



Sustainable education in Sustainable Energy Systems

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Background & Our approach

- 15 ECTS credit B.Sc. degree project organised as a course, grading A-F (objective oriented)
- 55 students in spring 2008, 4 teachers/supervisors
- Approach:
 - Introductory lecture series
 - One large frame-project divided in 4 subprojects
 - One project leader per subproject among the students
 - Each subproject is further divided into 6-7 pieces, each in which the students work in pairs
 - Regular report submissions and seminars in which each pair/projectleader present their work status orally
 - Regular FORMATIVE feedback from the teachers

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Objectives: What are we striving for?

- or rather what do we want the students to learn?

5 year Mechanical engineering program objectives (not all are listed here):

After graduation of the program the student should be able to:



- Apply knowledge in a practical environment
- Analyze, formulate and grasp technical problems: From an idea to a finished realisation
- Make relevant assessments, both in group and independently
- Communicate: written and orally
- Have especially good understanding that engineering-related problems are often complex, incompletely defined and sometimes contain contradictions

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Basic principles of our approach

- Need of formulating the project from a very conceptual description given by the course leaders
- Need to work after a certain schedule for report submissions and seminars. Literature survey needed for everybody.
- Need to take adequate external company/authority contacts
- Course-support in forms of lectures, project-meetings, seminars and IT based communication (PIM/Notice board/Email/Virt. Proj. groups)
- The sub-project leaders create a platform for communication within each subproject: **the students coach each other and exchange ideas.**
- Individual (per working pair) FORMATIVE feedback on 2/3 of the report which is NOT accounted for in the final grade
- The students get the exact grading template (A-F) at course start



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Process and Management: Examples

- Students:
1. Worries about the models and results even before literature survey is done (= giving knowledge base about the topic)
 2. Initially not knowing the correct answer, fear of not solving the problem



Course
leaders
response:

3. Insecurity in report writing: “how many pages?”
1. “Write literature survey first, think of model thereafter. Suggest a model and you will get detailed formative feedback”
2. “Several answers are correct. The discussion and sensitivity analysis are more important than one solution over another”
3. “We look at the content, are the essential parts there and is the focus right? Are all presented graphs, tables discussed properly?”

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Conclusions

1. A frame-work project gives everybody an overall final objective to work towards. Necessary for large student groups.
2. Subproject leaders take a large load from the teachers by setting the platform for communication: Internet and weekly meetings with the subprojectmembers where they can exchange ideas, questions and peer-review each other
3. Regular report submissions sets a relative uniform working pace for everybody
4. Formative and constructive feedback from the teachers is very appreciated among the students



Challenges for course responsible: To see to that the involved teachers are united and give similar type and quality of feedback to the students throughout the course

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