CT546: Introduction to Wireless Communication Systems

Course Placement a specialization core course for the first-year MTech EC students, also an elective for the BTech students

Course Format three Lecture hours and three Lab hours per week

Course Content The course CT546 introduces the student to the principles and the engineering practices that drive today’s wireless communication systems. Several topics covered in this class include

1. Cellular concept, frequency reuse, handoffs between cells, interference analysis
2. Wireless propagation models: large-scale path loss models and small-scale multipath fading effects, frequency-selective versus frequency-flat fading, the first-order statistical models including the Rayleigh, the Rician and the Nakagami-m fading models, the second-order models such as the Clarke’s, the Gans’ and the Jakes’ models
3. Digital modulation schemes, the receiver design principles including equalization and diversity combining in the presence of the wireless channel impairments, receiver performance analysis, channel coding
4. Introduction to multiple access: orthogonal versus non-orthogonal multiple access such as OFDMA, CDMA, TDMA and FDMA that are used in today’s wireless systems


Reference Books The following books are used as the reference:

5. Technical articles (journal/conference) papers

Assessment Method Two mid-term exams, a final exam, one semester-long project, and laboratory work

Course Outcomes this course introduces the students to the engineering knowledge (P1) of the mathematics and engineering fundamentals of the next generation wireless communication systems. The students engage in the analysis (P2) and design (P3) of the basic modules of a communication system. As part of the Lab and the Project, the students conduct investigations of the complex design and analysis problems (P4) and make use the modern tools (P5) such as Matlab and Python. Through the Lab and the Project works that is team-based and require a formal presentation by the students, they acquire the team-work (P9) and the technical communication (P10) skills.

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