

Faculty	Architecture, Civil and Environmental Engineering
Course Title	Electrical Engineering, Measurement and Control Technology
Number of ECTS credits	6
Hours per week (SWS)	3 + 1 +1
Semester	Autumn Term (Winter Semester)
Course objective	<p>By passing this module, students can:</p> <ul style="list-style-type: none"> • Understand and apply the basic parameters of electrical engineering • Describe the concept of the electromagnetic field, whose different manifestations are recognized and translated into practical applications • Understand and apply the structure and operation of various measurement techniques • Carry out a targeted selection of measurement technologies for a given environmental or process measurement task • Understand and apply key analytical techniques in environmental engineering • Describe uncertainties of measurements and measuring instruments • Understand and apply foundations of control technology • Describe and analyze single-loop control loops
Prerequisites	None; however, modules of the 1st and 2 nd year of study in ISU (Bachelor) or equivalent knowledge and skills are recommended
Recommended reading	Students will receive a current literature list at the beginning of the course.

Teaching methods	Seminars, lab practical, module-related tutorial
Assessment methods	Written assignment (PL) and oral exam (PL) Experimental work (SL)
Language of instruction	English
Name of lecturer	Dr. Florian Kuhnen
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Link	https://www.hs-bremen.de/mam/hsb/fakultaeten/F2/U/u5.5_emrt_electrical_engineering_measurement_and_control_technology.pdf
Course content	<p>The module teaches advanced knowledge of electrical engineering and measurement technology The following aspects are dealt with:</p> <ul style="list-style-type: none"> • Electrostatic field: charge, field, potential, voltage, capacitance • Stationary electric flow field: current, Ohm's law, resistance, power, Kirchhoff's sentences • Stationary magnetic field: inductance, magnetic circuits • Capacity induction: inductance, energy, motion induction, quiescent induction • Systematic and random measurement errors, statistics, presentation of measurement results • Meaning and definition of SI base units • Measurement of physical quantities (e.g. force, length, speed, torque, moment of inertia) • Measurement methods for process state variables (for example pressure, temperature, flow, level) • Measuring method for pH value, conductivity, O₂ or CO₂ concentration, redox potential • Analysis methods for BOD, COD, TOC, TS, oTS, NH₄, NO₃ • Strain gauges and Wheatstone bridge • Introduction to control engineering, rules and steering • Static and dynamic behaviour of control circuits and control processes • Mathematical description of simple control loops