DEIS COURSE DESCRIPTION (2017/6/2)

Introduction

Welcome to Design of Embedded and Intelligent Systems!
(DEIS, 15 credits; course examiner Wojciech Mostowski (wojciech.mostowski@hh.se), course responsible Martin Cooney (marcoo@hh.se))
Please read this course description carefully at the start of the course!

Syllabus
Please see Syllabus in Swedish (or translation in English) on Blackboard.

Intended Learning Outcomes (ILOs)
The basic course objective is that the student will develop their practical skills and conceptual knowledge related to the design of embedded and intelligent systems while considering various perspectives; upon completion of the course the student will be able to:

- apply basic skills and knowledge related to designing embedded and intelligent systems in problem-solving while collaborating with peers in a small group
- hypothesize independently about some new useful work which could be done in their speciality (e.g., embedded, intelligent, or communication) and specific steps required to accomplish it
- reflect on their experiences above in terms of the advantages and disadvantages of various approaches and explain how simplified embedded and intelligent systems work as a whole.

Thus, the three intended learning outcomes relate to *applying and collaborating* (the basic requirements), *hypothesizing independently* (creativity), *and reflecting* (excellence of methodology).

Teaching/Learning Activities
Based on and aligned with the learning outcomes, there are two teaching/learning activities:

- *main: a problem-solving project in groups from embedded, intelligent, and communication (conducted on your own),* to let you apply basic practical knowledge in DEIS while collaborating, exercise creativity, and reflect upon your experience in a specific context
- *supplement: lectures and labs from various teachers*, to help you to refine your basic conceptual knowledge, see from new perspectives, and reflect upon standard approaches

Summary of TLA1: Course project
Embedded and intelligent systems such as robots and autonomous vehicles offer various interdisciplinary challenges.
One challenge currently receiving much attention, e.g., in the Grand Cooperative Driving Challenge (GCDC), is how to design systems which can navigate (semi-)autonomously in platoons.
For your project you will tackle this challenge by programming little robots with Raspberry Pi/Arduino to run around a track on E1 in platoons.
Please see Project Description for details.

Summary of TLA2: Lectures and Labs
The content of the lectures and labs was chosen to represent some key areas in DEIS as described above in regard to "basic skills and knowledge", as well as for relevance to the project.
1 Basic introduction to course and design of embedded and intelligent systems (system modelling, project platform/environment (Martin, several lectures/labs)
2 Sensor Fusion (Hassan 1 lecture, 1 lab)
3 Embedded/real-time programming (Nicholas 1 lecture, 1 lab)

4 Odometry/path planning (Jens 1 lecture, 1 lab)
5 Simulation (Wojciech 1 lecture, 1 lab)
6 GCDC/Autonomous Vehicles (Cristofer 2 lectures)
7 Wireless communication (Nikita and Alexey 1 lecture, 1 lab)
8 Image processing (Josef 1 lecture, 1 lab)
Slides will be uploaded to Blackboard as the course progresses.

Examination
Examination is aligned with the intended learning outcomes and teaching/learning activities and focuses half on the project (tollgates/report) and half on the course overall (oral exam). Please see Examination for details.