

## 11673 - TELFIB - Optical Fiber Telecommunications

Coordinating unit: 230 - ETSETB - Escola Tècnica Superior d'Enginyeria de Telecomunicació de Barcelona  
Teaching unit: 739 - TSC - Department of Signal Theory and Communications  
Academic year: 2011  
Degree: TELECOMMUNICATION ENGINEERING (Syllabus 1992). (Teaching unit Optative)  
DEGREE IN ELECTRONICS ENGINEERING (Syllabus 1992). (Teaching unit Optative)  
DOCTORATE IN SIGNAL THEORY AND COMMUNICATIONS (Syllabus 2007). (Teaching unit Optative)  
MASTER OF SCIENCE IN INFORMATION AND COMMUNICATION TECHNOLOGIES (Syllabus 2006).  
(Teaching unit Optative)  
EUROPEAN MASTER OF RESEARCH ON INFORMATION AND COMMUNICATION TECHNOLOGIES  
(Syllabus 2006). (Teaching unit Optative)  
ECTS credits: 5 Teaching languages: Catalan, English

### Prior skills

Optical communications. Telecommunications systems.

### Requirements

### Teaching methodology

Fall: Language of instruction catalonian/spanish  
Spring: Language of instruction english

### Learning objectives of the subject

For students to acquire knowledge of optical fibre telecommunications systems.

### Content

1. Optical fiber communications and devices.

1.1. Optical fiber communications evolution.

1.1.1. From P2P to optical networking

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1.2. Optical fiber transmission systems.

1.3. WDM systems.

1.4. Devices and components for optical communications.

1.4.1. Optical fibers.

1.4.2. Lasers.

1.4.3. Transmitters.

1.4.4. Receivers.

1.4.5. Multiplexers.

1.4.6. Demultiplexers.

1.4.7. Filtres.

1.4.8. Circulators.

1.4.9. Couplers.

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1.4.10. Splitters.

1.4.11. Optical amplification.

1.4.12. Switches.

1.4.13. Isolators.

1.4.14. Dispersion compensators.

1.5. Devices and components for ASON-GMPLS optical transport networks.

1.5.1. Components: OADM, OXC, W-C.

1.5.2. Transport plane elements.

1.5.3. Control plane elements.

1.5.4. Management plane elements.

1.6. Access networks.

1.6.1. HFC.

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1.6.2. FTTH-FTTP.

1.6.3. PONS.

1.7. Optical monitoring.

2. Transporting IP traffic over optical networks.

2.1. Networks of optical fibre.

2.1.1. Current technologies: IP/ATM (short summary).

2.1.2. In deployment technologies: IP/SDH.

2.1.3. New technologies: IP/WDM.

2.2. Metro networks.

2.2.1. IP/GIGABITETHERNET/WDM.

2.2.2. RPR (Resilience Packet Rings).

2.3. Optical networks.

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2.3.1. IP/OTN (Optical Transport Networks).

2.3.2. IP/ASON (Automatic Switched Optical Networks).

2.3.3. GMPLS.

2.4. Optical burst/packet switching.

2.4.1. From fast packet switching to optical burst/packet switching.

2.4.2. Optical packet switching preliminary prototypes.

2.4.3. Traffic management in optical packet switching.

2.4.4. Optical packet switching (OMPLS).

2.4.5. Optical burst switching.

2.4.6. Optical metro networks.

### Qualification system

- Attendance: 10%
- Assignments: 40%
- Final exam: 50%

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Regulations for carrying out activities

## Bibliography

### Basic:

Keiser, G. *Optical fiber communications*. 4th ed. New York: McGraw-Hill, 2011. ISBN 9780073380711.

Stern, T.E.; Ellinas, G.; Bala, K. *Multiwavelength optical networks: architectures, design and control*. 2nd ed. New Jersey: Cambridge University Press, 2009. ISBN 9780521881395.

Laude, J.P. *DWDM fundamentals, components and applications*. Boston [etc.]: Artech House, 2002. ISBN 1580531776.

Mukherjee, B. *Optical WDM networks*. New York: Springer, 2006. ISBN 0387290559.

Tomsu, P.; Schmutzer, C. *Next generation optical networks: the convergence of IP intelligence and optical technology*. Upper Saddle River: Prentice Hall, 2002. ISBN 013028226X.

### Others resources: