

# Engineering and Information Technology Courses (EIT)

## EIT Courses

This is a list of courses with the subject code EIT. For more information, see College of Engineering in the catalog.

### **EIT:5120 Modern Automation and Control 3 s.h.**

Study of sensor, motors, control, process automation, and internet of things (IoT).

### **EIT:5135 Modern Information Systems 3 s.h.**

Introduction to enterprise information systems; RESTful service model, cloud service models, data storage models, big data considerations, network basics, security and privacy considerations; blockchain technology and its applications.

### **EIT:5150 Applied Artificial Intelligence 3 s.h.**

Artificial Intelligence (AI), search and logic, data science and analysis, advanced machine learning and deep learning, digital manufacturing and design, signal processing and fault diagnosis, AI robotics and computer vision, and applications in engineering.

### **EIT:5155 Cyber-Physical Systems 3 s.h.**

Introduction to modern "smart" systems providing intelligent monitoring, control, and coordination of societal, environmental, and business infrastructure; layered architecture for, relevant applications of, and projects involving conceptual design of cyber-physical systems.

### **EIT:5211 Machine Learning and Scientific Computing in Engineering 3 s.h.**

Numerical methods in scientific computing; root problems and optimization; linear algebraic equations; eigenvalue problems; numerical differentiation and integration; interpolation and curve fitting; initial value and boundary value problems; machine learning in regression, classification, and clustering problems; Python programming and scikit-learn packages.

### **EIT:5216 Manufacturing Process and Modeling 3 s.h.**

Fundamental science, modeling, and simulation technologies in materials processing; essential knowledge in automation and control of manufacturing systems; material removal processes, forming, microfabrication, and nontraditional material processes; finite element modeling/simulation of material processes; automation and control of manufacturing systems and processes.

### **EIT:5220 Advanced Control Engineering 3 s.h.**

State-space representation of linear systems, equilibrium points, linearization, controllability, observability, stability, state feedback control, linear observer design, and separation principle.

### **EIT:5224 Mechanical Design and Realization 3 s.h.**

Solid modeling, assemblies, drawings, geometric dimensioning and tolerancing, and basic engineering design process; use of analysis tools (e.g., Finite Element Analysis), fatigue and durability, optimization software.

### **EIT:5240 Kinematics of Modern Robotics 3 s.h.**

Robotics motion, configuration space, and path planning.

### **EIT:5298 Mechanical Component Durability and Integrity Analysis 3 s.h.**

System and component design, stress analysis, static failure, fatigue, fracture mechanics, vibration, materials science, and product life cycle.

### **EIT:5351 Cybersecurity 3 s.h.**

Taxonomy of security threats and attacks; chain-of-trust principle; authentication, access control, and security domains; perimeter security and defense in depth; cryptographic protocols; key management and distribution; security assessment, internet of things (IoT) security and privacy issues.

### **EIT:5352 Modern Database Systems 3 s.h.**

Introduction to contemporary database architectures: relational, key-value, document store, and graph-based; relative strengths and weaknesses of database architectures; enterprise scalability issues; data aggregation and visualization; project work involving use of modern database systems (e.g., MySQL, Redis, MongoDB, Neo4j).

### **EIT:5353 Big Data and Machine Learning 3 s.h.**

Storage, management, and analysis of very large data sets; distributed file systems and object stores; MapReduce framework for processing large data sets; machine learning techniques; classification and clustering; pattern recognition; projects involving big data and machine learning frameworks (e.g., Apache Hadoop).

### **EIT:5380 Software Engineering Methods, Tools, and Frameworks 3 s.h.**

Modern agile software development practices for cloud and web-based applications using state-of-the-art software engineering languages, tools, and technologies; software as a service (SaaS) architecture; software testing; introduction to enterprise application development frameworks; team-based project.

### **EIT:5381 Enterprise Software Engineering 3 s.h.**

Modern DevOps practices and toolchains for enterprise information systems; scalable architecture; cloud services (e.g., SaaS, PaaS, IaaS); load balancing/autoscaling; identity management and security; performance monitoring and tuning; continuous integration and hot deployment.

### **EIT:5382 Human-Computer Interaction Design and User Experience 3 s.h.**

Principles and guidelines for design and evaluation of human-computer interactions (HCI); design methodologies (e.g., participatory design, low- and high-fidelity prototyping); user interface technologies (e.g., input and output devices, interaction styles); quantitative and qualitative evaluation of user interfaces (e.g., expert reviews, usability testing).