270667 - DW - Data Warehousing

Coordinating unit: 270 - FIB - Barcelona School of Informatics
Teaching unit: 747 - ESSI - Department of Service and Information System Engineering
Academic year: 2019
Degree: MASTER'S DEGREE IN INNOVATION AND RESEARCH IN INFORMATICS (Syllabus 2012). (Teaching unit Optional)
ECTS credits: 6
Teaching languages: English

Prior skills

Basic knowledge on relational databases and SQL.
Specifically, it will be assumed knowledge on:
- UML class diagrams
- Relational algebra
- SQL queries
- Relational views
- B-tree operations (i.e., insertion and splits)
- Basic concepts on physical query optimization

Teaching methodology

The course comprises theory, and lab sessions.
Theory: The theory lectures comprise the teacher's explanations and problem solving. The students will also have some contents to be read and prepared outside the classroom.
Laboratory: Mainly, the lab sessions will be dedicated to the practice (with and without computer) of the concepts introduced in the theory lectures, by means of exercises that will be done during the class time. Some tools will be used for the design and practice on a specific DBMS or tool (e.g., Oracle). There will be three project deliverables that will be done outside the class.

Learning objectives of the subject

1. Be able to model multidimensional data warehouses
2. Be able to apply specific physical design techniques for decisional systems
3. Be able to design and implement data migration processes (i.e., ETL)

Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours large group: 36h</th>
<th>24.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours medium group: 0h</td>
<td></td>
<td>0.00%</td>
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<tr>
<td>Hours small group: 18h</td>
<td></td>
<td>12.00%</td>
</tr>
<tr>
<td>Guided activities: 0h</td>
<td></td>
<td>0.00%</td>
</tr>
<tr>
<td>Self study: 96h</td>
<td></td>
<td>64.00%</td>
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</tbody>
</table>
## Content

### Introduction

**Degree competences to which the content contributes:**

**Description:**

Comparison of operational and decisional systems; Metadata

### Data warehousing architectures

**Degree competences to which the content contributes:**

**Description:**

Corporate Information Factory; DW 2.0

### Multidimensional modeling and OLAP tools

**Degree competences to which the content contributes:**

**Description:**

Structure; Integrity constraints; Operations; Advanced concepts

### Database physical design for analytical queries

**Degree competences to which the content contributes:**

**Description:**

Star-join and join indexes; Bitmaps; Materialized views; Spatio-temporal data

### Extraction, Transformation and Load

**Degree competences to which the content contributes:**

**Description:**

Data quality; Integration; ETL management
## Planning of activities

<table>
<thead>
<tr>
<th>Theoretical lectures</th>
<th>Hours: 50h</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 25h</td>
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<tr>
<td></td>
<td>Practical classes: 0h</td>
</tr>
<tr>
<td></td>
<td>Laboratory classes: 0h</td>
</tr>
<tr>
<td></td>
<td>Guided activities: 0h</td>
</tr>
<tr>
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<td>Self study: 25h</td>
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</tbody>
</table>

**Description:**
In these activities, the lecturer will introduce the main theoretical concepts of the subject. Besides lecturing, cooperative learning techniques will be used. These demand the active participation of the students, and consequently will be evaluated.

**Specific objectives:**
1, 2, 3

<table>
<thead>
<tr>
<th>Hands-on sessions</th>
<th>Hours: 81h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 0h</td>
</tr>
<tr>
<td></td>
<td>Practical classes: 0h</td>
</tr>
<tr>
<td></td>
<td>Laboratory classes: 27h</td>
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<tr>
<td></td>
<td>Guided activities: 0h</td>
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<tr>
<td></td>
<td>Self study: 54h</td>
</tr>
</tbody>
</table>

**Description:**
The student will be asked to practice the different concepts introduced in the theoretical lectures. This includes problem solving either on the computer or on paper.

**Specific objectives:**
1, 2, 3

<table>
<thead>
<tr>
<th>Exam</th>
<th>Hours: 19h</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 2h</td>
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<tr>
<td></td>
<td>Practical classes: 0h</td>
</tr>
<tr>
<td></td>
<td>Laboratory classes: 0h</td>
</tr>
<tr>
<td></td>
<td>Guided activities: 0h</td>
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<tr>
<td></td>
<td>Self study: 17h</td>
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</tbody>
</table>

**Description:**
Written exam of the theoretical concepts introduced along the course.

**Specific objectives:**
1, 2, 3
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**Qualification system**

Final Mark = 60% E + 40% P

P = Weighted average of the marks of the three project deliverables

E = Exam

**Bibliography**

**Basic:**


**Complementary:**


**Others resources:**

**Hyperlink**

http://it4bi-dc.ulb.ac.be

http://tdwi.org

http://cs.ulb.ac.be/conferences/ebiss.html