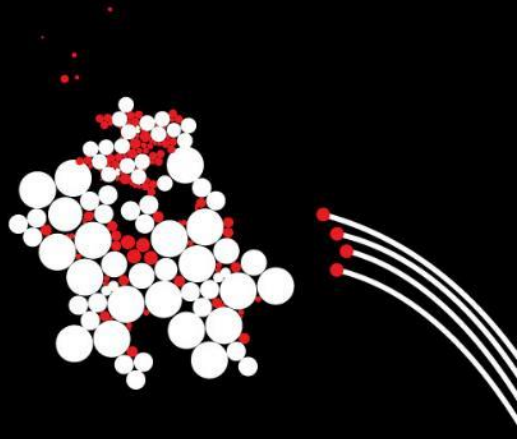
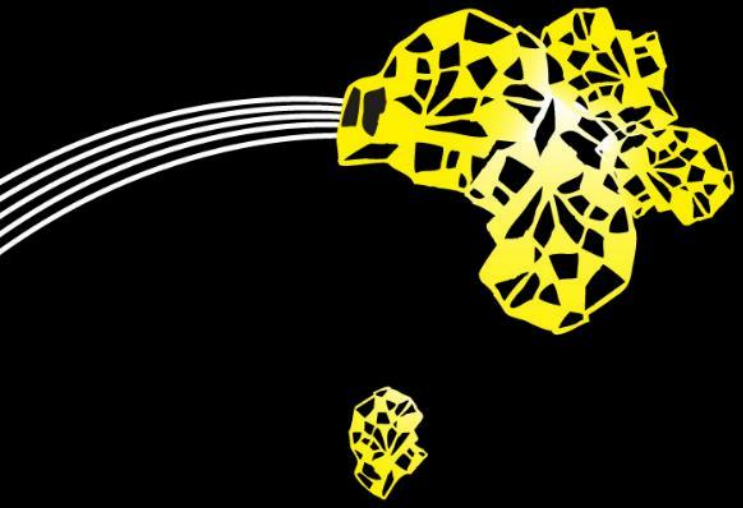
UNIVERSITEIT TWENTE.



PROJECT
PRODUCTION SYSTEMS ENGINEERING

KICK-OFF

WIETEKE DE KOGEL



AGENDA

- Introduction
- Organization
- Subject
- Assessment

INTRODUCTION

PRODUCTION SYSTEMS ENGINEERING

- Last group assignment of the bachelor
- You already finished 2½ years of your study:
  - 150EC = **4200** study hours in your backpack
  - Solid basis in:
    - (Fluid) Mechanics
    - Designing
    - Materials
    - Manufacturing
    - Energy
    - Etc.
- This is your opportunity to show that!

INTRODUCTION

PRODUCTION SYSTEMS ENGINEERING

- Make use of your “backpack”,
- Something missing in your backpack?

  ➔ complement

  - After all, you almost work at bachelor level
  - In industry/business nothing is explained exactly in advance
  - Corona is an extra handicap especially with larger groups, but that’s something people in industry have to deal with too

INTRODUCTION

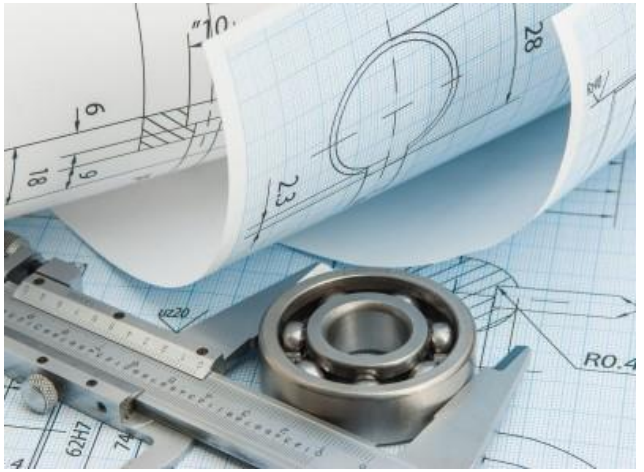
PRODUCTION SYSTEMS ENGINEERING

*"Werktuigbouwkunde gaat om het "**bouwen**" van "**tuig**" dat werkt."*

During the bachelor great attention has been given to the design of the "**tuig**". This project will focus on the "**bouwen**".

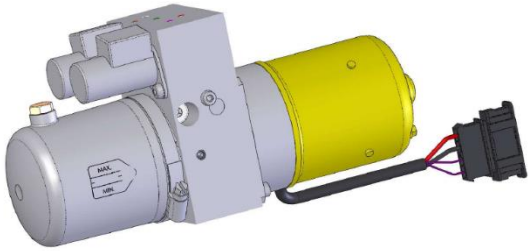
Every Mechanical Engineer gets into contact with manufacturing one way or the other, for example as a:

- designer of a car, machine or oilrig
- production or process engineer
- quality engineer
- maintenance engineer
- systems engineer
- etc.



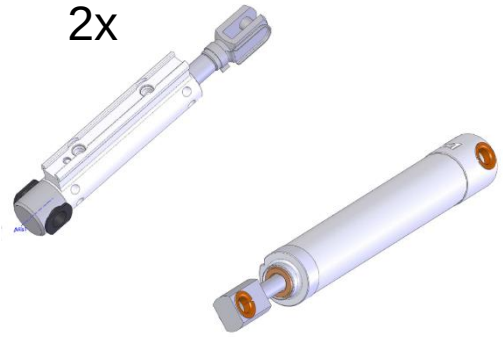
EXAMPLE POWER-PACKER OLDENZAAL

HYDRAULIC DRIVE MECHANISMS FOR SOFT/HARD TOPS



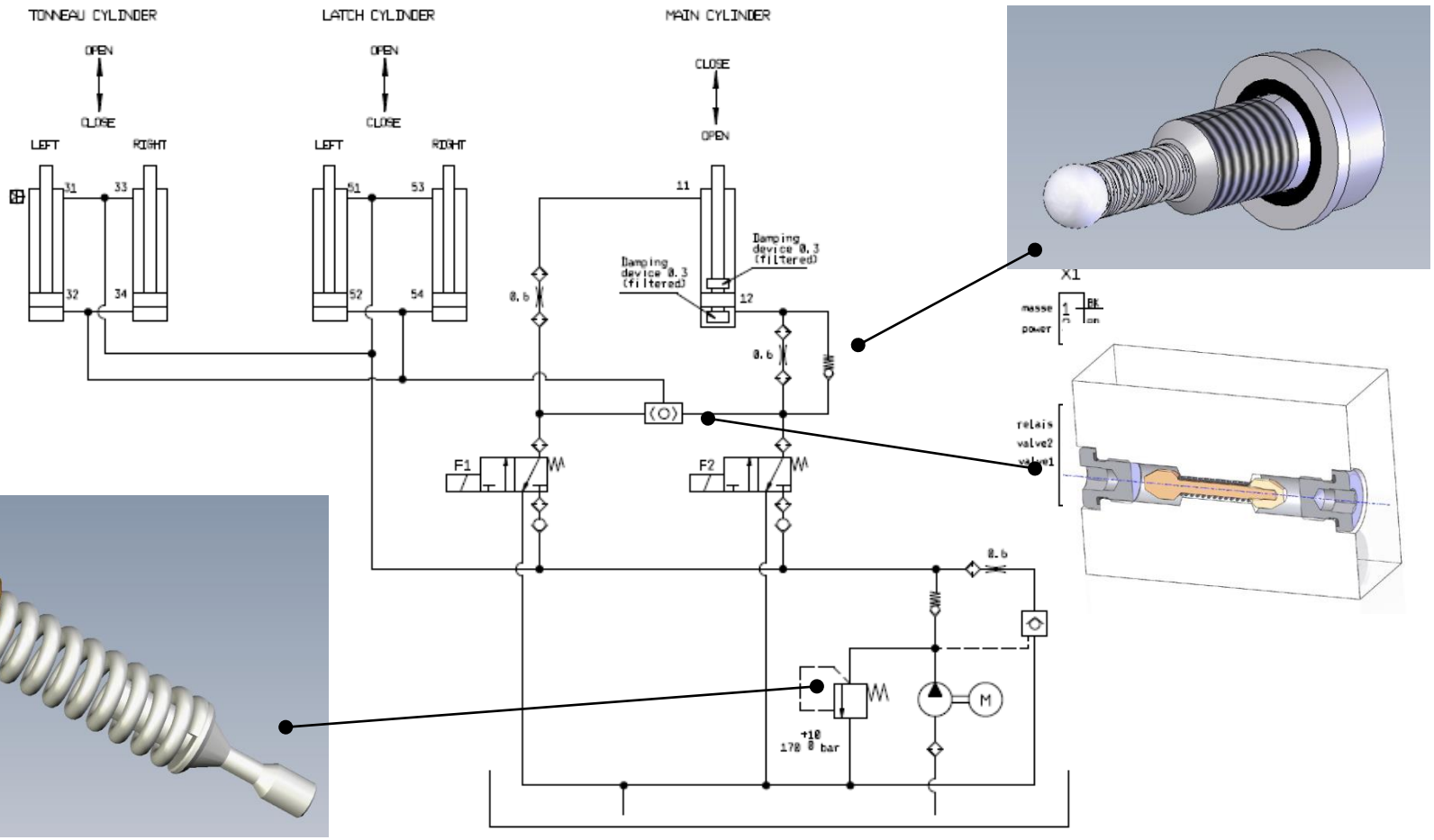
2x

2x



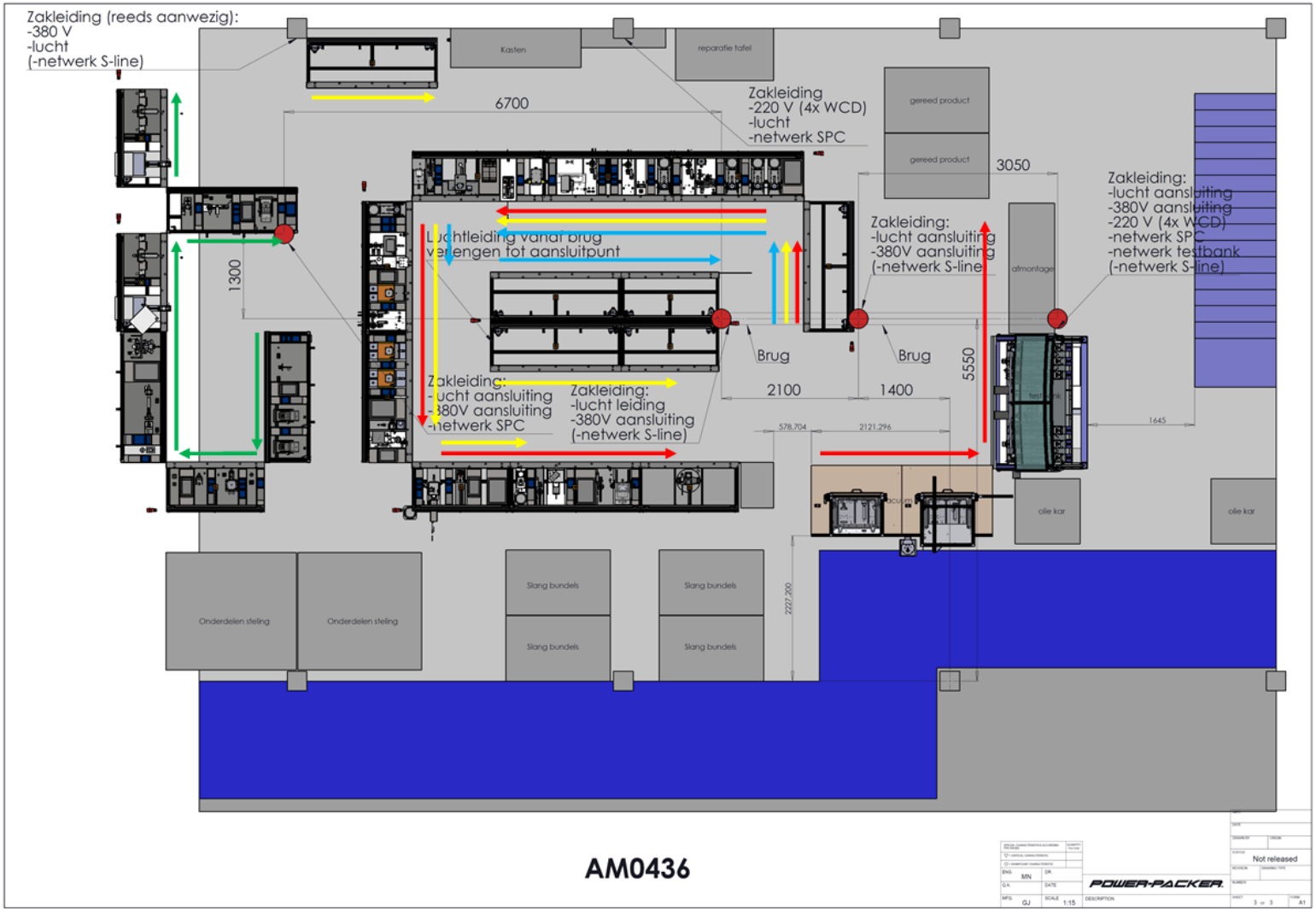
EXAMPLE POWER-PACKER OLDENZAAL

HYDRAULIC DRIVE MECHANISMS FOR SOFT/HARD TOPS



EXAMPLE POWER-PACKER OLDENZAAL

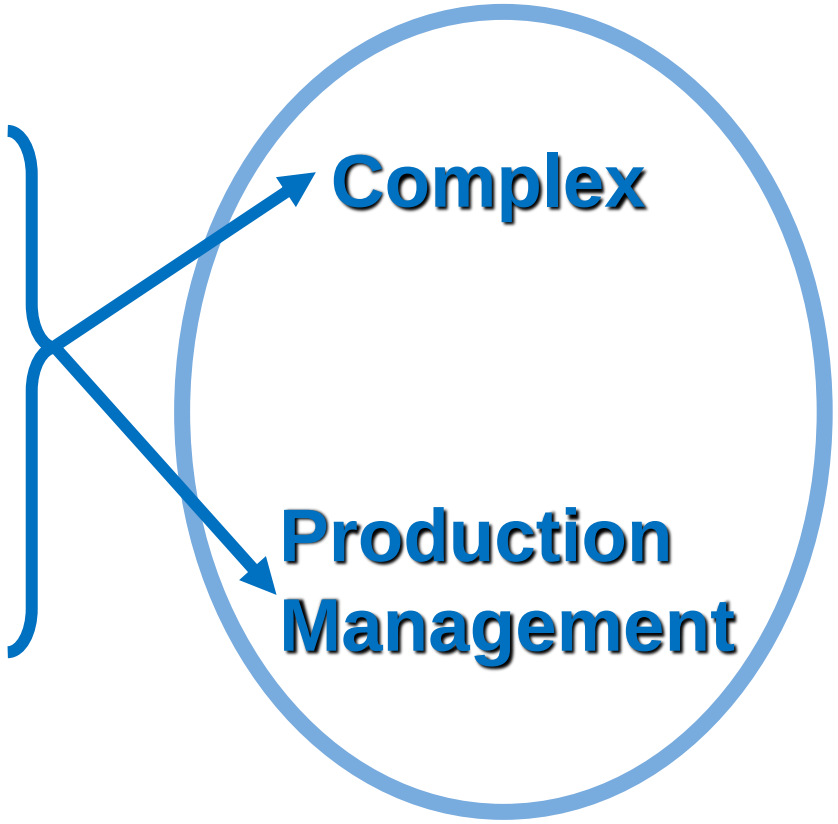
HYDRAULIC DRIVE MECHANISMS FOR SOFT/HARD TOPS



INTRODUCTION

CHARACTERISTICS OF MODERN MANUFACTURING SYSTEMS

- Volume - variety
- Layout & flow
- Logistics
- Respond to the market
- Process choice
- “Intelligent”
- Assembly



Project PSE

INTRODUCTION

THE MECHANICAL ENGINEER AS A SYSTEMS ENGINEER

The Mechanical Engineer:

- has to obtain and maintain the *overview* over a complex project
- has to be able to let people from *different disciplines* work together
- has to take care that the *different parts of a system* will deliver a good working system as a whole

➔ understanding and overview of complex systems

➔ **Systems engineering**

INTRODUCTION

THE MECHANICAL ENGINEER AS A PRODUCTION OR PROCESS ENGINEER

The Mechanical Engineer:

- has to recognize chances and (im)possibilities in manufacturing
- has to communicate with specialists
- has to be able *to design* a manufacturing environment
- can be a *specialist* in production management

➔ understanding and insight

➔ **Production management**

INTRODUCTION

LEARNING OBJECTIVES OF THE PSE PROJECT

After this project the student …

- … is able to (re)design (a part of) a production system on a basic level by applying theory/tools and solutions from the Production Management, Systems Engineering and Statistics disciplines;
- … can obtain and maintain overview over and between the disciplines, modules and sub-systems;
- … has practiced integrated production system development.

INTRODUCTION

Questions to be answered in the project:

- What are the specifications of the manufacturing system?
- Which sub-system are necessary?
  - interfaces, integration
- How is this going to work? What are the principles?
  - machine choice, layout & flow, quality, logistics, maintenance, etc.
- Are the requirements met?
- What about the costs?
  - system, development etc.
- How long to develop the system?
- …

AGENDA

- Introduction
- Organization
- Subject
- Assessment

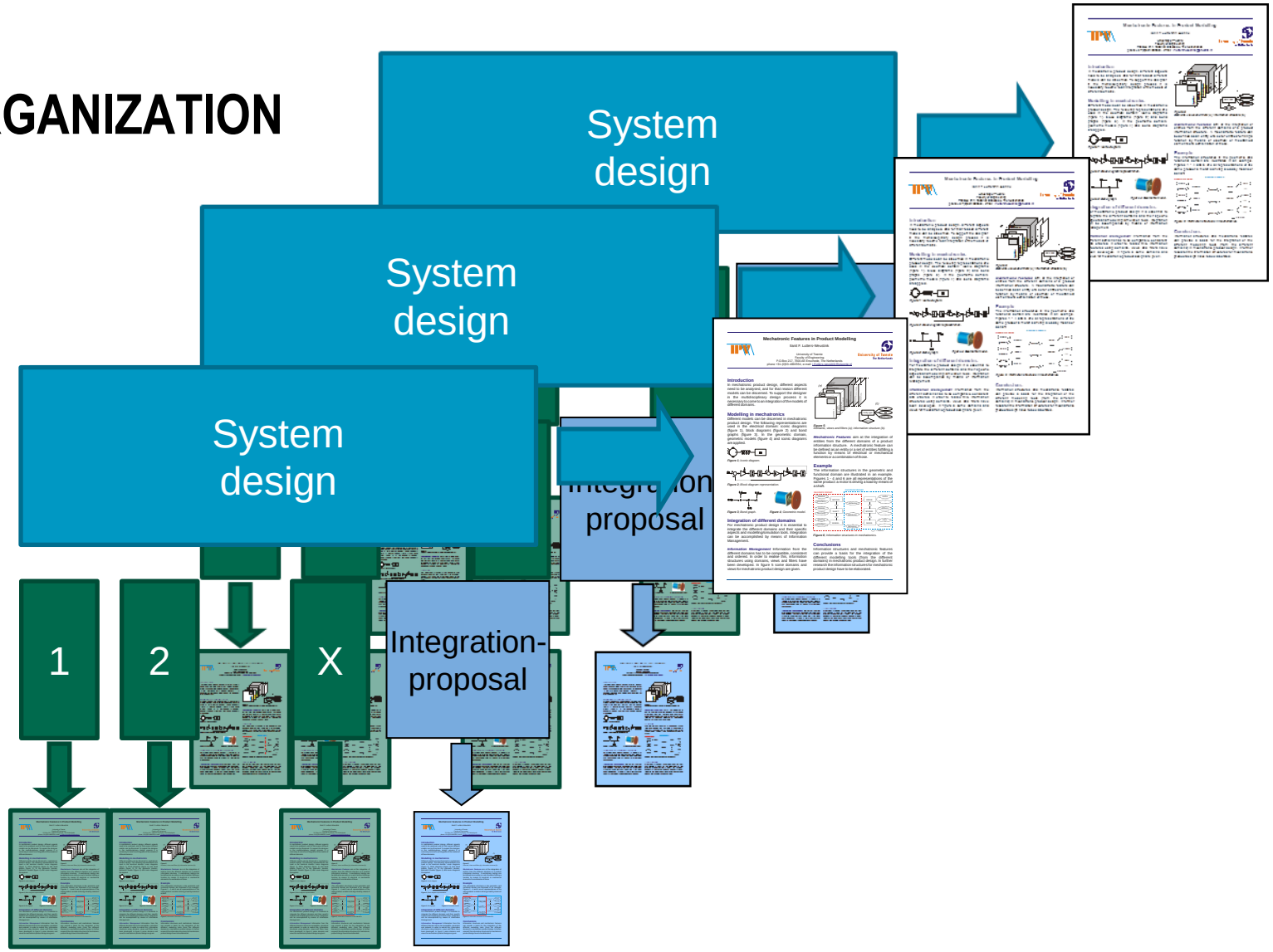
ORGANIZATION

PROJECT PRODUCTION SYSTEMS ENGINEERING

Total:	5.5 ECTS	
▪ **Production Management**	2,0 EC	56 hours
▪ **Systems Engineering**	1,5 EC	42 hours
▪ **Project assignment**	1,75 EC	49 hours
▪ **Statistics assignment**	0,25 EC	7 hours

- Short term (8 weeks)
- Application of project courses in assignment ➔ Assignment takes more than 42 hours!
- Completion by means of the project and the courses

ORGANIZATION



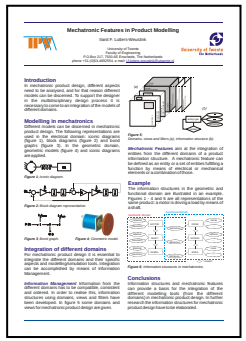
MORE SPECIFIC – OVERALL SYSTEM

System design (whole group, 3 weeks):

- Requirements, whishes, system specifications;
- Sub-systems, interfaces;
- Guarantee of connection between systems.

} “Architecture”

System design



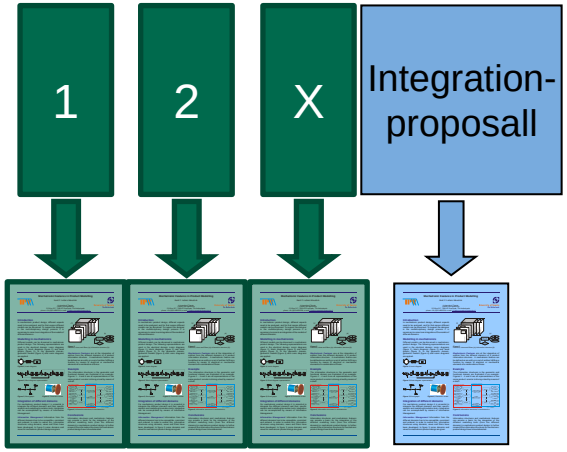
➔ Research poster

- Deadline: hand-in poster at Friday February 26th
- Design review March 2nd/3rd (schedule on Canvas)

MORE SPECIFIC – SUB-SYSTEMS

Sub-systems (small groups, created by yourself (max 2/3 stud.), 5 weeks):

- Analysis;
- Formulation requirements and whishes;
- Required functional components;
- Diagram of the components;
- Functional description;
- Technical feasibility;
- Proposal for integration and test of the system.



➔Research poster per sub-system + integration proposal

- Deadline: hand-in posters at Friday April 9th
- Project assessment April 13th-15th (schedule on Canvas)

ORGANIZATION

- Large groups: 12-15 students
  - Self enrollment, see Canvas
  - Not in a group → contact us asap
- No tutor

  ➔ Organization is your own responsibility!
- Specialists:

Teacher	Office	e-mail	Role
Maarten Bonnema	HR-W230	g.m.bonnema@utwente.nl	Teacher SE, Examiner PSE
Wieteke de Kogel	HR-W252	w.dekogel-polak@utwente.nl	Coordinator PSE, Teacher PM, Examiner PSE
Nelly Litvak	ZI 4031	n.litvak@utwente.nl	Teacher Statistics
Marcus Pereira Pessoa	HR-W260	m.v.pereirapessoa@utwente.nl	Examiner PSE, Coordinator module 11

AGENDA

- Introduction
- Organization
- Subject
- Assessment

A NEW PRODUCTION SYSTEM FOR MOROCANT

GROWTH AND A NEW CLIENT

- Design a new production system

- Morocant Drives is a specialist in driving technology
  - Rapid growth, the current building is old and becomes too small for any (future) expansion
  - New manufacturing facility
  - Assessment number of machines
  - New customer (Sali)

- Datasheet on Canvas

AGENDA

- Introduction
- Organization
- Subject
- Assessment

FINAL RESULT

In assessing the project, several facets are important. The final result of project PSE includes at least:

- Requirements and wishes and their implementation
- Concept of the system
- Sub-systems, interfaces and their integration
- Principles of operation of (sub-)system(s)
- Cost (in time/money)
- Length and intensity of the development program
- …

See project description!

ASSESSMENT

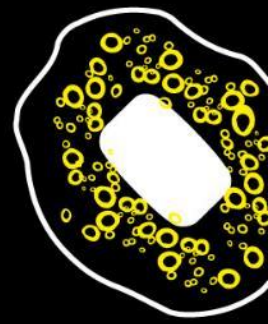
- **Project assignment:** 1/8
  - Poster 1; system architecture
  - Poster 2; elaboration sub-systems / integration / test 3/8
- **Production Management:** 1/4
  - Exam PM
- **Systems Engineering:** 1/4
  - Essay about expectations and application of SE in project
- **Statistics** Pass/fail
  - Assignment related to project

NB: every part has to be a pass (≥ 5.5)

SUMMARY

Date	Time	Activity	Remarks
3 February	9.00 am	Start of the project	
26 February	9.00 am	Deadline poster$_1$ submission	Hand in on Canvas
2/3 March		Design review (2 groups / 1 hour 45 min)	Review of system requirements, concept, and sub-system definition, based on the submitted poster. Schedule will be available on Canvas
9 April	9.00 am	Deadline poster$_2$ submission	Hand in on Canvas
13-15 April		Project presentations and assessment (2 groups/2 hours)	Schedule will be available on Canvas
16 April	8.00 am	Deadline essay SE	See Canvas organization SE for instruction
12 April	13.45-16.45	Exam PM	See Canvas

UNIVERSITEIT TWENTE.



ANY QUESTIONS?

GOOD LUCK & HAVE FUN!