Liverpool John Moores University

Title:	Vehicle Dynamics
Status:	Definitive
Code:	**6114MECH** (121352)
Version Start Date:	01-08-2021

Owning School/Faculty: Engineering
Teaching School/Faculty: Engineering

Team	Leader
Christian Matthews	Y

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:

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.