



Module Specification

Vehicle Design Fundamentals

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Part 1: Information

Module title: Vehicle Design Fundamentals

Module code: UFMFXS-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: The premise of the module is that students will work in groups on a project commissioned by a fictional manufacturing company to design and "theoretically" develop a small Formula-style car. The prototype race car is to be evaluated for its potential as a production item as well as a drivable solution and the adoption of clever problem solving to meet the complex design requirements.

Features: Not applicable

Educational aims: The module provides a system-based approach to the design of an automotive vehicle against a complex regulations and rules.

For this purpose the module will adopt, FSAE, FSUK and FSG rules and regulation for the student formal car design

Outline syllabus: The module will cover:

Automotive design requirements abstraction and embodiment

Powertrain selection; IC, hybrid, electric.

Chassis and suspension embodiment

Control and low voltage systems (ECU; autonomous systems; LV circuits)

Impact attenuation, body work and aerodynamic assistance.

Design set-up and testing.

Part 3: Teaching and learning methods

Teaching and learning methods: Scheduled learning includes lectures, Computer practicals, laboratory experiments, design lectorials and demonstrations.

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

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

MO1 Evaluate and apply understanding of the trends, legislation and regulations governing an automotive design problem to generate user requirements[]

MO2 Interpret experimental and computational data to assess the validity of solutions and make clear design recommendations[]

MO3 Demonstrate techniques for solving and analysing problems relating to a vehicle's, chassis, suspension, powertrain and transmissions against design requirements[]

MO4 Evaluation and select automotive components (mechanical, electrical and control) based on an understanding of their performance characteristics and regulatory requirements []

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 114 hours

Lectorials = 36 hours

Total = 150

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link

<http://readinglists.uwe.ac.uk/lists/09037587-5742-6A72-48FE-B7D18436DACA.html>

Part 4: Assessment

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

Group Executive Design Briefing, for a GROUP mark, to discuss how the automotive design solution was planned, conducted, reflecting how the engineers have connected with the groups involved in reaching the client's needs. This will be a briefing with a Question and Answer session taking around 20 minutes.

The group work mark will be moderated using the EDM Group Working Policy.

The students are required to produce an INDIVIDUAL written assignment submitted at the end of the module. The assignment is designed to assess the students' design theory, regulation/ standards and technical understanding and application of the various automotive technologies for a given component/system on the vehicle, integrations and the selection criteria and process in manifesting a solution for a given customer. (Maximum 2000 words + computer-aided design and analysis documents.

Resit is the same as the first sit

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

Risk of plagiarism will be mitigated by the individualised variables and data being issued to student groups with the assignment brief.

Assessment tasks:

Report (First Sit)

Description: 2000 design report + CAE and CAD files, design calculations in Matlab or Excel form

Weighting: 60 %

Final assessment: No

Group work: No

Learning outcomes tested: MO3, MO4

Presentation (First Sit)

Description: 12 minute GROUP design Briefing.

Weighting: 40 %

Final assessment: Yes

Group work: Yes

Learning outcomes tested: MO1, MO2

Report (Resit)

Description: 2000 design report + CAE and CAD files, design calculations in Matlab or Excel form

Weighting: 60 %

Final assessment: No

Group work: No

Learning outcomes tested: MO3, MO4

Presentation (Resit)

Description: 12 minute GROUP design Briefing.

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

Weighting: 40 %

Final assessment: Yes

Group work: Yes

Learning outcomes tested: MO1, MO2

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