

LEVEL 6 ASSESSMENT SPECIFICATION

Student name:		Student ID number:	
Programme:	BEng Automotive/Motorcycle/Motorsport Engineering		
Module:	Powertrain and Sustainability		
Module code:	M6X01206	Contribution to Overall Module Assessment (%):	50%
Lecturer:	Owen Williams	Internal Verifier:	Abi Summerfield
Assignment Title:	Real World Powertrain Analysis	Word count (or equivalent):	2500
Submission deadline:	23/3/20	Return date of provisional marks & written feedback:	20/4/20
Submission method:	All written assessments, where practical and possible, must be submitted via Turnitin unless otherwise instructed by the Lecturer. (Please DO NOT put this assessment specification into Turnitin or it will match many similarities with other students' submissions.) Alternative submission method (if applicable): Late submission of the assessment will result in a late penalty mark. Penalties for late submission: Up to one week late, maximum mark of 40%. Over one week late, 0%. Only the Extenuating Circumstances Panel may approve a change to submission dates.		
Academic honesty / referencing:	Academic honesty is required. In the main body of your submission you must give credit to authors on whose research and ideas your work is based. Append to your submission a reference list that indicates the books, articles, etc. that you have used, cited or quoted in order to complete this assessment.		

Module Learning Outcomes (from module syllabus)

- demonstrate and comprehensive and thorough knowledge of alternative power providers to enable specification of a system capable of fulfilling the vehicle's performance and emissions requirements (component A)
- demonstrate subject specific skills of the combustion and emissions mechanisms for conventional and bio-fuels used in SI and CI automotive applications (components A and B)

TASK DESCRIPTION

You are provided with 3 sets of vehicle data from a variety of different vehicle types. The data has been gathered via a logging application accessing vehicle data from the vehicle's OBDII port on a typical 'Drive to work' daily 'drive cycle'.

The vehicles tested are:

- 2016 Toyota Aygo 1.0 VVT-i X-Pression 5dr Hatchback.
- 2016 Volvo V40 Cross-Country D2
- 2011 Triumph Tiger 800 XC

The test is performed over a 30km distance, encompassing a range of road types and environments (Motorway, City Driving, Extra Urban, B-road, Unclassified road). Dash-Cam footage is also available. <https://youtu.be/CUSjIMxknHg>

The data is presented in 2 types, firstly a CSV file output from the application software. Also as a .lfg file type which can be used with the ScanXL software from Palmer Performance Engineering <https://www.palmerperformance.com>

The ScanXL professional software can be downloaded to your own machine and used to process the .lfg log files as if the vehicle was running.

The assignment is split into the following tasks:

- Compile and process the raw data files into a useable format (e.g Excel) and determine the validity of the calculated channels provided by the application software and removing the unnecessary data. Comment on the accuracy and validity of the 'raw' vehicle data? (Guide percentage - 20%)
- Compare and contrast the different vehicle types and how they differ in terms of engine load, drivability, efficiency and performance. Over the course of the test, all 3 vehicles deliver the same 'real world' fuel economy figure (50 ± 1 mpg) so the comparison is somewhat fair and reasonable. (Guide percentage - 20%)
- Using the GPS data as the basis of the 'Drive Cycle'; and the results of your initial analysis, you should attempt to model the 'ideal' vehicle for the 60km daily commute using one of the vehicles as your start point. You should look at the application of a range of technologies including electric/hybrid, stop-start and KERS as a minimum, including anything else you think reasonable. (Guide percentage - 30%)
- Assuming yourself to be a "company" Technical Director, determine the vehicle specification your company would pursue to be economically and politically viable for the 2028 production of a specific vehicle for this 'Drive Cycle'. You need to make sure you justify your proposal with proper technical judgement and current academic research. (Guide percentage - 30%)

Marks will be awarded for technical depth, clarity of thought and originality. (It must not be a 'cut and paste' job from literature sources but must be your own reasoned view. You should support your view with figures, illustrations, calculations as necessary to give substance to your reasoning).