Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David

LEVEL 6

SEMESTER 1

MODULE CODE: M3X8668

Electric and Hybrid Propulsion Control

ASSESSMENT TYPE: ASSIGNMENT

ASSESSMENT/COMPONENT: 1B

COMPONENT WEIGHTING: 25 %

WORD COUNT: 1548 WORDS

MODULE TUTOR : Mark Sandford

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RESULT	

BSc / HND ASSIGNMENT SPECIFICATION

Student name:		**Student P number:**	
Programme:	**BSc Automotive Engineering**		
Module:	**Electric and Hybrid Propulsion Control**	**Module Level (4, 5, 6):**	**6**
Module code:	M3X8668	**Contribution to Overall Module Assessment (%):**	**25**
Lecturer:	**Mark Sandford**	**Internal Verifier:**	**A Gibson**
Assignment Title:	**Series Hybrid Vehicle Requirements**	**Assignment No (x of x):**	**1 of 1**
Hand Out Date:	**Tues 23rd Jan 2018**	**Submission deadline:**	**Thurs 22nd March 2018**

Referencing:	In the main body of your submission you must give credit to authors on whose research your work is based. Append to your submission a reference list that indicates the books, articles, etc. that you have read or quoted in order to complete this assignment (e.g. for books: surname of author and initials, year of publication, title of book, edition, publisher: place of publication).		
Disclosure:	I declare that this assignment is all my own work and that I have acknowledged all materials used from the published or unpublished works of other people. All references have been duly cited.		
Student's Signature:	*Assignments will not be accepted without a signature here*	**Date:**	

Turnitin: Lecturer to tick to indicate if an electronic version of the assignment must be submitted to Turnitin. Note: the Turnitin version is the primary submission and acts as a receipt for the student. Both electronic and paper versions MUST be submitted by the same deadline. No marks will be released until both submissions are received. **Late submission of either the electronic or paper version will result in a late penalty mark.** Penalties for late submission: Up to four weeks late, maximum mark of 40%. Over four weeks late, Refer. Only Year Tutors and the Programme Director may grant an extension.	**YES**	✓
	NO	

Learning Outcomes tested (from module syllabus)	**Assessment Criteria To achieve each outcome a student must demonstrate the ability to:**
	•
1. critically analyse the control and monitoring systems required for electric and hybrid propulsion systems	• Evaluate the performance of an electric propulsion control and monitoring system and produce a report detailing and justifying the procedure adopted.

- **Please submit the assignment parts in a suitable report folder– not in polypockets.**
- **This form (ALL PAGES) MUST be at the front of the paper submission. Assignments will not be accepted without this form as it is a requirement that you sign the disclosure regarding referencing convention.**
- **DO NOT put this form into Turnitin or it will match many similarities with other students' submissions.**

TASK DESCRIPTION

In the first assignment you generated a duty cycle for an off road for the recreational and corporate entertainment sector. The company are considering producing a series hybrid version of their new buggy products. You will now need to research alternative series hybrid technologies for :

Internal combustion Engine (With sufficient power to provide average power at the wheels)
Generator
Energy storage device and controller
Motor and controller
Final drive solution
Make recommendations and outline costings.

Use comparison graphs and tables to support your discussion.

GUIDANCE FOR STUDENTS IN THE COMPLETION OF TASKS

Specify a suitable series hybrid system including the selection of.
Electric motor and a suitable matched controller
Final drive ratio
An energy storage solution that has the required storage capacity and power input and output ratings for your application.
ICE and Generator unit – (that will be greater than the average power requirement)
Consider control requirements
Maintenance requirements (additional to the base vehicle) Including safety and battery support, charging facilities etc.

Outline any likely fuel consumption benefits considering the engine operating point.

Outline the approximate costs for producing a prototype, component 'on cost'.
Discuss any concerns that you may have on the adoption of hybrid technology for this application.
Describe any functional advantages that could be incorporated into the vehicle for future models
Conclusions and recommendations

State all assumptions
Reference all material
Guideline word count 1548 (Selected component specifications should be in appendices)

Produce a paper report in A4 format (A3 sheets may be included if folded)
The report should have the following sections in order.

1) Introduction
2) Technology review (options available – technological and relative costs)
3) System specification and discussion (your chosen solution and justifications)
4) Preliminary costings
5) Conclusions and recommendations (for the adoption of selected technologies for the application).

Include a cover sheet identifying the module and assignment title, do not forget to include the author's name!
An electronic submission is also required through TurnItIn.

MARKING CRITERIA AND STUDENT FEEDBACK

This section details the assessment criteria. The *extent* to which these are demonstrated by you determines your mark. The marks available for each criterion are shown. Lecturers will use the space provided to comment on the achievement of the task(s), including those areas in which you have performed well and areas that would benefit from development/improvement.

Common Assessment Criteria Applied	**Marks available**	**Marks awarded**
1. Research-informed Literature Extent of research and/or own reading, selection of credible sources, application of appropriate referencing conventions.		
Review available technologies and references	20	
2. Knowledge and Understanding of Subject Extent of knowledge and understanding of concepts and underlying principles associated with the discipline.		
System specification and discussion	30	
Preliminary component costings	5	
3. Analysis Analysis, evaluation and synthesis; logic, argument and judgement; analytical reflection; organisation of ideas and evidence		
Use of spread sheet calculations to find energy flows and component sizings and final drive ratio.	20	
4. Practical Application and Deployment Deployment of methods, materials, tools and techniques; application of concepts; formulation of innovative and creative solutions to solve problems.		
Introduction and problem identification	5	
Conclusions and recommendations	10	
5. Skills for Professional Practice Attributes in professional practice: individual and collaborative working; deployment of appropriate media; presentation and organisation.		
Quality of report	10	

Assignment Mark (Assessment marks are subject to ratification at the Exam Board. These comments and marks are to give feedback on module work and are for guidance only until they are confirmed.)	**Late Submission Penalties (tick if appropriate)**		
	Up to four weeks late		**%**
	Over four weeks late		

COMMON ASSESSMENT AND MARKING CRITERIA

Assessment Criteria	OUTRIGHT FAIL 0-29%	UNSATISFACTORY 30-39%*	SATISFACTORY 40-49%	GOOD 50-59%	VERY GOOD 60-69%	EXCELLENT 70-79%	EXCEPTIONAL 80-100%
1. Research-informed Literature Extent of research and/or own reading, selection of credible sources, application of appropriate referencing conventions	Little or no evidence of reading. Views and findings unsupported and non-authoritative. Referencing conventions largely ignored.	Poor evidence of reading and/or of reliance on inappropriate sources, and/or indiscriminate use of sources. Referencing conventions used inconsistently.	References to a limited range of mostly relevant sources. Some omissions and minor errors. Referencing conventions evident though not always applied consistently.	Inclusion of a range of research-informed literature, including sources retrieved independently. Referencing conventions mostly consistently applied.	Inclusion of a wide range of research-informed literature, including sources retrieved independently. Selection of relevant and credible sources. Very good use of referencing conventions, consistently applied.	A comprehensive range of research informed literature embedded in the work. Excellent selection of relevant and credible sources. High-level referencing skills, consistently applied.	Outstanding knowledge of research-informed literature embedded in the work. Outstanding selection of relevant and credible sources. High-level referencing skills consistently and professionally applied.
2. Knowledge and Understanding of Subject Extent of knowledge and understanding of concepts and underlying principles associated with the discipline.	Major gaps in knowledge and understanding of material at this level. Substantial inaccuracies.	Gaps in knowledge, with only superficial understanding. Some significant inaccuracies.	Evidence of basic knowledge and understanding of the relevant concepts and underlying principles.	Knowledge is accurate with a good understanding of the field of study.	Knowledge is extensive. Exhibits understanding of the breadth and depth of established views.	Excellent knowledge and understanding of the main concepts and key theories. Clear awareness of challenges to established views and the limitations of the knowledge base.	Highly detailed knowledge and understanding of the main theories/concepts, and a critical awareness of the ambiguities and limitations of knowledge.
3. Analysis Analysis, evaluation and synthesis; logic, argument and judgement; analytical reflection; organisation of ideas and evidence	Unsubstantiated generalisations, made without use of any credible evidence. Lack of logic, leading to unsupportable/ missing conclusions. Lack of any attempt to analyse, synthesise or evaluate.	Some evidence of analytical intellectual skills, but for the most part descriptive. Ideas/findings sometimes illogical and contradictory. Generalised statements made with scant evidence. Conclusions lack relevance.	Evidence of some logical, analytical thinking and some attempts to synthesise, albeit with some weaknesses. Some evidence to support findings/ views, but evidence not consistently interpreted. Some relevant conclusions and recommendations, where relevant	Evidence of some logical, analytical thinking and synthesis. Can analyse new and/or abstract data and situations without guidance. An emerging awareness of different stances and ability to use evidence to support the argument. Valid conclusions and recommendations, where relevant	Sound, logical, analytical thinking; synthesis and evaluation. Ability to devise and sustain persuasive arguments, and to review the reliability, validity & significance of evidence. Ability to communicate ideas and evidence accurately and convincingly. Sound, convincing conclusions / recommendations.	Thoroughly logical work, supported by evaluated evidence. High quality analysis, developed independently or through effective collaboration. Ability to investigate contradictory information and identify reasons for contradictions. Strong, persuasive, conclusions, justifiable recommendations.	Exceptional work; judiciously selected and evaluated evidence. Very high quality analysis, developed independently or through effective collaboration. Ability to investigate contradictory information and identify reasons for contradictions. Highly persuasive conclusions
4. Practical Application and Deployment Effective deployment of appropriate methods, materials, tools and techniques; extent of skill demonstrated in the application of concepts to a variety of processes and/or contexts; formulation of innovative and creative solutions to solve problems.	Limited or no use of methods, materials, tools and/or techniques. Little or no appreciation of the context of the application.	Rudimentary application of methods, materials, tools and/or techniques but without consideration and competence. Flawed appreciation of the context of the application.	An adequate awareness and mostly appropriate application of well established methods, materials, tools and/or techniques. Basic appreciation of the context of the application.	A good and appropriate application of standard methods, materials, tools and/or techniques. Good appreciation of the context of the application, with some use of examples, where relevant.	A very good application of a range of methods, materials, tools and/or techniques. Very good consideration of the context of the application, with perceptive use of examples, where relevant. Evidence of some innovation and creativity.	An advanced application of a range of methods, materials, tools and/or techniques. The context of the application is well considered, with extensive use of relevant examples. Application and deployment extend beyond established conventions. Innovation and creativity evident throughout.	Outstanding levels of application and deployment skills. Assimilation and development of cutting edge processes and techniques.
5. Skills for Professional Practice Demonstrates attributes expected in professional practice including: individual initiative and collaborative working; deployment of appropriate media to communicate (including written and oral); clarity and effectiveness in presentation and organisation.	Communication media is inappropriate or misapplied. Little or no evidence of autonomy in the completion of tasks. Work is poorly structured and/or largely incoherent.	Media is poorly designed and/or not suitable for the audience. Poor independent or collaborative initiative. Work lacks structure, organisation, and/or coherence	Can communicate in a suitable format but with some room for improvement. Can work as part of a team, but with limited involvement in group activities. Work lacks coherence in places and could be better structured.	Can communicate effectively in a suitable format, but may have minor errors. Can work effectively as part of a team, with clear contribution to group activities. Mostly coherent work and is in a suitable structure.	Can communicate well, confidently and consistently in a suitable format. Can work very well as part of a team, with very good contribution to group activities. Work is coherent and fluent and is well structured and organised.	Can communicate professionally and, confidently in a suitable format. Can work professionally within a team, showing leadership skills as appropriate, managing conflict and meeting obligations. Work is coherent, very fluent and is presented professionally.	Can communicate with an exceptionally high level of professionalism. Can work exceptionally well and professionally within a team, showing advanced leadership skills. Work is exceptionally coherent, very fluent and is presented professionally.

Student Self Evaluation Form

Student name:		**Student P number:**	
Programme:		**Year of programme**	
Assignment Title:			

This section repeats in brief the common assessment criteria detailed on previous pages. The *extent* to which these are demonstrated by you determines your mark. Using these criteria, tick the box that best indicates the level of achievement you feel you have achieved with regard to each of them.

Common Assessment Criteria Applied	**Level of Achievement**						
	REFER		**3rd**	**2:2**	**2:1**	**1st**	**1st**
	OUTRIGHT FAIL	UNSATISFACTORY	SATISFACTORY	GOOD	VERY GOOD	EXCELLENT	EXCEPTIONAL
1. Research-informed Literature	0-29% ☐	30-39% ☐	**40-49%** ☐	**50-59%** ☐	**60-69%** ☐	**70-79%** ☐	**80-100%** ☐
2. Knowledge and Understanding of Subject	0-29% ☐	30-39% ☐	**40-49%** ☐	**50-59%** ☐	**60-69%** ☐	**70-79%** ☐	**80-100%** ☐
3. Analysis	0-29% ☐	30-39% ☐	**40-49%** ☐	**50-59%** ☐	**60-69%** ☐	**70-79%** ☐	**80-100%** ☐
4. Practical Application and Deployment	0-29% ☐	30-39% ☐	**40-49%** ☐	**50-59%** ☐	**60-69%** ☐	**70-79%** ☐	**80-100%** ☐
5. Skills for Professional Practice	0-29% ☐	30-39% ☐	**40-49%** ☐	**50-59%** ☐	**60-69%** ☐	**70-79%** ☐	**80-100%** ☐

PLEASE COMMENT ON AREAS IN WHICH YOU FEEL THAT YOU HAVE PERFORMED WELL	**PLEASE COMMENT ON AREAS YOU FEEL THAT YOU NEED TO DEVELOP**

Student's Name		**Date**	
Student's Signature			