Module specification

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Module Code	ENG557
Module Title	Automotive Design
Level	5
Credit value	20
Faculty	FAST
HECoS Code	100201
Cost Code	GAME

Programmes in which module to be offered

Programme title	Is the module core or option for this programme
BEng Automotive Engineering	Core
MEng Automotive Engineering	Core

Pre-requisites

None

Breakdown of module hours

Learning and teaching hours	12 hrs
Placement tutor support	0 hrs
Supervised learning e.g. practical classes, workshops	12 hrs
Project supervision (level 6 projects and dissertation modules only)	0 hrs
Total active learning and teaching hours	**24** hrs
Placement / work based learning	0 hrs
Guided independent study	176 hrs
Module duration (total hours)	200 hrs

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Initial approval date	Feb 2017
With effect from date	September 2022
Date and details of revision	Aug 2022: Learning outcomes and content update in engineering revalidation
Version number	2

Module aims

To support the development of the student in the following areas:

- Conceptual design of automotive systems.
- Design evaluation.
- Project planning, management, team working and presentation skills.
- Advanced design principles application (to create a new and innovative product and solve engineering design problems).
- Experience in the use of up-to-date visualisation approaches and commercial computer software for design applications.
- To provide students with the opportunity to practice the task management and problem-solving activities of a professional engineer and to explore original ideas.
- To exercise the student in applying and extending the methods, skills, information, knowledge and understanding obtained during the various parts of the programme to developing and evaluating an original design of an engineering product.

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

1	Apply structured techniques and methodologies to given product design specification in Automotive context.
2	Develop creative and innovative thinking to generate ideas and innovative evaluation strategies.
3	Implement the appropriate stages of a product design (including specification, task analysis, search of current information sources, options considerations, planning, costing, selection, prototyping, testing and final evaluation of solution).

In addition to the module learning outcomes, students will also cover the following accreditation of higher education programme (AHEP) fourth edition learning outcomes: C5.

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.

The assessment is based on directed activities (individual and in group) and individual investigations. The result of the work is presented as a single portfolio of evidence and is supported by an individual presentation.

Criteria for assessment will be based on the students' individual effort and interpersonal skills.

The portfolio should have a word count of 2500 or equivalent, the individual presentation should be 20 minutes long.

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)
1	1,2	Portfolio	60%
2	3	Presentation	40%

Derogations

A derogation from regulations has been approved for this programme 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

The module is taught through a combination of lectures and workshops. An active and inclusive approach is used to engage learners in the topics and will involve individual, group work and flipped learning experiences aligned to the university's Active Learning Framework (ALF). The approach offers students a flexible and adaptive learning experience that can accommodate a range of options that includes both on campus learning and remote learning where appropriate.

The Moodle VLE and other on-line materials and resources will be available to support learning. ALF offers a balance between the classroom elements and digitally enabled activity incorporating flexible and accessible resources and flexible and accessible feedback to support learning.

Lectures - presentation of theory, facts and concepts, relating to product design, in order to convey critical information.
Interaction or active learning should be implemented to develop an understanding of principles and concepts and stimulate discussion.

Tutorials and Practical interactive sessions – Close interaction with students ensuring that the work presented during lectures has been understood, with specific help being given in order to overcome any learning problems, should they occur.

Indicative Syllabus Outline

Problem Identification:
PDS (Product Design Specification) criteria and content in an automotive context.

Ethical Considerations:
Consideration of moral fitness and professional standards throughout the process.

Creativity:
Psychological mind set for creativity, inversion and fantasy as methods of developing ideas, brainstorming, morphological analysis, presentation of ideas.

Concept Selection:
Subjective decision-making methodologies including techniques such as criteria ranking and weighting, datum and EVAD method.

Embodiment:
Scheme drawings, form design, designing for assembly and manufacture.

Modelling:
Mathematical and computer modelling, scale models and simulation as used in automotive engineering design.

Detail Design:
Safety, robustness of design and selection of bought components.

Presentation to Client: how to present the creative, conceptual, embodied and final designs to a client orally and in report form.

Indicative Bibliography:

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

Essential Reads

K.H. Dietsche (ed.), Bosch Automotive Handbook, 10th ed. Robert Bosch GmbH. 2018

P.R.N. Childs, Mechanical Design Engineering Handbook, BH. 2018

Other indicative reading

T. Taura, *Creative Design Engineering*. Elsevier, 2016.

Employability skills – the Glyndŵr Graduate

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
Confidence
Adaptability

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