

Fall 2020 Project Guide

Model-Based Systems Engineering

Jan Madsen, September 14, 2020

1. Introduction

This document outlines the project related work in the MBSE course along with expectations and requirements on deliverables. PLEASE READ IT CAREFULLY.

The overarching requirement on the project is that a structured and quantitatively driven system engineering process is carried out. The project must demonstrate proficiency in the methods and concepts studied in the course.

The project is defined by the team based on topics presented by the course faculty. Each project addresses a technical challenge framed in a realistic scenario which will allow the team to develop and implement a model of the system which can be simulated with different parameter settings and different input data. The simulation will allow the team to explore properties of the system and iterate both model and simulations scenarios in order to arrive at an assessment of the quality and limitations of the proposed solution. These explorations must be elaborated within the project. Each team is expected to setup and follow a light version of the SCRUM agile development process.

Project teams are assumed to consist of **6 persons**. Larger teams than 6 persons are required to produce significantly more than the guidelines and proportional to the extra person. Smaller teams are expected to deliver the same work as a 6-person team.

2. Grading

The grading in the course consists of 3 elements;

- 1) Development process (achievement list)
- 2) Final report (scientific paper)
- 3) Oral exam (presentation of project)

The final grad is based on an overall assessment of the 3 elements. However, as a rule of thumb you can view them as contributing with **45%**, **45%** and **10%** respectively. In the following we will give more details of each of these. A passing grade is expected to correspond to 50% (of all 3 elements).

2.1 Development process (~45%)

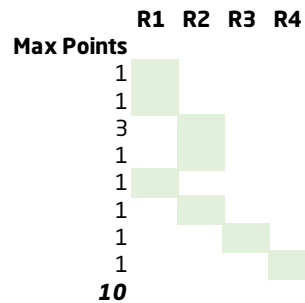
During the project development, we will have 4 reviews (mandatory!) where each team will present the status of their project. During this, we will keep track of progress using a score board called "Achievements of Team". At each review, we will score the team according to management, problem, model, implementation and simulation. In addition, we will also score on innovation, i.e. if the team has come up with something really novel and ingenious. The score board is gradually build up during the semester, and a max of **62 points** (of which 10 are innovation) can be achieved. The following table gives the details as well as the conversion into grades.

Achievements of Team

Project management

Group contract
Competence map
Trello Scrum setup
Scrum roles defined
Review meeting 1 (including presentation)
Review meeting 2 (including presentation)
Review meeting 3 (including presentation)
Review meeting 4 (including poster)

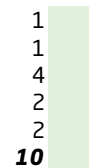
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Problem

Clear theme
Clear application
Use case / scenario
Challenge - dynamic system, embedded computing
Clear question

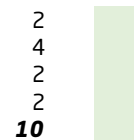
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Model

Conceptual system model
Components/modules defined
System environment defined
Clear assumptions

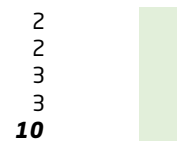
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Implementation

Clear overall design
Each module implemented
Test cases for the implementation
Overall system integration test

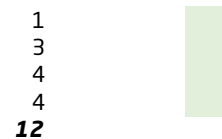
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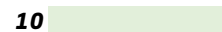
Simulation

Simple simulation experiments
Several simulation experiments
Analysis of experiments
New insight from analysis

Sum



Innovation up to



Total sum

62

Grades

12
10
7
4
2

56 and above
50 and above
43 and above
37 and above
31 and above

Fraction

0,9
0,8
0,7
0,6
0,5

2.2 Final Report (~45%)

Final report is based on how well the report covers the learning objectives of the course. A rough guide is as follows (considering the contribution measured in %, max contribution is 100%):

- 40%: Project theory discussed along with some models implemented.
- 60%: The above plus limited evaluation.
- 80%: The above plus using models to quantitatively drive a design process and a full evaluation.
- 100%: The above, full discussion, full design process with several revisions of models.

The final report is to be handed in at the end of the course and must cover all aspects of the project. Discussion and reflection are particularly important.

The size limitation of the report is **8 pages** not including a single cover page.

Appendices are allowed. Additional pages describing how to run the simulator, more extensive experiments and results, should be placed in a separate appendix. A short description of how the group has adapted the SCRUM development method or why they have decided not to use it, along with reflections, should be added as a separate appendix.

The cover page must include a detailed description on what each group member did and contributed to the report and project.

All reports must follow the **ACM double column proceeding layout** rules: <http://www.acm.org/publications/proceedings-template>. All page counts assume that layout model.

Precise deadlines for each deliverable are set by its DTU Learn assignment. All documents have to be delivered electronically.

2.3 Oral exam (~10%)

The oral exam will be split over 2 days in order to allow enough time for each team to present and defend their work. At the scheduled time, the team will first give a **15 min** presentation (in Power Point, Keynote, DFP, ...) using your own laptop. After the presentation, students of the team will be called in individually and asked questions for **5 min**. Then the assessment committee will have **10 min** to do the assessment, after which the grades will be given to the team as a whole or individually, if the team wishes so.

The given grade is individual and based on all 3 elements; process, report and presentation. Hence, an important aspect of the oral exam is to guarantee an individual overall grading.

3. Review meetings

All **4 review meetings** are mandatory for all team members. The achievement list indicates what aspects have to be presented - this will also be listed in the assignment on DTU Learn. After each review the team will get its points.

For review meeting 1, 2 and 3, a timeslot will be allocated to each team. Review meeting 4 will be a **poster session**¹ where all project teams present their work on an A1 poster. The poster should be easily accessible yet explaining the major outcomes of each project. The

¹ Depending on the development of covid19, this may be changed to another format.

deadline for the poster hand-in is on Wednesday in the week where we will have the poster session.

4. General rules

DTU has a zero-tolerance policy on **cheating and plagiarism**. This also extends to the report and indeed all your work. For example, to copy text passages from someone else without clearly and properly citing your source is considered plagiarism. See the study hand book for further detail.