

Liverpool John Moores University

Title: FPGA
Status: Definitive
Code: **6501TECCBT** (118465)
Version Start Date: 01-08-2011

Owning School/Faculty: Engineering
Teaching School/Faculty: Partner College

Team	Leader
Gareth Lewis	Y

Academic Level: FHEQ6
Credit Value: 12.00
Total Delivered Hours: 37.00
Total Learning Hours: 120
Private Study: 83

Delivery Options

Course typically offered: Semester 2

Component	Contact Hours
Lecture	20.000
Practical	5.000
Tutorial	10.000

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	Examination	70.0	2.00
Report	AS2	Coursework	30.0	

Aims

To acquire the skills required to implement digital hardware design in modern programmable logic devices, concentrating on mid range field programmable gate arrays (FPGA).

Learning Outcomes

After completing the module the student should be able to:

- 1 Perform a critical review of available programmable logic devices in order to select an appropriate technology for a particular problem.
- 2 Analyze a hardware design problem and individually produce a suitable design solution using a variety of methods – schematic capture, state machine design and hardware descriptor language
- 3 Apply their understanding of digital logic systems to devise a test bench to enable behavioral simulation of a circuit
- 4 Use the Xilinx ISE design tool set to synthesize a design, configure the target device and download the data file to the FPGA hardware

Learning Outcomes of Assessments

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

EXAM	1	2	3
CW	2	3	4

Outline Syllabus

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. Input and output options. Introduction to VHSIC Hardware Descriptor Language (VHDL) programming. Use of embedded microprocessors in FPGA designs. Design, test, simulation and implementation on a Xilinx Spartan 3E FPGA, using the proprietary CAD tool Xilinx ISE.

Learning Activities

By a combination of lectures, tutorials and laboratory design assignments.

References

Course Material	Book
Author	Chu, Pong P.
Publishing Year	2008
Title	FPGA Prototyping by VHDL Examples
Subtitle	
Edition	
Publisher	Wiley-Interscience
ISBN	

Course Material	Book
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Author	Wakerly, J.F
Publishing Year	2001
Title	Digital Design: Principles & Practices
Subtitle	
Edition	
Publisher	Prentice-Hall
ISBN	

Course Material	Book
Author	Roth, C.H
Publishing Year	2004
Title	Fundamentals of Logic Design
Subtitle	
Edition	
Publisher	Brooks/Cole Publishing
ISBN	

Notes

This level 3 module will provide undergraduates with a comprehensive understanding and develop a strong skill-set in industry standard theoretical and practical knowledge for the design of modern programmable logic systems.