Subject Description Form

Subject Code	EIE2261
Subject Title	Logic Design
Credit Value	3
Level	2
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	To provide students with a broad view in digital logic design and enable them to gain understanding and skills that will be used in later computer-related courses.
Intended Subject Learning Outcomes	**Upon completion of the subject, students will be able to:** Category A: Professional/academic knowledge and skills 1. Understand the fundamentals of digital systems and associated technologies. 2. Analyse and design simple systems related to digital logic. 3. Apply logic design techniques to construct digital systems with programmable logic devices and microprocessors, and appreciate the use of them. 4. Appreciate the importance of creativity and critical thinking on finding "good" solutions or making "good" designs. Category B: Attributes for all-roundedness 5. Think critically.
Subject Synopsis/ Indicative Syllabus	**Syllabus:** 1. Logic Circuit and ICs 1.1 Decoders and encoders 1.2 Multiplexers and demultiplexers 1.3 Binary adders, binary adder-subtractors 1.4 Binary multipliers 1.5 Sequential circuit analysis and design 1.6 Registers and counters 1.7 HDL representation. 2. Memory and Programmable Logic Devices 2.1 RAM: Write and read operations, timing waveforms, RAM integrated circuits, three-state buffers, DRAM ICs 2.2 Programmable logic technologies 2.3 ROM, PLA and PAL 2.4 VLSI programmable logic devices: Xilinx FPGA. 3. Microprocessor 3.1 Register transfer operations 3.2 Microoperations 3.3 Bus-based transfer 3.4 ALU 3.5 Shifter 3.6 Datapath representation 3.7 Control word 3.8 Control unit 3.9 Hardwired control 3.10 Basic Assembly Language Programming.

Laboratory Experiment:

1. Basic logic gates and their applications
2. Hardware description language and programmable logic devices

Teaching/ Learning Methodology

Teaching and Learning Method	Intended Subject Learning Outcome	Remarks
Lectures	1, 2, 3, 4	Fundamental principles and key concepts of the subject are delivered to students.
Tutorials	1, 2, 3, 4, 5	Supplementary to lectures and are conducted with smaller class size. Students will be able to clarify concepts and to have a deeper understanding of the lecture materials. Problems and application examples are given and discussed.
Laboratory sessions	1, 2, 3, 4, 5	students will make use of the software and hardware tools to develop simple digital systems, perform simulations

Assessment Methods in Alignment with Intended Subject Learning Outcomes

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Specific Assessment Methods/Tasks	Remark
Assignments	Enhance the understanding of the taught materials in the lectures.
Tests and examination	End-of chapter type problems are used frequently to evaluate students' ability in applying concepts and skills learned in class. The students are also needed to think critically and creatively in the process of solving problems.
Laboratory sessions	Each student is required to do a demonstration and submit a lab report after the laboratory.

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Student Study Effort Expected	**Class contact (time-tabled):**	
	• Lecture	24 Hours
	• Tutorial/Laboratory/Practice Classes	15 hours
	Other student study effort:	
	• Lecture: preview/review of notes; homework/assignment; preparation for test/quizzes/examination	36 Hours
	• Tutorial/Laboratory/Practice Classes: preview of materials, revision and/or reports writing	30 Hours
	Total student study effort:	**105 Hours**
Reading List and References	**Textbooks:** 1. M.M. Mano and C.R. Kime, *Logic and Computer Design Fundamentals*, 4th ed., Upper Saddle River, NJ: Prentice-Hall, 2008. **Reference Books:** 1. M.M. Mano and M.D. Ciletti, *Digital Design.*Upper Saddle River, NJ: Prentice-Hall, 2007. 2. S. Yalamanchili, *VHDL – A Starter's Guide*, 2nd ed. Prentice-Hall, 2005. 3. E.O. Hwang, *Digital Logic and Microprocessor Design With VHDL*, 1st ed., CL-Engineering, 2006.	
Last Updated	February 2018	
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