

Liverpool John Moores University

Title: COMMUNICATIONS ENGINEERING
Status: Definitive faculty appr change
Code: **6012ENG** (106217)
Version Start Date: 01-08-2011

Owning School/Faculty: Engineering
Teaching School/Faculty: Engineering

Team	Leader
Tony Moore	Y

Academic Level: FHEQ6
Credit Value: 24.00
Total Delivered Hours: 86.00
Total Learning Hours: 240
Private Study: 154

Delivery Options

Course typically offered: Summer

Component	Contact Hours
Lecture	48.000
Practical	12.000
Tutorial	24.000

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	Examination	50.0	2.00
Essay	AS2	Coursework	25.0	

Aims

This module covers the physical layer of communications, including channel behaviour, modulation systems, noise and error protection. To explain compression techniques, and traffic analysis.

Learning Outcomes

After completing the module the student should be able to:

- 1 Analyse the characteristics of transmission channels
- 2 Explain a variety of digital modulation techniques and analyse their performance in noise.
- 3 Perform calculations on channel performance and use error protecting codes
- 4 Analyse traffic characteristics

Learning Outcomes of Assessments

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

EXAM	1	2	3
CW	4		

Outline Syllabus

Fibre Optic transmission

Satellites, Geo-stationary orbit, Free Space Path Loss, Link Budget, G/T ratio, Current use in Broadcasting

Line coding: HDB3, block codes, pulse-shaping to avoid ISI, Nyquist's criterion.

Digital Modulation systems. The ITU/T V series of recommendations for FSK, PSK, QAM and TCM systems.

Performance of different schemes in noise, eye diagrams, multi-level coding, timing recovery.

Modern modulation systems; CDMA, OFDM

Mobile telephony air interfaces

Source Coding: Entropy, Variable length coding

Channel Coding: Shannon's theorem. Channel capacity and mutual information.

Error correction codes

Queueing theory, traffic calculations, blocking, service times

Learning Activities

By a combination of lectures, tutorials and laboratories

References

Course Material	Book
Author	Proakis, J.
Publishing Year	2000
Title	Digital Communications
Subtitle	
Edition	4th
Publisher	McGraw-Hill

ISBN	: 0071181830
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Course Material	Book
Author	Lathi, B.P.
Publishing Year	1998
Title	Modern Digital and Analog Communications Systems
Subtitle	
Edition	3rd
Publisher	Oxford University Press
ISBN	0195110099

Notes

This module covers the properties of channels and the principles of digital modulation: it also deals with emerging transmission systems.