Liverpool John Moores University

Title:	ELECTRONIC DEVICES AND PROGRAMMABLE SYSTEMS
Status:	Definitive
Code:	**6028ENG** (106368)
Version Start Date:	01-08-2016

Owning School/Faculty:	Maritime and Mechanical Engineering
Teaching School/Faculty:	Maritime and Mechanical Engineering

Team	Leader
Jian Zhang	Y

Academic Level:	FHEQ6	**Credit Value:**	24	**Total Delivered Hours:**	74
Total Learning Hours:	240	**Private Study:**	166		

Delivery Options

Course typically offered: Summer

Component	Contact Hours
Lecture	24
Practical	36
Tutorial	12

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	Examination	50	2
Report	AS2	Design-based assignment	50	

Aims

This module will give students knowledge and experience of designing using state of the art integrated circuit technologies and devices.

Learning Outcomes

After completing the module the student should be able to:

1. Demonstrate knowledge of modern electronic devices and systems
2. Analyse the performance of advanced devices and systems
3. Select components and systems for engineering applications
4. Recognize the future challenge and opportunity in this rapidly changing area
5. Propose the most appropriate modern design structures for particular applications.
6. Design using modern CPLD, FPGA and reconfigurable architectures.
7. Confidently use a proprietary CAD tool such as Xilinx, to design, test and fabricate a complex digital system.
8. Incorporate industry standard test methodologies into designs.

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

EXAM	1	2	4	5	
Design-based assignment	3	5	6	7	8

Outline Syllabus

A Review of microelectronic devices within industry: How did it happen?
Flash memories: structures, programming, erasing, reading, endurance and data retention.
TFTs and LCDs: Amorphous-Si TFTs and Poly-Si TFTs; Passively addressed LCDs and actively addressed LCDs
Voltage controlled oscillators (VCOs) and Phase Locked Loops, AM and FM Modulation and De-Modulation
Nano-meter transistors: challenges and opportunities
Future of microelectronic and computer industries: International Roadmap
Review of programmable architectures: PROM, PLD, EPLD, PAL, GAL, CLB, CPLD & FPGA. Design using reconfigurable systems. Combinational, synchronous and asynchronous sequential design in programmable logic. Considerations for high speed systems, metastability and clock distribution, transmission line considerations. Design, test, simulation and implementation using a proprietary CAD tool such as Xilinx. Design for testability and reliability, JTAG Boundary Scan (IEEE 1149.1), BIST methods, in-circuit testing, scan path method.

Learning Activities

Typically by a series of lectures, tutorials, CAD exercises, researching for information and analysis

Notes

This module will provide undergraduates with a comprehensive understanding of

state-of-the-art electronic devices and systems used in the present industrial and consumer products. It will also foster the awareness of students in the future challenges and opportunities in the microelectronics industry.