

EE-540

Optical communications

Gaumier Christian

Cursus	Sem.	Type
Electrical and Electronical Engineering	MA1, MA3	Opt.
Microtechnics	MA1, MA3	Opt.

Language of teaching	English
Credits	3
Session	Winter
Semester	Fall
Exam	Oral
Workload	90h
Weeks	14
Hours	3 weekly
Courses	2 weekly
Project	1 weekly
Number of positions	

Summary

Situate and evaluate the potentialities, limits and perspectives of optical communication systems and networks. Design and dimension of photonic communication systems and networks

Content

- Properties and imperfections of optical transmission systems: dispersion, non linearities, chirp, mode partition, etc. Special fibers. Solitons.
- Coherent transmission systems: coherent sources, modulation methods, heterodyne and homodyne coherent reception; advantages and applications.
- Multiplexing techniques: subcarrier multiplexing (SCM), wavelength division (WDM), optical frequency and time division (OFDM, OTDM). Crosstalk problems.
- Topology and morphology of photonic networks: core and access network. «Last mile» problem. Possibilities and limits.
- Planning: operation and capacity management, power budget, optical amplification, wavelength assignment. Reliability and economic aspects.

Keywords

Fiber optics, chromatic dispersion, wavelength division multiplexing (WDM), all-optical networks

Learning Prerequisites**Recommended courses**

Telecommunication systems. Optical signal processing.

Teaching methods

Ex cathedra with examples and demos. Exercises in class and group discussions. Project

Expected student activities

Attendance at lectures. Completing exercises. Doing a project.

Assessment methods

Oral examination (2/3)
Project (1/3)

Resources

Notes/Handbook

Ch. Gaumier, P,-G. Fontolliet - Communications optiques (in French)