

Module Name	Mobile Communication Systems Basics
Module Number	Eul-ET-E-MoNSG, Eul-IST-E-MoNSG
Responsible Lecturer	Prof. Dr.-Ing. Gerhard Fettweis gerhard.fettweis@tu-dresden.de
Qualification Objectives	After completing the module, students know and understand the fundamental structure of a cellular mobile communication system. They can qualitatively assess the effects of resource allocation, path loss mechanisms, cell size adaptation, and other factors on the capacity of a mobile communication network. Students are familiar with the phenomena of the mobile communication channel, master the basic principles of digital signal transmission over frequency-selective and time-variant transmission channels, and are capable of analyzing transmission-related problems, describing them mathematically, and developing solutions.
Contents	The module contents, chosen by the student, include: - Structure and architecture of digital mobile communication networks based on the cellular concept, i.e., explanation of the functionality of mobile communication networks using the standards of GSM and UMS networks, influence of propagation mechanisms of radio waves, queuing theory, and capacity planning. - Signal transmission over mobile communication channels, i.e., effects of physical phenomena such as multipath propagation and Doppler effect on digital signal transmission, mathematical description of time- and frequency-variant mobile communication channels using Bello functions, transmission techniques for frequency-selective transmission channels, transmission techniques for time-variant transmission channels, channel estimation methods. - Applications of estimation theory or a similar topic relevant to mobile communication.
Teaching and Learning Forms	4 hours per week of lectures, 2 hours per week of exercises, and self-study. The language of instruction for lectures and exercises can be either German or English and will be determined by the lecturer at the beginning of the semester and announced in the usual manner.
Prerequisites for Participation	The competencies to be acquired in the module "Systems Theory" are required.
Usability	The module is an elective module in the elective area "Competence Deepening" according to § 6 paragraph 3 of the study regulations and § 33 paragraph 4 of the examination regulations of the main study program in the field of Information Technology in the diploma program Electrical Engineering. Furthermore, it is an elective module in the elective area "Competence Deepening" according to § 6 paragraph 3 of the study regulations and § 33 paragraph 3 of the examination regulations of the main study program in the field of Communication Technology in the diploma program Information Systems Engineering. The module creates the prerequisites for the modules that list it under "Prerequisites for Participation."
Prerequisites for the Award of Credit Points	Credit points are awarded when the module examination is passed. The module examination consists of a written exam lasting 150 minutes.
Credit Points and Grades	7 credit points can be earned through the module. The module grade corresponds to the grade of the examination performance.
Frequency of the Module	The module is offered every summer semester.
Workload	The total workload is 210 hours.

Duration of the Module	The module lasts one semester.
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