Syllabus

Kursbeschreibung

Titel der Lehrveranstaltung	Grundlagen der Elektronik
Code der Lehrveranstaltung	42438
Zusätzlicher Titel der Lehrveranstaltung	
Wissenschaftlich-disziplinärer Bereich	IINF-01/A
Sprache	Italienisch
Studiengang	Bachelor in Elektro- und Informationstechnik
Andere Studiengänge (gem. Lehrveranstaltung)	
Dozenten/Dozentinnen	Prof. Luisa Petti, Luisa.Petti@unibz.it https://www.unibz.it/en/faculties/engineering/academic-staff/person/39580 dr. Giuseppe Ciccone, Giuseppe.Ciccone@unibz.it https://www.unibz.it/en/faculties/engineering/academic-staff/person/49145
Wissensch. Mitarbeiter/Mitarbeiterin	
Semester	Erstes Semester
Studienjahr/e	2
KP	9
Vorlesungsstunden	54
Laboratoriumsstunden	36
Stunden für individuelles Studium	135
Vorgesehene Sprechzeiten	27
Inhaltsangabe	· Fundamentals of electrical engineering: electrical quantities, concept of bipoles and quadripoles; ideal and real generators; Kirchhoff's laws.

	· Resistive circuits and adynamic bipoles: resistive bipoles and Ohm's law; Thevenin's and Norton's equivalent circuits; nodal analysis and circuit simplification; superposition principle. · Dynamic circuits and transient response: introduction to dynamic bipoles; first and second order circuits; transient response and time-domain analysis. · Sinusoidal circuit analysis: superposition in AC circuits; multi-frequency circuits and signal decomposition; Thevenin's and Norton's models in AC; nodal analysis in sinusoidal regimes. · Power in sinusoidal mode: instantaneous and average power calculations; root mean square (RMS) values, complex power and power factor considerations. · Biports and circuit interconnections: biports and their characteristics; connection methods and practical applications; analysis of biport circuits in both dynamic and sinusoidal regimes. · Operational amplifiers: principles and working of op-amps; circuit configurations and feedback mechanism; analysis of op-amp circuits in dynamic and sinusoidal conditions. · Frequency response and filters: transfer function and system behaviour; Decibel scale and Bode diagrams; design and analysis of filters. · Circuit simulation with SPICE: introduction to SPICE as a simulation tool; modelling and analysis of electrical components; practical applications in circuit design.
Themen der Lehrveranstaltung	· Fundamentals of electrical engineering: electrical quantities, concept of bipoles and quadripoles; ideal and real generators; Kirchhoff's laws. · Resistive circuits and adynamic bipoles: resistive bipoles and Ohm's law; Thevenin's and Norton's equivalent circuits; nodal analysis and circuit simplification; superposition principle. · Dynamic circuits and transient response: introduction to dynamic bipoles; first and second order circuits; transient response and time-domain analysis. · Sinusoidal circuit analysis: superposition in AC circuits; multi-frequency circuits and signal decomposition; Thevenin's and Norton's models in AC; nodal analysis in sinusoidal regimes. · Power in sinusoidal mode: instantaneous and average power calculations; root mean square (RMS) values, complex power and power factor considerations. · Biports and circuit interconnections: biports and their

	characteristics; connection methods and practical applications; analysis of biport circuits in both dynamic and sinusoidal regimes. · Operational amplifiers: principles and working of op-amps; circuit configurations and feedback mechanism; analysis of op-amp circuits in dynamic and sinusoidal conditions. · Frequency response and filters: transfer function and system behaviour; Decibel scale and Bode diagrams; design and analysis of filters. · Circuit simulation with SPICE: introduction to SPICE as a simulation tool; modelling and analysis of electrical components; practical applications in circuit design.
Stichwörter	Electrotechnics, Electrical Circuits, Dynamic Circuits, Operational Amplifier, SPICE
Empfohlene Voraussetzungen	Mathematical Analysis I + II, Linear Algebra, Physics I
Propädeutische Lehrveranstaltungen	
Unterrichtsform	Frontal lectures at the blackboard + Exercises at the blackboard + Practical Laboratories
Anwesenheitspflicht	suggested
Spezifische Bildungsziele und erwartete Lernergebnisse	to be filled in by the lecturer
Spezifisches Bildungsziel und erwartete Lernergebnisse (zusätzliche Informationen)	
Art der Prüfung	Written + oral exam, in addition to further points for practical labs
Bewertungskriterien	Knowledge and understanding The student understands the concept of a circuit model and its fundamental components; the fundamental laws and theorems (including their limits of validity) required for circuit analysis; and the operating principles of the main electronic devices. Applying knowledge and understanding The student is able to apply the acquired knowledge to develop circuit models and analyze electrical and electronic circuits.

	Making judgements The student is able to select the most appropriate methods and tools introduced in the course to achieve the objectives of modeling and analyzing analog and digital electrical and electronic circuits. Communication skills The student is able to present the acquired knowledge and competencies using terminology appropriate to the subject. Learning skills The student is able to use the tools and reasoning techniques acquired during the course to further develop their knowledge independently.
Pflichtliteratur	"Circuiti elettrici", Charles K. Alexander, Matthew Sadiku, Giambattista Gruosso, Giancarlo Storti Gajani.
Weiterführende Literatur	"Elettronica di Millman", Jacob Millman, Arvin Grabel, Pierangelo Terreni.
Weitere Informationen	
Ziele für nachhaltige Entwicklung (SDGs)	Hochwertige Bildung