Module specification

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Module Code	ENG785
Module Title	Advanced Automotive Chassis Design
Level	7
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
MSc Engineering (Automotive) MSc Engineering (Automotive) with Advanced Practice MEng Automotive Engineering	Core

Pre-requisites

None

Breakdown of module hours

Learning and teaching hours	25 hrs
Placement tutor support	0 hrs
Supervised learning e.g., practical classes, workshops	5 hrs
Project supervision (level 6 projects and dissertation modules only)	0 hrs
Total active learning and teaching hours	**30** hrs
Placement / work-based learning	0 hrs
Guided independent study	170 hrs
Module duration (total hours)	200 hrs

For office use only	
Initial approval date	22nd Aug 2022
With effect from date	Sept 2022
Date and details of revision	
Version number	1

Module aims

The module aims at providing students with a detailed understanding and knowledge in automotive chassis engineering, the factors that influence stability, comfort and efficiency of vehicle and preparing them to solve practical problems by carry out research, critical evaluation, and critical thinking in the field.

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

In addition to the module learning outcomes, students will also cover the following accreditation of higher education programme (AHEP) fourth edition learning outcomes: **M1, M2** & **M5**

1	Develop parameters for car and driver interaction with respect to car controllability.
2	Define and resolve complex problems arising from the relationships between aspects of performance car design and vehicle performance by analysing the suspension dynamics and handling performance of any conventional wheeled vehicle in low and high-speed use.
3	Apply simulation and optimisation methods for improving chassis design and performance

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 One: An individually prepared written coursework evaluating advanced automotive chassis design related to a given case study. Assessment one is a written coursework (5000 words) and represents 100% of the overall mark.

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)
1	1-3	Coursework	100%

Derogations

Credits shall be awarded by an assessment board for those Level 7 modules in which an overall mark of at least 50% has been achieved with a minimum mark of 40% in each assessment element.

Learning and Teaching Strategies

A series of workshop style lectures with student-led seminars and small group activities. Directed learning using library and internet resources will be facilitated using Moodle and MS Teams. This module will also follow the ALF (Active Learning Framework) guidelines, which will include alternative methods of assessment and a blended approach to delivery, with some

theory and software sessions being delivered online (depending on requirements and student experience).

Indicative Syllabus Outline

Chassis Suspension

- Dynamics of the chassis
- Road interactions
- Key parameters and simulation
- Vibrational Analysis of quarter and half car model - one and two DOF

Handling, Steering and Breaking

- Low and high-speed turning theory
- Effects of tractive forces
- Steering geometry errors
- Braking systems and effects of braking forces

Indicative Bibliography:

Essential Reads

D. G. Thomas, *Fundamentals of Vehicle Dynamics.* 2nd edn. Society of Automotive Engineers, 2021.

Other indicative reading

M. Guiggiani, *The Science of Vehicle Dynamics: Handling, Braking and Ride of Road and Race Cars,* Springer, 2018.

D. Hammill, *Sports Car & Kit Car Suspension and Brakes High-Performance Manual*. 2nd ed. Veloce Publishing Ltd, 2013.

H. B. Pacejka, *Tyre and Vehicle Dynamics.* Elsevier Science & Technology, 2012.

Plus, various others to be signposted on Moodle.

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
Resilience
Confidence
Adaptability

Practical Skillsets
Digital Fluency
Organisation
Critical Thinking
Communication