Master Thesis Project

Sławomir Nowaczyk
Course Basics

30 credits course
  o 20 weeks of full-time work
  o 800 (!) hours of work (per person)

Web pages:

https://tinyurl.com/HH-ITE-MSc

http://caisr.hh.se/Student_projects
Goal

...provide training in independent technological/scientific research and development work within the field of Embedded and Intelligent Systems in Computer Science and Engineering
Examiners

• Embedded Systems
  o Alexey Vinel
  o Mohamed Eldefrawy

• Intelligent Systems
  o Slawomir Nowaczyk
  o Fernando Alonso-Fernandez
Learning Outcomes

• Independently search for solutions
• Use advanced methods of analysis and construction
• Discuss the international research and development
• Assess scientific papers
• Relate own work to international research
• Present and defend own work
Grading Criteria

• Overview & understanding of needs and related work
  o Highlight weak & strong parts in referenced works and how it differs from the own work

• Understanding and refinement of problem/research questions
  o Identify methods needed to investigate the problem and answer the questions

• Method & setup of study/experiments to get & evaluate results
  o Define enough tests/measurements to get sufficient results & evidence for conclusions

• Solution of problem or answer of question and other results
  o Solve problems, create & evaluate feasible solutions, analyse the quality of results

• Initiative, creativity, ambition, planning and organization
  o Use feedback from supervisor for reflection, rather than asking for solutions

• Final oral presentation and final report
  o Results and the conclusions are clearly stated, discusses different aspects of the problem
Core Requirements

- Understand the problem
  - in context!
- Formulate research question(s)
  - novelty!
- Develop a solution
  - in context!
- Evaluate the results
  - rigorously!
- Summarise the findings
  - conclusions!
Process Overview

• Topic selection
  o until Sunday, 27th of October, 15:00

• Start report
  o report December 6th, presentations 9th and/or 11th

• Half-time seminar
  o middle of March

• Final seminar
  o end of May

GRADED!
Topic Selection
(check prerequisites!)

• Look at list of proposed topics
  o talk to supervisors to learn more

• Topics are mainly updated in September
  o there might be new topics still popping up
  o it’s possible to propose your own topic, but you need to find a supervisor from ITE

• Provide ranking of three preferred topics
  o by Sunday, 27th of October, 15:00 (GoogleForm)
  o you can also indicate preferred partner (but no guarantees)
Start Report

• Deadline is 6\textsuperscript{th} of December
  o for sending to the examiner!

• Needs to be approved by supervisor first
  o and you need time to incorporate their feedback

• So a reasonable schedule is:
  o 25\textsuperscript{th} of November send report to supervisor
  o 2\textsuperscript{nd} of December you get feedback
  o you have a few days to address the comments
Start Report

• Approximately five pages of text
  o please use the provided LaTeX template

• Report should cover three main aspects
  o problem formulation
  o literature review
  o project plan & management methodology

• A short presentation on 11\textsuperscript{th} of December
  o 10 minutes
Problem Formulation

• What you are going to do and why

• How will the result be evaluated

• Presented in a way that makes it clear what you your intended contribution is

• Put the emphasis on the novelty of your work, not only on the task itself

• Do not focus too much on implementation
Literature Review

• You should discuss 5+ research papers
• Well-chosen, i.e., ones that really provide sufficient coverage of your main topic
• Provide reasons for including particular papers, clearly relate them to your project
• Discuss how your work will extend the solutions presented in the literature
Project Plan

• Present the **main** tasks to achieve the results
  o this should be more detailed than 5-6 broad phases
  o split your problem into meaningful **sub-problems**
  o including some form of **success criterion** for each!

• Provide order and the expected timeline
  o including dependencies across tasks, and conditions

• Try to keep it **realistic**
  o e.g., do not forget “report writing”

• Follow a “real” project methodology
  o preferably something agile
Supervision

• It is **not** instruction!
• Support, guide and tutor
• Keep regular meetings
• **Ask** questions!
• But be **independent**!
• Track the contributions in a group
Science

• Be clear about the **science** part of it, do not only focus on the engineering aspect

• What have you **learned** during the project?

• How can your findings benefit the **next person** trying to solve a similar problem?

• What are the **limits** of applicability for the solutions you have proposed?
Reasoning & Comprehension

• You need to *demonstrate* the ability to *reason* about both problems and solutions
• The learning outcomes and grading criteria focus a lot on *comprehension* skills
• Not enough to solve the stated problem, you need to *describe* and *evaluate* both your solution, as well as your methods
Conclusions

• When stating your conclusions, it is not enough to just describe work done

• You need to put your work in context

• Demonstrate the novelty in the project
  o where did you go beyond the state of the art

• Be clear about evaluation of your results
  o how good they are, why those methods were chosen, how to proceed next, lessons learned, ...
Report Writing

• Refer in text to all figures and tables
  o explain their purpose, not only what they show

• Provide full bibliography references
  o pick whichever style you prefer, but don’t mix them

• Use clear and consistent notation in text
  o font for scalar and matrix, explain abbreviations, ...

• Use sections & subsections for readability
  o choose their titles and their contents carefully
Useful Material

- Course syllabus
- Course description
- Grading criteria
Questions?