

EBU4202

Digital Circuit Design

Overview 2018-19

Mr Andy Watson (Andy)

Dr James Kelly (James)

Dr Atm Shafiul Alam (Alam)

Dr Md Hasanuzzaman Sagor (Hasan)

Lecturers

Andy: e-Commerce teaching weeks 4 and 15

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James: e-Commerce teaching weeks 1 and 8

email: j.kelly@qmul.ac.uk

Alam: IoT teaching weeks 2 and 7

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Hasan: IoT teaching weeks 12 and 14

email: m.h.sagor@qmul.ac.uk

Information

- **Course website:**
 - Login to QM+
 - Course Area: EBU4202 – Digital Circuit Design
 - Check it regularly, as it is possible there could be additional information e.g. *messages, extra practice exercises, tutorials, etc*
- **Email:**
 - You are expected to check your email every week at least!
 - Please ensure you are on the *class mailing list*, so you do not miss important information and/or posted help.

Information

- **Lecture Notes:**
 - Should be available on QM+.
 - Access them from the “**Lectures and Tutorials**” link of the course website.
- **Recommended Textbook:**
 - *Digital Design: Principles and Practices*,
by John F. Wakerly, Prentice Hall
Edition: 4th Edition
- Two other recommended books are:
Digital Design by M. Morris Mano; 3rd Edition; Prentice Hall 2002;
ISBN 0130621218
Digital Design from Zero to One by Jerry D. Daniels; John Wiley &
Sons Inc. 1996; ISBN 0471124478.

Software

- There are several software platforms that can be used to simulate and test digital circuits:

For example:

- National Instruments Multisim:

<http://www.ni.com/multisim>

- Xilinx ISE:

<http://www.xilinx.com/products/design-tools/ise-design-suite.html>

- Logicly:

<http://logic.ly>

- VeriLUOC

<http://wyoming.uoc.es/pubver>

Timetable

Lectures :

Lecture week 1: Number Systems and Codes; Basic Logic Functions

Lecture week 2: Karnaugh Maps; Combinational Logic

Lecture week 3: Sequential Logic

Lecture week 4: Memory Devices; Digital System Blocks

Tutorials:

Thursday of lecture weeks at 17:30-18:30 room S106

Timetable

There are 3 labs:

- Class 2017215111-14, weeks 10, 12, 14, Saturdays 9:30-12:30, Shahe Campus Circuit Centre Laboratory Building 01, 02, 03, 04.
- Class 2017215115-18, weeks 10, 12, 14 , Saturdays 13:30-16:30, Shahe Campus Circuit Centre Laboratory Building 01, 02, 03, 04.
- Class 2017215119-22, weeks 10, 12, 14, Saturday 17:30-20:30, Shahe Campus Circuit Centre Laboratory Building 01, 02, 03, 04.

Note: Attendance at the labs takes priority over anything else.

Assessment

- Exam: 2 hour, 4 compulsory questions: overall weighting 75%
- Coursework: overall weighting 25%
- There is a coursework hurdle of 30%: (Your total coursework mark must be at least 30% for you to be able to pass the module)

Coursework is 3 labs plus assorted class tests.

The labsheets will be made available before the lab sessions and **you must read and do the preparation in time**. The completed labsheets must be handed in at the end of the lab. Late submissions will not be accepted resulting in a score of 0!

Background

- **What & Why:**
 - **Learn** how to **design digital electronic circuits**, so that we can build systems that solve practical problems.
 - **Provide** the **knowledge and understanding** that may be required for future study and applications.
- **How:**
 - **Introduce** the **basic theorems** of digital logic.
 - **Present** techniques for **designing and analysing digital circuits**.
 - **Describe** the **function and operation** of devices and building blocks used in digital circuits and systems.

Outline

Number Systems & Codes

Number System Conversions & Arithmetic / Binary Codes / Error Codes

Boolean Algebra & Basic Logic Functions

Truth tables / Operator precedence / Boolean Algebra / Canonical products and Sums

Map Minimisation

Karnaugh Maps / Sum-of-Products & Product-of-Sums

Combinational Logic

Adders / Code Converters / Decoders & Encoders / Multiplexers

Sequential Logic

Latches and Flip-Flops / Counters / State Diagrams / State Machine Design & Analysis

Memory Devices

ROM/SRAM/DRAM

Digital System Blocks

ALU/CPU/Peripheral Interfaces/Microcomputer Block Diagram

How to (possibly) pass

To succeed, you MUST ...

- Put the effort in.
- Make good use of available resources.
- Attend lectures, tutorials and labs.
- Read books and online materials.
- Do additional practice exercises.
- ASK!!! (Lecturers and TAs)
- Aim to fully understand new concepts.

How to fail

- You WILL fail if you ...
- Relax too much.
- Don't assimilate material covered in lectures.
- Don't attend labs.
- Don't seek help.
- “Borrow” from “others”: they can't help in the exam!

Module representatives

- Collect feedback from classmates about the lectures at the end of each teaching week
- Assist lecturers to prepare the content of revision lecture
- Provide reports and attend the SSLC meetings

Volunteers (two) will be welcomed or chosen during the first teaching week of the module.

Finally

Good Luck

Enjoy the Lectures

Do not be afraid to interrupt us to ask questions or ask for clarification. We would prefer that you do so rather than wait till it is too late.