# IMPACT
## Establishing the Bologna Structure with Master Programmes at Chalmers

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**Background – Bologna**
**Project description**
**Examples**
**Evaluation**

## Claes Niklasson
## Chemical Reaction Engineering

**(20% vpref, 30% IMPACT, 20% CPE, 15% GUN, (rest?) GU/Forskning)**
**Vice Head of Department Chemical and Biological Engineering 2005 –**

**Research publications (Int. journals and books)**
**Popular science**
**Scientific presentations (conferences and courses)**
**Supervision (Ph.D. 8, Lic.Eng 5)**
**Pedagogic publ. and rev.full paper conference papers**
**Pedagogic presentations int. courses and conf.**
**Pedagogic projects - (C-SELT Integration math./chem. Eng. - L-P Teacher/Student exch. Prog.)**

## I Chalmers strategidokument står det :
## *Chalmers strategy document*

***”I samklang med en hållbar samhällsutveckling och i samverkan över gränser skall Chalmers tekniska högskola vara förstahandsvalet för forskning, utbildning, bildning och innovationskraft.”***

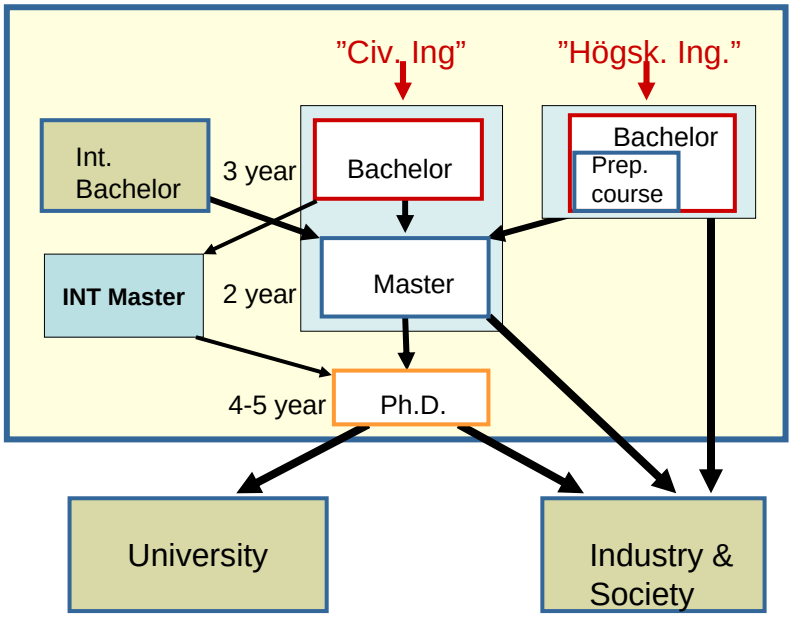
**In cooperation with sustainable development of society and cooperation cross borders Chalmers shall be the first choice for research, education, engineering competence assurance and innovation. (translation)**


# Bologna ideas

- Establish a system of easily transferable accessible and comparable degrees (Bachelor, Master, Doctoral) (3+2+3)
- Establish a European Credit Transfer System (ECTS)
- Promote mobility
- Promote cooperation within Europe concerning quality assurance
- Promote a European dimension in higher education.
- Promote Life Long learning
- Actively engage students in the development

# Introduction

- Chalmers early decided to transform and implement the first and second cycle education to the Bologna model with a three year Bachelor and a two year International Master programme.
- All students starting their Bachelor since 2004 have been following the first cycle and in 2007 the first students entered the second cycle, in which all Master level studies are organised in international Master programmes.
- This is part of the long term strategic development towards a full integration of the Bologna process for higher education. The Bologna process aims to establish a European area of higher education by 2010 and the objectives are to



## 44 MP in the beginning at Chalmers

### Innovative and Sustainable Chemical Engineering

Main Subject (30 cr)

Elective courses

**YEAR 1**

Adv. Chem. Eng. and Process Analytical Techn.
Biorefinery-chemical prereq. and technical processes
Computational fluid dynamics in chemical engineering
Control engineering
Design of processes
Experimental Design
Global sustainability
Ind. Energy System

| | |
|---|---|
| 5cr | 5cr |
| 5cr | 5cr |
| 5cr | 5cr |
| 5cr | 5cr |

**Quarter 1**
Prep. Courses **5 cr**

Hum/Soc **5 cr**

**YEAR 2**

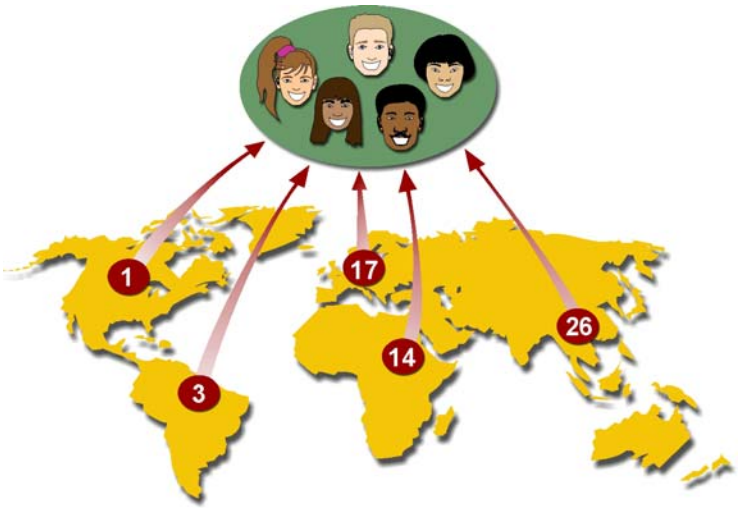
**20cr**

Modeling
Pulp and Paper
Energy Environment

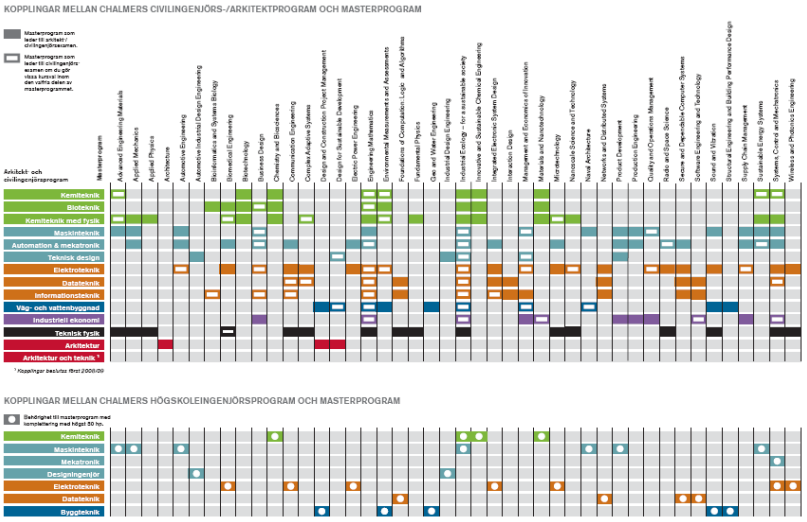
Innovation
Automotive/ Mechanical
Pharma.
Food and Biotechn.

Master Thesis **20cr** **20cr**

## Applications



## Possibilities and/or problems!!!




## Project Aim

**Chalmers new Master programs shall be of highest quality and internationally competitive.**

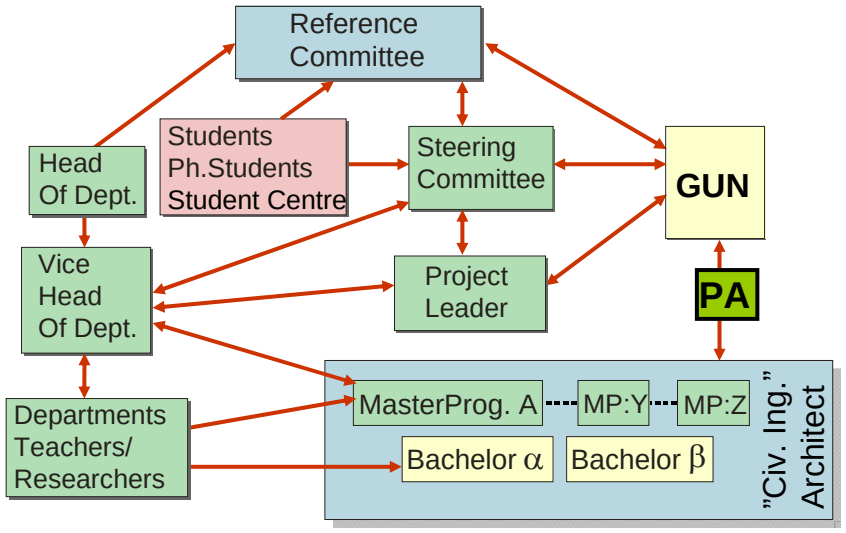
**Students graduating shall be atttractive for employment in the international industry/ academy/society**

**Chalmers foundation supports the project with 30 MSEK for 3 years**

## IMPACT Goals – Derived from a Bottom up process

1. Develop internationally competitive Master's Programmes with clear goals for improving the knowledge and competence of students.
2. Coordinate the Master's Programmes with Bachelor-, Bachelor Engineering- and other Master's Programmes and with graduate schools in a clear and well structured way.
3. Improve the connection within programmes by means of well defined learning outcomes and more visible common themes in the programmes.
4. Deliver all programmes and courses in English, using a pedagogy designed for active and life-long learning.
5. Ensure that the issues of diversity and sustainable development are considered in the delivery of the master's programmes.
6. Strengthen the teachers' competence in terms of pedagogy and English communication.
7. Provide new learning resources in English that are more than mere translations of existing material.
8. Set up a format for feed-back from important stakeholders.
9. Design a system of assessment for the Master's programmes to be used in long term quality assurance.
10. Set up common arenas for experience sharing and/or other means of support for the promotion of pedagogical development.
11. Institute adequate administrative routines for programme support and, for example quality assured admissions.

## Project Organisation



# Project focus

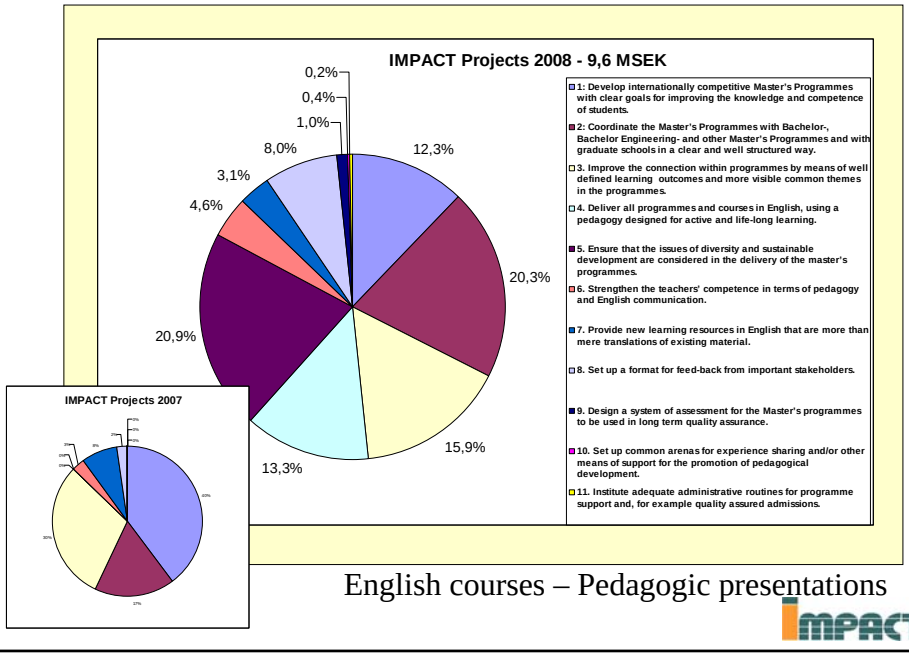
**2007**
- **Program development and quality assurance (24)**

**2008**
- **Program devlopment coordination/cooperation (53)**
- **Sustainability/Heterogenous student groups**

**2009**
- **Course/Programme coordination (38)**
- **Interaction with industry/society/research**
- **Sustainability/Heterogeneous student groups/Diversity**

**Teaching in English/Ped. Publ./present.**

CHALMERS — Development of Chalmers New Master Programmes




English courses – Pedagogic presentations

## Applications examples

Programutveckling MC2 Mikroteknologi och nanovetenskap
Progression av grundkurser Produkt- och produktionsutveckling
Projektansökan Tillämpad mekanik Tillämpad mekanik
Samverkan Signaler och system
Samverkan med andra program Teknisk fysik
Teori och praktikkopplingar samt branchinvarianta metoder Signaler och system
Tillämpning av matematik Matematiska vetenskaper
To educate Architecrue in English Arkitektur
Utveckling av pedagogik Teknikens ekonomi och organisation
Utveckling av undervisning inom Radio- och Rymdvetenskap Radio- och rymd.
Utveckling program I Teknikens ekonomi och organisation
Övergång till undervisning på Engelska Material- och tillverkningsteknik
Industribaserade proarbetens pedagogik och lärande Produkt- och produktionsutveckling
Inledande block som grund för fortsatta studier Bygg- och miljöteknik
Pedagogical Progression for the CSE Master Curriculum Data- och informationsteknik
Pedagogisk utveckling MC2 Mikroteknologi och nanovetenskap
Programutveckling Fundamental Fysik Fundamental fysik
Programutveckling KB 2007 Kemi- och bioteknik.....
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## ACTIVE VIBRATION CONTROL LAB




***Project Leader: Viktor BERBYUK***

*Division of Dynamics*
***Department of Applied Mechanics***
Chalmers University of Technology
Gothenburg, Sweden

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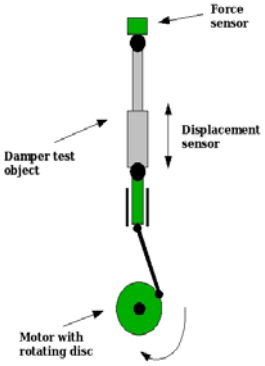
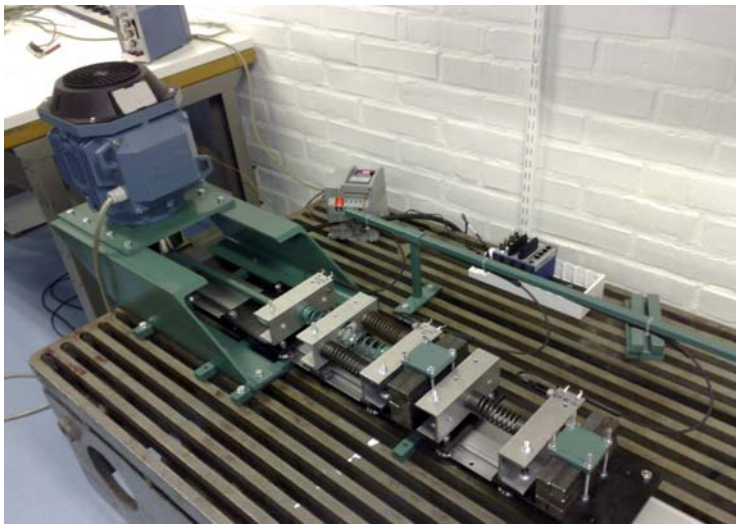
## Example A:Integrated teaching approach:
## *Theory, Virtual Instrumentation and Graphical System Design, and Experiment*




POWERED BY
NATIONAL INSTRUMENTS
LabVIEW

## Test rig for semi-active vibration control



## *B: Mapping of diversity aspects with the aim of developing learning strategies for sustainable development – Chem.and Biol. Engineering*

**Project Goal**

**All students independent of gender, ethnic background must be welcome and comfortable at Chalmers. They shall also actively participate and contribute to the discussions and development of the subjects. Teaching and learning in the subject Sustainable development deals in its context about understanding systems in many dimensions. The ability to have and understand different perspective of this is essential for effective learning. Communication across borders of any kind is an important part of this learning process.**

**Teaching platforms, making use of the heterogeneous structure of the student group, will be developed in terms of a new learning strategy. The course in Global Chemical Sustainability will be the pilot course for this project.**

**Process**

**Working seminars with teachers with much applied practical things on how to add values of ethnic perspectives in assignments were performed.**

**Workshops on perspective and diversity were arranged at Chalmers.**

**In depth interviews with students with heterogeneous background were performed.**

**Added Value**

**Diversity can, correctly used, be means for gaining better quality in the learning process. This knowledge can be used in all Master programmes at Chalmers (and elsewhere). In the same process the discrimination problem will become non-existent in the programme in a constructive way.**

**Evaluation**

**Results for in depth interviews, questionnaires, workshops will be reported and discussed in written and oral form. The student participation in the evaluation is essential.**

## *C: Individual Preparation Course – Civil and Environmental Engineering*

***Project Aim***

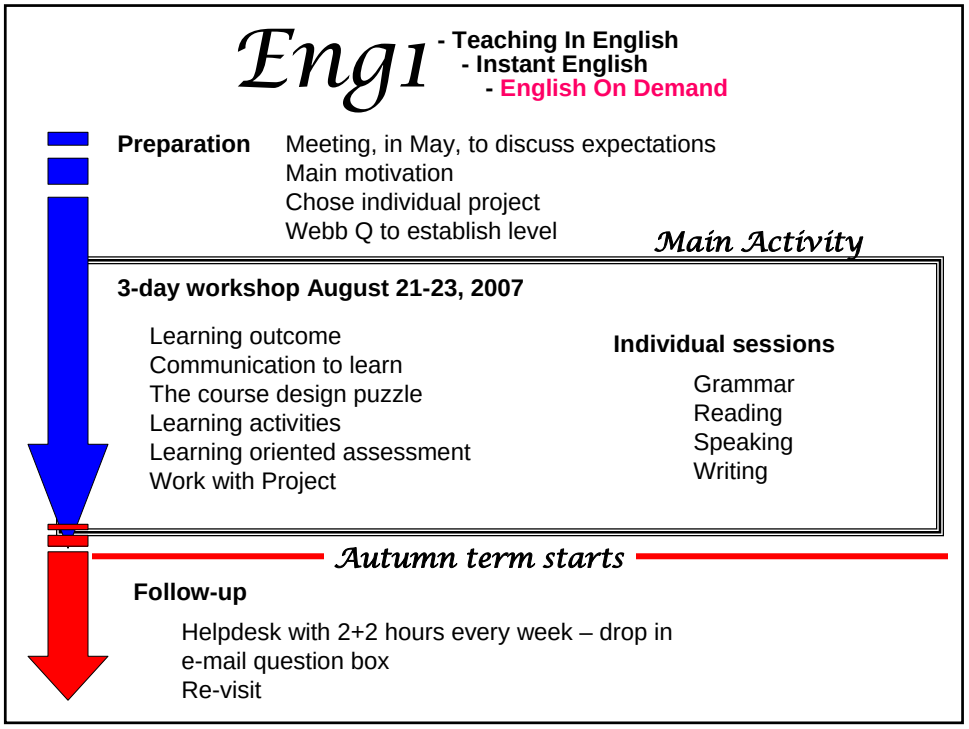
***Provide the students with aid for self studies, (lectures and assignments in Mathematics, MATLAB and Signal Processing) using developed and intelligent learning material. The developed material and computer facilities can be combined in different ways to reach the individual goals of every student entering the Master programme. The self study package is produced and implemented in the programme 2007 and will be evaluated in 2008. The Individual preparation course was first implemented during the fall of 2007/08 and will be run also next year.***

***Process***

***Development of the material is the main part of the project according to plan. The work is done by staff at the division of Applied Acoustics.***

***Added Value***

***The material supports a form of learning that is individual where the students can take greater responsibility for their own learning process and do that stage wise. This is a step towards "advanced learning" and life long learning. The teacher workload will be decreased and the teachers can act more like supervisors, mentors in the process with increased teaching and learning quality. This project shows how Chalmers, through new learning strategies, can decrease the possible differences for individual students coming from many nations in the world entering the programmes at Chalmers***




# Evaluation and Quality Assurance

**The IMPACT project is documented and evaluated in several ways:**

**The sub-projects reports and applications (24 in 2007, 53 in 2008, expected 30-40 in 2009)**

**The steering committee has evaluated and commented/feedback on all the reports from 2007.**

**In Dec. 2007 all the vice heads of the departments answered a questionnaire about the project development. The results show some very important and supportive result:**

- ***82% emphasise that IMPACT has improved the competitiveness of Chalmers Master programmes;***
- ***91% agree that the resources have been used effectively (54% very effectively);***
- ***100% state that information in IMPACT was most satisfactory;***
- ***91% mean that IMPACT strongly contributes to the fulfilment of IMPACT goals***

# More …QA

- *In mid-2008 IMPACT initiated a self-evaluation of all the Master programmes were all programme directors answered questions modelled around the IMPACT goals.*
- *All projects within the 2008 application process are quality assured through group interviews with project leaders, department vice heads and IMPACT direction.*
- *Applications reviewed by professional experties.*
- *Indicators for success?*
  - *Buying time, supporting ped dev. Applications to MP…*


***Thanks to***
***Chalmers Foundation,***
***Dept Chalmers***
***Chalmers***


Projekt för utveckling av Chalmers nya masterprogram

IMPACT

Ansökan Stiftelse Stiftelsens beslut | Mål- vision | Projekt- Rapporter | Projektorganisation - kontakt | Aktiviteter | HEM

## IMPACT

"Att föra Chalmers in i en Europeisk utbildningsmodell enligt Bologna fördraget är en av de största positiva och krävande utmaningar som Chalmers och dess personal stått inför på många år. För att utföra detta framgångsrikt krävs ett betydande arbetsinsats av alla inblandade parter med en stor samsyn och engagemang om Chalmers framtida konkurrenskraft"

**HOMEPAGE** http://www.chem.chalmers.se/impact/