

Module Details	
Module Title	Automotive Tribology and Noise Vibration and Harshness
Module Code	MAE7031-B
Academic Year	2020/1
Credits	20
School	Department of Mechanical and Energy Systems Engineering
Subject Area	Mechanical and Automotive Engineering
FHEQ Level	FHEQ Level 7
Pre-requisites	N/A
Co-requisites	N/A

Contact Hours	
Type	Hours
Laboratories	8
Online Lecture (Synchronous)	24
Directed Study	168

Availability	
Occurrence	Location / Period
BDA	University of Bradford / Semester 2

Module Aims
To gain systematic knowledge of the importance of tribology and noise, vibration and harshness (NVH) and their role in the design and operation of automotive systems. To be able to analyse complex systems and the effect of both tribology and noise vibration and harshness.

Outline Syllabus

Engine Lubrication and Lubricants.
 Lubrication of the Piston Assembly, Valve Train and Crankshaft Bearings.
 Engine Fuel Economy/Efficiency by Tribology.
 Wear and Durability of the Engine.
 Engine Oil Consumption and Lubricant Derived Exhaust Emissions.
 Tribology of Engine Ancillaries.
 Tribology of the Drivetrain and Transmission.
 Metrology: methods for non-destructive evaluation, technologies and capabilities, measurement systems analysis.
 Fundamentals of acoustics & vibration.
 Sources of low and high frequency noise & vibration including transmission and response.
 CAE prediction & analysis techniques.
 Experimental techniques for measurement and analysis.

Learning Outcomes

Outcome Number	Description
01	Critically evaluate vehicle component behaviour and the influence of tribology and NVH on such systems.
02	Use CAE tools competently to design, simulate and critically analyse component behaviour.
03	Apply experimental techniques to analyse vibrating systems.
04	Present and interpret experimental and CAE results.
05	Communicate effectively and manage your own learning.

Learning, Teaching and Assessment Strategy

The module is taught via a combination of lectures and computer laboratory sessions including a portfolio of case study exercises based around engine performance impacted by tribology. Technical knowledge is consolidated by project work focussing on aspects of vehicle NVH with applied dynamic modelling and computer simulations. Directed study takes the form of background reading to deepen the understanding of the material.

The module will be assessed by two pieces of project based coursework (LO1-5) .
 Supplementary assessment: repair deficiency in the original submission.
 Formative assessment is enabled via an online assessment with immediate solutions enabling self- evaluation and identification of areas for support.

This module satisfies the following Learning Outcomes as specified by the Accreditation of Higher Education Programmes: Third Edition (AHEP3) as published by The Engineering Council in-line with the UK Standard for Professional Engineering Competence (UK-SPEC). These outcomes specify six key areas of learning: Science and Mathematics (SM), Engineering Analysis (EA), Design (D), Economic, Legal, Social, Ethical and Environmental Context (EL), Engineering Practice (P) and Additional General Skills (G).

SM1m, SM4m, SM5m, EA1m, EA2, EA3m, EA4m, EA6m, D3m, D6, P2m, P3, P4, P7, G1, G2, SM7M, SM8M, SM9M, EA6M, EA7M, D9M, D11M, EL9M, EL10M, EL11M.

Further details of these learning outcomes can be found at <https://www.engc.org.uk/>.

Mode of Assessment				
Type	Method	Description	Length	Weighting
Summative	Coursework	Coursework relating to NVH (3000 words)	N/A	50%
Summative	Coursework	Coursework relating to tribology (3000 Words)	N/A	50%
Formative	Classroom test	Test the formal knowledge with immediate solutions to facilitate self evaluation of learning	Online	N/A

Reading List
To access the reading list for this module, please visit https://bradford.rl.talis.com/index.html

Please note:

This module descriptor has been published in advance of the academic year to which it applies. Every effort has been made to ensure that the information is accurate at the time of publication, but minor changes may occur given the interval between publishing and commencement of teaching. Upon commencement of the module, students will receive a handbook with further detail about the module and any changes will be discussed and/or communicated at this point.

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