

Automotive Tribology and Noise Vibration and Harshness

Module Code:	MAE7031-B
Academic Year:	2018-19
Credit Rating:	20
School:	Department of Mechanical and Energy Systems Engineering
Subject Area:	Mechanical and Automotive Engineering
FHEQ Level:	FHEQ Level 7 (Masters)

Pre-requisites:

Co-requisites:

Contact Hours

Type	Hours
Lectures	36
Laboratory	8
Directed Study	156

Availability Periods

Occurrence	Location/Period
BDA	University of Bradford / Semester 2 (Feb - May)

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

Module Learning Outcomes

On successful completion of this module, students will be able to...

- 1 Critically evaluate vehicle component behaviour and the influence of tribology and NVH on such systems.
- 2 Use CAE tools competently to design, simulate and critically analyse component behaviour.
- 3 Apply experimental techniques to analyse vibrating systems.
- 4 Present and interpret experimental and CAE results
- 5 Communicate effectively and manage your own learning.

Learning, Teaching and Assessment Strategy

The module is taught via a combination of lectures and laboratory sessions including a portfolio of case study exercises based around engine performance impacted by tribology.

Technical knowledge is consolidated by hands-on 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 both project based coursework (practical & computer based LO1-5) and formal examination (LO1 & , LO3).

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.

Mode of Assessment

Type	Method	Description	Length	Weighting	Final Assess'
Summative	Examination - closed book	Examination of taught material	2 hours	50%	Yes
Summative	Coursework	Programme of coursework relating to NVH and tribology	-2000 words	50%	No

Formative	Computer-based assessment	Test the formal knowledge with immediate solutions to facilitate self evaluation of learning	%	No
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Legacy Code (if applicable)

Reading List

To view Reading List, please go to [rebus:list](#).