UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Informatics

2122-3-E3201Q109

Aims

The course has two main objectives:

1) To introduce students to data base management systems with particular emphasis in the SQL language, which allows to define and inquiry relational databases. In particular, students will learn elementary concepts in order to model reality through a database. In particular, students will become familiar with relational databases. Through the laboratory activities they will put into practice the notions of theory and will learn to retrieve the information contained in a database, through appropriate instructions in SQL. The theoretical and practical notions will allow students to be able to manage the data that typically come from experimental activities related to their course of study.

2) To provide the basic programming knowledge needed to use Matlab and to study further programming languages. Students will begin to familiarize with programming, starting directly with the use of Matlab, applying it to data familiar to them. They will also be guided in writing codes for statistical data analysis.

The course is based on practical activities where theory acquired during the frontal lessons is applied and tested on experimental data.

At the end of the course students will be able to independently organize and query a relational database and write basic codes in matlab to analyze data.

Contents

Introduction to Data Base. The Entity Relationship (ER), the relational Data Model, the SQL language. Practical activities.

Fundamentals of programming using matlab for experimental data analysis and visualization.

Detailed program

1) Introduction to Data Base Management Systems

· The Entity Relationship Model: concepts of entity, relationship, attribute, generalization, identifier, integrity constraints.

· The Relational Data Model: concepts of relation, schema, attribute, domain, key, constraints.

· SQL, as Data Definition Language

· SQL, as Data Manipulation Language. Simple Select, the Join operator, aggregations, nested Select.

o Practical activities aimed at defining simple Database, and examples of queries.

2) Fundamentals of programming (Using Matlab)

· Algorithms

· Data types

· Variable and parameters

· Control-Flow Structures (if and switch), iterations (for, while).

· Functions, variable, input, output

· Import data

· Export data

o Practical activities using Matlab to process and analyze experimental data in particular applying statistical analysis and proper visualization functions.

Prerequisites

None

Teaching form

Lessons, 3 credits (24 hrs)

Classes, 2 credits (20 hrs)

Laboratory, 1 credit (10 hrs)

The course is taught in itlalian.

Textbook and teaching resource

P. Atzeni, S. Ceri, S. Paraboschi, R. Torlone: Basi di Dati: Modelli e linguaggi di interrogazione, McGraw-Hill Italia

Tutorial online

Slides of the lecturers.

Exercises and examples of exams.

Semester

First semester

Assessment method

Examination:

• Written and eventual oral exam

Evaluation Type:

• Final mark out of thirty

The exam consists of two practical activities: in the first part the student has to solve some queries on a database, using SQL and the Access interface. In the second part the student has to write some codes in matlab, that operate

simple analysis on data expressed with matrices or vectors. In particular, the application of statistical measurements, data visualization and management of input output data will be required.

It is also possible an oral verification of the expertise acquired.
Maximum mark is 30/30 cum Laude.

Two partial tests are scheduled, one at about half of the lessons, the second one at the end of the course. The first test is about queries on a database and the second one requires to write matlab codes. Both parts has a fmaximum mark of 30/30 cum Laude. The single test is considered passed if it has received a score >15. The final mark of the written exam is the average of the two parts (both of them >15). The exam is passed if this average is >=18.

If one of the two parts is not carried out (absent or withdrawn student) or if it is not sufficient (<=15) it can be recovered during the first examination only.

Office hours

Friday from 11.00 to 12.00.