



Module Specification

Emerging Automotive Technology 1

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Part 1: Information

Module title: Emerging Automotive Technology 1

Module code: UFMFWS-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: None

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: This module builds on thermofluid and electrical knowledge. The module introduces the students to the theory, operation and simulation of vehicle powertrains. The aim is to develop the students' understanding of fundamental concepts and apply them to the development of a vehicle powertrain.

In the first part of the module the students will learn about conventional and unconventional automotive powertrains, based on the outlined syllabus below. The

students will learn how the drive to making automotive technology more sustainable and environmentally friendly is being achieved. The students will also learn how to integrate different powertrains.

In the second part of the module the students will learn how to simulate a conventional Internal Combustion Engine (ICE). The students will use commercial software to develop an engine simulation and analyse its performance.

On successful completion of this module, students will be in a position to integrate knowledge from different engineering disciplines and apply methods of engineering analysis and simulation to problems that occur in the design of powertrain systems including the need for technologies that are environmentally sustainable.

Features: Not applicable

Educational aims: The aim of this module is to allow students to research and evaluate new and emerging technologies that will impact on the performance, safety and sustainability of automotive vehicles.

Outline syllabus: Components

Forced induction

Measuring Engine Performance

Natural ICE Wave model

Sizing of electric PT components

Control of electrical components

Integration of Hybrid systems

Environment and sustainability

Part 3: Teaching and learning methods

Teaching and learning methods: The module makes use of collaborative learning spaces to facilitate small group discussion. The module delivery is based on a lectorial model whereby lecture content and tutorial work and discussion are integrated and carefully managed in each session.

The delivery therefore ensures that engineering theory and principles can be readily assimilated and applied within the engineering context so that the components and interactions that make up the design of a powertrain system are fully understood.

The delivery model will therefore be in the form of lectorials to assist the learning in groups and also involve interactive quizzes to promote active engagement and regular formative feedback.

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

MO1 Apply an integrated or systems approach to solving complex Automotive engineering problems (EA4m)

MO2 Demonstrate use of fundamental scientific knowledge and principles to investigate new and emerging automotive technologies (EA5m)

MO3 Integrate knowledge and understanding of other engineering disciplines to critically evaluate emerging automotive technologies (SM3m)

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://rl.talis.com/3/uwe/lists/9F79CA37-DC70-8FB4-F7C6-F646F33BDE38.html?lang=en-US&login=1) via the following link <https://rl.talis.com/3/uwe/lists/9F79CA37-DC70-8FB4-F7C6-F646F33BDE38.html?lang=en-US&login=1>

Part 4: Assessment

Assessment strategy: The assessment strategy is designed to assess both the core engineering related to emerging automotive technologies and the use of simulation to study emerging technologies.

There will be two assessments:

- a written examination that will assess core engineering skills including electrical powertrain components and forced induction.

- a report that will assess the ability to simulate engines in order to investigate and evaluate emerging automotive technologies. The students will create a virtual engine simulation of a naturally aspirated and forced induction ICE using experimental data to validate their model.

The resit assessment will follow the same format as the first sit.

Assessment tasks:

Examination (First Sit)

Description: Exam (2 hours)

Weighting: 25 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3

Written Assignment (First Sit)

Description: Written report (2000 words)

Weighting: 75 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3

Examination (Resit)

Description: Exam (2 hours)

Weighting: 25 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3

Written Assignment (Resit)

Description: Written report (2000 words)

Weighting: 75 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Automotive Engineering [Sep][FT][Frenchay][3yrs] BEng (Hons) 2021-22

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

Automotive Engineering [Sep][SW][Frenchay][4yrs] BEng (Hons) 2020-21

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

Automotive Engineering {Foundation}[Sep][FT][Frenchay][4yrs] BEng (Hons) 2020-21

Mechanical Engineering {Apprenticeship-GlosColl} {Top-Up} [Frenchay] BEng (Hons) 2023-24

Mechanical Engineering {Apprenticeship-UCS} {Top-Up} [Frenchay] BEng (Hons) 2023-24

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

Mechanical Engineering [Sep][FT][Frenchay][3yrs] BEng (Hons) 2021-22

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

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

Mechanical Engineering [Sep][SW][Frenchay][4yrs] BEng (Hons) 2020-21

Mechanical Engineering {Foundation}[Sep][FT][Frenchay][4yrs] BEng (Hons) 2020-21