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Rev. 19.09.2011

Specifications of Bachelor project for students at the Electronic Engineering and Information Technology and Power Engineering. (2 A4 pages max)

Date	08102012	**Project no.** **(will be filled out by IHA)**	
Project title:	Electric Drive Train for Shell Eco Marathon vehicle		
The project applies to at least two students with a specialisation in (please indicate the number of students that will be ideal for the project. You can write your comments here)**:**			
Electronic Engineering	Specific specialization:	2-6 control, dc motor, battery management, solar power.	
Information and Communication Technology	Specific specialization:		
Power Engineering	Specific specialization:		
Remarks	AU has decided to participate in the 2013 Shell Eco Marathon and has established a team of tutors from mechanical- electronic- and software department at ASE and HIH. Also more than 20 students is involved in forming the team.		
Special demands to: - equipment - place - confidentiality	Participants are expected to collaborate across disciplines. Core persons from each discipline form the crew team participating in the race, Rotterdam May 2012		

Project provider	Company	Name	Telephone
	ASE	Carl Jakobsen	41893271
	Title	Email	Mobile phone
		cj@iha.dk	41893271
Supervisor Can be project provider or IHA teacher	Company	Name	Telephone
	To be determined		
	Title	Email	Mobile phone
Co-supervisor Can be project provider/ employee of project provider or IHA teacher. If Supervisor is not an IHA teacher, the Co-supervisor must be.	Company	Name	Telephone
	Title	Email	Mobile phone
Other remarks			

Project workplace	Will be offered	Where?

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Project description

This description will be under continuous review.

Design of electric motor and controller for the shellEcoMarathon vehicle

Introduction

Participation in the shell ecoMarathon requires the best possible utilisation of the availible energy, to propel the vehicle.
To participate in the battery powered electric class, we need a highly optimized system composed of an electric propulsion motor with motor controller.
The task is to analyse available technology, select & dimension suited components, implement and build a working prototype system, and to verify it against the requirements.
Latest regulation of the rules alows use of solar panels for powering. This will require the development of separate control algorithms..

References

1: shellEcoMarathon rules & regulations:
http://www.shell.com/home/content/ecomarathon/for_participants/general_information/rules/#subtitle_5

Requirements

Functional :

F1 : The propulsion system must be able to propel the vehicle at a minimum speed of xx m/s
  F1.1. the complete maximum weight of the vehicle is available in "ref.1"
F2 : The propulsion system must be able to accelerate the vehicle from standing still, to the speed in F1, in maximum yy seconds.
F3 : The propulsion system must as minimum conform to ALL safety features listed in "ref.1"
F4 : You must develop a control strategy that utilizes the propulsion motor in an optimum manner, in terms of energy-efficiency. Whether this is optimal in terms of mechanical wear or general appearance is not important.

Technical :

T1 : The propulsion system must be controlled via a CAN bus
  T1.1: CAN 2.0, 125kBps shall be used.
  T1.2: You must develop a protocol for CAN communication, in cooperation with the other AU (Herning / IHA) teams
T2 : The motor controller must be optimized for the selected energy storage technology (probably batteries)
T3 : The propulsion system shall be able to collect and store energy when braking or decelerating