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Module Guide

Certificate programs in English Language

Summer Term 2020

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Contents

1 Introduction to RF Engineering

Token / Number:	RFE
German title:	Einführung in die Hochfrequenztechnik
Credits:	3 ECTS
Language:	English
Turn / Duration:	every Summer Term / 1 Semester
Module authority:	Prof. Dr. Wolfgang Menzel
Training staff:	Prof. Dr. Wolfgang Menzel Dr.-Ing. Tobias Chaloun
Integration of module into courses of studies:	Suitable as introductional course for the MSc course Sensor Systems
Requirements (contentual):	- Basics of electrical engineering - Advanced mathematics (complex calculation, basics of vector analysis) - Analogue circuits - Signals and systems
Learning objectives:	With the successful completion of this module, the participants shall be able to describe basic properties of important radio frequency components and to use their performance to design respective circuits. They will be capable to apply basic methods for the analysis and the design of state-of-the-art RF circuits and systems.
Content:	- Short summary of mathematical basics - Real circuit devices - Short overview on Maxwell's equations, boundary conditions, wave equation, vector potential, Pointing vector, skin effect, plane waves - Waves on transmission lines - Smith chart, reflection of waves at load impedances, impedance transformation by transmission lines and other circuit elements - Wave amplitudes, description of linear, time-invariant wave-based N-ports by scattering parameters, signal flow diagrams - Electronic noise - Components like filters, couplers, amplifiers, mixers - Basic terms of antenna technology - Introduction into wave propagation
Literature:	- Online course material - Text books: see online list
Modes of learning and teaching:	Online course with lecture videos, lecture viewgraphs, exercises, online consultation
Estimation of effort:	Self-Study: 50 h Preparation, Follow-up, Exercises, Practice: 20 h Exam preparation: 20 h Sum: 90 h
Course assessment and exams:	Oral exam

Requirements (formal):	None
Grading:	The course score is that of the oral exam

2 Communication Skills for Scientists and Engineers

Token / Number:	CSSE
German title:	Kommunikationskompetenz für Wissenschaftler und Ingenieure
Credits:	3 ECTS
Language:	English
Turn / Duration:	every Summer Term / 1 Semester
Module authority:	Prof. Dr.-Ing. Hermann Schumacher
Training staff:	Prof. Dr.-Ing. Hermann Schumacher
Integration of module into courses of studies:	Optional Non-Technical Module
Requirements (contentual):	Basic knowledge of presentation software (e.g. PowerPoint, LibreOffice Impress)
Learning objectives:	Students recognize proven techniques for technical oral presentations supported by visual aids. In the preparation of their presentation, they distinguish different target audiences and devise their presentation strategy accordingly. They differentiate between different forms of presentation and develop suitable communication strategies. They are familiar with ethical standards, including forms of plagiarism, and are conformant with these standards. Students create an oral presentation on a topic of their choice within an annually changing topical framework, defend their ideas in front of their peers, and summarize their presentation in a three-page written report.
Content:	- Presentation quality criteria - Researching a subject - Structuring oral presentations - Visual aids preparation - Multimedia techniques - Public speaking - Handling questions and critique - Written presentations: 1. Research reports 2. Journal articles 3. Theses - Presenting technical matters on the web and in social media - Ethical aspects of creating and communicating scientific results
Literature:	Varying additional reading materials are presented each year on the learning management platform.
Modes of learning and teaching:	Kick-off meeting (in person) Video lectures, self-evaluation questions, weekly assignments and individual tutoring based on assignments Participation in seminar weekend, seminar presentation, participation in questions and critique sessions Preparation of abstract in IEEE workshop format

Estimation of effort:	Online materials and assessments: 30 h Research and preparing seminar presentation: 30 h Seminar participation: 12 h Preparing written report: 18 h Sum: 90 h
Course assessment and exams:	- Completion of all online assessments - Seminar presentation - 3-page written report
Requirements (formal):	No compulsory prerequisites
Grading:	not graded