

EE-540

**Optical communications**

Gaumier Christian

<b>Cursus</b>	<b>Sem.</b>	<b>Type</b>
Electrical and Electronical Engineering	MA1, MA3	Opt.
<b>MNIS</b>	MA3	Opt.
Microtechnics	MA1, MA3	Opt.
Photonics minor	H	Opt.

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

**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)