DEPARTMENT OF COMPUTER SCIENCE AND MANAGEMENT
SUBJECT CARD
Name in Polish Administrowanie serwerami Linux
Name in English Administering Linux Servers
Main field of study (if applicable): Informatics
Specialization (if applicable): ---
Level and form of studies: 1st/ 2nd* level, full-time / part-time*
Kind of subject: obligatory / optional / university-wide*
Subject code INZ005234
Group of courses YES / 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		60		
Form of crediting	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*
For group of courses mark (X) final course					
Number of ECTS points	1		2		
including number of ECTS points for practical (P) classes	0		2		
including number of ECTS points for direct teacher-student contact (BK) classes	0,6		1,2		

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES
1. Knowledge of the general principles of the modern operating systems.
2. Knowledge of the basic principles of operation of computer networks based on TCP / IP.
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SUBJECT OBJECTIVES
C1 Acquisition of basic knowledge and practical skills in the administration of the Linux server and workstation.
C2 Acquisition of basic knowledge and practical skills in managing the network infrastructure and network services using Linux.
C3. Acquisition of the ability to work independently with Linux and in a team of administrators.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEK_W01 - knows the basics of the Linux architecture and its use as a server or workstation in information systems based on the Linux platform;

PEK_W02 - have knowledge of the basics of the system Lunux in the network and the use of Linux in the construction of network infrastructure and network services;

PEK_W03-have basic knowledge of Linux system configuration including security aspects.

relating to skills:

PEK_U01 - can perform basic administrative tasks associated with the installation and configuration of Linux as a server and workstation;

PEK_U02 - can configure the basic elements of the network subsystem of the Linux platform and run on it network services;

PEK_U03 - can secure Linux operating system on the basic level.

relating to social competences:

PEK_K01 - can work in a team to solve problems.

PROGRAMME CONTENT

Form of classes - lecture		Number of hours
Lec 1	Linux distributions. The system architecture. Installation of the system.	1
Lec 2	Command line: shell, basic commands, scripts.	1
Lec 3	Managing user accounts and groups.	1
Lec 4	Disk and filesystem management.	1
Lec 5	Data Compression. Protection against data loss - Backup. Scheduling operations	1
Lec 6	Upgrading a system. Install, update and uninstall any software. Using the installation packages.	1
Lec 7	Printing in Linux. The graphical environment - X Window System.	1
Lec 8	Managing network connections. Routing.	1
Lec 9	Firewalls and control of network traffic.	1
Lec 10	Configuration and management of DHCP and DNS servers.	1
Lec 11	Configuration and management of the file server (NFS, Samba, FTP).	1
Lec 12	Configuration and management of the web server. Content Management Systems (CMS).	1
Lec 13	Virtualization on Linux.	1
Lec 14	Securing the server. Remote system administration.	1
Lec 15	Configuration and management of the mail server.	1
	Total hours	**15**

Form of classes - laboratory		Number of hours
Lab 1	Introduction to the laboratory. Health and Safety Training.	2
Lab 2	Installing Linux.	2
Lab 3	Command line: shell, basic commands, scripts.	2
Lab 4	Practical management of user accounts and groups.	2
Lab 5	Practical management of disk and filesystem.	2
Lab 6	Performing data compression. Backing up and recovering data. Scheduling operations.	2
Lab 7	Upgrading, installing, updating and uninstalling any software using the installation packages and software repositories.	2

Lab 8	Configuring printing on Linux. The graphical environment - X Window System. Practical test - Managing the server operating system and a workstation.	2
Lab 9	Managing network connections. Routing.	2
Lab 10	Firewalls and control of network traffic.	2
Lab 11	Configuration and management of DHCP and DNS servers.	2
Lab 12	Configuration and management of the file server (NFS, Samba, FTP).	2
Lab 13	Configuration and management of the web server. Content Management Systems (CMS).	2
Lab 14	Set up and run virtual machines on Linux. Securing the server. Remote system administration.	2
Lab 15	Practical test - Infrastructure management and network services.	2
	Total hours	30

TEACHING TOOLS USED

N1. Traditional lecture.
N2. Computer laboratories with full access to computers with the Linux operating system.
N3. Consultations for students.
N4. Own work - preparing for laboratories.
N5. Own work - self-study and exam preparation.

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	PEK_U01	Practical test - Managing the server and workstation operating system. (La8)
F2	PEK_U02, PEK_U03 PEK_K01	Practical test – Network infrastructure and services management. (La15)
P	PEK_W01 ÷ PEK_W03 PEK_K01	Examination.

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Ben Whaley, Evi Nemeth, Garth Snyder, Trent R. Hein, Unix i Linux. Przewodnik administratora systemów, Helion, 2011.
[2] Christopher Negus, Linux. Biblia. Ubuntu, Fedora, Debian i 15 innych dystrybucji, Helion, 2011.
[3] Łukasz Sosna, Linux. Komendy i polecenia. Helion 2010.

SECONDARY LITERATURE:

[1] Daniel J. Barrett, Richard E. Silverman, Robert G. Byrnes, Linux. Bezpieczeństwo. Receptury, Helion 2003
[2] Andrew Ford, Apache 2. Leksykon kieszonkowy, Helion, 2010

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

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Administering Linux Servers
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY **Informatics**
AND SPECIALIZATION ---

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)	K1INF_W10	C1	Lec1- Lec7	N1,3,5
PEK_W02	K1INF_W11	C2	Lec8- Lec13, Lec15	N1,3,5
PEK_W03		C1, C2	Lec14	N1,3,5
PEK_U01 (skills)	K1INF_U14, K1INF_U09	C1	Lab1-Lab8	N2,3,4
PEK_U02	K1INF_U08	C2	Lab9-Lab15	N2,3,4
PEK_U03	K1INF_U09	C1, C2	Lab14	N2,3,4
PEK_K01 (competences)		C3	Lec1-Lec15, Lab1-Lab15	N1,2,3,4,5

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

Zał. nr 4 do ZW 64/2012

FACULTY W8 / DEPARTMENT I-32
SUBJECT CARD
Name in Polish Administrowanie Systemami Microsoft Windows
Name in English Administering Microsoft Windows Systems
Main field of study (if applicable): Computer science
Specialization (if applicable): -
Level and form of studies: 1st/ 2nd* level, full-time / part-time*
Kind of subject: obligatory / optional / university-wide*
Subject code INZ005233
Group of courses YES / 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		60		
Form of crediting	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*
For group of courses mark (X) final course					
Number of ECTS points	1		2		
including number of ECTS points for practical	0		2		

4

(P) classes					
including number of ECTS points for direct teacher-student contact (BK) classes	0,6		1,2		

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Knowledge of contemporary operating systems architectures.
2. Knowledge of TCP/IP networks.

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SUBJECT OBJECTIVES

C1 Gaining knowledge of architecture of Microsoft Windows:

      C1.1. architecture and services of single server,

      C1.2. directory services,

      C1.3. network architecture and services.

C2 Gaining competencies of administering Windows systems using GUI and text interface:

      C2.1. management of accounts, groups and access to resource,

      C2.2. centralized management of distributed IT environment,

      C2.3. management of network infrastructure.

C3 Improve collaborative working, self-paced studying and solving problems.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEK_W01 –knows architecture of Windows system as well as different account and group types, knows relationship between them

PEK_W02 – knows mechanisms of centralized administration, is conscious about their possibilities and restrictions

PEK_W03 – knows services supporting computer networks, including remote access and secure network traffic.

relating to skills:

PEK_U01 can configure single computer and give a user access to selected resources on required level

PEK_U02 can leverage directory services to centralized management of distributed environment

PEK_U03 can configure simple computer network with remote access using computer running Windows system.

relating to social competences:

PEK_K01 is able to collaboratively solve administrative problems

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PROGRAMME CONTENT

Form of classes - lecture		Number of hours
Lec 1	System setup and installation. Introduction to domain environment.	1
Lec 2	Account and group management.	2
Lec 3	Disk resources management.	2
Lec 4	Configuration of distributed environment using group policy.	2
Lec 5	Configuration of multiple domain environment	2
Lec 6	System monitoring and auditing.	2

Lec 7	DNS and DHCP servers.	2
Lec 8	Routing and remote access.	2
	Total hours	15

Form of classes - laboratory		Number of hours
Lab 1	Getting started with class environment.	2
Lab 2	Installation and configuration of directory services	2
Lab 3	Configuration user accounts.	2
Lab 4	Configuration of groups. Script management of accounts.	2
Lab 5	Sharing disk resources.	2
Lab 6	Test1 – Management of basic system resources.	2
Lab 7	Configuration of distributed environment using Group Policies.	2
Lab 8	Configuration of advanced settings using Group Policies.	2
Lab 9	Replication management.	2
Lab 10	Advanced replication management.	2
Lab 11	Test 2 – Centralized administering using directory services.	2
Lab 12	Performance monitoring and auditing.	2
Lab 13	DNS and DHCP servers.	2
Lab 14	Routing and remote access configuration.	2
Lab 15	Test 3 – Network infrastructure management.	2
	Total hours	30

TEACHING TOOLS USED

N1.Lecture with slides and live demonstrations.
N2.Class using systems with full administrative access.
N3.Consultations
N4.Self-paced preparation to class
N5.Self-paced preparation to exam

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	PEK_U01 ÷ PEK_U03	Evaluation of activity and engagement during class
F2	PEK_U01 ÷ PEK_U03	Evaluation of environment configured by student during class
F3	PEK_U01 ÷ PEK_U03 PEK_W01 ÷ PEK_W08	Electronic exam using e-learning portal.
C=F3		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1]   W.R. Stanek, Microsoft Windows Server 2012. Vademecum administrator, APN Promise, 2012.

[2]   R.Morimoto, M.Noel, O.Droubi, R. Mistry, C.Amaris, Windows Server 2012 Unleashed, Sams Publishing, 2012 (on-line access through proxy BG PWr.) , polish translation: "Windows Server 2012. Księga eksperta", wyd. Helion.

[3]   M. Minasi, D. Gibson, A. Finn, W. Henry, B. Hynes, Mastering Windows Server® 2008 R2, Sybex, 2011 (access on-line through proxy BG PWr.)

SECONDARY LITERATURE:

[1]   J.Savill, The complete guide to Windows 2008 Server, Addison Wesley, 2008.

[2]   D.Holme, D.Ruest, N.Ruest, Training Kit 70-640 Konfigurowanie Active Directory w Windows Server 2008, APN Promise, 2009.

[3]   Training kit 70-642 Konfigurowanie infrastruktury sieciowej Windows Server 2008, APN Promise, 2009.

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

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT

……………………………

AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY ………………………..
AND SPECIALIZATION ……………………………·

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)		C1.1	Le1÷Le3	1,3,5
PEK_W02		C1.2	Le4÷Le6	1,3,5
PEK_W03		C1.3	Le7÷Le8	1,3,5
PEK_U01 (skills)		C2.1	Lab1÷Lab6	2,3,4
PEK_U02		C2.2	Lab7÷Lab11	2,3,4
PEK_U03		C2.3	Lab2÷Lab15	2,3,4
PEK_K01 (competences)	K1INF_K1, K1INF_K3	C3	Le1-Le8 Lab1-Lab15	1÷5

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

*** - from table above

FACULTY *****

SUBJECT CARD

Name in English: ALGEBRA AND ANALYTIC GEOMETRY A
Name in Polish: ALGEBRA Z GEOMETRIĄ ANALITYCZNĄ A
Main field of study (if applicable):
Specialization (if applicable):
Level and form of studies: I level, full time

Kind of subject: obligatory

Subject code: MAP003055

Group of courses: YES

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30	15			
Number of hours of total student workload (CNPS)	120				
Form of crediting	Exam				
For group of courses mark (X) final course	X				
Number of ECTS points	4				
including number of ECTS points for practical (P) classes	4				
including number of ECTS points for direct teacher-student contact (BK) classes	2,5				

PREREQUISITIES

It is recommended to know the basic algebraic operations on rational and real numbers, and knowledge of basic geometric figures and shapes.

SUBJECT OBJECTIVES

C1. Understanding the basic properties of complex numbers.

C2. Learning basic algebraic properties of polynomials.

C3. Mastering the concept of a vector, a vector space and the base of a linear space.

C4. Learning how to calculate the distance between the points in the space R^n, how to determine

the equations of lines and planes and understanding the concept of conic sections.

C5. Mastering the concepts of matrices, matrix operations, and learn the methods of solving systems of linear equations.

SUBJECT EDUCATIONAL EFFECTS

Relating to knowledge:

PEK_W01 knows basic properties of complex numbers

PEK_W02 knows basic algebraic properties of polynomials

PEK_W03 knows basic concepts of theory of linear spaces and methods of description of lines, planes and conic sections

PEK_W04 knows basic methods of solving systems of linear equations

Relating to skills:

PEK_U01 can carry out calculations with complex numbers

PEK_U02 can add, multiply and divide polynomials

PEK_U03 can find the equations of planes and lines in three dimensional space

PEK_U04 can add and multiply matrices and calculate determinants

PEK_U05 can solve systems of linear equations

Relating to social competences:

PROGRAM CONTENT		
Form of classes - lectures		**Hours**
W1	Natural, rational and real numbers. Mathematical induction. Newton's binomial formula.	2
W2	Complex numbers. Basic operations, modulus, complex conjugate.	2

W3	Polar form of complex number. Multiplication, division and exponentiation in polar form. Roots of complex numbers. The notion of algebraic field.	2
W4	Polynomials. Addition and multiplication of polynomials. Roots of polynomial. Polynomial remainder theorem. **Fundamental theorem of algebra**.	2
W5	The decomposition of a polynomial with real coefficients into product of linear and quadratic factors. Rational functions. Real simple rational factors. Decomposition of the functions into rational simple factors.	2
W6	Vectors in the space R^n. Addition and multiplication by scalars. Distance between points. Scalar product. Length of vector. **Cauchy–Schwarz inequality**. The angle between vectors.	2
W7	Analytic geometry of the plane. Straight line formulas (normal parametric and directional form). Distance of a point from a line. The angle between lines	2
W8	Analytic geometry of the space R^3. Equations for lines and planes. Distance between point and a plane. Intersection of planes.	2
W9	Linear combinations of vectors. Linearly independent vectors. The base of a space. Linear mappings. Matrix representation of linear mappings.	2
W10	Addition and multiplication of matrices and its correlation with operations on linear mappings. Example of matrices.	2
W11	Permutations and its sign..Definition of determinant and methods of calculation of determinant Algebraic complement of an element of a matrix. Laplace' formula for determinant. **Determinant and volume**.	2
W12	Inverse matrix. Systems od linear equations. **Cramer's formulas**. Examples. Homogeneous and non-homogeneous systems.	2
W13	Properties of linear mappings (kernel, image, rank). **Rouché – Capelli theorem**. Gaussian elimination.	2
W14	Eigenvalues and eigenvectors.	2
W15	Conic sections.	2
	Total hours	**30**

Form of classes – classes		Hours
Cw1	Real and complex numbers.	2
Cw2	Polynomials.	2
Cw3	Geometry of the plane.	2
Cw4	Geometry of the space R^3.	2
Cw5	Basis and linear mappings.	2

Cw6	Matrices and determinants.	2
Cw7	Systems of linear equations.	2
Cw8	Test	1
	Total hours	**15**

TEACHING TOOLS USED
N1. Lecture - traditional method
N2. Classes - traditional method
N3. Student's self work with the assistance of mathematical packages

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT

Evaluation (F -forming; P - concluding)	**Educational effect number**	**Way of evaluating educational effect achievement**
F - Cw	PEK_U01-PEK_U05	Oral answers, quizzes, written tests and/or e-tests
F – W	PEK_W01-PEK_W04	Exam or e-exam
P: sets the lecturer		

LITERATURE
PRIMARY:

[1] A. Białynicki-Birula, Algebra Liniowa z Geometrią, PWN 1976.
[2] F. Leja, Geometria analityczna, PWN, Warszawa 1972.
[3] A. Mostowski, M. Stark, Elementy algebry wyższej, PWN, Warszawa 1963.
[4] G. Banaszak, W. Gajda, Elementy algebry liniowej, część I, WNT, Warszawa 2002

SECONDARY:

[1] G. Farin, D. Hansford, Practical Linear Algebra: A Geometry Toolbox 2004, AK Peters, 2005.
[2] T. Jurlewicz, Z. Skoczylas, Algebra i geometria analityczna. Przykłady i zadania, Oficyna Wydawnicza GiS, Wrocław 2011.
[3] T. Jurlewicz, Z. Skoczylas, Algebra liniowa. Przykłady i zadania, Oficyna Wydawnicza GiS, Wrocław 2005.
[4] T. Jurlewicz, Z. Skoczylas, Algebra i geometria analityczna.. Definicje, twierdzenia i wzory. Oficyna Wydawnicza GiS, Wrocław 2011.
[5] T. Jurlewicz, Z. Skoczylas, Algebra liniowa. Definicje, twierdzenia i wzory. Oficyna Wydawnicza GiS, Wrocław 2005.
[6] E. Kącki, D. Sadowska, L. Siewierski, Geometria analityczna w zadaniach, PWN, Warszawa 1993.
[7] W. Stankiewicz, Zadania z matematyki dla wyższych uczelni technicznych, Cz. A, PWN, Warszawa 2003.

SUBJECT SUPERVISORS

prof. dr hab. Jacek Cichoń, dr Agnieszka Wyłomańska

Komisja programowa Instytutu Matematyki i Informatyki

MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT

ALGEBRA AND ANALYTIC GEOMETRY A MAP003055

AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY****

AND SPECIALIZATION …………..

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		C1	W1, W2, W3, W14	1,3
PEK_W02		C2	W4, W5	1,3
PEK_W03		C3, C4	W6, W7, W8, W9, W15	1,3
PEK_W04		C5	W10, W11, W12, W13	1,3
PEK_U01		C1	Cw1, Cw6, Cw7	1,2,3
PEK_U02		C2	Cw2	1,2,3
PEK_U03		C3, C4	Cw3, Cw4, Cw5	1,2,3
PEK U04		C5	Cw6, Cw7	1,2,3
PEK_U05		C5	Cw6, Cw7	1,2,3

** - z tabel powyżej

Zał. nr 4 do ZW 64/2012

FACULTY of **Computer Science and Management**/ DEPARTMENT………………
SUBJECT CARD
Name in Polish: Algorytmy i techniki programowania równoległego
Name in English: Parallel Programming - Algorithms and Techniques
Main field of study (if applicable): Informatics
Specialization (if applicable):
Level and form of studies: 1st/ 2nd* level, full-time / part-time*
Kind of subject: obligatory / optional / university-wide*
Subject code INZ005224 Wl
Group of courses YES / NO*

1

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30		30		
Number of hours of total student workload (CNPS)	60		60		
Form of crediting	~~Examination~~ / crediting with grade~~*~~	Examination / crediting with grade*	~~Examination~~ / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*
For group of courses mark (X) final course					
Number of ECTS points	**2**		2		
including number of ECTS points for practical (P) classes	0		2		
including number of ECTS points for direct teacher-student contact (BK) classes	1,2		1,2		

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES
1. Basic knowledge about computer architecture and organization
2. Programming skills at a basic level in C/C++ language

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SUBJECT OBJECTIVES
C1   Acquainting students with basic techniques of parallel processing.
C2   Acquainting students with basic knowledge about parallel algorithms
C3   Acquainting students with popular parallel processing environments.
C4   Acquisition of the ability to write simple parallel programs.
C5   Acquisition of the ability of using popular parallel programming environments.
C6   Acquisition of skills to plan and conduct simple computer experiments
C7   Acquiring the ability to documenting the experiments and their presentation in Polish and English

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SUBJECT EDUCATIONAL EFFECTS
relating to knowledge:
PEK_W01 Knows the basic techniques of parallel programming.
PEK_W02 Knows the basic parallel algorithms
PEK_W03 Knows chosen parallel processing environments
relating to skills:

PEK_U01 He is able to write simple parallel programs
PEK_U02 He is able to use chosen parallel programming environments.
PEK_U03 He is able to plan and conduct simple computer experiment.
PEK_U04 He is able to draw conclusions of the performed experiment, prepare its documentation and prepare a presentation on the results of an experiment in Polish and English

PROGRAMME CONTENT

Form of classes - lecture		Number of hours
Lec 1	Parallel programming languages, shared-memory and distributed memory programming paradigms, data and algorithm parallelism	2
Lec 2	MPI standard. Message passing communication - basic concepts, examples of simple parallel algorithms	2
Lec 3	Group communication algorithms ("one-to-all", "all-to-all" & others) for different network topologies and routing strategies – its implementation in MPI.	2
Lec 4	Parallel matrix multiplication algorithms	2
Lec 5	Parallel sorting algorithms	2
Lec 6	Parallel graph algorithms.	2
Lec 7	Search algorithms for discrete optimization problems.	2
Lec 8	Systolic algorithms	2
Lec 9	Architecture and programming of GPU	2
Lec 10	Programming in CUDA environment	2
Lec 11	Evaluation of parallel algorithms, computational complexity, speedup, efficiency.	2
Lec 12	Advanced mechanisms in MPI.	2
Lec13	Profiling of parallel programs.	2
Lec14	Test	2
Lec15	Parallel program design methodology	2
	Total hours	30
Form of classes - class		Number of hours
Cl 1		
	Total hours	
Form of classes - laboratory		Number of hours
Lab1	Presentation of lab scope, presentation of grading principles, training from health and safety at work. Familiarization with used at laboratory MPI environment.	2
Lab2	Testing execution environment, running simple programs that implement communication between two processors in MPI environment.	2
Lab3	Implementation of parallel algorithm that implement vector matrix multiplication in MPI environment.	2
Lab4	Implementation of chosen parallel matrix multiplication algorithm, carrying out the tests for different data, calculation of speedup, preparation the report and short presentation on received results in Polish in English.	2
Lab5	Presentation results of experiments performed during lab 4	2
Lab6	Implementation of chosen parallel sorting algorithm, carrying out the tests for different data, calculation of speedup, preparation the report and short presentation on received results in Polish in English.	2
Lab7	Presentation results of experiments performed during lab 6	2
Lab8	Implementation of chosen parallel search algorithm, carrying out the tests for different data, calculation of speedup, preparation the report and short presentation on received results in Polish in English.	2
Lab9	Presentation results of experiments performed during lab 8	2
Lab10	Implementation of chosen systolic algorithm, carrying out the tests for	2

	different data, calculation of speedup, preparation the report and short presentation on received results in Polish in English.	
Lab11	Presentation results of experiments performed during lab 10	2
Lab12	Familiarization with CUDA environment, running simple programs.	2
Lab13	Implementation of chosen algorithm that used shared memory at GPU, carrying out the tests and calculation of speedup.	2
Lab14	Implementation of chosen algorithm with data parallelism in CUDA environment, calculation of speedup, preparation the report and short presentation on received results in Polish in English	2
Lab15	Presentation results of experiments performed during lab 14	2
	Total hours	30

Form of classes - project		Number of hours
Proj1		
Proj2		
	Total hours	

Form of classes - seminar		Number of hours
Sem1		
Sem2		
	Total hours	

TEACHING TOOLS USED
N1. Lecture supported by multimedia presentations (slideshow) N2. Cluster of computers running under MPI N3. GPU server with CUDA environment

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)	PEK_W01 PEK_W02 PEK_W03	Quizzes and test during the lecture, student activity during the lecture, students answering on questions during lecture.
F2 – (laboratory)	PEK_U01 PEK_U02 PEK_U03 PEK_U04	Checking of student preparation for exercise realization, assessment of the reports of the exercises. Evaluation of the quality of submitted by students programs, Evaluation of students presentations (point allocation).
P - the final grade from lecture will be issued on the basic of partial grades (points) received from the test (T) and quizzes (Q) as follows: Grade = 20% * Q + 80% *T. The final grade from the laboratory will be issued on the basis of partial grades (points) obtained from all exercises.		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Kumar Vipin, Grama Ananth, Gupta Anshul, Karypis George "Introduction to Parallel Computing" The Benjamin/Cumming Publishing Company, Inc.

[2] B. Wilkinson, M. Allen, "Parallel Programming, Prentice Hall, 2005

[3] Writing Message-Passing Parallel Programs with MPI, Course Notes,
http://www.zib.de/zibdoc/mpikurs/mpi-course.pdf

[4] Peter Pacheco, Parallel Programming with MPI, Morgan Kaufmann Pub.
http://www.cs.usfca.edu/~peter/ppmpi/

[5] Zbigniew Czech, Wprowadzenie do obliczeń równoległych, PWN, Warszawa 2010

SECONDARY LITERATURE:

[1] Karbowski, E. Niewiadomska-Szynkiewicz, "Obliczenia Równoległe i Rozproszone", Wyd. Politechniki Warszawskiej, 2001

[2] Ian Foster, Designing and Building Parallel Programs, http://www.mcs.anl.gov/~itf/dbpp/

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

Jan Kwiatkowski, jan.kwiatkowski@pwr.wroc.pl

MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Parallel Programming - Algorithms and Techniques
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY **Informatics**
AND SPECIALIZATION

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)	K1INF_W04	C1	Lec1, Lec 2, Lec 9, Lec 10, Lec 11, Lec 12, Lec 13, Lec 15, Lec 14	N1
PEK_W02	K1INF_W04	C2	Lec 4 – Lec 8, Lec 14	N1
PEK_W03	K1INF_W04	C3	Lec 2, Lec 3, Lec 12, Lec 14	N1
PEK_U01 (skills)	K1INF_U06	C4	Lab2,Lab3, Lab4, Lab6, Lab8, Lab10, Lab13, Lab14	N2, N3
PEK_U02	K1INF_U06	C5	Lab1, La2b, Lab12, Lab13	N2, N3
PEK_U03	K1INF_U07	C6	Lab4, Lab6, Lab8, Lab10, Lab13, Lab14	N2, N3
PEK_U04	K1INF_U13	C7	Lab4, Lab5, Lab6, Lab7, Lab8, Lab9, Lab10, Lab11, Lab14, Lab15	N2, N3

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

*** - from table above

FACULTY W-8 / ~~DEPARTMENT~~…………….…
SUBJECT CARD
Name in Polish …… Algorytmy i Struktury Danych
Name in English …Algorithms and Data Structures
Main field of study (if applicable): …Informatics….
Specialization (if applicable): ……………………..
Level and form of studies: 1st/ ~~2nd~~* level, full-time / ~~part-time~~*
Kind of subject: obligatory ~~/ optional~~ / ~~university-wide~~*
Subject code …INZ001517Wcl
Group of courses YES / ~~NO~~* (lecture and classes)

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30	15	30		
Number of hours of total student workload (CNPS)	90	30	90		
Form of crediting	Examination / ~~crediting with grade*~~	Examination / ~~crediting with grade*~~	~~Examination~~ / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*
For group of courses mark (X) final course	X				
Number of ECTS points	2	2	3		
including number of ECTS points for practical (P) classes			3		
including number of ECTS points for direct teacher-student contact (BK) classes	1.2	1.2	1.8		

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Knowledge of a programming language (Java).
2. Knowledge of object programming basics

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SUBJECT OBJECTIVES

C1. Gaining basic knowledge on abstract data types and their implementation.
C2. Rules of algorithm assessment and comparison.
C3. Getting to know simple graph, geometrical and text algorithms.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEK_W01.   Knows a concept of abstract data type.
PEK_W02.   Knows the principles of dynamic data structure construction.
PEK_W03.   Understands the rules of algorithm assessment and comparison.
PEK_W04.   Knows simple graph algorithms.
PEK_W05.   Knows simple geometrical algorithms.
PEK_W06.   Knows methods of searching for patterns in a text.

relating to skills:

PEK_U01.   Can implement abstract data type.
PEK_U02.   Can test and compare algorithms.

relating to social competences:

PEK_K01 Can communicatively present own application and its test results.

Form of classes - lecture		Number of hours
Lec 1	Iterators – definition and use.	2
Lec 2	Linked lists.	4
Lec 3	Stacks and queues.	2
Lec 4	Sorting algorithms.	4
Lec 5	Simple implementations of mapping.	2
Lec 6	Binary search trees.	2
Lec 7	Red black trees, BTrees.	2
Lec 8	Hash tables.	2
Lec 9	Graph algorithms.	4
Lec 10	Priority queues.	2
Lec 11	Geometrical algorithms.	2
Lec 12	Text pattern searching.	2
	Total hours	**30**
Form of classes - class		Number of hours
Cl 1	Defining simple classes.	
Cl 2	Iterators.	1
Cl 3	Lists, heaps, queues.	2
Cl 4	Recursive list processing.	2
Cl 5	Sorting – algorithms analysis and comparison.	2
Cl 6	BST tree processing.	2
Cl 7	B-trees and hash tables.	2
Cl 8	Graphs.	2
	Total hours	15
Form of classes - laboratory		Number of hours
Lab 1	Creation and use of own iterators.	4
Lab 2	An implementation using dynamic data structures – lists, heaps, queues.	6
Lab 3	Preparation of a client enabling testing of chosen sorting algorithms.	6
Lab 4	Testing of chosen sorting algorithms and their comparison.	6

Lab 5	Applications using trees.	8
	Total hours	30

Form of classes - project		Number of hours
Proj 1		
Proj 2		
Proj 3		
Proj 4		
…		
	Total hours	

Form of classes - seminar		Number of hours
Sem 1		
Sem 2		
Sem 3		
…		
	Total hours	

TEACHING TOOLS USED
N1. Informational lecture. N2. E-learning system used to publish educational materials.

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
P1 Final score from the course group.	PEK_W01-PEK_W06, PEK_U01,PEK_U02	The score is given on the basic of the exam results. Attendance in the practical classes is a prerequisite for admission to the exam — one unjustified absence is allowed. The exam is passed if a student scores at least 50% of the points.
P2 Final score from the laboratory	PEK_U01,PEK_U02,PEK_K01	Execution of tasks indicated by the lecturer. The final score is the average from the partial scores.

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Sedgewick R., Algorytmy w Javie, Helion 2012
[2] Harris S., Ross J., Od Podstaw Algorytmy, Helion 2006

SECONDARY LITERATURE:

[1] Cormen T. H., Leiserson Ch. E., Rivest R. L., Wprowadzenie do Algorytmow, WNT 1997
[2] Harel D., Rzecz o Istocie Informatyki – Algorytmika, WNT 1992

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

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
…Algorithms and Data Structures
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY Informatics
AND SPECIALIZATION ……………………………..

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)	K1INF_W04	C1	Wy1- Wy3, Ćw1- Ćw3	N1,N2
PEK_W02	K1INF_W04	C1	Wy1- Wy8, Ćw2- Ćw7, La5	N1,N2
PEK_W03	K1INF_W04	C2	Wy4, Ćw5, La3, La4	N1,N2
PEK_W04	K1INF_W04	C3	Wy9, Ćw8	N1,N2
PEK_W05	K1INF_W04	C3	Wy11	N1,N2
PEK_W06	K1INF_W04	C3	Wy12	N1,N2
PEK_U01 (skills)	K1INF_U01, K1INF_U014	C1	Wy1- Wy8, Ćw2- Ćw8, La2- La5	N1,N2
PEK_U02	K1INF_U01	C2	Wy4, Ćw5, La3, La4	N1,N2
PEK_K01 (competences)	K1INF_W04		La1- La5	N2

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

*** - from table above

FACULTY

SUBJECT CARD

Name in English	**Mathematical Analysis 1.1 A**	
Name in Polish	**Analiza Matematyczna 1.1 A**	
Main field of study (if applicable)		
Specialization (if applicable)		
Level and form of studies	I level, full-time	
Kind of subject	obligatory	
Subject code	MAP3057	
Group of courses	Yes	

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30	30			
Number of hours of total student workload (CNPS)	150	90			
Form of crediting	exam				
For group of courses mark (X) final course	X				
Number of ECTS points	8				
including number of ECTS points for practical (P) classes	3				
including number of ECTS points for direct teacher-student contact (BK) classes	5				

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

It is recommended that the knowledge of mathematics is equivalent to secondary school certificate at the advanced level.

SUBJECT OBJECTIVES

C1. Understanding the basic methods of analysis of the graph of functions of one variable.

C2. Understanding the concept of definite integral and its basic properties and methods of determination.

C3. Understanding the practical applications of mathematical methods for the analysis of functions of one variable.

SUBJECT EDUCATIONAL EFFECTS

Relating to knowledge:

PEK_W1. Knows the basic definitions and theorem from Mathematical Analysis of functions of one variable.

PEK_W2. Knows the notion of definite integral and its basic applications.

Relating to skills:

PEK_U1. Can examine graphs of simple functions.

PEK_U2. Can calculate integrals of simple functions.

Relating to social competences:

PEK_K1. Understand how calculus affects on the development of technical civilization

PROGRAM CONTENT	
Form of classes - lectures	**Hours**
Wy1 Mathematical notations (logical connetives, quantifieries), elements of set theory, real numbers, subsets of real numbers (intervals, half-lines). Linear and quadratic functions.	2.0
Wy2 Basic properties of functions (injective and monotonic functions). Composition of functions. The inverse function. Power and exponential functions, and opposite to them. Properties of logarithms.	2.0
Wy3 Trygonometric functions and their inverses. Graphs of trigonometric and of its inverses.	2.0
Wy4 Sequences and limits. Basic formulas and theorems. Number e. Improper limits.	2.0
Wy5 The limit of a function in a point. Directional limits of function. Asymptotics of function.	2.0
Wy6 Continuity of a function in a point and on the interval. Basic properties of conituous functions. Approximate solutions of equations. Points of discontinuity.	2.0
Wy7 The definition of derivative. Basic formulas and theorems. Geometric and physics interpretations. Mean value theorem. De L'Hospital rule.	2.0
Wy8 Extreme values, monotonicity. Higher order derivatives. Convexity of function.	2.0
Wy9 Examination of the graph of a function.	2.0
Wy10 Taylor formula. Aproximation of function. Applications.	2.0
Wy11 Definite integral. Simple examples. Connection between interal and derivative (Fundamental Theorem of Calculus). Simple examples	2.0
Wy12 Indefinite integral: basic formulas. Areas of simple figures.	2.0

Wy13	The basic methods of calculus of integrals: integration by parts and by substitution.	2.0
Wy14	The basic methods of calculus of integrals: simple rational funnctions. Area and perimeter of a circle. The volume of rotary figures.	2.0
Wy15	Application of methods of mathematical analysis of one variable functions.	2.0
	Total hours	**30**
	Form of classes - classes	**Hours**
Cw1	Tautologies, de Morgan laws, union, intersection and complement of set	2.0
Cw2	Natural numbers, integers, rational and real numbers. Logarithm.	2.0
Cw3	Graphs of simple functions. Inverse function. Composition of functions.	2.0
Cw4	Trygonometric functions and trygonometric identities.	2.0
Cw5	Limit of sequences.	2.0
Cw6	The limit of a function in point.	2.0
Cw7	Continuous functions	2.0
Cw8	Points of discontinuity. Solutions of equations	2.0
Cw9	Derivatives. Tangent line to a graph of a function.	2.0
Cw10	Examination of graphs of functions - I	2.0
Cw11	Examination of graphs of functions - II	2.0
Cw12	Taylor formula. De L'Hospital rule	2.0
Cw13	Integration - I	2.0
Cw14	Integration - II	2.0
Cw15	Integration - applications	2.0
	Total hours	**30**

TEACHING TOOLS USED

N1. Lecture - traditional method

N2. Classes - traditional method

N3. Student's self work with the assistance of mathematical packages

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT

Evaluation (F-forming; P - concluding)	Educational effect number	Way of evaluating educational effect achievement
F1	PEK_U1, PEK_K1	colloquium during classes, oral answers
F2	PEK_U2, PEK_K1	colloquium during classes, oral answers
F3	PEK_W1, PEK_W2	exam
P - sets the lecturer		

PRIMARY AND SECONDARY LITERATURE

PRIMARY

A1. F. Leja, Rachunek Różniczkowy i Całkowy, Wydawnictwo Naukowe PWN, 2012

A2. W. Krysicki, L. Włodarski, Analiza Matematyczna w Zadaniach, Cz. I, PWN, Warszawa 2006

SECONDARY

B1. K. Kuratowski, Rachunek Różniczkowy i Całkowy. Funkcje Jednej Zmiennej, Wydawnictwo Naukowe PWN, 2012

B2. G. M. Fichtenholz, Rachunek Różniczkowy i Całkowy, T. I-II, PWN, Warszawa 2007

B3. M. Gewert, Z. Skoczylas, Analiza Matematyczna 1. Przykłady i Zadania, Oficyna Wydawnicza GiS, Wrocław 2011

SUBJECT SUPERVISORS

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT

Analiza Matematyczna 1.1 A MAP3057

AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY ……

AND SPECIALIZATION …..

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_W1		C1	Wy1 Wy2 Wy3 Wy4 Wy5 Wy6 Wy7 Wy8 Wy9 Wy10 Wy11 Wy12 Wy13 Wy14 Wy15 Cw1 Cw2 Cw3 Cw4 Cw5 Cw6 Cw7 Cw8 Cw9 Cw10 Cw11 Cw12 Cw15	N1, N2, N3
PEK_W2		C2 C3	Wy11 Wy12 Wy13 Wy14 Wy15 Cw13 Cw14 Cw15	N1, N2, N3
PEK_U1		C1	Wy1 Wy2 Wy3 Wy4 Wy5 Wy6 Wy7 Wy8 Wy9 Wy10 Wy15 Cw1 Cw2 Cw3 Cw4 Cw5 Cw6 Cw7 Cw8 Cw9 Cw10 Cw11 Cw12 Cw15	N1, N2, N3
PEK_U2		C1 C2 C3	Wy11 Wy12 Wy13 Wy14 Wy15 Cw13 Cw14 Cw15	N1, N2, N3
PEK_K1		C1 C2	Wy9 Wy10 Wy11 Wy12 Wy13 Wy14 Wy15 Cw12 Cw13 Cw14 Cw15	N1, N2, N3

FACULTY

SUBJECT CARD

Name in English	**Mathematical Analysis 2.4 A**	
Name in Polish	**Analiza Matematyczna 2.4 A**	
Main field of study (if applicable)		
Specialization (if applicable)		
Level and form of studies	I level, full-time	
Kind of subject	obligatory	
Subject code	MAP3059	
Group of courses	Yes	

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30	15			
Number of hours of total student workload (CNPS)	120				
Form of crediting	exam				
For group of courses mark (X) final course					
Number of ECTS points	4				
- including number of ECTS points for practical (P) classes	2				
- including number of ECTS points for direct teacher-student contact (BK) classes	2.5				

PREREQUISITIES

Knowledge of differential and integral calculus of function of one variable

SUBJECT OBJECTIVES

C1. Knowledge of basic properties of infinite series and power series.

C2. Understanding the basic concepts of differential calculus of several variables.

C3. Understanding the basic concepts of integral calculus of functions of several variables.

C4. Understanding the Laplace transform and Fourier transform.

SUBJECT EDUCATIONAL EFFECTS

Relating to knowledge:

PEK_W1. Know the basic criteria of convergence of infinite series.

PEK_W2. Know the basic concepts of differential and integral calculus of functions of several variables.

PEK_W3. Know the basic concepts of differential and integral calculus of functions of several variables.

Relating to skills:

PEK_U1. Can find power series of a function, knows how to use power series for approximations of functions

PEK_U2. Can compute the partial derivatives, directional and gradient functions of several variables and interpret the wielkoćci, able to solve problems for the optimization of functions of several variables

PEK_U3. Is able to calculate and interpret the integral multiple, able to solve engineering problems using double and triple integrals

PEK_U4. Can calculate integral transforms from simple functions

Relating to social competences:

PEK_K1. Understand the role played by Mathematical Analysis to analyze technical problems

PROGRAM CONTENT	
Form of classes - lectures	**Hours**
Wy1 Improper integrals. Cauchy principal value.	2.0
Wy2 Infinite series. The basic criteria for convergence of series. Absolute and conditional convergence. Leibniz criterion.	2.0
Wy3 Power series. The radius and interval of convergence. Cauchy theorem - Hadamard. Taylor Series.	2.0

Wy4	Properties of the space R^n. Subsets of the space R^n. Functions of several variables.	2.0
Wy5	Partial derivatives of the first order. Definition. Geometric interpretation. Higher order partial derivatives. Schwarz theorem	2.0
Wy6	The plane tangent to the graph of a function of two variables. Directional derivatives. Gradient of a function.	2.0
Wy7	Local extremes of functions of two variables. Sufficient conditions for the existence of extreme. The smallest and the largest value of the function on the set. Examples of extremal problems in geometry and technology.	2.0
Wy8	Conditional extremes conditional function of two variables. Applications. Examples of optimization problems.	2.0
Wy9	Double integrals. The definition of the double integral. Geometric and physical interpretation. Calculation of double integrals normal regions.	2.0
Wy10	Properties of double integrals. Jacobian function. Change of variables in double integrals. Double integral in polar coordinates.	2.0
Wy11	Triple integrals. Reversal iterated integrals. Change of variables in cylindrical and spherical coordinates	2.0
Wy12	Applications of double and triple integrals in geometry and physics.	2.0
Wy13	Laplace transform.	2.0
Wy14	Inverse Laplace transform and its applications	2.0
Wy15	Introduction to the Fourier transform.	2.0
	Total hours	30
Form of classes - classes		**Hours**
Cw1	Infinitie series	2.0
Cw2	Power series	2.0
Cw3	The functions of two variables.	2.0
Cw4	Partial derivatives.	2.0
Cw5	Gradient. Tangent planes.	2.0

Cw6	Extremes of functions of two variables.	2.0
Cw7	Conditional Extremes.	2.0
Cw8	The study of functions of several variables - I	2.0
Cw9	The study of functions of several variables - II	2.0
Cw10	Double integrals.	2.0
Cw11	Triple integrals.	2.0
Cw12	Integrals of functions of several variables.	2.0
Cw13	Applications of multiple integrals	2.0
Cw14	Laplace transform	2.0
Cw15	Integral transforms	2.0
	Total hours	**30**

TEACHING TOOLS USED

N1. Lecture - traditional method

N2. Classes - traditional method

N3. Student's self work with the assistance of mathematical packages

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT

Evaluation (F-forming; P - concluding)	Educational effect number	Way of evaluating educational effect achievement

F1	PEK_W1, PEK_W2, PEK_U1, PEK_U2, PEK_K1	kolokwium na cwiczeniach, odpowiedzi ustne
F2	PEK_W2, PEK_U2, PEK_U3, PEK_K1	kolokwium na cwiczeniach, odpowiedzi ustne
F3	all	exam
P - sets the lecturer		

LITERATURE

PRIMARY

A1. F. Leja, Rachunek Różniczkowy i Całkowy, Wydawnictwo Naukowe PWN, 2012

A2. R. Leitner, Zarys Matematyki Wyższej dla Studiów Technicznych, Cz. 1-2 WNT, Warszawa, 2006.

SECONDARY

B1. W. Krysicki, L. Włodarski, Analiza Matematyczna w Zadaniach, Cz. II, PWN, Warszawa 2006

B2. G. M. Fichtenholz, Rachunek Różniczkowy i Całkowy, T. I-II, PWN, Warszawa 2007

B3. M. Gewert, Z. Skoczylas, Analiza Matematyczna 2. Przykłady i Zadania, Oficyna Wydawnicza GiS, Wrocław 2011

SUBJECT SUPERVISORS

1. Komisja Programowa Instytutu Matematyki i Informatyki

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT

Mathematica Analysis 2.4 A MAP3059

AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY ……

AND SPECIALIZATION …..

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_W1		C1	Wy1 Wy2 Wy3 Cw1 Cw2	N1, N2, N3
PEK_W2		C2 C3	Wy4 Wy5 Wy6 Wy7 Wy8 Wy9 Wy10 Wy11 Wy12 Cw3 Cw4 Cw5 Cw6 Cw7 Cw8 Cw9 Cw10 Cw11 Cw12 Cw13	N1, N2, N3
PEK_W3		C4	Wy13 Wy14 Wy15 Cw14	N1, N2, N3
PEK_U1		C1	Wy1 Wy2 Wy3 Cw1 Cw2	N1, N2, N3
PEK_U2		C2	Wy5 Wy6 Wy7 Wy8 Cw3 Cw4 Cw5 Cw6 Cw7 Cw8 Cw9	N1, N2, N3
PEK_U3		C3	Wy9 Wy10 Wy11 Wy12 Cw10 Cw11 Cw12 Cw13	N1, N2, N3
PEK_U4		C4	Wy13 Wy14 Wy15 Cw14 Cw15	N1, N2, N3
PEK_K1		C1 C2 C3 C4	Wy1 Wy2 Wy3 Wy5 Wy6 Wy7 Wy8 Wy9 Wy10 Wy11 Wy12 Wy13 Wy14 Wy15 Cw1 Cw2 Cw3 Cw4 Cw5 Cw6 Cw7 Cw8 Cw9 Cw10 Cw11 Cw12 Cw13 Cw14 Cw15	N1, N2, N3

FACULTY of **Computer Science and Mangement**/ DEPARTMENT………………
SUBJECT CARD
Name in Polish: Architektura systemów komputerowych
Name in English: Computer Systems Architecture

Main field of study (if applicable): Informatics
Specialization (if applicable):
Level and form of studies: 1st/ 2nd* level, full-time / part-time*
Kind of subject: obligatory / optional / university-wide*
Subject code INZ001520Wl
Group of courses YES / NO*

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30		30		
Number of hours of total student workload (CNPS)	60		90		
Form of crediting	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*
For group of courses mark (X) final course	X				
Number of ECTS points	2		3		
including number of ECTS points for practical (P) classes	0		3		
including number of ECTS points for direct teacher-student contact (BK) classes	1,5		1,5		

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

3. Basic knowledge of computer systems organization and design of combinational and sequential circuits
4. Programming skills at a basic level

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SUBJECT OBJECTIVES

C1   Acquainting students with the architecture of modern computers, including the memory organization, and evaluation of their performance

C2   Acquisition of skills to design and construct simple combinational and sequential circuits

C3   Acquisition of programming skills in assembly language of selected processor at a basic level

C4   Acquisition of the ability to apply the principles of health and safety work

SUBJECT EDUCATIONAL EFFECTS

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEK_W01 Knows different computer architectures including the architecture of the parallel computers

PEK_W02 Knows the computer memory organization, especially memory cache

PEK_ W03 Knows the basics of pipeline processing, including how to solve the problems associated with this type of processing

PEK_W04 Knows the basic methods of evaluating the performance of parallel computers

relating to skills:

PEK_U01 Is able to write simple programs in assembly language of selected processor

PEK_U02 Can design and build simple combinational and sequential circuits

PEK_U03 Is able to use the principles of safety and health at work

relating to social competences:

PEK_K01…

PROGRAMME CONTENT

Form of classes - lecture		Number of hours
Lec 1	Introduction - taxonomy of computer architectures, memory hierarchy. Harvard, Princeton and Harvard-Princeton architectures.	2
Lec 2	RISC computer organization: pipelining, cache memory, control unit.	2
Lec 3	Architecture and organization of the chosen RISC processor.	2
Lec 4	Instruction set of the chosen RISC processor, the fundamentals of assembler programming.	2
Lec 5	Working environment. Programming in assembly language I.	2
Lec 6	Programming in assembly language II.	
Lec 7	Advanced assembly programming techniques.	2
Lec 8	Memory organization, cache memory – methods if it's realization (associative, direct mapped, set-associative) – examples	2
Lec 9	Virtual memory – paging, segmentation – examples.	2
Lec 10	Pipeline processing, identification of conflicts and it's avoiding, , automatic reordering of program execution.	2
Lec 11	Delay branches, branch prediction algorithms	2
Lec 12	Multiprocessor and multicomputer systems – distributed and shared memory, vector processors.	2
Lec 13	Static and dynamic interconnection networks, used topologies, routing mechanisms.	2
Lec 14	System evaluation: performance metrics, system scalability, Amdhal's Low.	2
Lec 15	. New trends in computer architecture.	2
	Total hours	30

Form of classes - class		Number of hours
Cl 1		
Cl 2		
..		
	Total hours	

Form of classes - laboratory		Number of hours
Lab1	Presentation of lab scope, presentation of grading principles, training from health and safety at work. Familiarization with laboratory tool used for the realization of combinational and sequential circuits.	2
Lab2	Introductory laboratory - the analysis of the chosen circuit	2
Lab3	Designing of combinational circuits I	2
Lab4	Designing of combinational circuits II	2
Lab5	The analysis of systems with static hazard	2
Lab6	The analysis of the synchronous circuit	2
Lab7	The synthesis of the synchronous circuit	2
Lab8	Introduction to the lab in assembly language programming, familiarization with the working environment	2
Lab9	Implementation of a simple program in assembler, running it in different execution modes, observing the contents of the registers during program execution.	2
Lab10	Implementation of a program that uses conditional branches	2
Lab11	Familiarization with the implementation of different iteration instructions in assembly language	2
Lab12	Familiarization with arrays implementation in assembly language.	2
Lab13	Familiarization with prodedures implementation in assembly language.	2
Lab14	Implementation of a program that used nested procedures.	2
Lab15	Implementation of a program with floating point operations	2
	Total hours	30

Form of classes - project		Number of hours
Proj1		
Proj2		
…		
	Total hours	

Form of classes - seminar		Number of hours
Sem1		
Sem2		
…		
	Total hours	

TEACHING TOOLS USED
N1. Lecture supported by multimedia presentations (slideshow) N2. SPIM and MIPS32 Simulator - http://pages.cs.wisc.edu/ ~ Larus / spim.html N3. MARS (MIPS Assembler and Runtime Simulator) -

N4. Mounting plates allowing realization of combinational and sequential circuits

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)	PEK_W01 PEK_W02 PEK_W03 PEK_W04	Quizzes during the lecture, student activity during the lecture, students answering on questions during lecture
F2 – (switching theory laboratory) - (Lab1- Lab7)	PEK_U01 PEK_U03	Checking of student preparation for exercise realization, assessment (points allocated) to the reports of the exercises
F3 – (assembly programming laboratory) - (Lab8- Lab15)	PEK_U02 PEK_U03	Evaluation of the quality of submitted by students programs, implementation during the laboratory additional tasks formulated during the laboratory (on-line programing

P - final exam, the final assessment will be issued on the basis of partial grades (points) received from the final exam (E) and the evaluation of F1, F2, F3 as follows:

Grade = 40% * E + 10% * F1 + 25% * F2 + 25% * F3

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1]   D. Patterson, J. Hennessy, Computer Organization and design, Elsevier
[2]   Technical documentation available on the Web related to MIPS, Intel and AMD processors
[3]   W. Stallings, „Computer Organization and Architecture", Prentice-Hall International
[4]   L. Null, J. Lobur, „The Essentials of Computer Organization and Architecture", Jones and Bartleet Pub. 2003

SECONDARY LITERATURE:

[1] D. Patterson, J. Hennessy, "Computer Architecture – a Quantitave Approach", Elsevier

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)
Jan Kwiatkowski, jan.kwiatkowski@pwr.wroc.pl

MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Computer Systems Architecture
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY I**nformatics**
AND SPECIALIZATION

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)	K1INF_W08	C1	Lec1, Lec2, Lec3, Lec12, Lec13, Lec15	N1
PEK_W02	K1INF_W08	C1	Lec2, Lec8, Lec9	N1
PEK_W03	K1INF_W08	C1	Lec2, Lec10, Lec11	N1
PEK_W04	K1INF_W08	C1	Lec14	N1
PEK_U01 (skills)	K1INF_U06	C3	Lec4, Lec5, Lec6, Lec7, Lab8 – Lab15	N1, N2, N3
PEK_U02	K1INF_U06	C2	Lab1- Lab7	N4
PEK_U03	K1INF_U14	C4	Lab1 – Lab15	N2,N3,N4
PEK_K01 (competences)				

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

*** - from table above

Zał. nr 4 do ZW 64/2012

FACULTY W-8 / DEPARTMENT………………

SUBJECT CARD

Name in Polish: Baza danych Oracle - programowanie
Name in English: Oracle Database - programming
Main field of study (if applicable): Informatics
Specialization (if applicable): ……………………..
Level and form of studies: 1st/ 2nd* level, full-time / part-time*
Kind of subject: obligatory / optional / university-wide*
Subject code   INZ005204
Group of courses   YES / NO*

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	15			30	
Number of hours of total student workload	30			90	

(CNPS)					
Form of crediting	~~Examination~~ / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	~~Examination~~ / crediting with grade*	Examination / 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	0			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. Knowledge of the rules of the projecting and building relation databases.
2. Skill in defining simple SQL queries.
3. Competences in the field of the structural and object-oriented programming paradigm.

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SUBJECT OBJECTIVES

C1 Gain basic knowledge of Oracle database programming environment.
C2 Gain basic knowledge of Oracle SQL extensions.
C3 Gain basic knowledge of the PL/SQL language.
C4 Gain basic knowledge of the object-oriented extensions of Oracle database.
C5 Gain basic knowledge of Oracle database security mechanisms.
C6 Gain basic knowledge of query optimization for Oracle database.

C7 Acquiring basic programming skills in the use of the programming environment of Oracle database.
C8 Acquiring basic programming skills in the use of Oracle SQL extensions.
C9 Acquiring basic programming skills in the use of PL / SQL language on the database server side.
C10 Acquiring basic programming skills in the use of Oracle object-oriented extensions for the database schema and for the programming on the database server side.
C11 Acquiring basic programming skills in the use of security mechanisms offered by the Oracle database.
C12 Acquiring basic skills development in the field of query optimization to an Oracle database.
C13 Learning how to navigate the literature and other sources to find information, expanding knowledge of the Oracle database programming.

C14 Obtaining competence in persuading and justifying the need for their solutions to work with the Oracle database.
C15 Awareness of the need for further work to expand knowledge of the Oracle database programming.
C16 Obtaining competence in the division of the solved problem, concerning database programming, into sub-problems in such a way that they can be passed to the implementation of co-workers, co-ordinating the work yourself.

C17	Awareness of the social dangers connected with incorrect or incomplete data protection.	

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEK_W01 He has a basic knowledge about the programming environment of Oracle database.
PEK_W02 He has knowledge about extensions of Oracle SQL
PEK_W03 He knows the structures of PL / SQL language.
PEK_W04 He has knowledge about object-oriented extensions of Oracle database.
PEK_W05 He has knowledge about the security mechanisms of Oracle database.
PEK_W06 He has knowledge connected with optimizers and with the principles of SQL queries optimization in an Oracle database

relating to skills:
PEK_U01 He can navigate in the programming environment of Oracle database
PEK_U02 He can construct advanced SQL queries to Oracle.
PEK_U03 Using PL / SQL language, he can program on the server-side of Oracle database.
PEK_U04 He can use the object-oriented extensions of the Oracle database, both in the definition of database scheme as well as programming in PL / SQL.
PEK_U05 He can define the basic security structures for Oracle database.
PEK_U06 He can modify the query to an Oracle database improving their efficiency and he can use Oracle database optimizers.
PEK_U07 He can navigate the literature and other sources to find extending information about programming of Oracle database..

relating to social competences:
PEK_K01 He can argue and justify the need to use their solutions at work with the Oracle database.
PEK_K02 He is aware of the need for further individual work in order to improve knowledge on Oracle database programming.
PEK_K03 He can divide a problem solved, connected with database programming, into sub-problems in such a way that they can be passed to the implementation of co-workers, co-ordinating the work yourself.
PEK_K04 He is aware of the social risks associated with incorrect or incomplete data protection.

PROGRAMME CONTENT

Form of classes - lecture		Number of hours
Lec 1	Preliminary information on the Oracle DBMS.	1
Lec 2	Oracle SQL dialect - specific extensions and advanced queries	2
Lec 3	PL / SQL language - commands and their syntax.	2
Lec 4	Advanced mechanisms of language PL / SQL.	2
Lec 5	Object-oriented extensions of the Oracle database.	2
Lec 6	Oracle security mechanisms, query optimization and optimizers.	2
Lec 7	Test.	2
Lec 8	Repeating test.	2
	Total hours	**15**

Form of classes - class		Number of hours
Cl 1		
Cl 2		

Cl 3		
Cl 4		
..		
	Total hours	

Form of classes - laboratory		Number of hours
Lab 1		
Lab 2		
Lab 3		
Lab 4		
Lab 5		
…		
	Total hours	

Form of classes - project		Number of hours
Proj 1	Preview, health and safety course, introduction to the Oracle programming environment.	2
Proj 2	Discussion and pass a project list No. 1 concerning advanced SQL in Oracle dialect.	2
Proj 3	Consultation to the project list No. 1 and its implementation.	2
Proj 4	Consulting to the project list No. 1, its implementation and reception.	2
Proj 5	Discussion and pass a project list No. 2, concerning the basic structures of PL / SQL. Test No. 1 concerning advanced Oracle SQL dialect.	2
Proj 6	Consultation to the project list No. 2 and its implementation.	2
Proj 7	Consulting to the project list No. 2, its implementation and reception.	2
Proj 8	Discussion and pass a project list No. 3 concerning advanced PL/SQL.	2
Proj 9	Consultation to the project list No. 3 and its implementation.	2
Proj 10	Consulting to the project list No. 3, its implementation and reception.	2
Proj 11	Discussion and pass a project list No. 4 concerning the object-oriented extensions of the Oracle database. Test No. 2 concerning PL/SQL.	2
Proj 12	Consultation to the project list No. 4 and its implementation.	2
Proj 13	Consulting to the project list No. 4, its implementation and reception.	2
Proj 14	Discussion and pass a project list No. 5, concerning using optimizer and the use of security mechanisms of Oracle database.	2
Proj 15	Consulting to the project list No. 5, its implementation and reception. Credits.	2
	Total hours	**30**

Form of classes - seminar		Number of hours
Sem 1		
Sem 2		
Sem 3		
…		
	Total hours	

	TEACHING TOOLS USED

N1. Lecture using the projector.
N2. Projects as a project task lists.
N3. Consultation.
N4. Student's own work - preparation of project tasks lists and self-refer to the topics identified by the teacher.
N5. Test (project).
N6. Test (lecture).

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	PEK_W02, PEK_U02, PEK_U07	Test No. 1. Point scale - up to 20% of the total number of points which one can obtain during the whole project.
F2	PEK_W03, PEK_U03, PEK_U07	Test No. 2. Point scale - up to 20% of the total number of points which one can obtain during the whole project.
F3	PEK_W01, PEK_W02, PEK_U01, PEK_U02, PEK_U07	Oral answer during passing a project list No. 1. Point scale - up to 12% of the total number of points which one can obtain during the whole project.
F4	PEK_W03, PEK_U03, PEK_U07	Oral answer during passing a project list No. 2. Point scale - up to 12% of the total number of points which one can obtain during the whole project.
F5	PEK_W03, PEK_U03, PEK_U07	Oral answer during passing a project list No. 3. Point scale - up to 12% of the total number of points which one can obtain during the whole project.
F6	PEK_W04, PEK_U04, PEK_U07	Oral answer during passing a project list No. 4. Point scale - up to 12% of the total number of points which one can obtain during the whole project.
F7	PEK_W05, PEK_W06, PEK_U05, PEK_U06, PEK_U07	Oral answer during passing a project list No. 5. Point scale - up to 12% of the total number of points which one can obtain during the whole project.
P1 - final evaluation of the lecture	PEK_W01, PEK_W02, PEK_W03, PEK_W04, PEK_W05, PEK_W06, PEK_U01, PEK_U02, PEK_U03, PEK_U04, PEK_U05, PEK_U06, PEK_U07, PEK_K01, PEK_K02, PEK_K03, PEK_K04	Test. Evaluation determined on the basis of the number of points gained (the percentage of the total number of points available) according to the formula: < 0%, 50%) → ndst <50%, 60%> → dst (60%, 70%> → dst+ (70%, 80%> → db (80%, 90%> → db+ (90%, 100%> → bdb

P2 - final evaluation of the project	PEK_W01, PEK_W02, PEK_W03, PEK_W04, PEK_W05, PEK_W06, PEK_U01, PEK_U02, PEK_U03, PEK_U04, PEK_U05, PEK_U06, PEK_U07	Evaluation determined on the basis of the total number of points scored in the evaluations forming F1, F2, F3, F4, F5, F6 and F7 (the percentage of the total number of points to obtain the project) according to the formula: < 0%, 60%) → ndst <60%, 68%> → dst (68%, 76%> → dst+ (76%, 84%> → db (84%, 92%> → db+ (92%, 100%> → bdb

<div align="center">

PRIMARY AND SECONDARY LITERATURE

</div>

PRIMARY LITERATURE:

[5]   J. Price, Oracle Database 11g i SQL. Programowanie, Wydawnictwo Helion, Gliwice 2009.
[6]   K. Loney, Oracle Database 11g. Kompendium administratora, Wydawnictwo Helion, Gliwice 2010.
[7]   M. McLaughlin, Oracle Database 11g. Programowanie w języku PL/SQL, Wydawnictwo Helion, Gliwice 2009.
[8]   A. Pelikant, Programowanie serwera Oracle 11g SQL i PL/SQL. eBook, Wydawnictwo Helion, Gliwice 2012.
[9]   F. Steven, Oracle PL/SQL. Najlepsze praktyki, Wydawnictwo Naukowe PWN, Warszawa 2009.
[10]   Materiały dostarczone przez wykładowcę.

SECONDARY LITERATURE:

[1]   T. Connolly, C. Begg, Systemy baz danych, T. 1 i 2, Wydawnictwo RM, Warszawa 2004.
[2]   H. Ladanyi, SQL, Księga eksperta, Wydawnictwo Helion, Gliwice 2000.

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

   Zbigniew Staszak, zbigniew.staszak@pwr.wroc.pl

MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Oracle Database - programming
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY Informatics
AND SPECIALIZATION ……………………………..

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)	K1INF_W05, K1INF_W10, K1INF_W16, K1INF_W22	C1	Wy1, Pr1	N1, N2
PEK_W02	K1INF_W06, K1INF_W16, K1INF_W22	C2	Wy2, Pr2, Pr3, Pr4	N1, N2, N3, N4, N5, N6
PEK_W03	K1INF_W04, K1INF_W05, K1INF_W06, K1INF_W16, K1INF_W22	C3	Wy3, Wy4. Pr5, Pr6, Pr7, Pr8, Pr9, Pr10	N1, N2, N3, N4, N5, N6
PEK_W04	K1INF_W04, K1INF_W05, K1INF_W06, K1INF_W16, K1INF_W22	C4	Wy5, Pr11, Pr12, Pr13	N1, N2, N3, N4, N6
PEK_W05	K1INF_W08, K1INF_W10, K1INF_W13, K1INF_W14, K1INF_W16, K1INF_W22	C5	Wy6, Pr14, Pr15	N1, N2, N3, N4, N6
PEK_W06	K1INF_W04, K1INF_W05, K1INF_W06, K1INF_W08, K1INF_W10, K1INF_W16, K1INF_W22	C6	Wy6, Pr14, Pr15	N1, N2, N3, N4, N6
PEK_U01 (skills)	K1INF_U06, K1INF_U16, K1INF_U19	C7	Wy1, Pr1	N1, N2
PEK_U02	K1INF_U01, K1INF_U03, K1INF_U04, K1INF_U19	C8	Wy2, Pr2, Pr3, Pr4	N1, N2, N3, N4, N5, N6
PEK_U03	K1INF_U01, K1INF_U03, K1INF_U19	C9	Wy3, Wy4, Pr5, Pr6, Pr7, Pr8, Pr9, Pr10	N1, N2, N3, N4, N5, N6
PEK_U04	K1INF_U02. K1INF_U15, K1INF_U19	C10	Wy5, Pr11, Pr12, Pr13	N1, N2, N3, N4, N6
PEK_U05	K1INF_U06, K1INF_U14, K1INF_U19	C11	Wy6, Pr14, Pr15	N1, N2, N3, N4, N6
PEK_U06	K1INF_U01, K1INF_U03, K1INF_U04, K1INF_U19	C12	Wy6, Pr14, Pr15	N1, N2, N3, N4, N6

PEK_U07	K1INF_U05, K1INF_U11, K1INF_U17	C13	Pr2, Pr3, Pr4, Pr5, Pr6, Pr7, Pr8, Pr9, Pr10, Pr11, Pr12, Pr13, Pr14, Pr15	N2, N4
PEK_K01 (competences)	K1INF_K04, K1INF_K06, K1INF_K08	C14	Pr4, Pr7, Pr10, Pr13, Pr15	N2, N3
PEK_K02	K1INF_K01, K1INF_K08	C15	Wy1, Wy2, Wy3, Wy4, Wy5, Wy6, Pr1, Pr2, Pr3, Pr4, Pr5, Pr6, Pr7, Pr8, Pr9, Pr10, Pr11, Pr12, Pr13, Pr14, Pr15	N1, N2, N3
PEK_K03	K1INF_K03, K1INF_K04, K1INF_K06	C16	Wy1, Wy2, Wy3, Wy4, Wy5, Wy6, Pr1, Pr2, Pr3, Pr4, Pr5, Pr6, Pr7, Pr8, Pr9, Pr10, Pr11, Pr12, Pr13, Pr14, Pr15	N1, N2, N3, N4
PEK_K04	K1INF_K02, K1INF_K05	C17	Pr1, Pr2, Pr3, Pr4, Pr5, Pr6, Pr7, Pr8, Pr9, Pr10, Pr11, Pr12, Pr13, Pr14, Pr15	N1, N2, N3

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

FACULTY **Computer Science and Management** / DEPARTMENT **Computer Science**
SUBJECT CARD
Name in Polish Bazy danych
Name in English Database
Main field of study (if applicable): Computer Science
Specialization (if applicable): ……………………..
Level and form of studies: 1st/ 2nd* level, full-time / part-time*
Kind of subject: obligatory / optional / university-wide*
Subject code *INZ002557*
Group of courses YES / NO*

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30	15	15		
Number of hours of total student workload (CNPS)	60	30	60		
Form of crediting	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*
For group of courses mark (X) final course					

Number of ECTS points	2	1	2		
including number of ECTS points for practical (P) classes		1	2		
including number of ECTS points for direct teacher-student contact (BK) classes	1,2	0,6	1,2		

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1.
2.
3.

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SUBJECT OBJECTIVES

C1. Getting familiar with the basic concepts, terminology and issues related to databases.
C2. Getting to know the relational database model.
C3. Learning to design a relational database with a chosen structured methodology.
C4. Learning to normalize relations schemes.
C5. Learning how to prepare database project documentation.
C6. Getting to know languages of databases.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEK_W01 - knows the chosen methodology of database design
PEK_W02 - knows the basic concepts, terminology and issues related to databases
PEK_W03 - knows the relational data model
PEK_W04 - has knowledge of the database normalization schema
PEK_W05 - knows the basic syntax of database languages
PEK_W06 - knows the rules for the preparation of a database project documentation
PEK_W07 - knows the issues of database security

relating to skills:
PEK_U01 - can correctly use the terminology associated with database
PEK_U02 - can see an area where there is a need to design a database
PEK_U03 - is able to design the database for the selected fragments of reality
PEK_U04 - can perform a database schema normalization
PEK_U05 - in accordance with the requirements can be documented using the database design
PEK_U06 - can create a sample of database schema and populate it with data
PEK_U07 - can formulate queries in selected query languages
PEK_U08 - can develop prototypes of simple view
PEK_U09 - observe safety rules when working in the laboratory
…
relating to social competences:
PEK_K01 - can work in a team (2-3 persons)
PEK_K02 - is aware of the importance of professional ethics
PEK_K03 - has a sense of responsibility for their own work and the willingness to comply with the rules
        work in a team and to take responsibility for collaborative tasks
PEK_K04 - can takes criticism and actually hold discussions
PEK_K05 - can argue their views
PEK_K06 - is able to evaluate their own work and team members

PEK_K07 - has the ability to communicate with team members
PEK_K08 - developing self-esteem and self-control ability and the responsibility for the results of actions taken
PEK_K09 - can plan your work and do it regularly in accordance with a specific timetable

PROGRAMME CONTENT	

Form of classes - lecture		Number of hours
Lec 1	Basic concepts and terminology of databases. The architecture of the database system.	2
Lec 2	Data models. Relational model.	2
Lec 3	Conceptual design. Entity Relation Diagram ERD	2
Lec 4	Designing logical. Transforming ERD to database schema	2
Lec 5	Features of a well-designed database. What determines the poor database design? Discussion of examples.	2
Lec 6	Functional dependencies. Normal Forms.	2
Lec 7	Database schema normalization.	2
Lec 8	Language of databases. Designing language queries using Query by Example.	2
Lec 9	SQL syntax.	2
Lec 10	Language based on predicate calculus.	2
Lec 11	Language based on the algebra of relations.	2
Lec 12	Distributed Database.	2
Lec 13	Confidentiality in database systems	2
Lec 14	Security database	2
Lec 15	Processing transaction in databases.	2
	Total hours	30

Form of classes - class		Number of hours
Cl 1	Basic concepts: database, DBMS, database system. Examples.	2
Cl 2	Relational model. Relational algebra.	2
Cl 3	Database modeling for a selected slice of reality.	2
Cl 4	ERD. Transformation rules from a conceptual model to a logical model	2
Cl 5	Normal forms, database normalization	2
Cl 6	Query languages: QbE, SQL language (the rudiments).	2
Cl 7	Languages based on the relational algebra and predicate calculus.	2
Cl 8	Final test.	1
	Total hours	15

Form of classes - laboratory		Number of hours
Lab 1	Health and Safety Training. Presentation of the selected DBMS.	2

Lab 2	Formulation of the topic in order to design your own database. The analysis actually chosen field. Documentation of work performed.	2
Lab 3	Development of the conceptual model.	2
Lab 4	The development of a logical model of the database.	2
Lab 5	Implementation of the sample database in DBMS and fill data.	2
Lab 6	Querying the database in the selected database languages.	2
Lab 7	Preparation of a chosen perspectives of prototype.	2
Lab 8	Laboratory assessment.	1
	Total hours	15

Form of classes - project		Number of hours
Proj 1		
Proj 2		
Proj 3		
…		
	Total hours	

Form of classes - seminar		Number of hours
Sem 1		
Sem 2		
Sem 3		
…		
	Total hours	

TEACHING TOOLS USED
N1. Examples of documentation of database designs and examples of the issues discussed

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 – attendance	PEK_K09	Control of the work schedule
F2 – evaluation for class participation	od PEK_U01 do PEK_U08	Logging activity
F3 – assessment for the project database	od PEK_U01 do PEK_U08 oraz od PEK_K01 do PEK_K09	Assessment for the project database
F4 – evaluation of the exercise test	od PEK_W01 do	Evaluation of the exercise test

PRIMARY AND SECONDARY LITERATURE		5

PRIMARY LITERATURE:

[1] Mazur H., Mazur Z.: Projektowanie relacyjnych baz danych. Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław, 2004.

[2] Date C.J.: Relacyjne bazy danych. Helion, Gliwice, 2006.

[3] Date C.J., Darwen H.: SQL. Omówienie standardu języka. WNT, Warszawa, 2000.

SECONDARY LITERATURE:

[1] Pelikant A.: Bazy danych – pierwsze starcie. Helion, Gliwice, 2009.

[2] Jakubowski A.: Podstawy SQL – ćwiczenia praktyczne. Helion, Gliwice, 2001.

[3] Allen S.: Modelowanie danych. Helion, Gliwice, 2006.

[4] Garcia-Molina H., Ullman J.D., Widom J.: Systemy baz danych. Pełny wykład. WNT, Warszawa, 2006.

[5] Ullman J, D.: Podstawowy wykład z systemów baz danych. WNT, Warszawa, 2004.

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

Dr hab. Zygmunt Mazur, prof. PWr., zygmunt.mazur@pwr.wroc.pl

	PEK_W06	
F5 – exam grade	od PEK_W02 do PEK_W05, PEK_W07	Exam grade

P1 – the credit rating of the lecture – exam grade (F5)
P2 – the credit rating exercise – weighted average of F1, F2, F4
P3 – the credit rating laboratory – weighted average of F1, F2, F3

MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Database
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY
computer science
AND SPECIALIZATION …………………………….

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	K1INF_W07	C3	Lec3, Lec4	N1
PEK_W02	K1INF_W22	C1	Lec1-Lec15	N1
PEK_W03	K1INF_W07	C2	Lec2	N1
PEK_W04	K1INF_W07	C4	Lec5-Lec7	N1
PEK_W05	K1INF_W16	C6	Lec8-Lec11	N1
PEK_W06	K1INF_W07	C5	Lec3, Lec4	N1
PEK_W07	K1INF_W16	C1	Lec14	N1
PEK_U01 (skills)	K1INF_U03	C1	Lec1-Lec15, Cl1-Cl7	N1
PEK_U02	K1INF_U03	C3	La2, Cl3	N1
PEK_U03	K1INF_U03	C3	Cl3-Cl5, La2-La5, Lec3-Lec5	N1
PEK_U04	K1INF_U03	C4	Lec6-Lec7, Cl5	N1
PEK_U05	K1INF_U03	C5	Lec3-Lec5, Cl3-Cl4, La2-La7	N1
PEK_U06	K1INF_U04, K1INF_U09	C7	Lec8-Lec11, Cl6-Cl7, La5-La7	N1
PEK_U07	K1INF_U04	C6	La6	N1

PEK_U08	K1INF_U19, K1INF_U09	C7	La7	N1
PEK_U09	K1INF_U14	C7	La1-La8	N1
PEK_K01 (competences)	K1INF_K01	C1-C7	Pr15	N1
PEK_K02	K1INF_K01	C1-C7	Pr15	N1
PEK_K03	K1INF_K01	C1-C7	Pr15	N1
PEK_K04	K1INF_K01	C1-C7	Pr15	N1
PEK_K05	K1INF_K01	C1-C7	Pr15	N1
PEK_K06	K1INF_K01	C1-C7	Pr15	N1
PEK_K07	K1INF_K01	C1-C7	Pr15	N1
PEK_K08	K1INF_K01	C1-C7	Pr15	N1
PEK_K09	K1INF_K01	C1-C7	Pr15	N1

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

Zał. nr 4 do ZW 64/2012

FACULTY OF COMPUTER SCIENCE AND MANAGEMENT

SUBJECT CARD
Name in Polish: Bezpieczeństwo i ochrona danych
Name in English: : Computer Security and Data Protection
Main field of study (if applicable): ………………………….
Specialization (if applicable): ……………………..
Level and form of studies: 1ˢᵗ level, full-time / ~~part-time~~*
Kind of subject: obligatory
Subject code INZ3563
Group of courses NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30		15		
Number of hours of total student workload (CNPS)	30		60		
Form of crediting	Crediting with grade		Crediting with grade		
For group of courses mark (X) final course					

Number of ECTS points	**1**		2		
including number of ECTS points for practical (P) classes	0		2		5
including number of ECTS points for direct teacher-student contact (BK) classes	0,6		1,2		

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basic knowledge of algebra and analysis
2. General knowledge of data transmission systems

SUBJECT OBJECTIVES

C1 Skills and knowledge of data security level assessment and knowledge of the algorithms used during data security protection.
C2 Skills of selecting strategy and technical solutions for appropriate data security protection.
C3. Social competence and skills in organizational leadership, management and collaboration. Ability to work well in teams, self-motivate and understand conflict management. Understanding of organizational mission, governance and administrative systems. Understanding how to use decision making to support mission.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEK_W01 Has a basic knowledge of data security attributes.
PEK_W02 Has a knowledge of standards and algorithms related to data security
PEK_W03 Has a knowledge of data protection problems in IT systems
relating to skills:
PEK_U01 Able to design data security architecture for IT systems
PEK_U02 Able to recognize the data security requirements of IT system
PEK_U03 Able to recognize the problems related to data security in IT systems
relating to social competences:
PEK_K01 Unerstands the need of data security protection in IT systems
PEK_K02 Understands the role of data confidentiality, integrity and authentication in achieving the required security level

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PROGRAMME CONTENT	
Form of classes - lecture	**Number of hours**
Lec 1 Introduction to data security	2
Lec 2 Confidentiality protection	2
Lec 3 Integrity protection	2
Lec 4 Data and users authentication	2
Lec 5 Data transmission in public networks security	2

Lec 6	Security models	2
Lec 7	Security level management	2
Lec 8	Competency test	1
	Total hours	15

PROGRAMME CONTENT		
Form of classes - class		**Number of hours**
Cl 1	Introduction and technical issues	2
Cl 2	Historical ciphers	2
Cl 3	Cryptanalysis of historical ciphers	2
Cl 4	Modern symmetric ciphers	2
Cl 5	Modes of operation of block ciphers	2
Cl 6	Asymmetric ciphers	2
Cl 7	Cryptanalysis of symmetric ciphers	2
Cl 8	Cryptanalysis of asymmetric ciphers	2
Cl 9	Cryptographic hash functions	2
Cl 10	Electronic signature	2
Cl 11	Application layer security	2
Cl 12	E-mail security	2
Cl 13	OS security	2
Cl 14	Data backup and integrity	2
Cl 15	Overview and comparison of selected security algorithms and tools	2
	Total hours	30

TEACHING TOOLS USED
N1. Tradnitional and multimedia lectures N2. Sudent's own work – project preparation N3. Project – methods of security related project preparation N4. Tutorials N5. Student's own work – literature study

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT		
Evaluation (F – forming	Educational effect	Way of evaluating educational effect achievement

(during semester), P – concluding (at semester end)	number	
F1	PEK_W01- PEK_W02, PEK_U01- PEK_U03, PEK_K01- PEK_K02,	Oral presentations and mid semestral reports of work progress
P PEK_W01- PEK_W02, Final test		

PRIMARY AND SECONDARY LITERATURE
PRIMARY LITERATURE:
[1] Stallings, William, Cryptography and Network Security: Principles and Practice [2] Schneier, Bruce, Applied Cryptography: Protocols, Algorithms, and Source Code in C [3] Menezes, Alfred J, Handbook of Applied Cryptography SECONDARY LITERATURE:
[1] Kahn, David, The Codebreakers: The Comprehensive History of Secret Communication from Ancient Times to the Internet [2] Dan Boneh, https://www.coursera.org/course/crypto [3] Dan Boneh, Dawn Song and John C Mitchell, https://www.coursera.org/course/security
SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)
Grzegorz Kołaczek, Grzegorz.Kolaczek@pwr.wroc.pl

MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT

…………………………

AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY ………………………..

AND SPECIALIZATION ……………………………..

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)	K1INF_W13	C1	Lec1-Lec7	N1,N4-N5
PEK_W02	K1INF_W13	C1	Lec1,W7	N1,N5
PEK_U01 (skills)	K1INF_U09	C2	Lec1-Lec7 Cl1-Cl10	N2-N4
PEK_U02	K1INF_U03, K1INF_U09	C2,C3	Lec1-Lec7 Cl1-Cl15	N2-N4
PEK_U03	K1INF_U09, K1INF_U14	C2,C3	Lec1-Lec7 Cl10-Cl15	N2-N4
PEK_K01 (competences)	K1INF_U09	C1,C3	Lec1,Cl1-Cl15	N4,N5
PEK_K02	K1INF_W13	C1,C2,C3	Lec8,Cl1-Cl15	N4,N5

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

*** - from table above

FACULTY OF INFORMATICS AND MANAGEMENT / DEPARTMENT………………

SUBJECT CARD

Name in Polish: Grafiki komputerowa
Name in English: Computer Graphics
Main field of study (if applicable): Informatics
Specialization (if applicable): ……………………..
Level and form of studies: 1st level, full-time
Kind of subject: optional
Subject code INZ005232
Group of courses NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30		30		
Number of hours of total	60		90		

student workload (CNPS)					
Form of crediting	crediting with grade	Examination / crediting with grade*	crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*
For group of courses mark (X) final course					
Number of ECTS points	2		3		
including number of ECTS points for practical (P) classes	0		3		
including number of ECTS points for direct teacher-student contact (BK) classes	1.2		1,8		

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

5. Knows elementary notions and computational methods of linear algebra and geometry in 2D and 3D
6. Is fluent in Java programming and knows basic general purpose algorithms and data types
7. Knows one of popular development environments for C++ or Java

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SUBJECT OBJECTIVES

C1 The students should know and understand the methods of 2D image rendering and 3D visualization, deeply understand how they work and what are their features and limitations.
C2 The students should know how to use practically standard software components supporting 2D and 3D CG application development in Java environment
C3 The students should be able to select appropriate methods and software components according to the particular needs related to the CG application domain and build CG application that renders plain image or 3D scene view using these software components

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SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEK_W01 Knows color spaces used in CG and understands differences between them
PEK_W02 Knows principles of transformation composition in homogenous coordinates
PEK_W03 Understands principles of curves modeling in 2D
PEK_W04 Knows properties of commonly used 3d rendering methods
PEK_W05 Knows and understands stages of typical 3D rendering pipeline
PEK_W06 Knows most popularly used geometry representation techniques for 3D
PEK_W07 Knows and correctly interprets components of Phong lighting model formula

relating to skills:
PEK_U01 Can implement procedural pattern rendering of regular 2D using raster and vector approach
PEK_U02 Is able to design and implement graphical UI using standard software components available in Java
PEK_U03 Can construct the transformation matrix in homogenous coordinates corresponding to visually specified transformation
PEK_U04 Can implement simple CG applications for 3D rendering based on OpenGL usage
PEK_U05 Can select scene description methods according to specified CG application and is able to find out reasons of defects appearing in obtained images

PEK_U06 Is able to evaluate efficiency of low-level methods and algorithms used in 2D and 3D CG

relating to social competences:
PEK_K01 Understands and appreciates the role of graphical interfaces in applications not directly
related to computer science
PEK_K02 Is able to compose GUI and visualization methods appropriate to needs of end users not
being IT specialists

PROGRAMME CONTENT		
Form of classes - lecture		**Number of hours**
Lec 1	Introduction, defining the scope of computer graphics, relation to other computer engineering domains, basic definitions and notions, raster graphics and vector graphics	2
Lec 2	CG program architecture, components for GUI building in Java2D and Swing	2
Lec 3	Color spaces in CG	2
Lec 4	Transformations in homogenous coordinates, general principles and advantages, affine transformation, derivation of transformation matrices for scaling rotation and translation	2
Lec 5	Derivation of transformation matrix for compound transformations in homogenous transformations, transformation superposition, examples	2
Lec 6	Bilinear interpolation of image attributes, application in image transformations, Gouraud shading	2
Lec 7	Curves modeling in 2D, Lagrange and Bezier curves, piecewise defined curves, B-splines	2
Lec 8	Introduction to 3D image synthesis, basic notions, scene description elements, lighting model, local and global illumination	2
Lec 9	3D scene geometry description, boundary representation, CSG, implicit surfaces, metaballs, volumetric representations, lighting models, Phong lighting model	2
Lec 10	Rendering pipeline, geometric transformations in 3D, observer coordinate system, projections from 3D to 2D	2
Lec 11	Visibility analysis methods, algorithms based on face sorting z-buffer algorithm, displaying transparent objects with z-buffer	2
Lec 12	OpenGL library, core functionality, rendering program organization for OpenGL, examples of visual effects available in OpenGL programs	2
Lec 13	Providing geometry to OpenGL, defining geometric transformations, application of transformation matrix stack, defining observer parameters, analysis of exemplary programs	2
Lec 14	Other 3D rendering component packages review: Direct3D and Java3D.	2
Lec 15	Brief review of advanced 3D rendering methods, backward ray tracing, radiosity, photon mapping	2
	Total hours	**30**
Form of classes - class		Number of

		hours
Cl 1		
Cl 2		
Cl 3		
Cl 4		
..		
	Total hours	

Form of classes - laboratory		Number of hours
Lab1	Lab scope safety regulations grading policy presentation, installation of IDE, short introduction to CG packages in Java	2
Lab2	Procedural rendering of 2D patterns using BufferedImage class	2
Lab3	Vector graphics components usage in interactive graphics, simple animation using vector graphics components	2
Lab4	GUI implementation using Swing components	2
Lab5	Image composition using affine transformations	4
Lab6	Bilinear and bicubic color interpolation, application to image scaling	2
Lab7	Implementation of Gouraud shading - displaying polygons with Gouraud shading	2
Lab8	Simple rendering of 3D scenes with Phong lighting model	2
Lab9	3D shape modeling by curve rotation and translation - conversion to triangle mesh, implementation of wireframe display of triangle meshes	4
Lab10	Scene rendering program based on OpenGL or java3D	2
Lab11	3D visualization program with observer interactive setting	4
Lab12	Summary, final grading	2
	Total hours	30

Form of classes - project		Number of hours
Proj1		
Proj2		
Proj3		
Proj4		
…		
	Total hours	

Form of classes - seminar		Number of hours
Sem1		
Sem2		
Sem3		
…		
	Total hours	

TEACHING TOOLS USED
N1. Multimedia presentation used in lectures
N2. Compilers and development environment for Java and C++
N3. Freeware and open source programs for 3D scene modeling
N4. E-learning system used to publish presentations, documents and other data related to the lecture and lab assignments

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 - Lab2	PEK_U01	Each assignment Lab2-Lab11 will be evaluated in the scale 2.0 - 5.0. The elements being evaluated: conformance with the assignment specification, ability to make small extensions and modifications to home-prepared code, relevance of used methods, efficiency, ability to predict results of processing of specified input data set , code clarity
F2 - Lab3	PEK_U01 PEK_U02	As in the case of grading of assignment in Lab2
F3 - Lab4	PEK_W02 PEK_U02 PEK_K01 PEK_K02	As in the case of grading of assignment in Lab2
F4 - Lab5	PEK_W01 PEK_W02 PEK_U03	As in the case of grading of assignment in Lab2, scoring: 0 – 3.
F5 - Lab6	PEK_W01 PEK_U02	
F6 - Lab7	PEK_W04 PEK_W05 PEK_U05 PEK_U06	As in the case of grading of assignment in Lab2, scoring: 0 – 3.
F7 - Lab8	PEK_W01 PEK_W04 PEK_W05 PEK_W07 PEK_U05	As in the case of grading of assignment in Lab2
F8 - Lab9	PEK_W03 PEK_W06 PEK_U04 PEK_U05	As in the case of grading of assignment in Lab2
F9 - Lab10	PEK_W04 PEK_W05 PEK_U02 PEK_U04 PEK_U05	As in the case of grading of assignment in Lab2
F10 - Lab11	PEK_W04 PEK_U02	As in the case of grading of assignment in

	PEK_U04	Lab2, scoring: 0 – 3.

P1 – final laboratory grade computed according to the following scale
 0.00 - 8.99   - unsatisfactory
 8.00 – 9.99   - satisfactory
10.00 – 11.99 - satisfactory plus
12.00 - 13.99 - good
10.00 - 14.99 - good plus
14.99 - 16.00 - very good

P2 – final lecture grade will be based on written exam results. The exam consists in solving a number of test queries and computational problems. Each query is assigned a number of scores. The final grade is based on total scores percentage according to the following scale
 0 - 50%   - unsatisfactory
51 - 60%   - satisfactory
61 - 70%   - satisfactory plus
80 - 89%   - good
90 - 95%   - good plus
96 - 100% - very good

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Foley J.D. et al. Computer Graphics, Principles and Practice, Third Edition, Addition-Wesley, 2013
[2] Klawonn F., Introduction to Computer Graphics: Using Java 2D and 3D, Second edition, Springer 2012
[3] Shreiner D. et al., OpenGL Programming Guide: The Official Guide to Learning OpenGL, Version 4.3 (8th Edition)

SECONDARY LITERATURE:

[1] Ammerall L., Zhang K., Computer Graphics for Java Programmers, John Wiley & Sons, 2007
[2] McReynolds T., Blythe D., Advanced Graphics Programming Using OpenGL, Elsevier 2005

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

Jerzy Sas, jerzy.sas@pwr.wroc.pl

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)	K1INF_W23	C1	Lec1,Lec3	N1,N4
PEK_W02	K1INF_W01, K1INF_W23	C1,C3	Lec4,Lec5	N1,N4
PEK_W03	K1INF_W01, K1INF_W23	C1	Lec7	N1,N4
PEK_W04	K1INF_W23	C1,C3	Lec8,Lec9,Lec10,Lec15	N1,N4
PEK_W05	K1INF_W23	C1	Lec8,Lec9,Lec10,Lec11	N1,N4
PEK_W06	K1INF_W23, K1INF_W08	C1,C3	Lec7,Lec8,Lec9	N1,N4
PEK_W07	K1INF_W23	C1,C3	Lec9,Lec12	N1,N4
PEK_U01 (skills)	K1INF_U04, K1INF_U09, K1INF_U12, K1INF_U16	C2	Lec1,Lec2,La2	N2,N4
PEK_U02	K1INF_U04, K1INF_U12, K1INF_U16	C2,C3	Lec2,La3,La4	N2,N4
PEK_U03	K1INF_W01, K1INF_U11	C1,C3	Lec4,La5	N1,N4
PEK_U04	K1INF_U04, K1INF_U12, K1INF_U16	C2	Lec12,Lec13, La10,La11	N2,N3,N4
PEK_U05	K1INF_U06, K1INF_U11	C3	Lec6,Lec8,Lec9, La7,La8,La9	N1,N3,N4
PEK_U06	K1INF_U07, K1INF_U11	C1,C3	Lec6,La6,La7	N1,N2,N3,N4
PEK_K01 (competences)	K1INF_K02, K1INF_K07	C3	Lec1,Lec2,La3,La4,La5	N1,N4
PEK_K02	K1INF_K02, K1INF_K07	C3	Lec1,Lec2,Lec14,Lec15,La3,La4, La5	N1,N2,N3,N4

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

Zał. nr 4 do ZW 64/2012

FACULTY W-8 / DEPARTMENT………………
SUBJECT CARD
Name in Polish Hurtownie Danych
Name in English Data warehouses
Main field of study (if applicable): Computer Science
Specialization (if applicable): ……………………..
Level and form of studies: 1st, full-time

	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		60		
Form of crediting	~~Examination~~ / crediting with grade*	Examination / crediting with grade*	~~Examination~~ / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*
For group of courses mark (X) final course					
Number of ECTS points	2		1		
including number of ECTS points for practical (P) classes	0		1		
including number of ECTS points for direct teacher-student contact (BK) classes	1.2		0.6		

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES
1. Basic knowledge of the organization of the database system
2. At least a basic knowledge of SQL query language.

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SUBJECT OBJECTIVES
C1. Acquiring knowledge of typical data warehouse architecture and organization.
C2. Acquiring basic knowledge on the main issues of BI systems (Business Intelligence).
C3. Acquiring elementary knowledge of data warehouse design process.
C4. Acquiring basic knowledge in the field of data mining in data warehouses.
C5. Acquiring basic skills of data warehouse creation and usage – including the ability to use multi-dimensional data model using Analysis Services (MS SQL Server).
C6. Acquiring basic skills to a database design for a data warehouse – ETL process using Integration Services (MS SQL Server).
C7. Acquiring basic skills of data mining – data mining tools in data warehouses.
C8. Acquiring basic skills of reporting – reporting data in data warehouses using Reporting Services (MS SQL Server).

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEK_W01. Knows the basic processing models - transactional and analytical.

PEK_W02. Knows the basic architecture and organization of typical data warehouse.

PEK_W03. Can describe and characterise common tasks of BI processes (Business Intelligence).

PEK_W04. Can describe in details the process of designing a data warehouse, including ETL data integration process.

PEK_W05. Knows the basics of MDX queries for multidimensional OLAP.

PEK_W06. Can formulate the basic tasks of data mining in data warehouses.

relating to skills:

PEK_U01. Can apply rules for the proper use of laboratory equipment.

PEK_U02. Can, using a dedicated software, build SQL queries using different methods of data aggregation.

PEK_U03. Can analyse an existing transactional database system.

PEK_U04. Can, using a dedicated software, prepare the database for the data warehouse, including the implementation of the ETL process.

PEK_U05. Can, using a dedicated software, design and implement a multi-dimensional cube - define measures, dimensions, calculated measures, partitions, aggregations, perspectives, key performance indicators.

PEK_U06. Can use a multidimensional data model using the MDX query language.

PEK_U07. Can, using a dedicated software, use the basic tools of data mining in data warehouses.

PEK_U08. Can, using a dedicated software, design and create simple reports in data warehouses.

relating to social competences:

PEK_K01. Knows the current issues of data analysis technology, understands the need to explore new solutions and further education.

PEK_K02. Understands the responsibilities and impact of data warehouse engineering on the business environment.

PROGRAMME CONTENT	
Form of classes - lecture	**Number of hours**
Wy1 Introduction – BI processes and tasks	**2**
Wy2 Data processing models – OLAP / OLTP	**1**
Wy3 Data models and Data Warehouse architecture	**2**
Wy4 Implementation of Data Warehouses in SSBDS	**1**
Wy5 Data Integration – ETL process	**2**
Wy6 Multidimensional query language - MDX	**2**
Wy7 Data Mining in Data Warehouses	**2**
Wy8 Fundamentals of Data Warehouse Design process	**2**
Wy9 Current issues in data analysis technology	**1**
Total hours	**20**

Form of classes - class	**Number of hours**

Cl 1		
Cl 2		
Cl 3		
Cl 4		
..		
	Total hours	

Form of classes - laboratory		Number of hours
La1	Health and Safety Training. Introduction.	1
La2	SQL queries – focus on data aggregation.	1
La3	Intro to MS SQL Server Management Studio and SQL Data Tools. Analysis of sample data source - AdventureWorks.	2
La4-5	Basics of Integration Services – focus on Control and Data Flow Tasks.	4
La6-10	Basics of Analysis Services – focus on cube creation, dimension and measure analysis, partition and aggregation design, KPI and perspective usage.	10
La11	Data Presentation – focus on charts and pivot tables.	2
La12-13	Basics of MDX query language.	4
La14	Basics of Reporting Services – focus on report design.	2
La15	Basics of Data Mining – focus on DM model creation and testing.	2
La16	Steps of the data warehouse design process – data source analysis, business analysis focus, cube development and implementation.	2
	Total hours	**30**

Form of classes - project		Number of hours
Proj 1		
Proj 2		
Proj 3		
Proj 4		
…		
	Total hours	

Form of classes - seminar		Number of hours
Sem 1		
Sem 2		
Sem 3		
…		
	Total hours	

TEACHING TOOLS USED
N1. Lecture.
N2. Group work - discussion, personal interview.
N3. Student's own work - programming.
N4. Student's own work - literature studies.
N5. Student's own work - analysis, design.

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	PEK_U01, PEK_U02, PEK_U04, PEK_U06, PEK_U07	Student activities observation, including individual conversation regarding the current laboratory tasks (program demonstration, results, conclusions)
F2	PEK_U03	Student activities observation, including individual conversation regarding the current laboratory tasks (analysis results)
F3	PEK_U05, PEK_U08	Student activities observation, including individual conversation regarding the current laboratory tasks (design results presentation)
P PEK_W01-PEK_W06 Final Test		
P PEK_U01-PEK_U08 Summary of student activities observation		

PRIMARY AND SECONDARY LITERATURE
PRIMARY LITERATURE:
8.   M. Jarke, M. Lenzerini, Y. Vassiliou, P. Vassiliadis. Hurtownie danych. Podstawa organizacji i funkcjonowania, WSiP, Warszawa 2003
9.   Inmon W., Building the Data Warehouse, John Wiley & Sons, New York 2002
10.   Pelikant A., Hurtownie danych. Od przetwarzania analitycznego do raportowania, Helion, 2011
SECONDARY LITERATURE:
[1]   Surma J., Business Intelligence, PWN, 2012
[2]   Microsoft SQL Server 2012 Integration Services, APN Promise, 2012
[3]   Scott C., Microsoft SQL Server 2008 Analysis Services Krok po kroku, Microsoft Press, 2009
[4]   MacLennan J., Tang ZH., Crivat B., Data Mining with SQL Server 2008, Wiley Publishing, Inc, 2009
[5]   Harinath S., Pihlgren R., Guang-Yeu Lee D., Sirmon J., M. Bruckner R., Professional Microsoft SQL Server 2012 Analysis Services with MDX and DAX, Wiley Publishing, Inc, 2012
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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Data Warehouses
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY **Computer Science**
AND SPECIALIZATION …………………………..

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)	K1INF_W07, K1INF_W16	C1, C2	Wy1, Wy2	N1
PEK_W02	K1INF_W07, K1INF_W15, K1INF_W16, K1INF_U03	C1, C3	Wy3, Wy4	N1
PEK_W03	K1INF_W15	C2	Wy1, Wy8, Wy9	N1
PEK_W04	K1INF_U03, K1INF_W15	C3	Wy5, Wy8	N1
PEK_W05	K1INF_U16, K1INF_W16	C1, C5	Wy6	N1
PEK_W06	K1INF_W15, K1INF_W16	C4	Wy7	N1
PEK_U01 (skills)	K1INF_U14	C5-8	La1	N2
PEK_U02	K1INF_U14, K1INF_U16	C5	La2	N2, N3, N4
PEK_U03	K1INF_U03, K1INF_U14	C2	La3, La15	N2, N3, N4
PEK_U04	K1INF_U03, K1INF_U04, K1INF_U14	C5,C6	La3-5	N2, N3, N5
PEK_U05	K1INF_U04, K1INF_U14, K1INF_U16	C5, C6	La6-10	N2, N3, N4, N5
PEK_U06	K1INF_U04, K1INF_U14	C5	La12-13	N2, N3, N4
PEK_U07	K1INF_U14, K1INF_U16	C7	La15	N2, N3, N4
PEK_U08	K1INF_U03, K1INF_U04	C8	La14	N2, N3, N4, N5
PEK_K01 (competences)	K1INF_K01	C1-2	Wy9	N1
PEK_K02	K1INF_K02	C2,C7-8	Wy1,Wy9,La14-15	N1, N2, N3

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

*** - from table above

FACULTY W-8 / DEPARTMENT………………

SUBJECT CARD

Name in Polish: *Hurtownie danych SAP*
Name in English: SAP data warehouses
Main field of study (if applicable): Computer Science
Specialization (if applicable): ……………………..
Level and form of studies: 1st/ 2nd* level, full-time / part-time*
Kind of subject: obligatory / optional / university-wide*
Subject code INZ005228
Group of courses YES / NO*

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30		30		

Number of hours of total student workload (CNPS)	60		60		
Form of crediting	~~Examination~~ / crediting with grade*	Examination / crediting with grade*	~~Examination~~ / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*
For group of courses mark (X) final course					
Number of ECTS points	2		2		
including number of ECTS points for practical (P) classes	0		2		
including number of ECTS points for direct teacher-student contact (BK) classes	1		1		

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES
1. Knowledge of database and data warehouse design methods
2. Familiarity with multidimensional data models

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SUBJECT OBJECTIVES
C1 To obtain by students the ability of designing multidimensional data model in SAP BW Systems.
C2 To obtain by students the ability of designing ETL processes in SAP BW Systems.
C3 To obtain by students the ability of designing analytical reports in SAP BW Systems.

SUBJECT EDUCATIONAL EFFECTS
relating to knowledge:
PEK_W01 Has a basic knowledge about SAP BW tools for data warehouse development
PEK_W02 Has a basic knowledge about methods of data warehouse design and development in SAP BW environment.
relating to skills:
PEK_U01 Is able to design and develop multidimensional data model in SAP BW
PEK_U02 Is able to design and develop ETL processes in SAP BW
PEK_U03 Is able to design and develop analytical reports in SAP BW
relating to social competences:
PEK_K01 Is able to work in and manager a small software development team

PROGRAMME CONTENT	
Form of classes - lecture	**Number of hours**
Lec 1 Introduction, about SAP	2
Lec 2 SAP BW architecture	2
Lec 3 Data modelling: - Infoobjects - Infoproviders - Multiproviders	6
Lec 4 ETL processes:	6

	- Source systems, Data sources - Transformations - DTPs, Process chains		

Lec 5	Analytical reporting:
	    - BEx Queries (structures, filters, variables)
	    - BEx Queries (key-figures, conditions, exceptions)
	    - Workbooks and Query views
		6	

Lec 6	Administration and optimization:
	    - Query optimization
	    - Infoproviders administration
	    - Authorizations
		6	

Lec 7	Test	2	
	Total hours	30	

Form of classes - class		Number of hours
Cl 1		
Cl 2		
Cl 3		
Cl 4		
..		
	Total hours	

Form of classes - laboratory		Number of hours
Lab 1	Introduction, Building of project teams	2
Lab 2	Brainstorming	2
Lab 3	Presentation of self prepared or chosen idea of data warehouse.	2
Lab 4	Introduction to SAP BW – tutorial	8
Lab 5	Data warehouse project – concept	4
Lab 6	Data warehouse project – data model	4
Lab 7	Data warehouse project – ETL processes	4
Lab 8	Data warehouse project – reporting	4
	Total hours	30

Form of classes - project		Number of hours
Proj 1		
Proj 2		
Proj 3		
Proj 4		
…		
	Total hours	

Form of classes - seminar		Number of hours
Sem 1		
Sem 2		
Sem 3		

…		
	Total hours	

TEACHING TOOLS USED

N1. Lecture
N2. Individual consultations
N3. The course web page with references to literature
N4. Software development tools
N5. SAP BW System

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	PEK_U01-03, PEK_K01	Evaluation of the inception phase of project [20 points] (Lab1-3)
F2	PEK_U01-03, PEK_K01	Evaluation of the concept [20 points] (Lab5)
F3	PEK_U01-03, PEK_K01	Evaluation of the data model[20 points] (Lab6)
F4	PEK_U01-03, PEK_K01	Evaluation of the ETL processes[20 points] (Lab7)
F5	PEK_U01-03, PEK_K01	Evaluation of the reporting [20 points] (Lab8)
P1	PEK_U01-03, PEK_K01	P1 is based on the sum of the points from F1…F5. At least 50% of points is required.
P2	PEK_W01-02	P2 is based on the result of a written test covering material presented during lectures. At least 50% of points is required to pass the test.

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Kevin McDonald, et al., Mastering the SAP Business Information Warehouse, Wiley Publishing, Inc., 2002
[2] Peter Jones, SAP Business Information Warehouse Reporting, McGraw-Hill, 2008
[3] Biao Fu, Henry Fu, SAP BW: A Step-by-Step Guide, Addison Wesley, 2002

SECONDARY LITERATURE:

[1] Naeem Hashmi, Business Information Warehouse for SAP, Premier Press, 2000

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
SAP data warehouses
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY ………………………..
AND SPECIALIZATION …………………………….

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)	K1INF_W04	C1 – C3	Lec1-Lec7	N1-N3
PEK_W02	K1INF_W04	C1 – C3	Lec1-Lec7	N1-N3
PEK_U01 (skills)	K1INF_U06, K1INF_U07, K1INF_U13	C1	Lec3, Lab2-Lab8	N1-N5
PEK_U02	K1INF_U06, K1INF_U07, K1INF_U13	C2	Lec4, Lab2-Lab8	N1-N5
PEK_U03	K1INF_U06, K1INF_U07, K1INF_U13	C3	Lec5, Lab2-Lab8	N1-N5
PEK_K01 (competences)		C1 – C3	Lab2-Lab8	N1-N5

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

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FACULTY W-8 / DEPARTMENT………………
SUBJECT CARD
Name in Polish Informatyczne systemy sterowania
Name in English Process control computer systems
Main field of study (if applicable): Informatyka
Specialization (if applicable): ……………………..
Level and form of studies: 1st/ 2nd* level, full-time / part-time*
Kind of subject: obligatory / optional / university-wide*
Subject code INZ003560
Group of courses YES / NO*

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	15		30	15	
Number of hours of total student workload (CNPS)	60		60	60	
Form of crediting	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*
For group of courses mark (X) final course					
Number of ECTS points	2		2	2	

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including number of ECTS points for practical (P) classes	0		2	2	
including number of ECTS points for direct teacher-student contact (BK) classes	1,2		1,2	1,2	

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Knowledge on functions of computer's main components and registers.

2. Knowledge on functions of operating systems and on structure and operation principles of PC computers operating systems.

3. Knowledge on Ethernet local area network communication protocol.

4. Knowledge on how process dynamics can be modeled using a differential equation or a transfer function.

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SUBJECT OBJECTIVES

C1 Acquiring basic knowledge on problems, methods and technologies of industrial process control – as a main implementation area for real-time computer systems.

C2 Acquiring skills in developing computer systems supporting simple control tasks, in particular – skills in setting up and configuring equipment as well as in designing and implementing control algorithms, user's interfaces and communication procedures in distributed environments.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEK_W01 Student can characterize typical structures of control systems.

PEK_W02 Student can formulate a stabilization problem and present a selected stabilization algorithm in a closed-loop system.

PEK_W03 Student knows definitions and examples of real-time systems, and the SFC method for modeling transitions in event systems, is able to present architecture and operation principles of a selected real-time operating system.

PEK_W04 Student can characterize equipment of computer control systems, in particular – can describe architecture, operation principle and programming languages of PLCs as well as describe PLCs' properties specific to real-time systems.

PEK_W05 Student is able to describe a selected communication mechanism of distributed computer control systems and explain its important real-time properties in comparison to a selected communication mechanism of distributed computer systems with no real-time requirements.

relating to skills:

PEK_U01 Student follows rules for using laboratory equipment.

PEK_U02   Student is capable of applying a dedicated software to perform simulation of a control algorithm and analyze the results.

PEK_U03   Student is capable of implementing interface to a control system, in a form of synoptic table/operator's panel, and implement it using SCADA software.

PEK_U04   Student is capable of configuring and programming PLC, and of calculating its cycle time.

PEK_U05   Student is able to connect and configure component devices of a distributed computer control system and implement communication between them over an industrial network.

PEK_U06   Student is able to specify control tasks, to select components of a computer control system, to recommend control algorithms as well as technologies for process data collection and visualization – based on user's requirements expressed verbally.
relating to social competences:
PEK_K01   Student is familiar with current trends in technological development of computer control systems, understands the need for learning new solutions and minimizing costs.

PROGRAMME CONTENT	
Form of classes - lecture	**Number of hours**

	Form of classes - lecture	Number of hours
Lec1	Introduction. Control problem, control system, typical structures of control systems.	1
Lec2, Lec3	Closed-loop control. Stability. Closed-loop control algorithms.	3
Lec3, Lec4	Real-time systems and control systems. Real-time operating systems.	3
Lec5	Hierarchical structure of a distributed computer control system.	1
Lec5, Lec6	Programmable controllers PLC.	3
Lec7	Industrial computer networks.	2
Lec8	Sensors and A/C, C/A converters.	2
	Total hours	15

	Form of classes - class	Number of hours
Cl 1		
Cl 2		
Cl 3		
Cl 4		
..		
	Total hours	

	Form of classes - laboratory	Number of hours
Lab1	Explaining safety rules (BHP training). Introduction.	1
Lab1 – Lab6	Using SCADA software – defining variables, downloading process data, data visualization and manual control with operators panel.	11
Lab7 – Lab11	Using MATLAB/Simulink software for simulation, analysis and design of control algorithms.	10
Lab12 – Lab15	Data exchange technologies in control systems. Linking SCADA and Matlab software environments. Using OPC software tools.	8
	Total hours	30

Form of classes - project	Number of hours

		s
Proj1	Introduction. Familiarization with PLC structure and software development packages for Windows.	1
Proj2 – Proj4	Implementing LOGO! PLC control programs and S7-200 PLC control programs for control tasks specified by a teacher. Setting up and putting in operation the corresponding control systems developed by individual students.	6
Proj5 – Proj8	Design, implementation, setting up and putting in operation of distributed control systems developed by student teams.	7
Proj8	Presentations of the developed control systems.	1
	Total hours	15

Form of classes - seminar		Number of hours
Sem1		
Sem2		
Sem3		
…		
	Total hours	

TEACHING TOOLS USED
N1. Traditional lecture.   N2. Students individual work – solving computational exercises.   N3. Group work – discussion, conversation with an individual student.   N4. Students individual work – programming.   N5. Students individual work – performing computer simulations.   N6. Students individual work – studying literature.   N7. Students individual work – analyzing, designing.   N8. Students individual work – presenting.   N9. Students individual work – setting up and configuring devices.

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 – F4	PEK_U01, PEK_U03	Watching students actions. Short (ca. 4 min) conversations with individual students concerning current laboratory exercises (incl. presentation of computer programs, computed results and conclusions), a report.
F5 – F8	PEK_U01, PEK_U02	Watching students actions Short (ca. 4 min) conversations with individual students concerning current laboratory exercises (incl. presentation of computer programs, computed results and conclusions), a report.
F9 – F10	PEK_U01, PEK_U02, PEK_U03	Watching students actions. Short (ca. 4 min) conversations with individual students concerning current laboratory exercises (incl. presentation of computer programs, computed results and conclusions), a report.
F11, F12	PEK_U01, PEK_U04	Watching students actions. Short (ca. 4 min) conversations with individual students concerning current laboratory exercises (incl.

		presentation of computer programs, computed results and conclusions), a report.
F13	PEK_U05, PEK_U06	On the basis of: conversations on current effects of project works, a report, a presentation.
P1 (Lec)	PEK_W01 – PEK_W05	Written examination.
P2 (Lab)	PEK_U01, PEK_U02, PEK_U03	F1 – F10
P3 (Proj)	PEK_U01, PEK_U04, PEK_U05, PEK_U06	F11 – F13

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[3]   Users' manuals and programmers' guides for PLC LOGO! and PLC S7-200 (available on-line)
[4]   Wonderware InTouch - users' manual (available on-line)

SECONDARY LITERATURE:

[1]   Bubnicki Z.: *Modern control theory*, Springer Verlag, Heidelberg-Oxford-N. York, 2005.

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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)	K1INF_W15	C1	Lec1	N1
PEK_W02	K1INF_W15, K1INF_W21 K1INF_U05	C1	Lec2, Lec3	N1
PEK_W03	K1INF_W10, K1INF_W21 K1INF_U05	C1	Lec3, Lec4	N1
PEK_W04	K1INF_W08, K1INF_W21 K1INF_U05	C1	Lec5, Lec6, Lec8	N1
PEK_W05	K1INF_W11, K1INF_W21	C1	Lec5, Lec7	N1
PEK_U01 (skills)	K1INF_U14	C2	Lab1 – Lab15, Proj1 – Proj8	N1, N3, N9
PEK_U02	K1INF_U05, K1INF_U14, K1INF_U15	C2	Lab7 – Lab15	N3, N4, N5, N6, N7
PEK_U03	K1INF_U05, K1INF_U06, K1INF_U14, K1INF_U15, K1INF_U18	C2	Lab1 – Lab6, Lab12 – Lab15 Proj5 – Proj8	N3, N4, N6, N7
PEK_U04	K1INF_U05, K1INF_U14, K1INF_U18	C2	Lec6, Proj1 – Proj8	N1, N2, N3, N4, N6, N9
PEK_U05	K1INF_U05, K1INF_U08, K1INF_U14, K1INF_U18	C2	Lec6, Lec7, Proj1 – Proj8	N1, N3, N4, N6, N9
PEK_U06	K1INF_U05, K1INF_U06, K1INF_U13, K1INF_U15, K1INF_U18	C2	Lec2, Lec3, Lec5 – Lec8, Lab1 – Lab6, Proj5 – Proj8	N1, N3, N4, N6, N7, N8, N9
PEK_K01 (competences)	K1INF_K01, K1INF_K02	C1, C2	Lec2 – Lec8, Proj5 – Proj8	N1, N3, N6, N7

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

Zał. nr 4 do ZW 64/2012

FACULTY ……… / DEPARTMENT………………
SUBJECT CARD
Name in Polish *Interakcja człowiek-komputer*
Name in English *Human Computer Interaction*
Main field of study (if applicable): *Computer Science*
Specialization (if applicable): ……………………..
Level and form of studies: 1ˢᵗ level, full-time
Kind of subject: optional
Subject code INZ005226
Group of courses NO*

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30		30		
Number of hours of total student workload (CNPS)	60		60		
Form of crediting	Crediting with grade	Examination / crediting with grade*	Crediting with grade	Examination / crediting with grade*	Examination / crediting with grade*
For group of courses mark (X) final course					
Number of ECTS points	2		2		
including number of ECTS points for practical (P) classes			2		
including number of ECTS points for direct teacher-student contact (BK) classes	1.2		1.2		

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Introduction to computer system design
2. Ability to read with understanding scientific and technical texts in English.

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SUBJECT OBJECTIVES

C1 To familiarise students with basic knowledge from the area of Cognitive Psychology, that is necessary for the understanding of human-computer interaction.

C2 To make students aware of the importance of the software system usability and the key role of usability for the overall quality of the computer system.

C3 To familiarise students with the overall process of software system development in a way focused on achieving high quality with respect to its usability.

C4 To present methods and techniques of performing complex usability evaluation.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEK_W01 A student knows basic notions of Cognitive Psychology relevant to Human Computer Interaction.

PEK_W02 A student is familiar with best practices in user interface design.

PEK_W03 A student knows basic models of the processes of interactive system design and methods of the usability evaluation.

relating to skills:

PEK_U01 A student is able to perform a context of use analysis for a software system.

PEK_U02 A student has basic skills in planning and monitoring of the user interface development process.

PEK_U03 A student is able to design user interface.

PEK_U04 A student knows how to plan a usability evaluation process, perform it and draw conclusions concerning necessary changes in the system under development.

relating to social competences:

PEK_K01 A student is able to cooperate with a group building a software system, such that roles of members responsible for the system usability have been appointed.

PEK_K02 A student is aware of the influence of the software system on the environment of its use and the life of users; a students understand importance of the usability as perceived in this context.

PROGRAMME CONTENT		
Form of classes - lecture		**Number of hours**
Lec 1	Basic notions and elements of Congnitive Psychology applied in Human Computer Interaction	4
Lec 2	Usability notion and an outline of the process to ensure high quality of usability.	2
Lec 3	Context of use: description and analysis	4
Lec 4	Software system design process focused on sers and their tasks.	2
Lec 5	Standards in Human Computer Interaction and their applications in the user interface development process.	2
Lec 6	Usability evaluation of the constructed user interface.	4
Lec 7	Designing the structure and content of a Web page, service or portal.	2
Lec 8	Overview of the most important guidelines for graphic screens design and utilisation of interaction tools in GUI.	4
Lec 9	Analysis of the selected use cases in the are of GUI design.	4
Lec 10	Usability specification and the issueof usability in software project management.	2
	Total hours	**30**
Form of classes - class		Number of hours
Cl 1		
Cl 2		
Cl 3		
Cl 4		
..		

	Total hours	

Form of classes – laboratory		**Number of hours**
Lab 1	Experimental task: teaching a person with very limited computer skills to use an application which has been jointly selected by him.	2
Lab 2	Experimental task: an intuitive analysis of a selected application performed on the basis of the exploratory learning scheme.	2
Lab 3	Formulation of the general specification of the project (a mission and a preliminary, draft description of users and their tasks), that is to be used as a pivot for all following tasks.	2
Lab 4	Preparing context of use description (on the basis of the collected data).	4
Lab 5	Analysis of user tasks (on the basis of the context of use description).	4
Lab 6	Conceptual design of the user interface.	2
Lab 7	Formulating assumptions for the technical design and preparing an intinial paper prototype.	4
Lab 8	Building an initial electronic prototype.	4
Lab 9	Performing analytical usability evaluation with two methods: Cognitive Walkthrough and GOMS.	2
Lab 10	Building an improved UI prototype and performing empirical usability evaluation for selected, most important user tasks.	4
	Total hours	

Form of classes - project		**Number of hours**
Proj 1		
Proj 2		
Proj 3		
Proj 4		
…		
	Total hours	

Form of classes - seminar		**Number of hours**
Sem 1		
Sem 2		
Sem 3		

…		
	Total hours	

TEACHING TOOLS USED

N1. Textbooks

N2. Electronic materials on selected Web pages and Internet portals.

N3. Electronic materials for the lecture and Project that are Publisher on the e-learning portal of the Faculty of Computer Science and Management.

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 Evaluation of the phases: context of use and task analysis	PEK_W03, PEK_U01, PEK_U02, PEK_K01, PEK_K02	A student presents a report, which is next evaluated and scored.
F2 Evaluation of the user interface design	PEK_W02, PEK_U02, PEK_U03, PEK_K01	A student presents user interface design, which is next evaluated and scored.
F3 Evaluation of the prototype and usability assessment	PEK_W01, PEK_U02, PEK_U04 PEK_K01 PEK_K02	A student presents user interface prototype, usability evaluation results and an improved version of the initial prototype – all are evaluated and scored.
C		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:
[11]   Barfield L. The User Interface Concepts & Design. Addison-Wesley 1993.
[12]   Hackos J., Redish J. User and Task Analysis for Interface Design, Wiley Comp. Pub. 1998.
[13]   Newman W., Lamming M. Interactive System Design. Addison-Wesley 1995.
[14]   Hnatkowska Bogumiła, Piasecki Maciej. Modelowanie konceptualne interfejsu użytkownika w metodykach obiektowych. W: Inżynieria oprogramowania. Nowe wyzwania. VI Krajowa Konferencja Inżynierii Oprogramowania. Red. J. Górski, A. Wardziński. Warszawa: WNT 2004.
[15]   International Standard ISO 9241 (1,2,10-17) Ergonomic requirements for office work with visual display terminals (VDTs), szczególnie: Part 11 Guidance on Usability.
[16]   Galitz W.O. Essential Guide to User Interface Design. Wiley Comp. Pub. 2007.
[17]   Nielsen J. Projektowanie funkcjonalnych serwisów internetowych. Helion, 2003.
[18]   Human-Computer Interaction: Design Issues, Solutions, and Applications. Ed. Andrew Sears i Julie A. Jacko. CRC Press/Taylor & Francis Group, 2009

SECONDARY LITERATURE:
[5]   Maruszewski T. Psychologia poznania. Gdańskie Wyd. Psychologiczne, 2001.
[6]   Nielsen J., Tahir M. Funkcjonalność stron WWW 50 witryn bez sekretów. Helion, 2005.
[7]   Spool J. M., Scanlon T., Schroeder W., Snyder C., DeAngelon T. Web Site Usability. Morgan Kaufman, 1999.

[8]   Marti A. Hearst. Search User Interfaces.

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

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Human Computer Interaction
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY
Computer Science (1st level, full-time)
AND SPECIALIZATION ……………………………..

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)	K1INF_W20	C1	Wy1, Wy3	N1-N3
PEK_W02	K1INF_W05	C2, C3	Wy3, Wy7, Wy8, Wy9	N1-N3
PEK_W03	K1INF_W07	C3, C4	Wy2, Wy4, Wy5, Wy6, Wy10	N1-N3
PEK_U01 (skills)	K1INF_U10	C1, C2, C3	La1, La2	N1-N3
PEK_U02	K1INF_U10	C3	La3-La5	N1-N3
PEK_U03	K1INF_U10	C3	La6-La8	N1-N3
PEK_U04	K1INF_U10	C2, C4	La9, La10	N1-N3
PEK_K01 (competences)	K1INF_K03	C3	La3-La10	N1-N3
PEK_K02	K1INF_K02	C2	La1, La2, La4, La10	N1-N3

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

Zał. nr 4 do ZW 64/2012

FACULTY ……… / DEPARTMENT……………….
SUBJECT CARD
Name in Polish Inżynieria bezpieczeństwa systemów
Name in English Network and Internet Systems Security Engineering
Main field of study (if applicable): ………………………….
Specialization (if applicable): ……………………..
Level and form of studies: 1st/ 2nd* level, full-time / part-time*
Kind of subject: obligatory / optional / university-wide*
Subject code …………….
Group of courses YES / NO*

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30		30		

Number of hours of total student workload (CNPS)	60		60		
Form of crediting	crediting with grade*		crediting with grade*		
For group of courses mark (X) final course					
Number of ECTS points	**2**		2		
including number of ECTS points for practical (P) classes	0		2		
including number of ECTS points for direct teacher-student contact (BK) classes	1,2		1,2		

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basic knowledge of computer networks
2. Basic knowledge of modern cryptography

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SUBJECT OBJECTIVES

C1 Skills and knowledge of security analysis and design of secure computer systems
C2 Skills of selecting strategy and technical solutions for appropriate security architecture design.
C3. Social competence and skills in organizational leadership, management and collaboration. Ability to work well in teams, self-motivate and understand conflict management. Understanding of organizational mission, governance and administrative systems. Understanding how to use decision making to support mission.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEK_W01 Has a knowledge of methods allowing to reach the planned security level
PEK_W02 Has a knowledge about a security plan
relating to skills:
PEK_U01 Able to characterize elements of security plan
PEK_U02 Able to select appropriate methods and mechanisms for obtaining the security plan goals
PEK_U03 Able to use the security testing and preserving tools
relating to social competences:
PEK_K01 Understands the need to improve continuously the knowledge related to security problems
PEK_K02 Understands the role of the security plan in the process of IT systems security protection

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PROGRAMME CONTENT

Form of classes - lecture		Number of hours
Lec 1	Introduction. Goals of the security plan	2
Lec 2	Security level inspection	2
Lec 3	Protection of computer systems	2
Lec 4	Detection of security related problems	2
Lec 5	Reaction	2
Lec 6	Rebuilding security level	2
Lec 7	Vulnerabilities of network communication protocols	2
Lec 8	IPSec and IPv6	2

Lec 9	SSL/TLS	2
Lec 10	Public Key Infrastructure	2
Lec 11	Wireless Networks security	2
Lec 12	Intrusion and anomaly detection	2
Lec 13	IDS and anomaly detection tools	2
Lec 14	Applications security	2
Lec 15	Final test	2
	Total hours	

Form of classes - class		Number of hours
Cl 1		
Cl 2		
Cl 3		
Cl 4		
..		
	Total hours	

Form of classes - laboratory		Number of hours
Lab 1	Introduction and system configuration	2
Lab 2	GnuPGP – secure e-mail	2
Lab 3	Steganography	2
Lab 4	Password security	2
Lab 5	Security scanning	2
Lab 6	Network traffic analysis	2
Lab 7	ARP-spoofing	2
Lab 8	DNS- spoofing	2
Lab 9	Attack against SSL/TLS	2
Lab 10	Penetration testing	2
Lab 11	Privacy in public networks – TOR project	2
Lab 12	VPN	2
Lab 13	Honeypots	2
Lab 14	Public Key Infrastructure	2
Lab 15	Final remarks	2
…		
	Total hours	

Form of classes - project		Number of hours
Proj 1		
Proj 2		
Proj 3		
Proj 4		
…		
	Total hours	

Form of classes - seminar		Number of hours
Sem 1		
Sem 2		
Sem 3		
...		
	Total hours	

TEACHING TOOLS USED
N1. Tradnitional and multimedia lectures
N2. Sudent's own work – project preparation
N3. Project – methods of security related project preparation
N4. Tutorials
N5. Student's own work – literature study

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	PEK_W01-PEK_W03, PEK_U01-PEK_U03, PEK_K01-PEK_K02,	Oral presentations and mid semestral reports of work progress
P PEK_W01- PEK_W02- Final test		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Bishop, Matt.   Computer security : art and science /   Boston : Addison-Wesley, cop. 2003
[2] Pipkin, D., Information Security: Protecting the Global Enterprise
[3] Sean Boran, IT Security Cookbook
[4]

SECONDARY LITERATURE:

[1] Metasploit : the penetration tester's guide /   San Francisco : No Starch Press, cop. 2011.
[2] Dan Boneh, Dawn Song and John C Mitchell, Computer Security
[3] Barbara Endicott-Popovsky, Information Security and Risk Management in Context

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

Grzegorz Kołaczek, Grzegorz.Kolaczek@pwr.wroc.pl

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)	K1INF_W04	C1	Lec7-Lec14 Lab5-Lab13	N1,N4-N5
PEK_W02	K1INF_W04	C1	Lec1-Lec6	N1,N5
PEK_U01 (skils)	K1INF_W04, K1INF_U06, K1INF_U13	C2	Lec1-Lec6	N2-N4
PEK_U02	K1INF_W04, K1INF_U06, K1INF_U13	C2,C3	Lab2-Lab14	N2-N4
PEK_U03	K1INF_W04, K1INF_U06, K1INF_U07, K1INF_U13	C2,C3	Lec11,Lec13,Lec14,Lab10-Lab14	N2-N4
PEK_K01 (competences)	K1INF_U06	C1,C3	Lec1-Lec14 Lab1-Lab14	N1,N4,N5
PEK_K02	K1INF_U13	C1,C2,C3	Lec1-Lec6	N1,N4,N5

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

*** - from table above

Zał. nr 4 do ZW 64/2012

FACULTY **Computer Science and Management** / DEPARTMENT **Computer Science**
SUBJECT CARD
Name in Polish *Inżynieria systemów baz danych*
Name in English *Engineering database systems*
Main field of study (if applicable): Computer Science
Specialization (if applicable): ………………………..
Level and form of studies: 1st/ 2nd* level, full-time / part-time*
Kind of subject: obligatory / optional / university-wide*
Subject code INZ005203
Group of courses YES / 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	~~Examination~~ / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	~~Examination~~ / crediting with grade*	Examination / 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. Useful knowledge of databases
2. Indicated ability to design a dedicated database
3. Competencies: communication skills, the ability to locate errors and correct them

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SUBJECT OBJECTIVES
C1. Getting the selected database management system.
C2. Improving data modeling and relational database design.
C3. Ergonomic design forms, menus and reports.
C4. Creating database queries in SQL.
C5. Implementation of database transactions.
C6. Design, implementation and documentation of a dedicated database system.

SUBJECT EDUCATIONAL EFFECTS
relating to knowledge:
PEK_W01 – knows the chosen methodology of database design and database systems
PEK_W02 – has knowledge of the possibility of database management systems
PEK_W03 – knows the principles of ergonomic design forms, menus and reports
PEK_W04 – knowledgeable about database transactions and their implementation in the selected environment
PEK_W05 – knows the basic syntax of SQL commands
PEK_W06 – knows the chosen relational database management system
PEK_W07 – is knowledgeable about creating macros
PEK_W08 – knowledgeable about the types of tests and methods of testing
PEK_W09 – knows the issues of database security
PEK_W10 – has knowledge of the project documentation database
PEK_W11 – has knowledge of the assessment of the quality and functional use of the database system
PEK_W12 – has knowledge of the assessment of the quality and functional use of the database system
relating to skills:
PEK_U01 – able to correctly use the terminology associated with database systems
PEK_U02 – can see the area where there is a need to design a database system

PEK_U03 – able to design the database for the selected fragments of reality

PEK_U04 – able to design a database application for the selected field

PEK_U05 – can implement a database designed

PEK_U06 – can implement a simple database application

PEK_U07 – can implement ergonomic forms and the application menu

PEK_U08 – able to develop a clear reports

PEK_U09 – see the need for the use of transactions and can be implemented

PEK_U10 – has the ability to create the necessary macros

PEK_U11 – in a systematic and planned manner performs testing of the system

PEK_U12 – accordance with the requirements can make a technical and functional documentation system

PEK_U13 – can formulate a query in SQL

PEK_U14 – can establish and manage user accounts

PEK_U15 – can provide secure access to the database

PROGRAMME CONTENT	
Form of classes - lecture	**Number of hours**
Lec 1	Basic concepts and terminology database systems. Designing and creating databases	1
Lec 2	Sorting and indexing. Search of data. Advanced query. SQL	2
Lec 3	Deleting and updating data. Transaction processing. Forms.	2
Lec 4	Macros. Reports. Communication with the user. Menus, toolbars.	2
Lec 5	Security of data in database systems.	2
Lec 6	Testing, documenting database system. Evaluation of quality usable and functional database system. Legal aspects of the implementation and operation of database systems.	2
Lec 7	Final test.	2
Lec 8	Colloquium correction.	2
	Total hours	15

Form of classes - class		**Number of hours**
Cl 1		
Cl 2		
Cl 3		
Cl 4		
..		
	Total hours	

Form of classes - laboratory		**Number of hours**
Lab 1		
Lab 2		

Lab 3		
Lab 4		
Lab 5		
…		
	Total hours	

Form of classes - project		Number of hours
Proj 1	Health and Safety Training. Presentation Management System Relational Database	2
Proj 2	Business modeling. Identification of the functionality of the proposed database application, database modeling environment for the design, choice of database system architecture and implementation environment	2
Proj 3	Database design for the selected slice of reality.	2
Proj 4	Implementation of the project database schema in DBMS and fill with sample data. The integrity of the database	2
Proj 5	Design and implementation of advanced forms	2
Proj 6	Design and implementation of the application main menu	2
Proj 7	Ergonomic user interface design, implementation, applications using graphical tools, macros and database languages. Procedures, stored functions, triggers.	2
Proj 8	Implementation of advanced queries. Query optimization	2
Proj 9	Transaction processing. Transaction management.	2
Proj 10	Design and implementation of advanced reports	2
Proj 11	Security of data in a database application, user accounts, granting privileges and authorizing access to data	2
Proj 12	Testing database application, the assessment of quality for use and functional database system, the legal aspects of the implementation and operation of database systems	2
Proj 13	Preparation of final documentation database system	2
Proj 14	Presentation of database applications	2
Proj 15	Assessment of the project	2
	Total hours	**30**

Form of classes - seminar		Number of hours
Sem 1		
Sem 2		
Sem 3		
…		
	Total hours	

TEACHING TOOLS USED
N1. Demo examples of correct and incorrect database systems
N2. Examples of systems documentation

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 – attendance	PEK_K09	Control of the work schedule
F2 – evaluation for class participation	od PEK_U01 do PEK_U15 oraz od PEK_K01 do PEK_K09	Logging activity
F3 – rating for the database system	od PEK_U01 do PEK_U15	rating for the database system
F4 – evaluation for system documentation	od PEK_U01 do PEK_U15	evaluation for system documentation
F5 – evaluation of the test	od PEK_W01 do PEK_W12	evaluation of the test
P1 – the credit rating of the lecture – evaluation of the test (F5)		
P2 – the credit rating project – weighted average of F1, F2, F3, F4		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Mazur H., Mazur Z.: Projektowanie relacyjnych baz danych. Oficyna Wydawnicza Politechniki Wrocławskiej, 2004.
[2] Date C.J.: Wprowadzenie do systemów baz danych. WNT, Warszawa, 2000.
[3] Date C.J., Darwen H.: SQL. Omówienie standardu języka. WNT, Warszawa, 2000
[4] Ullman J, D.: Podstawowy wykład z systemów baz danych. WNT, Warszawa, 2004
[5] Garcia-Molina H., Ullman J.D., Widom J.: Systemy baz danych. Pełny wykład. WNT, Warszawa, 2006.

SECONDARY LITERATURE:

[1] Pelikant A.: Bazy danych – pierwsze starcie. Helion, 2009.
[2] Jakubowski A.: Podstawy SQL – ćwiczenia praktyczne. Helion, 2001.
[3] Allen S.: Modelowanie danych. Helion, 2006

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

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Engineering database systems
MAIN FIELD OF STUDY
computer science
AND SPECIALIZATION …………………………….

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	K1INF_W07	C2	Lec1	N2
PEK_W02	K1INF_W22	C1	Lec1	N1
PEK_W03	K1INF_W07	C3	Lec3, Lec4	N1
PEK_W04	K1INF_W22	C5	Lec3	N1
PEK_W05	K1INF_W07	C4	Lec2	N1
PEK_W06	K1INF_W16	C1	Lec1	N1
PEK_W07	K1INF_W16	C3	Lec4	N1
PEK_W08	K1INF_W07	C6	Lec6	N1
PEK_W09	K1INF_W16	C1	Lec5	N1
PEK_W10	K1INF_W07	C6	Lec6	N2
PEK_W11	K1INF_W07	C6	Lec6	N1
PEK_W12	K1INF_W07	C6	Lec6	N1
PEK_U01	K1INF_U03	C1	Proj1	N1
PEK_U02	K1INF_U03	C2	Proj2, Proj14	N1
PEK_U03	K1INF_U03	C2	Proj3	N1
PEK_U04	K1INF_U03	C6	Proj4	N1
PEK_U05	K1INF_U04	C6	Proj4	N1
PEK_U06	K1INF_U19	C3	Proj4	N1
PEK_U07	K1INF_U19	C3	Proj5, Proj6	N1
PEK_U08	K1INF_U16	C3	Proj10	N1

PEK_U09	K1INF_U04	C5	Proj9	N1
PEK_U10	K1INF_U04	C6	Proj7	N1
PEK_U11	K1INF_U04	C6	Proj12	N1
PEK_U12	K1INF_U03	C6	Proj13	N2
PEK_U13	K1INF_U16	C4	Proj8	N1
PEK_U14	K1INF_U09	C6	Proj11	N1
PEK_U15	K1INF_U09	C6	Proj11	N1

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

*** - from table above

FACULTY W-8 / DEPARTMENT………………

SUBJECT CARD

Name in Polish: *Języki modelowania i wymiany informacji*
Name in English: *The languages for information modeling and exchange*
Main field of study (if applicable): Computer Science
Specialization (if applicable): ……………………..
Level and form of studies: 1st/ 2nd* level, full-time / part-time*
Kind of subject: obligatory / optional / university-wide*
Subject code INZ005217
Group of courses YES / 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		60		
Form of crediting	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*
For group of courses mark (X) final course					
Number of ECTS points	1		2		
including number of ECTS points for practical (P) classes	0		2		
including number of ECTS points for direct	1		1		

teacher-student contact (BK) classes					

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Knowledge of elementary data structures

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SUBJECT OBJECTIVES

C1 Obtaining by students the ability of using semi-structural languages
C2 Getting knowledge about XML language
C3 To obtain by students the ability of designing XML documents structures.
C4 To obtain by students the ability of using XML documents in databases and in EAI tasks.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEK_W01 Has a basic knowledge about XML language.
PEK_W02 Has a basic knowledge about methods of structure design and processing of XML
          documents.

relating to skills:
PEK_U01Is able to design structures of XML documents.
PEK_U02 Is able to design and develop software processing XML documents.

relating to social competences:
PEK_K01Is able to work in and manager a small software development team

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PROGRAMME CONTENT

Form of classes - lecture		Number of hours
Lec 1	Introduction, Semi-structural data	1
Lec 2	Introduction to XML Language	1
Lec 3	XML documents	2
Lec 4	Definition of XML document structure	2
Lec 5	Document object model	2
Lec 6	X* technologies (XPath, XPointer, XLink, XSL)	2
Lec 7	XML Schema	2
Lec 8	XML Documents and databases	2
Lec 9	Test	1
	Total hours	15

Form of classes - class		Number of hours
Cl 1		
Cl 2		
Cl 3		
Cl 4		
..		
	Total hours	

Form of classes - laboratory		Number of hours
Lab 1	Introduction, Building of project teams	2
Lab 2	Brainstorming	2
Lab 3	Presentation of self prepared or chosen idea of application	2
Lab 4	XML documents processing with DOM	2
Lab 5	XML documents processing with SAX	2
Lab 6	Project of application processing XML documents – concept	4
Lab 7	Project of application processing XML documents – XML schemas	4
Lab 8	Project of application processing XML documents – design	4
Lab 9	Project of application processing XML documents – development	4
Lab 10	Evaluation of project results	4
	Total hours	30

Form of classes - project		Number of hours
Proj 1		
Proj 2		
Proj 3		
Proj 4		
…		
	Total hours	

Form of classes - seminar		Number of hours
Sem 1		
Sem 2		
Sem 3		
…		
	Total hours	

TEACHING TOOLS USED
N1. Lecture N2. Individual consultations N3. The course web page with references to literature N4. Software development tools N5. ESB N6. DBMS supporting XML N7. Object programming language

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT

Evaluation (F – forming (during semester), P – concluding (at	Educational effect number	Way of evaluating educational effect achievement

semester end)		
F1	PEK_U01-03, PEK_K01	Evaluation of the inception phase of project [20 points] (Lab1-3)
F2	PEK_U01-03, PEK_K01	Evaluation of the concept [20 points] (Lab6)
F3	PEK_U01-03, PEK_K01	Evaluation of the XML structuring [20 points] (Lab7)
F4	PEK_U01-03, PEK_K01	Evaluation of the design [20 points] (Lab8)
F5	PEK_U01-03, PEK_K01	Evaluation of the development [20 points] (Lab9)
P1	PEK_U01-03, PEK_K01	P1 is based on the sum of the points from F1…F5. At least 50% of points is required.
P2	PEK_W01-02	P2 is based on the result of a written test covering material presented during lectures. At least 50% of points is required to pass the test.

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Elliotte Rusty Harold, XML Bible, IDG Books Worldwide, Inc., 1999
[2] Eric van der Vlist, XML Schema, O'Reilly, 2002

SECONDARY LITERATURE:

[1] Jim Melton, Stephen Buxton, Querying XML XQuery, XPath, and SQUXML in Context, Morgan Kaufmann, 2006

[2] Akmal B.Chaudhri, Awais Rashid, Roberto Zicari, XML Data Management: Native XML and XML-Enabled Database Systems, Addison Wesley, 2003

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

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
The languages for information modeling and exchange
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY ………………………..
AND SPECIALIZATION ……………………………..

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)	K1INF_W05, K1INF_W06	C1 – C3	Lec1-Lec9	N1-N3
PEK_W02	K1INF_W05, K1INF_W06	C1 – C3	Lec1-Lec9	N1-N3
PEK_U01 (skills)	K1INF_U04, K1INF_U09, K1INF_U11,K1INF_U12, K1INF_U14	C1 – C3	Lec1-Lec9, Lab2-Lab10	N1-N6
PEK_U02	K1INF_U04, K1INF_U09, K1INF_U11,K1INF_U12, K1INF_U14	C1 – C4	Lec1-Lec9, Lab2-Lab10	N1-N6
PEK_K01 (competences)		C1 – C3	Lab2-Lab5	N1-N6

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

Zał. nr 4 do ZW 64/2012

FACULTY: Informatics and Management
SUBJECT CARD
Name in Polish: Logika dla informatyków
Name in English: Logic for computer scientists
Main field of study (if applicable): Informatics
Specialization (if applicable):
Level and form of studies: 1st/ 2nd* level, full-time / part-time*
Kind of subject: obligatory / optional / university-wide*
Subject code INZ001518
Group of courses YES / NO*

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30	30			
Number of hours of total student workload (CNPS)	90	60			
Form of crediting	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*
For group of courses mark (X) final course					
Number of ECTS points	2	2			
including number of ECTS points for practical	0	2			

(P) classes					
including number of ECTS points for direct teacher-student contact (BK) classes	1,2	1,2			

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

Knowledge of mathematics at the high school level in the expanded school.

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SUBJECT OBJECTIVES

C1. Gaining knowledge of the set theory and the classical propositional and predicate calculi.

C2. Gaining knowledge about the usage of classical logic to formally define some elements of programming languages.

SUBJECT EDUCATIONAL EFFECTS

Relating to knowledge:

PEK_W01: Students know and understand the concept of a set and operations on sets, the concept of relations and functions.

PEK_W02: Students know and understand the concept of logical syntax and semantics of propositional logic and predicate calculus, and selected proving systems.

PEK_W03: Students know and understand the concept of mathematical induction and structural definition of recursive sets and functions, graphs and methods of their representation.

Relating to skills:

PEK_U01: Students can apply propositional and predicate calculi.

PEK_U02: Students can conduct a simple and moderately difficult proofs by mathematical and structural induction.

PEK_U03: Students can use language of set theory interpreting problems in different areas of mathematics and science.

Relating to social competences:

PEK_K01: Students can precisely formulate questions to deepen their understanding of the topic and find the missing pieces of reasoning.

PEK_K02: Students can independently search the bibliographic databases and study the literature available there.

PEK_K03: Students know the limits of their own knowledge and understand the need for further education

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PROGRAMME CONTENT		
Form of classes - lecture		**Number of hours**
Lec 1	Basic logical notions: truth and false, simple and compound propositions. Basic set-theoretical notions: a set, definitions of sets, operations on sets.	2
Lec 2	Cartesian product, relations and their properties, equivalence and ordering relations.	2
Lec 3	Functions, composition of functions. Equinumerosity of sets, cardinal numbers.	2

	Sequences and operations on sequences.	
Lec 4	Graphs, formal languages, free-context grammars.	2
Lec 5	One-sort and many-sort algebras, relational systems.	2
Lec 6	Syntax and semantics of propositional calculus.	2
Lec 7	Zero-one method of formulas proving. Proving system based on semantic equivalence of formulas.	2
Lec 8	Proving system for the propositional calculus based on Gentzen's sequents.	2
Lec 9	Complete sets of logical connectives. Meta-logical properties of the propositional calculus – decidability, consistency and completeness of proving systems.	2
Lec 10	Syntax of the predicate calculus.	2
Lec 11	Semantics of the predicate calculus.	2
Lec 12	Proving system for the predicate calculus based on Gentzen's sequents – its consistency and completeness.	2
Lec 13	Formulas in canonical forms.	2
Lec 14	Proving system based on resolution rule.	2
Lec 15	Elements of programming in logic.	2
	Total hours	30

Form of classes - class		**Number of hours**
Cl 1	Basic logical notions: truth and false, simple and compound propositions.	2
Cl 2	Methods of definitions of sets, operations on sets.	2
Cl 3	Cartesian product, relations defining and checking their properties.	2
Cl 4	Proving properties of equivalence and ordering relations.	2
Cl 5	Checking equinumerosity of sets. Operations on sequences.	2
Cl 6	Defining of exemplary formal languages.	2
Cl 7	Test 1.	2
Cl 8	Many-sorted algebras as models for data types.	2
Cl 9	Application of zero-one method and transformational method for formulas proving.	2
Cl 10	Application of Gentzen system for proposition formulas proving.	2
Cl 11	Informal interpretation of predicate formulas.	2
Cl 12	Application of Gentzen system for predicate formulas proving.	2
Cl 13	Canonical forms of predicate formulas.	2
Cl 14	Test 2. Application of resolution rule for formulas proving.	3
Cl 15	Corrective test.	1
	Total hours	30
TEACHING TOOLS USED		

N1. Lecturer's presentation at a blackboard, supported by a multimedia presentation using a laptop and a projector.
N2. Individual search and study of literature and Internet sources.
N3. Access to teaching materials published in the local area network.
N4. Individual consultations.

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	PEK_W01 PEK_W02 PEK_U01 PEK_U02 PEK_K01	During each class students are awarded 1 or 2 points for an individual solution of a task from the announced list of tasks.
F2	PEK_W02 PEK_W03 PEK_U02 PEK_U03 PEK_K01	Students are oblige to participate in two tests at the middle and at the end of a semester. During each test students are awarded up to 10 points.
F3	PEK_W01 PEK_W02 PEK_W03 PEK_U01 PEK_U02 PEK_U03	Final mark for the classes is determined on the base of total number of points resulted from activity during classes (F1) and points for the tests (F2). Detailed rules for final mark evaluation are as follows: Let c_i the number of points scored for activity during classes in the i-th part of semester, for $i = 1, 2$; t_i the number of points scored during the i-th test, for $i = 1, 2$; t_{popr} the number of points scored during corrective test; $P_i = min(10, c_i + t_i)$ for $i = 1, 2$; $P = P_1 + P_2$. For passing classes without corrective test the following condition should be satisfied: $P \geq 10$ and ($P_i \geq 4$ for $i = 1, 2$). If the condition is satisfied the mark is calculated according to the table: 	P	10	12	14	16	18	 	**Mark**	3.0	3.5	4.0	4.5	5.0	 The students which have passed the classes without corrective test and have got at least mark 4 are exempted from examination with the same mark.

C: The final evaluation of the course is determined based on the results of the examination. The examination lasts two hours and consists of a set of tasks, with the total number of 20 points. The condition for a positive assessment of the final exam is to get 10 points and a positive final evaluation of the exercise.

The final evaluation of the examination is determined in accordance with the following table:

Points	10	12	14	16	18
Mark	3.0	3.5	4.0	4.5	5.0

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Information Systems Modeling and Analysis
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY **Informatics**
AND SPECIALIZATION
Computer Engineering

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)	K_W02, K_W03, K_W06	C1, C2	Lec1-Lec6	N1, N2, N3, N4
PEK_W02	K_W02, K_W03, K_W04, K_W05, K_W06	C1, C2	Lec5-Lec12	N1, N2, N3, N4
PEK_W03	K_W02, K_W03, K_W04, K_W05, K_W06	C1, C2	Lec11-Lec15	N1, N2, N3, N4
PEK_U01 (skills)	K_U01, K_U02, K_U06, K_U07	C1, C2	Cl1-Cl8	N1, N2, N3, N4
PEK_U02	K_U01, K_U02, K_U03, K_U05	C1, C2	Cl9-Cl14	N1, N2, N3, N4
PEK_U03	K_U01, K_U02, K_U03, K_U04, K_U05, K_U06, K_U07	C1, C2	Cl1-Cl15	N1, N2, N3, N4
PEK_K01 (competences)	K_K02	C1, C2	Lec1-Lec15 Cl1-Cl15	N1, N2, N3, N4
PEK_K02	K_K06	C1, C2	Lec1-Lec15 Cl1-Cl15	N1, N2, N3, N4
PEK_K03	K_K01	C1, C2	Lec1-Lec15 Cl1-Cl15	N1, N2, N3, N4

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

*** - from the table above

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FACULTY …W8…… / DEPARTMENT…I 32…
SUBJECT CARD
Name in Polish ……… Matematyka dyskretna
Name in English ………Discrete Mathematics
Main field of study (if applicable): … Informatics
Specialization (if applicable): ……………………..
Level and form of studies: 1st/ 2nd* level, full-time / part-time*
Kind of subject: obligatory / optional / university-wide*
Subject code … MAZ001500
Group of courses YES / NO*

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	45	30	0	0	0

Number of hours of total student workload (CNPS)	90	90			
Form of crediting	Examination / ~~crediting with grade~~*	~~Examination~~ / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*
For group of courses mark (X) final course					
Number of ECTS points	3	3			
including number of ECTS points for practical (P) classes					
including number of ECTS points for direct teacher-student contact (BK) classes	1,8	1,8			

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. The course „Logics for informaticiens"
2. The course „Mathematical analysis"

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SUBJECT OBJECTIVES

The science of computers, computer systems and their applications (often called in short "computer science" or also "theoretical and applied informatics") is a very young discipline starting together with the development of the first electronic computers. The problem-solving emphasis of computer science borrows heavily from the areas of mathematics and logic. Faced with a problem, computer scientists must first formulate a solution. This method of solution, or algorithm as it is often called in computer science, must be thoroughly understood before the computer scientists make any attempt to implement the solution on the computer. Discrete mathematical structures, in particular such as mathematical logic and set theory, algebraic systems, graphs and so on, underpin a large amount of modern computer science. The main purpose of this course is representation of some selected topics of the discrete mathematical structures now having a large application in the computer science theory. This is a fundamental course. The lectures are predestined at first for the computer science students, however it can also be useful in other areas, e.g. such as: system techniques and control, technical cybernetics, telecommunication, managing etc. The main objectives of this course are as follows:

C1: Thorough knowledge of the sense of using natural deduction methods in computer science.

C2: A possibility of obtaining a knowledge for the purpose of efficient bibliographic search in this field of application and also with respect to future scientific investigations and/or practical applications.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEK_W01   A good knowledge of the used methods (i.e. the corresponding instrumentarium) in discrete mathematics

PEK_W02   A good knowledge of the assumptional system style techniques.

…

relating to skills:

PEK_U01   A communication ability in senso stricto

PEK_U02   Practical implementations of different projects using the obtained skills

…

relating to social competences:

PEK_K01   Computer science competency

PEK_K02   Further investigation-competency related to new research and developments

PEK_K03   Elaboration of new solutions and/or technologies

PROGRAMME CONTENT

Form of classes - lecture		Number of hours
Lec 1	Introduction: Discrete mathematics and informatics. Natural deduction in logical calculi and sets	1
Lec 2	Propositional calculus	2
Lec 3	First order predicate logic	2
Lec 4	Set theory	2
Lec 5	Relations and functions. Applications: k-dense ordered sets	2
Lec 6	Multisets and multirelations	2
Lec 7	T- and S-norms, fuzzy sets and fuzzy relations, t-equivalence, interval type-2 fuzzy sets	2
Lec 8	Some non-standard logics: many-valued and fuzzy logics, modal, deontic and temporal logics	2
Lec 9	Approximative space and rough sets. Fuzzy rough sets. Near sets	2
Lec 10	Elements of theory of information systems. Decision tables	2
Lec 11	Operations and algebraic systems	2
Lec 12	Lattices, Boolean, multiple valued and fuzzy algebras	2
Lec 13	Homomorphisms of algebraic systems	2
Lec 14	Congruencies, quotient systems, direct products and free algebraic systems	2
Lec 15	Grammars and sequential machines	2
Lec 16	Algorithms, computability, induction and recursion	2
Lec 17	Elements of graph theory. Hypergraphs	2
Lec 18	Combinatorics and elements of combinatorial analysis	2
Lec 19	Elements of probability theory, Markov's chains	2
Lec 20	Elementary number theory	2
Lec 21	Information, coding, encryption codes	2
Lec 22	Elements of Petri net theory	2
Lec 23	Algorithm complexity	2
	Total hours	45
Form of classes - class		**Number of hours**
Cl 1	Lec 2, Lec 3	2
Cl 2	Lec 4	2
Cl 3	Lec 5	2
Cl 4	Lec 6	2
Cl 5	Lec 7	2
Cl 6	Lec 8	2
Cl 7	Lec 9	2
Cl 8	Lec 10	2
Cl 9	Lec 11	2
Cl 10	Lec 12	2
Cl 11	Lec 13, Lec 14	2

Cl 12	Lec 15, Lec 16	2
Cl 13	Lec 17	2
Cl 14	Lec 18, Lec 19, Lec 20	2
Cl 15	Lec 21, Lec 22, Lec 23	2
	Total hours	30

The considered exercises are a methodical illustration and/or extension of the above presented lectures.

Form of classes - laboratory		Number of hours
Lab1		
Lab2		
Lab3		
Lab4		
Lab5		
…		
	Total hours	

Form of classes - project		Number of hours
Proj1		
Proj2		
Proj3		
Proj4		
…		
	Total hours	

Form of classes - seminar		Number of hours
Sem1		
Sem2		
Sem3		
…		
	Total hours	

TEACHING TOOLS USED
N1. Accurately defined problems N2. A logical sequential way of solving problems N3. An analysis of the obtained results

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT

Evaluation(F – forming (during semester), C – concluding (at semester end)	Educational effect number	Way of evaluating educational effect achievement
F1	PEK_W01	On-line, real-time problem solving method
F2	PEK_W02	
F3	PEK_U01	
C PEK_W01, PEK_W02, PEK_U01		

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
………Discrete Mathematics…………
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY ………Informatics…..
AND SPECIALIZATION ……………………………..

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)	x	x	x	N1
PEK_W02	x	x	x	N2,N3
PEK_U01 (skills)	x	x	x	N1
PEK_U02	x	x	x	N1,N2,N3
PEK_K01 (competences)	x	x	x	N1
PEK_K02	x	x	x	N1,N2
PEK_K03	x	x	x	N1,N2,N3

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

*** - from table above

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FACULTY W-8 / DEPARTMENT………………
SUBJECT CARD
Name in Polish Metaheurystyki w rozwiązywaniu problemów.
Name in English Problem solving using metaheuristics.
Main field of study (if applicable): …………………………..
Specialization (if applicable): ……………………..
Level and form of studies: 1st/ 2nd* level, full-time / part-time*
Kind of subject: obligatory / optional / university-wide*
Subject code INZ0005223
Group of courses YES / NO*

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30		30		
Number of hours of total student workload (CNPS)	60		60		
Form of crediting	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*
For group of courses mark (X) final course	-	-	-	-	-

1

Number of ECTS points	**2**		2		
including number of ECTS points for practical (P) classes	-		2	-	-
including number of ECTS points for direct teacher-student contact (BK) classes	1,2		1,2		

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

 1. K1INF_W15 Has basic knowledge about modelling, and knows methods and techniques used in decision supporting systems
 2. K1INF_U16 Can effectively use methods and tools of information storing, information
processing, information searching and knowledge aquisttion

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SUBJECT OBJECTIVES

C1 To teach students about various approaches and metaheristics used in machine learning tasks
C2 To get a skill of metaheuristics selection suitable to given task
C3 To get a skill of validation of metaheuristics in real world applications

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SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEK_W02: Has knowledge of approaches and methods used in machine learning

PEK_W02: Has knowledge of various metaheurictics applications

PEK_W03: Has knowledge of selected data preprocessing techniques

PEK_W04: Has knowledge of metaheuristics results validation

PEK_W05: Has knowledge of effective implementation of metaheuristics

relating to skills:
PEK_U01: Can select a proper metaheuristic for given task

PEK_U02: Can design and implement application

PEK_U03: Can prepare and do an empirical experiments to examine metaheuristics effectiveness and usability

PEK_U04: Can prepare results analysis and do raport of done experiments

relating to social competences:
PEK_K01

PROGRAMME CONTENT		
Form of classes - lecture	**Number of hours**	
L1	Introduction to metaheuristics	**2**
L2	Introduction to Evolutionary Algorithms (EA)	**2**
L3	Solving problems and tasks by metaheuristics – research methodology	**2**
L4	Other metaheuristics: HillClimbing (HC), Tabus Search (TS), Simulated Annealing (SA)	**2**
L5	Introduction to EA specialisation and extensions	**2**
L6	Specialisation of EA: reprezentation, fitness finction and gentic operators	**2**
L7	Types and extensions of EA	**4**
L9	Hybrid metaheuristics	**2**
L10	Selected swarm-based metaheuristics: Ant Colony Optimisations, Bee Colony Optimisation, Particle Swarm Optimisation	**2**
L11	Other selected metaheuristics	**4**
L12	Methods of metaheuristics effeciency improvment	**4**
L13	Summary and recent directions	**2**
	Total hours	**30**

Form of classes - class	**Number of hours**	
Cl 1		
Cl 2		
Cl 3		
Cl 4		
..		
	Total hours	

Form of classes - laboratory	**Number of hours**	
Lab 1	Organization issues	2
Lab 2	L1. Application of Evolutionary Algorithms to given problem A	6
Lab 3	L2 Tabu Search (TS) usage to selected problem A	4
Lab 4	L3 Simulated Annealing (SA) application to selected problem A	4
Lab 5	L4 Comparision of EA, TS and SA implementation effectivity for	4

	selected problem A	
Lab 6	L5 Hybrids EA+SA and EA+TS used for A problem solving	2
Lab 7	L6 Selected metaheuristics implementation, e.g. Ant Colony Optimisation solving A problem	8
	Total hours	30

Form of classes - project	Number of hours	
Proj 1		
Proj 2		
Proj 3		
Proj 4		
…		
	Total hours	

Form of classes - seminar	Number of hours	
Sem 1		
Sem 2		
Sem 3		
…		
	Total hours	

TEACHING TOOLS USED
N1. Multimedia powerpoint presentation
N2. Laboratory excersises description
N3. e-learning system

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 – L1 realisation	PEK_W01; PEK_U01; PEK_U03; PEK_U04;	L1 realisation is worth 10 points. For each working week delay penatly -20% is used. In each laboratory student can present only one excercise realisation. The exercise realisation is: exercise specification reading, given method analysis and implementation, application verification and effectivency research. The whole process

		is described in raport. There are included implementation details, research metodology, summary results and emerged problems. Such raport is uploaded to e-learing portal. It is suggested implementation in non-interpret programming language – such language usage deacrease points -20%. The C/C++ usage is preffered.
F2 – L2 realisation	PEK_W01; PEK_U02; PEK_U03; PEK_U04;	Like F1
F3 – L3 realisation	PEK_W01; PEK_U02; PEK_U03; PEK_U04;	Like F1
F3 – L4 realisation	PEK_W01; PEK_U02; PEK_U03; PEK_U04;	Like F1
F3 – L5 realisation	PEK_W01; PEK_U02; PEK_U03; PEK_U04;	Like F1
F3 – L6 realisation	PEK_W01; PEK_U02; PEK_U03; PEK_U04;	Like F1
C - summay	PEK_U01; PEK_U02; PEK_U03; PEK_U04; PEK_U01;	The final mark is given as follows: 0 – 29 points gives ndst 30 - 34 points gives dst 35 - 40 points gives dst+ 41 - 45 points gives db 45 - 50 points gives db+ 51 - 60 points gives bdb No more than 2 absences are allowed. More fails the course.

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

11. Goldberg D. "Algorytmy genetyczne i ich zastosowanie", WNT 1998.

12. Kwaśnicka H. "Obliczenia ewolucyjne w sztucznej inteligencji", Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław, 1999.

13. Michalewicz Z. "Algorytmy genetyczne + struktury danych = programy ewolucyjne", WNT 2010.

14. Michalewicz Z., Fogel D.B. "Jak to rozwiązać, czyli nowoczesna heurystyka", WNT 2006

SECONDARY LITERATURE:

[1] Arabas J. "Wykłady z algorytmów ewolucyjnych", WNT, Warszawa 2004.

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

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
………………………………
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY ………………………..
AND SPECIALIZATION ……………………………..

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_W06_S2ISI_W01 K2INF_W06_S2ISI_W02	C1, C3	W2 - W13	N1, N3
PEK_W02	K2INF_W06_S2ISI_W01 K2INF_W06_S2ISI_W02	C1, C2	W2 - W13	N1, N3
PEK_W03	K2INF_W06_S2ISI_W01 K2INF_W06_S2ISI_W02	C1, C2, C3	W2 - W13	N1, N3
PEK_W04	K2INF_W06_S2ISI_W01 K2INF_W06_S2ISI_W02	C1, C2, C3	W2 - W13	N1, N3
PEK_W05	K2INF_W06_S2ISI_W01 K2INF_W06_S2ISI_W02	C1, C2, C3	W2 - W13	N1, N3
(skills)				
PEK_U01	K2INF_U08_S2ISI _U01 K2INF_U08_S2ISI _U02 K2INF_U08_S2ISI _U03	C1, C2, C3	L1-L6	N2, N3
PEK_U02	K2INF_U08_S2ISI _U01 K2INF_U08_S2ISI _U02 K2INF_U08_S2ISI _U03	C1, C2, C3	L1-L6	N2, N3
PEK_U03	K2INF_U08_S2ISI _U01 K2INF_U08_S2ISI _U02 K2INF_U08_S2ISI _U03	C1, C2, C3	L1-L6	N2, N3
PEK_U04	K2INF_U08_S2ISI _U01 K2INF_U08_S2ISI _U02 K2INF_U08_S2ISI _U03	C1, C2, C3	L1-L6	N2, N3

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

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FACULTY W-8 / DEPARTMENT………………
SUBJECT CARD

Name in Polish Metody systemowe i decyzyjne w informatyce
Name in English Systems analysis and decision support methods in Computer Science
Main field of study (if applicable): Computer Science
Specialization (if applicable): ……………………..
Level and form of studies: 1st/ 2nd* level, full-time / part-time*
Kind of subject: obligatory / optional / university-wide*
Subject code INZ 002556
Group of courses YES / NO*

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30	15	15		
Number of hours of total student workload (CNPS)	90	60	60		
Form of crediting	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*
For group of courses mark (X) final course					
Number of ECTS points	3	2	2		
including number of ECTS points for practical (P) classes	0	0	2		
including number of ECTS points for direct teacher-student contact (BK) classes	1,8	1,2	1,2		

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES
1. Knows basics of mathematical analysis and linear algebra.
2. Basic programming skills (variables, functions, loops, conditional statements).

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SUBJECT OBJECTIVES
C1 Knowledge about methods of modelling static and dynamic systems.
C2 Acquisition of skills necessary to develop computer models of technical and non-technical processes.
C3 Learning how to formulate typical decision making problems and how to solve them.
C4 Learning how to use computer engineering software to develop decision making support systems and solve optimization tasks.

SUBJECT EDUCATIONAL EFFECTS

related to knowledge:

PEK_W01 Knows basic ideas, problems and methods of systems modelling and identification.

PEK_W02 Knows typical decision making tasks and knows methods of solving optimization problems.

related to skills:

PEK_U01 Knows how to formulate decision making problems.

PEK_U02 Knows how to use MATLAB and SIMULINK for engineering computations, in particular for systems modelling and identification.

PEK_U03 Knows how to use computer engineering software to solve optimization tasks and to develop decision making support systems.

related to social competences:

PEK_K01 Knows how to make documentation of their own work, that is readable for other people.

PROGRAMME CONTENT

Form of classes - lecture		Number of hours
Lec 1	Model in systems research. Introduction – basic concept.	1
Lec 2	Continuous signal, the Laplace transform.	1
Lec 3	Discrete signal, the Z transform.	1
Lec 4	Typical plant models – relations between descriptions.	1
Lec 5	Elementary linear elements.	1
Lec 6	Model building task based on experiment – identification problem.	1
Lec 7	Identification of static plant. Deterministic problem – determination of the plant parameters.	1
Lec 8	Noised measurements of the physical variables.	1
Lec 9	Estimation of plant parameters with noisy measurements.	1
Lec 10	Choice of the best model – probabilistic case. Regression functions.	1
Lec 11	Determination of the regression functions based on the experimental data.	1
Lec 12	Model based decision making (acceptable, satisfactory and optimal decisions).	1
Lec 13	Analytical methods of unconstrained optimization for multivariable functions.	1
Lec 14	Analytical methods of constrained optimization for multivariable functions.	2
Lec 15	Discrete optimization – the branch and bound algorithm.	1
Lec 16	Linear programming.	1
Lec 17	Numerical optimization methods – basic concepts. Numerical optimization methods for one variable function.	1
Lec 18	Pattern search optimization.	2
Lec 19	Gradient based optimization methods.	1
Lec 20	Methods for probabilistic optimization problems: the Monte Carlo method, evolutionary and genetic algorithms, simulating annealing.	2
Lec 21	Multi-criteria optimization.	1
Lec 22	Pattern recognition algorithms for decision making support.	2
Lec 23	Multi-stage decision making, dynamical programming.	1

Lec 24	Decision making in uncertain conditions.	1
Lec 25	Game theory in decision making.	2
	Total number of hours	**30**

Form of classes - class		Number of hours
Cl 1	Examples of dynamical processes and their models.	1
Cl 2	Differential equations, the Laplace's transform and transfer function.	1
Cl 3	Solving differential equations with use of the Laplace transform.	1
Cl 4	Discrete processes examples and their models. The Z Transform.	1
Cl 5	Solving difference equations.	1
Cl 6	Numerical methods of solving differential equations. The Euler's scheme.	1
Cl 7	Optimization problems formulations. Decision variables, performance index, constraints.	2
Cl 8	Foundations of optimization. Convex sets and functions, quadratic form, gradient, the Hessian matrix.	1
Cl 9	Analytical methods for unconstrained and constrained optimization. Equality constraints and the Lagrange function.	1
Cl 10	Analytical methods for unconstrained and constrained optimization. Inequality constraints and Kuhn-Tucker conditions.	1
Cl 11	Linear programming.	1
Cl 12	Integer programming.	1
Cl 13	Dynamical programming.	2
	Total number of hours.	**15**

Form of classes - laboratory		Number of hours
Lab 1	Instructions for OSH. Introduction for MATLAB. Basic commands, working with command window.	1
Lab 2	Advanced functions in MATLAB for data processing.	1
Lab 3	Dynamical processes modeling in Simulink. Difference equations and transfer function. Solving difference equations.	2
Lab 4	Fundamental classes of dynamical processes. Simulation studies.	1
Lab 5	Building model and simulation of selected dynamical process. Programming test.	1
Lab 6	Optimization method for one variable function. Implementation and graphical presentation of selected methods.	2
Lab 7	Optimization method for multi variable function. Implementation and graphical presentation of selected methods. Report.	3
Lab 8	Application of Matlab's toolbox for advanced problems of modeling and optimization.	2
Lab 9	Elaboration of student's own project in Matlab environment. Report.	2
	Total hours	**15**

Form of classes - project		Number of hours
Proj 1		
Proj 2		

Proj 3		
Proj 4		
…		
	Total hours	

Form of classes - seminar	Number of hours

Sem 1		
Sem 2		
…		
	Total number of hours	

TEACHING TOOLS USED

N1. Traditional lecture. Multimedia presentations.
N2. Student's own works – solving calculation tasks.
N3. Collective works – consultations with teacher.
N4. Student's own works – literature studies.
N5. Student's own works – computer programming.
N5. Student's own works – simulation studies.
N7. Student's own works – results presentation.

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT

Evaluation (F – forming (during semester), P – concluding (at semester end)	Educational effect number	The way of evaluating educational effect achievements
F1	PEK_U02	Observation of student's activity. Conversation with student about current laboratory exercises. Programming test.
F2	PEKU03 PEK_K01	Observation of student's activity. Conversation with student about current laboratory exercises. Report evaluation.
F3	PEK_W01 PEK_W02 PEK_U01	Observation of student's activity. Solving exercises. Test.
P1 (Lec)	PEK_W01 PEK_W02	Examination.
P2 (Cl)	PEK_W01 PEK_W02 PEK_U01	On the basis of F1.
P3 (La)	PEK_U02 PEK_U03	On the basis of F1, F2.

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Bubnicki Z., *Identification of control plants*, PWN, Warszawa, 1980.
[2] Bubnicki Z. *Modern Control Theory*, Springer, Berlin-Heidelberg-New York, 2005
[3] Ikonen E., Najim K*., Advanced identification and control*, CRC Press LLC, 2002

SECONDARY LITERATURE:

[1] Bazaraa M. S., Sherali H.D., Shett C. M., *Nonlinear Programming Theory and Algorithms*, John Wiley and Sons, Inc., 2006
[2] Chong E.K.P., Żak S.H., *An Introduction to Optimization*, Wiley-Interscience, 2008.
[3] Ogata K., *Modern Control Engineering*, Prentice Hall, 2009.

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT

……………………….

AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY ……………………..
AND SPECIALIZATION ……………………………

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)	K1INF_W02 K1INF_W15	C1	Lec1 – Lec 11 Cl1 – Cl 6	N1, N2, N4
PEK_W02	K1INF_W01 K1INF_W15	C3	Lec 12 – Lec 25 Cl 7 – Cl 13	N1, N2, N4
PEK_U01 (skills)	K1INF_U15	C3	Lec 12, Lec 21, Lec 23 – Lec 25, Cl 7, Lab9	N1, N2
PEK_U02	K1INF_U07	C2	Lab1 – Lab5	N3, N5 – N7
PEK_U03	K1INF_U07 K1INF_U11	C4	Lab6 – Lab9	N3, N5 – N7
PEK_K01 (competences)			Lab7, Lab9	N3, N7

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

FACULTY **Computer Science and Management**   / DEPARTMENT………………
SUBJECT CARD
Name in Polish Organizacja systemów komputerowych
Name in English   *Computer Organization*
Main field of study (if applicable): Informatics
Specialization (if applicable):
Level and form of studies: 1st/ 2nd* level, full-time / part-time*
Kind of subject: obligatory / optional / university-wide*
Subject code INZ001726Cw
Group of courses YES / NO*

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30	15			
Number of hours of total student workload (CNPS)	30	90			
Form of crediting	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*
For group of courses					

mark (X) final course					
Number of ECTS points	1	2			
including number of ECTS points for practical (P) classes	0	0			
including number of ECTS points for direct teacher-student contact (BK) classes	0,6	1,2			

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1 lists and describes the basic components of a computer.
2 defines basic features of the computer.

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SUBJECT OBJECTIVES

C1 familiarize students with the nature and properties of modern computers
C2 familiarize students with the basics of designing computers for achieving high performance, availability and performance solutions
C3 Knowing how to represent the numbers and do basic arithmetic for these numbers.
C4 Learning methods of reducing Boolean expressions.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEK_W01 lists and describes the elements of the modern computer
PEK_W02 describes the design requirements of efficient, reliable and environmentally computers
PEK_W03 Describes how to represent numbers in a more fixed systems, methods for converting numbers and how to implement arithmetic operations.
PEK_W04 knows the basic methods of reducing Boolean expressions

relating to skills:
relating to social competences:
PEK_K01 has awareness of the importance of non-technical aspects of engineering-science; understands the need to provide high quality and availability of information systems, taking into account the needs of different user groups.

PROGRAMME CONTENT

Form of classes - lecture		Number of hours
Lec 1	Introduction to the course. Description of the course, the organization of classes and examination. Introduction of the basic concepts. The structure and architecture of the computer. A brief history of computing - evolution, efficiency, environmental performance computers.	2
Lec 2	Computer Arithmetic. Number Systems. Representation of integers and natural - NBC code, representation sign and magnitude, two's complement representation. Conversions of numbers.	2
Lec 3	The arithmetic of integers - negation, addition and subtraction, multiplication, division.	2

Lec 4	Floating-point representation. Standard IEEE 754 floating-point arithmetic	2
Lec 5	The overall picture of the computer and its internal connections. Elements of computer. Execution of instructions. Instruction cycle. Interrupts and their support.	2
Lec 6	The structure of internal connections. Magistrale computer. Arbitration and coordination time. PCI bus.	2
Lec 7	Organization of I/O – I/O modules, programmable input-output.	2
Lec 8	Organization of input-output. Input-output controlled via interrupt, direct memory access, external interfaces: Ethernet	2
Lec 9	Support the operating system - an overview of operating systems, scheduling	2
Lec 10	Support the operating system – memory management, virtualisation	2
Lec 11	List of instructions: properties and functions, addressing modes and formats	2
Lec 12	Processors. The structure and operation of the processor. RISC and CISC processors. The organization of registers. Pipelining of instructions	2
Lec 13	Discussion of sample CISC processor	2
Lec 14	Discussion of sample RISC processor	2
Lec 15	Test	2

Form of classes - class		Number of hours
Cj 1	Discussion of the organization and program of activities. Introduction to classes - basic arithmetic in positional numerical system.	1
Cl 2	Methods for converting numbers to different formats of fixed-number systems.	2
Cl 3	The methods of coding numbers. Binary codes, BCD and complement representation,	2
Cl 4	The arithmetisc of binary numbers. Binary codes, BCD and complement representation.	2
Cl 5	Test.	2
Cl 6	Fixed point arithmetic - multiply and divide of numbers.	2
Cl 7	Fundamentals of Boolean algebra. Methods of reducing Boolean expressions.	2
Cl 8	Test.	2
	Total	15

Form of classes - laboratory		Number of hours
Lab 1		
Lab 2		
	Total hours	

Form of classes - project		Number of hours
Proj 1		
Proj 2		
	Total hours	

Form of classes - seminar		Number of hours

TEACHING TOOLS USED
N1. Lecture supported by multimedia presentations
N2. Examples of documentation manufacturers of processors and computers
N3. E-learning system used for publication of teaching materials or announcements, collection and assessment of student work
N4 Own materials prepared for the classes.
N5 Classes at the blackboard..

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
P1 – concluding lectures	PEK_W01	Test in e-learning system evaluating the knowledge acquisited at the lecture. In this test point is granted a positive rating if the student scores at least 50% of the maximum number of points. P1 is the number of points scored.
F1 – concluding classes 1-5	PEK_W03	Test in e-learning system checking the knowledge acquired at classes. Scoring.
F2 - concluding classes 6-7	PEK_W04	Test in e-learning system checking the knowledge acquired at classes. Scoring.
P2 – concluding classes		Scoring: - Total points ratings forming F1 and F2, - Bonus points for the exercises at the blackboard (up to 10% of the points for the test forming)

		- Negative points for absences and unpreparedness for classes. Scoring positive for winning at least 50% of the maximum possible total score ratings forming F1 and F2.
P3 – final grade		Rating determined at a weighted average basis: P3 = P1 + 0.5 * 0.5 * P2 points P1 and P2 according to the formula: [50%, 60%) – dst [60%, 70%) – dst+ [70%, 80%) – db [80%, 90%) – db+ [90%, 100%) – bdb 100% – cel

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[11] W. Stallings, Organizacja i architektura systemu komputerowego, WNT, Warszawa 2004 lub nowsze.
[12] A. Skorupski: Podstawy techniki cyfrowej, WKŁ, Warszawa 2004,
[13] B. Pochopień: Arytmetyka systemów cyfrowych, WPŚ, Gliwice 2002.

SECONDARY LITERATURE:

[1] L. Null, J. Lobur, Struktura organizacyjna i architektura systemów komputerowych, Helion 2004
[2] A. Tanenbaumn, Strukturalna organizacja systemów komputerowych, Helion 2006
[3] W. Komorowski, Krótki kurs architektury i organizacji komputerów, MIKOM 2004
[4] Materiały przygotowane przez prowadzącego kurs.
[5] B. Pochopień: Podstawy techniki cyfrowej, WSB, Dąbrowa Górnicza 2004,

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Computer Organization
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY **Infomatics**
AND SPECIALIZATION

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	K1INF_W08	C1	Wy1, …, Wy15	N1, N2, N3
PEK_W02	K1INF_W08	C2	Wy1, …, Wy15	N1, N2, N3
PEK_W03	K1INF_W08	C3	Ćw1, …, Ćw6	N3, N4, N5
PEK_W04	K1INF_W08	C4	Ćw7, Ćw8	N3, N4, N5

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

*** - from table above

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FACULTY of Informatics and Management / DEPARTMENT………………
SUBJECT CARD
Name in Polish: Paradygmaty programowania
Name in English: Programming Paradigms
Main field of study (if applicable): Informatics
Specialization (if applicable): ……………………..
Level and form of studies: 1st/ 2nd* level, full-time / part-time*
Kind of subject: obligatory / optional / university-wide*
Subject code INZ002528
Group of courses YES / NO*

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

(BK) classes					

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basic knowledge of object-oriented programming and the ability to write simple programs in Java.
2. Knowledge of basic algorithms and data structures.

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SUBJECT OBJECTIVES

C1 Ability to use programming techniques typical of chosen programming paradigm.
C2 Ability to merge constructs from different paradigms in one program.

SUBJECT EDUCATIONAL EFFECTS

relating to skills:
PEK_U01 Implement programs in accordance with the given specification.
PEK_U02 Select the programming paradigm that best suits the problem in hand.
PEK_U03 Choose appropriate constructs available in programming language depending on the
            problem to be solved.
PEK_U04 Use the standard documentation of programming languages.
PEK_U05 Use a modern programming environment (e.g. Eclipse) and programming tools.
PEK_U06 Know and observe safety rules.

PROGRAMME CONTENT

Form of classes - laboratory		Number of hours
Lab 1	Grading policy. Safety rules. Introduction to the programming environment used.	2
Lab 2	Functional programming in interactive environment.	2
Lab 3	Simple functions with pattern matching.	2
Lab 4	Higher-order functions.	2
Lab 5	Functions with algebraic data types (e.g. trees).	2
Lab 6	Functions on lazy lists and/or trees.	2
Lab 7	Functions with computational effects.	2
Lab 8	Using modules.	2
Lab 9	Object-oriented program with class hierarchy.	2
Lab 10	Object-oriented program with traits and mixins..	2
Lab 11	Object-oriented program with generic classes. Variance properties.	2
Lab 12	Concurrent programming with threads.	2
Lab 13	Concurrent programming. Actors and message passing.	2
Lab14	Program with event handling.	2
Lab 15	Grading.	2
	Total hours	30

TEACHING TOOLS USED

N1. Modern programming environment and programming tools.
N2. E-learning system used to publish teaching materials and messages.

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT

Evaluation (F – forming	Educational effect	Way of evaluating educational effect achievement

(during semester), P – concluding (at semester end)	number	
F1	PEK_U01-U06	Grading programs written on-line during labs..

C The overall grade for labs according to the rules announced during the first lab.

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Handouts provided by the teacher.
[2] M. Odersky, L.Spoon, B.Venners, Programming in Scala, Artima 2010.
[3] J. Hickey, Introduction to Objective Caml, Internet.
[4] P. Van Roy, S.Haridi, Concepts, Techniques, and Models of Computer Programming, MIT 2004.

SECONDARY LITERATURE:

[1] R. W.Sebesta, Concepts of Programming Languages, Addison-Wesley 2012.
[2] E. Chailloux, P.Manoury, B.Pagano, Developing Applications with Objective Caml, Internet.
[3] Documentation of programming languages used.

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Programming Languages and Paradigms
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY Informatics
AND SPECIALIZATION ……………………………..

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_U01 (skills)	K1INF_U02, K1INF_W05, K1INF_W06	C1, C2	Lab2-14	N1, N2
PEK_U02	K1INF_U02, K1INF_W05, K1INF_W06	C1, C2	Lab2-14	N1, N2
PEK_U03	K1INF_U02, K1INF_W05, K1INF_W06	C1, C2	Lab2-14	N1, N2
PEK_U04	K1INF_U02, K1INF_W06	C1, C2	Lab2-14	N1, N2
PEK_U05	K1INF_U02	C1, C2	Lab2-14	N1, N2
PEK_U06	K1INF_U14		Lab1-14	

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

Zał. nr 4 do ZW 64/2012

FACULTY of Informatics and Management / DEPARTMENT………………
SUBJECT CARD
Name in Polish: Paradygmaty programowania
Name in English: Programming Paradigms
Main field of study (if applicable): Informatics
Specialization (if applicable): ……………………..
Level and form of studies: 1st/ 2nd* level, full-time / part-time*
Kind of subject: obligatory / optional / university-wide*
Subject code INZ002528Wc
Group of courses YES / NO*

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30	15			
Number of hours of total student workload (CNPS)	70	50			
Form of crediting	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*
For group of courses mark (X) final course	X				
Number of ECTS points	2,5	1,5			
including number of ECTS points for practical (P) classes					
including number of					

1

ECTS points for direct teacher-student contact (BK) classes	1,5	0,9			

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

2. Basic knowledge of object-oriented programming and the ability to write simple programs in Java.
2. Knowledge of basic algorithms and data structures.

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SUBJECT OBJECTIVES

C1 Basic understanding of fundamental programming paradigms and programming-language constructs.
C2 Ability to use programming techniques typical of chosen programming paradigm.
C3 Ability to merge constructs from different paradigms in one program.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEK_W01 Enumerate and characterize the basic programming paradigms.
PEK_W02 Know which programming languages support these paradigms.
PEK_W03 Know typical for basic paradigms programming mechanisms.
PEK_W04 Know common abstractions and mechanisms that support those abstractions in programming languages.

relating to skills:
PEK_U01 Implement programs in accordance with the given specification.
PEK_U02 Select the programming paradigm that best suits the problem in hand.
PEK_U03 Choose appropriate constructs available in programming language depending on the problem to be solved.
PEK_U04 Use the standard documentation of programming languages.

PROGRAMME CONTENT

Form of classes - lecture		Number of hours
Lec 1	Introduction. Functional programming in interactive environment.	2
Lec 2	Basics of functional programming: curried and uncurried form, tail recursion, pattern matching.	2
Lec 3	Higher-order functions. Higher-order programming.	2
Lec 4	Algebraic data types: definitions and usage.	2
Lec 5	Eager and lazy evaluation. Streams. Parameter passing.	2
Lec 6	Computational effects. Imperative programming.	2
Lec 7	Abstract data types.	2
Lec 8	Object-oriented programming I. Reminder of known programming constructs.	2
Lec 9	Object-oriented programming II. New programming constructs: traits, mixins, case classes and others.	2
Lec 10	Generic classes, variance properties and bounded polymprphism.	2
Lec 11	Most important forms of abstraction in programming languages.	2

Lec 12	Concurrent programming. Threads and shared memory.	2
Lec 13	Concurrent programming. Actors and message passing.	2
Lec 14	Handling events. GUI programming.	2
Lec 15	Basics of logic programming.	2
	Total hours	30

Form of classes - class		Number of hours
Cl 1	Administrative class. Grading policy.	1
Cl 2	Basics of functional programming. Pattern matching.	2
Cl 3	Higher-order functions. Algebraic data types.	2
Cl 4	Eager and lazy evaluation. Computational effects.	2
Cl 5	Abstract data types. Basics of object-oriented programming.	2
Cl 6	More advanced object-oriented mechanisms. Generic classes and variance properties.	2
Cl 7	Concurrent programming with threads.	2
Cl 8	Concurrent programming with actors and message passing. Handling events.	2
	Total hours	15

TEACHING TOOLS USED
N1. Lecture supported by multimedia presentations.   N2. E-learning system used to publish teaching materials and messages.

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	PEK_W01 PEK_W02 PEK_W03 PEK_W04 PEK_U01 PEK_U02 PEK_U03 PEK_U04	Grading homework exercises solved at classes and declared as solved.
F2	PEK_W01 PEK_W02 PEK_W03 PEK_W04	Written examination.
C The overall grade of the course is the grade for written exam, possibly modified by 0,5 up or down depending on the activity during classes.		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Handouts provided by the teacher.
[2] M. Odersky, L.Spoon, B.Venners, Programming in Scala, Artima 2010.
[3] J. Hickey, Introduction to Objective Caml, Internet.
[4] P. Van Roy, S.Haridi, Concepts, Techniques, and Models of Computer Programming, MIT 2004.

SECONDARY LITERATURE:

[1] R. W.Sebesta, Concepts of Programming Languages, Addison-Wesley 2012.
[2] E. Chailloux, P.Manoury, B.Pagano, Developing Applications with Objective Caml, Internet.

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

Zdzisław Spławski, zdzislaw.splawski@pwr.wroc.pl

MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Programming Languages and Paradigms
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY Informatics
AND SPECIALIZATION ……………………………..

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)	K1INF_W06	C1	Lec1-2, Lec8-9, Lec12-13, Lec15	N1, N2
PEK_W02	K1INF_W06	C1	Lec1, Lec8-9, Lec15	N1, N2
PEK_W03	K1INF_W05, K1INF_W06	C1	Lec1-15	N1, N2
PEK_W04	K1INF_W05, K1INF_W06	C1	Lec2-15	N1, N2
PEK_U01 (skills)	K1INF_U02, K1INF_W05, K1INF_W06	C2, C3	Cl2-8	N2
PEK_U02	K1INF_U02, K1INF_W05, K1INF_W06	C1, C2, C3	Cl2-8	N2
PEK_U03	K1INF_U02, K1INF_W05, K1INF_W06	C2, C3	Cl2-8	N2
PEK_U04	K1INF_W06, K1INF_U02	C1, C2	Cl2-8	N2

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

Zał. nr 4 do ZW 64/2012

FACULTY W-8 / DEPARTMENT………………
SUBJECT CARD
Name in Polish …… Podstawy Inżynierii Oprogramowania **…….**
Name in English …… Foundations of Software Engineering **….**
Main field of study (if applicable): …Informatics……….
Specialization (if applicable): ……………………..
Level and form of studies: 1st/ ~~2nd~~* level, full-time / ~~part-time~~*
Kind of subject: obligatory / ~~optional / university-wide~~*
Subject code INZ002558
Group of courses ~~YES~~ / NO*

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30	15	15		
Number of hours of total student workload (CNPS)	60	30	60		
Form of crediting	~~Examination~~ / crediting with grade*	~~Examination~~ / crediting with grade*	~~Examination~~ / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*
For group of courses mark (X) final course					

Number of ECTS points	**2**	1	2		
including number of ECTS points for practical (P) classes	1,2	0,6	1,2		
including number of ECTS points for direct teacher-student contact (BK) classes	1	1	1		

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES
1. Knowledge and experience in object-oriented programming language (eg. Java)
2.
3.

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SUBJECT OBJECTIVES
C1 obtain basic knowledge in the following areas of software engineering: processes and methodologies, software development life cycle models, requirements engineering and software testing.
C2 Gaining practical skills in engineering and specifying requirements for software testing.

SUBJECT EDUCATIONAL EFFECTS
relating to knowledge:
PEK_W01 student knows the software life cycle models and systems specification languages PEK_W02 student understands the need for methodologies in the software development process
PEK_W03student understands the need for software testing, distinguishes between types of tests and test levels;

relating to skills:
PEK_U01 student is able analyze a provided description of the user's needs in order to formulate the requirements for the software
PEK_U02 student models the requirements for the software in the form of use cases
PEK_U03 student develops interface as a verification of requirement modelt
PEK_U04 student specifies the business constraints on the system
PEK_U05 student specifies unit tests for a given program functions
PEK_U06 student formulates and develops test cases

relating to social competences:
....

PROGRAMME CONTENT

Form of classes - lecture		Number of hours
Lec 1	Introduction to Software Engineering (SE): the basic concepts of software engineering. Presentation of the program of the course, the organization of classes and evaluation process.	2
Lec 2	Software lifecycle processes. Models of the software life cycle. Methodologies of software development.	2
Lec 3	Engineering of software requirements	2
Lec 4	Modeling the structure and behavior of software systems	2

Lec 5	Language OCL as a formal specification language for constraints defined for the system	2
Lec 6	Human-computer interface, standards, technical designing.	2
Lec 7	Software designing process and artifacts.	2
Lec 8	Software implementation process, style guides, code versioning.	2
Lec 9	The quality of software in the process of its development.	2
Lec 10	Testing - tips, techniques, automated testing.	2
Lec 11	Issues on implementation of information systems.	2
Lec 12	Problems and methods of software maintenance.	2
Lec 13	Organization of software project.	2
Lec 14	Issues on configuration and change management in enterprise information systems.	2
Lec 15	Test	2
	Total hours	**30**

Form of classes - class		Number of hours
Cl 1	Introduction.	1
Cl 2	Developing a use case model	2
Cl 3	Specifications of the scenarios of use cases	2
Cl 4	Defining a data model of domain in consideration (class diagram)	2
Cl 5	The formal specification (OCL) of business rules	2
Cl 6	Specification of unit tests	2
Cl 7	Specification of acceptance tests	2
CL8	Test	2
	Total hours	15

Form of classes - laboratory		Number of hours
Lab 1	Organizational activities. Presentation of the scope and principles of assessment. Familiarization the students with the principles of health and safety. Getting familiar with development environments (DE) used in the laboratory.	1
Lab 2	Developing an use case model in DE.	2
Lab 3	Defining the scenarios of use cases in DE.	2
Lab 4	Prototyping of an application interface	2
Lab 5	Developing a business rules of domain in consideration	2
Lab 6	Performing an unit testing	2
Lab 7	Performing an acceptance testing	2
Lab 8	Preparation of final report from the lab	2
	Total hours	15

Form of classes - project		Number of hours
Proj 1		

Proj 2		
Proj 3		
Proj 4		
…		
	Total hours	

Form of classes - seminar		Number of hours
Sem 1		
Sem 2		
Sem 3		
…		
	Total hours	

TEACHING TOOLS USED

N1. Informative lecture, supported by multimedia presentations
N2. Examples of software models and software tests.
N3. Examples of technical documentation used in the software engineering area
N4. E-learning system used for the publication of teaching materials.

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	PEK_U01, PEK_U02, PEK_U04, PEK_U06,	Evaluation of tasks solutions from previously announced task lists. The solution is developed by the students partly during the teaching time, and partly - beyond. The subject leading teacher evaluates the solution drawn up by the student - usually during the classes in the University. Rating F1 is dependent on the scope, quality and level of expertise of the work. Students are informed of the assessment F1 directly.
F2	PEK_U01, PEK_U02, PEK_U04, PEK_U06,	Colloquium - written work (tasks to solve) checking the trained skills. The work is given a positive evaluation, if the student scores at least 50% of the maximum number of points.
F3 – use case model, scenarios, interface prototype	PEK_U02, PEK_U03,	Reviewing the requirements specification correctness. Verification of compliance with the principles of user interface design. Point scale (up to 50% of the total score) or traditional.
F4 –the unit testing	PEK_U05,	Checking the accuracy and completeness of the model and its compliance with the requirements specification. Point scale (max. 30% of total score) or traditional.
F5 – the acceptance testing	PEK_U06,	Verify the accuracy and completeness of unit and acceptance tests. Point scale (up to 20% of total points) or traditional.

F6 – 'checking' questions		Test (at least one per semester). Scale: *passed /no passed* (four *no passed* is understood as no possibility to complete the course)
P1 – the final evaluation of lecture	PEK_W01, PEK_W02, PEK_W03,	Colloquium - written test for evaluation of students' knowledge. The test is given a positive evaluation, if the student scores at least 50% of the maximum number of points.
P2 – the final evaluation of the excercises	PEK_U01, PEK_U02, PEK_U04, PEK_U05, PEK_U06,	The final evaluation of the exercise is determined on the basis of total marks obtained by the student from the lists of tasks (F1). Praise P2 is awarded to a student who passed positive the all lists and has won a total of at least 50% of the total points available within the evaluation of F2
P3 - – the final evaluation of the laboratory	PEK_U02, PEK_U03, PEK_U05, PEK_U06,	Rate determined on the basis of the total points of ratings forming F3 ... F5 according to the formula: <40% of the points ➜ not sufficient. <40%, 50%) ➜ sufficient <50%, 60%) ➜ sufficient + <60%, 70%) ➜good <70%, 80%) ➜ good + <80%, 90%) ➜ very good > 90% ➜ excellent or the weighted average: F3 *0.5 + 0.2 * F4 + 0.3 * F5

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[22]   Pressman , Praktyczne podejście do inżynierii oprogramowania, WNT 2003
[23]   Hamlet, Maybee , Podstawy techniczne inżynierii oprogramowania, WNT 2003
[24]   K. Sacha, Inżynieria oprogramowania, PWN, Warszawa, 2010

SECONDARY LITERATURE:

[14]   M. Fowler – UML w kropelce, LTP Oficyna Wydawnicza, 2005

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

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
… Foundations of Software Engineering …
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY **Informatics**…..
AND SPECIALIZATION ………………………..

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	K1INF_W07	C1	Lec2, …, Lec6, Lec11, …, Lec14	N1, N2,N4
PEK_W02	K1INF_W07	C2	Lec7, Lec8, Lec11.. Lec14	N1, N2, N4
PEK_W03	K1INF_W07	C2	Lec9,Lec10	N1, N2,N4
PEK_U01	K1INF_U03	C2	CL1,CL2,Lab8	N2, N3, N4
PEK_U02	K1INF_U03, K1INF_U14	C2	CL2, Lab1,Lab2	N2, N3, N4
PEK_U03	K1INF_U03,	C2	CL3, CL4,Lab3	N3, N4
PEK_U04	K1INF_U03	C2	CL5, Lab5,	N3, N4
PEK_U05	K1INF_U03,	C2	CL6, Lab6,	N3, N4
PEK_U06	K1INF_U03,	C2	CL7, Lab7	N3, N4

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

*** - from table above

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FACULTY W-8 / DEPARTMENT………………

SUBJECT CARD

Name in Polish Podstawy zarządzania
Name in English Management basics
Main field of study (if applicable): Informatics
Specialization (if applicable): ……………………..
Level and form of studies: 1st/ 2nd* level, full-time / part-time*
Kind of subject: obligatory / optional / university-wide*
Subject code ZMZ003559
Group of courses YES / NO*

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30				
Number of hours of total student workload (CNPS)	60				
Form of crediting	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*
For group of courses mark (X) final course					
Number of ECTS points	2				

including number of ECTS points for practical (P) classes	0				
including number of ECTS points for direct teacher-student contact (BK) classes	1.2				

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES
none

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SUBJECT OBJECTIVES
C1 To transfer and causing understanding by students information about management of their present conceptions. Understanding stages of organisation management evolution with development of organisational forms of market subjects and public sector
C2 Discussion about organisational models and legal forms of subjects activity on local and global market
C3 Reengineering as a mean to build advantage competitive companies and organisations through the means of optimising BPMN (Business Process Management Notation)
C4 Representing method of monitoring effectiveness of tasks, motivation and organising work teams
C5 Acquiring the necessary knowledge about active definition of functionality's and choosing proper ICT support (Informatics Communication Technology)

SUBJECT EDUCATIONAL EFFECTS
relating to knowledge:
PEK_W01 – has basic knowledge about running a business including organisational models and legal forms of subjects activity on local and global market
PEK_W02 – has basic knowledge about creating business processes BPMN and using this knowledge to optimise business processes and building competitive advantage
PEK_W03 – has basic knowledge about project management and work task teams
PEK_W04 – knows basic possibilities of using ICT as a support for running business

PROGRAMME CONTENT		
Form of classes - lecture		**Number of hours**
Lec 1	Basic terms from management – precursors of management	1
Lec 2	Theories, practices, schools of management	2
Lec 3	Legal and organisational forms of market subjects and public sector	2
Lec 4	Defining strategy and creating market advantage – business plan	2
Lec 5	Management of knowledge in organisation and information suport systems for creating competence – HR (Human Resources)	2
Lec 6	Resources management, motivation, Maslows theory, work tasks teams growing up phases	2
Lec 7	Organisational and management models from perspective key processes by informational systems	2
Lec 8	ICT globalisation factor in organisation, product, project, service life cycle	2
Lec 9	Business process modelling in market subjects and organisations of public sector BPMN	3

Lec 10	Risk management in company	2
Lec 11	Contract management	1
Lec 12	Changes management in organisation oriented on process reengineering and bringing new services on the market - Catalist	3
Lec 13	Production management with knowledge transfer B+R (Activity Based Costing and expectation and functions of class BI systems (Business Intelligence)	2
Lec 14	Outsourcing and teleworking	1
Lec 15	Role and significance of PM (Project Management) in management – management by projects	2
Lec 16	Written test	1
	Total hours	30

Form of classes - class		Number of hours
Cl 1		
Cl 2		
Cl 3		
Cl 4		
..		
	Total hours	

Form of classes - laboratory		Number of hours
Lab 1		
Lab 2		
Lab 3		
Lab 4		
Lab 5		
…		
	Total hours	

Form of classes - project		Number of hours
Proj 1		
Proj 2		
Proj 3		
Proj 4		
…		
	Total hours	

Form of classes - seminar		Number of hours
Sem 1		
Sem 2		
Sem 3		

…		
	Total hours	

TEACHING TOOLS USED
N1. N2. N3.

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
P	PEK_W01	Written test
P	PEK_W02	Written test
P	PEK_W03	Written test
P	PEK_W04	Written test

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[25] [Koźmiński, A.K. i Jemielniak, D. (2008) *Zarządzanie od podstaw*, Wydawnictwa Akademickie i Profesjonalne, Warszawa, 2008

[26] Frączkowski K., Zarządzanie projektem informatycznym, Wydawnictwo Oficyna PWr, 2002

SECONDARY LITERATURE:

[15] Gryfin Ricky W. Podstawy zarządzania organizacjami. Wydawnictwo Naukowe PWN, 2005

[16] Marcin W. Staniewski., Zarządzanie zasobami ludzkimi, a zarządzanie wiedzą w przedsiębiorstwie, Wyd. Vizja Press&IT ,2008

[17] Opolski Krzysztof., Biznes plan. Jak go budować i analizować ? Wyd. CeDeWu, 2006

[18] Frączkowski K ., Modele zarządzania zasobami projektu informatycznego i organizacji zespołów – telepraca. http://www.e-informatyka.pl/wiki/Modele_zarz%C4%85dzania_zasobami_projektu_informatycznego_i_organizacja_zespo%C5%82%C3%B3w_-_telepraca

[19] Frączkowski K., Model mapowania aktywności i kompetencji w projektach IKT. w. XXI Autumn Meeting of Polish Information Processing Society ISBN 83-922646-0-6 Conference Proceedings, pp.59-71 © 2005 PIPS oraz : http://www.proceedings2005.imcsit.org/docs/73.pdf

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Management basics
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY Informatics
AND SPECIALIZATION ……………..

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	K1INF_W18	C1,C2	Lec1,Lec2, Lec3,Lec4,	brak
PEK_W02	K1INF_W18	C3	Lec7,Lec9, Lec12, Lec13	brak
PEK_W03	K1INF_W18	C4	Lec5, Lec6, Lec10,Lec11,Lec15	brak
PEK_W04	K1INF_W18	C5	Lec8, Lec14	brak

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

Zał. nr 4 do ZW 33/2012

WYDZIAŁ W-8/ STUDIUM………………

KARTA PRZEDMIOTU
Nazwa w języku polskim ……Podstawy Elektroniki i Miernictwa………….
Nazwa w języku angielskim ……… Electronics and Metrology
Kierunek studiów (jeśli dotyczy): Informatyka
Specjalność (jeśli dotyczy): ……………………..
Stopień studiów i forma: I / II stopień*, stacjonarna / niestacjonarna*

Rodzaj przedmiotu: obowiązkowy / wybieralny / ogólnouczelniany *

Kod przedmiotu INZ001516W, INZ002554L

Grupa kursów TAK / NIE*

	Wykład	Ćwiczenia	Laboratorium	Projekt	Seminarium
Liczba godzin zajęć zorganizowanych w Uczelni (ZZU)	30		30		

Liczba godzin całkowitego nakładu pracy studenta (CNPS)	60		60		
Forma zaliczenia	~~Egzamin~~ / zaliczenie na ocenę*	Egzamin / zaliczenie na ocenę*	~~Egzamin~~ / zaliczenie na ocenę*	Egzamin / zaliczenie na ocenę*	Egzamin / zaliczenie na ocenę*
Dla grupy kursów zaznaczyć kurs końcowy (X)					
Liczba punktów ECTS	**2**		2		
w tym liczba punktów odpowiadająca zajęciom o charakterze praktycznym (P)	0		2		
w tym liczba punktów ECTS odpowiadająca zajęciom wymagającym bezpośredniego kontaktu (BK)	1,2		1,2		

*niepotrzebne skreślić

WYMAGANIA WSTĘPNE W ZAKRESIE WIEDZY, UMIEJĘTNOŚCI I INNYCH KOMPETENCJI
1. Wiedza z zakresu Analizy I i Fizyki I

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CELE PRZEDMIOTU

C1 Opanowanie podstawowej wiedzy dotyczącej właściwości obwodów elektrycznych.

C2 Opanowanie podstawowej wiedzy związanej z budową i działaniem podstawowych przyrządów półprzewodnikowych (diody \, tranzystory, bramki logiczne)

C3 Opanowanie podstawowej wiedzy dotyczącej miernictwa elektrycznego (zasady pomiaru prądu i napięcia, wzorce miar)

C4 zapoznanie studentów z podstawami optoelektroniki

PRZEDMIOTOWE EFEKTY KSZTAŁCENIA

Z zakresu wiedzy:

PEK_W01 ma podstawową wiedzę związaną z prawami rządzącymi przepływem prądu elektrycznego w obwodzie elektrycznym

PEK_W02 zna budowę, zasadę działania i podstawowe zastosowania przyrządów półprzewodnikowych takich jak np. dioda, tranzystory bipolarne i unipolarne

PEK_W03 ma podstawową wiedzę z zakresu miernictwa elektrycznego

…

Z zakresu umiejętności:

PEK_U01 potrafi analizować i projektować proste, liniowe układy elektryczne

PEK_U02 potrafi analizować i projektować układ elektryczny z elementami nieliniowymi

PEK_U03 potrafi zaprojektować stabilizator oparty na diodzie Zenera

Z zakresu kompetencji społecznych:

PEK_K01 potrafi wyszukiwać i korzystać z literatury zalecanej do kursu

PEK_K02 rozumie konieczność systematycznej pracy w celu opanowania materiału kursu

PEK_K03 identyfikuje zastosowania elektroniki różnych dziedzinach życia

TREŚCI PROGRAMOWE		
Forma zajęć - wykład		**Liczba godzin**
Wy1	*Obwód prądu stałego, układy RLC*	2
Wy2	*Podstawy miernictwa*	2
Wy3	*Fizyczne podstawy działania przyrządów półprzewodnikowych*	2
Wy4	*Złącze p-n, zasada działania, właściwości*	2
Wy5	*Diody półprzewodnikowe i ich zastosowania w układach elektronicznych*	2
Wy6	*Budowa, zasada działania tranzystora bipolarnego, podstawowe zastosowania w układach elektronicznych I*	2

Wy7	*Budowa, zasada działania tranzystora bipolarnego, podstawowe zastosowania w układach elektronicznych II*	2
Wy8	*Budowa zasada działania i podstawowe zastosowania tranzystorów unipolarnych*	2
Wy9	*Metody realizacji elementów elektronicznych w układach scalonych*	2
Wy10	*Bramki logiczne, parametry, rodzaje, zastosowania*	2
Wy11	*Pamięci półprzewodnikowe*	2
Wy12	*Przetworniki A/C i C/A*	2
Wy13	*Podstawy optoelektroniki*	2
Wy14	*Kolokwium zaliczeniowe*	2
Wy 15	*Poprawa i wpisy ocen do indeksów*	2
	Suma godzin	**30**

Forma zajęć - ćwiczenia		**Liczba godzin**
Ćw1		
Ćw2		
Ćw3		
Ćw4		
..		
	Suma godzin	

Forma zajęć - laboratorium		**Liczba godzin**
La1	Zajęcia organizacyjne (BHP, warunki zaliczenia)	2
La2	Pomiar wartości rzeczywistych rezystancji, określenie błędów względnych i bezwzględnych	2
La3	Szeregowe i równoległe łączenie rezystorów, rezystancja wypadkowa	2

1

La4	Pomiar charakterystyki I=f(U) diody półprzewodnikowej	2
La5	Dioda Zenera, pomiar właściwości stabilizatora opartego na diodzie Zenera	2
La6	Pomiar charakterystyk tranzystora bipolarnego	2
La7	Pomiar częstotliwości granicznych tranzystora bipolarnego	2
La8	Pomiar charakterystyk tranzystora unipolarnego	2
La9	Pomiar charakterystyk statycznych bramki TTL	2
La10	Pomiar mocy pobieranej przez bramkę TTL	2
La11	Pomiar czasu przełączania bramki TTL	2
La12	Pomiar charakterystyk elementów optoelektronicznych	2
La13	Termin odróbczy I	2
La14	Termin odróbczy II	2
La15	Zaliczenia i wpisy	2
	Suma godzin	**30**

Forma zajęć - projekt		Liczba godzin
Pr1		
Pr2		
Pr3		
Pr4		
…		
	Suma godzin	

Forma zajęć - seminarium		Liczba godzin
Se1		
Se2		
Se3		
…		
	Suma godzin	

STOSOWANE NARZĘDZIA DYDAKTYCZNE

1. Wykład – metoda tradycyjna z wykorzystaniem środków multimedialnych

2. Laboratorium pomiarowe – metoda tradycyjna

3. Konsultacje

4. Praca własna studenta – przygotowanie do laboratorium

OCENA OSIĄGNIĘCIA PRZEDMIOTOWYCH EFEKTÓW KSZTAŁCENIA

Oceny (F – formująca (w trakcie semestru), P – podsumowująca (na koniec semestru)	Numer efektu kształcenia	Sposób oceny osiągnięcia efektu kształcenia
F - laboratorium	PEK_U01, PEK_U02 PEK_U03 PEK_K01	Odpowiedzi ustne, kartkówki, sprawozdania
P - wykład	PEK_W01 PEK_W02 PEK_W03 PEK_K02	Kolokwium zaliczeniowe na koniec semestru

	PEK_K03	

LITERATURA PODSTAWOWA I UZUPEŁNIAJĄCA

LITERATURA PODSTAWOWA:

[20]   A. Zatorski, Podstawy miernictwa elektrycznego, Kraków AGH, 2011
[21]   J. Hennel, Podstawy elektroniki półprzewodnikowej, Warszawa, Wydawnictwo NT
    2003

LITERATURA UZUPEŁNIAJĄCA:

[22]   A.Świt, J. Pułtorak, Przyrządy Półprzewodnikowe, Warszawa, WTN 1979
[23]   S. Lebson, Podstawy miernictwa elektrycznego, WNT, 1972
[24]
[25]
[26]

OPIEKUN PRZEDMIOTU (IMIĘ, NAZWISKO, ADRES E-MAIL)

dr hab. inż. Janusz Martan prof. PWr, janusz.martan@pwr.wroc.pl

MACIERZ POWIĄZANIA EFEKTÓW KSZTAŁCENIA DLA PRZEDMIOTU
Podstawy Elektroniki i Miernictwa………
Z EFEKTAMI KSZTAŁCENIA NA KIERUNKU …**INFORMATYKA**..
I SPECJALNOŚCI …………………………..

Przedmiotowy efekt kształcenia	Odniesienie przedmiotowego efektu do efektów kształcenia zdefiniowanych dla kierunku studiów i specjalności (o ile dotyczy)**	Cele przedmiotu***	Treści programowe***	Numer narzędzia dydaktycznego***
PEK_W01 (wiedza)	K1INF-W08	C1	Wy1	1,3,4
PEK_W02	K1INF-W08	C2, C4	Wy3-Wy13	1,3,4
PEK_W03	K1INF-W08	C3	Wy2	1,3,4
…				
PEK_U01 (umiejętności)	K1INF-W07, K1INF -U14	C2, C3	L2, L3	2,3,4
PEK_U02	K1INF-W07, K1INF -U14	C2-C4	L4, L6-L12	2,3,4
PEK_U03	K1INF-W07, K1INF -U14	C2, C3	L4, L5	2,3,4
…				
PEK_K01 (kompetencje)		C1-C4	Wy1-Wy13 L2-L12	1-4
PEK_K02		C1-C4	Wy1-Wy13 L2-L12	1-4
PEK_K03		C1-C4	Wy1-Wy13 L2-L12	1-4

** - wpisać symbole kierunkowych/specjalnościowych efektów kształcenia
*** - z tabeli powyżej

Zał. nr 4 do ZW 64/2012

FACULTY W-8 / ~~DEPARTMENT~~…………….

SUBJECT CARD

Name in Polish ……Podstawy Programowania……………….
Name in English …… Fundamentals of Progamming ………
Main field of study (if applicable): …Informatics………….
Specialization (if applicable): ……………………..
Level and form of studies: 1st/ ~~2nd~~* level, full-time ~~/ part-time~~*
Kind of subject: obligatory ~~/ optional~~ / ~~university-wide~~*
Subject code …INZ001519Wcl
Group of courses YES ~~/ NO*~~ (lecture and classes)

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30	30	15		
Number of hours of total student workload (CNPS)	60	60	60		
Form of crediting	~~Examination~~ / crediting with grade*	~~Examination~~ / crediting with grade*	~~Examination~~ / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*
For group of courses mark (X) final course	X				
Number of ECTS points	2	2	2		
including number of ECTS points for practical (P) classes			2		
including number of ECTS points for direct teacher-student contact (BK) classes	1,2	1,2	1.2		

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Ability to work in Windows system.

\

SUBJECT OBJECTIVES

C1 Knowledge of Java programming language basics.

C2 Knowledge of object programming basics.

C3 Gaining practical ability to create simple Java applications.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEK_W01.   Knows basics of Java programming language.
PEK_W02.   Knows basics of object programming.
PEK_W03.   Knows the problem solution process.

relating to skills:

PEK_U01. Knows how to formulate and write an algorithm.
PEK_U02. Can implement Java algorithms.
PEK_U03. Knows how to run and test simple applications in Java programming language.
PEK_U04. Is able to define a class hierarchy.

relating to social competences:

PEK_K01 Can describe development of own application in a communicative manner.

PROGRAMME CONTENT

	Form of classes - lecture	Number of hours
Lec 1	Introductory information: task solution process, algorithm formulation and notation, simple Java application development.	
Lec 2	Basic elements of Java programming language.	
Lec 3	Full definition of a simple class, class documenting.	
Lec4	Using of arrays.	
Lec 5	Inheritance, override of fields and methods, polymorphism.	
Lec 6	Abstract classes, interfaces.	
Lec7	Working with object collections.	
Lec 8	Handling of input/output streams.	
Lec 9	File processing.	
Lec 10	Error identification: exception handling, assertions.	
Lec 11	Recurrence.	
Lec 12	Basics of software testing.	
Lec 13	Enumerations in Java.	
Lec 14	Case study - application design.	
	Total hours	
	Form of classes - class	Number of hours
Cl 1	Formulating and notation of algorithms with branching.	
Cl 2	Iterative algorithms.	
Cl 3	Implementation of algorithms in form of methods.	
Cl 4	Full definition of simple classes.	
Cl 5	One-dimensional arrays.	
Cl 6	Multi-dimensional arrays.	
Cl 7	Test 1.	

Cl 8	Defining a class hierarchy.	
Cl 9	Object collection processing.	
Cl 10	Input/output streams.	
Cl 11	File processing.	
Cl 12	Exception handling, assertions.	
Cl 13	Test 2.	
Cl 14	Recurrence.	
Cl 15	Retake test.	
	Total hours	

Form of classes - laboratory		Number of hours
Lab 1	BlueJ environment discovery.	
Lab 2	Simple class definition, class documentation.	
Lab 3	Classes with array fields.	
Lab 4	Class hierarchy building (inheritance).	
Lab 5	Object collection processing.	
Lab 6	Designing and implementation of full application (using input/output and files).	
	Total hours	

Form of classes - project		Number of hours
Proj 1		
Proj 2		
Proj 3		
Proj 4		
...		
	Total hours	

Form of classes - seminar		Number of hours
Sem 1		
Sem 2		
Sem 3		
...		
	Total hours	

TEACHING TOOLS USED
N1. Informational lecture. N2. E-learning system used to publish educational materials.

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 Algorithm notation, algorithm implementation, simple class definition.		Test checking the knowledge and skills gained during the lectures and practical classes. At least 50% of the points are required for the pass.

F2 Table processing, collection type use, input/output handling.		Test checking the knowledge and skills gained during the lectures and practical classes. At least 50% of the points are required for the pass.
P1 Final score from laboratory.		Execution of tasks indicated by the lecturer. The final score is the average from the partial scores.
P2 Final score from the course group.		The overall pass depends on passing two test (or retake test). The final score is calculated on the basis of test scores.

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Lis M., Praktyczny kurs Java, Helion 2004
[2] Barnes D. J. , Kolling M. , Objects first with Java, Pearson Education Limited, 2006 (s
[3] Eckel B., Thinking in Java edycja polska, Helion 2006

SECONDARY LITERATURE:

[1] http://www.bluej.org
[2] http://wazniak.mimuw.edu.pl/index.php?title=Programowanie_obiektowe

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

Janusz Ratajczak janusz.ratajczak@pwr.wroc.pl

MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT

……………………………

AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY ………………………..
AND SPECIALIZATION ……………………………..

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)				
PEK_W02				
…				
…				
PEK_U01 (skills)				
PEK_U02				
…				
PEK_K01 (competences)				
PEK_K02				
…				

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

*** - from table above

Zał. nr 4 do ZW 64/2012

FACULTY OF COMPUTER SCIENCE AND MANAGEMENT

SUBJECT CARD

Name in Polish: Podstawy teleinformatyki

Name in English: Basics of information and communication technologies

Main field of study (if applicable): computer science
Specialization (if applicable):
Level and form of studies: 1st level, full-time
Kind of subject: obligatory
Subject code INZ001702
Group of courses: NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30	30	0	0	0
Number of hours of total student workload (CNPS)	120	90			
Form of crediting	Examination	Crediting with grade			

1

For group of courses mark (X) final course					
Number of ECTS points	4	3			
including number of ECTS points for practical (P) classes					
including number of ECTS points for direct teacher-student contact (BK) classes	2,4	1,8			

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Has a basic knowledge of linear algebra, analytic geometry and mathematical analysis, which is necessary to perform simple computing tasks on an engineering of technical and non-technical disciplines (K1INF_W01).
2. Has a basic knowledge of discrete mathematics, mathematical logic and mathematical statistics, the necessary information to solve simple engineering problems (K1INF_W02).
3. Has a basic knowledge of classical mechanics and wave motion (K1INF_W03).
4. Can be used as indicated analytical method and to plan and carry out a simple experiment engineering and computer simulation, to carry out tests and analyze results, particularly for the selected system components (K1INF_U09).
5. Understands the need and knows the possibility of lifelong learning and to improve their professional competence and social (K1INF_K01)

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SUBJECT OBJECTIVES

C1. Ordered, underpinned by theoretical knowledge in the field of information systems and processes, the use of statistical information theory, optimal coding of continuous and discrete information channels with and without interference, methods and techniques of signals using different modulation techniques supporting continuous and discrete signals, continuous and discrete signals and information against errors arising in the performance interference in transmission channels.

C2. Skills for determining the characteristics of analog and discrete (frequency spectrum frequency band, power distribution), the advantages and disadvantages of various methods of modulation signals, continuous and discrete signals and adjust transmission channels, comparison of modulation methods of continuous and discrete signals, the range of applications of particular methods of modulation, scratch hierarchy analog and digital signals and selection methods to prevent errors in transmission systems.

C3. Skills for the selection of appropriate methods of modulation communication tasks in analog and digital systems.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
  K1INF_W11: Has basic knowledge of information systems and computer communication networks
  K1INF_W16: Knows the basic methods and tools for collecting, processing and retrieval of
               information and knowledge extraction

relating to skills:
  K1INF_U05: Has the ability to self-study, including in order to improve the professional competence
  K1INF_U15: Can use the right tools to build a simple model of the process (the object), to formulate
               specific task analysis and decision making
                K1INF_U16: Can effectively use methods and tools for collecting, processing and
                retrieval of information and knowledge extraction

relating to social competences:

K1INF_K01: Understands the need and knows the possibilities of lifelong learning and to improve their professional and social competences

K1INF_K03: Can interact and work in a group, taking the different roles

PROGRAMME CONTENT	
Form of classes - lecture	Number of hours
Lec 1 Information systems - basic concepts	2
Lec 2 Theories of information. Statistical information theory. Entropy as a measure of the amount of information in the statistical theory of information.	2
Lec 3 Information processes and information transfer. Model of communication channel.	2
Lec 4 Optimal discrete error free channel coding	2
Lec 5 Optimal discrete noisy channel coding	2
Lec 6 Optimal continuous error free and noisy channel coding	2
Lec 7 Representation of signals and systems - Fourier transform	2
Lec 8 Fourier transform - properties	2
Lec 9 Continuous amplitude modulation	2
Lec 10 Continuous angle modulation	2
Lec 11 Amplitude, frequency and phase kying	2
Lec 12 Pulse Code Modulation	2
Lec 13 Transmission coding	2
Lec 14 Error recovery – correction codes	2
Lec 15 Error recovery – automatic retransmission request	2
Total hours	30

Form of classes - class	Number of hours
Cl 1 Fourier transform and Fourier series	2
Cl 2 Orthogonality - orthogonal signals sets	2
Cl 3 Fourier transform of periodic and non-periodic signals	2
Cl 4 Fourier series – amplitude, trigonometric and exponential forms	2
Cl 5 Calculation of coefficients of Fourier series in amplitude, trigonometric and exponential forms	2
Cl 6 Fourier series properties – linearity, time delay and scale change.	2
Cl 7 Fourier series properties – real signal frequency translation	2
Cl 8 Fourier series properties – integration and differentiation	2

Cl 9	Fourier series properties – multiplication, conjugation and duality	2
Cl 10	Rayleigh energy theorem	2
Cl 11	The inverse proportionality of the time and frequency - the interchangeability of the product of bandwidth and time	2
Cl 12	The Dirac delta function - sampling function and unit step function	2
Cl 13	Applications of sampling function and unit step function	2
Cl 14	Transmission of signals through linear systems	2
Cl 15	Fast Fourier Transform - algorithms	2
	Total hours	30

TEACHING TOOLS USED
N1. Traditional lecture. Multimedia presentations.
N2. Student's own works – solving calculation tasks.
N3. N4. Student's own works – literature studies.
N5. Collective works during classes.
N5. Student's own works – oral presentations.

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)	K1INF_W11 K1INF_W16 K1INF_U05 K1INF_U15 K1INF_U16 K1INF_K01 K1INF_K03	Observation of student's activity. Solving exercises. Preparation and presentation delivery.
F1 – F15 (class)	K1INF_W11 K1INF_W16 K1INF_U05 K1INF_U15 K1INF_U16 K1INF_K03	Checking the preparation of the student. Checking the presence of the student. Observation of student activity. Observation and evaluation of student independence. Analysis of reports of exercise.
P (lecture)	K1INF_W11 K1INF_W16 K1INF_U05 K1INF_U15 K1INF_U16 K1INF_K01 K1INF_K03	Examination taking into account results of forming evaluation F1 (lecture)
P (class)	K1INF_W11 K1INF_W16 K1INF_U05	Weighted sum of forming evaluations F1 – F15 (classes).

	K1INF_U15
	K1INF_U16
	K1INF_K03

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] G. Pujolle, D. Seret, D. Dromard, E. Horlait, „Integrated Digital Communication Networks", J. Wiley & Sons
[2] S. Haykin, „Communication systems", J. Wiley & Sons
[3] M. Roden, „Analog and digital communication systems", Prentice Hall
[4] J. Seidler, „Nauka o informacji", WNT, Warszawa 1983.
[5] J. Nowakowski, W. Sobczak, „Teoria informacji", WNT, Warszawa 1971.
[6] W. Sobczak (red.), „Problemy teleinformatyki", WKŁ, Warszawa 1984.
[7] S. Haykin, „Systemy telekomunikacyjne", WKŁ, Warszawa 2001,
[8] A. Jajszczyk, „Podstawy telekomunikacji", WKŁ, Warszawa 2001.
[9] B.P. Lathi, „Systemy telekomunikacyjne", WNT, Warszawa 1972
[10] J. Izydorczyk, G. Płonka, G. Tyma, „Teoria sygnałów", Helion 1991.

SECONDARY LITERATURE:

[1] MIT open cources:http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/
[2] http://www.freebookcentre.net/Networking/Free-Computer-Networking-Books-Download.html

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

Adam Grzech, adam.grzech@pwr.wroc.pl

MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Basics of information and communication technologies

AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY

Subject educational effect	Correlation between subject educational effect and educational effects defined for main field of study and specialization (if applicable)**	Subject objectives***	Program content***	Teaching tool number***
PEK_W01 (knowledge)	K1INF_W11	C1, C2, C3	Lec 1 – Lec 15	N1, N2, N3
PEK_W02	K1INF_W16	C1, C2, C3	Lec 1 – Lec 15	N1, N2, N3
PEK_U01 (skills)	K1INF_U05	C2, C3	Lec 1 – Lec 15 Cl 1 – Cl 15	N1, N2, N4
PEK_U02	K1INF_U15	C2, C3	Lec 1 – Lec 15 Cl 1 – Cl 15	N1, N2, N4, N5
PEK_U03	K1INF_U16	C2, C3	Lec 1 – Lec 15 Cl 1 – Cl 15	N1, N2, N3, N4
PEK_K01 (competences)	K1INF_K01	C1, C2, C3	Cl 1 – Cl 15	N4, N5
PEK_K02	K1INF_K03	C1, C2, C3	Lec 1 – Lec 15	N1, N2, N3, N4

			Cl 1 – Cl 15	

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

Zał. nr 4 do ZW 33/2012

WYDZIAŁ INFORMATYKI I ZARZĄDZANIA/ STUDIUM………………

KARTA PRZEDMIOTU
Nazwa w języku polskim ……Praca dyplomowa…………………………….
Nazwa w języku angielskim ………Diploma Thesis……………………….
Kierunek studiów (jeśli dotyczy): …Informatyka…………………………….
Specjalność (jeśli dotyczy): ……………………..
Stopień studiów i forma: **I / II stopień*, stacjonarna / niestacjonarna***

Rodzaj przedmiotu: **obowiązkowy / wybieralny / ogólnouczelniany ***

Kod przedmiotu **INZ005221**

Grupa kursów **TAK / NIE***

	Wykład	Ćwiczenia	Laboratorium	Projekt	Seminarium
Liczba godzin zajęć zorganizowanych w Uczelni (ZZU)				30	
Liczba godzin całkowitego nakładu pracy studenta (CNPS)				390	
Forma zaliczenia	Egzamin / zaliczenie na ocenę*	Egzamin / zaliczenie na ocenę*	Egzamin / zaliczenie na ocenę*	Egzamin / zaliczenie na ocenę*	Egzamin / zaliczenie na ocenę*
Dla grupy kursów zaznaczyć kurs końcowy (X)					
Liczba punktów ECTS				13	
w tym liczba punktów odpowiadająca zajęciom o charakterze praktycznym (P)				13	

1

w tym liczba punktów ECTS odpowiadająca zajęciom wymagającym bezpośredniego kontaktu (BK)				7	

*niepotrzebne skreślić

WYMAGANIA WSTĘPNE W ZAKRESIE WIEDZY, UMIEJĘTNOŚCI I INNYCH KOMPETENCJI

1. Wiedza, umiejętności i kompetencje uzyskane na kierunku Informatyka do semestru VI włącznie

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CELE PRZEDMIOTU

C1 Opracowanie pracy dyplomowej inżynierskiej zgodnej z wymaganiami regulaminowymi na Wydziale Informatyki i Zarządzania Politechniki Wrocławskiej

PRZEDMIOTOWE EFEKTY KSZTAŁCENIA

Z zakresu umiejętności:

PEK_U01 - Potrafi pozyskiwać informacje z literatury, baz danych i innych źródeł, dla potrzeb opracowania pracy dyplomowej inżynierskiej, potrafi integrować uzyskane informacje, dokonywać ich interpretacji, a także wyciągać wnioski oraz formułować i uzasadniać opinie.

PEK_U02- Potrafi pracować i porozumiewać się przy użyciu różnych technik informacyjno-komunikacyjnych w celu prezentacji rezultatów prac.

PEK_U03- Potrafi przygotować przedstawić raport poświęcony wynikom realizacji pracy dyplomowej inżynierskiej

Z zakresu kompetencji społecznych:

PEK_K01- Rozumie potrzebę i zna możliwości ciągłego dokształcania się oraz podnoszenia własnych kompetencji zawodowych i społecznych

PEK_K02- Ma świadomość ważności i zrozumienie pozatechnicznych aspektów i skutków działalności inżyniera rozwiązującego problemy informatyczne

PEK_K03- Potrafi pracować indywidualnie oraz współdziałać nad przygotowaniem pracy dyplomowej

PEK_K04-Potrafi odpowiednio określić wybór tematyki do zaprezentowania w ramach zadanego zakresu pracy dyplomowej

TREŚCI PROGRAMOWE		
Forma zajęć - wykład		**Liczba godzin**
Wy1		
Wy2		
Wy3		
Wy4		
Wy5		
….		
	Suma godzin	

Forma zajęć - ćwiczenia	**Liczba godzin**

	Ćw1		
	Ćw2		
	Ćw3		
	Ćw4		
	..		
		Suma godzin	

Forma zajęć - laboratorium		Liczba godzin
La1		
La2		
La3		
La4		
La5		
…		
	Suma godzin	

Forma zajęć - projekt		Liczba godzin
Pr1	Przedmiot jest stanowi głównym elementem procesu dyplomowania i wiąże się z przygotowaniem przez studenta pracy dyplomowej inżynierskiej indywidualnej. Praca dyplomowa inżynierska jest wykonywana pod kierunkiem promotora, z którym student uzgadnia jej zakres, cele, zadania i harmonogram realizacji. .	
	Suma godzin	**30**

Forma zajęć - seminarium		Liczba godzin
	Suma godzin	

STOSOWANE NARZĘDZIA DYDAKTYCZNE
N1. Przygotowanie pracy dyplomowej
N2. Tekst pracy dyplomowej
N3. Recenzja pracy dyplomowej przygotowana przez promotora
N4. Konsultacje promotora ze studentami realizującymi u niego pracę dyplomową

OCENA OSIĄGNIĘCIA PRZEDMIOTOWYCH EFEKTÓW KSZTAŁCENIA

Oceny (F – formująca (w trakcie semestru), P – podsumowująca (na koniec semestru)	Numer efektu kształcenia	Sposób oceny osiągnięcia efektu kształcenia
P	PEK_U01, PEK_U02, PEK_U03, PEK_K01, PEK_K02, PEK_K03, PEK_K04	Student wybiera temat pracy dyplomowej i promotora studenta zgodnie z obowiązującą procedurą dyplomowania. Promotor na bieżąco monitoruje realizację pracy dyplomowej. Ocenie podsumowującej podlega ostateczny tekst pracy dyplomowej. Warunkiem zaliczenia jest złożenie w terminie ostatecznego tekstu pracy dyplomowej, gotowej do obrony. Ocena realizowana jest w postaci recenzji przygotowanej przez promotora. Drugą recenzję, która jednakże nie warunkuje zaliczenia przedmiotu wykonuje na potrzeby egzaminu dyplomowego, powołany przez dziekana recenzent na podstawie ostatecznego tekstu pracy dyplomowej. Recenzje wykonane są zgodnie z ujednoliconym formatem. Aby student mógł przystąpić do egzaminu dyplomowego obie recenzje muszą być pozytywne.

LITERATURA PODSTAWOWA I UZUPEŁNIAJĄCA

LITERATURA PODSTAWOWA:

[27]   Literatura zgodna z problematyką pracy dyplomowej wybrana samodzielnie i polecana przez promotora

[28]   Wymagania na pracę dyplomową inżynierską na Wydziale Informatyki i Zarządzania Politechniki Wrocławskiej, www.wiz.pwr.wroc.pl

[29]   Kraśniewski A.: Jak pisać pracę dyplomową, [http://cygnus.tele.pw.edu.pl/~andrzej/TP/wyklad/wyklad-pdf/TP-praca_dypl.pdf], 2012

LITERATURA UZUPEŁNIAJĄCA:

[1] Rawa T., Metodyka wykonywania inżynierskich i magisterskich prac dyplomowych. Wydaw. ART., Olsztyn, 1999

[2] Wojciechowska R., Przewodnik metodyczny pisania pracy dyplomowej. Warszawa, Difin 2010

[3] Wrycza-Bekier J., Kreatywna praca dyplomowa. Jak stworzyć fascynujący tekst naukowy. Helion 2010

[4] Dokumentacja techniczna

OPIEKUN PRZEDMIOTU (IMIĘ, NAZWISKO, ADRES E-MAIL)

Dr hab. inż. Leszek Borzemski, prof. PWr

MACIERZ POWIĄZANIA EFEKTÓW KSZTAŁCENIA DLA PRZEDMIOTU
Praca dyplomowa
Z EFEKTAMI KSZTAŁCENIA NA KIERUNKU **Informatyka**
I SPECJALNOŚCI ………………-…………..

Przedmiotowy efekt kształcenia	Odniesienie przedmiotowego efektu do efektów kształcenia zdefiniowanych dla kierunku studiów i specjalności (o ile dotyczy)**	Cele przedmiotu***	Treści programowe***	Numer narzędzia dydaktycznego***
PEK_U01, (umiejętności)	K1INF_U11	C1	Pr1	N1, N2, N3, N4
PEK_U02	K1INF_U12	C1	Pr1	N1, N2, N3, N4
PEK_U03	K1INF_U13	C1	Pr1	N1, N2, N3, N4
PEK_K01 (kompetencje)	K1INF_K01	C1	Pr1	N1, N2, N3, N4
PEK_K02	K1INF_K02	C1	Pr1	N1, N2, N3, N4
PEK_K03	K1INF_K03	C1	Pr1	N1, N2, N3, N4
PEK_K04	K1INF_K04, K1INF_K05	C1	Pr1	N1, N2, N3, N4

** - wpisać symbole kierunkowych/specjalnościowych efektów kształcenia
*** - z tabeli powyżej

Zał. nr 4 do ZW 64/2012

FACULTY ……… / DEPARTMENT………………
SUBJECT CARD
Name in Polish **Problemy społeczne i zawodowe informatyki**
Name in English **Social and Professional Problems of Computer Science**
Main field of study (if applicable): Computer Science
Specialization (if applicable): ……………………..
Level and form of studies: 1st/ ~~2nd* level,~~ full-time ~~/ part-time*~~
Kind of subject: obligatory ~~/ optional / university-wide*~~
Subject code INZ004632
Group of courses ~~YES~~ / NO*

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30				
Number of hours of total student workload (CNPS)	60				

Form of crediting	~~Examination /~~ crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	~~Examination~~ / crediting with grade*
For group of courses mark (X) final course					
Number of ECTS points	2				
including number of ECTS points for practical (P) classes	0				
including number of ECTS points for direct teacher-student contact (BK) classes	1,2				

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Competence from the scope of using computer, computer network and software.
2. Knowledge from the scope of bases of designing and manufacturing the software.
3. Skills in collecting and analysis of the information.

\

SUBJECT OBJECTIVES

C1 Educating the abilities of understanding problems associated with the profession of the computer specialist. Acquiring the knowledge of solving problems related to Computer Science profession.

C2 Educating the abilities of Acquiring competence in the scope of the assessment of the copyright connected with the about computer science profession.

C3 Educating the ability of the evaluation of the copyright of technical structures associated with components and the building blocks associated with the process of coming into existence and works about computer character or associated with the computer science.

C4 Acquiring the knowledge of both the ability in collecting and analysis of documents about standard character and practical competence in the extent of protection of the industrial property.

C5 Providing practical abilities in methods of the assessment of the effects of the break of the law and violating ethics in the profession of the computer specialist.

C6 Acquiring the knowledge in the scope of computer ethics.

C7 Acquiring competence and shaping the attitude in the social scope including the ability of the harmonious group work and the reliable, honest and ethical practising a profession of the computer specialist.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEK_W01 Student has an acquaintance of the problems associated with the practising a profession of the computer specialist, is conscious of problems associated with the copyright and the protection law of the industrial property.

PEK_W02 Student has competence in analysis of patent specifications and preparing documentation associated with the registration of the invention.

PEK_W03 Student has an acquaintance knowledge in the copyright and applying it with reference to works about computer character.

PEK_W04 Student has a knowledge in the scope of the assessment of the connected occupational hazard from completion of undertakings about computer character.

PEK_W05 Student knows principles of protection of works about computer character individual and team.

PEK_W06 Student has an acquaintance of processes of the transfer operation of the property of works about computer character.

PEK_W07 Student is possessing the acquaintance of codes of ethics and a skill of applying them in practice.

relating to skills:

PEK_U01 Student is possessing skills of the evaluation of a situation and risks in the working life of the computer specialist.

PEK_U02 Student is possessing skills of noticing and appreciating the social context of the computer science.

PEK_U03 Student is possessing a skill of analysis of patent documentation and the registration of the invention and the work about computer character.

PEK_U04 Student is able to assess issues of law associated with the source materials associated with the completion of a project about computer character and associated with the computer science.

PEK_U05 Student is able to apply principles arising from the copyright in practice.

relating to social competences:

PEK_K01 Student has competence in the practising a profession ethical, in accordance with the law in force of the computer specialist.

PEK_K02 Student is able to notice public aspects of the completion of computer undertakings.

PEK_K03 He is possessing a skill of the independent and creative thinking with the respect for the law and of professional ethics.

PROGRAMME CONTENT		
Form of classes - lecture		Number of
Lec 1	The specificity of the environment of the professional computer scientist. The ethics and the social meaning of the computer scientist occupation. Ethical codes and codes of practice.	2
Lec 2	The formation, the projection, the production and the exploitation of the software and hardware products in the social context. The interaction and the correlation of ethics and laws.	2
Lec 3	The intellectual property, definitions, legal settlements, examples.	2
Lec 4	The object and the person of author's law. Computer programmes and databases.	2
Lec 5	The authorship of the composition, dependent rights. Personal rights and property - in the context of compositions about the computer science character.	2
Lec 6	The spread of compositions. The protection of compositions about the computer science character and related compositions. The protection of the privacy.	2
Lec 7	The delivery and the sale of copyrights to compositions about the computer science character. The exercise of compositions in frames of the relation of the work inframes of the activity didactic and scientific. Licensing. Passing of copyrights as result of the succession.	2
Lec 8	The criminal responsibility for the violation of copyrights. The computer crimes. Computer forensic.	2
Lec 9	The industrial right properties.	2
Lec 10	Useful examples. Trademarks. Patents. Notifying and the protection.	2
Lec 11	The industrial rights protection in Poland and regulations of the European Union. The intellectual property in the context of the inquiry society.	2

Lec 12	Examples of the use of the copyrights.	2
Lec 13	The copyright and teamworks. The reliability of the software and hardware products. The responsibility for defects.	2
Lec 14	The risk in-service of the computer scientist. The valuation of the risk. The minimization of the risk.	2
Lec 15	Final test.	2
	Total hours	30

Form of classes - class		Number of hours
Cl 1		
Cl 2		
Cl 3		
Cl 4		
..		
	Total hours	

Form of classes - laboratory		Number of hours
Lab 1		
Lab 2		
Lab 3		
Lab 4		
Lab 5		
…		
	Total hours	

Form of classes - project		Number of hours
Proj 1		
Proj 2		
Proj 3		
Proj 4		
…		
	Total hours	

Form of classes - seminar		Number of hours
Sem 1		
Sem 2		
Sem 3		
…		
	Total hours	

TEACHING TOOLS USED

N1. Lecture with using the multimedia slide projector.
N2. Consultation.
N3. Own work of the student.
N4. Electronic using educational platforms.

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	PEK_U01÷PEK_U05 PEK_K01÷PEK_K03	an oral answers, written short tests
F2	PEK_W01÷PEK_W06 PEK_U01÷PEK_U05 PEK_K01÷PEK_K03	final test
C=F1+F2		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Cohen J. E.: Copyright in a global information economy. Aspen Publishers 2010.
[2] Okediji C. L. & Orourke: Copyright Law. Aspen Publishers 2010.
[3] Thies Ch.: Computer Law and Ethics. Mercury Learning & Information 2013.

SECONDARY LITERATURE:

[1] McJohn S. M.: Examples & Explanantions: Copyright. Aspen Publishers 2012.

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

Arkadiusz Liber, PhD

Arkadiusz . Liber / at / pwr . wroc . pl

MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT

……………………………

AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY ………………………..
AND SPECIALIZATION ……………………………..

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, PEK_W02	K1INF_W19, K1INF_K03	C1, C2,C6	Lec1,Lec2,Lec3,Lec4	N1,N2,N3,N4
PEK_W03, PEK_W04	K1INF_K03, K1INF_K05	C1,C2	Lec5,Lec6,Lec7, Lec8,Lec9	N1,N2
PEK_W05, PEK_W06, PEK_W07	K1INF_W19, K1INF_K03, K1INF_K05	C1,C3,C4,C5	Lec10,Lec11,Lec12,Lec13,Lec14,Lec15	N1,N2,N3,N4
PEK_U01, PEK_U02	K1INF_K01, K1INF_K01	C1,C6	Lec1,Lec2,Lec3, ,Lec5,Lec6,Lec7, Lec8,Lec9,Lec10,Lec11,Lec12,Lec13,Lec14	N1,N2,N3
PEK_U03, PEK_U04	K1INF_K03	C1,C3,C4,C5	Lec1,Lec4, ,Lec5,Lec6,Lec7, Lec8,Lec9,Lec10,Lec11,Lec12,Lec13,Lec14	N1,N2,N3,N4
PEK_U05	K1INF_W19, K1INF_K03, K1INF_K05	C1,C3,C4,C5	Lec1,Lec2,Lec3,Lec4,Lec7, Lec8,Lec9Lec10,Lec11,Lec12,Lec13,Lec14	N1,N2,N3,N4
PEK_K01	K1INF_W19, K1INF_K03, K1INF_K05		Lec1,Lec4,Lec7, Lec8,Lec9Lec10,Lec11,Lec12,Lec13,Lec14	N1,N2,N3,N4
PEK_K02, PEK_K02	K1INF_K03	C1,C2,C6	Lec1,Lec4,Lec7, Lec8,Lec9Lec10,Lec11,Lec12,Lec13,Lec14	N1,N2,N3,N4
PEK_W01, PEK_W02	K1INF_W19, K1INF_K03	C1, C2,C6	Lec1,Lec2,Lec3,Lec4	N1,N2,N3,N4
PEK_W03, PEK_W04	K1INF_K03, K1INF_K05	C1,C2	Lec5,Lec6,Lec7, Lec8,Lec9	N1,N2
PEK_W05, PEK_W06, PEK_W07	K1INF_W19, K1INF_K03, K1INF_K05	C1,C3,C4,C5	Lec10,Lec11,Lec12,Lec13,Lec14	N1,N2,N3,N4

PEK_U01, PEK_U02	K1INF_K01, K1INF_K01	C1,C6,C7	Wy1,Wy2,Wy3, ,Wy5,Wy6,Wy7, Wy8,Wy9,Wy10,Wy11,Wy12,Wy13,Wy14,Wy15	N1,N2,N3

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

Zał. nr 4 do ZW 64/2012

FACULTY W-8 / DEPARTMENT………………

SUBJECT CARD

Name in Polish Procesowe zarządzanie projektem informacyjnym – DIP
Name in English Process-oriented management of information projects-DIP
Main field of study (if applicable): Informatics
Specialization (if applicable): ……………………..
Level and form of studies: 1st/ ~~2nd*~~ level, full-time / ~~part-time*~~
Kind of subject: ~~obligatory~~ / optional / ~~university-wide*~~
Subject code INZ005208
Group of courses ~~YES~~ / 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		60		
Form of crediting	~~Examination~~ / crediting with grade*	Examination / crediting with grade*	~~Examination~~ / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*
For group of courses mark (X) final course					
Number of ECTS points	1		2		
including number of ECTS points for practical (P) classes	0		2		
including number of ECTS points for direct teacher-student contact (BK) classes	0,6		1,2		

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES
none
\

SUBJECT OBJECTIVES
C1 Knowledge about roles and responsibilities of key members in an venture
C2 Knowledge about basic issues connected with planning and scheduling in an venture
C3 Demonstration of knowledge from fields of monitoring and reassuring quality in an venture

1

SUBJECT EDUCATIONAL EFFECTS
relating to knowledge:
PEK_W01 – knows overall roles and responsibilities of key members of an venture
PEK_W02 – knows basic issues concerning planning and scheduling of an venture
PEK_W03 – knows basic issues concerning monitoring and reassuring quality
relating to skills:
PEK_U01 – can use to formulate ventures learned methods of planning, scheduling, role defining and responsibilities
PEK_U02 – can assure quality in an venture and use monitoring mechanisms
relating to social competences:
PEK_K01 – has awareness of importance and understands non-technical aspects and repercussions leading and venture and connected with it responsibilities for made decissions

PROGRAMME CONTENT		
Form of classes - lecture		**Number of hours**
Lec 1	Basic definitions from range of venture management	2
Lec 2	Feasibility study	2
Lec 3	Team communication and management	2
Lec 4	Venture planning methods (examples)	2
Lec 5	Venture resources	2
Lec 6	Venture progress monitoring	2
Lec 7	Configuration and changes management in a ICT venture	2
Lec 8	Chosen issues of process and product measuring	2
Lec 9	Software quality	2
Lec 10	ICT tools for venture management	2
Lec 11	PRINCE2 methodology	2
Lec 12	ISO and SEI norms	2
Lec 13	Methodologies of implementing ICT ventures (examples)	2
Lec 14	Written test	1
	Total hours	28

Form of classes - class		**Number of hours**
Cl 1		
Cl 2		
Cl 3		
Cl 4		
..		
	Total hours	

Form of classes - laboratory		**Number of hours**
Lab 1	Brain storming selection of the project to produce a document management, MS-Project	4
Lab 2	Defining an adjustment to qualified Prince2 project	4
Lab 3	Project documents - Basic Assumptions Project	4

Lab 4	Transforming WBS in the schedule to the allocation of resources	4
Lab 5	Project risk analysis	4
Lab 6	Allocation of resources and time and budget estimation - critical path	4
Lab 7	Control of the project based on Earn Value (EV)	6
	Total hours	30

Form of classes - project		Number of hours
Proj 1		
Proj 2		
Proj 3		
Proj 4		
...		
	Total hours	

Form of classes - seminar		Number of hours
Sem 1		
Sem 2		
Sem 3		
...		
	Total hours	

TEACHING TOOLS USED
none

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
P	PEK_W01	Colloquium
P	PEK_W02	Colloquium
P	PEK_W02	Colloquium
P	PEK_U01	
P	PEK_U02	
P	PEK_K01	

PRIMARY AND SECONDARY LITERATURE

1

PRIMARY LITERATURE:

[30]   Cadle J., Yeates D., Zarządzanie procesem tworzenia systemów informacyjnych, WNT 2004

[31]   Frączkowski K., Zarządzanie projektem informatycznym, Wydawnictwo Oficyna PWr 2002

SECONDARY LITERATURE:

[27]   Gryfin Ricky W. Podstawy zarządzania organizacjami. Wydawnictwo Naukowe PWN, 2005

[28]   Marcin W. Staniewski., Zarządzanie zasobami ludzkimi, a zarządzanie wiedzą w przedsiębiorstwie, Wyd. Vizja Press&IT ,2008

[29]   Opolski Krzysztof., Biznes plan. Jak go budować i analizować ? Wyd. CeDeWu, 2006

[30]   Frączkowski K ., Modele zarządzania zasobami projektu informatycznego i organizacji zespołów – telepraca. http://www.e-informatyka.pl/wiki/Modele_zarz%C4%85dzania_zasobami_projektu_informatycznego_i_organizacja_zespo%C5%82%C3%B3w_-_telepraca

[5]   Frączkowski K., Model mapowania aktywności i kompetencji w projektach IKT. w. XXI Autumn Meeting of Polish Information Processing Society ISBN 83-922646-0-6 Conference Proceedings, pp.59-71 © 2005 PIPS oraz : http://www.proceedings2005.imcsit.org/docs/73.pdf

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

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1

MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Process-oriented management of information projects
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY Informatics
AND SPECIALIZATION ……………………………..

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	K1INF_W18	C1	Lec1, Lec2, Lec3,	none
PEK_W02	K1INF_W18	C2	Lec4, Lec5, Lec6, Lec7,Lec8, Lec9, Lec10, Lec11, Lec13	none
PEK_W02	K1INF_W18	C3	Lec7,Lec8, Lec9, Lec12	none
PEK_U01	K1INF_U10,K1INF_U14	C2		none
PEK_U02	K1INF_U10,K1INF_U14	C3		none
PEK_K01	K1INF_K02	C1,C2,C3		none

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

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FACULTY W-8 / DEPARTMENT………………
SUBJECT CARD
Name in Polish Programowanie w systemie Linux
Name in English Programming in Linux…………………………………………………….
Main field of study (if applicable): …Informatics……………………….
Specialization (if applicable): ……………………..
Level and form of studies: 1st level, full-time
Kind of subject: optional
Subject code INZ005218
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		60		
Form of crediting	Examination		crediting with grade*		
For group of courses mark (X) final course					

Number of ECTS points	1		2		
including number of ECTS points for practical (P) classes					
including number of ECTS points for direct teacher-student contact (BK) classes	0,6		1,2		

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. General knowledge of programming
2. General knowledge of operating systems

\

SUBJECT OBJECTIVES

C1 Students understand the programming problems in Linux
C2 Students acquire practical skills for system programming in Linux operating system

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEK_W01 Students know basic programming rules in Linux operating system
PEK_W02 Students know commands used to operate in operating system
PEK_W03 Students have knowledge of structure and working of operating systems
PEK_W04 Students know the basic system functions of operating system, which enable creating
         system software in C language
…
relating to skills:

PEK_U01 Students have the skills of self-learning
PEK_U02 Students are able to gain information from various sources
PEK_U03 Students are able to define problems and then find solution
PEK_U04 Students are able to work individually and in the team
…
relating to social competences:

PEK_K01 Students understand the need of continous education

PROGRAMME CONTENT

Form of classes – lecture		Number of hours
Lec 1	General structure of Linux operating system	2
Lec 2	File system organisation	2
Lec 3	Processes in Linux, command operating on processes	2
Lec 4	Selected system commands	2
Lec 5	Programming in Bash command interpreter	2
Lec 6	Kernel of Linux operating system	2
Lec 7	Selected system functions	2
Lec 8	Trends in development of Linux operating systems	1
	Total hours	15
Form of classes – class		Number of hours
Cl 1		
Cl 2		

Cl 3		
Cl 4		
..		
	Total hours	

Form of classes – laboratory		Number of hours
Lab1	Introduction to work in operating system Linux	2
Lab2	Working user environment	2
Lab3	Operation on files and directories	4
Lab4	Bash command interpreter, preparing and running scripts	4
Lab5	Signals in Linux operating system	2
Lab6	Using system functions	4
Lab7	Text data processing (grep, awk)	4
Lab8	Detailed characteristic of file, use i-node structure	4
Lab9	Processes in operations system, processes communications	4
	Total hours	30

Form of classes – Project		Number of hours
Proj1		
Proj2		
Proj3		
Proj4		
…		
	Total hours	

Form of classes - seminar		Number of hours
Sem1		
Sem2		
Sem3		
…		
	Total hours	

TEACHING TOOLS USED
N1. Lecture – traditional method N2. Consultations N3. Practical exercises at computer laboratory

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 Laboratory	PEK_W01-03	Presentation of programming work, oral explanation

		PEK_U01-03	
P	Lecture	PEK_W01-03	Final test

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Beginning Linux Programming, Matthew N.,1999, Wrox Press Ltd.
[2] Linux Programming by Example, Wall K., 2000, Que Corporation
[3] Advanced Unix Programming, Rockind J., 2004, Pearson Education Inc.
[4]

SECONDARY LITERATURE:

[1] Unix Network Programming, Stevens M., 1998, Pearson Education
[2]
[3]

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

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
…Informatics…………………………
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY ………………………..
AND SPECIALIZATION …………………………….

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)	K1INF_W04, K1INF_W05	C1,C2	Wy1-6	N1-3
PEK_W02	K1INF_W05	C1, C2	Wy04	N1-3
PEK_W03…	K1INF_W10	C1,C2	Wy01, Wy01	N1, N2
PEK_W04…	K1INF_W10	C2	Wy06	N1-3
PEK_U01 (skills)	K1INF_U05, K1INF_U06	C2	Wy1-7	N1-2
PEK_U02	K1INF_U05, K1INF_U11	C1,C2	Wy1-7	N1-3
PEK_U03	K1INF_U12, K1INF_U14	C1, C2	Wy1-7	N1-3
PEK_U04	K1INF_U14	C1, C2	Wy1-7	N1-3
PEK_K01 **(competences)**	K1INF_K01, K1INF_K05	C1, C2	Wy1-7	N1-3
…				

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

FACULTY W-8					
SUBJECT CARD					
Name in Polish: **Programowanie systemów webowych**					
Name in English: **Web Systems Programming**					
Main field of study (if applicable): **Computer Science**					
Specialization (if applicable):					
Level and form of studies: **1ˢᵗ, full-time**					
Kind of subject: **optional**					
Subject code **INZ005200**					
Group of courses: **NO**					

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30		30		
Number of hours of total student workload (CNPS)	90		60		
Form of crediting	Crediting with grade*		Crediting with grade*		
For group of courses mark (X) final course					
Number of ECTS points	2		3		
including number of ECTS points for practical (P) classes	0		3		
including number of ECTS points for direct teacher-student contact (BK) classes	1,2		1,8		

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basic knowledge of structured and object-oriented programming
2. Basic database skills

SUBJECT OBJECTIVES

C1 Acquisition of knowledge and skills in developing systems that are based on client-server communication and use HTTP.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEK_W01 Identifies and explains the functionality of selected programming language commands
PEK_W02 Selects appropriate technology for programming Web-based systems' components

relating to skills:
PEK_U01 Adapts, arranges and rearranges working systems or their components in accordance with the submitted requirements
PEK_U02 Constructs simple web-based systems in accordance with the submitted requirements

relating to social competences:
PEK_K01 Presents the results of his or her work

PROGRAMME CONTENT

Form of classes – lecture		Number of hours
Lec1	Internet and Web - Introduction	2
Lec2	Introduction to HTML5	2
Lec3	New capabilities of HTML5	2
Lec4	Introduction to CSS3	2
Lec5	New capabilities of CSS3	2
Lec6	Selected elements of JavaScript	2
Lec7	Document Object Model and event handling	2
Lec8	Working with WWW Server and basic PHP	2
Lec9	PHP applications that use the database	2
Lec10	Introduction to Programming in ASP.NET	2
Lec11	ASP.NET – session mechanism	2
Lec12	ASP.NET – cooperation with the database	2
Lec13	ASP.NET – Website with an authentication mechanism	2
Lec14	ASP.NET – using AJAX	2

Lec15	Overview of advanced web technologies	2
	Total hours	**30**

Form of classes - laboratory		**Number of hours**
Lab 1	Introductory classes: presentation of health and safety regulations, fire protection rules as well as grading and class policies.	2
Lab 2	HTML5 Programming Basics Part 1	2
Lab 3	HTML5 Programming Basics Part 2	2
Lab 4	CSS3 Programming Basics Part 1	2
Lab 5	CSS3 Programming Basics Part 2	2
Lab 6	JavaScript programming	2
Lab 7	DOM and event handling	2
Lab 8	XAMPP i ASP.NET – running environments	2
Lab 9	Programming in PHP Part 1	2
Lab 10	Programming in PHP Part 2	2
Lab 11	Programming in PHP Part 3	2
Lab 12	Programming in ASP.NET Part 1	2
Lab 13	Programming in ASP.NET Part 2	2
Lab 14	Programming in ASP.NET Part 3	2
Lab 15	Examination	2
	Total numer of hours	**30**

TEACHING TOOLS USED
N1. Lectures illustrated with multimedia boards
N2. Laboratory exercises using appropriate programming environments
N3. The e-learning system for publishing course materials and receiving students' work
N4. **Student's i**ndividual work based on the lists of tasks
N5. **Student's** individual work - exam preparation
N6. The e-learning system conducting the examination

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 – F6 (Lab2 – Lab7)	PEK_W01 PEK_U01 PEK_K02	Scoring on a scale (0-10).
F7 – F12 (Lab9 – Lab14)	PEK_W01 PEK_U01 PEK_U02 PEK_K02	Scoring on a scale (0-10).
P Lab	PEK_W01 PEK_U01 PEK_U02 PEK_K02	The pass mark is 50% of the points. Other evaluation by proportionate ranges from 50% to 100% of the points.
P Lec	PEK_W01 PEK_W02	The pass mark is 50% of correct answers in the test exam. Other assessment by proportional ranges from 50% to 100% correct answers.

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[32]   Paul Deitel, Harvey Deitel, Abbey Deitel: Internet & World Wide Web: How to Program, Fifth Edition, Prentice Hall, 2011

SECONDARY LITERATURE:

[1]   Brian P. Hogan: HTML5 i CSS3 standardy przyszłości, Helion, 2011

[2]   Stoyan Stefanov: JavaScript : programowanie obiektowe , Helion, 2010

[3]   Julie C. Meloni: PHP, MySQL i Apache, Helion, 2009

[4]   Bill Evjen, Scott Hanselman, Devin Rader: ASP.NET 4 z wykorzystaniem C# i VB. Zaawansowane programowanie, Helion, 2011

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

Ziemowit Nowak, ziemowit.nowak@pwr.wroc.pl

MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Web Systems Programming
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY
Computer Science

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	K1INF_W06	C1	Lec2-Lec14	N1, N5, N6
PEK_W02	K1INF_W05, K1INF_W07	C1	Lec1-Lec15	N1, N5, N6
PEK_U01	K1INF_U04, K1INF_U09, K1INF_U14	C1	Lab2-Lab7, Lab9-Lab14	N2, N3, N4
PEK_U02	K1INF_U04, K1INF_U09, K1INF_U11, K1INF_U14	C1	Lab9-Lab14	N2, N3, N4
PEK_K01	K1INF_U12	C1	Lab2-Lab7, Lab9-Lab14	N2

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

Zał. nr 4 do ZW 64/2012

FACULTY Computer Science and Management / DEPARTMENT………………
SUBJECT CARD
Name in Polish *Programowanie urządzeń mobilnych w C#*
Name in English *Programming of mobile devices in C#*
Main field of study (if applicable): *Computer Science*
Specialization (if applicable): ……………………..
Level and form of studies: 1st/ 2nd* level, full-time / part-time*
Kind of subject: obligatory / optional / university-wide*
Subject code INZ005216
Group of courses YES / 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		60		

1

Form of crediting	Examination / crediting with grade*	Examination / crediting with grade*	~~Examination /~~ crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*
For group of courses mark (X) final course					
Number of ECTS points	1		2		
including number of ECTS points for practical (P) classes	0		2		
including number of ECTS points for direct teacher-student contact (BK) classes	0,6		1,2		

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. A student knows java or c# language.

SUBJECT OBJECTIVES

C1 To gain skills in software implementation for mobile devices using C # and the mechanisms available at .NET platform

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SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEK_W01 A student calls and describes the behavior of basic components used in the implementation of mobile applications for . NET platform.

PEK_W02 A student lists and describes .NET mechanisms, addressing the problems of security, data persistency, localization, network communication

relating to skills:

PEK_U01 A student implements a simple applications for mobile devices, including requiring data persistency

PEK_U02 A student applies appropriate security techniques for mobile applications

PEK_U03 A student obtains information from various sources on how to create mobile applications and solve problems in this area

PEK_U04 A student communicates with a teacher using available hardware and software infrastructure.

Form of classes – lecture		**Number of hours**
Lec 1	Introduction. Basic controls. Construction of the page. Navigation between pages.	2
Lec 2	The life cycle of an application. Data binding. Support for gestures. Transformations and animations.	2
Lec 3	MVVM pattern. Selected advanced controls.	2
Lec 4	Media. Internationalization. User controls.	2
Lec 5	Linq. Storing application state.	2
Lec 6	Communication with sensors. Lanchers and choosers.	2

Lec 7	Client-server applications. Building client applications.	2
Lec 8	Notifications. Application security.	1
	Total hours	15

Form of classes – laboratory		Number of hours
La1	Introduction. Course description, course organization. First program.	2
La2	Basic controls (ex. 1)	2
La3	Navigation between pages (ex. 2)	2
La4	Data binding. Application life cycle (ex. 3)	2
La5	Gestures. Transformations and animations (ex. 4)	2
La6	MVVM pattern (ex. 5)	2
La7	Advanced controls (ex. 6, literature survey)	2
La8	User controls (ex. 7)	2
La9	Media. Internationalization (ex. 8)	2
La10	Data storage (ex. 9)	2
La11	Ling (ex. 10)	2
La12	Communication with sensors (ex. 11, literature survey)	2
La13	Lanchers and choosers (ex. 12)	2
La14	Client applications (ex. 13)	2
La15	Security. Notifications (ex. 14)	2
	Total hours	30

TEACHING TOOLS USED
N1. Informative lecture with elements of problem lecture, supported by multimedia presentations N2. Software for implementation of mobile applications. N3. E-learning system used for the publication of teaching materials, collection and assessment of students work.

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 – ex. 1	PEK_U01 PEK_U04	Assessment of ex. 1. Scale 0..1 or traditional.
F2 – ex. 2	PEK_U01 PEK_U04	Assessment of ex. 2. Scale 0..1 or traditional.
F3 – ex. 3	PEK_U01 PEK_U04	Assessment of ex. 3. Scale 0..1 or traditional.
F4 – ex. 4	PEK_U01 PEK_U04	Assessment of ex. 4. Scale 0..1 or traditional.
F5 – ex. 5	PEK_U01	Assessment of ex. 5. Scale 0..1 or traditional.

	PEK_U04	
F6 – ex. 6	PEK_U01 PEK_U04	Assessment of ex. 6. Scale 0..1 or traditional.
F7 – ex. 7	PEK_U01, PEK_U03, PEK_U04	Assessment of ex. 7. Scale 0..1 or traditional.
F8 – ex. 8	PEK_U01 PEK_U04	Assessment of ex. 8. Scale 0..1 or traditional.
F9 – ex. 9	PEK_U01 PEK_U04	Assessment of ex. 9. Scale 0..1 or traditional.
F10 – ex. 10	PEK_U01 PEK_U04	Assessment of ex. 10. Scale 0..1 or traditional.
F11 – ex. 11	PEK_U01 PEK_U04	Assessment of ex. 11. Scale 0..1 or traditional.
F12 – ex. 12	PEK_U01, PEK_U03, PEK_U04	Assessment of ex. 12. Scale 0..1 or traditional.
F13 – ex. 13	PEK_U01 PEK_U04	Assessment of ex. 13. Scale 0..1 or traditional.
F14 – ex. 14	PEK_U01 PEK_U04	Assessment of ex. 14. Scale 0..1 or traditional.
P2 – final grade (lecture)	PEK_W01, PEK_W02	Examination – written test containing open and closed questions. A student will pass the exam if he/she receives at least 50% of points. Next, the grade is increased every 10%
P1 – final grade (laboratory)	PEK_U01,…,PEK_U04	Final grade calculated as an average of F1..F14 (traditional scale) or according to the formula (scale 0..1): < 8 → 2.0 8 p. → 3.0 9,5 p. → 3.5 11 p. → 4.0 12,5 p. → 4.5 14 p. → 5.0 > 14 p. → 5.5 (additional tasks)

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[33] Henry Lee, Eugene Chuvyrov, Windows Phone 7. Tworzenie efektownych aplikacji, Helion 2011
[34] Boryana Miloshevska, Windows Phone Toolkit in Depth, II edition, www.winsoqaphonegeek.com, free e-book
[35] Pete Brown, Silverlight 4 w działaniu: Silverlight 4, MVVM i usługi WCF RIA Services. Warszawa: APN 2011

SECONDARY LITERATURE:

[31] Materiały przygotowane przez prowadzącego kurs.
[32] Rob S. Miles, Microsoft XNA Game Studio 4.0: projektuj i buduj gry dla konsoli Xbox 360, urządzeń z systemem Windows Phone 7 i własnego PC, Helion 2012

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

Dr inż. Bogumiła Hnatkowska, Bogumila.Hnatkowska@pwr.wroc.pl

MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Programming of mobile devices in C#
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY
Computer Science
AND SPECIALIZATION …………………………….

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	K1INF_W05	C1	Lec1, Lec2, Lec3	N1
PEK_W02	K1INF_W06	C1	Lec4, Lec5, Lec6, Lec7, Lec8	N1
PEK_U01	K1INF_U04	C1	La1, …, La14	N2, N3
PEK_U02	K1INF_U09	C1	La15	N2, N3
PEK_U03	K1INF_U11	C1	La7, La12	N2, N3
PEK_U04	K1INF_U12	C1	La1, …, La15	N2, N3

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

*** - from table above

FACULTY W-8/ DEPARTMENT………………
SUBJECT CARD
Name in Polish Projektowanie baz danych
Name in English Database System Design
Main field of study (if applicable): computer science
Specialization (if applicable): ….
Level and form of studies: 1ˢᵗ level, full-time *
Kind of subject: optional
Subject code INZ005206

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	0			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. Completed the „Databases" course.

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SUBJECT OBJECTIVES

C1 Introduce the methods of databases design and implementation to students
C2 Gather knowledge of available databases design and implementation tools
C3 Applying the acquired knowledge during the design of relational and object databases

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SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEK_W01 Student has a basic knowledge of methods and available tools for databases design
PEK_W02 Student is able to present all phases of databases design

relating to skills:
PEK_U01 Student is able to prepare all phases of databases design
PEK_U02 Student is able to implement a database
PEK_U03 Student is able to choose proper tools for databases design

relating to social competences:
PEK_K01 Student is able to search and reuse the primary and secondary literature listed below and is able to gather the proper knowledge
PEK_K02 Student understands the need for systematic and individual work in order to cover the scope of the course

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PROGRAMME CONTENT

Form of classes - lecture		Number of hours
Lec 1	Introduction to database system design methodology	1
Lec 2	Selected elements of UML	1
Lec 3	Entity-relationship schemas design	2
Lec 4	Relational schemas design	2
Lec 5	Conceptual model of a database	2
Lec 6	Logical model of a database	2
Lec 7	Physical model of a database	2
Lec 8	An overview of available tools for database design	1
Lec 9	Types and specification methods of integrity constraints	1
Lec 10	Test	1
	Total hours	**15**
Form of classes - class		Number of hours

Cl 1		
Cl 2		
Cl 3		
Cl 4		
..		
	Total hours	

Form of classes - laboratory		Number of hours
Lab 1		
Lab 2		
Lab 3		
Lab 4		
Lab 5		
…		
	Total hours	

Form of classes - project		Number of hours
Proj 1	Introduction to database design (Power Designer, Visio)	2
Proj 2	Relational model: conceptual model of a database	2
Proj 3	Relational model: logical model of database	2
Proj 4	Relational model: physical model of database	2
Proj 5	Relational model: integrity constraints	2
Proj 6	Relational model: interface and report design, constraints	2
Proj 7	Object model: class diagrams	2
Proj 8	Object model: description of methods	2
Proj 9	Implementation of a database schema	4
Proj 10	Implementation of integrity constraints	4
Proj 11	Implementation of an interface	4
Proj 12	Implementation of reports, evaluation of projects	2
	Total hours	**30**

Form of classes - seminar		Number of hours
Sem 1		
Sem 2		
Sem 3		
…		
	Total hours	

TEACHING TOOLS USED
N1. Traditional lecture N2. Labs N3. One-to-one consultancy during stuff hours

N4. Student self-study

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
P- project	PEK_U01-PEK_U03, PEK_K01-PEK_K02	Evaluation of the prepared tasks during labs, oral test
P- lecture	PEK_W01-PEK_W02 PEK_K01-PEK_K02	Test

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

LITERATURA PODSTAWOWA:

[36]   Beynon-Davies P., *Systemy baz danych*. WNT, W-wa, 2003
[2]   Connolly T., Begg C., *Systemy baz danych*. RM 2004. T2

[3]   Date C.J., *Wprowadzenie do baz danych*. WNT, W-wa, 2000.

[4]   Szeląg A., *PHP, Microsoft IIS, SQL Server : projektowanie i programowanie baz danych*. Helion 2008
[5]   Ullman J.D., *Systemy baz danych*. WNT, W-wa, 2003.

[6]   Wrembel R., *Oracle : projektowanie rozproszonych baz danych : wiedza niezbędna do projektowania oraz zarządzania bazami danych*. Helion 2003.

SECONDARY LITERATURE:

[1]
[2]
[3]

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)
Prof. dr hab. inż Ngoc Thanh Nguyen, Ngoc-Thanh.Nguyen@pwr.wroc.pl

MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Database System Design
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY
Computer Science
AND SPECIALIZATION …………………………….

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	K2INF_W22	C2	Lec1-9 Pr1-12	N1-4
PEK_W02	K2INF_W22	C1	Lec3-7,9	N1-4
PEK_U01	K2INF_W22, K1INF_U03, K1INF_U11	C1, C3	Lec3-7,9 Pr2-8	N1-4
PEK_U02	K2INF_W22, K1INF_U04, K1INF_U11, K1INF_U19	C1, C3	Pr9-12	N1-4
PEK_U03	K2INF_W22, K1INF_U03, K1INF_U11	C2, C3	Lec8 Pr1-12	N1-4
PEK_K01		C1, C2, C3	Lec1-10 Pr1-12	N1-4
PEK_K02		C1, C2, C3	Lec1-10 Pr1-12	N1-4

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

Zał. nr 4 do ZW 64/2012

FACULTY Computer Science and Management / DEPARTMENT………………
SUBJECT CARD
Name in Polish *Projektowanie Oprogramowania*
Name in English *Software Design*
Main field of study (if applicable): *Computer Science*
Specialization (if applicable): ……………………..
Level and form of studies: 1st~~/ 2nd* level,~~ full-time / ~~part-time*~~
Kind of subject: obligatory / ~~optional /~~ ~~university-wide*~~

	Lecture	Classes	Laboratory	Project	Seminar
Subject code INZ003561 **Group of courses** ~~YES /~~ NO*					
Number of hours of organized classes in University (ZZU)	30		30		
Number of hours of total student workload (CNPS)	90		60		
Form of crediting	Examination / ~~crediting with grade*~~	Examination / crediting with grade*	~~Examination /~~ crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*
For group of courses mark (X) final course					
Number of ECTS points	2		3		
including number of ECTS points for practical (P) classes	0		3		
including number of ECTS points for direct teacher-student contact (BK) classes	1,2		1,8		

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. A student knows properties of object-oriented programming paradigm.
2. A student lists and describes basic models of the software life cycle.
3. A student uses a high-level programming language to solve programming problems. He/she is able to implement a graphical user in the selected programming language and tool.

SUBJECT OBJECTIVES

C1. Students are familiarized with tasks performed in basic processes of software life-cycle according to ISO/IEC 12207, good design practices (including design patterns) and are prepared for team engineering project (for software projects).
C2. Students are familiarized with development of software design documents, practical usage of UML and supporting tools.

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SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEK_W01 A student lists and describes processes of the software life cycle
PEK_W02 A student identifies and describes basic elements of the UML diagrams used for modeling and software specification
PEK_W03 A student lists, and classifies design patterns and selects appropriate to solve a specified problem
PEK_W04 A students points out the tools used for modeling, specification, implementation and testing of software

relating to skills:

PEK_U01A student uses UML for requirements specification and domain modeling
PEK_U02 A student prepares graphical user interface

PEK_U03 A student adapts basic architectural and design patterns to engineering problem
PEK_U04 A student implements selected functional requirements of an application in a high level
programming language
PEK_U05 A student plans and specifies tests, and performs functional testing

relating to social competences:
PEK_K01 A student is aware of the importance of non-technical aspects of computer science engineer,
understands need of high quality and availability of information systems, takes into account
needs of different user groups.

Form of classes – lecture		**Number of hours**
Lec 1	Course description, course organization, examination. Definition of basic concepts.	2
Lec 2	Definition of stakeholders' requirements. Techniques of requirements elicitation. Domain model and glossary. Process of system requirements analysis. Requirements classification. Requirements diagram.	2
Lec 3	Process of system architecture design. Architectural perspectives. Component diagrams.	2
Lec 4	Process of software requirements analysis. How to write effective use-cases. Templates of use-cases and user-stories. Key abstractions. Object life cycle description with the use of state machines (repetition).	2
Lec 5	Graphical user interface. GUI design rules (e.g. for mobile applications).	2
Lec 6	Process of software architecture design. Architectural patterns. Architecture design principles.	2
Lec 7	Design patterns – application examples, and discussion.	2
Lec 8	Design of use-case realizations.	
Lec 9	Techniques of software design: Domain Driven Design, Test Driven Design	2
Lec 10	Architectural mechanisms. Database design. ORM tools.	2
Lec 11	Process of detailed design.	2
Lec 12	Software construction process.	2
Lec 13	Quality of artifacts. Software testing. Testing levels and testing techniques.	2
Lec 14	Integration processes. Process of qualifying testing and system delivery.	2
Lec 15	Repetition. Exam preparation.	2
	Total hours	30

Form of classes – laboratory		**Number of hours**
La1	Introduction. Course description, course organization.	2
La2	System vision. Glossary.	2
La3	Business rules definition.	2
La4	Domain model.	2
La5	Specification of functional and non-functional requirements. Use-case model.	2

La6	Use-case specifications.	2
La7	User interface prototype.	2
La8	Software logical architecture. Conceptual data model.	2
La9	Use-case realization.	2
La10	Detail design.	2
La11	Implementation of user interface according to the prototype.	2
La12	Implementation of business logic and data access layer.	2
La13	Unit tests for selected classes.	2
La14	Developing test cases for functional tests. Quality evaluation.	2
La15	Course assessment. Students assessment.	2
	Total hours	30

TEACHING TOOLS USED
N1. Informative lecture with elements of problem lecture, supported by multimedia presentations N2. Examples of project documentation, prepared in accordance with shared document templates. N3. Software for modeling, implementation and testing of software. N4. E-learning system used for the publication of teaching materials, collection and assessment of students work.

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 – system conception	PEK_U01	Evaluation of internal and external consistency, completeness of prepared documents (1-st part: system vision, domain model, business rules) 15% of final grade
F2 – requirement specification	PEK_U01. PEK_U02, PEK_K01	Evaluation of internal consistency and external consistency, completeness of prepared documents (2-nd part: requirement specification, user interface prototype) 25% of final grade
F3 – architectural design, detail design	PEK_U01, PEK_U03	Evaluation of internal consistency and external consistency, completeness of prepared documents (3-nd part: software architecture, detail design) 30% of final grade
F4 – implementation and tests	PEK_U04, PEK_U05	Evaluation of internal consistency and external consistency, completeness of prepared documents (4-rd part: source code, tests cases) 30% of final grade
P1 – final grade (lecture)	PEK_W01, PEK_W02, PEK_W03, PEK_W04	Examination - written test. The test is given a positive evaluation, if the student scores at least 50% of the maximum number of points.
P2 – final grade (laboratory)	PEK_U01,…, PEK_U05	Final grade calculated on the base of F1-F4 according to formula:

		< 40% → 2.0
		<40%, 50%) → 3.0
		<50%, 60%) → 3.5
		<60%, 70%) → 4.0
		<70%, 80%) → 4.5
		<80%, 90%) → 5.0
		>90% → 5.5
		or:
		0,15 * F1 + 0,25 * F2 + 0,3 * F3 + 0,3 * F4

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[37]   I. Dubielewicz, B. Hnatkowska, Z. Huzar, L. Tuzinkiewicz. Metodyka QUAD, Sterowane jakością wytwarzanie aplikacji bazodanowych, Oficyna Wydawnicza PWR, 2010

[38]   K. Sacha, Inżynieria oprogramowania, PWN, Warszawa, 2010.

[39]   S. Wrycza, B. Marcinkowski, K. Wyrzykowski. Język UML 2.0 w modelowaniu systemów informatycznych. Helion 2006.

[40]   M. Śmiałek. Zrozumieć UML 2.0. Metody modelowania obiektowego. Helion 2005.

SECONDARY LITERATURE:

[33]   M. Fowler – UML w kropelce, LTP Oficyna Wydawnicza, 2005.

[34]   A. Shalloway, J. R. Trott – Projektowanie zorientowane obiektowo. Wzorce projektowe. Helion 2005.

[35]   Materials prepared by lecturer.

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

Dr inż. Bogumiła Hnatkowska, Bogumila.Hnatkowska@pwr.wroc.pl

MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Team Engineering Project
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY
Computer Science
AND SPECIALIZATION …………………………..

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	K1INF_W07	C1	Lec2, …, Lec4, Lec6, Lec11, Lec12, Lec14, Lec15	N1, N4
PEK_W02	K1INF_W07	C2	Lec2, Lec3, Lec4, Lec8, Lec11	N1, N2, N4
PEK_W03	K1INF_W05	C1	Lec6, Lec7	N1, N4
PEK_W04	K1INF_W07	C2	Lec1, Lec5, Lec10, Lec13	N1, N4
PEK_U01	K1INF_U03, K1INF_U13	C2	La2, La3, La4, La5, La6, La10	N2, N3, N4
PEK_U02	K1INF_U03, K1INF_U14	C1	La7	N2, N3, N4
PEK_U03	K1INF_U03, K1INF_U04	C1, C2	La8, La9	N3, N4
PEK_U04	K1INF_U02, K1INF_U04	C1	La11, La12	N3, N4
PEK_U05	K1INF_U04	C1	La13, La14	N3, N4
PEK_K01	K1INF_K02	C1	La7	N3, N4

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

*** - from table above

FACULTY **Computer Science and Management**   / DEPARTMENT………………
<div align="center">**SUBJECT CARD**</div>
Name in Polish Proseminarium inżynierskie
Name in English   Proseminar
Main field of study (if applicable): Informatics
Specialization (if applicable):
Level and form of studies: 1st/ 2nd* level, full-time / part-time*
Kind of subject: obligatory / optional / university-wide*
Subject code INZ0141S
Group of courses YES / NO*

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)					30

Number of hours of total student workload (CNPS)					60
Form of crediting	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	~~Examination~~ / crediting with grade*
For group of courses mark (X) final course					
Number of ECTS points					2
including number of ECTS points for practical (P) classes					
including number of ECTS points for direct teacher-student contact (BK) classes					1

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1 Knowledge, skills and competences acquired at Informatics field at second level of study until 5th semester

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SUBJECT OBJECTIVES

C1 Preparing students to write a master thesis according the internal requirements in Informatics field at Faculty of Computer Science and Management, Wrocław University of Technology,

C2 Providing students with basic skills related to preparation and presentation of scientific texts, beginning from the choice of topic, selection of tasks to be performed, use of literature to interpretation of the results.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

…

relating to skills:

PEK_U01 He is able to acquire information from literature, databases and other sources, for the purpose of preparation a presentation on a selected topic, is able to integrate the information obtained, interpret them and also draw conclusions and formulate and justify opinions.

PEK_U02 He can work and communicate using a various information and communication techniques in order to present the results of work and during the seminar presentations.

relating to social competences:

PEK_K01-Understands the need and knows the possibilities of lifelong learning and improving their professional and social competences

PEK_K02-is aware of the importance and understanding of non-technical aspects and impacts of engineering solving IT problems

PEK_K03-Able to interact and work in a group on the preparation and execution of presentation

PEK_K04-Able to properly determine the choice of subjects to set presentations and correctly determines its structure and means of expression

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PROGRAMME CONTENT

Form of classes - lecture		Number of hours
Lec 1		
Lec 2		
	Total hours	

Form of classes - class		Number of hours
Cl 1		
Cl 2		
	Total hours	

Form of classes - laboratory		Number of hours
Lab 1		
Lab 2		
	Total hours	

Form of classes - project		Number of hours
Proj 1		
Proj 2		
	Total hours	

Form of classes - seminar		Number of hours
Se1	Presentation of the principles and feasibility of diploma theses majoring in computer engineering. Discussion of the principles of preparing a presentation for students. Establishing a schedule delivering by students following the presentation.	2
Se2	Types of qualification and their demands. The formulation of the problem of engineering, development and research. Form and structure of engineering thesis. The thesis work, the purpose of work. The study of literature. Some methodological and practical part. Presentation of the results and their analysis.	2
Se3	Overview of research and development carried out at the Institute of Computer Science - Part 1	2
Se4	Overview of research and development carried out at the Institute of Computer Science - Part 2	2
Se5	Overview of research and development carried out at the Institute of Computer Science - Part 3	2
Se6-15	Students are divided into teams of 2-3 people (with assumptions other than ZPI groups). Each team member prepares and conducts personalized multimedia presentation in the Polish language in the framework of a common theme for the group - selected or indicated - for engineering tasks, development or research in the field of computer science. The task is to be divided into subtasks - division of desire and individual presentations make students themselves. One of the team members prepare a breakdown of tasks into subtasks and plan for further presentation. Individual presentations have included: the presentation	20

	agenda, aim, the formulation of subtasks, subtasks and discuss the characteristics, scope of work to be done, an overview of the state of the literature, the concept and the method of solution and discuss the non-technical aspects of this task. Presentations are prepared also as a printed report and are presented in accordance with a predetermined schedule.	
	Total hours	30

TEACHING TOOLS USED

N1. Multimedia presentations
N2. Examples of scientific papers and reports from the field of computer science.
N3. E-Learning System used to publish teaching materials and announcements, also used for collection and evaluation of student work.

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
P	PEK_U01 PEK_U02, PEK_U03, PEK_K01, PEK_K02, PEK_K03, PEK_K04	Evaluation of the presentation of the work at the seminar and prepared documentation from the presentation. The evaluation shall be subject to the fulfillment of the requirements for the presentation, including its substantive scope, structure and organization of presentation, techniques of conversation, a form of presentation, compactness of presentation and conclusions reached. Participation in the discussions after presentation is also evaluated. In addition, the seminar leader is able to control the cooperation between supervisors and graduate students.

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[41]   Literature related to the scope of realized project selected by student and recommended by the teacher.

[42]   Requirements for engineering thesis at the Faculty of Computer Science and Management, Wrocław University of Technology, www.wiz.pwr.wroc.pl

SECONDARY LITERATURE:

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

Dr hab. inż. Leszek Borzemski, leszek.borzemski@pwr.wroc.pl

MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Proseminar
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY **Infomatics**
AND SPECIALIZATION

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_U01, (skills)	K1INF_U11	C1, C2	Se1-15	N1, N2, N3
PEK_U02	K1INF_U12	C1, C2	Se1-15	N1, N2, N3
PEK_U03	K1INF_U13	C1, C2	Se1-15	N1, N2, N3
PEK_K01 (competences)	K1INF_K01	C1, C2	Se1-15	N1, N2, N3
PEK_K02	K1INF_K02	C1, C2	Se1-15	N1, N2, N3
PEK_K03	K1INF_K03	C1, C2	Se1-15	N1, N2, N3
PEK_K04	K1INF_K04, K1INF_K05	C1, C2	Se1-15	N1, N2, N3

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

Zał. nr 4 do ZW 64/2012

FACULTY Department of Computer Science and Management / DEPARTMENT……………
SUBJECT CARD
Name in Polish: Rachunek prawdopodobieństwa i statystyka matematyczna
Name in English: Probability theory and mathematical statistics
Main field of study (if applicable): ………………………….
Specialization (if applicable): Security and Reliability of Information Systems
Level and form of studies: 1st/ 2nd* level, full-time / part-time*
Kind of subject: obligatory / optional / university-wide*
Subject code MAZ002519
Group of courses YES / NO*

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30	30			
Number of hours of total student workload (CNPS)	90	90			
Form of crediting	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*
For group of courses					

mark (X) final course					
Number of ECTS points	3	3			
including number of ECTS points for practical (P) classes	0	1,5			
including number of ECTS points for direct teacher-student contact (BK) classes	1,8	1,8			

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Passed the subject: Algebra and Analytic Geometry. Knowledge of the subject.
2. Passed the subject: Mathematical analysis. Knowledge of the subject.
3. Passed the subject: Discrete Mathematics. Knowledge of the subject.

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SUBJECT OBJECTIVES

C1 Acquisition of basic knowledge of probability and improved knowledge of selected aspects of probability.

C2 Acquisition of basic knowledge of the reliability of circuits and systems.

C3 Acquisition of basic knowledge of mathematical statistics.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEK_W01 – has knowledge of the nature and properties of probability and probability space, and has knowledge of the calculation of the probability and the conditional probability of events.

PEK_W02 – knows the total probability theorem and Bayes' formula events and also has knowledge of the reliability of circuits.

PEK_W03 – has knowledge of random variables, probability distribution, distribution function of a random variable, has knowledge of the basic parameters of random variable and their interpretations.

PEK_W04 – knows the limit theorems and their interpretation, and knows no equal probability, and knows how to pre-analyze the data for probabilistic analysis.

PEK_W05 – knows the point estimate and the maximum likelihood estimators.

PEK_W06 – is aware of the confidence intervals for the mean and variance of the normal distribution and the proportion is also knowledge of statistical hypothesis testing, tests for the mean and variance of the normal distribution and the aspect ratio.

PEK_W06 – knows conformance tests and independence tests, chi-square test, no knowledge of analysis of variance and univariate linear regression.

relating to skills:

PEK_U01 – can calculate the occurrence of events, conditional probability and the probability of the occurrence of complete overlap of events.

PEK_U02 – can calculate the reliability of connections.

PEK_U03 – is able to calculate the distribution and the cumulative distribution function of the random variable and the basic parameters of the random variables.

PEK_U04 – is able to apply the highest estimate and estimates process reliability, test hypotheses about the mean and variance of a normal distribution, and find the one-dimensional linear regression.

relating to social competences:

PEK_K01 – understands the importance of probability and statistics in the processes of social, economic,

and technology.

PROGRAMME CONTENT	

Form of classes - lecture		**Number of hours**
Lec 1	The essence of a random experiment. Definition and properties of probability. Calculating the probability of events. The definition of the probability space.	2
Lec 2	Conditional probability. Definition, examples.	2
Lec 3	Bayesian model. Theorem of total probability events.	2
Lec 4	Independence of events. Circuits' reliability.	2
Lec 5	Random variable. The probability distribution. Distribution function of a random variable. Formal definitions and examples.	2
Lec 6	Basic parameters of random variable. Interpretation of parameters.	2
Lec 7	Limit theorems and their interpretation. Important inequalities of probability theory.	2
Lec 8	Initial analysis of the data.	
Lec 9	The point estimation.	2
Lec 10	Maximum likelihood estimators.	2
Lec 11	Confidence intervals for the mean and variance of the normal distribution and the aspect ratio.	2
Lec 12	Statistical hypothesis testing. Tests for the mean and variance of the normal distribution and for the ratio.	2
Lec 13	Compliance tests and independence tests. Chi-square test.	2
Lec 14	Analysis of variance. Simple linear regression.	2
Lec 14	Repertory.	2
	Total hours	30
Form of classes - class		**Number of hours**
Cl 1	Determination and calculation of probabilities - accounting exercises.	2
Cl 2	Conditional probability - accounting exercises.	2
Cl 3	Independence of events - examples, accounting exercises. Reliability of connections - accounting exercises.	2
Cl 4	Random variable. The probability distribution. Distribution function of a random variable. The analysis of the properties of distributions of random variables. Examples of phenomena of a given distribution.	2
Cl 5	Basic parameters of the random variable and their interpretation - accounting	2

	exercises.	
Cl 6	Important inequalities in probability theory, limit theorems and their interpretation - accounting exercises.	2
Cl 7	Preliminary analysis of the data. Examples of data analysis problems. Types of analytical variables. Examples and accounting exercises.	2
Cl 8	Point estimation - accounting exercises.	2
Cl 9	Maximum likelihood estimators - accounting exercises.	2
Cl 10	Statistical hypothesis testing - examples. Tests for the mean and variance of the normal distribution and the proportion - accounting examples and exercises.	2
Cl 11	Statistical hypothesis testing - examples. Tests for the mean and variance of the normal distribution and the proportion - accounting examples and exercises.	2
Cl 12	Compliance tests and chi-square independence - accounting exercises.	2
Cl 13	Analysis of variance. Simple linear regression. Examples and account exercises.	2
Cl 14	Simple linear regression.	2
Cl 15	Final test.	2
	Total hours	30

Form of classes - laboratory		Number of hours
Lab 1		
Lab 2		
Lab 3		
…		
	Total hours	

Form of classes - project		Number of hours
Proj 1		
Proj 2		
Proj 3		
Proj 4		
…		
	Total hours	

Form of classes - seminar		Number of hours
Sem 1		
Sem 2		
Sem 3		
…		
	Total hours	

TEACHING TOOLS USED
N1. Traditional lecture-based multimedia presentations.
N2. Tutorials and discussion of solutions of the foundations of probability and reliability of the system.

Discussing and presenting solutions do lists. Final test of the exercise.
N3. Consultations for students.
N4. Consultations for students – solving task lists.
N5. Self-study problems of lecture and exam preparation.

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	PEK_U01-PEK_U04	Examples and exercises account. Solving task lists. Analysis of the problems of reliability of systems.
C	PEK_W01-PEKW_07, PEK_K01	Examination.

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] J. Bartos, W. Dyczka, W. Krysicki, *Rachunek prawdopodobieństwa i statystyka matematyczna w zadaniach*, PWN, Warszawa 2008.
[2] J. Jakubowski, R. Sztencel, *Rachunek prawdopodobieństwa dla prawie każdego,* Script, Warszawa, 2009.
[3] A. Plucińska, E. Pluciński, *Rachunek prawdopodobieństwa*, WNT, Warszawa 1999.
[4] R. Zieliński, *Tablice statystyczne*, WNT, Warszawa 2006.
[5] J. Koronacki, J. Mielniczuk, *Statystyka dla studentów kierunków technicznych i przyrodniczych*, WNT, Warszawa 2001.
[6] L. Gajek, M. Kaluszka, *Wnioskowanie statystyczne. Modele i metody*, Wydawnictwa Naukowo-Techniczne, Warszawa 1984.
[7] D. Bobrowski, *Probabilistyka w zastosowaniach technicznych*, WNT, Warszawa 1986.
[8] D. Bobrowski, *Modele i metody matematyczne teorii niezawodności w przykładach i zadaniach*, WNT, Warszawa 1985.
[9] M. Fisz, *Probability theory and mathematical statistics, 3 edition*, Krieger Pub Co, June 1980.

SECONDARY LITERATURE:

[1] W. Feller, *Wstęp do rachunku prawdopodobieństwa*, tom I.II, PWN, Warszawa 2009.
[2] G. Grimmet, D. Stirzaker, *One thousand exercises In probability*, Oxford University Press, 2004.
[3] H. Jasiulewicz, W. Kordecki, *Rachunek prawdopodobieństwa i statystyka matematyczna. Definicje, twierdzenia, wzory*, GiS, Wrocław 2001.
[4] H. Jasiulewicz, W. Kordecki, *Rachunek prawdopodobieństwa i statystyka matematyczna. Przykłady i zadania*, GiS, Wrocław 2001.
[5] M. Maliński, *Weryfikacja hipotez statystycznych wspomagana komputerowo*, Wyd. Politechniki Śląskiej, Gliwice 2004.

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

prof. dr hab. inż. Ireneusz Jóźwiak, 71 320 33 40; ireneusz.jozwiak@pwr.wroc.pl

MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Network and Internet security
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY Informatics
AND SPECIALIZATION ……………………………..

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)	K1INF_W02	Cl 1	Lec1-Lec2	N1, N3, N5
PEK_W02	K1INF_W02	C1 2	Lec3-Lec4	N1, N3, N5
PEK_W03	K1INF_W02	Cl 3	Lec5-Lec6	N1, N3, N5
PEK_W04	K1INF_W02	Cl 3	Lec7-Lec8	N1, N3, N5
PEK_W05	K1INF_W02	Cl 3	Lec9-Lec10	N1, N3, N5
PEK_W06	K1INF_W02	Cl 3	Lec11-Lec12	N1, N3, N5
PEK_W07	K1INF_W02	Cl 3	Lec13-Lec15	N1, N3, N5
PEK_U01 (skills)	K1INF_W02	Cl 1	Cl 1-Cl 3	N2, N3, N4
PEK_U02	K1INF_W02	Cl 2	Cl 3	N2, N3, N4
PEK_U03	K1INF_W02	Cl 3	Cl 4-Cl 7	N2, N3, N4
PEK_U04	K1INF_W02	Cl 3	Cl 8-Cl 15	N2, N3, N4
PEK_K01 (competences)	K1INF_W02	Cl 1-Cl 3	Cl 1-Cl 15	N1, N3, N5

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

Zał. nr 4 do ZW 64/2012

FACULTY OF COMPUTER SCIENCE AND MANAGEMENT

SUBJECT CARD
Name in Polish: Ruting i przełączanie w sieciach

Name in English: Routing and switching in networks

Main field of study (if applicable): Computer science
Specialization (if applicable): ……………………..
Level and form of studies: 1st level, full-time
Kind of subject: obligatory
Subject code INZ005236
Group of courses NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	15	0	30	0	0
Number of hours of total student workload (CNPS)	30		60		
Form of crediting	Examination		Crediting with grade		

For group of courses mark (X) final course						
Number of ECTS points	1		2			
including number of ECTS points for practical (P) classes			2			
including number of ECTS points for direct teacher-student contact (BK) classes	0,6		1,2			

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Has a basic knowledge of linear algebra, analytic geometry and mathematical analysis, which is necessary to perform simple computing tasks on an engineering of technical and non-technical disciplines (K1INF_W01).
2. Has a basic knowledge of discrete mathematics, mathematical logic and mathematical statistics, the necessary information to solve simple engineering problems (K1INF_W02).
3. Has a basic knowledge of computer organization and architecture (K1INF_W08).
4. Has a basic knowledge of the structure and operation of an operating systems (K1INF_W10).
5. Has a basic knowledge of IT systems and computer networks (K1INF_W11).
6. Has a basic knowledge of the Internet architecture and Web-based systems (K1INF_W14).
7. Knows the basic methods and tools for collecting, processing and retrieval of information and knowledge extraction (K1INF_W16).
8. Can choose the hardware and software components of a computer system for specific applications (K1INF_U06).
9. Can be used as indicated analytical method and to plan and carry out a simple experiment engineering and computer simulation, to carry out tests and analyze results, particularly for the selected system components (K1INF_U09).
10. Can configure basic networking hardware and software in computer networks (K1INF_U08).
11. 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).
12. Has the ability to self-education, including in order to improve professional competence (K1INF_U05).
13. Understands the need and knows the possibility of lifelong learning and improving their skills and social (K1INF_K01).

SUBJECT OBJECTIVES

C1. Ordered, underpinned by theoretical knowledge in the field of information and communication aggregation methods in different - fundamental for modern data transmission systems - concepts of reproduction for the purposes of efficient use of resources of analog and digital systems and the pros and cons practically applied frequency and digital hierarchy.

C2. Ordered, underpinned by theoretical knowledge in methods of switching and traffic management (access control, flow control, anti-overload) in ICT networks for the provision of quality services in ICT networks and to formulate and solve problems for optimal use of distributed IT systems.

C3. Skills for the analysis, comparison, configuration and design of networked devices and software network devices using a model of nodes and networks and standards, the task of formulating the design and analysis of network solutions and evaluate the suitability of different networking solutions for the implementation of various qualitative and quantitative requirements for

distributed services communication systems.

C4. Skills for the selection of appropriate methods, algorithms, standards, tools (software and hardware) and network solutions to design and network services that meet the qualitative and quantitative requirements of the users of distributed ICT systems.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

K1INF_W11: Has basic knowledge of IT systems and networks

K1INF_W12: Has basic knowledge of the architecture of distributed systems and methods for multiprocessor and distributed computing

relating to skills:

K1INF_U05: He has the ability to self-study, including in order to improve the professional competence

K1INF_U08: Can configure basic networking hardware and software in computer networks

K1INF_U11: Can obtain information from literature, databases and other sources, also in English, including for the purposes of self-education and professional skills development, can integrate the information, make their interpretation, and to draw conclusions and formulate and justify opinions.

relating to social competences:

K1INF_K01: Understands the need and knows the possibilities of lifelong learning and to improve their professional competence and social

K1INF_K04: Can properly set priorities for implementation specified by you or other tasks

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PROGRAMME CONTENT	
Form of classes - lecture	**Number of hours**
Lec 1	Multiplexing methods - FDMA (Frequency Division Multiplexing), TDMA (Time Division Multiplexing), CDMA (Code Division Multiplexing) i WDMA (Wavelength Division Multiplexing)	1
Lec 2	Digital hierarchies – PDH (Plesiochronous Digital Hierarchy) i SDH (Synchronous Digital Hierarchy)	2
Lec 3	Analysis of multiplexed traffic – queuing systems	2
Lec 4	Space-domain and time-domain switching	2
Lec 5	Quality of service and quality of experience in routing and switching tasks	2
Lec 6	Access control, switching, routing, flow control and congestion control tasks in circuit-switched and packet-switched computer communication networks. Queuing systems. Kleinrock approximation.	2
Lec 7	Virtualization of network and its application in the task of separation of network traffic and provide quality of service	2
Lec 8	New concepts in teletraffic management - Content Aware Network, Context Aware Network, Software Defined Network), New Generation Network, Next Generation Network, etc.	2
	Total hours	15

PROGRAMME CONTENT		
Form of classes - laboratory		**Number of hours**
Lab 1	Organizational activities. Safety in the laboratory.	2
Lab 2	The basic configuration of a Cisco router. Static Routing.	2
Lab 3	Dynamic Routing - RIP (Routing Information Protocol) version 1	2
Lab 4	Dynamic Routing - RIP (Routing Information Protocol) version 2	2
Lab 5	Dynamic routing - EIGRP (Enhanced Interior Gateway Routing Protocol)	2
Lab 6	Dynamic routing - OSPF (Open Shortest Path First) Part 1	2
Lab 7	Dynamic routing - OSPF (Open Shortest Path First) Part 2	2
Lab 8	Final examination of the two semester CCNA (Cisco Certified Network Associate) Exploration	2
Lab 9	Setting up a PPP connection (Point-to-Point Protocol)	2
Lab 10	Configuring Frame Relay	2
Lab 11	Securing your network and network resources. Securing access to the devices.	2
Lab 12	Securing your network and network resources. Traffic control (access lists).	2
Lab 13	Services in an IP network. Dynamic configuration DHCP (Dynamic Host Configuration Protocol). Network Address Translation - NAT (Network Address Translation) and PAT (Port Address of Translation).	2
Lab 14	Final examination of four semester CCNA (Cisco Certified Network Associate) Exploration	2
Lab 15	Solving problems in the network configuration. Improvement exams.	2
	Total hours	30

TEACHING TOOLS USED
N1. Traditional lecture. Multimedia presentations.
N2. Student's own works – solving experiments and tasks in laboratory.
N3. Student's own works – literature 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)	K1INF_W11 K1INF_W12 K1INF_U05 K1INF_U08	Observation of student's activity. Solving exercises. Preparation and presentation delivery.

	K1INF_U11	
	K1INF_K01	
	K1INF_K04	
F1 – F15 (laboratory)	K1INF_U05	Checking the preparation of the student.
	K1INF_U08	Checking the presence of the student.
	K1INF_U11	Observation of student activity. Observation and
	K1INF_K01	evaluation of student independence. Analysis of
	K1INF_K04	reports of exercise.
P (lecture)	K1INF_W11	Examination taking into account results of
	K1INF_W12	forming evaluation F1 (lecture)
	K1INF_U05	
	K1INF_U08	
	K1INF_U11	
	K1INF_K01	
	K1INF_K04	
P (laboratory)	K1INF_U05	Weighted sum of forming evaluations F1 – F15
	K1INF_U08	(laboratory).
	K1INF_U11	
	K1INF_K01	
	K1INF_K04	

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[43] G. Ash, "Dynamic routing in telecommunication networks", McGraw-Hill, 1998.

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[51] A. Grzech, „Sterowanie ruchem w sieciach teleinformatycznych", Oficyna PWr, Wrocław 2002.

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[1] Akademia sieci Cisco CCNA, PWN, 2008

[2] S. Haykin, „Systemy telekomunikacyjne", WKiŁ, Warszawa 1999.

[3] MIT Free Open Course Materials (http://ocw.mit.edu/index.htm) http://www.freebookcentre.net/Networking/Free-Computer-Networking-Books-Download.html

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Routing and switching in networks

AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY

Subject educational effect	Correlation between subject educational effect and educational effects defined for main field of study and specialization (if applicable)**	Subject objectives***	Program content***	Teaching tool number***
PEK_W01 (knowledge)	K1INF_W11	C1, C2, C3	Lec 1 – Lec 8	N1, N2, N3
PEK_W02	K1INF_W12	C1, C2, C3, C4	Lec 1 – Lec 8	N1, N2, N3
PEK_U01 (skills)	K1INF_U05	C3, C4	Lab 1 – Lab 15	N2, N4, N5
PEK_U02	K1INF_U08	C3, C4	Lab 1 – Lab 15	N2, N4, N5
PEK_U03	K1INF_U11	C1, C2, C3, C4	Lec 1 – Lec 8 Lab 1 – Lab 15	N1, N2, N3, N4, N5
PEK_K01 (competences)	K1INF_K01	C1, C2, C3, C4	Lec 1 – Lec 8 Lab 1 – Lab 15	N1, N2, N3, N4, N5
PEK_K02	K1INF_K04	C1, C2, C3, C4	Lec 1 – Lec 8 Lab 1 – Lab 15	N1, N2, N3, N4, N5

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

Zał. nr 4 do ZW 64/2012

FACULTY Department of Computer Science and Management / DEPARTMENT……………
SUBJECT CARD
Name in Polish: Rozproszone bazy danych
Name in English: Distributed databases
Main field of study (if applicable): Informatics
Specialization (if applicable): …………….
Level and form of studies: 1st/ 2nd* level, full-time / part-time*
Kind of subject: obligatory / optional / university-wide*
Subject code INZ005230
Group of courses YES / NO*

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30		30		
Number of hours of total student workload (CNPS)	90		60		
Form of crediting	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*

For group of courses mark (X) final course					
Number of ECTS points	3		2		
including number of ECTS points for practical (P) classes	0		1		
including number of ECTS points for direct teacher-student contact (BK) classes	1,8		1,2		

*delete as <mark>not</mark> applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

4. Basic knowledge of computer systems design.
5. Knowledge of programming languages and platforms, web applications (HTML, XML, C#, JavaScript).
6. Knowledge of application development in one of the ASP technology based on MS Visual Studio.
7. Knowledge and skills in the field of databases and SQL.

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SUBJECT OBJECTIVES

C1 Acquisition of knowledge diffusion paradigm databases and applications of database systems, with a three-tier architecture of distributed systems, databases, types of transparency in the access to data in databases, data repositories, three orthogonal architecture DDBMS.

C2 Acquisition of basic knowledge in the field of designing horizontal primary and secondary fragmentation algorithms, as well as in the field of vertical fragmentation algorithms, meaning affinity of attributes in data in databases, clustering algorithms and vertical splitting of database tables.

C3 Acquisition of basic knowledge of replication fragments and their allocation alternatives, implementation heuristics and control of semantic data integrity, management views, security.

C4 Acquisition of basic knowledge of distributed SQL query, the optimization of such queries and algebraic optimization, distributed transaction processing, 2PC and 3PC protocols, as well as basic knowledge of the business paradigms DDBMS architecture, topology DDBMS systems, the role of machines in a distributed database system.

C5 The acquisition of specific knowledge and skills in the field of mechanisms for creating and administration of distributed databases allocated on MS SQL Server servers and on and ASP.NET technology platform, and other technology platforms, including mobility. The mechanisms and maintain load balancing in distributed database processing.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEK_W01 – has knowledge of the paradigm dispersion databases and applications of database systems, with a three-tier architecture of distributed systems, databases, types of transparency in the access to data in databases, data repositories, three orthogonal architecture DDBMS.

PEK_W02 – has knowledge of the design algorithms of primary and secondary horizontal fragmentation, as well as in the field of vertical fragmentation algorithms, has knowledge of attribute affinity and clustering data in databases, vertical clustering and splitting algorithms of database tables.

PEK_W03 – has knowledge of the replication fragments and their allocation heuristic alternatives, and of implementation and control of semantic data integrity, management views, security.

PEK_W04 – has knowledge of distributed SQL queries, know how optimize the queries and how work their algebraic optimization, has knowledge of distributed transaction processing, 2PC and 3PC

protocols, as well as basic has knowledge of the business DDBMS architecture paradigms, DDBMS systems topology, machines roles in a distributed database system.

PEK_W05 – has specific knowledge and skills in the field of mechanisms for creating and administration of distributed databases allocated on MS SQL Server servers and on and ASP.NET technology platform, and other technology platforms, including mobility. The mechanisms and maintain load balancing in distributed database processing.

relating to skills:

PEK_U01 – able to create and manage databases distributed across servers MS SQL Server and ASP.NET technology platform and other proprietary technology platforms - with databases on mobile devices, inclusive, as well as how to create distributed databases.

PEK_U02 – knows how to build and test a prototype web-based system with a distributed database model, taking into account subscription-publishing system and business paradigm for replication transaction, snapshot transaction, and merge transaction.

relating to social competences:

PEK_K01 – know how to carry out research work as a team and solve problems.

PROGRAMME CONTENT	
Form of classes - lecture	**Number of hours**
Lec 1 Databases distribution paradigm, data and processing logic distribution.	2
Lec 2 DBMS layered architecture, relational algebra vs. relational calculations.	2
Lec 3 Types of transparency in DDBMS systems, ANSI / SPARC architecture.	2
Lec 4 Three-orthogonal architecture of DDBMS system, distribution of the data and control.	2
Lec 5 Designing distribution, horizontal fragmentation primary and secondary, algorithms.	2
Lec 6 Fragmentation vertical affinity, grouping and splitting algorithms.	2
Lec 7 Replication fragments and alternative allocation heuristics.	2
Lec 8 Semantic checking data integrity, management views, security.	2
Lec 9 Distributed query optimization of SQL queries and algebraic optimization.	2
Lec 10 Processing distributed transactions, 2PC and 3PC protocols.	2
Lec 11 Business paradigms of DDBMS architecture, topology of DDBMS system, the roles of machines.	2
Lec 12 Control mechanisms of consistency and synchronization of data copies of the data.	2
Lec 13 Mechanisms of formation and administration of distributed databases Microsoft, Oracle, Sybase. Detailed analysis of the distributing based on MS SQL Server - Part I.	2
Lec 14 Detailed analysis of distribution on MS SQL Server - Part II. Load balancing systems in the processing of distributed databases. Distributed databases in ASP.NET technology platforms.	2
Lec 15 Databases on Microsoft and Sybase on PDA and mobile messaging.	2
Total hours	30
Form of classes - class	**Number of hours**
Cl 1	
Cl 2	

Cl 3		
Cl 4		
..		
	Total hours	

Form of classes - laboratory		Number of hours
Lab 1	Design and create a prototype web-based system in accordance with a methodology of designing Web-based systems with a distributed database - a sketch of the manufacturing process.	2
Lab 2	Concept. Determination of functional and non-functional objectives of the project - the purpose of the project, the mission system, the scope of the prototype system. Actors. Functional and non-functional requirements. The main assumptions of distribution. The schedule of production. The business architecture and application logic and database the distribution system locations.	2
Lab 3	Subscription-publishing model of system. Description of reality fragment. Use cases.	2
Lab 4	Business rules.	2
Lab 5	Design of relational database. Conceptual physical model of database.	2
Lab 6	Installing the development environment. Installing the database server component of vertical, horizontal and hybrid database distribution implementation, and installing tools for monitoring and tuning database distribution with SQL Server. Creation of application with centralized database.	2
Lab 7	Testing of application with centralized database.	2
Lab 8	Overall performance rating of centralized system.	2
Lab 9	Project of horizontal fragmentation of database.	2
Lab 10	Project of database vertical and hybrid fragmentation.	2
Lab 11	The physical model of fragmentation. The mechanism of replication. Building a database server infrastructure, at least two-machine or two instances.	2
Lab 12	Creating a distributed database.	2
Lab 13	Adding publishers and subscribers for transactional publications and for snapshot publications. Adding mechanisms for merge publications.	2
Lab 14	Adding subscribers, publishers and related agents.	2
Lab 15	Functional and performance tests on the basis of a distributed system. Tuning a distributed system.	2
	Total hours	30

Form of classes - project		Number of hours
Proj 1		
Proj 2		
Proj 3		
Proj 4		
…		
	Total hours	

Form of classes - seminar		Number of hours

Sem 1		
Sem 2		
Sem 3		
…		
	Total hours	

TEACHING TOOLS USED

N1. Traditional lectures based on multimedia presentations.
N2. A computer lab with Internet access, and virtualization capabilities of workstations and servers.
N3. Student workload – preparing for the tasks of laboratory and small design tasks.
N4. Student workload – studying the issues discussed during the lecture.
N5. Consultations for students.

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	PEK_U01- PEK_U02, PEK_K01	Ratings for implementation and documentation of web application with a distributed database, the implementation of mobility and load balancing.
F2	PEK_U01-PEK_U05	Ratings for the implementation and documentation of laboratory tasks.
C	PEK_W01-PEK_W05	Final test for the lecture.

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] T. Ozsu, P. Valduriez, *Principles of distributed database systems*, Prentice-Hall, 1991.
[2] A.S. Tanenbaum, Maarten van Steen, *Distributed Systems Principles and Paradigms*, International Edition (1) and Ed. 2nd, Prentice-Hall, Inc., New Jersey 2002.
[3] G. Coulouris, J. Dollimore, T. Kinberg, *Distributed Systems Concepts and Design*, Fourth edition, Addison-Wesley Publishers Limited, 2005.
[4] D. Bell, J. Grimson, *Distributed Database Systems*, Reading 38, Addison Wesley, 1992.
[5] J. Gray, A. Reuter, *Transaction Processing: Concepts and Techniques*, Morgan-Kauffman, 1994.

SECONDARY LITERATURE:

[1] A.S. Tanenbaum, Maarten van Steen, *Systemy rozproszone. Zasady i paradygmaty*, (Ed. 2nd, 2002), Edycja polska (1), WNT, Warszawa 2006.
[2] G. Coulouris G., J. Dollimore, T. Kindberg, *Systemy rozproszone Koncepcja i projektowanie*, Wyd. 2, WNT, Warszawa 1998.
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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Network and Internet security
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY Informatics
AND SPECIALIZATION Security and Reliability of Information Systems

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)	K1INF_W04	C1	Lec1-Lec4	N1, N4-N5
PEK_W02	K1INF_W04	C2	Lec5-Lec6	N1, N4-N5
PEK_W03	K1INF_W02	C3	Lec7-Lec8	N1, N3-N5
PEK_W04	K1INF_W04	C4	Lec9-Lec11	N1, N4-N5
PEK_W05	K1INF_W04	C1-C5	Lec12-Lec15, Lab1-Lab15	N1, N4-N5
PEK_U01 (skills)	K1INF_U06-K1INF_U07, K1INF_U13	C1-C5	Lec12-Lec15, Lab1-Lab15	N1-N5
PEK_U02	K1INF_U06-K1INF_U07, K1INF_U13	C5	Lab1-Lab15	N2-N5
PEK_K01 (competences)		C5	Lab1-Lab15	N2-N4

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

*** - from table above

Zał. nr 4 do ZW 64/2012

FACULTY W8 / DEPARTMENT……………….
SUBJECT CARD
Name in Polish …… Rozproszone systemy informatyczne
Name in English …… Distributed computer systems
Main field of study (if applicable): Informatics
Specialization (if applicable): ……………………..
Level and form of studies: 1st/ 2nd* level, full-time / part-time*
Kind of subject: obligatory / optional / university-wide*
Subject code …………….
Group of courses YES / NO*

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30		15		
Number of hours of total student workload (CNPS)	60		30		
Form of crediting	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*
For group of courses mark (X) final course					
Number of ECTS points	2		1		

including number of ECTS points for practical (P) classes	0		1		
including number of ECTS points for direct teacher-student contact (BK) classes	1,2		0,6		

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basic knowledge of computer networks.
2. Knowledge of programming in Java.
3. Basic knowledge of programming in C.

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SUBJECT OBJECTIVES

C1 Obtaining basic knowledge of the architecture of distributed computer systems.
C2 Knowledge of selected algorithms and mechanisms used in distributed computing systems.
C3 Acquiring practical skills of implementation of simple applications for selected distributed processing environments.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEK_W01 Describes the basic architectures of distributed computing systems and sample solutions of such systems..
PEK_W02 Lists and describes the mechanisms used to support distributed computer systems.
PEK_W03 Knows the basic algorithms used in the basic functions of distributed processing systems..

relating to skills:
PEK_U01 Student is able to implement a simple application on distributed computing cluster.
PEK_U02 Student is able to implement a simple distributed application in the internetwork.
PEK_U03 Student is able to apply the principles of work, including safety rules, in a typical cluster computing workplace.

relating to social competences:

PROGRAMME CONTENT

Form of classes - lecture		Number of hours
Lec 1	Presentation of the organization and program of the course. Introduction to lecture subject: basic characteristics, the purpose and design assumptions of distributed and multiprocessor systems.	2
Lec 2	The basic architecture (structures and software) of distributed systems.	2
Lec 3	Communication in distributed systems - point-to-point communication, collective communication, communication costs.	2
Lec 4	Communications services and processing on higher levels - Remote Procedure Call (RPC), Distributed Objects (DO).	2
Lec 5	MPI environment. Selected technologies of RPC and DO implementations.	2
Lec 6	MOM Architecture.	2
Lec 7	Naming Services.	2

Lec 8	The coordination of distributed processes - time synchronization, mutual exclusion. Deadlocks in distributed systems.	2
Lec 9	Distributed transactions. Concurrency control.	2
Lec 10	Reliability of processing in distributed systems. Agreement problems. Election algorithms.	2
Lec 11	Reliable communication in distributed systems.	2
Lec 12	Process management and scheduling in distributed systems. Load balancing algorithms.	2
Lec 13	Service-oriented architecture (SOA). Web-based services (Web Services).	2
Lec 14	Basics of P2P systems.	2
Lec 15	Passing test.	2
	Total hours	**30**

Form of classes - class	Number of hours
Total hours	

Form of classes - laboratory	Number of hours
Lab 1	Health and Safety Training . Discussion of the organization and program of activities. Presentation of teaching tools .	1
Lab 2	Basics of programming distributed applications using the MPI standard.	2
Lab 3	The implementation of MPI point-to-point communication.	2
Lab 4	Collective (group) communication in the MPI standard.	2
Lab 5	Basics of programming distributed applications in Java RMI.	2
Lab 6	Selected advanced techniques for distributed processing in Java RMI.	2
Lab 7	The implementation of distributed applications using selected RPC standards	2
Lab 8	Summarization and final assessment of classes..	2
	Total hours	15

Form of classes - project	Number of hours
Total hours	

Form of classes - seminar	Number of hours
Total hours	

TEACHING TOOLS USED
N1. Lecture supported by multimedia presentations.
N2. Preparatory multimedia presentations for exercises.
N3. Software to implement distributed application for selected processing environments.
N4. Sample programs for exercise.
N5. The e-learning system for publication of teaching materials, exercises, announcements, and collection and evaluation of student work, as well as for testing of acquired knowledge.

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 – Lab2	PEK_U01 PEK_U03	Assessment of the completeness and quality of the solution of the problem. 0÷10 point scale.
F2 – Lab3	PEK_U01 PEK_U03	Assessment of the completeness and quality of the solution of the problem. 0÷10 point scale.
F3 – Lab4	PEK_U01 PEK_U03	Assessment of the completeness and quality of the solution of the problem. 0÷10 point scale.
F4 – Lab5	PEK_U02 PEK_U03	Assessment of the completeness and quality of the solution of the problem. 0÷10 point scale.
F5 – Lab6	PEK_U02 PEK_U03	Assessment of the completeness and quality of the solution of the problem. 0÷10 point scale.
F6 – Lab7	PEK_U02 PEK_U03	Assessment of the completeness and quality of the solution of the problem. 0÷10 point scale.
P1 - the final evaluation of the laboratory.	PEK_U01 PEK_U02 PEK_U03	The rate determined on the basis of the total points of forming ratings F1 to F6 according to the formula: - less than 50% of the points - 2.0 (insufficient) [50%, 60%) – 3.0 (sufficient) [60%, 70%) – 3.5 (sufficient+) [70%, 80%) – 4.0 (good) [80%, 90%) – 4.5 (good+) [90%, 100%) – 5.0 (very good) 100% – 5.5 (excellent)
P2 - the final evaluation of the lecture.	PEK_W01 PEK_W02 PEK_W03	Test of knowledge - with the use of electronic test of the e-learning system. Score points obtained from the test. The grading scale such as for P1.

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[36]   Tanenbaum A. S., van Steen M.: Distributed systems: principles and paradigms, Pearson Prentice Hall, 2007.

[37]   Coulouris G., Dollimore J., Kindberg T.: Distributed systems: concepts and design, Addison-Wesley, 2005.

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[39]   Buford J. Yu H., Lua E.K.: P2P Networking and Applications, Morgan Kaufman 2009

[40]   Curry E.: Message-Oriented Middleware, Middleware Communications, 2004.

[41]   Oracle electronic resources– materials for the considered technologies: http://www.oracle.com

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[1] Silberschatz A., Petersom J., Galvin P.: Operating system concepts, John Wiley & Sons, 2010.

[2] R. Steinmetz, K. Wehrle: Peer-to-Peer Systems and Applications, LNCS 3485, Springer, 2005.

[3] Hasan J.: Expert Service-Oriented Architecture in C#: Using the Web Services Enhancements 2.0, Apress, 2004.

[4] M. P. Papazoglou: *Web Services & SOA. Principles and Technology*, Pearson Education Limited, 2012

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Distributed computer systems
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY Informatics
AND SPECIALIZATION ……………………………..

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 (wiedza)	K1INF_W12	C1	Lec1, Lec2, Lec4, Lec6, Lec7, Lec13, Lec14	N1, N5
PEK_W02	K1INF_W12	C1	Lec3,…,Lec11	N1, N5
PEK_W03	K1INF_W12	C2, C3	Lec8,…,Lec12	N1, N5
PEK_U01 (umiejętności)	K1INF_U04	C3	Lab1,…,Lab4 Lec5	N1, N2, N3, N4, N5
PEK_U02	K1INF_U04	C3	Lab5,…,Lab9 Lec5	N1, N2, N3, N4, N5
PEK_U03	K1INF_U14	C3	Lab1,…,Lab9	N2, N3, N4, N5

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

Zał. nr 4 do ZW 64/2012

FACULTY **Computer Science and Management** / DEPARTMENT………………   **SUBJECT CARD**   **Name in Polish** Seminarium dyplomowe   **Name in English** Diploma seminar   **Main field of study (if applicable): Informatics**   **Specialization (if applicable): ……………………..**   **Level and form of studies: 1st/ ~~2nd* level~~, full-time ~~/ part-time~~***   **Kind of subject: obligatory ~~/ optional / university-wide*~~**

	Lecture	Classes	Laboratory	Project	Seminar
Subject code INZ0285S Group of courses ~~YES~~/ NO*					
Number of hours of organized classes in University (ZZU)					30
Number of hours of total student workload (CNPS)					60
Form of crediting	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	~~Examination~~ / crediting with grade*
For group of courses mark (X) final course					
Number of ECTS points					2
including number of ECTS points for practical (P) classes					
including number of ECTS points for direct teacher-student contact (BK) classes					1,2

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Knowledge, skills and competences acquired at Informatics field of study until 7th semester

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SUBJECT OBJECTIVES

C1 Preparing students to write a engineering thesis according the internal requirements in Informatics field at Faculty of Computer Science and Management, Wrocław University of Technology,
C2 Providing students with basic skills related to preparation and presentation of scientific texts, beginning from the choice of topic, selection of tasks to be performed, , use of literature and also how to write thesis and how obtained results should be interpret.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
…
relating to skills:
PEK_U01 He is able to acquire information from literature, databases and other sources, for the purpose of preparation a presentation on a selected topic, is able to integrate the information obtained, interpret them and also draw conclusions and formulate and justify opinions.
PEK_U02 He can work and communicate using various information and communication techniques in order to present the results of work and during the seminar presentations.
PEK_U03 He is able to prepare and give a presentation prepared in Polish and English, related to the results of his engineering task
relating to social competences:
PEK_K01 He understands the need and knows the possibilities of lifelong learning and improvement his professional and social competences
PEK_K02 He is aware of importance and understanding of non-technical aspects and impacts of engineering activity related to information technologies.

PEK_K03- He can cooperate to prepare and realize a presentation

PEK_K04- He can properly determine the choice of subjects to set presentation and correctly determines its structure and means of expression

PEK_K05 – He correctly identifies and resolves dilemmas associated in the profession

PROGRAMME CONTENT		
Form of classes - lecture		**Number of hours**
Lec 1		
Lec 2		
	Total hours	
Form of classes - class		**Number of hours**
Cl 1		
Cl 2		
	Total hours	
Form of classes - laboratory		**Number of hours**
Lab 1		
Lab 2		
	Total hours	
Form of classes - project		**Number of hours**
Proj 1		
Proj 2		
	Total hours	
Form of classes - seminar		**Number of hours**
Sem 1	Familiarization with the principles of engineering thesis realization at Informatics field. Rules related to student presentations. Determining the schedule of student presentations.	2
Sem 2	Review of basic skills related to preparation and presentation of scientific and technical texts by students, beginning from the choice of topic, selection of tasks to be performed, use of literature and also how to write thesis and how obtained results should be interpret.	2
Sem 3 – Sem15	During semester each student has 2 presentations. The first presentation is related to the general view of the engineering thesis topic, its placement in the literature and in the Informatics field. The student should present the primary aim of thesis, the state of art related to thesis topic, the concept of solution, the initial structure of thesis and timetable for further work. The purpose of the second presentation is preparation to defense and demonstrate presentation skills in English. The second presentation consists of two parts, namely,	26

	discussion of the results of the work in English and a short presentation in Polish devoted to the results of the thesis.	
	Total hours	30

TEACHING TOOLS USED

N1. Multimedia presentations
N2. Examples of scientific papers and reports from the field of computer science.
N3. E-Learning System used to publish teaching materials and announcements, also used for collection and evaluation of student work.

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
P	PEK_U01, PEK_U02, PEK_U03, PEK_K01, PEK_K02, PEK_K03, PEK_K04, PEK_K05.	Evaluation of the presentation at the seminar and prepared documentation from the presentation. The evaluation shall be subject to the fulfillment of the requirements for the presentation, including its substantive scope, structure and organization of presentation, techniques of conversation, a form of presentation, compactness of presentation and conclusions reached. Participation in the discussions after presentation is also evaluated. In addition, the seminar leader is able to control the cooperation between supervisors and graduate students.

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[55] Literature related to the scope of realized thesis selected by student and recommended by the promoter.

[56] Requirements for engineering thesis at the Faculty of Computer Science and Management, Wrocław University of Technology, www.wiz.pwr.wroc.pl

SECONDARY LITERATURE:

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

Dr hab. inż. Leszek Borzemski, leszek.borzemski@pwr.wroc.pl

MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Diploma seminar
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY **Informatics**
AND SPECIALIZATION …………………………..

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_U01 (skills)	K1INF_U11	C1, C2	Se1-15	N1, N2, N3
PEK_U02	K1INF_U12	C1, C2	Se1-15	N1, N2, N3
PEK_U03	K1INF_U13	C1, C2	Se1-15	N1, N2, N3
PEK_K01 (competences)	K1INF_K01	C1, C2	Se1-15	N1, N2, N3
PEK_K02	K1INF_K02	C1, C2	Se1-15	N1, N2, N3
PEK_K03	K1INF_K03	C1, C2	Se1-15	N1, N2, N3
PEK_K04	K1INF_K04	C1, C2	Se1-15	N1, N2, N3
PEK_K05	K1INF_K05	C1, C2	Se1-15	N1, N2, N3

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

*** - from table above

Zał. nr 4 do ZW 64/2012

FACULTY OF COMPUTER SCIENCE AND MANAGEMENT

SUBJECT CARD

Name in Polish: Sieci komputerowe

Name in English: Computer communication networks

Main field of study (if applicable): Information technology

Specialization (if applicable): ……………………..

Level and form of studies: 1st level, full-time

Kind of subject: obligatory

Subject code INZ001704

Group of courses: NO

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

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

4. Has a basic knowledge of linear algebra, analytic geometry and mathematical analysis, necessary for solving simple problems of an engineering calculation of technical and non-technical disciplines (K1INF_W01)

5. Has a basic knowledge of discrete mathematics, mathematical logic and mathematical statistics, the necessary information to solve simple engineering problems (K1INF_W02)

6. Has a basic knowledge of computer organization and architecture (K1INF_W08)

7. Has a basic knowledge of the design and operation of operating systems (K1INF_W10)

8. Can use indicated an analytical method and plan and carry out a simple experiment and computer simulation engineering, conduct a survey and analyze the results, particularly for the selected system components (K1INF_U09)

9. Knows the basic methods and tools for collecting, processing and retrieval of information and to extract knowledge (K1INF_W16)

10. Can use the right tools to build a simple model of the process (the object), to formulate a specific task analysis and decision making (K1INF_U15)

11. Has the ability to self-education, including in order to improve professional competence (K1INF_U05)

12. Understands and knows the need continuous training opportunities and improving their social skills and (K1INF_K01)

SUBJECT OBJECTIVES

C1. Ordered, underpinned by theoretical knowledge in the field of taxonomy, structure and applications of computer networks, circuit switching and switching messages and tiered hierarchical models of computer networks, construction and functionality of network protocols, network protocols, rules of cooperation in piles according to protocols and analysis of quantitative and qualitative existing networks computer.

C2. Skills of analysis, design and configuration of network solutions using network models, standards and protocol stacks, formulation design and analysis tasks of network solutions and assess the suitability of a variety of networking solutions for the implementation of various services distributed systems.

C3. Skills for the selection of the appropriate variety of networking solutions to achieve business goals supported by IT systems.

SUBJECT EDUCATIONAL EFFECTS
Relating to knowledge:
K1INF_W11: Has basic knowledge of IT systems and computer networks
K1INF_W12: Has basic knowledge in the field of distributed systems architecture and methods for multiprocessor and distributed computing
K1INF_W14: Has basic knowledge of the architecture of the Internet and Web-based systems
Relating to skills:
K1INF_U05: Has the ability to self-study, including in order to improve the professional competence
K1INF_U06: Can choose the hardware and software components of a computer system for specific applications
K1INF_U08: Can configure basic network hardware and software in computer networks
K1INF_U11: Can obtain information from literature, databases and other sources, also in English, including for the purposes of self-education and improving professional skills, able to integrate the information, make their interpretation, as well as draw conclusions and formulate and justify opinions.
Relating to social competences:
K1INF_K01: Understands and knows the need for continuous training opportunities and improve their professional competence and social
K1INF_K04: He can appropriately prioritize for implementation specified by you or other tasks

PROGRAMME CONTENT	
Form of classes - lecture	**Number of hours**
Lec 1 Classification of computer networks	2
Lec 2 Circuit switching and message switching (packet switching). Evaluation of the effectiveness of resource use in networks with different switching methods. The optimal packet length (task fromulation). Classification of data communications traffic.	2
Lec 3 Connecting open systems model (Open Systems Interconnection model) and other models of computer networks	2
Lec 4 Layered network models and principles of cooperation between the layers	2
Lec 5 Open Systems Interconnection model layers – the physical layer	2
Lec 6 Medium access method in local and wide area networks, wired and wireless networks	2
Lec 7 Open Systems Interconnection model layers - the data link layer. Implementations of the data link layer functions in different network standards.	2
Lec 8 HDLC (High Level Data Link Control) protocol as an example of the connection in the data link layer	2
Lec 9 Open Systems Interconnection model layers - the network layer. Implementations of the network layer functions in different network standards.	2

Lec 10	Measures of the quality of services provided by networks serving streaming and elastic traffic. The tasks of routing and flow control	2
Lec 11	Node queuing model of packet-switched networks	2
Lec 12	IP (Internet Protocol) as an example of connectionless protocol at the network layer. Addressing issues in networks.	2
Lec 13	Congestions and congestion control tasks in packet switched networks.	2
Lec 14	TCP (Transport Control Protocol) as an example of protocol at the transport layer connection	2
Lec 15	Guidelines for the development of a network of circuit switched and packet switched. Concepts of providing the quality of services in computer networks. New generations of computer networks.	2
	Total hours	**30**

PROGRAMME CONTENT		
Form of classes - laboratory		**Number of hours**
Lab 1	Organizational Information.	2
Lab 2	Physical media, making the cables.	2
Lab 3	Communication over the network. Wired computers connections.	2
Lab 4	Using Wireshark™ to view and examine protocol data units. Application layer protocols.	2
Lab 5	IPv4 addressing. Packet Tracer. Network simulator.	2
Lab 6	Using Wireshark™ to view protocol data units. Network and transport layer protocols.	2
Lab 7	Establishing a console session with switch/router. Basic Cisco device configuration.	2
Lab 8	Basic Cisco device configuration part 2. Managing router and switch configuration. Password recovery procedure.	2
Lab 9	Final exam from Cisco CCNA (*Cisco* Certified Network Associate) Exploration semester 1	2
Lab 10	Creating VLAN (Virtual Local Area Network) network on switches. Connections between switches with trunk lines.	2
Lab 11	Managing the VLANs with VTP (Virtual Transfer Protocol) protocol	2
Lab 12	Basic static route configuration	2
Lab 13	Basic Inter-VLAN routing	2
Lab 14	Basic RIP (Routing Information Protocol) configuration	2
Lab 15	Exams Cisco CCNA (*Cisco* Certified Network Associate) Exploration. Grading.	2
	Total hours	**30**

TEACHING TOOLS USED
N1. Traditional lecture. Multimedia presentations.

N2. Student's own works – solving experiments and tasks in laboratory.

N3. Student's own works – literature 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)	K1INF_W11 K1INF_W12 K1INF_W14 K1INF_U05 K1INF_U06 K1INF_U08 K1INF_U11 K1INF_K01 K1INF_K04	Observation of student's activity. Solving exercises. Preparation and presentation delivery.
F1 – F15 (laboratory)	K1INF_U05 K1INF_U06 K1INF_U08 K1INF_U11 K1INF_K01 K1INF_K04	Checking the preparation of the student. Checking the presence of the student. Observation of student activity. Observation and evaluation of student independence. Analysis of reports of exercise.
P (lecture)	K1INF_W11 K1INF_W12 K1INF_W14 K1INF_U05 K1INF_U06 K1INF_U08 K1INF_U11 K1INF_K01 K1INF_K04	Examination taking into account results of forming evaluation F1 (lecture)
P (laboratory)	K1INF_U05 K1INF_U06 K1INF_U08 K1INF_U11 K1INF_K01 K1INF_K04	Weighted sum of forming evaluations F1 – F15 (laboratory).

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[57]   A.S. Tanenbaum, „Computer networks", Prentice Hall; 1996

[58]   G. Pujolle, D. Seret, D. Dromard, E. Horlait, „Integrated Digital Communication Networks", J. Wiley & Sons

[59]   B. Russell, „The art of computer networks", Prentice Hall; 2009

[60]   V.S. Bagad, I.A. Dhotre, „Computer networks", Technical Publications, 2009.

[61]   http://www.freebookcentre.net/Networking/Free-Computer-Networking-Books-Download.html

[62]   M. Roden, „Analog and digital communication systems", Prentice Hall

SECONDARY LITERATURE:

[1]   MIT open cources:http://ocw.mit.edu/courses/electrical-engineering-and-computer-science

[2]   CCNA Exploration Network Fundamentals, Cisco Academy, PWN, 2008

[3]   http://www.freebookcentre.net/Networking/Free-Computer-Networking-Books-Download.html

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)
Adam Grzech, adam.grzech@pwr.wroc.pl

MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Computer communication networks

AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY ………………………..
AND SPECIALIZATION …………………………….

Subject educational effect	Correlation between subject educational effect and educational effects defined for main field of study and specialization (if applicable)**	Subject objectives***	Program content***	Teaching tool number***
PEK_W01 (knowledge)	K1INF_W11	C1,C3	Lec 1 – Lec 15	N1, N2, N3
PEK_W02	K1INF_W12	C1, C2	Lec 1 – Lec 15	N1, N2, N3
PEK_W03	K1INF_W14	C1, C3	Lec 1 – Lec 15	N1, N2, N3
PEK_U01 (skills)	K1INF_U05	C2	Lab 1 – Lab 15	N2, N4, N5
PEK_U02	K1INF_U06	C2	Lab 1 – Lab 15	N2, N4, N5
PEK_U03	K1INF_U08	C2	Lab 1 – Lab 15	N2, N4, N5
PEK_U04	K1INF_U11	C1, C2, C3	Lec 1 – Lec 15 Lab 1 – Lab 15	N1, N2, N3, N4, N5
PEK_K01 (competences)	K1INF_K01	C1, C2, C3	Lec 1 – Lec 15 Lab 1 – Lab 15	N1, N2, N3, N4, N5
PEK_K02	K1INF_K04	C1, C2, C3	Lec 1 – Lec 15 Lab 1 – Lab 15	N1, N2, N3, N4, N5

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

*** - from table above

FACULTY OF COMPUTER SCIENCE AND MANAGEMENT

SUBJECT CARD

Name in Polish: Sieci komputerowe II

Name in English: Computer communication networks II

Main field of study (if applicable): Computer science
Specialization (if applicable): ……………………..
Level and form of studies: 1ˢᵗ level, full-time
Kind of subject: obligatory
Subject code INZ005227
Group of courses NO

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30	0	30	0	0
Number of hours of total student workload (CNPS)	60		60		
Form of crediting	Examination	Crediting with grade			
For group of courses mark (X) final course					
Number of ECTS points	2		2		
including number of ECTS points for practical (P) classes			2		
including number of ECTS points for direct teacher-student contact (BK) classes	1,2		1,2		

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES
1. Has a basic knowledge of linear algebra, analytic geometry and mathematical analysis, which is necessary to perform simple computing tasks on an engineering of technical and non-technical disciplines (K1INF_W01).
2. Has a basic knowledge of discrete mathematics, mathematical logic and mathematical statistics, the necessary information to solve simple engineering problems (K1INF_W02).
3. Has a basic knowledge of computer organization and architecture (K1INF_W08).
4. Has a basic knowledge of the structure and operation of an operating systems (K1INF_W10).
5. Has a basic knowledge of IT systems and computer networks (K1INF_W11).
6. Has a basic knowledge of the Internet architecture and Web-based systems (K1INF_W14).
7. Knows the basic methods and tools for collecting, processing and retrieval of information and knowledge extraction (K1INF_W16).
8. Can choose the hardware and software components of a computer system for specific applications (K1INF_U06).

9. Can be used as indicated analytical method and to plan and carry out a simple experiment engineering and computer simulation, to carry out tests and analyze results, particularly for the selected system components (K1INF_U09).
10. Can configure basic networking hardware and software in computer networks (K1INF_U08).
11. 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).
12. Has the ability to self-education, including in order to improve professional competence (K1INF_U05).
13. Understands the need and knows the possibility of lifelong learning and improving their skills and social (K1INF_K01).

SUBJECT OBJECTIVES

C1. Ordered, underpinned by theoretical knowledge of methods of delivering quality services in networks, reliability and safety in today's ICT systems using models of queuing and reliability models.

C2. Ordered, underpinned by theoretical knowledge of methods, algorithms, procedures and monitoring protocols for the analysis, design and management of quality, reliability and security in ICT systems.

C3. Skills for the analysis, comparison, configuration and design of networked devices and software network devices using a model of nodes and networks and standards, the task of formulating the design and analysis of network solutions and evaluate the suitability of different network solutions to support different services reliable and secure distributed communication systems.

C4. Skills for the selection of appropriate methods, algorithms, standards, tools (software and hardware) and network solutions for the design and provision of reliable and secure network services in a distributed ICT systems.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
  K1INF_W11: Has basic knowledge of IT systems and networks
  K1INF_W12: Has basic knowledge of the architecture of distributed systems and methods for multiprocessor and distributed computing

relating to skills:
  K1INF_U05: Has the ability to self-study, including in order to improve the professional competence
  K1INF_U08: Can configure basic networking hardware and software in computer networks
  K1INF_U11: Can obtain information from literature, databases and other sources, also in English, including for the purposes of self-education and professional skills development, can integrate the information, make their interpretation, and to draw conclusions and formulate and justify opinions.

relating to social competences:
  K1INF_K01: Understands the need and knows the possibilities of lifelong learning and to improve their professional competence and social
  K1INF_K04: Can properly set priorities for implementation specified by you or other tasks

PROGRAMME CONTENT		
Form of classes - lecture		**Number of hours**
Lec 1	Quality of networks and networks' services. Security of computer networks.	3
Lec 2	Reliability of computer systems and networks	3
Lec 3	Diagnostics and testing of computer hardware	3
Lec 4	Testing and diagnostics of software	3
Lec 5	Detection and fault tolerance in the system	3
Lec 6	Reliability models and their use in the diagnosis and their use in planning and resource management system	3
Lec 7	Security of computer networks. Systematics. Basic problems and how to solve them.	3
Lec 8	Cryptography and cryptographic systems	3
Lec 9	Attacks on security. Methods and techniques of security breaches Monitoring network traffic and detecting anomalies.	3
Lec 10	Reliability and security of computer networks. Standards, standards and recommendations.	3
	Total hours	30

PROGRAMME CONTENT		
Form of classes - class		**Number of hours**
Lab 1	Organizational activities. Safety in the laboratory.	3
Lab 2	Secure networking devices - examples of methods and their practical implementations (Secure Network Devices).	3
Lab 3	Objectives and configuration in the tasks of authentication, authorization, and accounting (Authentication, Authorization and Accounting) networks	3
Lab 4	Practical implementations of firewall (Firewall Technologies)	3
Lab 5	Implementation and configuration of security systems and detection of security breaches (Intrusion Prevention)	3
Lab 6	Implementation and configuration examples of local security networks in the tasks of security and safety violations.	3
Lab 7	Cryptographic systems and their implementations	3
Lab 8	Setting up and managing virtual networks. Virtualization nodes and network links (Virtual Private Networks)	3
Lab 9	Management of networked systems with built-in security systems (Secure Network Management)	3
Lab 10	Solving problems in the network configuration. Improve reporting and testing. Examination.	3
	Total hours	30

TEACHING TOOLS USED

N1. Traditional lecture. Multimedia presentations.

N2. Student's own works – solving experiments and tasks in laboratory.

N3. Student's own works – literature 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)	K1INF_W11 K1INF_W12 K1INF_U05 K1INF_U08 K1INF_U11 K1INF_K01 K1INF_K04	Observation of student's activity. Solving exercises. Preparation and presentation delivery.
F1 – F10 (laboratory)	K1INF_U05 K1INF_U08 K1INF_U11 K1INF_K01 K1INF_K04	Checking the preparation of the student. Checking the presence of the student. Observation of student activity. Observation and evaluation of student independence. Analysis of reports of exercise.
P (lecture)	K1INF_W11 K1INF_W12 K1INF_U05 K1INF_U08 K1INF_U11 K1INF_K01 K1INF_K04	Examination taking into account results of forming evaluation F1 (lecture)
P (laboratory)	K1INF_U05 K1INF_U08 K1INF_U11 K1INF_K01 K1INF_K04	Weighted sum of forming evaluations F1 – F10 (laboratory).

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[63] M. Serafin, "Sieci VPN. Zdalna praca i bezpieczeństwo danych", Helion, 1991 – 2013

[64] W. Stallings, Kryptografia i bezpieczeństwo sieci komputerowych. Matematyka szyfrów i techniki kryptologii, Helion, 1991 – 2013.

[65] S. Garfinkel, G.Spafford, Bezpieczeństwo w Unixie i Internecie. Wydawnictwo RM, Warszawa 1997.

[66] B. Schneier, Kryptografia dla praktyków - protokoły, algorytmy i programy źródłowe w języku C. WNT, Warszawa 1995.

[67] D. Comer, Sieci komputerowe TCP/IP. Zasady, protokoły i architektura. WNT, Warszawa 1997.

[68] D. Bobrowski, Modele i metody matematyczne teorii niezawodności w przykładach i zadaniach. WNT, Warszawa 1985.

[69] D. Bobrowski, Probabilistyka w zastosowaniach technicznych. WNT, Warszawa 1986.

[70] I. Koźniewska, M.Włodarczyk, Modele odnowy, niezawodności i masowej obsługi. PWN, Warszawa 1978.

[71] A. Grzywak, Bezpieczeństwo systemów komputerowych i telekomunikacyjnych. Wydawnictwo SOTEL, Chorzów 1999.

[72] J. Sosnowski, Testowanie i niezawodność systemów komputerowych, Oficyna EXIT, Warszawa 2005.

[73] J. Woźniak, K. Nowicki, "Sieci LAN, MAN i WAN – protokoły komunikacyjne", Wydawnictwo FPT, Kraków 1998

SECONDARY LITERATURE:

[1] S. Maguire, "Niezawodność oprogramowania", Helion, 1991 – 2013.

[2] Akademia sieci Cisco CCNA, PWN, 2008

[3] S. Haykin, "Systemy telekomunikacyjne", WKiŁ, Warszawa 1999.

[4] MIT Free Open Course Materials (http://ocw.mit.edu/index.htm) http://www.freebookcentre.net/Networking/Free-Computer-Networking-Books-Download.html

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

Adam Grzech, adam.grzech@pwr.wroc.pl

MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Computer communication networks II

AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY

Subject educational effect	Correlation between subject educational effect and educational effects defined for main field of study and specialization (if applicable)**	Subject objectives***	Program content***	Teaching tool number***
PEK_W01 (knowledge)	K1INF_W11	C1, C2, C3	Lec 1 – Lec 10	N1, N2, N3
PEK_W02	K1INF_W12	C1, C2, C3, C4	Lec 1 – Lec 10	N1, N2, N3
PEK_U01 (skills)	K1INF_U05	C3, C4	Lab 1 – Lab 10	N2, N4, N5
PEK_U02	K1INF_U08	C3, C4	Lab 1 – Lab 10	N2, N4, N5
PEK_U03	K1INF_U11	C1, C2, C3, C4	Lec 1 – Lec 10 Lab 1 – Lab 10	N1, N2, N3, N4, N5
PEK_K01 (competences)	K1INF_K01	C1, C2, C3, C4	Lec 1 – Lec 10 Lab 1 – Lab 10	N1, N2, N3, N4, N5
PEK_K02	K1INF_K04	C1, C2, C3, C4	Lec 1 – Lec 10 Lab 1 – Lab 10	N1, N2, N3, N4, N5

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

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FACULTY W-8 / DEPARTMENT………………

SUBJECT CARD

Name in Polish *Sieci neuronowe……………………….*
Name in English *Neural Networks………………………….*
Main field of study (if applicable): *Informatics…………….*
Specialization (if applicable): ……………………..
Level and form of studies: 1st/ ~~2nd* level,~~ full-time ~~/ part-time~~*
Kind of subject: ~~obligatory /~~ optional / ~~university-wide~~*
Subject code *INZ005222*

Group of courses ~~YES~~ / NO*

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30		30		
Number of hours of total student workload (CNPS)	60		60		
Form of crediting	~~Examination~~ /	Examination /	~~Examination~~ /	Examination /	Examination /

2

	crediting with grade*	crediting with grade*	crediting with grade*	crediting with grade*	crediting with grade*
For group of courses mark (X) final course					
Number of ECTS points	2		2		
including number of ECTS points for practical (P) classes					
including number of ECTS points for direct teacher-student contact (BK) classes	1,2		1,2		

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. K1INF_U02; K1INF_U03 skills in coding at any high programming language 2.K1INF_W01 fundamental knowledge in differential calculus and matrices.

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SUBJECT OBJECTIVES

C1 Teaching neural network design

C2 Presentation of various kinds of neural networks trained in supervised and unsupervised way

C2 Teaching practical application of neural networks: a choice of neural network to a specific problem, design of its architecture and training.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEK_W01 Student knows theoretical backround of neural network architecture, methods of training principles of processing information

relating to skills:

PEK_U01 Student knows how to analyze and formulate problem in terms of neural network application.

PEK_U02 Student is able to design and to implement application being neural network model

PEK_U03 Student is able to plan and conduct experiments testing efficiency of applied neural network .

PEK_U04 Student knows how to prepare report describing conducted experiments.

relating to social competences:

PROGRAMME CONTENT

Form of classes – lecture	Number of

2

Lec 1	Introduction to the course. Description of the course, its organization and principles of evaluation. An example of neural network application. Principles of neural network design.	2
Lec 2	The first Simple networks: Simple perceptron	2
Lec 3	The first Simple networks: Adaline	2
Lec4	BackPropagation- supervised training method	2
Lec5	Multilayered networks (MLP) – the choice of architecture to the specific task, training parameters, coding inputs and outputs	2
Lec6	Examples of MLP applications	2
Lec7	Unsupervised networks – CounterPropagation network	2
Lec8	Self Organizing Maps – SOM	2
Lec9	Radial Basis Function Networks – methods of training and applications	2
Lec 10	Associative Memories –Hopfield Network	2
Lec 11	Associative Memories – BAM neural networks	*2*
Lec 12	Stochastics based neural network – introduction	2
Lec 13	Boltzmann Machine	2
Lec 14	Neocognitron in its first version	2
Lec15	Short survey of all presented neural networks	2
	Total hours	30

Form of classes - class		Number of hours
Cl 1		
Cl 2		
Cl 3		
Cl 4		
..		
	Total hours	

Form of classes - laboratory		Number of hours
Lab 1	Introductory information - presentation of the formal principles of the course and the project assessment. Presentation of exemplary project report	2
Lab 2	Project1: Implementation of simple perceptron and Adaline and their training to per form Simple logi cal function	2
Lab 3	Evaluation of Project 1 and discussion on the choice of problem to solve by BP Network (Project2)	2
Lab 4	Conceptual design of the Project. Collecting data.	2

Lab 5	Implementation of Project.2	2
Lab6	Public presentation of the current result of Project 2 realization.	2
Lab7	Testing and report preparation for Project2	2
Lab8	Public presentation of the final state of the Project 2	2
Lab9	Discussion on the problem chosen to solve as a Project 3 (unsupervised trained neural Network)	2
Lab10	Conceptual design of the Project. Collecting data.	2
Lab11	Implementation of Project3	2
Lab12	Public presentation of the current result of Project 3 realization.	2
Lab13	Testing and report preparation for Project3	2
Lab14	Public presentation of the final state of the Project 23	2
Lab15	Discussion about projects	2
…		
	Total hours	30

Form of classes - project		of hours
Proj 1		
Proj 2		
Proj 3		
Proj 4		
Proj5		
	Total hours	

Form of classes - seminar		Number of hours
Sem 1		
Sem 2		
Sem 3		
…		
	Total hours	

TEACHING TOOLS USED
N1. Informational lecture supported by multimedia presentation
N2. Design specification needed for the project
N3. Design document template

N4. e-learning system applied for publication of didatic materials

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 Delivery of project1 (implementation and report)	PEK_U02 PEK_U03 PEK_U04	Assessed are: Correctness of the task formulation, assumptions the scheme of coding input and output information and the current progress of the project. The way of presentation is also evaluated. The grade scale 1-10.
F2 Delivery of Project 2 declaration	PEK_U01	Every week of unjustified delay in delivering project declaration results in grade reduction in course grade
F3 Presentation of partial results of the project2	PEK_U01, PEK_U02	Assessed are: Correctness of the task formulation, assumptions the scheme of coding input and output information and the current progress of the project. The way of presentation is also evaluated. The grade scale 1-10.
F4 Report from the implementation of the project2	PEK_U03 PEK_U04	Appraisal refers to the way of problem solution, experiment quality, the experiment documentation and the project report (structure, theoretical introduction and bibliography). The grade scale 1-10.
F5 Delivery of Project 3 declaration	PEK_U01	Every week of unjustified delay in delivering project declaration results in grade reduction in course grade
F6 Presentation of partial results of the project3	PEK_U01, PEK_U02	Assessed are: Correctness of the task formulation, assumptions, the scheme of coding input and output information and the current progress of the project. The way of presentation is also evaluated. The grade scale 1-10.
F7 Report from the implementation of the project2	PEK_U03 PEK_U04	Appraisal refers to the way of problem solution, experiment quality, the experiment documentation and the project report (structure, theoretical introduction and bibliography). The grade scale 1-10.
P1 – the final grade for project	PEK_U01 – PEK_U04	The final number of points is calculated according to the following formulae : P1=0.2F1+ 0.1 F3+ 0.3 F4+0.1 F6+ 0.3 F7. The final grade is

		calculated on the base of the number of points in the following way:
		<50%, 60%) $\rightarrow$ dst
		<60%, 70%) $\rightarrow$ dst+
		<70%, 80%) $\rightarrow$ db
		<80%, 90%) $\rightarrow$ db+
		<90%, $\rightarrow$ bdb
		Remark: the final grade is reduced by half of a grade for each week of unjustified delay of a declaration or a report
P2– the final grade for the lecture	PEK_W01	The test consists of open questions with given number of points. The sum of points is translated to the grades as follows:
		<50%, 60%) $\rightarrow$ dst
		<60%, 70%) $\rightarrow$ dst+
		<70%, 80%) $\rightarrow$ db
		<80%, 90%) $\rightarrow$ db+
		<90%, $\rightarrow$ bdb

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[74] [1] S.Osowski: Sieci neuronowe w ujęciu algorytmicznym, WNT 1996
[75] Sieci neuronowe w zastosowaniach, pod red. U. Markowskiej Kaczmar, H. Kwaśnickiej, Oficyna Wydawnicza PWr. 2005
[76] T. Masters: Sieci neuronowe w praktyce. Programowanie w języku C++, WNT 1996
[77] Biocybernetyka i inżynieria biomedyczna 2000 Tom 6 Sieci neuronowe (redaktorzy tomu (Włodzisław Duch, Józef Korbicz, Leszek Rutkowski, Ryszard Tadeusiewicz); Akademicka Oficyna Wydawnicza EXIT.

SECONDARY LITERATURE:

[43] [1] J. ∫urada, M. Barski, W. Jędruch: Sztuczne sieci neuronowe. Podstawy teorii i zastosowania, PWN Warszawa 1996
[44] R. Tadeusiewicz: Wprowadzenie do sieci neuronowych, StatSoft 2001.

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

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Neural Network
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY ………………………..
AND SPECIALIZATION ……………………………

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)	K1INF_W17	C3	Wy1 – Wy8	N1,N4
PEK_U01 (skills)	K1INF_U03	C1, C2, C3	Wy1 Pr2, Pr8	N1, N4
PEK_U02	K1INF_U04	C1,C3	Pr4, Pr10	N1, N2, N4
PEK_U03	K1INF_U07, K1INF_U10	C1, C3	Pr5 – Pr14	N2, N4
PEK_U04	K1INF_U13	C3	Pr 7, Pr13	N3

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

*** - from table above

Zał. nr 4 do ZW 64/2012

FACULTY W-8 / DEPARTMENT…Informatics……………
SUBJECT CARD
Name in Polish … Środowisko sieciowe Unix……………………………………………….
Name in English…Unix in Network Environment…………… ………………………………….
Main field of study (if applicable): …Informatics……………………….
Specialization (if applicable): ……………………..
Level and form of studies: 1ˢᵗ level, full-time
Kind of subject: optional
Subject code …INZ005237
Group of courses YES

	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		60		
Form of crediting	Examination		crediting with grade*		
For group of courses mark (X) final course					
Number of ECTS points	1		2		
including number of ECTS points for practical (P)			2		

2

classes					
including number of ECTS points for direct teacher-student contact (BK) classes	0,6		1,2		

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basic knowledge of operating systems
2. Basic knowledge of computer networks

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SUBJECT OBJECTIVES

C1 Students understand the main features of Linux and Unix operating systems
C2 Students acquire the practical skills of instalation and configuration of Unix operating systems
C3 Students acquire the practical skills of using information systems in Unix network environment

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEK_W01 Students know architecture of Unix and Linux
PEK_W02 Students know the mechanism of computer Network
PEK_W03 Students know methods used in information systems
…
relating to skills:
PEK_U01 Students have the skills of self learning in the aim of lifting professional skills
PEK_U02 Students are able to gain information from various sources
PEK_ U03 Students are able to define problems and then finding solution
…
relating to social competences:
PEK_K01 Students understand the need of continous education

PROGRAMME CONTENT

Form of classes - lecture		Number of hours
Lec 1	General characteristic of network environment	2
Lec 2	Architecture of Unix and Linux operating systems	2
Lec 3	Kernel of operating system	2
Lec 4	File systems	2
Lec 5	Processess management	2
Lec 6	Interprocesses communication	2
Lec 7	Implementing and running network services	2
Lec 8	Socket network communication	1
	Total hours	15

Form of classes - class		Number of hours
Cl 1		
Cl 2		
Cl 3		
Cl 4		
..		

	Total hours	
Form of classes - laboratory		Number of hours
Lab1	Logging into the operating system	2
Lab2	Using documentation of Linux system	2
Lab3	File system, file and directories management	2
Lab4	User environment	2
Lab5	Using different command interpreters	2
Lab6	Linux system instalation	2
Lab7	Network interface configuration	2
Lab8	Network interface testing	2
Lab9	FTP Service	4
Lab10	DNS Service	4
Lab11	Backup and recovery of data	4
Lab12	User management in Linux	2
	Total hours	30
Form of classes - project		**Number of hours**
Proj1		
Proj2		
Proj3		
Proj4		
...		
	Total hours	
Form of classes - seminar		Number of hours
Sem1		
Sem2		
Sem3		
...		
	Total hours	
TEACHING TOOLS USED		
N1. Lecture – traditional method N2. Consultations N3. Practical exercises at computer laboratory		

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 Laboratory	PEK_W01-03 PEK_U01- 03	Presentation of programming work, oral explanation
P – lecture	PEK_W01-03 PEK_U01-03	Final test
C		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Unix Network Programming, Stevens W., Pearson Education,1998
[2] Advanced Unix Programming, Rockind W., Pearson Education, 2004
[3]
[4]

SECONDARY LITERATURE:

[1] Operating System Concept, Silberschatz A., Addison-Wesley, 2005
[2]
[3]

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

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
…Unix in Network Environment…………………………
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY Informatics………………………..
AND SPECIALIZATION ……………………………..

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)	K1INF_W10,K1INF_W04	C1,C2	Wy1-6	N1-3
PEK_W02	K1INF_W11, K1INF_W05	C1, C2	Wy1-6	N1-3
PEK_W03	K1INF_W13	C1,C2	Wy1-8	N1-3
…				
PEK_U01 (skills)	K1INF_U05, K1INF_U06	C2	Wy1-8	N1-3
PEK_U02	K1INF_U11, K1INF_U08	C2	Wy1-8	N1-3
PEK_U03…	K1INF_U08	C1, C2	Wy1-8	N1-3
PEK_K01 (competences)	K1INF_K05	C1, C2	Wy1-8	N1-3
PEK_K02				
…				

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

*** - from table above

Zał. nr 4 do ZW 64/2012

FACULTY W-8 / DEPARTMENT………………
SUBJECT CARD
Name in Polish …… Systemy wbudowane i mobilne
Name in English …… Embedded and mobile systems
Main field of study (if applicable): Informatics
Specialization (if applicable): ……………………..
Level and form of studies: 1st/ 2nd* level, full-time / part-time*
Kind of subject: obligatory / optional / university-wide*
Subject code …………….
Group of courses YES / NO*

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30		30		
Number of hours of total student workload (CNPS)	60		60		
Form of crediting	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*
For group of courses mark (X) final course					

Number of ECTS points	2		2		
including number of ECTS points for practical (P) classes	0		2		
including number of ECTS points for direct teacher-student contact (BK) classes	1,2		1,2		

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES
1. Knowledge of programming in Java
2. Basic knowledge of programming in C and/or C #

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SUBJECT OBJECTIVES
C1 Obtaining basic knowledge of the architecture of embedded systems and mobile applications.
C2 Obtaining basic knowledge of application design for selected types of mobile devices and embedded systems selected class.
C3 Gaining practical skills of implementation of selected, commonly used, mobile device applications, and/or selected high-level language programmable desktop system.

SUBJECT EDUCATIONAL EFFECTS
relating to knowledge:
PEK_W01 Lists and characterizes basic hardware and software of embedded systems and mobile devices.
PEK_W02 Knows the basic properties and applications of specific software solutions for embedded systems, including real-time systems.
PEK_W03 Describes the operation of application components for main types of mobile phone systems.
relating to skills:
PEK_U01 Student is able to implement a simple application on the selected, mobile and embedded system platforms.
PEK_U02 Student can choose the right components and techniques used to achieve the main activities of selected applications on mobile devices.
PEK_U03 student can analyze and evaluate, in a basic scope, the characteristics of embedded system, including real-time system.
PEK_U04 Student is able to apply the principles of work, including safety rules, in a typical workplace for mobile system software development.

PROGRAMME CONTENT	
Form of classes - lecture	**Number of hours**
Lec 1 Presentation of the organization and the program of the course. Introduction to lecture subject.	2
Lec 2 Selected software platforms for embedded and mobile systems, Java 2 Platform, GEM/MHP, Android , Windows Phone.	2
Lec 3 Architecture and building of GEM/MHP applications.	2
Lec 4 Architecture and building of MIDP applications.	2

Lec 5	Architecture and building of Android applications (part 1) - the components and design of the application life cycle , creating basic interface.	2
Lec 6	Architecture and building of Android applications (part 2) – layouts and controls, controlling activities.	2
Lec 7	Architecture and building of Android applications (part 3) – selected interface components, data storage.	2
Lec 8	Architecture of Windows Phone applications – platform environment, the creation and structure of the application, application life cycle, the construction of pages.	2
Lec 9	Basics of building Windows Phone applications – controls, navigation between pages, data binding, the system functions: launchers and choosers.	2
Lec 10	Selected aspects of embedded systems architecture – microcontrollers: general characteristics and architecture.	2
Lec 11	Selected aspects of embedded systems architecture - integrated I/O.	2
Lec 12	Real-time systems - definitions, characteristics, classification, software.	2
Lec 13	Real-time systems - process management.	2
Lec 14	Selected issues of the embedded systems and applications design.	2
Lec 15	Passing test.	2
	Total hours	**30**
Form of classes - class		**Number of hours**
	Total hours	
Form of classes - laboratory		**Number of hours**
Lab 1	Health and Safety Training . Discussion of the organization and program of activities. Presentation of teaching tools .	2
Lab 2	Introduction to the platform for building and running MHP applications. Testing the platform.	2
Lab 3 & 4	MHP applications - building interface, controls, event handling, images, graphics blending.	4
Lab 5 & 6	MIDP application - a high-level API interface and RMS.	4
Lab 7	Getting familiar with, and configuring development platform for Android applications.	2
Lab 8	Android application - activities (windows), layouts and controls, activity interactions.	2
Lab 9 & 10	Android applications - advanced UI elements.	4
Lab 11	Android applications - data storage.	2
Lab 12	Getting familiar with, and configuring development platform for Windows Phone applications.	2
Lab 13	Windows Phone Application - interface elements, the basic controls, manage events and navigation between pages.	2
Lab 14	Windows Phone application - data binding, selected additional UI elements.	2
Lab 15	Summarization and final assessment of classes..	2
	Total hours	30

Form of classes - project	Number of hours
Total hours	

Form of classes - seminar	Number of hours
Total hours	

TEACHING TOOLS USED
N1. Lecture supported by multimedia presentations. N2. Laboratory aids for exercises. N3. Software to implement application for specific classes of devices. N4. Devices (smartphones, tablets, set-top boxes,) and emulators to run developed applications. N5. The e-learning system for publication of teaching materials, exercises, announcements and collection and evaluation of student work, as well as for testing of acquired knowledge.

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 – Lab2	PEK_U01, PEK_U02, PEK_U04	Assessment of the completeness and quality of the solution of the problem. 0÷10 point scale.
F2 – Lab4	PEK_U01, PEK_U02, PEK_U04	Assessment of the completeness and quality of the solution of the problem. 0÷10 point scale.
F3 – Lab6	PEK_U01, PEK_U02, PEK_U04	Assessment of the completeness and quality of the solution of the problem. 0÷10 point scale.
F4 – Lab8	PEK_U01, PEK_U02, PEK_U04	Assessment of the completeness and quality of the solution of the problem. 0÷10 point scale.
F5 – Lab10	PEK_U01, PEK_U02, PEK_U04	Assessment of the completeness and quality of the solution of the problem. 0÷10 point scale.
F6 – Lab11	PEK_U01, PEK_U02, PEK_U04	Assessment of the completeness and quality of the solution of the problem. 0÷10 point scale.
F7 – Lab13	PEK_U01, PEK_U02, PEK_U04	Assessment of the completeness and quality of the solution of the problem. 0⬚10 point scale.
F8 – Lab14	PEK_U01, PEK_U02, PEK_U04	Assessment of the completeness and quality of the solution of the problem. 0⬚10 point scale.
P1 - the final evaluation of the laboratory.	PEK_U01, PEK_U02, PEK_U04	The rate determined on the basis of the total points of forming ratings F1 to F6 according to the formula: - less than 50% of the points – 2.0 (insufficient)

		[50%, 60%) – 3.0 (sufficient) [60%, 70%) – 3.5 (sufficient+) [70%, 80%) – 4.0 (good) [80%, 90%) – 4.5 (good+) [90%, 100%) – 5.0 (very good) 100% – 5.5 (excellent)
P2 - the final evaluation of the lecture.	PEK_W01, PEK_W02, PEK_W03, PEK_U03	Test of knowledge - with the use of electronic test of the e-learning system. Score points obtained from the test. The grading scale such as for P1.

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[78]   Komatineni S., MacLean D.: Pro Android 4. Apress, New York 2012
[79]   Allen, G.: Android. Beginning Android 4, Apress, New York 2012
[80]   Petzold C.: Programming Windows Phone 7, MS Press, 2010
[81]   Petzold C.: Programming Windows: Writing Windows 8 Apps With C# and XAM, MS Press, 2013
[82]   Open Handset Alliance electronic documentation: http://developer.android.com
[83]   MS Windows Phone electronic documentation: http://msdn.microsoft.com
[84]   Oracle Java electronic documentation: http://www.oracle.com
[85]   Morris S., Smith-Chaigneau A.: Interactive TV Standards: A Guide to MHP, OCAP, and JavaTV. Focal Press, 2005
[86]   Atmel 16/32 microcontroler electronic documentation: http://www.atmel.com
[87]   Kamal R.: Embedded systems - Architecture, Programming and Design, McGraw-Hill Education, 2008
[88]   Laplante P.A.: Real-Time Systems Design And Analisys, IEEE Press, 2004

SECONDARY LITERATURE:

[45]   Miloshevska B.: Windows Phone Toolkit In Depth" 2nd edition, 2011
[46]   Windows Phone Programming in C#, Rob Miles, 2011
[47]   Pełka R.: Mikrokontrolery – architektura, programowanie, zastosowania. WKŁ, 2000.
[48]   Daca W.: Mikrokontrolery – od układów 8-bitowych do 32-bitowych. MIKOM, 2000.
[49]   Bryndza L.: Mikrokontrolery z rdzeniem ARM9. Wyd. BTC, 2009
[50]   Ułasiewicz J.: Systemy czasu rzeczywistego QNX6 Neutrino, BTC, 2007.
[51]   Praca zbiorowa: Real Time Scheduling Theory, Kluwer Academic Publishers, 2004

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

MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT

…………………………

AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY ………………………..
AND SPECIALIZATION ……………………………

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)	K1INF_W09	C1	Lec1,…,Lec15	N1, N5
PEK_W02	K1INF_W09	C1	Lec12, Lec13, Lec14	N1, N5
PEK_W03	K1INF_W09	C2, C3	Lec4,…,Lec9	N1, N5
PEK_U01 (skills)	K1INF_U04	C3	Lab1,…,Lab15	N2, N3, N4, N5
PEK_U02	K1INF_U04, K1INF_U06	C3	Lab1,…,Lab15 Lec4,…,Lec9	N2, N3, N4, N5
PEK_U03	K1INF_U06	C3	Lec1,…,Lec15	N1, N5
PEK_U04	K1INF_U14	C3	Lab1,…,Lab15	N2, N4

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

*** - from table above

Zał. nr 4 do ZW 64/2012

FACULTY: COMPUTER SCIENCE AND MANAGEMENT					
SUBJECT CARD					
Name in Polish Systemy operacyjne					
Name in English Operating systems					
Main field of study (if applicable): Information technology					
Specialization (if applicable): ……………………..					
Level and form of studies: 1st level, full-time					
Kind of subject: obligatory					
Subject code INZ001521					
Group of courses NO					
	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30		30		
Number of hours of total student workload (CNPS)	60		60		
Form of crediting	crediting with grade		crediting with grade		

For group of courses mark (X) final course					
Number of ECTS points	2		2		
including number of ECTS points for practical (P) classes					
including number of ECTS points for direct teacher-student contact (BK) classes	1,2		1,2		

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. K1INF_W01
2. K1INF_W02
3. K1INF_W08
4. K1INF_W10
5. K1INF_U09
6. K1INF_W16
7. K1INF_U05
8. K1INF_K01

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SUBJECT OBJECTIVES

C1. Acquireing knowledge about architecture and tasks of operating systems.

C2. Acquireing knowledge about parallel processing, task scheduling and relevant algorithms

C3. Acquireing knowledge about memory management.

C4. Acquireing knowledge about operating systems' security and access control mechanisms

C5. Acquireing knowledge about file system management.

C6. Acquireing knowledge about distributed operating systems, their strategies for resource management with relevant algorithms.

C7. Acquireing practical knowledge about experimental assessment of chosen algorithms and methods of resource management used in modern operating systems.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
K1INF_W10, K1INF_W12

relating to skills:
K1INF_U07, K1INF_U11

relating to social competences:
K1INF_K01, K1INF_K04

PROGRAMME CONTENT

Form of classes - lecture		Number of hours
Lec 1	Introduction. History, evolution and architectures of operating systems. Models of	2

	operating systems.	
Lec2	Process scheduling	2
Lec3	Process coordination, semaphores, critical sections, inter-process communication	2
Lec4	Deadlocks and synchronization	2
Lec5	Memory management, segmentation and paging.	2
Lec6	Virtual memory, page allocation.	2
Lec7	External memory management.	2
Lec8	File systems	2
Lec9	Access control in operating systems	2
Lec10	Distributed operating systems	2
Lec11	Synchronization in distributed operating systems, clock synchronization, elections, transactions.	2
Lec12	Processor scheduling in distributed operating systems.	2
Lec13	Distributed file systems	2
Lec14	Distributed shared memory. Memory consistency.	2
Lec 15	Operating systems in GRID architectures. Operating systems' perspectives and future development.	2
	Total hours	30

Form of classes - laboratory		Number of hours
Lab 1	Introduction, security rules, programming environment.	2
Lab 2	Basic functionalities of operating systems	2
Lab 3	Administrative tools in operating systems	2
Lab 4	User account management	2
Lab 5	UNIX operating system - introduction	2
Lab 6	UNIX operating system – resource management	2
Lab 7	UNIX operating system – shell scripts	2
Lab 8	Processor scheduling – simulations and analysis	2
Lab 9	Memory management – simulations and analysis	2
Lab 10	Memory management, page allocation – simulations and analysis	2
Lab 11	Virtual memory management– simulations and analysis	2
Lab 12	Deadlocks, critical sections, inter-process communication	2
Lab 13	Negotiations, Byzantine Agreements, proces coordination in distributed systems	2

Lab 14	Processor scheduling in distributed systems	2
Lab 15	Access control models and algorithms	2
	Total hours	30

TEACHING TOOLS USED

N1. Lectures, including multimedia presentations

N2. Literature studies – student's work

N3. Student's individual work – solving problems, performing simulations, and laboratory tasks.

N4. Preparing lab tasks reports – student's individual work.

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)	K1INF_W10 K1INF_W12 K1INF_U11 K1INF_K01 K1INF_K04	Evaluation of student's activity and solving of exemplary tasks and problems.
F1 – F15 (labs)	K1INF_W10 K1INF_W12 K1INF_U07 K1INF_U11 K1INF_K01 K1INF_K04	Evaluation of student's preparedness and presence on the labs along with his activity. Analysis and evaluation of task reports.
P (labs)	K1INF_W10 K1INF_W12 K1INF_U07 K1INF_U11 K1INF_K01	Weighted sum of grades F1 – F15.

2

	K1INF_K04		
P (lecture)	K1INF_W10	Written test with taking into consideration the F1.	2
	K1INF_W12		
	K1INF_U11		
	K1INF_K01		
	K1INF_K04		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Silbershatz, J.L. Peterson, P.B. Galvin, *Podstawy systemów operacyjnych*, WNT 1993.
[2] A.S. Tannenbaum, *Rozproszone systemy operacyjne*, Wyd. Nauk. PWN, 1997.
[3] A.M. Lister, R.D. Eager, *Wprowadzenie do systemów operacyjnych*, WNT, 1994.
[4] M.J Bach, *Budowa systemu operacyjnego UNIX*, WNT, 1995

SECONDARY LITERATURE:

[1] W.R. Stevens, Programowanie zastosowań sieciowych w systemie UNIX, WNT, 1995.
     Gabassi, Przetwarzanie rozproszone w systemie UNIX, Wyd. Lupus.
[2] Starllings W., Organizacja i architektura systemu komputerowego, WNT, Warszawa 2004.
[3] Madeja L., Cwiczenia z systemu Linux. Podstawy obsługi systemu, Mikom, Warszawa 1999.

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

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………………………………

AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY ………………………..
AND SPECIALIZATION ……………………………..

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	K1INF_W10	C1-C7	Lec1 – Lec15 Lab1 – Lab15	N1-N4
PEK_W02	K1INF_W12	C1-C7	Lec1 – Lec15 Lab1 – Lab15	N1-N4
PEK_U01	K1INF_U07	C1-C7	Lab1 – Lab15	N3-N4
PEK_U02	K1INF_U11	C1-C7	Lec1 – Lec15 Lab1 – Lab15	N1-N4
PEK_K01	K1INF_K01	C1-C7	Lec1 – Lec15 Lab1 – Lab15	N1-N4
PEK_K02	K1INF_K04	C1-C7	Lec1 – Lec15 Lab1 – Lab15	N1-N4

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

*** - from table above

FACULTY **Computer Science and Management** / DEPARTMENT………………
SUBJECT CARD

Name in Polish Systemy webowe
Name in English *Web systems*
Main field of study (if applicable): Informatics
Specialization (if applicable):
Level and form of studies: 1st/ 2nd* level, full-time / part-time*
Kind of subject: obligatory / optional / university-wide*
Subject code INZ001715
Group of courses YES / NO*

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30		15		30

Number of hours of total student workload (CNPS)	30		30		60
Form of crediting	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	~~Examination~~ / crediting with grade*
For group of courses mark (X) final course					
Number of ECTS points	1		1		2
including number of ECTS points for practical (P) classes			1		
including number of ECTS points for direct teacher-student contact (BK) classes	0,6		0,6		1,2

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1 has a basic knowledge of the architecture of computer networks.
2 has a basic knowledge of the use and programming of web sites
\

SUBJECT OBJECTIVES

C1 familiarize students with the nature and properties of Internet traffic (web-based)
C2 familiarize students with current knowledge in the field of technical infrastructures Web-based systems
C3 mastering the creation and characterization and analysis of hardware and software infrastructures for the promotion of the quality of Web-based systems.
C4 characterization skills by students of various issues concerning the issues of Web-based systems and present in the form of scientific and technical presentations.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEK_W01 has a basic knowledge of the architecture of the Internet, Web-based systems and the nature and characteristics of web-based traffic
PEK_W02 has a basic knowledge of hardware and software infrastructures for the promotion of the quality of Web-based systems.
PEK_W03 has a basic knowledge of selected methods and algorithms of web-based systems management
relating to skills:
PEK_U01 Can select hardware components and software web-based computer system for specific applications.
PEK_U02 Can apply indicated the analytical method and to plan and carry out a simple experiment and computer simulation engineering, carry out measurements and analyze results, particularly for selected components of an information system for research activities and performance of Web-based system.
PEK_U03 apply the principles of health and safety.
PEK_U04 has the ability to self-education, including in order to improve professional skills, able to independently gather information about the issues of Web-based systems for the presentation of the issues.
PEK_U05 Able to prepare documentation on the task of engineering for Web-based systems and to

prepare a text that contains a discussion of the results of this task.

relating to social competences:

PEK_K01 understands and knows the need for continuous training opportunities and enhancing their professional and social competence in the field of Web-based systems.

	PROGRAMME CONTENT	
	Form of classes - lecture	**Number of hours**
Lec 1	Introduction to the course. Description of the course, the organization of classes and examination. The architecture and structure of a Web-based systems. A Brief History of the Internet - evolution, efficiency, quality Web-based systems.	2
Lec 2	Characteristics of Web-based traffic.	2
Lec 3	The HTTP protocol. Web-based transaction. The quality of web-based services.	2
Lec 4	Quaranting of Web-based services	2
Lec 5	Web Server - organization, operation, management, implementation, control and scheduling of HTTP requests	2
Lec 6	Admission control and scheduling of HTTP requests on web server.	2
Lec 7	Architecture of high-performance scalable Web sites.	2
Lec 8	Distribution of local HTTP requests - architecture, methods, algorithms, implementations	2
Lec 9	Distribution of global HTTP requests - architecture, methods, algorithms, implementations	2
Lec 10	Web content caching, CDN systems	2
Lec 11	Sources of Web-data and its users. dła danych o Webie i jego użytkownikach	2
Lec 12	Measurements of Web. Measurement metrics. Active and passive, measurement methods. WING and MWING systems.	2
Lec 13	Analysis of Web-based systems in terms of content mining, usage mining, structure mining, mining user profiles	2
Lec 14	Analysis of Web-based systems in terms of performance mining	2
Lec 15	Test	2
	Total hours	30

Form of classes - class		Number of hours
Lab 1	Introduction to the course. Description of the course, the organization of labs and grading. Overview of lab environment.	3
Lab 2	SQUID - the creation of hierarchical structures and their analysis.	3
Lab 3	SQUID - creating ACL rules and principles.	3
Lab 4	Content Distribution Network Simulation using CDNSim package.	3
Lab 5	Continuation of Content Distribution Network simulation using CDNSim package. Credits.	3
	Total hours	15

Form of classes - laboratory		Number of hours
Lab 1		
Lab 2		
	Total hours	

Form of classes - project		Number of hours
Proj 1		
Proj 2		
	Total hours	

Form of classes - seminar			Number of hours
Se1	Presentation of the principles of course. Selection of topics for presentations by students. Discussion of students to the principles and form of adjustment before a larger group of scientific presentation.	2	
Se2-Se9	Aim of the presentation is to deepen and detailed discussion of some theoretical and practical issues presented in the lecture "web systems". Problems are proposed for the presentation of technical problems, design, realizacyjnymi or theoretical and apply methodologies and algorithms and means (tools, software, hardware) organization and operation of Web-based systems. The choice of the problem belongs to the student. Selected issue should be defined, described and solved using the language and forms adequate to the nature of the problem and the solutions. Presentation of the individual student is expected to last exactly 30 minutes. The speaker is obliged to prepare the slides in PPT or PPTX with notes. For individual classes is an average of 3 speakers, after each occurrence is organized few-minute discussion.	16	
	Total hours	18	

TEACHING TOOLS USED
N1. Lectures supported by multimedia presentations
N2. Documentation manufacturers web infrastructure
N3 Scientific and technical publications
N4. E-learning system used for publication of teaching materials or announcements, collection and assessment of student work
N5. Additional consultations for students.

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
P1 – concluding	PEK_W01, PEK_W02,	Test in the e-Learning checking knowledge acquired at the lectures. In this test is to assess the positive grade if the student scores at least 50%

lectures	PEK_W03	of the maximum number of points according to a formula consistent with the principle applicable to the assessment of P.
P2 – concluding labs	PEK_U01, PEK_U02, PEK_U03, PEK_U05	The basis of assessment is the presence in the classroom laboratory, laboratory exercises performed and the reports of laboratory exercises.
P3- concluding seminar	PEK_U04, PEK_K01	Rating P3 is weighed. Weights of individual components of the final grade P3 are as follows: evaluation of the guidance prepared and delivered a presentation - 50% rating for the activity and participation in discussions - 25%, the assessment for the presence, timely settlement of the delivery of materials and giving a presentation in accordance with the schedule-25 %.

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[89]   J. F. Kurose, Sieci komputerowe, Helion, Gliwice 2006
[90]   Publikacje naukowe i techniczne podawane na bieżąco przez prowadzących
[91]   Publikacje naukowe wybrane przez studentów i dostosowane do tematu seminarium
[92]   Publikacje własne prowadzących zajęcia

SECONDARY LITERATURE:

[52]   http://www.squid-cache.org/
[53] Literatura uzupełniająca i strony www dostosowane do tematu seminarium
[54] Dokumentacja produktów i rozwiązań systemów webowych

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

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Web systems
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY **Infomatics**
AND SPECIALIZATION

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_W01-03	K1INF_W14	C1, C2, C3	Wy1-Wy15 Se2-10, Lab2, Lab4-5	N1, N2, N3, N4, N5
PEK_U01	K1INF_U06	C4	Lab1-5	N2, N4, N5
PEK_U02	K1INF_U07	C4	Lab2-5	N2, N3, N4, N5
PEK_U03	K1INF_U14	C4	Lab1-5	N2, N4, N5
PEK_U04	K1INF_U05	C3	Se1-10	N1, N3, N4, N5
PEK_U05	K1INF_U13	C3	Lab1-5	N2, N4, N5
PEK_K01	K1INF_K01	C1, C2, C3,C4	Lab1-5, Se1-10	N1, N2, N3, N4, N5

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

Zał. nr 4 do ZW 64/2012

FACULTY W-8 / DEPARTMENT………………
SUBJECT CARD
Name in Polish … Sztuczna inteligencja i inżynieria wiedzy **….**
Name in English … Artificial Intelligence and Knowledge Engineering **….**
Main field of study (if applicable): …Computer Science**…….**
Specialization (if applicable): ……………………..
Level and form of studies: 1st/ 2nd* level, full-time / part-time*
Kind of subject: obligatory / optional / university-wide*
Subject code … INZ003565
Group of courses YES / NO*

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30	-	30	-	
Number of hours of total student workload (CNPS)	60		60		

Form of crediting	Examination / ~~crediting with grade~~*	Examination / crediting with grade*	~~Examination~~ / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*
For group of courses mark (X) final course					
Number of ECTS points	2		2		
including number of ECTS points for practical (P) classes	-		**2**		
including number of ECTS points for direct teacher-student contact (BK) classes	1,2		1,2		

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. K1INF_W02
2. K1INF_W04
3. K1INF_W05
4. K1INF_W06

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SUBJECT OBJECTIVES

C1: Introducing students to the area of artificial intelligence
C2: To familiarize students with the basic methods for specific types of problems.
C3: To teach how to select an appropriate intelligent technique to a given problem.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEK_W01: Has basic knowledge of search and planning problems.
PEK_W02: Has basic knowledge of knowledge representation and inference methods.
PEK_W03: Know simple, popular methods of uncertain knowledge processing.
PEK_W04: Understands concepts related to the acquisition of knowledge from data and machine
        learning.
…
relating to skills:
PEK_U01: Is able to choose the appropriate intelligent method to a problem.
PEK_U02: Ability to analyze the results and prepare a report on the experiments.
PEK_U03: He can practically use the selected tools and systems.
…
relating to social competences:
PEK_K01

PROGRAMME CONTENT

Form of classes - lecture		Number of hours
Lec 1	Artificial Intelligence – basic concepts, research area, application area	2
Lec 2	Constraint satisfaction Problems – problem formulation, methods	2
Lec 3	Planning task as an example of search of state space – Forward State Propagation, backward State Propagation	2
Lec 4	Search methods	2

Lec 5	Games – game tree, MINMAX algorithm, Alpha-beta pruning	2
Lec 6	Knowledge, the role of knowledge in computer systems. Knowledge-based systems. Expert systems.	2
Lec 7	Knowledge representation methods	2
Lec 8	Knowledge processing – Forward Chaining and Backward Chaining	2
Lec 9	Imprecise knowledge. Using probability calculus; Certainty Factor	2
Lec 10	Imprecise knowledge – fuzzy logic inference and other approaches	2
Lec 11	Building expert systems. Knowledge gathering form experts and data	2
Lec 12	Introduction to Knowledge Discovery from Data	2
Lec 13	Supervised and unsupervised learning – idea, examples, selected methods	2
Lec 14	Hybrid intelligent systems – selected issue.	2
Lec 15	Summary of the course. History and perspectives of AI	2
	Total	30

Form of classes - class		Number of hours
Cl 1		
Cl 2		
Cl 3		
Cl 4		
..		
	Total hours	

Form of classes - laboratory		Number of hours
Lab 1	General information, requirements, introduction to the first exercise (Exercise 1)	2
Lab 2	Using evolutionary computation to selected problem solving (Exercise 1)	4
Lab 3	Constraint satisfaction problem – experimental comparison of two methods (Exercise 2)	8
Lab 4	Planning task (Exercise 3)	8
Lab 5	Pattern recognition using selected method of machine learning (Exercise 4)	8
	Total hours	30

Form of classes - project		Number of hours
Proj 1		
Proj 2		
Proj 3		
Proj 4		
…		
	Total hours	

Form of classes - seminar		Number of hours
Sem 1		
Sem 2		
Sem 3		

...		
	Total hours	

TEACHING TOOLS USED

N1. Projector, slides presentations
N2. Computers in laboratory – specification of required documentation for the exercices
N3. E-learning system used for the publication of teaching materials

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 Presentation of the 1st laboratory exercise.	PEK_W01; PEK_U02;	Evaluation of Exercise 1; student can receive maximum 10 points. The delay in the implementation of the tasks causes 20% reduction of points. During one laboratory the student cannot pass more than one task.
F2 Presentation of the 2nd laboratory exercise.	PEK_W01; PEK_U02;	As above
F3 Presentation of the 3rd laboratory exercise.	PEK_W01; PEK_U02;	As above
F4 Presentation of the 4th laboratory exercise.	PEK_W01; PEK_U02;	As above
F5 During the classes will be two announced quizzes corresponding to the content of current carried out the exercise.	PEK_W01; PEK_U01; PEK_U02;	Student can receive 8 point max. for each quiz
P1 The final grade of the laboratory	PEK_W01; PEK_W02; PEK_U02;	The final evaluation will be issued in accordance with the following scale: 0 - 28: 2.0 29 - 35: 3.0 36 - 40: 3.5 41 - 45: 4.0 46 - 50: 4.5 51 - 56: 5.0 Two unexcused absences are allowed. For each subsequent absence grade is reduced by 0.5.
P2 The final grade of the lecture	PEK_W01; PEK_W02; PEK_W03; PEK_W04; PEK_U01;	Exam. The exam is a written exam, checking knowledge of the lecture. It consists of open-ended questions, with known points for each. The student to pass the course should obtain more than 50% of all possible points (50%+1 point). % of points: grade [0%, 50%]: 2.0 [50%+1 point, 60%): 3.0 [60%, 70%): 3.5 [70%, 80%): 4 [80%, 90%): 4.5 [90%, 100%]: 5.0

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[93] Mariusz Flasiński: Wstęp do sztucznej inteligencji. PWN, Warszawa 2011.

[94] Halina Kwaśnicka: Sztuczna inteligencja i systemy ekspertowe. Rozwój, perspektywy. Wyższa Szkoła Zarządzania i Finansów, Wrocław 2005.

[3]

[4]

SECONDARY LITERATURE:

[55] Rutkowski Leszek: Metody i techniki sztucznej inteligencji . PWN, Warszawa 2005.

[56] Nils J. Nilsson: THE QUEST FOR ARTIFICIAL INTELLIGENCE. A HISTORY OF IDEAS AND ACHIEVEMENTS. Stanford University. Web Version: ai.stanford.edu/~nilsson/QAI/qai.pdf Print version published by Cambridge University Press http://www.cambridge.org/us/0521122937

[57] Jan J. Mulawka, Systemy ekspertowe. Wydawnictwa Naukowo-Techn., Warszawa, 1996.

[58] S.J. Russel, Peter Norvig, Artificial Intelligence. A Modern Approach. Prentice Hall Series in Artificial Intelligence, 1995.

[59] Kwaśnicka H., Spirydowicz A., Uczący się komputer. Programowanie gier logicznych. Oficyna Wydawnicza PWr. Wrocław. 2004.

[60] Józef Kloch, Świadomość komputerów? Argument "Chińskiego Pokoju" w krytyce mocnej sztucznej inteligencji według Johna Searle'a. OBI, Kraków, 1996.

[61] John R. Searle: Umysł, mózg i nauka. Wyd. Naukowe PWN, W-wa, 1995, seria Logos.

[62] Journal papers – news on AI.

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Artificial Intelligence and Knowledge Engineering
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY …Computer Science…..
AND SPECIALIZATION ……………………………..

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)	K1INF_W17; K1INF_W15;	C1, C2, C3	W1-W5	N1, N3
PEK_W02	K1INF_W17; K1INF_W15;	C1, C2, C3	W6-W8	N1, N3
PEK_W03	K1INF_W17; K1INF_W15; K1INF_W16	C1, C2, C3	W9,W10	N1, N3
PEK_W04	K1INF_W17; K1INF_W15; K1INF_W16	C1, C2, C3	W11-W15	N1, N3
PEK_U01 (skills)	K1INF_U15; K1INF_U16;	C3	L1-L15;W1-W15	N1,N2,N3
PEK_U02	K1INF_U15; K1INF_U16;	C2, C3	L1-L15	N2,N3
PEK_U03	K1INF_U15; K1INF_U16;	C2, C3	L1-L15	N2,N3

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

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FACULTY Computer Science and Management / DEPARTMENT………………
SUBJECT CARD
Name in Polish: Techniki przetwarzania mediów cyfrowych
Name in English: Digital Media Processing Techniques
Main field of study (if applicable): Computer Science
Specialization (if applicable): Information Systems
Level and form of studies: 1st/ 2nd* level, full-time / part-time*
Kind of subject: obligatory / optional / university-wide*
Subject code …………….
Group of courses YES / NO*

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	**30**		**30**		
Number of hours of total student workload (CNPS)	**60**		**90**		
Form of crediting	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*
For group of courses mark (X) final course					
Number of ECTS points	**2**		**3**		

including number of ECTS points for practical (P) classes	**0**		**3**		
including number of ECTS points for direct teacher-student contact (BK) classes	**1,2**		**1,8**		

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES
1. Knowledge of Discrete Fourier Transform, Discrete Cosine Transform and reverse transformations.
2. Knowledge in the area of nature and basic parameters that characterize mechanical waves.

SUBJECT OBJECTIVES
C1 Passing the knowledge on audio data digitalization, compression, transmission and processing.
C2 Acquiring knowledge on audio synthesis methods and MIDI system.
C3 Presentation of models and systems of colors and their digital representations.
C4 Acquisition of knowledge in the area of vector graphics and 3-D graphics.
C5 Acquiring knowledge on image digitalization, compression, transmission and processing.
C6 Passing Basic knowledge on Digital video and animation
C7 Acquiring practical knowledge on using specialistic software for creating and editing vector graphics.
C8 Acquisition of practical knowledge of using digital image editors.
C8 Acquiring skills of audio data edition.
C9 Acquiring practical knowledge on creating multimedia presentation joining digital image and sound.
C10 Acquisition of knowing how to prepare technical report.
C11 Acquiring knowledge in the area of industrial safety in computer laboratory

SUBJECT EDUCATIONAL EFFECTS
relating to knowledge:
PEK_W01 Student can enumerate and describe phases of audio data discretization process.
PEK_W02 Student knows methods of audio compression.
PEK_W03 Student knows sound processing techniques.
PEK_W04 Student can enumerate and describe methods of sound synthesis.
PEK_W05 Student has basic knowledge in the area of MIDI system.
PEK_W06 Student is able to enumerate and describe models and systems of colors.
PEK_W07 Student can explain what are objects and transformations in vector graphics.
PEK_W08 Student has basic knowledge on 3-D graphics.
PEK_W09 Student knows and can describe image digitalization.
PEK_W10 Student has knowledge on digital image compression.
PEK_W11 Student can indicate and describe essential operations used in digital image processing.
PEK_W12 Student has elementary knowledge on digital video animation.
relating to skills:
PEK_U01 Student knows how to use specialist software for creating, editing and joining digital media.
PEK_U02 Student knows how to effectively use methods and tools of information gathering, processing and retrieval.

2

PEK_U03 Student can prepare report of an engineer task completing.

PEK_U04 Student knows and applies rules of industrial safety in computer laboratory.

PROGRAMME CONTENT	

Form of classes - lecture		**Number of hours**
Lec 1	Introduction. Nature of sound. Parameters of acoustic wave. Foundations of psychoacoustics. Digitalization of sound: phases, parameters, distortions.	2
Lec 2	Images of sound. Audio processing.	2
Lec 3	Audio data compression. Formats of audio files.	2
Lec 4	Sound synthesis. MIDI	2
Lec 5	Human image perceptron. Models and systems of colors.	2
Lec 6	Vector graphics: objects, transformations.	2
Lec 7	3-D graphics.	2
Lec 8	Raster graphics: image digitalization, parameters, distortion, compression.	2
Lec 9	Digital image processing – context-free operations.	2
Lec 10	Digital image processing – context-dependent operations.	2
Lec 11	Mathematical morphology in digital image processing.	2
Lec 12	Digital video: standards, compression.	2
Lec 13	Digital video: edition, post-production and distribution.	2
Lec 14	Animation	2
Lec 15	Multimedia in Internet	2
	Total hours	30

Form of classes - class		**Number of hours**
Cl 1		
Cl 2		
Cl 3		
Cl 4		
..		
	Total hours	

Form of classes - laboratory		**Number of hours**
Lab 1	Classes organization: substantial introduction to laboratory, organization and schedule of classes, credit conditions, BHP training.	2
Lab 2, Lab 3	Simple edition of sound files: voice recording, noise reduction, formats conversion, cutting, pasting and mixing of sounds, volume adjustment .	4
Lab 4, Lab 5	Advanced edition of sound files. Spectral analysis, special effects, midi edition.	4
Lab 6, Lab 7	Creating and editing vector graphics.	4
Lab 8,	Raster image processing – old photo retouch.	4

Lab 9		
Lab 10, Lab 11	Raster image edition – photo-montage.	4
Lab 12, Lab 13, Lab 14	Final task – Project and realization of multimedia presentation.	6
Lab 15	Final task presentation.	2
	Total hours	30
Form of classes - project		**Number of hours**
Proj 1		
Proj 2		
Proj 3		
Proj 4		
…		
	Total hours	
Form of classes - seminar		**Number of hours**
Sem 1		
Sem 2		
Sem 3		
…		
	Total hours	

TEACHING TOOLS USED
N1. Traditional lecture assisted multimedia presentation.
N2. E-learning: making available lecture teaching aids.
N3. E-learning: exam in a form of electronic test.
N4. E-learning: organization of laboratory classes, making available exercises instructions, patterns of documentation and other teaching aids, sending completed tasks and reports via e-portal, using forum and e-mail for teacher-student and student-student communication.
N5. Specialist hardware and software.

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		Grades of completed tasks
F2		Grades of reports
F3		Grade of final task
C – laboratory		Weighted mean of grades obtained = 0,3*(mean of grades of completed tasks) + 0,3*(mean of reports grades) + 0,4*grade of final task

C – lecture		Exam in a form of e-test; to pass the test student has to obtain at least 50% of total points.

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[95] Chapman N., Chapman J., Digital Multimedia, Third Edition, John Wiley & Sons, Ltd., Chichester, 2009

[96] Malina W., Smiatacz M., Cyfrowe przetwarzanie obrazów, Warszawa: Akademicka Oficyna Wydawnicza EXIT, 2008.

[97] Czyżewski A., Dźwięk Cyfrowy: wybrane zagadnienia teoretyczne, technologia, zastosowania, Wyd. 2, Warszawa: Akademicka Oficyna Wydawnicza EXIT, 2001.

[98] Nowak W., Homan W., Midi: muzyczny standard dla komputerów, Kraków: Wydawnictwo DMM, 1994.

SECONDARY LITERATURE:

[63] Petrou M., Petrou C., Image Processing: The Fundamentals, 2nd ed., Chichester: John Wiley & Sons, 2010.

[64] Goodall, D. P., Haas, O. C. L., Signal and Image Processing, Wrocław: Wrocław University of Technology ; Łódż : PRINTPAP, 2011.

[65] Thyagarajan K. S., Digital Image Processing with Application to Digital Cinema, Elsevier, 2006.

[66] Speech and audio processing in adverse environments, Eds. Hänsler E., Schmidt G., Berlin ; Heidelberg : Springer-Verlag, cop. 2010.

[67] Zolzer U., Digital audio signal processing, Chichester: John Wiley and Sons, 1997.

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

Elżbieta Kukla, Elzbieta.Kukla@pwr.wroc.pl

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)	K1INF_W23	C1	Wy1	N1, N2, N3
PEK_W02	K1INF_W23	C1	Wy3	N1, N2, N3
PEK_W03	K1INF_W23	C1	Wy2	N1, N2, N3
PEK_W04	K1INF_W23	C2	Wy4	N1, N2, N3
PEK_W05	K1INF_W23	C2	Wy4	N1, N2, N3
PEK_W06	K1INF_W23	C3	Wy5	N1, N2, N3
PEK_W07	K1INF_W23	C4	Wy6	N1, N2, N3
PEK_W08	K1INF_W23	C4	Wy7	N1, N2, N3
PEK_W09	K1INF_W23	C5	Wy8	N1, N2, N3
PEK_W10	K1INF_W23	C5	Wy8	N1, N2, N3
PEK_W11	K1INF_W23	C5	Wy9..Wy11	N1, N2, N3
PEK_W12	K1INF_W23	C6	Wy12..Wy15	N1, N2, N3
PEK_U01 (skills)	K1INF_U04, K1INF_U09, K1INF_U11, K1INF_U12,	C7, C8, C9	La2..La15	N4, N5
PEK_U02	K1INF_U04, K1INF_U09, K1INF_U11, K1INF_U12,	C7, C8, C9	La2..La15	N4, N5
PEK_U03	K1INF_U04, K1INF_U09, K1INF_U11, K1INF_U12,	C10	La2..La15	N4, N5
PEK_U04	K1INF_U14	C11	La1..La15	N4, N5

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

FACULTY Computer Science and Management / DEPARTMENT Informatics
SUBJECT CARD
Name in Polish … Wprowadzenie do zarządzania projektem informatycznym
Name in English …Introduction to Software Project Management …….
Main field of study (if applicable): Computer Science
Specialization (if applicable): ……………………..
Level and form of studies: 1st/ 2nd* level, full-time / part-time*
Kind of subject: obligatory / optional / university-wide*
Subject code …………….
Group of courses YES / 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		60		
Form of crediting	~~Examination~~ / crediting with grade*	Examination / crediting with grade*	~~Examination~~ / crediting with grade*	Examination / crediting with grade*	~~Examination~~ / crediting with grade*
For group of courses mark (X) final course					
Number of ECTS points	**1**		2		
including number of ECTS points for practical (P) classes			2		
including number of ECTS points for direct teacher-student contact (BK) classes	1		2		

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1 Knowledge of software life cycle models
2 Knowledge of software development methodologies: traditional and agile.
3 Writing skills in technical reports

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SUBJECT OBJECTIVES

C1 To familiarize students with the basic issues related to planning and scheduling of the project, understanding the roles and responsibilities of key members of the project and preparation of engineering project planning (software development projects).
C2 Development of skills in preparation of managerial documentation; ability to practical application of tools supporting IT project management

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEK_W01 student demonstrate knowledge of basic issues related to the planning and scheduling of the project
PEK_W02 students understands the responsibilities of key members of the project and has knowledge of the roles in the project
PEK_W03 student knows methods of progress monitoring and knows approaches to quality assurance in the project
…
relating to skills:
PEK_U01 student is able to analyze the project vision and makes a selection of project methodology
PEK_U02 student is able to plan the work and tasks to be implemented in the project
PEK_U03 student is able to choose methods to carry out the project cost estimations
PEK_U04 student is able to analyze and report a progress of the project
PEK_U05 student has the ability to present and justify their decisions

relating to social competences:
PEK_K01 student understands the need to provide high quality and availability of information systems, taking into account the needs of different user groups, recognizes the risks associated with information systems application

PROGRAMME CONTENT		
Form of classes - lecture		Number of hours
Lec 1	Introduction to the topic. Description of the course, the organization of classes and examination. The basic concepts of project management. Management Methodologies: Agile and traditional	2
Lec 2	Project planning and scheduling techniques for plan driven methods and agile driven methods. Project resources	2
Lec 3	Team management (organization and decision-making, roles and responsibilities in a software team). Communication in project	2
Lec 4	Project risk. Project cost estimation .	2
Lec 5	Project tracking and progress monitoring. Software quality.	3
Lec 6	Selected aspects of the measurement of processes and products	1
Lec 7	Methodologies of software project management- review (PRINCE2,DSDM,Scrum.). Tools for project management	2
Lec 8	Test	1
	Total hours	15
Form of classes - class		Number of hours
Cl 1		
Cl 2		
Cl 3		
Cl 4		
..		
	Total hours	
Form of classes - laboratory		Number of hours
Lab 1	Organizational activities. Presentation of the scope and principles of assessment. To familiarize students with the principles of health and safety regulation; introduction to MSProject 2010.	2
Lab 2	Defining the project :Project scope definition; requirements specification.	2
Lab 3-4	Planning the project: the traditional approach	4
Lab 5	Project Resource definition and allocation	**2**
Lab 6-7	Critical path analysis and project replanning	4
Lab 8-9	Estimation of fixed costs and the cost of staff Estimating project risk	4
Lab10	Tracking the progress of meth. Earned value	2
Lab 11	Tracking progress (burndown charts)	2
Lab12-13	Re-planning of the project: Agile project planning and scheduling	4
Lab14-15	Summary-Reporting project elaboration results	4
Total hours		**30**
Form of classes - project		Number of

		hours
Proj 1		
Proj 2		
Proj 3		
Proj 4		
…		
	Total hours	
Form of classes - seminar		**Number of hours**
Sem 1		
Sem 2		
Sem 3		
Sem 4		
….		
	Total hours	
TEACHING TOOLS USED		

N1. Informative lecture, supported by multimedia presentations.
N2. Examples of managerial documentation for the project, prepared in accordance with
        shared document templates.
N3. Software to support the management of the process of software development.
N4. E-learning system used for the publication of teaching materials as well as for collection of student assignments.

EVALUATION OF SUBJECT EDUCATI ONAL EFFECTS ACHIEVEMENT

Evaluation (F – forming (during semester), P – concluding (at semester end)	Educational effect number	Way of evaluating educational effect achievement
F1	PEK_U01, PEK_K01	Checking *Project Vision* -the 1st part of the project documentation (provided by the student)- according to the completeness and compliance with the template. Point scale (up to 15% of the total score) or traditional.
F2	PEK_U01, PEK_U02, PEK_K01	Checking *Plans, specifications, risk assessment*- the 2nd part of the documentation- according to the consistency, completeness and compliance with the initial vision of the project. Point scale (up to 40% of the total score) or traditional.
F3	PEK_U01, PEK_U03,	Checking *Project resource estimation and project cost* documents acoording to completeness and consistency with previous

		documents. Point scale (up to 30% of total points) or traditional.
F4	PEK_U04, PEK_U05,	Validation and checking compatibility *Monitoring, evaluation of progress* - the 4th part of the documentation of the project - with earlier documents. Point scale (up to 15% of the total score) or traditional.
F5		Tests (at least one per semester). Scale: credit / fail (four fails means lack of the lab class completion)
P2 – final grade for lab class		Rate determined on the basis of the total points of ratings forming F1 ... F4 according to the formula: $<40\%$ of the points $\lozenge$ ndst. $<40\%, 50\%) \lozenge$ dst $<50\%, 60\%) \lozenge$ dst + $<60\%, 70\%) \lozenge$ db $<70\%, 80\%) \lozenge$ db + $<80\%, 90\%) \lozenge$ vg $> 90\% \lozenge$ target or the weighted average: $0.15 * 0.25 * F1 + F2 + F3 + 0.3 * 0.4 * F4$
P1 – lecture final grade	PEK_W01-PEK_W03	Colloquium - a written test checking knowledge presented during the lecture. The test is given a positive evaluation, if the student scores at least 50% of the maximum number of points.

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Cadle J., Yeates D. Zarządzanie procesem tworzenia systemów informacyjnych. WNT 2004
[2] Schwaber K., Sprawne zarządzanie projektami metodą Scrum. APN Promise, Warszawa, 2005
[3]Wróblewski P., Zarządzanie projektami informatycznymi dla praktyków. Helion 2005
[4]Microsoft Project 2010.

SECONDARY LITERATURE:

[1] E-Book – *PMBOK® Guide:* A Guide to the Project Management Body of Knowledge. Third Edition, 2004
[2] SWEBOK - Guide to the Software Engineering Body of Knowledge - IEEE 2004.

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

Iwona Dubielewicz, iwona.dubielewicz@pwr.wroc.pl

MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Software Project Management
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY
Computer Science
AND SPECIALIZATION ……………………………..

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	K1INF_W18	C1	Lec1, Lec2, Lec 3,	N1, N2,N4
PEK_W02	K1INF_W18	C1	Lec 4, Lec 5,	N1, N2, N4
PEK_W03	K1INF_W18	C1	Lec 6, Lec 7	
PEK_U01	K1INF_U10, K1INF_U14, K1INF_K02	C2	La1, La3	N2, N3, N4
PEK_U02	K1INF_U10, K1INF_K02	C2	La 2,La3, La4, La5, La6, La12	N2, N3, N4
PEK_U03	K1INF_U10	C2	La7,La8,La9	N2, N3, N4
PEK_U04	K1INF_U10	C2	La10, La11	N3, N4
PEK_U05	K1INF_U10, K1INF_K02	C2	La13,La14	N3, N4
PEK_K01	K1INF_K02	C1	La1, La2,La6	N3, N4

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

*** - from table above

Zał. nr 4 do ZW 64/2012

FACULTY OF COMPUTER SCIENCE AND MANAGEMENT
SUBJECT CARD
Name in Polish: Wspomaganie zarządzania projektami informatycznymi
Name in English: Computer Aided IT Project Management
Main field of study (if applicable): Computer Science
Specialization (if applicable):-
Level and form of studies: 1st level, full-time
Kind of subject: obligatory
Subject code INZ005209
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**		**60**		
Form of crediting	~~Examination~~ / crediting with grade*	Examination / crediting with grade*	~~Examination~~ / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*

For group of courses mark (X) final course					
Number of ECTS points	**1**		**2**		
including number of ECTS points for practical (P) classes	0		2		
including number of ECTS points for direct teacher-student contact (BK) classes	0,6		1,2		

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Completing courses in programming basics
2. Completing courses in data base systems

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SUBJECT OBJECTIVES

C1 Familiarize students with basic methods for IT project management.
C2 Familiarize students with categories of software tools aiding IT project management.
C3 Gaining skills in work breakdown, planning, scheduling, cost estimation, and monitoring in IT projects.
C4 Gaining skills in utilizing software tools aiding IT project management.
C5 Gaining skills in working and cooperating with a team utilizing software tools aiding IT project management.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEK_W01 student has a basic knowledge of methods for IT project management.
PEK_W02 student knows categories of software tools aiding IT project management.

relating to skills:
PEK_U01 can select and utilize aiding software tools appropriate for different phases of IT project management.
PEK_U02 student is able to carry out work breakdown, allocate resources, schedule and monitor accomplishment of a small IT project.

relating to social competences:
PEK_K01 student can retrieve and utilize information from recommended sources and acquire knowledge on his own.
PEK_K02 student understands the necessity of working systematically and creatively to accomplish the course.
PEK_K03 student is capable of cooperating in a team utilizing software tools aiding IT project management.

PROGRAMME CONTENT

Form of classes - lecture	Number of hours
Lec 1	Introduction. Basic notions.	1

Lec 2	IT project lifecycle. Methodology of IT project management.	2
Lec 3	Typology of software tools aiding IT project management.	2
Lec 4	Aiding analysis and modelling.	2
Lec 5	Aiding planning.	2
Lec 6	Aiding communication.	2
Lec 7	Aiding tools in a computational cloud.	2
Lec 8	Final test.	2
	Total hours	15

Form of classes - class		**Number of hours**
Cl 1		
Cl 2		
Cl 3		
Cl 4		
..		
	Total hours	

Form of classes - laboratory		**Number of hours**
Lab1	Introduction. Division into lab teams. Assigning tasks to accomplish.	2
Lab2	Utilizing tools for business process modelling.	2
Lab3	Utilizing tools for modelling and designing (CASE).	2
Lab4-5	Utilizing tools for planning and/or scheduling.	4
Lab6	Utilizing tools for size and cost estimation.	2
Lab7	Utilizing tools for risk management.	2
Lab8	Utilizing tools for monitoring project realization.	2
Lab9-10	Utilizing tools for group communication.	4
Lab11	Utilizing tools for change management.	2
Lab12	Utilizing tools for report preparation.	2
Lab13-14	Utilizing multi-function tools in a computational cloud.	4
Lab15	Presentation of final reports	2
	Total hours	**30**

Form of classes - project		**Number of hours**
Proj 1		
Proj 2		
Proj 3		
Proj 4		
	Total hours	

Form of classes - seminar		**Number of hours**
Sem 1		
Sem 2		
Sem 3		
...		

	Total hours	

<table>
<tr><td colspan="3" align="center">TEACHING TOOLS USED</td></tr>
<tr><td colspan="3">N1. Lecture (delivered with slides)
N2. Laboratory (using aiding software tools)
N3. Consultations
N4. Student's own work</td></tr>
</table>

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 -laboratory	PEK_U01,PEK_U02, PEK_K01, PEK_K02, PEK_K03	Assessment of tasks accomplished during laboratory and interim reports
P1 - lecture	PEK_W01, PEK_W02, PEK_K01, PEK_K02	Final test
P2 -laboratory	PEK_U01,PEK_U02, PEK_K01, PEK_K02, PEK_K03	Presentation of completed system and system documentation

<table>
<tr><td colspan="3" align="center">PRIMARY AND SECONDARY LITERATURE</td></tr>
<tr><td colspan="3">

PRIMARY LITERATURE:
[1] Koszlajda Adam: Zarządzanie projektami IT : przewodnik po metodykach. Helion 2010
[2] Wróblewski Piotr: Zarządzanie projektami z wykorzystaniem darmowego oprogramowania. Helion 2009
[3] Kazimierz Waćkowski, Jacek Chmielewski: Wspomaganie zarządzania projektami informatycznymi. Poradnik dla menedżerów. Helion 2007

SECONDARY LITERATURE:
[1] The Internet
[2] Sommerville Ian: Inżynieria oprogramowania. WNT 2003
[3] Włodzimierz Dąbrowski, Andrzej Stasiak, Michał Wolski: Modelowanie systemów informatycznych w języku UML 2.1 w praktyce, PWN, Warszawa 2009
[4] Chatfield Carl, Johnson Timothy: Microsoft Project 2013 Krok po kroku. Promise, 2013

</td></tr>
<tr><td colspan="3">SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)</td></tr>
<tr><td colspan="3">dr inż Bogdan Trawiński, bogdan.trawinski@pwr.edu.pl</td></tr>
</table>

MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
Computer Aided IT Project Management
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY
Computer Science

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)	K1INF_W18	C1, C2	Lec1-8	N1-4
PEK_W02	K1INF_W18	C1, C2	Lec1-8	N1-4
PEK_U01 (skills)	K1INF_U10, K1INF_U11, K1INF_U12, K1INF_U13	C3,C4,C5	Lec1-8 Lab1-15	N1-4
PEK_U02	K1INF_U10, K1INF_U11, K1INF_U12, K1INF_U13	C3,C4,C5	Lec1-8 Lab1-15	N1-4
PEK_K01 (competences)	K1INF_K01	C1-5	Lec1-8 Lab1-15	N1-4
PEK_K02	K1INF_K04, K1INF_K06	C1-5	Lec1-8 Lab1-15	N1-4
PEK_K03	K1INF_K03	C3,C4,C5	Lab1-15	N1-4

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

*** - from table above