Liverpool John Moores University

Title:	Communications Engineering
Status:	Definitive
Code:	**6099ENG** (116886)
Version Start Date:	01-08-2016
Owning School/Faculty:	Electronics and Electrical Engineering
Teaching School/Faculty:	Electronics and Electrical Engineering

Team	Leader
Ronan McMahon	Y
Tony Moore	

Academic Level:	FHEQ6	**Credit Value:**	20	**Total Delivered Hours:**	75
Total Learning Hours:	200	**Private Study:**	125		

Delivery Options
Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	48
Tutorial	24

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	Exam		70	3
Technology	Tec Task 1		10	
Technology	Tec Task 2		20	

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	Analyse a variety of coding systems
4	Perform calculations on link budgets
5	Simulate communication channels
6	Analyse traffic characteristics

Learning Outcomes of Assessments

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

Exam	1	2	3	6
Technological Task 1	4			
Technological Task 2	5			

Outline Syllabus

Performance of digital signals in noise, eye diagrams, multi-level coding, timing recovery.
Line coding: HDB3, block codes, pulse-shaping to avoid ISI, Nyquist's criterion.
Digital Modulation Systems
Modern modulation systems; CDMA, OFDM
Satellites transmission, Free Space Path Loss, Link Budget
Fibre Optic transmission
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

Notes

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