The University Of Sheffield.

Electronic & Electrical Engineering.

EEE6400 PRINCIPLES OF COMMUNICATIONS

Credits: 10

Course Description including Aims

This course considers the theory and techniques used by a wide range of communication systems, particularly the more recent digital and cryptographic systems.

The main aim is to create a theoretical background that applies to all communication systems and is not affected by any particular technology.

The course provides a description of the structure of modern communication systems and the basic issues at each stage in the system.

Outline Syllabus

Components of a typical communication system. Formatting and source encoding. Information and entropy. Channel capacity. Hartley-Shannon law. Probability of error in transmission. M-ary signalling. Channel encoding, linear block encoding. Types of transmission channel and their limitations. Methods of synchronisation. Multiplexing and multiple access. Spread spectrum objectives and techniques. Crypto-graphy and code breaking. RSA scheme and SSL protocol.

Time Allocation

24 lectures plus 12 hours of additional support material.

Recommended Previous Courses

Background knowledge equivalent to AMA242 “Mathematics III” and EEE206 Communication Systems”.

Assessment

2 hour examination, answer 3 questions from 4.

Recommended Books

Sklar, B.	*Digital Communications*	Prentice-Hall
Roden, M.S	*Digital Communication Systems Design*	Prentice-Hall
Brewster, R.L.	*Telecommunications Technology*	Ellis Horwood
Young P.H.	*Electronic Communication Techniques*	Macmillan
Lee W.C.Y.	*Mobile Communications Design Fundamentals*	Wiley

Objectives

By the end of this module students will be able to

1. Understand that communication is the process of exchanging information.
2. Calculate the information content and coding efficiency of a message and where possible, reduce (or compress) the average code length of the message.
3. Demonstrate awareness of the need for communication security and describe techniques for encryption.
4. Display familiarity with techniques that maximise spectrum utilisation.
5. Understand how noise limits the information rate and to be aware of techniques that maximise signal detection in the presence of noise.
6. Appreciate the fundamental nature of the trade-off between error performance and bandwidth in a communications system.
7. Describe current technological advances and show how they allow a closer approximation to theoretical information capacity limits.