



## **Module Specification**

### **Automotive Technology**

Version: 2022-23, v3.0, 09 Jun 2022

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## Part 1: Information

**Module title:** Automotive Technology

**Module code:** UFMFMC-30-2

**Level:** Level 5

**For implementation from:** 2022-23

**UWE credit rating:** 30

**ECTS credit rating:** 15

**Faculty:** Faculty of Environment & Technology

**Department:** FET Dept of Engineering Design & Mathematics

**Partner institutions:** None

**Delivery locations:** Frenchay Campus, Global College of Engineering and Technology (GCET)

**Field:** Engineering, Design and Mathematics

**Module type:** Standard

**Pre-requisites:** Engineering Mathematics 2022-23

**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:** See Learning Outcomes.

**Outline syllabus:** The syllabus includes:

Internal Combustion (IC) Engines:

Thermodynamic cycle in power production, IC engine types and applications; IC engine performance calculations, fuelling and ignition systems, combustion in spark ignition (SI) engines, combustion in compression ignition (CI) engines. Chemistry of combustion, reactants, products and pollutants. Engine heat balance, thermal loading engine heat transfer and engine cooling. Numerical modelling of combustion and heat transfer. Alternative Engines, alternative power sources and hybrids. Fundamentals of test, measurement, data acquisition and interpretation.

Vehicle Powertrains:

Transmission system types, operation, construction and performance characteristics. Clutches and Gear Boxes. Hydrodynamic torque converter. Epicyclical gear trains. Automatic transmission, hydrostatic drives and electric drives. Hybrid drives; series and parallel. Electric drives.

Vehicle Dynamics:

Vehicle dynamic modelling fundamentals and reference systems. Acceleration performance. Braking performance. Road loads, ride and handling. Steady state cornering; low speed turning and high speed cornering. Automotive suspension. Steering system and tyres.

### **Part 3: Teaching and learning methods**

**Teaching and learning methods:** Scheduled learning lectures will introduce the general theoretical concepts and present examples in the use of these techniques. Laboratory sessions will be used to underpin and integrate the key theoretical concepts. Some simulation software may be used to complement and help understand the application concepts with a possible industrial visit or an arranged lecture.

Independent learning In addition to the scheduled learning, students are expected to

spend time engaged with essential reading, report preparation and studying the concepts and underlying principles.

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

**MO1** The underlying principles of Internal Combustion

**MO2** The underlying principles of vehicle transmission systems

**MO3** Techniques for solving and analysing problems relating to IC engines, vehicle transmissions and automotive manufacturing systems

**MO4** Modelling and simplifying real problems, applying fundamental principles of mechanical engineering to the analysis of realistic problems and making recommendations based on analysis

**MO5** Interpreting experimental data to assess the validity of solutions and make clear recommendations

**MO6** Modelling situations and providing solutions to problems using engineering principles

**MO7** Problem formulation and decision making, independent learning

**MO8** The underlying principles and practice of vehicle dynamics and vehicle technologies

**Hours to be allocated:** 300

**Contact hours:**

Independent study/self-guided study = 228 hours

Face-to-face learning = 72 hours

Total = 300

**Reading list:** The reading list for this module can be accessed at [readinglists.uwe.ac.uk](https://uwe.rl.talis.com/modules/ufmfmc-30-2.html) via the following link <https://uwe.rl.talis.com/modules/ufmfmc-30-2.html>

## **Part 4: Assessment**

**Assessment strategy:** Component A consists of two examinations held at the end of each teaching block. These will be designed to assess the student's understanding of the theoretical concepts and the ability to apply them in standard problems.

There is no Component B in this module.

The GCET delivery of this exam is a 3 hour exam. It was agreed that GCET can deliver the exam in a different way to UWE for in-country reasons for 2021/22 and 2022/23 providing there is no change to the UWE assessment during this time

**Assessment components:**

**Examination (Online) - Component A (First Sit)**

Description: Online Examination

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO3, MO4, MO5, MO6, MO7

**Examination (Online) - Component A (First Sit)**

Description: Online Examination

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO2, MO3, MO4, MO5, MO6, MO7, MO8

**Examination (Online) - Component A (Resit)**

Description: Online Exam

Weighting: 100 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4, MO5, MO6, MO7, MO8

## Part 5: Contributes towards

This module contributes towards the following programmes of study:

Automotive Engineering {Foundation} [Sep][SW][Frenchay][6yrs] - Not Running  
MEng 2020-21

Automotive Engineering {Foundation} [Sep][FT][Frenchay][5yrs] - Not Running MEng  
2020-21

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

Automotive Engineering {Foundation} [Sep][SW][Frenchay][5yrs] - Not Running  
BEng (Hons) 2020-21

Mechanical Engineering and Vehicle Technology {Foundation}  
[Feb][FT][GCET][4yrs] BEng (Hons) 2020-21

Mechanical Engineering and Vehicle Technology {Foundation} [Oct][FT][GCET][4yrs]  
BEng (Hons) 2020-21