London South Bank University

EST 1892

Module Guide

Introduction to Digital Electronics

ENG_4_406

http://vle.lsbu.ac.uk

School of Engineering

2019-20

Level 4

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1. MODULE DETAILS

Module Title:	Introduction to Digital Electronics
Module Level:	Level 4
Module Reference Number:	ENG_4_406
Credit Value:	20
Student Study Hours:	200
Contact Hours:	52
Private Study Hours:	148
Pre-requisite Learning (If applicable):	NA
Co-requisite Modules (If applicable):	NA
Course(s):	501, 502, 4526, 4632, 4633, 4634, 4635
Year and Semester	2018-2019, Semester 2
Module Coordinator:	Dr Oswaldo Cadenas
MC Contact Details (Tel, Email, Room)	020 7815 7589, cadenaso@lsbu.ac.uk, T-808
Teaching Team & Contact Details (If applicable):	Dr Oswaldo Cadenas
Subject Area:	EEE
Summary of Assessment Method:	CW: 50%, EX: 50%
External Examiner appointed for module:	Prof Danny Morton, University of Bolton.

2. SHORT DESCRIPTION

This module introduces the fundamentals of combinatonial logic design and sequential design. The module addresses hardware devices to perform digital logic designs and tools to support the design and analysis. The module covers common combinational design blocks such as adders, encoders, comparators and data selectors as well as sequential design blocks such as counters and registers. The module gives examples of analysis of full digital systems as well as the design of typical finite state machines.

3. AIMS OF THE MODULE

To develop knowledge, and the ability to analyse and understand the operation of a digital circuit
To develop knowledge, and the ability to analyse and understand the operation of a sequential circuit
To develop practical skills to enable students to have confidence in building and testing digital circuitry
To develop knowledge and skills in using standard workshop instruments for digital designs
To develop written communication skills by logbook maintenance

4. LEARNING OUTCOMES

4.1 Knowledge and Understanding

Knowledge of the underlying principles and practices of simple Boolean and sequential circuits using Boolean equations, logic mimimisation; analysis and synthesis of sequential designs

4.2 Intellectual Skills

Understand the operation and application of basic digital components such as gates, latches, flip-flops and its analysis including timing circuits

4.3 Practical Skills

Use standard workstation instruments; keep a technical logbook of all work done. Gain the ability to construct circuits on breadboard from drawn schematics and try them out. Develop fault-find abilities using logic probes and test instruments

4.4 Transferable Skills

To be able to effectively communicate and critically evaluate observed results in a technical format. To work effectively as a team member during lab work

5. ASSESSMENT OF THE MODULE

This module is assessed through a combination of end of module unseen written exam worth 50% of the module and the remaining 50% is set as coursework through the module. The coursework will consist of a phase test, a lab quiz and logbook submission. All this is summarised below:
Exam 50%
Coursework 50%
- Online assessment 1 of first part of coursework (20%)
- Online assessment 2 of second part of coursework (20%)
- Logbooks (10%)

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.

General feedback, applying to all students, will also be placed on the module VLE site within 15 working days.

7. INTRODUCTION TO STUDYING THE MODULE

7.1 Overview of the Main Content

The main content of this module is split into three areas: Combinatorial Logic, Sequential Logic and Finite State Machines.

7.2 Overview of Types of Classes

Classes are arranged as weekly two hour lectures/tutorials and bi-weekly two hour laboratory sessions. Students are organised into smaller groups for the laboratory so that they can work in pairs (preferable) at the workstations (or groups of three as maximum).

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.

Students are also expected to download the relevant tutorial exercises and study them in advance of each revision seminar, in order to derive maximum benefit from seminar time. The

programme of teaching, learning and assessment gives guidance on the textbook reading required, the purpose of which is to encourage further reading both on and around the topic.

7.4 Employability

Digital electronics is a fundamental component within the field of Electrical and Electronic Engineering and is central to further topics with the discipline. Understanding of digital electronics is paramount to most roles and employment in the industry in this area.

8. THE PROGRAMME OF TEACHING, LEARNING AND ASSESSMENT

Truth tables, Boolean equation in sum-of-products
Simplification of Boolean Equations – Karnaugh Maps
Minterm-Maxterm Expansions
Number Systems and Conversions
Combinational logic blocks: adders, multiplexers, decoders, comparators
Sequential Components: Flip-flops, D-Type flip flop
Counters, shift registers
Finite State Machines

9. STUDENT EVALUATION

Student evaluation from last year indicated minor changes in teaching. As a result more tutorilas are being planned in the delivery of this module.

10. LEARNING RESOURCES

10.1 Core Materials

1. Fundamentals of Logic Design, C.H. Roth & L. Kinney, 7th Edition, Cengage Learning, , 2014
2. Electronics: A systems Approach, Neil Storey, 5th Edition, Pearson, 2013

10.2 Optional Materials

3. Digital Design - Principles & Practices, J. Wakerly, Pearson, 2008