# MSc in Bioinformatics for Health Sciences

# DBW. Databases and Web Development

**Syllabus Information**

**Academic Course:** 2018/19

**Academic Center:** 804 - Official Postgraduate Programme in Biomedicine

**Study:** 8045 – Bioinformatics for Health Sciences - MSc

**Subject:** 30178 – DBW. Databases and Web Development

**Credits:** 5.0

**Course:** 1st

**Teaching languages:** English

**Teachers:** Josep Lluís Gelpí

**Teaching Period:** 2nd term

## *Presentation*

This course takes place at the Faculty of Biology (Universitat de Barcelona).

This course provides an introduction to the concept and design of databases to hold biological data, and the design and programming of web-based applications.

## *Associated skills*

**General competences:**

1. Learning the concept of data model, and database

2. Learning the concept of web-based applications.

3. Acquiring operative skills in the design of a web-based software project including user interaction and interfaces, and data management, centered in a biological application.

**Specific competences:**

1. Acquire basic skills in computer communications, web-server management, and the deployment of web-based applications
2. Operative skills in data management through relational databases (MySQL) and SQL language
3. Operative skills in PHP language
4. Basic skills in software management and application design

## *Contents*

**Contents section 1:**

1.1 Introduction to basic computer communication protocols

1.2 Concept of client-server interaction. Web-servers and clients

1.3 Concept and kinds of computer addresses. Concept of URL

1.4 Introduction to Web, based protocols, and languages: HTTP, HTML, CSS, JS

**Contents section 2:**

2.1 Concepts of Data Model and Database

2.2 Criteria for Database design, SQL vs NoSQL Databases

2.3 Definition and representation of Data Models (E-R diagrams). Implementation in Relational and non-relational DBs.

2.4 SQL Language

**Contents section 3:**

3.1 Concept of Web-based applications

3.2 Server-client interaction. Synchronous and asynchronous communications. Persistency in web-based applications

3.3 PHP Language

3.4 Use Cases

3.4.1 User management

3.4.2 External application interfaces

3.4.3 Database interaction, forms and output reports,

3.5 Web-services, and specialized clients

## *Teaching methods*

**Approach and general organization of the subject:**

Each section of the course includes a set of theoretical introduction followed by hands-on sessions covering practical aspects of the subjects. Hands-on sessions are centered in solving use cases. Along the course an example application is constructed from scratch through a series of steps that follows the different theory subjects. Besides, students should develop in parallel their own applications and share their progresses in one public presentation in each block.

**Training activities**

The students are expected to develop a fully operative application on a subject of their interest, applying the concepts introduced in theoretical sessions and developed in the hand-on sessions. Applications should be developed in personal laptops, bu finally should be installed in a server organized as a standard public, shared, university web-server. Also students are explected to build and maintain a personal web-site holding their course contributions, and personal data.

Theoretical classes with study sessions for complementing material, written assays and oral presentation

## *Evaluation*

**Assesment system:**

Personal Web-site

Presentations of the progress of Application project

Operative Web-based Application

**Grading system:**

Personal Web-site (10%)

Exercises (10%)

Progress presentations (15%)

Application Data Model (20%)

Application project (45%)

## *Bibliography and Information Resources*

On-line manuals and tutorials