

## Module specification

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Module Code	ENG5A4
Module Title	Engineering Futures – Research, Ethics, and Sustainability
Level	5
Credit value	20
Faculty	FAST
HECoS Code	100184
Cost Code	GAME

### Programmes in which module to be offered

Programme title	Is the module core or option for this programme
BEng/MEng Aeronautical Engineering	Core
BEng/MEng Automotive Engineering	Core
BEng/MEng Electrical and Electronic Engineering	Core
BEng/MEng Mechanical Engineering	Core
BEng/MEng Renewable and Sustainable Engineering	Core
Engineering summer school	Stand-alone
BEng Aeronautical and Mechanical Engineering	Core

### Pre-requisites

N/A

### Breakdown of module hours

Learning and teaching hours	30 hrs
Placement tutor support	0 hrs
Supervised learning e.g., practical classes, workshops	0 hrs
Project supervision (level 6 projects and dissertation modules only)	0 hrs
<b>Total active learning and teaching hours</b>	30 hrs
Placement / work-based learning	0 hrs
Guided independent study	170 hrs
<b>Module duration (total hours)</b>	200 hrs

<b>For office use only</b>	
Initial approval date	22/08/2022
With effect from date	September 2022
Date and details of revision	Addition of BEng Aero and Mechanical Engineering
Version number	2

## Module aims

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The module will develop the reflective and analytical skills needed to recognise the future of engineering and to aid student personal development, through the following aims:

- Foster reflection on the wider context of contemporary engineering and personal development
- Build awareness of how ethics and sustainability drives engineering and its approach to tackling global problems
- Enhance knowledge of the different environments in which engineering operates and the importance of recognition through engineering professional organisations
- Develop research skills and knowledge

**Module Learning Outcomes** - at the end of this module, students will be able to:

1	Critically evaluate their baseline skills and reflect on areas for personal development and improvement
2	Explain how ethics and sustainability are key components of contemporary engineering
3	Explain the context in which engineering operates and the importance of professional engineering organisations
4	Analyse fundamental research methods concepts and how they can apply in an engineering context

In addition to the module learning outcomes, students will also cover the following accreditation of higher education programme (AHEP) fourth edition learning outcomes: C4, C5, C7, C8, C9, C10, C11, C15, C16, C17 & C18.

## Assessment

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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.

The assessment will be in the form of a portfolio of work in several sections, each individually uploaded to Moodle . A group assessment will be developed to consider H&S

policies and practices in engineering. Alongside this diversity and inclusivity in the workplace will be discussed within engineering. Engineering ethics will be assessed nominally through case studies with societal and environmental impacts of engineering and sustainability.

A second phase of the portfolio will be used to develop research skills by constructing a research proposal, to include a literature reviews, risk assessment (including security risks), research ethics consideration and project planning

The portfolio should have a word count of 4000 or equivalent.

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)
1	1 – 4	Portfolio	100

## Derogations

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A derogation from regulations has been approved for these programmes which means that whilst the pass mark is 40% overall, each element of assessment (where there is more than one assessment) requires a minimum mark of 30%.

## Learning and Teaching Strategies

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The module will align with the principles of the university Active Learning Framework (ALF) and will offer learning and teaching approaches that aid flexibility and accessibility. There will be a learning blend between online and face to face methods, such as:

- In person seminars
- Online synchronous sessions
- Online asynchronous sessions
- Self-directed study tasks that will include videos, podcasts, and professional organisation websites

The portfolio assessment tasks will be supported through the delivered sessions and self-directed study so that the student can build the portfolio throughout the course of the module. There will be formative assessment to aid student development and prepare for the summative assessment.

## Indicative Syllabus Outline

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- Personal development – skills analysis
- Contemporary issues in Engineering
- Diversity and inclusion
- The future of engineering – horizon scanning and new developments
- Ethics and sustainability of engineering
- Professional engineering organisations and campaigns (e.g., World engineering day)
- The relationship between engineering and society
- Modern industry and climate change
- Factors affecting an organisation/business – using models such as PESTEL
- Leadership and management
- Research methods – theories, approaches, and examples

## **Indicative Bibliography:**

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

### **Essential Reads**

L. J. Mullins, *Organisational behaviour in the workplace*, 12<sup>th</sup> ed. Harlow, England: Pearson, 2019. (There is an e-book option).

### **Other indicative reading**

J. W. Creswell, *Research design: qualitative, quantitative, and mixed methods approaches*, 5<sup>th</sup> ed. Los Angeles: SAGE, 2018. (There is an e-book option).

Websites:

<https://www.theengineer.co.uk/>

<https://www.engineeringuk.com/>

<https://www.sciencecampaign.org.uk/>

<https://worldengineeringday.net/>

<https://www.engc.org.uk/> (engineering council)

## **Employability skills – the Glyndŵr Graduate**

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Each module and programme is designed to cover core Glyndŵr Graduate Attributes with the aim that each Graduate will leave Glyndŵr having achieved key employability skills as part of their study. The following attributes will be covered within this module either through the content or as part of the assessment. The programme is designed to cover all attributes and each module may cover different areas.

### **Core Attributes**

Engaged  
Enterprising  
Creative  
Ethical

### **Key Attitudes**

Commitment  
Curiosity  
Resilience  
Confidence  
Adaptability

### **Practical Skillsets**

Digital Fluency  
Organisation  
Leadership and Team working  
Critical Thinking  
Emotional Intelligence  
Communication