Liverpool John Moores University

Title:	Electronics Systems Integration
Status:	Definitive
Code:	**6506ELESBC** (120228)
Version Start Date:	01-08-2018
Owning School/Faculty:	Electronics and Electrical Engineering
Teaching School/Faculty:	The Sino-British College

Team	Leader
Wei Zhang	Y
Zhigang Ji	

Academic Level:	FHEQ6	**Credit Value:**	20	**Total Delivered Hours:**	72
Total Learning Hours:	200	**Private Study:**	128		

Delivery Options
Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	24
Practical	48

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Report	Report	Report	100	

Aims

The module aims to provide the students with advanced knowledge and skills of electronics systems design, to enable students to design practical applications with the integration of analogue and digital systems.

Learning Outcomes

After completing the module the student should be able to:

1 Evaluate digital system design and integration including ALUs and FSMs.
2 Design, simulate, test and implement programmable logic based systems using VHDL.
3 Design and implement microprocessor based analogue and digital systems.
4 Design peripheral components for digital and analogue systems power supplies, bus structures, memories and interfacing/signal processing circuits.

Learning Outcomes of Assessments

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

Report	1	2	3	4

Outline Syllabus

1. FPGA based design
Design ALU and FSM 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

2. VHDL based design
Hardware Descriptor Language (HDL) programming. Design, test, simulation and implementation on a Xilinx Spartan 3E FPGA, using the proprietary CAD tool Xilinx ISE.

3. Microprocessor based design
Design and implementation of digital systems with microcontrollers; I/O in digital systems, on-board serial data communication with peripheral ICs, and offboard communication with a host or other computing entity via, for example, USB or radio telemetry; Buses and bus timing; Memory device technology and interfacing;

4. Systems integrations
Integrated I/O Interfaces, for example, ADC, UART, SPI, I2C and Interrupt Controller.
Development platforms for digital systems, JTAG development and debugging environments.
Design of advanced analogue data acquisition and filtering systems. Measurement of information, A/D converters, source coding, circuits and techniques for error detection and correction in digital systems, D/A converters, control and drive circuits. Design of power supplies for digital and analogue systems.

Learning Activities

A combination of lectures, practical work and tutorials.

Notes

This Level 6 module will provide students with advanced skills to design and integrate electronic systems in practical applications.