

MASTER OF SCIENCE IN BIOMEDICAL ENGINEERING

TELEMATIC APPLICATIONS

SSD ING-INF/05, 6 CFU

Objectives

Knowledge and understanding

This class aims that students learn the basics to design a computer-based information system. The student will:

- Get an adequate level of knowledge of the methods used to analyse, write, and verify the requirements of an information system, mostly in an healthcare environment;
- Learn the basics of network technologies and their design.

Applying knowledge and understanding

The student will learn the following specific abilities:

- Know how to analyze, define, draft and verify the requirements of an information system;
- Know how to use the core components of a network, using a suitable simulation environment.

Making judgements

The student must be able to judge what are the basic elements of an information system to be used to solve real application cases. It will also have to know how to judge the requirements of an information system, and the basic elements of a computer network.

Communication skills

The student must be able to draw up a document presenting the requirements of an information system, and know how to display the contents of the teaching with appropriate technical language.

Learning skills

The student will have to develop those learning skills that are needed for undertake further studies with a high degree of autonomy.

Prerequisites

Basic concepts of computer architecture and computer programming.

Contents

Requirements engineering:

- Introduction to requirements and to systems engineering
- The generic process for requirements engineering
- System modelling for requirements engineering
- Writing and reviewing requirements
- Requirements engineering in the problem domain
- Requirements engineering in the solution domain
- Comparison between Waterfall and Agile methodologies
- Laboratory activities: preparation of models and documents to write requirements according to specific development tools
- External activity: visit to server room, POP (Point of presence) room, switch room

Computer networks:

- Introduction, ISO/OSI and TCP/IP model
- Physical layer, Data Link, Switch, MAC Table
- Network Layer, Router, Routing Table
- IP Addressing
- Transport Layer
- Application, Presentation, Session Layer, Security
- Security
- Laboratory activities: setting, testing and troubleshooting in real contexts or in simulation/project environments

Health applications: E-health in Italy

Teaching Methods

The class consists of traditional lectures in classroom as well as of practical lessons using both open-source and proprietary software packages, as well as simulation tools.

The division between frontal teaching and practical lessons is equal to 60% -40%, respectively, except for specific needs that may arise during teaching.

Verification of learning

The examination consists of two tests: the first consists of an experimental work (individually or in groups) with a presentation. This test aims at verifying that a student is able to use the tools to analyse, define, and verify the requirements of a computer based information system, and of a computer network. The second test is an oral that aims at verifying that a student gets a satisfactory knowledge of class contents.

The two tests equally contribute to the final mark.

Texts

- E. Hull, k. Jackson, J. Dick, Requirements Engineering, Springer
- Introduction to Networks, Cisco