Faculty of Electrical Engineering, Computer Science and Telecommunications

University of Zielona Góra

INFORMATION BOOKLET

Subject Area: COMPUTER SCIENCE (INFORMATICS)

First-cycle Level Studies
(Full-time, Part-time)
Academic Year 2011/2012

European Credit Transfer System ECTS
ECTS COURSE CATALOGUE

COMPUTER SCIENCE (INFORMATICS)

FIRST-CYCLE LEVEL STUDY (B.Sc.Degree)

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SPECIALIST SUBJECTS
Computers Architecture I

Course code: 06.0-WE-I-AK1-PK_S1S

Type of course: Compulsory

Entry requirements: -

Language of instruction: Polish

Director of studies: Dr hab. inż. Andrzej Pieczyński, prof. UZ

Name of lecturer: Dr hab. inż. Andrzej Pieczyński, prof. UZ

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Full-time studies

 COURSE CONTENTS:


Instructions pipelining. Cooperation of many executive units. Branch prognosis and implementation. Information processing models.


LEARNING OUTCOMES:
Knowledge of computer structure, conditions of data transfer, storage and processing, basic rules of computer operation. Parallel architectures of computers.

ASSESSMENT CRITERIA:
Lecture – the main condition to get a pass are sufficient marks in written or oral tests conducted at least once per semester.

RECOMMENDED READING:

OPTIONAL READING:
[1] –
PRINCIPLES OF PROGRAMMING

Course code: 11.3-WE-I-PP-PK_S1S
Type of course: Compulsory
Entry requirements: -
Language of instruction: Polish
Director of studies: Dr inż. Wojciech Zając
Name of lecturer: Dr inż. Wojciech Zając

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Full-time studies

| Lecture             | 30                                   | 2                                | Grade                                  |                                 |
| Laboratory          | 30                                   | 2                                | Grade                                  |                                 |
| Project             | 15                                   | 1                                | Grade                                  | 4                               |

Part-time studies

| Lecture             | 30                                   | 2                                | Grade                                  |                                 |
| Laboratory          | 30                                   | 2                                | Grade                                  |                                 |
| Project             | 15                                   | 1                                | Grade                                  |                                 |

COURSE CONTENTS:


C programming. Program structure, commands syntax. Constants, variables, data types. Operators, expressions and basic instructions of C.


Complex instructions, expressional instruction, empty instruction, grouping instruction. Control instructions: if-else, switch. Loops: do, while, for.

Expressions and operators. Functions: structure, arguments, result, prototype, declaration, calling out. Communication with other elements. Use of functions. Recurrence functions.

Pointers: rules of operation, declaration, using the address and the pointed value. Use of pointers to communicate with other elements.

Tables: declaration, usage, examples. String as a table of characters. Name of a table as a pointer. Tables of tables: declaration, usage, examples.


LEARNING OUTCOMES:
Abilities and competence in computer system operation understanding and programming in C.

ASSESSMENT CRITERIA:
Lecture – the main condition to get a pass are sufficient marks in written or oral tests conducted at least once per semester.
Laboratory – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.
Project – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

RECOMMENDED READING:

OPTIONAL READING:
[1] –
OBJECT-ORIENTED PROGRAMMING

Course code: 11.3-WE-I-PO-PK_S1S
Type of course: Compulsory
Entry requirements: -
Language of instruction: Polish
Director of studies: Dr inż. Paweł Majdzik
Name of lecturer: Dr inż. Paweł Majdzik

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COURSE CONTENTS:
1. Introduction to object programming. Abstract data typing definition with member functions (encapsulation), private and public functions.
2. Constructors and destructors. The initialization of the objects by the constructors (default and copy constructors), the constructor initializer list.
3. Functions overloading: friend functions and inline functions, constructor and operator conversion.
7. Design pattern. Adapter pattern, facade pattern, bridge pattern etc..

LEARNING OUTCOMES:
The aim of the subject is to acquaint students with the object programming paradigm. In particular the lectures include: abstract data typing definition with member functions (encapsulation), inheritance, polymorphism and virtual functions, templates of classes and functions. The aim of the laboratory is to teach how to design programs and utilize tools (e.g. tools from Standard Template Library) created to support a programmer’s work.
ASSESSMENT CRITERIA:
Lecture – obtaining a positive grade in written or oral exam.
Laboratory – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

RECOMMENDED READING:
1. Lippman S. B.: Model obiektu w C++, WNT, Warszawa, 1996

OPTIONAL READING:
[1] –
**ALGORITHMS AND DATA STRUCTURES**

Course code: 11.3-WE-I-ASD-PK_S1S  
Type of course: Compulsory  
Entry requirements: -  
Language of instruction: Polish  
Director of studies: Dr hab inż. Andrzej Obuchowicz, prof UZ  
Name of lecturer: Dr hab inż. Andrzej Obuchowicz, prof UZ

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**COURSE CONTENTS:**

- **An algorithm and its basic properties.** Concepts of an algorithmic problem and algorithm, properties of algorithms, steering structures and block schemes.
- **Programming techniques.** Recursion and derecursion, “divide and conquer” strategy, greedy algorithms, dynamic programming.
- **Data structures.** Concepts of a data structure, dynamic sets, linear-ordered sets, dictionary structure, stuck (LIFO) and queue (FIFO). Linked lists: singly-linked, doubly-linked and circularly-linked lists. Binary trees, priority queues.
- **Sets and Graphs.** Sets, graphs, graph representations, depth-first and breadth-first searching, graph-theory algorithms.
- **Analysis of the selected algorithmic problems.** Linear and bipartition searching, table and file sorting, string searching algorithms, geometrical algorithms, paging problem, arithmetic systems, basic coding and compression methods.
LEARNING OUTCOMES:
Basic knowledge and engineering skills in designing algorithms using basic algorithmic techniques.

ASSESSMENT CRITERIA:
Lecture – obtaining a positive grade in written or oral exam.
Laboratory – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

RECOMMENDED READING:

OPTIONAL READING:
[1] –
**Digital System Design**

Course code: 06.0-WE-I-UC-PK_S1S  
Type of course: **Compulsory**  
Entry requirements: -  
Language of instruction: Polish  
Director of studies: Dr inż. Zbigniew Skowroński  
Name of lecturer: Dr inż. Zbigniew Skowroński

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**Course Content:**


**Combinational Logic Design.** Design principles (hierarchy, top-down design, CAD, HDLs, logic synthesis). Combinational circuit analysis and timing. Design procedure (examples). Technology mapping.


procedure, finding state diagrams/tables, examples. Sequential Circuit Design: state assignment, designing with D and JK flip-flops, designing with unused states, other design examples.

Registers. Registers with Load Enable and with Parallel Load. Register Transfers. Shift Registers, Shift Registers with Parallel Load, Bidirectional/Universal Shift Registers.


Memory Basics. SRAM. DRAM. Basic memory system design.

LEARNING OUTCOMES:
Demonstrate knowledge of fundamental Boolean principles and manipulation and their application to digital design. In-depth understanding of combinational and sequential digital/logic circuits, and modular design techniques. Ability to analyze and synthesize logic circuits. Basic understanding of datapath and control unit design and memory basics.

ASSESSMENT CRITERIA:
Lecture – the main condition to get a pass are sufficient marks in written or oral tests conducted at least once per semester.
Laboratory – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

RECOMMENDED READING:

OPTIONAL READING:
[1] –
Courses Code: 11.3-WE-I-SK1-PK_S1S

Type of course: Compulsory

Entry requirements:

Language of instruction: Polish

Director of studies: Dr inż. Emil Michta

Name of lecturer: Dr inż. Marcin Mrugalski

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COURSE CONTENTS:

Introduction to computer networks: Classification of computer networks. Hardware and software components of network hosts. OSI communication model. TCP/IP reference model.


Transport layer: Functions and TCP and UDP transports protocols.


Introduction to routers: Router components and operation. User interface and configuration principle.

Security basis: Firewalls: generations, structures and configurations.

LAN network design: Rules of LAN networks design and documentation. Structural cabling.

LEARNING OUTCOMES:

Abilities and competence: design, installation and configuration of simple local area network connected to Internet, IP address management, switch and router configuration, firewall configuration.

ASSESSMENT CRITERIA:

Lecture – the main condition to get a pass are sufficient marks in written or oral tests conducted at least once per semester.
RECOMMENDED READING:

OPTIONAL READING:
[1] –
THEORETICAL FOUNDATIONS OF COMPUTER SCIENCE

Course code: 11.3-WE-I-TPI-PK_S1S
Type of course: Compulsory
Entry requirements: -
Language of instruction: Polish
Director of studies: Dr hab. inż. Andrzej Obuchowicz, prof UZ.
Name of lecturer: Dr hab. inż. Andrzej Obuchowicz, prof UZ.

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**COURSE CONTENTS:**


*Algorithmic correctness.* Correctness of algorithms, partial correctness of algorithms, termination, proving of algorithm correctness, loop invariants method.

*Foundations of automation and languages theory.* Finite automata and regular expressions, context-free grammars, pushdown automata and context-free languages.


*Algorithm complexity.* Measures of algorithms’ effectiveness, space and time complexity, pessimistic and average complexity, top and down limits of complexity, natural complexity of problems, algorithmically open and close problems, algorithmic gap. Classification of algorithmic problems: P class, Exponential class, NP and NP-complete class. Reduction. Decidable and undecidable problems


**LEARNING OUTCOMES:**

Basic knowledge and engineering skills in analysis of correctness and complexity of sequential, parallel and probabilistic algorithms.
### ASSESSMENT CRITERIA:

**Lecture** – obtaining a positive grade in written or oral exam.

**Laboratory** – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

### RECOMMENDED READING:


### OPTIONAL READING:

[1] –
OPERATING SYSTEMS I

Course code: 11.3-WE-I-SO1-PK_S1S

Type of course: Compulsory

Entry requirements: -

Language of instruction: Polish

Director of studies: Dr hab. inż. Krzysztof Patan

Name of lecturer: Dr hab. inż. Krzysztof Patan

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COURSE CONTENTS:

Computer system structure: Operating memory, CPU, I/O devices, idea of the interrupt, dual model of system operation.

Operating systems types: Batch systems, multiprogramming systems, time-sharing (multi-tasking) systems, parallel systems, distributed systems, networked systems, real-time operating systems.

Operating systems design. Basic components of operating systems. Operating systems services. Kernel based systems, virtual machines. System calls.


LEARNING OUTCOMES:

Skills and competences in computer systems and operating systems design. To learn about process scheduling, memory management, file system design.

Ability to administrate and configure the operating systems Windows XP/Vista and Windows Server 2008.
ASSESSMENT CRITERIA:
Lecture – the main condition to get a pass are sufficient marks in written or oral tests conducted at least once per semester.
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RECOMMENDED READING:

OPTIONAL READING:
[1] –
**COMPUTER GRAPHICS**

Course code: 11.3-WE-I-GK-PK_S1S  
Type of course: Compulsory  
Entry requirements: -  
Language of instruction: Polish  
Director of studies: Dr hab. inż. Sławomir Nikiel  
Name of lecturer: Dr hab. inż. Sławomir Nikiel

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**COURSE CONTENTS:**

*Human factors.* Human perception of visual stimuli. Digital content creation process. Models for computer graphics.

*Introduction to computer graphics and digital imaging.* Input/output devices, acquisition and display of digital images. Application cases in education, entertainment, architecture, industry and healthcare.


*Textures.* Fractals in computer graphics.


Programming form computer graphics. OGL, DirectX, Cg, PYTHON.
LEARNING OUTCOMES:
Skills and competences in programming and design for computer graphics, digital image synthesis and image processing. Modeling two- and three-dimensional geometry and object representation.

ASSESSMENT CRITERIA:
Lecture – the main condition to get a pass are sufficient marks in written or oral tests conducted at least once per semester.
Laboratory – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

RECOMMENDED READING:
5. Various conference proceedings

OPTIONAL READING:
[1] –
SOFTWARE ENGINEERING

Course code: 11.9-WE-I-IO-PK_S1S
Type of course: Compulsory
Entry requirements: -
Language of instruction: Polish
Director of studies: Dr hab. inż. Sławomir Nikiel
Name of lecturer: Dr hab. inż. Sławomir Nikiel

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COURSE CONTENTS:

Introduction to software engineering. Why engineering software is different? Software lifespan and maintenance. Lifecycle models with specified project phases.

Information systems. System and software design. Models for information systems.


Reliability and system security.


CASE. Computer Aided Software Engineering. Upper and Lower CASE, CASE workbenches.

Configuration and maintenance. Evolution of information systems.

LEARNING OUTCOMES:

To develop students’ attitude that the maintaining the production of software requires an engineering approach. It is done by introducing phases of the software lifecycle and presenting techniques for these phases.
ASSESSMENT CRITERIA:

Lecture – the main condition to get a pass are sufficient marks in written or oral tests conducted at least once per semester.

Project – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

RECOMMENDED READING:

1. Sommerville I.: Software Engineering Addison-Wesley, 1992

OPTIONAL READING:

[1] –
**Databases**

Course code: 11.3-WE-I-BD-PK_S1S  
Type of course: Compulsory  
Entry requirements: -  
Language of instruction: Polish  
Director of studies: Dr inż. Agnieszka Węgrzyn  
Name of lecturer: Dr inż. Agnieszka Węgrzyn, dr inż. Jarosław Gramacki

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**Course contents:**

- Introduction to databases: relational model, hierarchical model, network model, XML model, object-oriented databases  
- The relational model: Relational data objects and SQL; Relational operators and SQL; Relational data integrity, Entity-Relationship Diagram – ERD, normalize relations into normal forms  
- Introduction to SQL: create tables, insert, delete, update data, select statements, subquery, relational operators and constraint, create sequences, create view, create and manage indexes, built-in SQL functions, transactions  
- Introduction to PL/SQL: PL/SQL types and operators, SQL in PL/SQL, cursors, exceptions, procedures, functions, packages, triggers, built-in packages.

**Learning outcomes:**

Using of selected relational database management systems (RDBMS); design and implementation of relational database structures / models, SQL language; design of database applications; conceptual, logical, and physical database design.
ASSESSMENT CRITERIA:

Lecture – obtaining a positive grade in written or oral exam.

Laboratory – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

Project – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

RECOMMENDED READING:


OPTIONAL READING:

[1] –
ELEME NTS OF ARTIFICIAL INTELLIGENCE

Course code: 11.4-WE-I-ESI-PK_S1S
Type of course: Compulsory
Entry requirements: -
Language of instruction: Polish
Director of studies: Prof. dr hab. inż. Józef Korbicz
Name of lecturer: Prof. dr hab. inż. Józef Korbicz, Dr inż. Marek Kowal

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COURSE CONTENTS:
First-order logic. Syntax and Semantics of first-order logic. Inference in first order logic. Atomic and complex sentences.
LEARNING OUTCOMES:
Skills and competences in: solving problems using searching algorithms, developing heuristic functions, solving problems using local search algorithms, solving adversarial problems using minimax algorithms, using and understanding first-order logic, solving problems of planning and scheduling by search algorithms, applying probabilistic and uncertain reasoning to solve problems, applying learning algorithms to acquire knowledge from observation, applying segmentation and edge detection algorithms to object recognition problems.

ASSESSMENT CRITERIA:
Lecture – obtaining a positive grade in written or oral exam.
Laboratory – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.
Project – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

RECOMMENDED READING:

OPTIONAL READING:
[1] –
**EMBEDDED SYSTEMS**

Course code: 11.9-WE-I-SW-PK_S1S  
Type of course: Compulsory  
Entry requirements: Logic circuits, Fundamentals of programming  
Language of instruction: Polish  
Director of studies: prof. dr hab. inż. Alexander Barkalov  
Name of lecturer: prof. dr hab. inż. Alexander Barkalov  

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**COURSE CONTENTS:**  
Introduction to the embedded systems. Main elements of the embedded system. Hardware and software part of the embedded system. System-on-a-chip (SoC) and System-on-a-programmable chip (SoPC). Prototyping flow of the embedded system.  
IP-Cores in design process of embedded systems. Softcore and hardcore processors. Realisation and implementation of embedded systems.  

**LEARNING OUTCOMES:**  
Skills and competence in: prototyping and designing of embedded systems.  

**ASSESSMENT CRITERIA:**  
*Lecture* – obtaining a positive grade in written or oral exam.  
*Laboratory* – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.  
*Project* – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.
RECOMMENDED READING:


OPTIONAL READING:

SOCIAL AND PROFESSIONAL PROBLEMS OF COMPUTER SCIENCE

Course code: 11.9-WE-I-SZPI-PK_S1S
Type of course: Compulsory
Entry requirements: -
Language of instruction: Polish
Director of studies: Dr inż. Włodzimierz Kujanek
Name of lecturer: Dr inż. Włodzimierz Kujanek

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COURSE CONTENTS:

Ethical and professional responsibility. Law of work in range of computer science. Internet and personal value of man. Freedom and dependences in process of communication in Internet. Contracting) of agreement in Internet. Duties of administrators.

Ethical codes and codes of procedure. Code of Internet – Net. Forms of publicity in Internet. Internet in marketing and to management. Use electronic posts in commercial targets. Other dishonest behaviour in nets.


Legal bases of protection of privacy. Protection of personal goods on the ground of civilian code. Right to privacies and total computer science structure.

Bases of profiting from Internet. Disturbings of marks differentiating in Internet. Other dishonest maintenances in cyber space.

LEARNING OUTCOMES:
Perception and valuing of social context of computer science and connected from her risks and estimations of situation appearing in life computer science, both in respect of legal as and ethical.

ASSESSMENT CRITERIA:
Lecture – the main condition to get a pass are sufficient marks in written or oral tests conducted at least once per semester.

RECOMMENDED READING:

OPTIONAL READING:
[1] –
**PROJECT MANAGEMENT**

Course code: 11.9-WE-I-ZPG-PD_S1S

Type of course: Compulsory

Entry requirements:

Language of instruction: Polish

Director of studies: dr inż. Anna Pławiak-Mowna

Name of lecturer: dr inż. Anna Pławiak-Mowna

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**COURSE CONTENTS:**


*Project planning and management software.* Apply of Project Management Tools.
LEARNING OUTCOMES:
The aim of this course is to equip the student with the skills and knowledge of a conceptual framework for the discipline of IT project management, engineering project planning, project management, phases of the project life cycle, human resource management, project planning and management control.

ASSESSMENT CRITERIA:
Lecture – the main condition to get a pass are sufficient marks in written or oral tests conducted at least once per semester.
Laboratory – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.
Project – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

RECOMMENDED READING:

OPTIONAL READING:
[1] –
**MATHEMATICAL FOUNDATIONS OF ENGINEERING**

Course code: 11.9/06.0-WE-I-MPT-PD_S1S

Type of course: Compulsory

Entry requirements: -

Language of instruction: Polish

Director of studies: dr Dorota Krassowska

Name of lecturer: dr Dorota Krassowska

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**COURSE CONTENTS:**

Numbers and their properties.

Rational numbers, irrational numbers and theirs approximations by rationals, the minimum principle, mathematical induction method, equations and inequalities with absolute value function inside.

Polynomial and rational functions.

Polynomial equations and inequalities ,factorization method, Viete formulas, Cardan formulas , Ferrara formulas, quadratic equations and inequalities with parameters, rational functions and decomposition into prime fractions.

Elementary functions and theirs properties.

Power with real exponents, exponential and logarithmic functions, simple exponential equations and inequalities ,logarithmic equations and inequalities, trigonometric functions ,reduction formulas ,trigonometric type equations and inequalities.

Numerical sequences .

Recurrently defined sequences, limit of numerical sequence and its determination,

Basic properties of limits, some remarkable limits ,geometric series and their summation.

Continuity and derivative of function.

The continuity of function concept and its consequences, limits of functions, some remarkable limits, function derivative and their geometrical and mechanical meanings, basic properties of derivatives ,derivatives of elementary functions ,applications of derivative in investigating behaviour of functions: critical points calculations, extreme (minimum, maximum),necessary and sufficient condition of extreme , monotonicity intervals, convexity and concavity ,inflexion point.

2D Geometry (plane geometry).
Sinus and cosinus theorems, geometrical transformations of plane: rotations, reflexions, symmetries, vector algebra calculus, straight lines, second order curves and their analytical description: circles, ellipses, paraboles, hyperboles, areas of plane figures.

3D Geometry (stereometry).

Elementary probability calculus.
Definition and basic properties of probability: elementary event, the space of events, probability measure, elements of combinatorics: combinations, permutations and variations, Bernoulli schemes and distribution, independence of events, conditional probability.

LEARNING OUTCOMES:
To standardize the preliminary high school mathematical background necessary to follow university level mathematical courses is the main aim of the present activity.
After this series of lectures and exercises the majority of students will reach the appropriate level of elementary mathematics knowledge, the level that will help them to understand foundations of higher mathematics methods and techniques.

ASSESSMENT CRITERIA:
Lecture – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.
Class – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

RECOMMENDED READING:
[1] Textbooks on Mathematics from any mathematically oriented high schools

OPTIONAL READING:
[1] –
**EXPERIMENT METHODOLOGY I**

Course code: 11.9-WE-I-TE1-PD_S1S

Type of course: Compulsory

Entry requirements: -

Language of instruction: Polish

Director of studies: dr hab inż. Ryszard Rybski

Name of lecturer: dr hab inż. Ryszard Rybski

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**COURSE CONTENTS:**

*Information: acquisition and processing.* Information as a basic factor for civilisation development of a contemporary society, information society. Experiment as a basic manner of collection information about an object, phenomenon or process. Basic concepts of the information theory.

*Elements of the experiment theory.* Designing experiments. General rules and procedures for carry out experiments. The significance of mathematical modelling in the experiment methodology. Measurement as a basic element of the experiment methodology.

*General characteristics and basic elements of measurement information acquisition systems.* The relations of information acquisition systems with data telecommunication systems of information processing and computer control systems.

LEARNING OUTCOMES:
Skills and competences in: basics in designing and conducting experiments; analysing, developing and documenting experiment results.

ASSESSMENT CRITERIA:
Lecture – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.
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RECOMMENDED READING:

OPTIONAL READING:
[1] –
**COMPUTER NETWORKS II**

Course code: 11.3-WE-I-SK2-PD_S1S  
Type of course: Compulsory  
Entry requirements: -  
Language of instruction: Polish  
Director of studies: Doc dr inż. Emil Michta  
Name of lecturer: dr inż. Marcin Mrugalski

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**COURSE CONTENTS:**

*Introduction to Internet:* Technical basis of Internet. Internet, Intranet and Extranet. Communication protocols of network and application layer. TCP/IP stack and ISO model.

*Wideband Internet access networks:* xDSL, UMTS, WiMax. Last mile Ethernet. FTTO and FTTH access.


*IP address management:* Class-base routing. Classless routing. Sub-netting and super-netting. IP address aggregation. DHCP client and server configuration. Private addressing and NAT function configuration.


**LEARNING OUTCOMES:**

Abilities and competence: advanced IP address management, configuration of router DHCP, NAT and firewall functions, calculation of computer networks communication parameters.
ASSESSMENT CRITERIA:

*Lecture* – obtaining a positive grade in written or oral exam.

*Laboratory* – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

RECOMMENDED READING:


OPTIONAL READING:

[1] –
# JAVA AND WEB TECHNOLOGIES

**Course code:** 11.3-WE-I-SK2-PD37_S1S  
**Type of course:** Compulsory  
**Entry requirements:** -  
**Language of instruction:** Polish  
**Director of studies:** dr inż. Andrzej Marciniak  
**Name of lecturer:** dr inż. Andrzej Marciniak

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### COURSE CONTENTS:

- **Java fundamentals.** Data-types, operators, instructions, objects and classes, packages, interfaces and inner classes, exceptions, inheritance, strings, utilities, streams, serialization.
- **Java advanced features.** Multithreading, collections, database connections, distributed objects, Java Beans, security, localisation, reflections.
- **Media and graphics in Java.** Graphical user-interface, image processing, MIME formats, AWT and SWING.
- **Networking.** Socket programming, clien-server architecture, implementing servers, resource locators and identifiers, harvesting information from the Web.

### LEARNING OUTCOMES:

Complete knowledge of the syntax and structure of the Java programming language and how to create Java applications that run on server and desktop systems. An ability to design within Java environment a system, component or process to meet the desired needs. Use of modern engineering tools such as Eclipse and NetBeans for the development and implementation of programs. Being familiar with Java enterprise design patterns and antipatterns. An ability to design interactive Web applications.
ASSESSMENT CRITERIA:

*Lecture* – obtaining a positive grade in written or oral exam.

*Laboratory* – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

RECOMMENDED READING:


OPTIONAL READING:

[1] –
CONCURRENT AND DISTRIBUTED PROGRAMMING

Course code: 11.3-WE-I-PWR-PD38_S1S

Type of course: Compulsory

Entry requirements: -

Language of instruction: Polish

Director of studies: dr inż. Tomasz Gratkowski

Name of lecturer: dr inż. Tomasz Gratkowski

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COURSE CONTENTS:
Concurrent programming – basic concept: process, shared resources, critical section, mutual exclusion, synchronization.
Aims of concurrent programming. Advantages and disadvantages of concurrent programming.
Channels. Allowable operations on channels. Communication and synchronization based on channels.
Semaphores: general semaphore, binary semaphore, synchronization of processes with usage of semaphores.
Basic concept of transputer platform. Mutual exclusion problem: Dekker algorithm, others algorithms.
Types of parallel architectures: SISD, SIMD, MISD, MIMD. Array computers.
Architecture of T805 and ST20 processor.
Vector computers, multiprocessor systems, supercomputers.

LEARNING OUTCOMES:
Abilities and competence in design and implementation software consist of many processes.

ASSESSMENT CRITERIA:
Lecture – obtaining a positive grade in written or oral exam.
Laboratory – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.
RECOMMENDED READING:
1. Weiss Z., Grużlewski T., Concurrent and distributed programming, WNT Warszawa 1993 (in Polish)
2. Ben-Ari M., Basis of concurrent and distributed programming, WNT Warszawa 1996 (in Polish)
3. Czech Z., Distributed programming – selected problems, WPS Gliwice 1999 (in Polish)
5. Iszkowski W., Maniecki M., Concurrent programming, WNT Warszawa 1982 (in Polish)

OPTIONAL READING:
[1] –
COURSE CONTENTS:
FTP
File editor vi commands.
Find command.
Multitasking. Processes.
X Window. System administration.

LEARNING OUTCOMES:
Abilities and competence in using and administrating UNIX/Linux systems.

ASSESSMENT CRITERIA:
Lecture – obtaining a positive grade in written or oral exam.
Laboratory – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.
RECOMMENDED READING:

OPTIONAL READING:

[1] –
DEVELOPMENT OF INFORMATION SYSTEMS

Course code: 11.3-WE-I-PSI-PS40_ISM_S1S
Type of course: Compulsory
Entry requirements: -
Language of instruction: Polish
Director of studies: Dr inż. Agnieszka Węgrzyń
Name of lecturer: Dr inż. Agnieszka Węgrzyń, dr inż. Tomasz Gratkowski

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COURSE CONTENTS:
Basic function of information system.
Methodology of information system development (phases of development life cycle: analysis and requirements specification, specific implementation environment, implementation, testing, installation).
Documentation type of information system (business documentation, analytic documentation, technical documentation, user guides).
Modeling in UML diagrams.
Code generation using UML diagrams.

LEARNING OUTCOMES:
Analysis and development of information systems.

ASSESSMENT CRITERIA:
*Lecture* – obtaining a positive grade in written or oral exam.
*Laboratory* – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.
RECOMMENDED READING:


OPTIONAL READING:
HARDWARE DESCRIPTION LANGUAGES

Course code: 06.0-WE-I-JMSC-PS42_ISM_S1S

Type of course: Compulsory

Entry requirements: -

Language of instruction: Polish

Director of studies: Dr inż. Marek Węgrzyn

Name of lecturer: Dr inż. Marek Węgrzyn

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COURSE CONTENTS:

Introduction to modeling of Digital Systems in Hardware Description Languages (HDLs).
Introduction to SystemVerilog. Hardware/Software co-simulation.

LEARNING OUTCOMES:

Skills and competence in: modeling, simulation and synthesis of digital systems in Hardware Description Languages (HDLs).

ASSESSMENT CRITERIA:

Lecture – obtaining a positive grade in written or oral exam.
Laboratory – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.
RECOMMENDED READING:

OPTIONAL READING:
DATA SAFETY AND CRYPTOGRAPHY

Course code: 11.3-WE-I-BDIEK-PS43_ISM_S1S
Type of course: Compulsory
Entry requirements: -
Language of instruction: Polish
Director of studies: Dr inż. Remigiusz Wiśniewski
Name of lecturer: Dr inż. Remigiusz Wiśniewski

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Part-time studies

COURSE CONTENTS:

Introduction: Fundamentals of cryptography and data safety, cryptosystems, basics of encryption and decryption, classic cryptography (transposition ciphers and substitution ciphers; Caesar cipher, Vigenère cipher, XOR, etc.). Implementation of the basic algorithms in programming languages.

Symmetric-key algorithms: Key management, block ciphers (DES, AES, Blowfish) and stream ciphers (RC4). Implementation in programming languages (C, C++, Assembler, Pascal). Hardware implementation (with programmable devices - FPGAs).

Asymmetric-key algorithms: Public and private keys, hash functions. Main protocols and cryptosystems (Diffie-Hellman, RSA, SHA, MD5, etc.), Implementation in programming languages (C, C++, Assembler, Pascal). Hardware implementation (with programmable devices - FPGAs).


Cryptanalysis: Main goals of cryptanalysis. Weakness of particular cryptosystems. Data safety. Debugging of computer applications and programs.
LEARNING OUTCOMES:
Skills and competence in: data safety (data protection, digital signature and smartcards security), basic knowledge of cryptosystems and cryptology (either cryptography and cryptanalysis).

ASSESSMENT CRITERIA:
Lecture – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.
Laboratory – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.
Project – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

RECOMMENDED READING:

OPTIONAL READING:
**INFORMATICS SYSTEMS TESTING**

Course code: 06.0-WE-I-TSI-PSW46_D_ISM_S1S  
Type of course: Optional
ENTRY REQUIREMENTS:

Language of instruction: Polish

Director of studies: prof. dr hab. inż. Janusz Biernat, mgr inż. Michał Doligalski

Name of lecturer: prof. dr hab. inż. Janusz Biernat, mgr inż. Michał Doligalski

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**COURSE CONTENTS:**


Examination of selected parameters of digital circuits: Using a digital oscilloscope to measure time parameters of digital circuits (TTL, CMOS, FPGA) include: propagation time, rise time, fall time, setup time. Electrical parameters including current, voltage. Boundary conditions of digital circuits work.

Diagnosis of software - hardware microinformatics systems: Logic analyzer for the analysis of digital systems. Trigger algorithms based on changes or values of signals. The use of simulation results to verify on the prototype stage. Extension of the digital microsystem of the block generator for testing. Serial bus debugging (I2C, SPI, RS-232, CAN) by means of oscilloscope. The use of specialized multimeters to analyze the Ethernet bus.

Diagnostic software: Use specialized software in the diagnosis process of digital systems (FPGAView, ChipScope Pro), JTAG interface for the analysis of digital systems. FPGAView software and use an digital oscilloscope and / or logic analyzer. Embedding of test cores inside the embedded systems (ChipScope Pro).
LEARNING OUTCOMES:
Skills and competences in diagnostic techniques of the microinformatics systems embedded in FPGA devices.
Knowledge of operation and ability to use of digital diagnostic equipment (digital oscilloscope, logic analyzer).
Knowledge of the principles for estimating and eliminating measuring error and the ability to choose a diagnostic tool for testing the microinformatic system.
Ability to increase the reliability of microinformatics systems in stage of testing.
Knowledge of protocols and the ability to serial buses debug (I2C, SPI, RS-232, CAN).

ASSESSMENT CRITERIA:
Lecture – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.
Laboratory – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.
Project – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

RECOMMENDED READING:

OPTIONAL READING:
**COURSE CONTENTS:**

Construction and operation of diagnostic tools: survey of the construction, operating principles and measurements performing by means of digital diagnostics apparatus like: Digital oscilloscopes, logical analyzers, arbitrary generators.

Use an oscilloscope and arbitrary generator to generate analogue and digital waveforms on the basis of waveforms recorded using an oscilloscope. Interfaces of the measuring apparatus (RS-232, RS-485, GPIB, USB).

Examination of selected parameters of digital circuits: Using a digital oscilloscope to measure time parameters of digital circuits (TTL, CMOS, FPGA) include: propagation time, rise time, fall time, setup time. Electrical parameters including current, voltage. Margin of disruptions and faults tolerant. Boundary conditions of digital circuits work.

Diagnosis of software - hardware digital systems: verification of digital systems output signals by means of digital oscilloscope. Logic analyzer for the analysis of digital systems. Trigger algorithms based on changes or values of signals. The use of simulation results to verify on the prototype stage.

Diagnosis of software: Use specialized software in the diagnosis process of digital systems (FPGAView, ChipScope Pro). JTAG interface for the analysis of digital systems. FPGAView software and use an digital oscilloscope and / or logic analyzer. Embedding of test cores inside the embedded systems (ChipScope Pro).
Diagnosis of DSP systems: Arbitrary signal generator and digital mixed signal oscilloscope for DSP systems testing.

LEARNING OUTCOMES:
Skills and expertise in diagnostic techniques for hardware - software digital systems testing.
Knowledge of operation and ability to use digital diagnostic equipment (digital oscilloscope, logic analyzer).
Knowledge of the principles for estimating and eliminating errors of measurement and the ability to choose a diagnostic tool for digital system testing.
Ability to increase the reliability of digital systems at the stage of testing.

ASSESSMENT CRITERIA:
Lecture – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.
Laboratory – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.
Project – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

RECOMMENDED READING:
2. Łuba T., Programowalne układy przetwarzania sygnałów i informacji. WKiŁ 2008.

OPTIONAL READING:
**DESIGN OF MULTITIER WEB SYSTEMS**

Course code: 11.3-WE-I-PWSI-PSW47_E_ISM_S1S

Type of course: **Compulsory**

Entry requirements: -

Language of instruction: Polish

Director of studies: Dr inż. Tomasz Gratkowski

Name of lecturer: Dr inż. Tomasz Gratkowski

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**COURSE CONTENTS:**


*Persistence Tier:* Object/relational mapping facility in Java EE. Data model on all tiers in multi-tier system.

*Additional services:* Introduction to Security in the Java EE Platform. Design Patterns for JEE.

**LEARNING OUTCOMES:**

Design and programming skills in multi-tier systems in Java EE.
Integration of heterogeneous systems.
Foundational knowledge and skills required to build business application in Java EE.
ASSESSMENT CRITERIA:

Lecture – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

Laboratory – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

Project – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

RECOMMENDED READING:

1. Eric Jendrock, Jennifer Ball, Debbie Carson, Ian Evans, Scott Fordin, Kim Haase: The Java EE 5 Tutorial For Sun Java System Application Server 9.1; October 2008;
2. Deepak Alur, John Crupi, Dan Malks: core J2EE. Wzorce projektowe; Wydawnictwo Helion 2004;
4. Sameer Tyagi, Keiron McCammon, Michael Vorburger, Heiko Bobzin: Core JAVA Data Objects; Wydawnictwo Helion 2004;
5. Bryan Basham, Kathy Sierra, Bert Bates: Head First Servlets & JSP; Wydawnictwo Helion 2009;

OPTIONAL READING:

1. Joel Scamray, Mike Shema: Hakerzy aplikacje webowe. Sekrety zabezpieczeń aplikacji webowych; Wydawnictwo Translator s.c. 2002;
2. S.Graham, S.Simeonov, T. Boubez, D. Davis, G. Daniels: Java. Usługi WWW. Vademecum profesjonalisty; Wydawnictwo Helion 2003;
3. Alan Monnox: J2EE. Podstawy programowania aplikacji korporacyjnych; Wydawnictwo Helion 2005;
MOBILE TECHNOLOGIES AND APPLICATIONS

Course code: 11.3-WE-I-TAM-PSW47_E_ISM_S1S
Type of course: Compulsory

Entry requirements: -
Language of instruction: Polish
Director of studies: dr inż. Jacek Tkacz
Name of lecturer: dr inż. Jacek Tkacz

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COURSE CONTENTS:
User interface. The design and the implementation of GUI of mobile applications my means of using MICROSOFT software products.
Access to data. Databases dedicated for mobile technology and devices. Access and synchronization with external data sources.
Exchange information between mobile application and external environment. Communications by using wireless technology: BLUETOOTH, IrDA. XML language as universal format of data exchange.
Wireless network. Communication by WLAN network (WiFi).
Systems of the satellite navigation. Serial communication with internal and external GPS modules. GPS communication protocol NMEA-0183.

LEARNING OUTCOMES:
Abilities of the design and the implementation of mobile applications by means of using .NET technology.
ASSESSMENT CRITERIA:

Lecture – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

Laboratory – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

Project – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

RECOMMENDED READING:

8. E. Smitkowska, „IT w kieszonk – rynek urządzeń mobilnych”, Software Developer’s, 2005

OPTIONAL READING:

2. BLUETOOTH http://www.bluetooth.com
3. CODEGURU http://www.codeguru.pl/
**OPERATIONAL SYSTEM LEVEL PROGRAMMING**

**Course code:** 11.3-WE-I-PPSO-PSW47_E_ISM_S1S  
**Type of course:** Compulsory  
**Entry requirements:** -  
**Language of instruction:** Polish  
**Director of studies:** dr inż. Grzegorz Łabiak  
**Name of lecturer:** dr inż. Grzegorz Łabiak

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**Full-time studies**

| Lecture | 9            | 1            | VII      | Grade          |          |
| Laboratory | 9            | 1            | VII      | Grade          |          |
| Project | 9            | 1            | VII      | Grade          |          |
|          |              |              |          |                | 6        |

**Part-time studies**

**COURSE CONTENTS:**

Windows operational system architecture.
Application Programming Interface – API functions.
Program environment under operational system conditions: application, event, message queue.
Program scheme under operational system conditions: window function, message, message loop.
WM_PAINT message handling, client area, graphic device context.
Graphic device context objects: pen, brush, bitmap, font.
Resources. Creation and using resources: menu, dialog box, writing text strings.
Menu dynamic creation and its handling.
Creation and programming own dialog boxes.
Static libraries (*.lib) and dynamic libraries (*.dll).
OpenGL library.
DirectX technology.

**LEARNING OUTCOMES:**

After completion of this course students will possess skills in implementing low-level programming using API functions.
ASSESSMENT CRITERIA:

Lecture – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

Laboratory – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

Project – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

RECOMMENDED READING:

2. Roland Waclawek, Windows od kuchnik, Help, 1993

OPTIONAL READING:
**COURSE CONTENTS:**

*Introduction.* Outline of the presented material. Literature for the course. Evolution of microprocessor engineering.


*Memories in microprocessor systems.* Basic memory types. Write and read operations. Basic memory parameters.


*Interfacing of external peripheral systems.* Address decoder design on the basis of middle scale of integration chips and PLD devices.

*Handling of peripheral devices.* Polling. Interrupt system. Direct memory access.

*Local serial interfaces.* I²C, SPI, 1-Wire.

ECTS Course Catalogue Computer Science – first-cycle level


Basic user interface in microprocessor system. Keyboard. LED and LCD displays. Service of user interface by software.


LEARNING OUTCOMES:
Skills and competences: design and programming of microprocessor systems, their peripheral systems, user interfaces and local serial interfaces.

ASSESSMENT CRITERIA:
Lecture – obtaining a positive grade in written or oral exam.
Laboratory – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.
Project – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

RECOMMENDED READING:

OPTIONAL READING:
INFORMATION SYSTEMS IN MANAGEMENT

Course code: 11.9-WE-I-SIZP-PS_PSI_S1S
Type of course: Compulsory
Entry requirements: -
Language of instruction: Polish
Director of studies: Dr hab inż. Wiesław Miczulski, dr inż. Marek Florczyk
Name of lecturer: dr inż. Marek Florczyk

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COURSE CONTENTS:


Customer Relationship Management (CRM): CRM in firm, connections to other systems. CRM structure. CRM implementation.


Electronic Banking: Home Banking and Internet Banking. Stages of implementation. Statistical data – Internet Banking in Poland. Security and Internet Banking. ELIXIR and SWIFT.


LEARNING OUTCOMES:
Design and implementation of Management Information Systems and CRM Systems for small business.

ASSESSMENT CRITERIA:
Lecture – obtaining a positive grade in written or oral exam.
Laboratory – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

RECOMMENDED READING:

OPTIONAL READING:
-
**COMPUTER-AIDED DESIGN**

Course code: 11.9-WE-I-KWP-PS_PSI_S1S  
Type of course: Compulsory  
Entry requirements: -  
Language of instruction: Polish  
Director of studies: Dr inż. Janusz Kaczmarek  
Name of lecturer: Dr inż. Janusz Kaczmarek

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**COURSE CONTENTS:**

Basic knowledge of the virtual instruments. Basic definitions. Characteristic of integrated software environments to designing the software for virtual instruments and measurement systems.


**LEARNING OUTCOMES:**

Know-how and competences in the field of designing and creating the software for measurement systems with the use of specialized integrated software environments – LabVIEW and LabWindows.
ASSESSMENT CRITERIA:

Lecture – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

Laboratory – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

Project – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

RECOMMENDED READING:


OPTIONAL READING:

-
### COURSE CONTENTS:

- **Primary protocols and services of Internet.** Description of work of protocols: TcpIp, Http, Ftp.
- **WWW and FTP servers.** Description of work of servers, configuration and management.  
- **Client – Server Databases.** Description of work, objects and projecting of structures of databases.  
- **WWW Technologies.** Static and dynamic technologies of creating WWW pages – review.  
- **Microsoft .NET technology.** Description of basics of work of technology.  
- **WWW forms.** Description of work of mechanisms of sending data through WWW pages.  
- **Databases and WWW.** Study of possibilities of building WWW pages with Access to databases.  
- **Security mechanisms.** Description of problem of security of work in WWW network.

### LEARNING OUTCOMES:

Skills and competences in: designing of structures of databases, starting and configuring of WWW and FTP Server, projecting WWW pages with Access to databases.
ASSESSMENT CRITERIA:
Lecture – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.
Laboratory – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.
Project – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

RECOMMENDED READING:

OPTIONAL READING:
-
**INDUSTRIAL COMPUTER NETWORK**

Course code: 11.9-WE-I-KSP-PSI_S1S

Type of course: Compulsory

Entry requirements: -

Language of instruction: Polish

Director of studies: Dr inż. Adam Markowski

Name of lecturer: Dr inż. Adam Markowski

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**COURSE CONTENTS:**


*Access methods to a medium in industrial networks.* Master - Slave, Token-Passing, Token-Ring and CSMA.

*Standard communication protocols.* Characteristics of standard communication protocols PROFIBUS, MODBUS, FIP, P-NET, CAN, LonWorks and INTERBUS-S.


*Analysis of communication efficiency and time parameters of selected protocols.* Transparency, scalability, time determination in industrial networks.

*Industrial network components.* Converters, amplifiers, concentrators, nodes, routers, bridges and gates. Integration of industrial networks with local computer networks.


*Integration and management of industrial networks.* Methods of industrial network integration.

Standards engineering of industrial network environments. Specifics of application areas for particular standards. Elements of industrial network designing.

LEARNING OUTCOMES:
Skills and competences in: creating simple applications for cooperation with measuring converter and executive systems equipped with serial communication interfaces, carrying out an analysis of a given project of a measuring – controlling system with industrial network segments related to the determination of communication properties of such a system, selection of industrial network components for a given industrial facility, the determination of communication properties of a proposed solution.

ASSESSMENT CRITERIA:
Lecture – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.
Laboratory – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.
Project – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

RECOMMENDED READING:

OPTIONAL READING:
-
SIGNAL PROCESSING TECHNIQUES

Course code: 06.0-WE-I-TPS-PSI_S1S

Type of course: Compulsory

Entry requirements: -

Language of instruction: Polish

Director of studies: Dr inż. Leszek Furmankiewicz

Name of lecturer: Dr inż. Leszek Furmankiewicz

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COURSE CONTENTS:


Signal description in the time and in the frequency domain. Basic parameters of necessitarian signals. Description of stochastic signals. Fourier series development of periodical signals. Spectrum of periodic and aperiodic signals.

Static and dynamic properties of measuring transducers. Static parameters. The methods of description the transducer static and dynamic parameters: transmittance, time characteristics and frequency characteristics. Dynamic properties of ideal and real transducers.

Initial signals conversion Amplifying and filtering. Operational amplifiers in initial signals conversion circuit. Analog filters. Mathematical models of passive and active analog filters.


LEARNING OUTCOMES:
Skills and competences in the range of the: signals and measuring transducers description in the time domain and in the frequency domain; principle of work, characteristics and a basic design of signal conversion circuit with initial signal conversion, analog to digital conversion and digital to analog conversion.

ASSESSMENT CRITERIA:
Lecture – obtaining a positive grade in written or oral exam.
Laboratory – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

RECOMMENDED READING:

OPTIONAL READING:
-
**WIRELESS NETWORK**

Course code: 06.0-WE-I-SB-PS_PSI_S1S
Type of course: Compulsory
Entry requirements: -
Language of instruction: Polish
Director of studies: Doc dr inż. Emil Michta
Name of lecturer: Doc dr inż. Emil Michta

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**Part-time studies**

COURSE CONTENTS:


WLAN physical layer: Structure and parameters of physical layer. Physical layer technologies.


Access Points: Types of access points. Functioning modes of access points. Access point configuration.

Wireless networks WPAN: Bluetooth, ZigBee and UWB networks. Functioning and application areas.


Mobility in wireless networks: Characteristic of roaming. Roaming on layer 2. Roaming on layer 3 – mobile IP.


LEARNING OUTCOMES:

Abilities and competence: configuration of the access points and wireless client stations, design WLAN and WPAN wireless networks, hot-spots design, implementation of security methods in WLAN.
ASSESSMENT CRITERIA:

Lecture – obtaining a positive grade in written or oral exam.

Project – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

RECOMMENDED READING:

OPTIONAL READING:
-
SOFTWARE FOR MEASUREMENT AND CONTROL EQUIPMENT

Course code: 11.9-WE-I-OSPS-PS_PSI_S1S
Type of course: Compulsory
Entry requirements: -
Language of instruction: Polish
Director of studies: Dr inż. Leszek Furmankiewicz
Name of lecturer: Dr inż. Leszek Furmankiewicz

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**COURSE CONTENTS:**


Data acquisition cards. Classification and basic functional blocks of the data acquisition cards. Data acquisition cards programming, description of the software functions.

SCPI standard. SCPI device model, structure of commands, trigger system, status system. Profile of commands for example devices.


Virtual measurement instruments. The definition, structure and basic tags of virtual instruments. Virtual instruments programming. Examples of virtual instruments.

Internet technologies in measurement and control systems. Embedded WWW servers. Hardware and software profiles of chosen embedded WWW servers.

**LEARNING OUTCOMES:**

Skills and competences in the range of the: understanding of functioning of the measurement and the control systems, creating software for measuring systems, creating software drivers for measuring instruments, using internet technology in measuring and control systems.
ASSESSMENT CRITERIA:

Lecture – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

Project – the main condition to get a pass are sufficient marks for all exercises and tests conducted during the semester.

RECOMMENDED READING:


OPTIONAL READING:

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