

module guide

Introduction to Digital Electronics

ENG-4-406

School of Engineering

Academic Year: 2015 - 2016

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Table of contents

1.0	MODULE DETAILS	3
2.0	SHORT DESCRIPTION	3
3.0	AIMS OF THE MODULE Error! Bookmark not defin	ed.
4.0	LEARNING OUTCOMES	3
5.0	INTRODUCTION TO STUDYING THE MODULE	4
5.1	OVERVIEW OF THE MAIN CONTENT	4
5.2	OVERVIEW OF TYPES OF CLASSES	4
5.3	IMPORTANCE OF STUDENT SELF-MANAGED LEARNING TIME	4
6.0	THE PROGRAMME OF TEACHING, LEARNING AND ASSESSMENT	5
7.0	ASSESMENT OF THE MODULE	5
8.0	LEARNING RESOURCES	5
8.1	CORE MATERIALS	5
8.2	OPTIONAL MATERIALS	5

1.0 MODULE DETAILS

Module Title:	Introduction to Digital Electronics
Module Level:	4
Module Reference Number:	ENG-4-406
Credit Value:	30
Student Study Hours:	300
Contact Hours:	96
Private Study Hours:	204
Pre-requisite Learning (If applicable):	None
Co-requisite Modules (If applicable):	
Course(s):	EEE, TECNE, CNS
Year and Semester	2015-16, Semester 2
Module Coordinator:	Dr Paul Klimo
UC Contact Details (Tel, Email, Room)	x7579, <u>klimop@lsbu.ac.uk</u> , T 708
Teaching Team & Contact Details	Dr Paul Klimo & Dr Nigel Webster
(If applicable):	
Subject Area:	
Summary of Assessment Method:	Exam:50%
	Workshop & Assignments: 50%

2.0 SHORT DESCRIPTION

This module aims to introduce the student to the fundamentals of combinatorial logic design and the hardware and the software tools involved.

3.0 LEARNING OUTCOMES

On successful completion of the module, students will be expected to:

- Know the technologies that are available for implementation of combinatorial systems.
- Analyse the circuit behaviour and performance using standard methods
- Appreciate the use of simulation and Hardware Description Languages
- Select suitable hardware components and software tools to implement and verify the electronic system design to be carried out.
- To understand the principles involved in specific designs and appreciate the design constraints due to the hardware and software involved.

4.0 INTRODUCTION TO STUDYING THE MODULE

4.1 OVERVIEW OF THE MAIN CONTENT

The module involves basic aspects of the combinatorial circuit design. It provides information on the design procedures, the modern hardware components and the CAD and the software packages used in the design and the simulation. Students are taught some of the most commonly used methods of circuit analysis and synthesis of Boolean digital systems. They will learn how to proceed in stages from a technical specification to a complete circuit design.

4.2 OVERVIEW OF TYPES OF CLASSES

The lectures cover a selection of some key topics on the theory and the procedures of the digital design. The workshops enhance the material presented in the lectures and provide a practical means of applying the learned theory to real simple designs.

Students are expected to attend all lectures. <u>Students are required to use</u> one of the core text textbooks recommended in the section 7. Learning Resources.

4.3 IMPORTANCE OF STUDENT SELF-MANAGED LEARNING TIME

The self-study represents the most important part of the Module. The lectures, serve only as pointers to acquiring the skills in the subject. Students are expected to use several core and supplementary resources to obtain an alternative and deeper view of the material presented in the lectures. The level of competence required for the end of module exam can be only achieved by students working independently on the tutorial examples provided for the module and also in the supporting material listed at the end of this Module Guide.

Students will be encouraged to work through the core reading materials to consolidate the knowledge and understanding of the fundamentals of digital systems design. They will be able to extend and deepen their knowledge by further experimentation in their own time using the software at home or on campus.

5.0 INDICATIVE PROGRAMME OF TEACHING

- Weeks 1: Number Systems and Conversions
- Weeks 2-3: Boolean Algebra
- Weeks 4-5: Minterm-Maxterm Expansions
- Weeks 6-7: Karnaugh Maps
- Week 8: IC implementation: Gates

Weeks 9: Multiplexers and Decoders

Weeks 10-11:

Programmable Logic Devices

Weeks 11-12 Use of VHDL in Modelling and System Implementation

6.0 ASSESMENT OF THE MODULE

The assessment consists of an End of Module written exam of two hours duration (weighing 50%) and the coursework (weighing 50%) based workshop assignments. The attendance of workshops is compulsory and forms part of the workshop assessment component.

If so required, the lab logbooks and/or the formal assignments are to be **submitted through the faculty office for the attention of the Lecturer who set the Assignment.**

Late submissions of the coursework shall be penalised in accordance with the University regulations.

Submission Dates:

Unless advised otherwise the lab logbooks are to be submitted latest by the Friday of the teaching week 13 in each semester.

7.0 LEARNING RESOURCES

7.1 CORE MATERIALS

Fundamentals of Logic Design, C.H. Roth, Thomson Publ, 2004. **Digital Fundamentals with VHDL**, T.L. Floyd, Prentice Hall, 2001.

7.2 OPTIONAL MATERIALS

Digital Design - Principles & Practices, J. Wakerly, Prentice Hall. 1999.