

Liverpool John Moores University

Title: Transmission media
Status: Definitive
Code: **7017ELE** (120439)
Version Start Date: 01-08-2016

Owning School/Faculty: Electronics and Electrical Engineering
Teaching School/Faculty: Electronics and Electrical Engineering

Team	Leader
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Academic Level: FHEQ7 **Credit Value:** 20 **Total Delivered Hours:** 72
Total Learning Hours: 200 **Private Study:** 128

Delivery Options

Course typically offered: Semester 2

Component	Contact Hours
Lecture	24
Practical	24
Tutorial	24

Grading Basis: 50 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Report	Case study	report	60	
Presentation	Case study	presentation	40	

Aims

To introduce the use of the electromagnetic spectrum in telecommunications systems, the choices available and consequences for system design

Learning Outcomes

After completing the module the student should be able to:

- 1 Analyse the advantages and disadvantages of different parts of the electromagnetic spectrum for a particular application
- 2 Design a transmission system to meet a particular need
- 3 Evaluate possible technical solutions to noise and attenuation issues
- 4 Discuss future developments in maximizing available bandwidth

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

Case study report	1	2	3
Case study presentation	4		

Outline Syllabus

The electromagnetic spectrum and wave propagation principles, Considerations of band choice (Eg RF, Optical, Microwave) for:

- *guided signals (eg copper twisted pair)*
 - *wave guides (eg singlemode/multimode optical fibre)*
 - *free space propagation (eg. LoS (ground-waves, space-waves), NLoS (tropospheric refraction, sky-waves, laser systems)).*
 - *Noise sources, multi-user issues, signal degradation, consequences and mitigation, attenuation and power budgeting*
 - *Transmitter/receiver design (eg antennas)*
 - *Access to em spectrum/markets*
- Modern and future approaches to maximizing availability, eg cognitive radio, Terahertz waves*

Learning Activities

Lectures, tutorials based on case studies and practicals

Notes

This module looks at electromagnetic waves, their use in Telecommunication Systems, and the design issues related to particular parts of the spectrum.