



Module Specification

Power Electronics

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Part 1: Information

Module title: Power Electronics

Module code: UFMFDE-15-3

Level: Level 6

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: Practical Electronics 2023-24

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: Power conversion and transmission technologies are essential and pervasive. A deep and comprehensive understanding of the scientific and engineering principles that support the field of power electronics provides a vital background for electronic engineers wishing to address the engineering challenges posed by the generation and transmission of power for industry, retail and domestic use. The module provides an opportunity for students to explore and understand the environmental and ethical issues in this field of engineering.

Features: Not applicable

Educational aims: The aim of this module is to provide advanced and comprehensive understanding of technical content in the field of power electronics and transmission that builds upon scientific and engineering principles covered in at earlier levels.

Outline syllabus: The syllabus includes:

Power Electronic Systems,
DC to DC Choppers,
AC to DC Converters,
DC to AC Inverters,
AC to AC Regulators,
Switched Mode Power Supplies,
Power Electronic Switches,
High Voltage DC Transmission,
FACTS (Flexible AC Transmission Systems),
Power Electronics for Wind, Solar and Hydro: Grid Interconnection.

Part 3: Teaching and learning methods

Teaching and learning methods: Concepts and the Learning Methods scope of a topic will be introduced in lectures supported by directed reading and simulation laboratory based work.

The labs sessions will enhance the understanding of students of real-world applications of the material delivered in the module.

The students will learn through applying a variety of analysis methods, mathematical and simulation tools to design power electronics circuits.

Relevant ethical issues will be highlighted and students will be encouraged to consider these further through directed reading.

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

MO1 Describe and provide a detailed explanation of the operating principles of power electronic converters.

MO2 Apply appropriate techniques to the design, analysis and evaluation of performance of power electronics circuits

MO3 Apply modern power electronics usages in terms of FACTS (Flexible AC Transmission Systems).

MO4 Design a simulation case study of Power Electronic systems

MO5 Research literature from the field and present technical information in a clear and concise manner.

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 114 hours

Face-to-face learning = 36 hours

Total = 150

Reading list: The reading list for this module can be accessed at [readinglists.uwe.ac.uk](https://uwe.rl.talis.com/modules/ufmfde-15-3.html) via the following link <https://uwe.rl.talis.com/modules/ufmfde-15-3.html>

Part 4: Assessment

Assessment strategy: The module will have two assessment tasks.

There will be a final written end of module exam set at the end of the term and a total of 50% marks will be contributed from this assessment.

The coursework assessment is numerical-type/mini-research-based work.

The resit coursework will be an individual work assignment and the remaining part of the module assessment will be same as set in the first run.

Assessment tasks:

Examination (Online) (First Sit)

Description: Online Examination

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3

Written Assignment (First Sit)

Description: Coursework assignment

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4

Examination (Online) (Resit)

Description: Online Examination

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3

Written Assignment (Resit)

Description: Coursework assignment

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Electronic and Computer Engineering [Aug][FT][SHAPE][1yr] BEng (Hons) 2023-24

Electronic and Computer Engineering [Aug][PT][SHAPE][2yrs] BEng (Hons) 2023-24

Electronic Engineering {Apprenticeship-UCW} {Top-Up} [Frenchay] - Withdrawn
BEng (Hons) 2023-24

Electronic Engineering (Nuclear) {Apprenticeship-UCW} {Top-Up} [MOD] -
Withdrawn BEng (Hons) 2023-24

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

Electrical and Electronic Engineering [Feb][PT][BIET][16months] BEng (Hons) 2022-
23

Electrical and Electronic Engineering [Oct][PT][BIET][16months] BEng (Hons) 2022-
23

Electrical and Electronic Engineering [May][PT][BIET][16months] BEng (Hons) 2022-
23

Electronic and Computer Engineering [Sep][FT][Frenchay][3yrs] BEng (Hons) 2021-
22

Electronic and Computer Engineering [Sep][SW][Frenchay][4yrs] BEng (Hons) 2020-
21

Electronic and Computer Engineering [Sep][PT][GlosColl][5yrs] BEng (Hons) 2020-
21

Electronic and Computer Engineering {Apprenticeship-GLOSCOLL}
[Sep][FT][GlosColl][5yrs] BEng (Hons) 2020-21

Electronic and Computer Engineering {Apprenticeship-GLOSCOLL}
[Sep][FT][GlosColl][5yrs] - Withdrawn BEng (Hons) 2020-21

Electronic and Computer Engineering [Sep][PT][GlosColl][5yrs] - Withdrawn BEng
(Hons) 2020-21

Electronic Engineering [Sep][FT][Frenchay][4yrs] - Withdrawn MEng 2021-22

Electronic Engineering [Sep][SW][Frenchay][5yrs] MEng 2020-21

Electronic Engineering {Apprenticeship-GLOSCOLL} [Sep][FT][GlosColl][5yrs] -
Withdrawn BEng (Hons) 2020-21

Electronic Engineering [Sep][SW][Frenchay][4yrs] - Not Running BEng (Hons) 2020-
21

Electronic Engineering {Foundation} [Sep][FT][Frenchay][4yrs] - Not Running BEng
(Hons) 2020-21

Instrumentation and Control Engineering {Foundation} [Feb][FT][GCET][4yrs] BEng
(Hons) 2020-21

Instrumentation and Control Engineering {Foundation} [Oct][FT][GCET][4yrs] BEng
(Hons) 2020-21

Electronic Engineering [Sep][PT][Frenchay][6yrs] BEng (Hons) 2019-20

Electronic Engineering {Foundation} [Sep][SW][Frenchay][5yrs] BEng (Hons) 2019-
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