Program	59EC – Communications Electronic Engineering B. Eng.
	59SC – Telecommunications Systems Engineering B. Eng.
	59SO – Sound and Image Engineering B.Eng.
	59TL – Telematics Engineering B. Eng.

Course number and name	
Number	595000228, 595020228, 595023228, 595021228
Name	Transmission Systems
Semester	S5 [(September-January)]

Credits and contact hours	
ECTS Credits	6
Contact hours	60

Coordinator's name	Ortiz Ortiz, Óscar [oscar.ortiz@upm.es]

Specific course information

Description of course content

The future Telematic engineer must know the equipment and technology that set up the current transport networks which use to a great extent the optical technologies in a physical level.

List of topics to be covered

1. Introduction to Transmission Systems
2. 2 Mb/s Multiplex Systems
3. Digital Plesiochronous Hierarchy (PDH)
4. Synchronous Digital Hierarchy (SDH): multiplexing structure
5. Synchronous Digital Hierarchy (SDH): network structure
6. Fiber Optic Line Systems

Prerequisites or co-requisites

– Communication Theory

Course category in the program

_X_ R (required)	__ E (elective)
	(elective courses may not be offered every year)

Specific goals for the course

Specific outcomes of instruction

- RA689 – To analyze the structure and quality of the 2 MB/s standardized systems.
- RA697 – To use the appropriate laboratory equipment for the measurement of defects, abnormalities, and quality of the signal transmission in normalized

structures according to the European synchronous digital hierarchy.

- RA687 – To calculate the bandwidths used in telephony and data communications.
- RA692 – To understand the functioning of the transmitter and the receiver at different levels of the European plesiochronous digital hierarchy.
- RA691 – To understand the rules used in the multiplexes of plesiochronous digital hierarchy.
- RA693 – To learn about other international standards equivalent to the European ones, relating to the plesiochronous digital hierarchy.
- RA686 – To distinguish the elements that constitute a wide area network.
- RA690 – To use the appropriate laboratory equipment to verify the proper functioning of the 2 MB/s standardized systems.
- RA695 – To know the parameters that define the quality of optical fiber line systems.
- RA698 – To understand the problems arising in the integration of plesiochronous digital hierarchy networks with synchronous digital hierarchy networks.
- RA685 – To contextualize a transmission system model applied to a wide area network.
- RA688 – Ability to understand the technological state of the current networks.
- RA694 – To use the appropriate laboratory equipment to verify the proper functioning of the European standard plesiochronous digital hierarchy systems.
- RA696 – To understand the rules used in the multiplex of synchronous digital hierarchy.

Further reading and supplementary materials

– ITU-T: Recomendaciones de la serie G: Sistemas y medios de transmisión, sistemas y redes digitales: https://www.itu.int/rec/T-REC-G/es.
– Transmission Networking. Sonet and the Syncronous Digital Hierarchy. Sexton Reid, Mike. Artech House. 1992.
– Principles of Synchronous Digital Hierarchy. Jain, Rajesh Kumar.
– Moodle.