Aston University
Quality and Standards Committee
Module Specification

REG/03/53(2)

School and Subject Group		School of Engineering and Applied Science, Electronic Engineering	
Module Code		EE3DTR	
Module Title		Digital Transmission	
Module Type		Taught	
Date of introduction of new module		2001	
Level		6	Credit Value: 10
Programme(s) in which module is available		MSc in Telecommunications Technology MRes in Photonic Network Systems MSc in Telecommunications Technology (Distance Learning)	
Involvement of Other Schools		None	
Resource Split			
Name of Module Co-ordinator		Dr. John A.R. Williams	
Name of Module Advisor		I. Bennion	
Related Modules	Pre-requisites	None	
	Co-requisites	None	
	Prohibited Combinations	None	
Minimum and Maximum Intake Sizes		None – 36	

Aims of the Module

To provide a basic understanding of the purpose and principles of transmission and modulation techniques used in analogue and digital communication systems.

Summary of Content

Pulse Modulation Pulse amplitude and pulse position modulation, time division multiplexing, pulse code modulation, sampling and quantisation, companding, NICAM, differential pulse code modulation, adaptive quantisation and prediction, delta modulation, adaptive subband coding.

Baseband Pulse Transmission Matched Filter, Additive White Gaussian Noise, error rate due to noise, intersymbol interference, ideal Nyquist channel, raised cosine filter, correlative-level coding, tapped delay line equalisation, line codes, eye pattern diagram

Digital Passband Transmission Geometric Interpretation of Signals and Noise (Signal Space diagrams), Probability of Error, Coherent Binary Phase Shift Keying, Binary and M-ary Amplitude Shift Keying, Coherent Binary FSK, Coherent M-ary Phase Shift Keying, Calculation of Error Rate for QPSK, Quadrature Amplitude Modulation (QAM), Calculation of symbol error rate for QAM. Modems, Comparison of modulation schemes, Carrier and symbol synchronisation, Spread Spectrum techniques, Modems

Contemporary Transmission Systems modems, xDSL techniques, modulation techniques used for mobile radio

Summary of Methods and Frequency of Teaching	**Tutorials** 4 hours. **Laboratory** 12 hours. On campus for all students. **Lectures** 24 hours.

Summary of Methods of Assessment

Assessment Type	*Status*	*%*	*Requirements*	*Due*
Formal Examination	Compulsory	60.0	Exam. 2hr formal examination	15 Dec 2009
Laboratory	Compulsory	20.0	Laboratory. Tests to be completed at the end of every session.	10 Dec 2009
Online test	Compulsory	20.0	MCQ. Online tests to be completed at regular intervals.	10 Dec 2009

Module Outcomes - what the student should gain from successful completion of the module:	Learning and Teaching and Assessment Strategies to enable outcomes to be achieved and demonstrated	
	Learning and Teaching Methods	Assessment Methods
A. Knowledge and Understanding		
the purpose and principles of transmission and modulation techniques used in analogue and digital communication systems	Laboratory, Lectures, Tutorials	Formal Examination, Laboratory, Online test
B. Intellectual Skills		
C. Professional Skills		
apply their knowledge of the principles underlying modern data networks	Laboratory, Tutorials	Laboratory
D. Transferable Skills		

Please provide either or both of:	
(i) Introductory Learning Resources	1. Blackboard module with discussion group and tutorial material 2. Online tutorials with integrated formative/summative assessments
(ii) Core Texts	1. "Communication Systems', Simon Haykin, 4th Edition, Pub. Wiley, 2000. ISBN 0471178691. Class Number 621.380413 HAY 2. "Digital Communications', I.A. Glover and P.M. Grant, , Pub Prentice Hall 1998. ISBN 0-13-565391-6 pounds 25 softback 3. "Digital Communications', John G. Proakis, 3rd Edition, Pub. McGraw-Hill 1995. ISBN 0-07-113814-54 pounds 22.95 paperback 4. "Telecommunications Engineering', J. Dunlop and D.G. Smith 3rd Edition, Pub Chapman & Hall. Class Number 621.38 DUN 5. "The Principles of Communications', R. E. Ziemer and W. H. Tranter, 4th Ed., Pub Houghton Mifflin Company 1995 6. "ADSL, VDSL, and Multicarrier Modulation' John A.C. Bingham, Wiley 2000, ISBN 0-47-29099-8, Library 621.38 BIN
Reading Lists	Attached
Specification completed by:	Dr. John A.R. Williams
Date	22-Apr-2009
Date module approved by Teaching Committee(s)	

Date module approved by School Board(s)	