Mechatronics (EIE 070)

Spring 2010

"Mechatronics is the synergistic combination of precision mechanical engineering, electronic control and systems thinking in the design of products and manufacturing processes."

(Industrial Research and Development Advisory Committee of the European Community)

1 Subject

Mechatronics is an interdisciplinary knowledge area, which comprises electrical and mechanical engineering as well as information technologies. Within the scope of a couple of lectures it is hardly possible to get to the bottom of all these topics. The goal of this course is to give you – whether you are a student from the E-, M-, F- or even some other programs – insight into the adjacent subjects. You will in addition to your specialist knowledge get a survey of the most important aspects within mechatronics. The purpose with this mechatronics course is to engender mutual respect, a candid attitude and understanding among students from the different knowledge fields and thus facilitate discussion and cooperation in product development projects.

In addition to their expertise most engineers avail themselves of experiences and practical skills usually not been taught at university. This course on mechatronics will take up a lot of this so-called silent knowledge focusing on the mutual dependence between mechanics, electronics and software. You will learn to consider side effects of technology and to take advantage of them for system functionality. Moreover you will get to know a set of important terms from the different engineering branches, which will serve as a base for future discussions with specialist from the respective technical areas.

2 Content

One section of this course concentrates on work in a *project* orientated environment and on the special requirements for the members of a *team developing mechatronics products*. To clarify the strong *coupling* between information technology, electrical and mechanical engineering several technical choices are discussed. Moreover you will learn about the effect of *legal provisions, standards and directives* on product construction. A section about *materials and manufacturing processes* focuses on the close relation between electrical and mechanical component properties.

Furthermore a series of *common system modules*, their function, electrical and mechanical structure as well as their limitations and typical application fields will be presented. In this section of the course you will get an overview of all parts, which usually are included in so called *embedded systems*. Implementation of the control functions will be considered as well as realization of the *energy flow*. You will even become familiar with the use of *computer-aided construction tools* and their limitations.

Exercises will give you the chance to strengthen and deepen the acquired knowledge. Trough discussions you will learn to review information, analyze problems and find the right question at issue to get to optimized solutions. In a project work, which carries out in cooperation with an industrial company, you will get the possibility to put your new skills into practice.

3 Projects

All students will be a part of a Mechatronics development project group. The project is defined in cooperation with a company and three reports are required:

- Project goal and preparation (spring study period 1, Monday week 7). Written report

- Product concept, choice of concept and detail construction (spring study period 2, Friday week 4). Written full report
- Oral presentation (spring study period 2, week 6)

4 Examination

The course with 7,5 ECTS credits is given within 72 lectures in the spring study periods 1 and 2.

To pass the course with grade 3, the following items must be fulfilled:

1 Four out of five intermediate examinations passed. Three of these are written homework assignments. The other two is the fullfillment of a laboration in real time systems and a design task in FEM. The three written intermediate exams are based on three sections of the lecture series.

2 Passed project reports, ie an approved written full project report in English and an oral project presentation in English.

To pass the course with higher grades, an additional written exam is required.

5 Contacts

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Homepage www.iea.lth.se/mek

6 Dynamic schedule (subject to change! Look out on the home page!)

http://www.iea.lth.se/mek/10-Schema.pdf