Braking of Road Vehicles

Module Code: JLR7001-A
Academic Year: 2016-17
Credit Rating: 10
School: School of Engineering
Subject Area: Jaguar Land Rover (JLR)
FHEQ Level: FHEQ Level 7 (Masters)
Module Coordinator: Dr David Bryant

Contact Hours

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
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<tbody>
<tr>
<td>Lectures</td>
<td>24</td>
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<tr>
<td>Tutorials</td>
<td>8</td>
</tr>
<tr>
<td>Directed Study</td>
<td>68</td>
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Availability Periods

<table>
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<tr>
<th>Occurrence</th>
<th>Location/Period</th>
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<tbody>
<tr>
<td>BDA</td>
<td>University of Bradford / Semester 1 (Sep - Jan)</td>
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<td>BDA</td>
<td>University of Bradford / Semester 2 (Feb - May)</td>
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<td>BDA</td>
<td>University of Bradford / Semester 3 (June - Oct)</td>
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<td>BDB</td>
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Module Aims

This module aims to develop knowledge, understanding, and skills in the design and engineering of road vehicle brakes and braking systems, braking system technologies suitable for various road vehicles, and the principles of braking and the associated legislation associated with vehicle design.
Outline Syllabus

Friction and friction materials;
- Brake design analysis;
- Dynamics of braking;
- Tyres and tyre friction;
- Brake system design, braking distribution for cars, trucks and trailers;
- Legislation and type approval;
- Design, installation and production of brake rotors;
- Materials design for disc brakes;
- Thermal effects in brakes;
- Electronic braking and vehicle stability, basics of Electronic Control Systems including electronic stability control (ESC), including ABS, TCS, EBD, ESP;
- Regenerative braking;
- Brake noise and judder;
- Steering system and tyre interaction during braking;
- Brake testing;
- Case studies;

Module Learning Outcomes

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

1.1 Demonstrate a sound knowledge of the underpinning physical science and principles of road vehicle braking.
1.2 Demonstrate a sound knowledge of the evolution and recent developments in road vehicle brakes and braking systems.
1.3 Demonstrate a sound knowledge of the brake system design and operation, together with strategies for brake and associated vehicle system control.
1.4 Apply the legislative requirements associated with road vehicle braking in the UK and Europe.
1.5 Complete design calculations for brake system implementation.

2.1 Demonstrate mastery of the skills required to design, specify and evaluate the performance of road vehicle braking systems.

3.1 Demonstrate analytical and problem solving skills, and use basic computer programmes for braking system analysis (e.g. Excel).

Learning, Teaching and Assessment Strategy

This module will be delivered through a combination of seminars and case studies with expert speakers from the university, industry and other institutions. The seminars explore the science, principles and technology of road vehicle braking and braking systems together with their complexities (Learning outcomes 1.1, 1.2, 1.3 and 1.4). Learning materials are provided (text-book, lecture notes and case study) to support the principles and theories in the seminars. These are then reinforced through hands-on computer-based case studies (Learning outcome 1.5).

Directed study takes the form of background reading to deepen the understanding of the material, and the completion of a 5000-word assignment which focuses on the design, calculation and analysis of a vehicle braking system (Learning outcomes 1.1, 1.2, 1.3, 1.4, 1.5, 2.1 and 3.1). The assignment is supported by tutorials with formative verbal feedback. Detailed written feedback is provided on the assignment.
Mode of Assessment

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<th>Method</th>
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<tr>
<td>Summative</td>
<td>Coursework</td>
<td>Project based 5,000 word assignment</td>
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Legacy Code (if applicable)
ENG4101M

Reading List
To view Reading List, please go to rebus:list.