



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Mobile and wireless technologies [S2Teleinf2-ISS>TM]

### Course

Field of study

Teleinformatics

Year/Semester

1/2

Area of study (specialization)

Intelligent control systems

Profile of study

general academic

Level of study

second-cycle

Course offered in

Polish

Form of study

full-time

Requirements

compulsory

### Number of hours

Lecture

14

Laboratory classes

24

Other

0

Tutorials

0

Projects/seminars

0

### Number of credit points

3,00

### Coordinators

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### Lecturers

### Prerequisites

A student starting this subject should have basic knowledge of digital transmission systems and radio transmission methods.

### Course objective

The aim of the course is to familiarize the student with the latest mobile communication technologies, such as the latest generations of cellular systems and the so-called "cell-free", communication systems between vehicles, unmanned aerial vehicles and wireless communication of the Internet of Things.

### Course-related learning outcomes

Knowledge:

1. A student has in-depth knowledge of the construction and operation of modern mobile and radio communication systems and the construction of devices and networks used in them [K2\_W02].
2. A student knows the limitations of the use of these systems related to the occurrence of characteristic propagation phenomena, the Doppler effect, interference and the type of telecommunications traffic [K2\_W02, K2\_W05, K2\_W11].
3. A student understands the methodology and specificity of designing mobile communication systems

[K2\_W04].

Skills:

1. A student is able to design a radio link between moving objects [K2\_U06, K2\_U07].
2. A student is able to compare mobile systems and propose improvements or alternatives to existing solutions [K2\_U09, K2\_U14].
2. A student is able to assess the usefulness and possibility of using specific mobile transmission techniques for specific applications [K2\_U10, K2\_U16].

Social competences:

1. A student understands the importance of mobile telecommunications solutions for the development of the information society and the quality of these solutions to ensure global connectivity [K2\_K01, K2\_K06, K2\_U17].

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge acquired during the lectures is verified on the basis of a written or oral assessment. It consists of 5 open questions scored equally. The passing threshold is 50% of points. The skills acquired during laboratory classes are verified on the basis of reports from completed exercises. It is required to obtain at least 50% of the maximum number of points.

Grading scale: <50% - 2.0 (ndst); 50% to 59% - 3.0 (dst); 60% to 69% - 3.5 (dst+); 70% to 79% - 4.0 (db); 80% to 89% - 4.5 (db+); 90% to 100% - 5.0 (bdb).

### Programme content

1. Introduction. Modern radio systems.
2. The latest generations of cellular and cell-free systems and the techniques used.
3. The role of intelligent detection and prediction (spectrum, location, trajectory) in mobile systems.
4. V2V, V2X inter-vehicle communication systems.
5. Communication systems with unmanned aerial vehicles (UAVs).
6. Mobile Internet of Things communication methods.
7. The latest trends in the development of mobile radio communication.

### Course topics

1. Introduction. Modern radio systems.
2. The latest generations of cellular and cell-free systems and the techniques used.
3. The role of intelligent detection and prediction (spectrum, location, trajectory) in mobile systems.
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### Teaching methods

Lecture: multimedia presentation, materials available online; stationary/hybrid/online forms of presentation acceptable

Laboratory classes: case study, problem solving.

### Bibliography

Basic:

- A. S. Molish, Wireless Communications: From Fundamentals to Beyond 5G, Wiley, 3rd Edition  
K. Wesolowski, Systemy radiokomunikacji ruchomej, Wydawnictwo Komunikacji i Łączności, Wyd. 3, 2006

Additional:

- G. Dimitrakopoulos, Current Technologies in Vehicular Communication, Springer Link, 2017

### Breakdown of average student's workload

	Hours	ECTS
Total workload	78	3,00
Classes requiring direct contact with the teacher	38	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	40	1,50