![German University of Digital Science logo]

Micro-Degree Programs
Offered in the Study Quarter 1/04/25 - 30/06/25

What are Micro-Degree programs?

In addition to the full degree programs offered by the German University of Digital Science, the individual teaching modules of the various study programs are also offered separately or in thematically bundled blocks as interactive online Micro Degree Programs.

These 3-month programs are designed for lifelong learning and professional development, providing learners with valuable knowledge and skills. Learners who wish to up-skill, re-skill, or further their education on a specific digitization topic can enroll in Micro Degree Programs and earn a Micro Degree worth 5 credits (ECTS). One of the main advantages of a Micro Degree is that it can be recognized by any university for a full degree program.

Registration Link: https://campus.german-uds.de/micro-degree-programs

Immersive Technologies

This module aims to provide a comprehensive understanding of how immersive technologies create engaging and interactive experiences by blending the digital and physical worlds. Students will explore the technical aspects of developing immersive content including 3D modelling, real-time rendering, and user interaction.

Learning Objectives

- Grasp the core principles and ecosystems of immersive technologies, including their hardware and software.
- Acquire technical skills for designing user-centered immersive experiences, encompassing 3D modeling, animation, real-time rendering, and interface design.
- Evaluate the use of immersive technologies across industries to understand their impact, benefits, and challenges.

Module Instructor: Prof. Dr. Daniele Di Mitri

Big Data, Software Systems, Cloud Computing

Big data and cloud computing are leading edge IT technologies that team together as key enablers for today's IT industry with its emerging AI-based solutions. Students learn about the basics and advanced topics of big data, complex software systems, platforms, and cloud computing, their design and implementation, and their utilization in commercial applications.

Learning Objectives

- Understand the fundamentals, principles, and tools of big data and cloud computing, including distributed data processing and relevant APIs.
- Analyze the role of cloud providers, evaluate cloud-based architectures, and assess their business impact.
- Develop innovative AI and data processing solutions for the next generation.

**Module Instructor:** Prof. Dr. Raad Bin Tareaf

Complex Problem Solving

Irrespective of the area of implementation, digitalization and digital transformation pose complex challenges. Often, problems are not well-defined and need to be tackled in diverse areas being aware of many interrelated elements. The skill to solve complex problems belongs to a set of so-called "future skills", which are needed to thrive in and design the digital age.

Learning Objectives

- Develop theoretical, methodological, and problem-solving skills to address complex issues.
- Practice teamwork, including conflict management, while enhancing cognitive, emotional, and social abilities.
- Present complex problems and solutions effectively to an audience, incorporating feedback and critique.

Module Instructor: Dr. Maurice Steinhoff

Cybersecurity Fundamentals
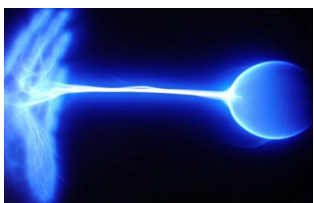
This course equips participants with essential knowledge and skills to navigate the rapidly evolving field of cybersecurity. It provides a foundational understanding of key concepts such as the CIA (Confidentiality, Integrity, Availability) triad, common threats, and attack vectors, helping students understand and address today's cyber threat landscape.

Learning Objectives

- Gain theoretical and methodological knowledge in cybersecurity while reinforcing IT fundamentals, including networking, operating systems, and software with a cybersecurity focus.
- Understand key security issues, attack categories, the cyber kill chain, and principles and technologies of modern cybersecurity.
- Explore current practices, emerging challenges, and research trends in the field of cybersecurity.

Module Instructor: Dr. Pejman Najafi

Logic and Symbolic AI
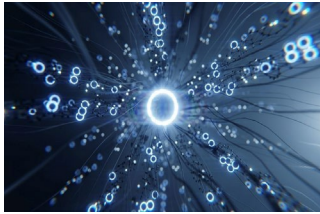
This Course is an introduction to symbolic AI. First the basics of logic systems are discussed, followed by the presentation of combinatorial algorithms for the solution of AI problems. Prolog is used as the implementation language. Students learn to prove assertions of predicate logic and implement simple proof systems in Prolog.

Learning Objectives

- Learn logic, proof systems, and combinatorial algorithms, and apply them to solve symbolic problems.
- Develop programming skills for symbolic AI systems and practice teamwork on benchmark problems.
- Master various proof methods for tackling symbolic challenges effectively.

Module Instructor: Dr. Felix Weitkämper

# Understanding and Designing the Digital World

Applying digital capabilities to processes, products, and assets improves efficiency, enhances customer value, and creates new revenue opportunities. This course provides an advanced understanding of digital technologies and focuses on digital media, and the fundamentals of the Internet, the WWW, and emerging digital technologies.

Learning Objectives

- Provide students with advanced understanding and design capabilities of digital technologies.
- Be prepared to assess the potentials of and be able to apply digital technologies in companies as well as in public institutions.

Module Instructor: Profs. Drs. Christoph Meinel and Mike Friedrichsen

Coding Camp I: Python
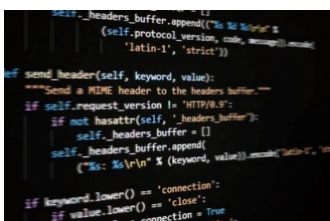
The course provides a deep dive into software development. Software is a crucial component of every modern device and plays an essential role. To better understand the process behind software development, the coding camp places students into a team software development project in which they get to understand and experience it.

Learning Objectives
- Students are aware of and can explain different models of software development, such as agile as well as traditional development principles.
- Students experience working and developing code for a project in a (small) team.
- Students have developed and experienced the lifecycle of a software development project.

Module Instructor: Dr. Thomas Staubitz

Design Thinking

The Design Thinking process combines methods and tools from the fields of design, engineering, the social sciences, and business administration. IT is a team-based approach and uses these tools to determine the latent desires and needs of future customers. This user-orientation is combined with the perspective of technological feasibility and economic viability.

Learning Objectives
- Acquire subject-specific theoretical and methodological knowledge
- Explore, understand and apply the methods and mindsets of Design Thinking
- Practice techniques using concrete project challenges and learn how to effectively and productively contribute to a collaborative team.

Module Instructor: Dr, Steven Ney

General Information

- Course start date: 1st Jan 2025, 1st April 2025
- Course end date: 31st Mar 2025, 31st Jul 2025
- Course fee: ∈900
- Teaching Format: Mastery: Coding
- Total Workload Master: 125h (40h/85h) / 5 ECTS
- Total Workload MBA: 100h (30h/70h) / 4 ECTS
- Total Workload Micro Degree: 125h (40h/85h) / Equivalent to 5 ECTS
- Examinations: Quizzes, presentation(s), essay(s)/paper(s), project report(s), written exam.
- Offered: Odd quarters