

Master in IT

preparing tomorrow's Internet architects



Introduction

Information Technology is a key to our modern society communication and business success. There is clearly a huge trend for the future to create and invent new technology, new application that can simplify day to day life and communication or make businesses more profitable and streamline.

In the past 10 years, the broad access to the Internet has revolutionize first the computer environment and more recently the mobile world. We believe that the vast majority of innovation in the upcoming years will come through the usage of the Internet and related technologies. In this perspective the Master in IT aims to prepare engineers, developers and more importantly creative persons who can become the next Internet architects in a fast moving world.

Keywords: network, internet, open, standard, computing

Modules

1. Project Methodologies & Collaborative Development

This course will first cover project management methodologies, specifically agile methodologies (Extreme Programming, Scrum...). In a second part, the course will cover the full life-cycle of an application development in order to introduce keys processes to students and let them understand how much the code development is only a small part of this cycle. Best practices and patterns will be introduce including business process modeling and designing (UML), test-driven development (TDD), bug reporting, documentation, security, source control management, staging and deployment.

2. Application Frontend Engineering

This module introduces the increasingly more important role of the user interface and the interaction of the user with the machine (Human-Computer Interface). It is now acknowledged that a very good technical solution can commercially fail due to its lack of clear interface, simplicity to use and its graphical appearance. To avoid such failure, engineers and developers must take more responsibilities in this area. Students will learn user interface paradigm, usability principles and advanced web 2.0 approach in order to make a successful application.

3. Application Backend Development

This course proposes to students to understand modern backend development in highly competitive and demanding environment. We will cover paradigms and tools to make sure an application can run and cope with the demand, be maintained and extended on the long-term, including most of the key design patterns, frameworks and API technologies.

4. Mobile Platforms

The course will cover the major mobile platforms. After introduction of their different development environment, frameworks and API, students will develop an application in order to understand the specificity of those platforms. This course will look ahead of the mobile market to investigate future trends in terms of technology as well as usage.

5. Distributed Database

Databases are used on all information systems nowadays. However, with the data explosion, traditional database systems show their limits to handle very large amount of data or to cope with the increasing demand, specially during peak period. This course will cover technology to improve scalability of existing database and more importantly students will study new databases technology such as distributed databases or document based databases.

6. Networking and Security

This module will offer a deep view on all critical Internet protocols such as TCP/IP, DNS and will have a large part of practical exercises for students to deeply understand routers, firewall, virtual networks, PKI, WAN and so on. The objective is not only to understand the theory but as well to feel comfortable with all those critical element of today network infrastructure.

7. Systems Scalability

The use of Internet and cloud computing application are increasing and so the need to growth the related infrastructure. The course will discuss available technologies and systems to allow applications to easily increase their bandwidth or processing power. Topics such as clustering, load balancing, high availability, fault-tolerance or data-center management will be covered.

8. Embedded, Wearable Computing & Smart Appliances

Technology is now expanding outside traditional computers and networks areas and more and more objects of our daily life are now inter-connected to keep us always connected and bring us augmented reality experience. This course will look at those technologies and all their possible interaction in order to improve our future.

Notes:

- Within these modules, students will have to use several programming languages and they will have to learn them by themselves. We consider this learning process as a normal exercise for IT people.
- Most of these module can, beside the taught part, include a project for students to be able to apply their knowledge and validate it.
- The final project should as much as possible cover several areas taught earlier, e.g.: a web application with mobile application integration, or

integration between a web application and RFID cards, or computer network lab to test security systems and so on.

- We will encourage students to publish everything under an open source license and a global website for the University will host all those projects (<http://openusj.org>).