Zał. nr 4 do ZW 64/2012

FACULTY OF COMPUTER SCIENCE AND MANAGEMENT

SUBJECT CARD

Name in Polish: Teoria i inżynieria ruchu teleinformatycznego
Name in English: Theory and engineering of teletraffic
Main field of study (if applicable): Computer science
Specialization (if applicable): Teleinformatics
Level and form of studies: 2nd level, full-time
Kind of subject: obligatory
Subject code INZ3759
Group of courses: NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	15			30	
Number of hours of total student workload (CNPS)	30			90	
Form of crediting	Crediting with grade			Crediting with grade	
For group of courses mark (X) final course					
Number of ECTS points	1			3	
including number of ECTS points for practical (P) classes				3	
including number of ECTS points for direct teacher-student contact (BK) classes	0,6			1,8	

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Has a basic knowledge of ICT systems and computer communication networks (K1INF_W11).
2. Knows the basic methods and tools for collecting, processing and retrieval of information and knowledge extraction (K1INF_W16)
3. Can use the right tools to build a simple model of the process (the object), to formulate specific task analysis and decision making (K1INF_U15)
4. Can effectively use the methods and tools for collecting, processing and retrieval of information and knowledge extraction (K1INF_U16)
5. It has the ability to self-education, including in order to improve the professional competence (K1INF_U05)
6. Understands the need and knows the possibility of lifelong learning and to improve their professional and social competences (K1INF_K01)

SUBJECT OBJECTIVES

C1. Ordered, underpinned by theoretical knowledge of methods and techniques for transmitting signals using different modulation techniques, methods and techniques of information transmission, methods of organization and management of data communications traffic in the tasks of design and analysis of communication systems,

methods of delivering service quality of ICT systems, analysis of quantitative and qualitative requirements and methods for sizing of distributed IT systems.

C2. Skills about the differences and benefits of the use of analog and digital data transmission techniques, the differences and benefits of the use of wired and wireless signal transmission techniques, developing the concept of using wired and wireless technologies in the basic applications of ICT systems, defining the qualitative and quantitative requirements of the user information and communication systems range of data, designing ICT solutions needed to achieve the qualitative and quantitative requirements of the user, using standards and solutions available on the market, estimating the cost of preparing and maintaining ICT solutions needed to achieve the qualitative and quantitative requirements, designing modernization of IT solutions needed to achieve the qualitative and quantitative requirements, identifying differences and similarities between solutions in a variety of applications (e-health, e-government and e-learning, in real-time systems, etc.).

C3. Skills for the design and analysis of complex, distributed ICT systems providing network services for distributed computer communication systems.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

K2INF_W02: Has a structured, theoretically founded essential knowledge of business modeling and requirements specification systems.

K2INF_W03: Has a structured, theoretically founded essential knowledge in the delivery of information distributed systems

K2INF_W06: Achieves results in the category of knowledge for specialty data communications

relating to skills:

K2INF_U05: Can - in formulating and solving engineering tasks - integrate knowledge of the fields of science and scientific disciplines relevant to the study being studied and applied a systemic approach, taking into account the non-technical aspects

K2INF_U06: Can solve the modeling, analysis and decision making for different types of objects

K2INF_U08: Achieves results and skills in areas of data exchange and computer communications systems

relating to social competences:

K2INF_K01: Can think and act in a creative and enterprising

K2INF_K02: Has aware of the social role of technical graduating, especially understands the need for the formulation and communication to the public, especially through the mass media, information and opinion on the achievements of technology and other aspects of engineering, shall endeavor to provide such information and opinions in a widely understood the reasons for the different points of view

PROGRAMME CONTENT		
Form of classes - lecture		**Number of hours**
Lec 1	Classification of ICT systems from different points of view. Quality of Experience (QoE) and Quality of Service (QoS) in ICT systems with	2

	elastic and streaming traffic.	
Lec 2	Introduction to queuing. Open and close networks of queues.	2
Lec 3	Queuing models of circuit-switched and packet-switched computer communication systems. Burke's theorem and Kleinrock approximation.	2
Lec 4	Access control, flow control and routing tasks formulation and solution in distributed environments.	2
Lec 5	Requirements analysis	1
Lec 6	Models (Poisson, Markov modulated, self-similarity, etc) of teletraffic and its application in traffic engineering tasks.	2
Lec 7	QoS delivery concepts: best effort, integrated services and differentiated services	2
Lec 8	New concepts of systems and networks - NXGN (Next Generation Networks) i NWGN (New Generation Network). Summary.	2
	Total hours	15

PROGRAMME CONTENT		
Form of classes - project		**Number of hours**
Proj 1	Formulation design task based on the analysis of the literature, documentation, etc.	2
Proj 2	Justification for the choice task and purpose of the task design - an analysis of the expected benefits of the project task.	2
Proj 3	Quantitative requirements analysis for the communication system under design	2
Proj 4	Qualitative requirements analysis for the communication system under design	2
Proj 5	Analysis of state of the art on how to solve the task design	2
Proj 6	Analysis and selection of the task design methodology	2
Proj 7	Tools (methods, algorithms, procedures, software and hardware) analysis and selection required for the implementation of the project task	2
Proj 8	Implementation of prototype of modules solve the task	2
Proj 9	Prototype testing and evaluation	2
Proj 10	Modification of solutions using prototype test results	2
Proj 11	Integration of modules distinguished at the stages of requirements analysis and prototyping	2
Proj 12	Verification and testing of an integrated solution design task	2
Proj 13	Analysis of the possibility of extending the project tasks	2
Proj 14	Preparation of the presentation and documentation of the design task	2
Proj 15	Presentation of the results of the design task	2
	Total hours	30

TEACHING TOOLS USED
N1. Traditional lecture supported by whole class multimedia presentations based on literature and open access and commercial sources.
N2. Student's own works – solving experiments and tasks in laboratory as well as homework.
N3. Student's own works – literature and open access sources studies.
N5. Collective works in laboratory
N5. Student's own works – preparation of presentations and technical documentations.

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT		
Evaluation (F – forming (during semester), P – concluding (at semester end)	Educational effect number	Way of evaluating educational effect achievement
F1 (lecture)	K2INF_W03 K2INF_W04 K2INF_W06 K2INF_U05 K2INF_U06 K2INF_U08 K2INF_K01 K2INF_K02	Observation and verification of student activity. Solving the sample jobs.
F1 – F15 (project)	K2INF_W06 K2INF_U05 K2INF_U06 K2INF_U08 K2INF_K01	Checking the preparation of the student. Checking the presence of the student. Observation of student activity. Observation and assessment of student autonomy.
P (lecture)	K2INF_W03 K2INF_W04 K2INF_W06 K2INF_U05 K2INF_U06 K2INF_U08 K2INF_K01 K2INF_K02	Colloquium (course credit) in the evaluation of forming F1 (lecture)
P (project)	K2INF_U05 K2INF_U06 K2INF_U08 K2INF_K01	Total weighted ratings F1 - F15 (project) and the assessment for the presentation of the final results of the project.

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] A.S. Tanenbaum, „Computer networks”, Prentice Hall; 1996
[2] G. Pujolle, D. Seret, D. Dromard, E. Horlait, „Integrated Digital Communication Networks”, J. Wiley & Sons
[3] B. Russell, „The art of computer networks”, Prentice Hall; 2009
[4] V.S. Bagad, I.A. Dhotre, „Computer networks”, Technical Publications, 2009.
[5] M. Roden, „Analog and digital communication systems”, Prentice Hall
[6] http://www.freebookcentre.net/Networking/Free-Computer-Networking-Books-Download.html

SECONDARY LITERATURE:

[1] S. Haykin, „Telecommunication systems”, Prentice Hall, 1999.
[2] MIT Free Open Course Materials (http://ocw.mit.edu/index.htm)
[3] CCNA Exploration Network Fundamentals, Cisco Academy, PWN, 2008

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Theory and engineering of teletraffic

AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY
Computer science

AND SPECIALIZATION
Teleinformatics

Subject educational effect	Correlation between subject educational effect and educational effects defined for main field of study and specialization (if applicable)**	Subject objectives***	Programme content***	Teaching tool number***
PEK_W01 (knowledge)	K2INF_W03	C1, C2, C3	Lec 1 – Lec 8	N1, N4
PEK_W02	K2INF_W04	C1	Lec 1 – Lec 8	N1,N2, N4
PEK_W03	K2INF_W06	C1	Lec 1 – Lec 8	N1, N4
PEK_U01 (skills)	K2INF_U05	C1, C2, C3	Lec 1 – Lec 8 Proj 1 – Proj 15	N1, N2, N3, N4, N5
PEK_U02	K2INF_U06	C1, C2	Lec 1 – Lec 8 Proj 1 – Proj 15	N2, N3, N5
PEK_U03	K2INF_U08	C1, C2	Lec 1 – Lec 8 Proj 1 – Proj 15	N2, N3, N5
PEK_K01 (competences)	K2INF_K01	C1, C2	Lec 1 – Lec 8 Proj 1 – Proj 15	N1, N2, N3, N4, N5
PEK_K02	K2INF_K02	C1, C2	Lec 1 – Lec 8	N1, N2, N3, N4, N5

** - enter symbols for main-field-of-study/specialization educational effects
*** - from table above