Module Specification

High Speed Electronic System Design

Version: 2023-24, v2.0, 31 Jan 2023

Contents

Part 1: Information

Module title: High Speed Electronic System Design

Module code: UFMFUN-15-M

Level: Level 7

For implementation from: 2023-24

UWE credit rating: 15

ECTS credit rating: 7.5

Faculty: Faculty of Environment & Technology

Department: FET Dept of Engineering Design & Mathematics

Partner institutions: None

Field: Engineering, Design and Mathematics

Module type: Module

Pre-requisites: None

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: The module provides a systematic view of the performance limitations related to high-speed electronic systems and their dependencies on the underlying technology choices. The key focus is how the interconnects (wires), all the way from system level to chip-level affect the system performance and how it will define the performance, reliability and the price of the end-product. The students will develop a thorough theoretical basis of the fundamental system level electrical issues and gain experience to design, simulate, and analyse electronic circuits.

Features: Not applicable

Educational aims: This module will extend and further develop the practical, theoretical and professional skills needed for designing and implementing complex digital systems for a wide range of applications.

Outline syllabus: The syllabus includes the following topics:

Interconnect modelling: wires, Connectors, Vias, and Solder Bumps

Signal Integrity Issues in Electronic Systems

Power Supply Noise and Power Delivery Systems

EMC/EMI Fundamentals in Electronic Systems

Shielding and Electrostatic Discharge (ESD) Protection

Thermal Design in Electronic System

Production and Disposal of Electronic Systems

Part 3: Teaching and learning methods

Teaching and learning methods: An initial set of structured laboratory exercises will extend the students understanding of the tools and techniques required, followed by a problem based exercise. These exercises will provide the basis for the assessed coursework and for the laboratory exams.

Module Learning outcomes: On successful completion of this module students will achieve the following learning outcomes.

MO1 Use quantitative methods and appropriate computer software tools to design complex electronic systems from printed circuits board (PCB) level to higher levels

MO2 Explain and apply basic principles and design guidelines to complex electronic systems

MO3 Identify and manage cost drivers in the design and development of electronic systems and model the performance of electronic system

MO4 Apply analytical methods (i.e. circuit theory) and modelling techniques (i.e. electronic device models) to the identification, classification and description of electronic circuits and their performance in response to a range of externally applied stimuli.

MO5 Analyse systematically the key electrical phenomena at interconnection substrate levels defining the system signal integrity and robustness properties in order to define the future constraints to integration for consumer electronic products.

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 126 hours

Face-to-face learning = 24 hours

Total = 150

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link https://uwe.rl.talis.com/modules/ufmfun-15-m.html

Part 4: Assessment

Assessment strategy: Summative assessment will be achieved through:

A presentation on a case study that will assess the student's ability to correctly understand and predict performance limitations factors in high speed electronic circuits. The presentation will be for 15 minutes followed by questions.

A series of practical design, simulation and implementation tasks based on

laboratory work. Students will select four tasks to submit as part of portfolio. Each task will lead to a short report (500 words) where students evaluate and reflect on their design solutions. The reports will form a portfolio (2,000 words).

Formative feedback will provided through verbal feedback during laboratory sessions and through tutorial exercises.

Assessment tasks:

Presentation (First Sit)
Description: Individual Presentation (15 minutes)
Weighting: 25 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO4, MO5

Portfolio (First Sit)
Description: Design portfolio (2,000 words)
Weighting: 75 %
Final assessment: No
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO5

Presentation (Resit)
Description: Individual presentation (15 minutes)
Weighting: 25 %
Final assessment: Yes
Group work: No
Learning outcomes tested:

Portfolio (Resit)
Description: Design portfolio (2,000 words)
Weighting: 75 %
Final assessment: No

Group work: No

Learning outcomes tested:

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Digital Electronic Systems Engineering {Apprenticeship-UWE} [Frenchay] - Suspended MSc 2022-23