**ECTS – Course sheet**

**Responsible for the course**
Dr inż. Wojciech Bobrzyński, WEAIE AGH

**Course code;**
MK920

**Course name**
Computer methods in medicine

**Course type**
Area–oriented

**Area and degree of studies; specialization**
Medical Physics – graduate level (M.Sc.) studies
Electronics and Dosimetry,
Imaging and Biometrics

**Semester, type of classes, #of hours, ECTS points**
semester: II, total hours: 45, lecture: 22, Laboratories: 23
ECTS: 4

**Course objectives**
To acquaint students with basic database technology, data warehouses data mining and their application in medicine.

**Lectures content**

<table>
<thead>
<tr>
<th>#</th>
<th>Topic</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Typical applications of computer systems and systems architectures. Client-server based database access technology. General database characteristics. Key features of database management systems. Logical and physical data representation. Database security. Hospital Information Systems – 2h</td>
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<tr>
<td>4</td>
<td>Database development life cycle. Designing of information systems and databases. Methods of designing. – 2h</td>
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<tr>
<td>5</td>
<td>File organization types. Unsorted and sorted files. Index structure of files. Files access methods. Hashing. Indices characteristics. – 2h</td>
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<td>6</td>
<td>Data warehouse and data mining. OLTP and OLAP processing. Relational OLAP. Data warehouse architecture. Hierarchy generation. Multi-dimensional data model (data cube): Roll-up, drill-down, slice/dice and rotate operations. SQL for data warehouses. Clinical and bioinformatical data warehouses. – 2 h</td>
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<tr>
<td>7</td>
<td>An introduction to data mining – concepts and techniques. Data mining as a part of the knowledge discovery process. Goals of data mining - prediction, identification, classification, and optimization. Exploratory Data Analysis (EDA). Six major phases of CRISP-DM. Data preprocessing. – 2 h</td>
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<tr>
<td>9</td>
<td>Decision trees. Association rules. Model evaluation techniques. Applications of Data Mining for knowledge discovery in science, business and healthcare. – 2h</td>
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<td>10</td>
<td>Artificial intelligence and expert systems. Architecture of expert systems, knowledge base, knowledge representation, inference engine, search techniques, user interface, user dialog, explanation, tutoring. – 2h</td>
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**Content laboratories**

**MS ACCES**

**AN EXAMPLE OF EXPERT SYSTEM**
Applying a BayEx shell expert system with probability knowledge base for medical diagnostic. – 2 h.

**STATISTICA Data Miner**

**Course summary**
ECTS – Course sheet

Bibliography

1. Connolly T., Begg C., Systemy baz danych, Łódź 2004
2. Date C.J., Wprowadzenie do systemów baz danych, WNT, Warszawa 2000
4. Electronics STATISTICA Manual
5. Instrukcje do ćwiczeń laboratoryjnych

Conditions for receiving credit
Test in lectures contents and homework.
Continuous assessment of laboratory work

Rules to determine the final grade
Weighted mean of all received grades.

Keywords
databases, MS ACCESS, data mining, data warehouses, expert systems