STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
Wireless System Design	**1010802121010812896**

Field of study	Profile of study (general academic, practical)	Year /Semester
Electronics and Telecommunications	**general academic**	**1 / 2**

Elective path/specialty	Subject offered in:	Course (compulsory, elective)
Information and Communication	**English**	**elective**

Cycle of study:	Form of study (full-time,part-time)
Second-cycle studies	**full-time**

No. of hours				No. of credits
Lecture: **2** Classes: **-** Laboratory: **2** Project/seminars: **-**				**5**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
major	**from field**

Education areas and fields of science and art	ECTS distribution (number and %**)**
technical sciences	**5 100%**
Technical sciences	**5 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	K1_W07 K1_W14 K1_W17
2	**Skills**	K1_U11 K1_U15 K1_U17 K1_U19
3	**Social competencies**	n.a.

Assumptions and objectives of the course:

The main purpose of the course is to acquaint students with 2G/3G radio network planning and optimization process. During the run of the course the methodology, planning tools and measurement equipment used in radiocommunication is introduced.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Has a systematic knowledge, with the necessary theoretical background, of optimization methods used in radio network planning.   - [K2_W03]

2. Has a systematic, advanced knowledge of contemporary mobile communication systems and state-of-the-art techniques applied in these systems. - [K2_W06]

Skills:

1. Is able to use various measurement techniques applied to wireless communications. - [K2_U13]

2. Is able to analyze, design, construct and exploit mobile communication systems and devices which are part of them. - [K2_U16]

Social competencies:

1. Is aware of the necessity to approach solving technical problems in mobile communication systems with responsibility and professionalism. - [K2_K05]

Assessment methods of study outcomes

Faculty of Electronics and Telecommunications

Laboratory exercises.
Written exam.

Course description

Lectures:

1.UMTS system basics (physical layer).

2.Radio channel modeling.

3.Theoretical models of UMTS radio access network.

4.UMTS radio network planning.

5.Electromagnetic compatibility of UMTS system.

6.Radio network optimization.

7.GSM radio network planning - differences and similarities.

8.Indoor radio network planning.

Lab exercises:

1.Radio link budget.

2.UTRAN coverage planning in macro-cell environment.

3.UTRAN capacity planning.

4.Channel modeling for indoor planning.

5.Measurements in wireless communication systems.

Basic bibliography:

1. M. J. Nawrocki, M. Dochler, A. H. Aghvami, Understanding UMTS Radio Network, Wiley, 2006

Additional bibliography:

1. Ar. R. Mishra, Advanced Cellular Network Planning and Optimisation, Wiley, 2007

2. J. Laiho, A. Wacker, T. Novosad, Radio Network Planning and Optimisation for UMTS, Wiley, 2002

3. M. Tolstrup, Indoor Radio Planning, Wiley, 2008

Result of average student's workload

Activity	Time (working hours)
1. Participation in lectures.	30
2. Laboratory exercises.	30
3. Preparation to lab exercises.	15
4. Preparation of reports.	20
5. Preparation to examination	25
6. Consulting with teachers	3
7. Exam	2

Student's workload

Source of workload	hours	ECTS
Total workload	125	5
Contact hours	65	3
Practical activities	60	2