Module Specification

Materials for Semiconductors

Version: 2023-24, v3.0, 06 Jul 2023

Contents

Part 1: Information

Module title: Materials for Semiconductors

Module code: UFMFFR-30-3

Level: Level 6

For implementation from: 2023-24

UWE credit rating: 30

ECTS credit rating: 15

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: Not applicable

Features: Not applicable

Educational aims: This module will cover the different properties (electrical, optical, and magnetic) of electronic materials in relation to their importance in the semiconductor industry and their technological applications such as wafer devices, solid-state fuel cells, lithium secondary batteries, light-emitting diodes and solid-state

lasers. This will include semiconductors, electronic ceramics, conducting polymers and optical and magnetic materials. This module will also cover processes and operations in semiconductor manufacturing.

Outline syllabus: Indicative Content:

Material Science Concepts
Electrical and thermal Conduction of Solids
Modern theory of solids
Semiconductors electronic ceramics and polymers.
Dielectric materials and Insulation
Magnetic properties of materials
Optical properties of materials
Superconductivity
Processes in Semiconductor Manufacturing

Part 3: Teaching and learning methods

Teaching and learning methods: Teaching will include the formal presentation of material through lectures, and presentations by the teaching team. The delivery is intended to ensure that students have opportunity to develop the theoretical understanding of different materials and their properties suitable for semiconductor device fabrication. The student will apply this understanding to the develop processing technologies for noval semiconductor devices and that this will form the module assessment.

Independent learning includes hours engaged with essential reading, assignment preparation and completion etc.

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

MO1 Describe in detail the fundamental properties of electronic materials and their roles and applications in modern semiconductor device manufacturing technology.

MO2 Analyse the fundamental principles underlying the design and operation of various electronic devices.

MO3 Develop manufacturing processes for noval semiconductor devices selecting suitable semiconductor materials in the electronics industry.

MO4 Compare and critically appraise the processes and operations involved in semiconductor manufacturing technology.

Hours to be allocated: 300

Contact hours:

Independent study/self-guided study = 46 hours

Placement = 56 hours

Face-to-face learning = 48 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/ufmffr-30-3.html

Part 4: Assessment

Assessment strategy: The assessment for this module is as follows:

REPORT: The report will involve students undertaking an investigation of the application of semiconductor materials relating to processes, applications or specific devices in industry. The activity will result in a group report involving groups of 2 or 3 students. Individual contributions will be determined via a peer review process.

PRESENTATION: The presentation will involve a short presentation on the group report. Each student will be marked individually based on their contribution and the knowledge on the technical content covered.

Resit is the same as the first sit

Resit deliverable(s) will be scaled appropriately to group size and task complexity

Assessment tasks:

Report (First Sit)
Description: Group report
Weighting: 75 %
Final assessment: Yes
Group work: Yes
Learning outcomes tested: MO1, MO2, MO3, MO4

Presentation (First Sit)
Description: A group presentation
Weighting: 25 %
Final assessment: No
Group work: Yes
Learning outcomes tested: MO1, MO2

Report (Resit)
Description: Group report

Resit deliverable(s) will be scaled appropriately to group size and task complexity
Weighting: 75 %
Final assessment: Yes
Group work: Yes
Learning outcomes tested: MO1, MO2, MO3, MO4

Presentation (Resit)
Description: A group presentation

Resit deliverable(s) will be scaled appropriately to group size and task complexity
Weighting: 25 %
Final assessment: No

Group work: Yes

Learning outcomes tested: MO1, MO2

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Mechanical Engineering (Mechatronics) [AustonSingapore] BEng (Hons) 2023-24

Electrical and Electronic Engineering [AustonSingapore] BEng (Hons) 2023-24