

## Module specification

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|                             |                                        |
|-----------------------------|----------------------------------------|
| <b>Module Code</b>          | ENG4C7                                 |
| <b>Module Title</b>         | Fundamentals of Motorsport Engineering |
| <b>Level</b>                | 4                                      |
| <b>Credit value</b>         | 20                                     |
| <b>Faculty</b>              | FACE                                   |
| <b>HECoS Code</b>           | 100206                                 |
| <b>Cost Code</b>            | GAME                                   |
| <b>Pre-requisite module</b> | N/A                                    |

### Programmes in which module to be offered

| <b>Programme title</b>             | <b>Core/Optional/Standalone</b> |
|------------------------------------|---------------------------------|
| BEng (Hons) Motorsport Engineering | Core                            |

### Breakdown of module hours

|                                                             |                |
|-------------------------------------------------------------|----------------|
| Learning and teaching hours                                 | 30 hrs         |
| Placement tutor support hours                               | 0 hrs          |
| Supervised learning hours e.g. practical classes, workshops | 30 hrs         |
| Project supervision hours                                   | 0 hrs          |
| <b>Active learning and teaching hours total</b>             | <b>60 hrs</b>  |
| Placement hours                                             | 0 hrs          |
| Guided independent study hours                              | 140 hrs        |
| <b>Module duration (Total hours)</b>                        | <b>200 hrs</b> |

### Module aims

This module combines conceptual teaching with guided practical work to strengthen students' understanding of fundamental principles. Learners explore how theoretical knowledge connects with real-world practice through structured experimentation and applied tasks. The approach builds confidence, technical awareness, and the ability to apply knowledge effectively within authentic learning contexts.

This module aims to introduce students to the fundamental engineering principles underpinning motorsport vehicles, combining theoretical understanding with practical

measurement activities to develop technical awareness, analytical thinking, and preparation for higher-level motorsport engineering study.

## Module Learning Outcomes

At the end of this module, students will be able to:

|          |                                                                                                                                                                                                                                                      |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1</b> | Describe core motorsport vehicle systems and operating principles, explaining their contribution to vehicle performance, safety, and regulatory compliance.                                                                                          |
| <b>2</b> | Apply fundamental engineering principles to analyse simple motorsport vehicle behaviours, including braking, load transfer, and tyre response, using simplified assumptions and basic calculations.                                                  |
| <b>3</b> | Undertake practical measurement activities relevant to motorsport applications, selecting appropriate tools and methods to collect and record performance-related data safely and accurately as an individual and as part of a small technical team. |
| <b>4</b> | Communicate technical findings clearly and professionally, demonstrating accurate interpretation of experimental and simulation results.                                                                                                             |

## Assessment

Indicative Assessment Tasks:

This section outlines the type of assessment task the student will be expected to complete as part of the module. More details will be made available in the relevant academic year module handbook.

### Assessment 1: Portfolio

This assessment evaluates the development of fundamental engineering knowledge and practical competence. Students submit a portfolio of evidence derived from practical, laboratory, workshop, or equivalent applied activities undertaken during the module. Evidence may take a range of appropriate forms, including measurements, observations, visual records, and brief technical commentary.

Minimum expectation: The portfolio must demonstrate engagement with a representative range of activities and include sufficient evidence of method, results, and basic interpretation to allow academic judgement of performance and achievement of learning outcomes.

### Assessment 2: Oral Presentation

This assessment evaluates students' ability to communicate engineering understanding using appropriate technical content and supporting evidence. Students deliver a structured presentation based on a selected system, topic, or set of activities relevant to the module. The presentation should demonstrate understanding of underlying principles, use of relevant data or evidence, and a basic level of analysis.

Minimum expectation:

The presentation must include appropriate supporting material (such as data, examples, or applications) and demonstrate a clear link to the learning activities of the module.

| Assessment number | Learning Outcomes to be met | Type of assessment | Duration/Word Count      | Weighting (%) | Alternative assessment, if applicable |
|-------------------|-----------------------------|--------------------|--------------------------|---------------|---------------------------------------|
| 1                 | 1-3                         | Portfolio          | Equivalent to 2000 words | 75%           |                                       |
| 2                 | 4                           | Presentation       | 10 minutes               | 25%           |                                       |

## Derogations

Credits shall be awarded by an Assessment Board for those modules in which a pass mark 40% has been achieved, with a minimum mark of 30% in each assessment element.

## Learning and Teaching Strategies

Learning and teaching combine classroom-based instruction with structured laboratory practice to reinforce theoretical understanding through application. Students participate in lectures, workshops, and supervised experiments that link principles to professional practice. Online materials and activities complement face-to-face sessions, supporting reflection and self-paced learning. Tutorials and group discussions promote collaboration and the development of analytical and communication skills.

## Welsh Elements

This module will be delivered through the medium of English; however, students have the option to submit their assessments in the medium of Welsh. While this module is not currently offered fully through Welsh, Welsh language support and guidance are available, and some learning materials or tutorial discussions may incorporate Welsh elements where appropriate. To further promote bilingual learning, all students have the opportunity to take the 20-credit *Welsh for STEM* short course, designed to develop confidence and subject-specific language skills in both English and Welsh.

## Indicative Syllabus Outline

### Describe core motorsport vehicle systems and operating principles:

Introduction to motorsport vehicle architectures, including chassis, suspension, braking, tyres, aerodynamics, and powertrain fundamentals.  
Role of regulations, safety requirements, and system integration in motorsport vehicle performance.

### Apply fundamental engineering principles to analyse simple motorsport vehicle behaviours.

Basic vehicle dynamics concepts including centre of gravity, weight distribution, load transfer, braking forces, and tyre grip behaviour.  
Introductory analysis of performance-related behaviours using simplified models and assumptions.

### **Undertake practical measurement activities relevant to motorsport applications.**

Practical measurement techniques including camber, toe, ride height, corner weighting, and basic data collection methods.

Safe use of measurement equipment and application of appropriate procedures during laboratory and workshop activities.

### **Interpret basic motorsport data and communicate findings effectively.**

Interpretation of measured data to identify basic performance trends and sources of uncertainty.

Communication of technical findings through structured written work and reflection on practical outcomes.

## **Indicative Bibliography**

Please note the essential reads and other indicative reading are subject to annual review and update.

### **Essential Reads:**

J. Katz, Race Car Aerodynamics: Designing for Speed, 2nd ed. Cambridge, MA, USA: Bentley Publishers, 2016.

### **Other indicative reading:**

R. Bosch GmbH, Bosch Automotive Handbook, 10th ed. Chichester, UK: Wiley, 2018.

J. C. Dixon, Tyres, Suspension and Handling, 2nd ed. Chichester, UK: Wiley, 1996.

## **Administrative Information**

| <b>For office use only</b>   |                |
|------------------------------|----------------|
| Initial approval date        | June 2026      |
| With effect from date        | September 2026 |
| Date and details of revision |                |
| Version number               | 1              |