different cryptography and IT related roles.

Explore different internet-based applications from a security approach, the use of algorithms in cyber defence planning, how to expose weaknesses in cryptographic systems and how to build solutions for common IT security issues.

CAREER OUTLOOK

Private sector, public service or freelance: Computer scientists are in a very high demand in all branches of industry, including finance, automotive, commerce and many more. Our Master of Computer Science is a clear boost for your career and will pave many ways to a successful entry into the job market.

DATA ENGINEER

As a data engineer, you take care of all processes to do with the generation, filing, processing, maintenance, and transferring of data. For this, the structure and surveillance of hardware and software infrastructure is crucial. The approach, purchase, as well as the installation of all necessary components is a key part of this. Above all, you, as a data expert, are responsible for the stability of the entire system, as well as the adherence to data protection and security protocols.

SOFTWARE DEVELOPER IN DATA SCIENCE & AI

As a software developer, you develop and implement software – from individual building blocks all the way to complete applications. With your specialisation in Data Science and Artificial Intelligence, you can turn complex algorithms from the field into efficient software. In coordination with users from different specialised departments, you develop solutions for filing and evaluating large amounts of data and using this data to answer your users' questions.

DATA SECURITY SPECIALIST

As a security specialist in Data Science and AI, you are responsible for the security of available data, as well as securing the corresponding infrastructure and protecting it from both attacks and accidental damages. You, your colleagues from software development and IT, and users from the specialist department cooperate to eliminate risks and make corresponding preventative measures.

ADMISSION

ADMISSION REQUIREMENTS FOR 120-ECTS

- Completed, undergraduate degree with 180 ECTS with a focus on **Computer Science or computer-related subjects**
- Your degree must be from a state or state-recognised higher education institution/university
- You must have achieved a final grade of at least "satisfactory" or Grade C equivalent in your previous undergraduate degree

FURTHER ADMISSION OPPORTUNITIES

Is your undergraduate degree not in the required subject field for this programme's **120 ECTS points variation admission** requirements? You can still apply! You'll have to take 2 specific courses at the start of your studies, and pass them successfully in order to continue with your studies. That way, you don't have to take an entrance examination, and can prove your skills while earning ECTS points as part of your studies.

SCHOLARSHIP PROGRAMME: HELP GETTING STARTED

Start your online degree with our Scholarship Programme and receive a scholarship up to 67%! Start in our Scholarship Programme as a participant with immediate access to 50% of your courses. You can do this by taking our Entrance Examination which will be included in your course as part of the Scholarship Programme. Once you have handed in all admission documents and the courses are completed, you can go on to finish your degree.

Questions? Speak to your study advisor, they will guide you through every step of the process.

ENGLISH SKILLS

At IU, we teach in English to prepare you for the international market. We therefore ask for proof of your English language skills*. If English is your native language or you graduated from an English-speaking school/university, you don't need to prove your English skills.

Accepted certifications:

- English Courses (complimentary when signing up with IU)**
- TOEFL (min. 80 points) or
- IELTS (min. Level 6.0 out of 9 points) or
- Duolingo English test (min. 95 points) or
- Cambridge Certificate (min. B grade overall) or
- Equivalent proof

*Proof must be provided before the start of the study and must not be older than five years.
**Please note that English Courses aren't accepted as a language certificate for on campus study programmes.

8 STEPS TO COMPLETE YOUR STUDIES

1. **Register and apply online**
2. **Choose your course**
3. **Download your study scripts**
4. **Work independently with study scripts**
5. **Take part in Q&A sessions**
6. **Prepare for exams and take them either:**
   - directly online, or
   - at an IU examination centre (remember to register in time).
7. **Master thesis and colloquium**
8. **Complete your studies with certificate**