

# ES4B7-15 Vehicle Propulsion

**23/24**

**Department**

School of Engineering

**Level**

Undergraduate Level 4

**Module leader**

Jonathan Saul

**Credit value**

15

**Module duration**

10 weeks

**Assessment**

60% coursework, 40% exam

**Study location**

University of Warwick main campus, Coventry

---

## Description

### Introductory description

The module covers the principles and concepts behind engineering hybrid and electrified vehicles at the vehicle system level.

Propulsion architectures, control methods and integration issues are covered in detail.

[Module web page](#)

### Module aims

The students will gain a thorough understanding of the issues faced by the industry in moving to electrification, and the purpose of the propulsion system in context of delivering the customer attributes.

### Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

Customer perceived attributes and characteristics such as performance feel are covered along with the governing legislation relevant to New Energy Vehicles (NEV's). Propulsion architectures for NEV's are then covered, along with the associated systems and sub-systems. Principles of

requirements cascade and NEV design are incorporated, and finally integration issues associated to NEV's are covered.

## Learning outcomes

By the end of the module, students should be able to:

- Be familiar with the complex design and operating parameters of current propulsion operating characteristics. ( M1, M3, M4, M5)
- Interpret the complex requirements for and operating characteristics of HEV enabling technology and the complexity of technology integration. (M4, M5, M13)
- Critically analyse the diverse justifications for complex vehicle hybridisation and electrification. (M4, M5, M13)

## Indicative reading list

[View reading list on Talis Aspire](#)

## Subject specific skills

1. Gaining the theoretical knowledge to solve problems in existing and emerging technologies, applying and developing analytical techniques.
2. Understand the customer, environmental, safety, cost and timescale requirements and limitations.
3. Understand how to design concepts and principles, taking into account both requirements and limitations.
4. Gain practical competence to deliver innovative products and services.

## Transferable skills

Design and development of processes, systems, services and products.

Contribute proactively to the continuing development of Engineering in their domain.

Appreciation of the global dimensions of Engineering, commerce and communication.

Exercise initiative and personal responsibility, including time management.

Numeracy: apply mathematical and computational methods to communicate parameters, model and optimize solutions.

---

## Study

### Study time

Type	Required
Seminars	18 sessions of 2 hours (24%)
Total	150 hours

<b>Type</b>	<b>Required</b>
Other activity	2 hours (1%)
Private study	112 hours (75%)
Total	150 hours

### **Private study description**

Guided Independent Learning 112 hours

### **Other activity description**

Examples class (exam revision)

### **Costs**

No further costs have been identified for this module.

---

### **Assessment**

You must pass all assessment components to pass the module.

Students can register for this module without taking any assessment.

### **Assessment group D5**

	<b>Weighting</b>	<b>Study time</b>
Individual report	60%	
Post Module assessment based on the Learning Outcomes of the module.		
Summer exam	40%	
QMP - Post Module online exam based on the Learning Outcomes of the module.		
~Platforms - QMP		

---

- Online examination: No Answerbook required
- Engineering Data Book 8th Edition

### **Feedback on assessment**

Individual and cohort feedback for all assessments.

[Past exam papers for ES4B7](#)

---

# Availability

## Courses

This module is Core for:

- Year 4 of UESA-H336 MEng Automotive Engineering
- Year 5 of UESA-H337 MEng Automotive Engineering with Intercalated Year

This module is Optional for:

- Year 4 of UESA-H116 MEng Engineering with Exchange Year
- Year 5 of UESA-H115 MEng Engineering with Intercalated Year

This module is Option list A for:

- Year 4 of UESA-H114 MEng Engineering
- Year 4 of UESA-HH76 MEng Manufacturing and Mechanical Engineering
- Year 5 of UESA-HH38 MEng Manufacturing and Mechanical Engineering with Intercalated Year
- Year 5 of UESA-HH77 MEng Manufacturing and Mechanical Engineering with Intercalated Year
- Year 4 of UESA-H311 MEng Mechanical Engineering

This module is Option list B for:

- UESA-H311 MEng Mechanical Engineering
  - Year 4 of H311 Mechanical Engineering
  - Year 4 of H30L Mechanical Engineering with Automotive Engineering
  - Year 4 of H30G Mechanical Engineering with Business Management
  - Year 4 of H30P Mechanical Engineering with Fluid Dynamics
  - Year 4 of H30H Mechanical Engineering with Sustainability
- Year 4 of UESA-H316 MEng Mechanical Engineering
- Year 4 of UESA-H318 MEng Mechanical Engineering with Exchange Year
- Year 5 of UESA-H317 MEng Mechanical Engineering with Intercalated Year

This module is Option list C for:

- UESA-H311 MEng Mechanical Engineering
  - Year 4 of H30J Mechanical Engineering with Appropriate Technology
  - Year 4 of H30M Mechanical Engineering with Robotics
  - Year 4 of H30N Mechanical Engineering with Systems Engineering