

SYLLABUS OF A MODULE

Polish name of a module	Sztuczna inteligencja w diagnostyce medycznej
English name of a module	Artificial intelligence in medicine
ISCED classification - Code	0612
ISCED classification - Field of study	<i>Database and network design and administration</i>
Languages of instruction	<i>English</i>
Level of qualification:	2
Number of ECTS credit points	6
Examination:	A
Available in semester:	A

Number of hours per semester:

Lecture	Tutorial	Laboratory	Seminar	Project	Others
30	0	30	0	15	0

MODULE DESCRIPTION

Module objectives

- O1. Introducing the students to the basics of data analysis and exploration.
- O2. Application of analytical databases, OLAP cubes and big data programming model.
- O3. Obtaining by the students the practical skills in state-of-the-art solutions for data mining and big data.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Knowledge of the design and administration of databases.
2. Personal computer operating systems literacy.
3. Ability to program in any high level language.
4. Basic knowledge of programming in a database environment.
5. Ability to use different sources of information and technical documentation.

6. Ability to work independently and in a group.
7. Ability to correctly interpret and present their own activities.

LEARNING OUTCOMES

- LO 1 - has basic theoretical knowledge in the field of knowledge discovery methods in data structures,
- LO 2 - has a basic knowledge of data warehouse,
- LO 3 - has basic knowledge about the design of Business Intelligence,
- LO 4 - knows the technology and tools for the tasks related to the mining of the knowledge contained in analytical databases,
- LO 5 - able to select appropriate algorithms for data analysis depending the problem and to implement them,
- LO 6 - can design appropriate diagrams to organize information using known tools,
- LO 7 - is able to propose a solution to a specific issue related to data mining and big data.

MODULE CONTENT

Type of classes – Lectures	Number of hours
Lect. 1 Introduction to the analysis and data mining.	2
Lect. 2 Data Warehousing - architecture.	2
Lect. 3 OLAP Technology - OLAP cubes.	2
Lect. 4 Introduction to MDX and MDX expressions	2
Lect. 5 Server SSAS - the basics of working in the environment and automate administrative tasks, part 1.	2
Lect. 6 Server SSAS - the basics of working in the environment and automate administrative tasks, part 2.	2
Lect. 7 Introduction to the basic techniques of data mining.	2
Lect. 8 Application of data mining techniques - classification.	2
Lect. 9 Application of data mining techniques - regression.	2

Lect. 10	Application of data mining techniques - segmentation.	2
Lect. 11	Application of data mining techniques – association	2
Lect. 12	Application of data mining techniques - sequential analysis and forecasting	2
Lect. 13	Big data programming model – part 1	2
Lect. 14	Big data programming model – part 2	2
Lect. 15	Reading and evaluation of outcomes - visualization and reporting	2
Type of classes– Labolatory		Number of hours
Lab. 1	Introduction to the SQL Server environment and tools used in the data analysis process.	2
Lab. 2	Project of simple analytical databases and analytical cubes.	2
Lab. 3	Installing and getting to know the structure of the sample data warehouse.	2
Lab. 4	Basic MDX expressions used during data processing.	2
Lab. 5	MDX - use of additional built-in functions of language.	2
Lab. 6	Server SSAS - monitoring the work and safety - roles, permissions, etc. SQL Server Profiler.	2
Lab. 7	Tasks SQL Server Agent, XMLA.	2
Lab. 8	Analysis of the data using Excel.	2
Lab. 9	Practical use of the classification.	2
Lab. 10	Practical use of regression.	2
Lab. 11	Practical use of segmentation.	2
Lab. 12	Practical use of association.	2

Lab. 13	Practical use of sequential analysis.	2
Lab. 14	Practical use of forecasting.	2
Lab. 15	Methods of presentation and evaluation of results.	2
Type of classes– Project		Number of hours
Proj. 1	SQL databases 1	2
Proj. 2	SQL databases 2	2
Proj. 3	Mining multimedia data 1	2
Proj. 4	Mining multimedia data 2	2
Proj. 5	Mining multimedia data 3	2
Proj. 6	Big data programming model 1	2
Proj. 7	Big data programming model 2	2
Proj. 8	Big data programming model 3	1

TEACHING TOOLS

1. – lectures using multimedia presentations
2. – blackboard and chalk or whiteboards and pens
3. – laboratory guides
4. – reports from laboratory activities
5. – computer stations with software

WAYS OF ASSESSMENT (F – FORMATIVE, S – SUMMATIVE

F1. – assessment of preparation for laboratory exercises
F2. – assessment of the ability to apply acquired knowledge during laboratory exercises and projects
F3. – assessment of reports
F4. – assessment of activity during classes

S1. – assessment of the ability to solve the posed problems and the method of presentation of the obtained results - credit for the grade

S2. – assessment of mastery of the lecture material - passing the lecture (or exam)

*) the condition for obtaining a credit is to obtain positive grades from all laboratory exercises and the completion of the test task

STUDENT'S WORKLOAD

L.p.	Forms of activity	Average number of hours required for realization of activity
1. Contact hours with teacher		
1.1	Lectures	30
1.2	Tutorials	0
1.3	Laboratory	30
1.4	Seminar	0
1.5	Project	15
Total number of contact hours with teacher:		75
2. Student's individual work		
2.1	Preparation for tutorials and tests	0
2.2	Preparation for laboratory exercises, writing reports on laboratories	20
2.3	Preparation of project	15
2.4	Preparation for final lecture assessment	20
2.5	Preparation for examination	0
2.6	Individual study of literature	20
Total number of hours of student's individual work:		75
Overall student's workload:		150
Overall number of ECTS credits for the module		6
Number of ECTS points that student receives in classes requiring teacher's supervision:		3

Number of ECTS credits acquired during practical classes including laboratory exercises and projects :	1,8
---	-----

BASIC AND SUPPLEMENTARY RESOURCE MATERIALS

Mark Hall, Ian Witten, Eibe Frank, Data Mining: Practical Machine Learning Tools and Techniques, Morgan Kaufmann 2011.
D. J. Hand, Heikki Mannila, Padhraic Smyth, Principles of Data Mining, MIT Press, 2001
Jamie MacLennan, ZhaoHui Tang, Bogdan Crivat, Data Mining with Microsoft SQL Server 2008, John Wiley & Sons

MODULE COORDINATOR (NAME, SURNAME, INSTITUTE, E-MAIL ADDRESS)

1. dr hab. inż. Rafał Scherer, prof. PCz, rafal.scherer@pcz.pl
--