

Liverpool John Moores University

Title: VLSI DESIGN
Status: Definitive
Code: **7005ENG** (105353)
Version Start Date: 01-08-2016

Owning School/Faculty: General Engineering Research Institute
Teaching School/Faculty: General Engineering Research Institute

Team	Leader
David Harvey	Y

Academic Level: FHEQ7 **Credit Value:** 20 **Total Delivered Hours:** 38
Total Learning Hours: 200 **Private Study:** 162

Delivery Options

Course typically offered: Semester 2

Component	Contact Hours
Lecture	18
Practical	12
Tutorial	6

Grading Basis: 50 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	2 hour exam	70	2
Report	AS2	1 coursework	30	

Aims

*To develop skills related to VLSI design.
To develop advanced skills in VLSI circuit design, at the transistor and gate levels.
To develop expertise in modern digital electronic circuit design and testing.*

Learning Outcomes

After completing the module the student should be able to:

- 1 Design modern digital electronic circuits.
- 2 Perform VLSI design with the aid of CAD software
- 3 Realize MOS design methods and design rules
- 4 Comprehend the principles of self testing within VLSI circuits

Learning Outcomes of Assessments

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

EXAM	1	3	4
CW	1	2	3

Outline Syllabus

Review of clocked and pulse mode circuits, sequential circuit design. Asynchronous digital circuit design, fundamental mode circuit design. Design for test, Built-in Self Test (BIST/BIT), Boundary Scan testing, IEEE 1149.1 and variants.

Review of MOS technology, properties of MOS circuits, MOS Design rules, Stick diagram design, Transistor level design of MOS logic functions.

Semi-custom design, Selection of PLA/PLD/CPLD/FPGA/ROM based designs.

Languages for VLSI Design, levels of design and simulation, introduction to languages for VLSI design, eg VHDL, Verilog, Chipwise, Palasm, Abel.

Emerging technologies, future important devices, new design methods.

Learning Activities

Lectures supported by handouts & tutorials where appropriate.

Practical sessions will use software packages (eg Chipwise, Xilinx) for circuit design and development.

An individual student report is required for the coursework.

Notes

This level 7 module gives the student an advanced knowledge of the design and test techniques required for modern digital electronic integrated circuits, at the transistor, register and silicon level. Practical design is carried out with the help of modern ECAD software.