London South Bank University

EST 1892

Module Guide

Introduction to Communication Systems and Networks

ENG_5_533

School of Engineering

Level 5

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1. MODULE DETAILS

Module Title:	Introduction to Communication Systems and Networks
Module Level:	5
Module Reference Number:	ENG_5_533
Credit Value:	20
Student Study Hours:	200
Contact Hours:	26 hours lectures, 14 hours tutorials, 12 hours workshop
Private Study Hours:	148
Pre-requisite Learning (If applicable):	Relevant knowledge in communications and networking
Co-requisite Modules (If applicable):	None
Course(s):	BEng/MEng CSN
Year and Semester	2019-2020, Semester 1
Module Coordinator:	Dr Jian-Guo Zhang
MC Contact Details (Tel, Email, Room)	Tel: 020 7815 7576 Email: zhangja@lsbu.ac.uk Room T813
Teaching Team & Contact Details (If applicable):	
Subject Area:	Electrical and Electronic Engineering
Summary of Assessment Method:	Exam (70%) and Coursework (30%)
External Examiner appointed for module:	Prof. Jonathan Loo (till 2019), University of West London

2. SHORT DESCRIPTION

This module is intended to give students an introduction on data communications and computer networking. The topics covered mainly focus on the OSI model for the basic communication and networks, especially the 4 bottom layers: i.e. Physical layer, Data-link layer, Network layer, and Transport layer. Students will gain comprehensive understanding in terms of overall connection of these layers and the importance of each layer and their specific functions. Moreover, students will be able to understand the principle of a typical communication system, analogue and digital modulation techniques, and line coding schemes, respectively.

3. AIMS OF THE MODULE

- To understand the role of electronic communications in industry and commercial areas.
- To learn general principles of engineering and practice when designing a typical communication system.
- To understand details and specific topics related to how signals are transmitted, i.e., modulation techniques for both analogue and digital signal transmissions, line coding schemes, etc.
- To apply knowledge of network topologies and requirements to evaluate their effectiveness in specific design and application.
- To be familiar with protocols for general network communications.

4. LEARNING OUTCOMES

4.1 Knowledge and Understanding

- Understanding of underlying principles and practices of communication signals and systems.

- Understanding of performance analyses on modulations and multiplexing.

4.2 Intellectual Skills

- Understanding of computer networking principles. Ability to identify the performance of a network through the use of analytical methods.
- Ability to design and construct a computer network and evaluate the outcomes.

4.3 Practical Skills

- Construct a basic network with standard workstation and networking devices, keep a technical logbook of all work done.

4.4 Transferable Skills

- To effectively communicate and critically evaluate observed results in a technical format. Work effectively as a team member during lab work.

5. ASSESSMENT OF THE MODULE

The learning outcomes of the module are assessed through a combination of examination and coursework assignment. Knowledge and understanding of the analytical content will be assessed through examination whilst coursework will assess students' problem solving abilities and practical skills of network design.

- End of Module examination of duration – 3 hours (70%)
- Coursework with laboratory based assignments (30%)

Students' laboratory logbooks are to be submitted latest by **Friday of the teaching week 12**.

6. FEEDBACK

Feedback will normally be given to students 15 working days after the final submission of an assignment or as advised by their module leader.

7. INTRODUCTION TO STUDYING THE MODULE

7.1 Overview of the Main Content

This module discusses both the principles and practice of communication systems and computer networking.

7.2 Overview of Types of Classes

Lectures, tutorials and laboratory workshops
These can be classified into two main activities as follows.

- Lectures and tutorials will be at the rate of about 3 hour per week. Lectures will cover all the main aspects of the subject matter in the module. You will be given website based handouts to either accompany the module textbook or to complement it when necessary. You are encouraged to find out more about each topic covered for deeper understanding, and to consult your lecturer for more information.
- Laboratory sessions, each being for two hours, will be held 6 times during the semester. It covers practical experiments.

7.3 Importance of Student Self-Managed Learning Time

Student responsibility in the learning and development process will be emphasised. Students are required to undertake directed self-study and prepare solutions/discussions to questions relative to various topic areas. Students will be encouraged to identify for themselves particular problems of difficulty and to use seminar discussions, where appropriate, for the resolution of these. Students must regularly access the Moodle site

for this module. They should download the class/lecture material from the Moodle site, and do the recommended reading, before each lecture/class.
The programme of teaching, learning and assessment gives guidance on the textbook reading required for each week, the purpose of which is to encourage further reading both on and around the topic.

7.4 Employability

The module aims to equip graduates with concrete knowledge and understanding of related electronic industry in order to prepare graduates with relevant skills for various possible jobs in wireless engineering and industries, mobile networks and systems providers and operators, consultancy, wireless standards, advisory and regulatory agencies. Using the knowledge acquired in class to solve engineering problems will be stressed through teaching. Some key issues associated to job hunting in the field of analogue, digital, optical and telecommunications and computer networks will be advised.

8. THE PROGRAMME OF TEACHING, LEARNING AND ASSESSMENT

SEMESTER 2		
WEEK	**TOPIC**	**READING (CORE TEXT)**
1	**Networking Fundamentals and Introduction to Broadband Communications**	
2	**Local Area Network (LAN), Access Network, Metropolitan Area Network (MAN), Wide Area Network (WAN)**	
3	**OSI Model and TCP/IP Model**	
4	**Network Layer**	
5	**Data Link Layer**	
6	**Transport Layer**	
7	**Basics of Signals, Transmission Impairments, Data Rate Limit, and Multiplexing Techniques**	
8	**Line Coding Schemes, Analog-to-Digital Conversion (ADC)**	
9-10	**Analogue Modulation Schemes**	
11-12	**Digital Modulation Schemes**	
13	**Revision**	

9. STUDENT EVALUATION

Based on student's responses to the "End of Module Questionnaire", the analysis appears to suggest that the contents and the assessments of this module should be appropriate for students. General comments are good.

10. LEARNING RESOURCES

Reading List

10.1 Core Materials

- James F. Kurose & Keith W. Ross, Computer Networking A Top-Down Approach, 7/E, 2017, ISBN-13: 9780133594140
- B. Forouzan, Introduction to Data Communications and Networking 5/E, 2013, Publisher: McGraw-Hill, ISBN: 978-9814577519

10.2 Optional Materials

- L.E. Frenzel, Principles of Electronic Communication Systems, Fourth Edition, McGraw-Hill Education, 2016
- Halsall, F, Computer Networking and the Internet, Addison Wesley; 5 edition (27 Jan 2005)
- Stallings, Data and Computer Communications, Prentice Hall; 10/E, Dec 2013, ISBN-13: 978-1292014388
- Beyda W, Basic Data Communications, 4th Edition, Prentice-Hall, 2005
- Schweber W, Electronic Communication Systems, 4th Ed., Prentice Hall, 2002