IT.3502 High-Speed Networks

General information

Title of the module : High-Speed Networks
Identifier : IT.3502
Average workload : de 80h à 120h (42h supervised)
ECTS : 5 credits
Teamwork : Yes
Language: English
Keywords : Optical networks, satellite networks.

Presentation

Currently, the demand for broadband connection from corporate networks and operators continues growing. This demand is due to the increase in the number of Internet users, computing applications including distributed databases, multimedia communications, e-commerce... The evolution of optical networks and satellite networks makes it possible to better optimize the physical infrastructures of wireless networks. These provide greater transport capacity and reduce costs for implementing new applications.

This module introduces optical and satellite broadband networks used as infrastructure for wireless networks.

Pedagogical objectives

The module is targeting the following know-how :

- Size and deploy a satellite and terrestrial broadcast network (Basic Level).
- Deploy an optical network.

Prerequisite

Basic knowledge in telecommunications and networks

Content/Program

Concepts

The lessons given in this module make it possible to develop the following concepts:

- Architecture and engineering of very high-speed networks.
- Radio waves and their characteristics applied to satellite links.
- Wavelength-division multiplexing (WDM)
- Architectures and evolutions of optical networks,
- Routing, allocation of spectral resources in optical networks
- Protection techniques in optical networks

Tools used by the teacher/speaker

The teacher/speaker will use the following tools: Matlab/Excel/NetworkX

Tools used by the learner

By the end of the module, learners will have learned how to use the following tools/methods: Matlab

Pedagogical modalities

Learning methods

During lectures and tutorials, the main concepts and keywords, as well as concrete examples, will be exposed. At the end of each part, an individual written exam will assess each person's abilities to implement the skills acquired through various posed problems.

In parallel to this, a project on satellite communications is carried out per group. During this project, the following points are addressed: project organization and management, equipment and system, business plan, R&D project.

Assessment procedures

In the module, individual or group written work will assess the abilities of each learner to implement the knowledge acquired through various problems posed.

- Evaluation by group (50%): for the project.
- Individual assessment (50%): One exam for each part.

Bibliography - Webography – Other resources

- Internal resources, Moodle.
- Gérard Maral, Michel Bousquet, Satellite Communication Systems, Wiley, 5th édition.
- Optical WDM Networks. Springer, Biswanath Mukherjee, 2006
- Optical Network Design and Planning. Springer, Jane Simmons 2008