

Radio and Optical Signal Propagation

Module Information

2022.01, Approved

Summary Information

Module Code	7546ELEMST
Formal Module Title	Radio and Optical Signal Propagation
Owning School	Engineering
Career	Postgraduate Taught
Credits	10
Academic level	FHEQ Level 7
Grading Schema	50

Teaching Responsibility

LJMU Schools involved in Delivery
LJMU Partner Taught

Partner Teaching Institution

Institution Name
Sri Lanka Technological Campus

Learning Methods

Learning Method Type	Hours
Lecture	22
Practical	12
Tutorial	11

Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
JAN-PAR	PAR	January	12 Weeks

Aims and Outcomes

Aims	To introduce the use of the electromagnetic spectrum in telecommunications systems, the choices available and consequences for system design
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After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Critically analyse the advantages and disadvantages of different parts of the electromagnetic spectrum for a particular application and future developments in maximizing available bandwidth
MLO2	2	Design a high level transmission system to meet a particular need
MLO3	3	Critically evaluate possible technical solutions to noise and attenuation issues

Module Content

Outline Syllabus	The electromagnetic spectrum and wave propagation principles, Considerations of band choice (E.g. RF, Optical, Microwave) for:- guided signals (e.g. copper twisted pair) - wave guides (e.g. single mode/multimode optical fibre)- free space propagation (e.g. 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 (e.g. antennas)- Access to em spectrum/marketsModern and future approaches to maximizing availability, e.g. cognitive radio, Terahertz waves
Module Overview	
Additional Information	This module looks at electromagnetic waves, their use in Telecommunication Systems, and the design issues related to particular parts of the spectrum.

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Report	Case study report	100	0	MLO1, MLO2, MLO3

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Ronan McMahon	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings