**Liverpool** John Moores University

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|---|---|
| Title: | Vehicle Dynamics |
| Status: | Definitive |
| Code: | **6514USST** (126454) |
| Version Start Date: | 01-08-2019 |
| Owning School/Faculty: | Maritime and Mechanical Engineering |
| Teaching School/Faculty: | University of Shanghai For Science and Technology |

| Team | Leader |
|---|---|
| Christian Matthews | Y |

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| **Academic Level:** | FHEQ6 | **Credit Value:** | 10 | **Total Delivered Hours:** | 41 |
| **Total Learning Hours:** | 100 | **Private Study:** | 59 | | |

**Delivery Options**
Course typically offered: Semester 1

| Component | Contact Hours |
|---|---|
| Lecture | 22 |
| Practical | 6 |
| Tutorial | 11 |

**Grading Basis:** 40 %

**Assessment Details**

| Category | Short Description | Description | Weighting (%) | Exam Duration |
|---|---|---|---|---|
| Exam | AS1 | Examination | 70 | 2 |
| Portfolio | AS2 | Portfolio | 30 | |

**Aims**

*This module aims to provide Automotive engineers with specialist knowledge relating to the performance of road vehicles. It considers the motion of the vehicle in response to driver inputs, road load and propulsion forces.*

**Learning Outcomes**

After completing the module the student should be able to:

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| 1 | Apply the principles of mechanics and dynamics to derive mathematical models describing the motion of road vehicles. |
| 2 | Analyse the performance of a road vehicle in traction, braking and cornering |

**Learning Outcomes of Assessments**

The assessment item list is assessed via the learning outcomes listed:

| | | |
|---|---|---|
| Examination | 1 | 2 |
| Portfolio | 1 | 2 |

**Outline Syllabus**

*This module will follow the syllabus outlined in 'Fundamentals of Vehicle Dynamics' by Gillespie. Topics will include:*

*Introduction:*

*Coordinate systems*
*Motion variables*
*Forces*

*Acceleration:*
*Inertia Limited Acceleration*
*Power Limited Acceleration*

*Braking:*
*Constant Deceleration*
*Brake Proportioning*

*Road Load:*
*Aerodynamic*
*Rolling Resistance*

*Ride:*
*Excitation sources*
*Vehicle Ride Response*

*Cornering (Steady-State):*
*Low Speed*
*High Speed*
*Understeer gradient*
*Critical Speed*

*Suspensions:*
*Solid Axles*

*Independent Suspensions*
*Geometry (Independent Suspensions)*
*Roll Centres and Axis'*
*Active Suspensions*

*Steering:*
*Steering Linkages*
*Steering geometry*
*Steering Forces*

*Tires:*
*Construction*
*Traction*
*Cornering*
*Combined Slip*

**Learning Activities**

Lectures, tutorials and demonstrations using software, or in a laboratory

**Notes**

The module will provide students with an understanding of the dynamics of road vehicles.