COURSE DESCRIPTION CARD - SYLLABUS

Course name
Information technologies and computer science [S1IBio1>TIiI]

Course

Field of study
Biomedical Engineering

Year/Semester
1/1

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
30

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

4,00

Coordinators

Lecturers

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Prerequisites

Student has knowledge of information technology and the basics of computer science in In secondary school level. Student is familiar with computer hardware and system software and use basic applications like: word processing, spreadsheet, presentation graphics program. Student can use internet technologies for communication and information acquiring. It has a sense of responsibility for their own work, to understand the need to learn and acquire new knowledge.

Course objective

To familiarize students with the basic operations of computer hardware and software in the processes of data processing, transmitting, presenting and information security. Preparing students for the wide application of information technologies in engineering issues. Understanding theoretical and practical problems associated with the design and application engineering databases in the enterprise.

Course-related learning outcomes

Knowledge:
Student describes how information is represented in digital systems. Student can describe functional model of computer system, data processing organization and interface standards. Student defines the basic structures of algorithms and methods for describing algorithms. Student can describe the structure of computer networks, basic network services, computer network configuration and basic principles of data security in computer systems. Defines, distinguishes and classifies the basic concepts in the area of database design. A distinction is called, characterizes and describes the database systems and issues related to them. Suggests the use of database systems for different areas of the enterprise.

Skills:
Student can use system software to support hardware and data organization and utility software for computational tasks and presentation of results. Can formalize simple algorithmic actions and describe them using Visual Basic. Can automate activities in application software using Visual Basic for Applications. Student can design a relational database for different areas of the enterprise. Able to carry out the implementation of engineering database in MS Access. Able to handle the database (enter, edit or delete data).

Social competences:
Student is open to the implementation of modern information technology in science and technology. Student can use Internet technologies for communication, teamwork and information search. Student can acquire new knowledge on the subject. It is aware of the role of computerization in the activities of engineering. Can independently develop knowledge concerning.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Intermediate rating:
Lecture : credit based on test consisting of open questions in a scale 0-1. Test is passed after obtaining at least 55% of all points. Laboratory completion is needed to begin final test papers. Discussion of the test results. Test is carried out at the end of the semester
Laboratory: credit based on tasks performer during laboratory (credit on computer workstation) and the implementation of the report of the exercises. The student must obtain a positive assessment of the executed report..

Programme content

Lecture:
- Applying information technology in science and technology. Digital representation of information.
- Functional and structural model of computer. Organization of data processing in digital systems.
- System and utility software. Methods of description of algorithms. Correctness of the algorithm. Data structures, operations on data.
- Basic numerical and graphical algorithms.
- Customizing the application using Visual Basic for Applications.
- Computer networks.
- Security of data in computer systems.
- Basic knowledge and principles of database design (concepts, definitions, characteristics, classification).
- The data models: hierarchical, network, relational, object-oriented.
- Design methodology.
- The tools for building database systems.
- The use of databases in the enterprise (the role of databases, requirements, organization of data, examples of applications).
- Database management systems (organization of external memory, index files, queries and their optimization, data integrity and ways of ensuring transactions, blocking, reliability of databases, protection of data against unauthorized access).
- Introduction to SQL.
- Distributed databases.
Laboratory classes:

- Using spreadsheets in computational and data presentation tasks.
- Programming computational algorithms using Visual Basic.
- Decision and iteration structures, written in Visual Basic.
- Customizing the applications to specific needs using Visual Basic for Applications environment.
- Transforming Object-union model to the relational model using tools.
- Enter data into the sample database.
- Implementation of the relational model in MS Access (create relationships, relationships and giving referential integrity).
- Building queries.
- Create a sample forms and queries.
- The execution of user interface database.

Teaching methods

Lecture: multimedia presentation illustrated with examples on the board, solving sample tasks by the lecturer
Laboratory exercises: solving tasks at the computer. Practical exercises and discussion.

Bibliography

Basic
1. A. Hamrol (red.), Elementy informatyki dla inżynierów mechaników, Wydawnictwo Politechniki Poznańskiej, Poznań, 2001
2. M. Lewandowski, Więcej niż Excel 2007, Wydawnictwo Helion, Gliwice, 2010
3. P. Beynon-Davies, Systemy baz danych, WNT, Warszawa, 1998
4. Rojek-Mikołajczak I, Bazy danych, Wydawnictwo Akademii Bydgoskiej, Bydgoszcz, 2004
5. Mark Whitehorn, Bill Marklyn, Relacyjne bazy danych, Helion, Warszawa 2003
Additional
1. T. Jankowski, Od podstaw VBA/ Excel, Wydawnictwo Mikom, Warszawa, 2004
2. T. Willis, B. Newsome, Visual Basic 2010. Od podstaw, Wydawnictwo Helion, Gliwice, 2011
3. Fundamentals of database systems, R. Elmasri, S. B. Navathe, The Benjamin/Cummings Publishing Company, Redwood City CA 94065, 1994

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	60	2,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	40	1,50