

Workshop theme status report

Johan Malmqvist

Pete Young

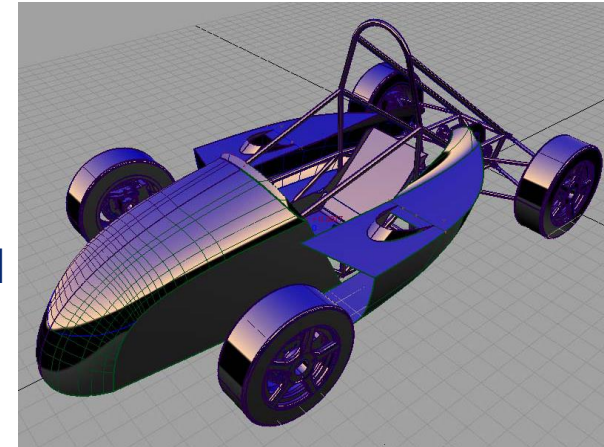


Status at Chalmers 1(2)

- Lab building work will start on December 1, 2002
- Plan to be used in courses in period 4, AY 2002/2003
 - Mechatronics
 - Product Development
 - Possibly Machine Elements & Manufacturing Engineering project
- Equipment acquisition is under way
- Lab staffing completed: Bahram Atabeyli, Göran Stigler, Lennart Darell

Status at Chalmers 2(2) - Ongoing development of design-build-experiences:

- Formula Student
 - # Chalmers took part in the competition in July 2002, new car to designed & built this year
 - # Labspace allocated
 - # 20 students, 3 faculty + industrial advisory board
 - # Will use this project as a testbed on how to integrate CDIO teaching and learning in extracurricular (?) student projects
- Product Development (planned for AY 2002/2003)
 - # Investigation of use of physical prototyping lab and IDE studio in advanced-level course
 - # Software support for teamwork being set up - creates a digital template for project execution, mailing lists, discussion forums etc
 - # Teamwork IRM will be tested in this project-based course



Status at Linköping 1(6)

- From year 2003/2004 it will be compulsory for students in the fourth year of the program to attend a CDIO project course
- The project courses are related to the specializations during year four
- Svante Gunnarsson chairs the working group that coordinates the development, has taken over after Lars Nielsen
- Course requirements
 - Minimum 5 credits (5 weeks full-time study)
 - Project groups of at least 4 members
 - Project work using LIPS
 - CDIO syllabus
 - Industrially relevant projects

Status at Linköping 3(6) - Proposed Y4 courses

- Electronics system design (EE)
- Systems engineering (EE)
- Applied math (Math)
- Medical technology (Med Tech)
- Automatic control (EE)
- Image processing (EE)
- VLSI system design (EE)
- Mixed signal electronic design (EE)
- Computational physics (Physics)
- Microchip design and manufacturing (Physics)
- Software development (CS)
- Modeling and verification (CS)

- 12 courses from 5 different departments will be offered as CDIO-based project courses from AY 2003/2004
- Varying needs for development in different courses
- No course has earlier used a LIPS-type project model
- Two courses have been piloted during 2001/2002
- Four courses will be partly adapted

Status at Linköping 4(6) - Status of individual Y4 courses

“Pilot courses” given during 2001/2002:

- Electronics system design
- Systems engineering

Courses to be partly adapted for 2002/2003:

- Applied math
- Medical technology
- Automatic control
- Image processing

Courses proposed to be developed for 2003/2004

- VLSI system design
- Mixed signal electronic design
- Computational physics
- Microchip design and manufacturing
- Software development
- Modeling and verification

Status at Linköping 5(6) - Development of Electronics project course for Y3

Done so far:

- Course plan & organisation has been decided
- Lab exercises have been developed
- A compendium in VHDL has been written
- General course literature has been chosen
- Development tools for microcomputer development and VHDL programming has been decided and evaluated
- Components and microcomputers have been chosen
- Several projects are decided

Remaining tasks during autumn 2002:

- Design of special boards and interface modules
- Adapting the LIPS templates for the electronics project
- Test proposed projects by building prototypes & find more projects
- Establish the course organisation and educate supervisors
- Purchase course specific equipment (development tools, components etc.)
- Remaining work, about 250 hours
- Remaining investments, about 300 000 sek

The course will start 2003

Status at Linköping 5(6) - Muxen development

Done so far:

- MUXEN; 4 labs, one conference room, one server room and one component room is fully equipped with furniture etc.
- The network in the lab has been updated
- Computers have been purchased and installed
- A first batch of logic analysers has been purchased and evaluated
- Lab material, tools etc. have been evaluated, and purchased to some extent
- Investment costs for equipment during 2003 is, up till now, about 1 million SEK

Remaining tasks during autumn 2002:

- Installation of special software for the electronics course
- Purchase the last batch of logic analysers (16 units)
- Test the lab with a smaller group of students
- Buy the rest of the needed tools and lab material
- Remaining investment costs about 550 000 SEK

Other labs

Vehicle systems lab, automatic control lab (LABOTEKET) and medical technology lab are all ready for executing the Y1 project course.

Status at KTH 1(4)

- CDIO-based project course in Vehicle Eng
 - Course offered for 2nd time
 - # The Waterbike project aim is to break the world record for human-propelled seacraft
 - 16 student from two specializations
 - Khalid and Kristina support the further development of learning objectives, assessment form etc
- Another design course in the department has been extended from 1 to 2 semesters (10 p) and its contents CDIO-adapted
 - this courses uses smaller groups and industrial projects (training gear for astronauts etc)
 - offering students some more choice in how to learn CDIO skills
- Next year: both project concepts will be roomed in the same course
- Stefan and Jakob are writing a paper on the Solar-powered aircraft project course, draft to be presented at meeting



Status at KTH 2(4): Development and use of Hangaren

- The student lab Hangaren has for the last 1.5 years been the headquarter of the DB course "Solar Aircraft Project".
- It was equipped from scratch to fulfill the needs of this particular project and for similar projects to come.
- The Hangaren is being developed with the aim of keeping the facility flexible and dynamic
 - Fall term: meetings & planning
 - Spring term: workshop
- Early stages of the project: use as design office and study room:
 - Office equipment
 - Large whiteboards supporting group discussions
 - Small model manufacturing was allowed in an adjacent room - support for creative work and technical discussions

Status at KTH 3(4): Hangaren cont

- Later phases of the project: shift from the office-type needs to machine shop-type needs
 - Use as an assembly space and for lighter manufacturing tasks
 - Heavy composite manufacturing and machining had to be done in other labs with proper fans and safety equipment.
- Access to a lab space for assembly etc where students were in 100% control of the activities resulted in students taking large responsibility
- Need for more tools and other equipment was identified. Lack of resources hindered the purchase of some necessary equipment which instead had to be borrowed from other labs

Status at KTH 4(4): Hangaren cont

- Evaluation:
 - no equipment has disappeared. The risk of "equipment diffusion" was early identified as a potential problem, especially as the lab had numerous visitors.
- Upgrading to fill the needs of the waterbike and other projects
- Office equipment
 - new PC, printer, scanner, projector, wireless LAN
- Machine shop equipment:
 - more hand tools
 - Small table mounted saws and drills are installed
 - upgraded equipment for hot-wire cutting of foam.
 - A system for the students to share and have access to expensive and delicate equipment is being planned

Status at MIT

- Workshop fully operational, senior technician (D. Robertson) added
- Supersonic wind tunnel re-activated, used for academic and research purposes
- Ongoing workshop projects:
 - Unified Engineering labs
 - CNC fabrication of Boeing blended wing-body wind tunnel model
- Spring '03 planning
 - Heavy usage forecast
 - Planning underway for increased 3rd/4th year professional area activities

Status of joint efforts

- Papers presented:
 - “Setting goals for design education”
 - ”Engineering the engineering education environment”
- Common issues to be discussed at meeting
 - Maintainability and Supportability of labs
 - Use of sensors and related equipment in DB courses
 - Advanced-level DB experiences
 - Assessment of Design-build experiences (with Assessment)