

Systems Engineering Master Project

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www.gaudisite.nl

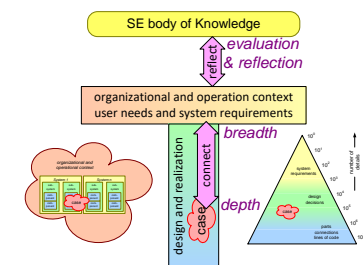
Abstract

The master study Systems Engineering is completed by performing a master project. This document describes objectives and guidelines for the project and the resulting paper or report.

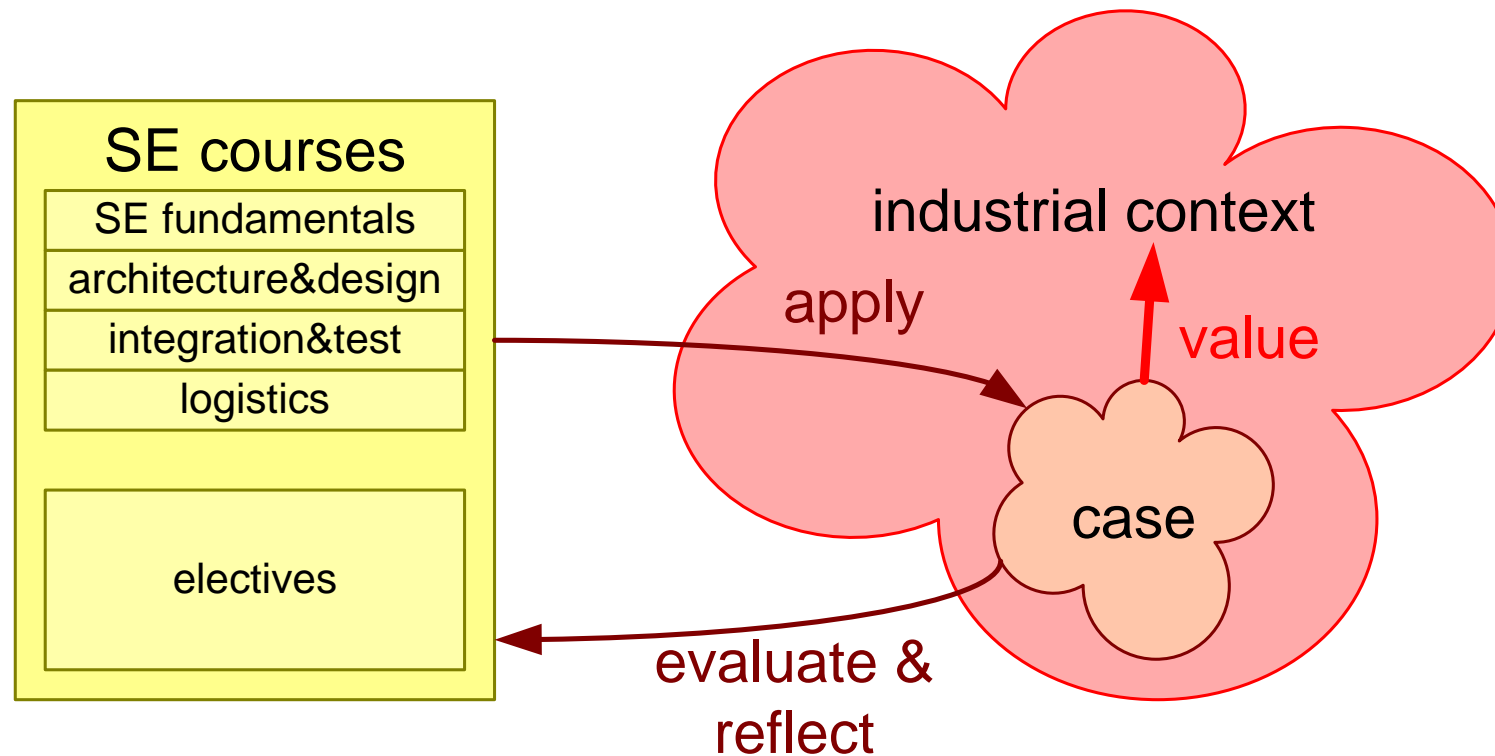
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August 16, 2025
status: concept
version: 1.8



Objectives of Master Project



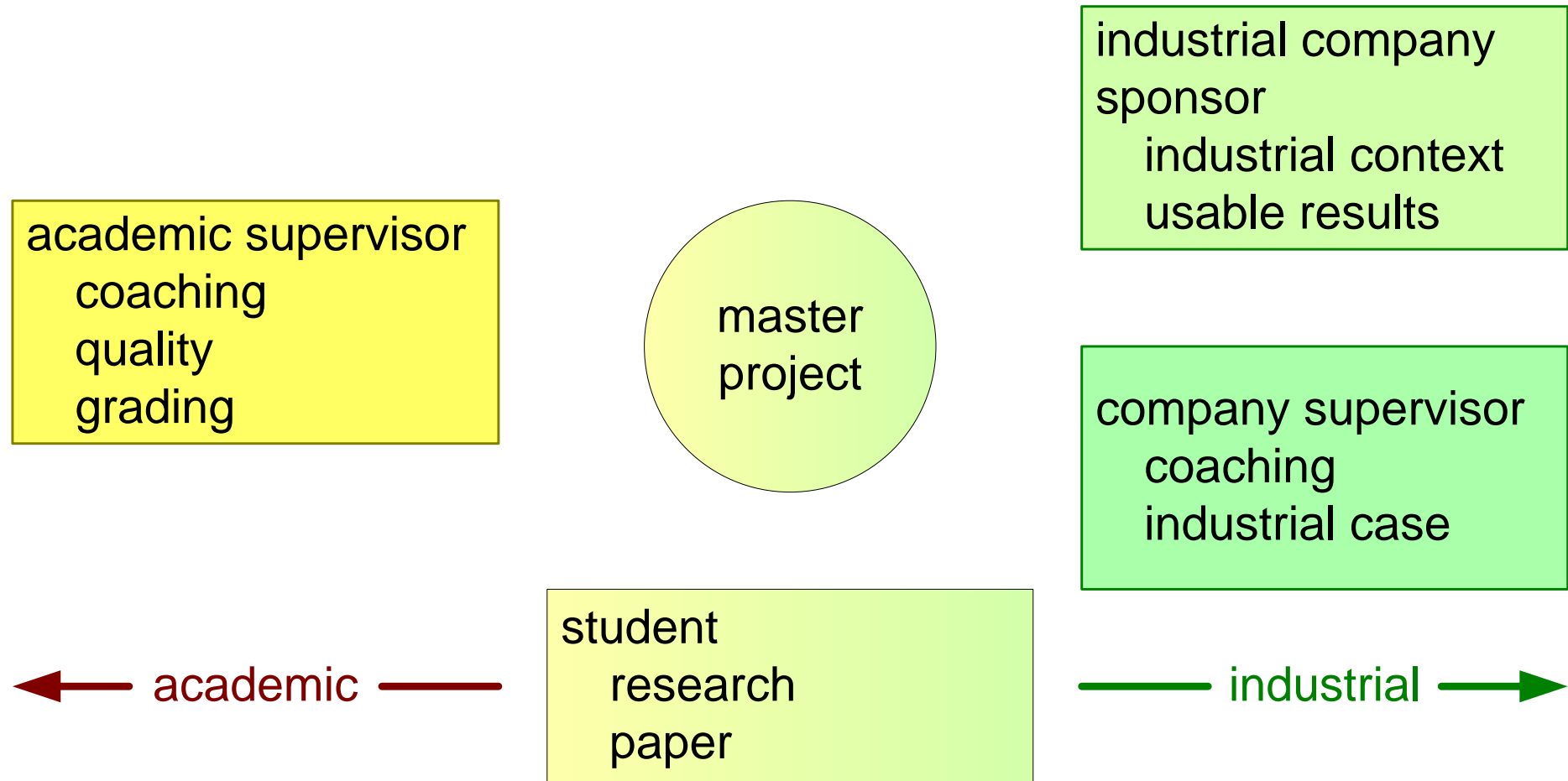
Apply SE methods, techniques, and concepts in practice and evaluate and reflect on its application, while providing value to the industrial sponsor

Formalized Goal Statement

The goals of the Final Project are:

- the students have to show their **professional competence** and the acquired command of the systems engineering discipline by applying it to a selected problem.
- the selected problem has to be **relevant** in the context of the **company** in which the student works
- **competence** is truly put into **practice**.
- to facilitate the students to make the step from “just applying” to “**critical evaluation** and **reflection**”.
- to verify that students are capable to operate at **academic level**.

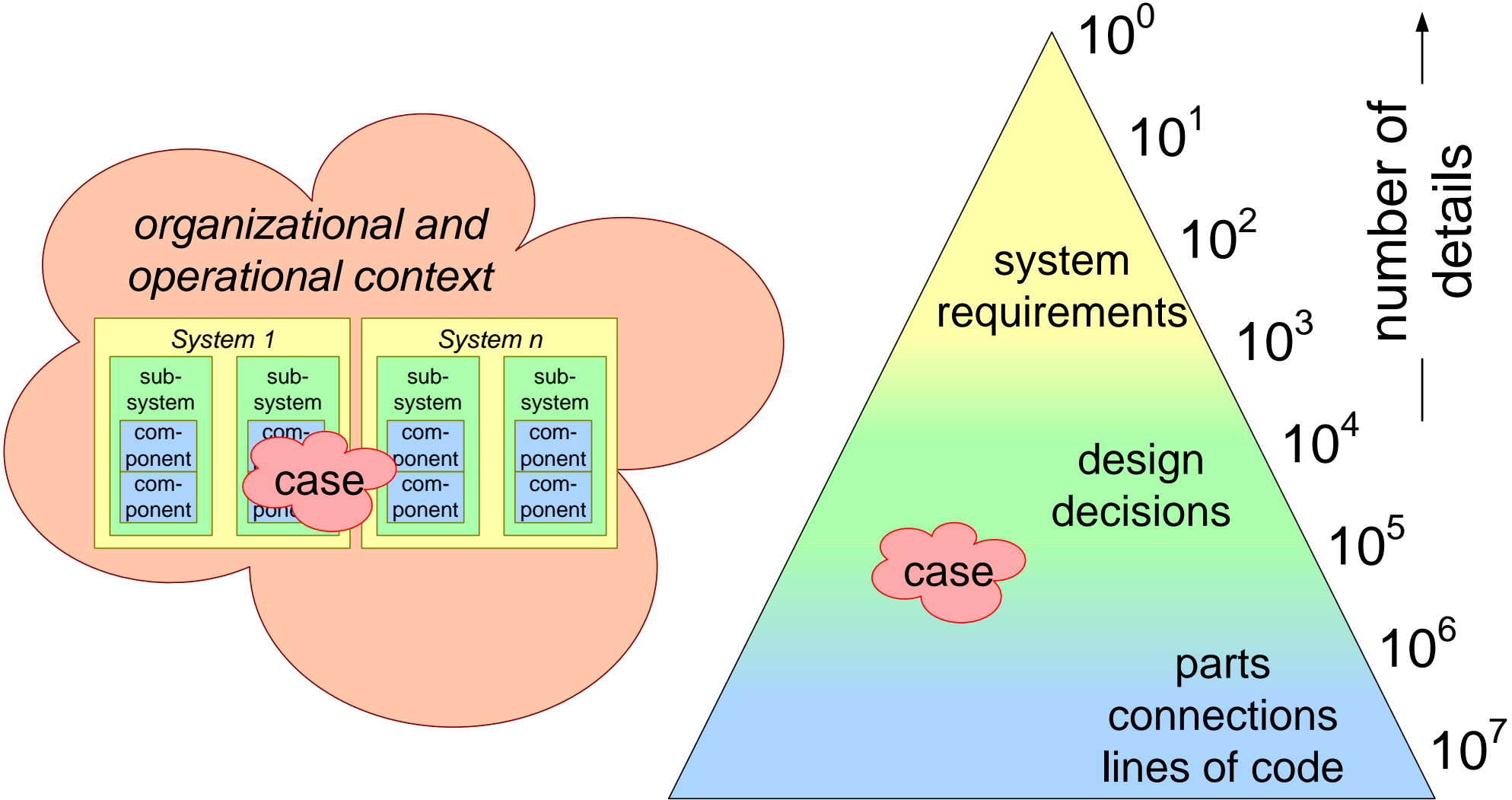
Stakeholders of the Master Project



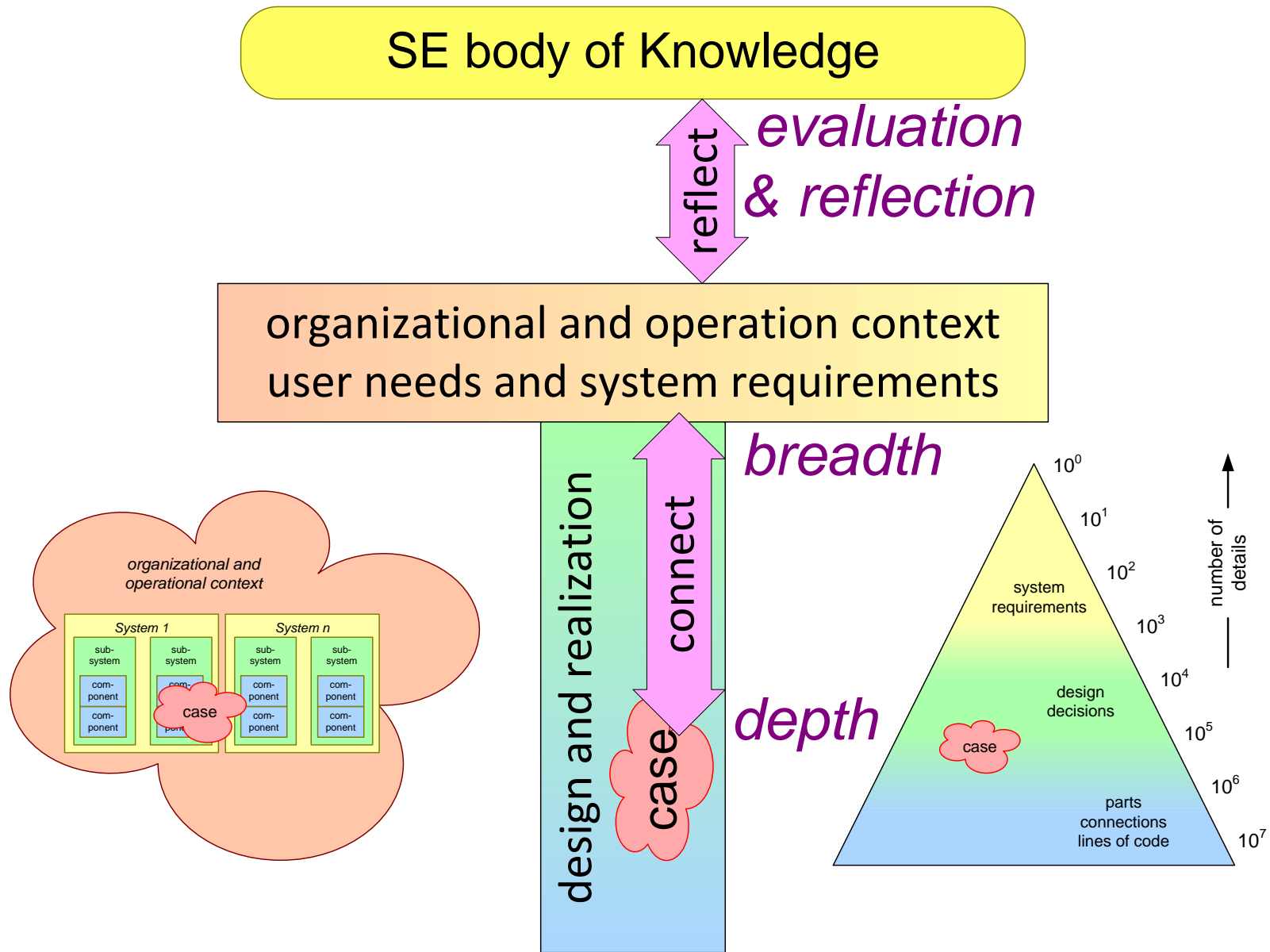
Scoping is Crucial

What methods, techniques, tools, concepts	Systems Engineering
What (sub)systems, releases, functions, qualities, aspects, disciplines, technologies	industrial
What timing of activities and deliverables	planning
What resources (student time, means, advisors)	planning
What approach, criteria	research

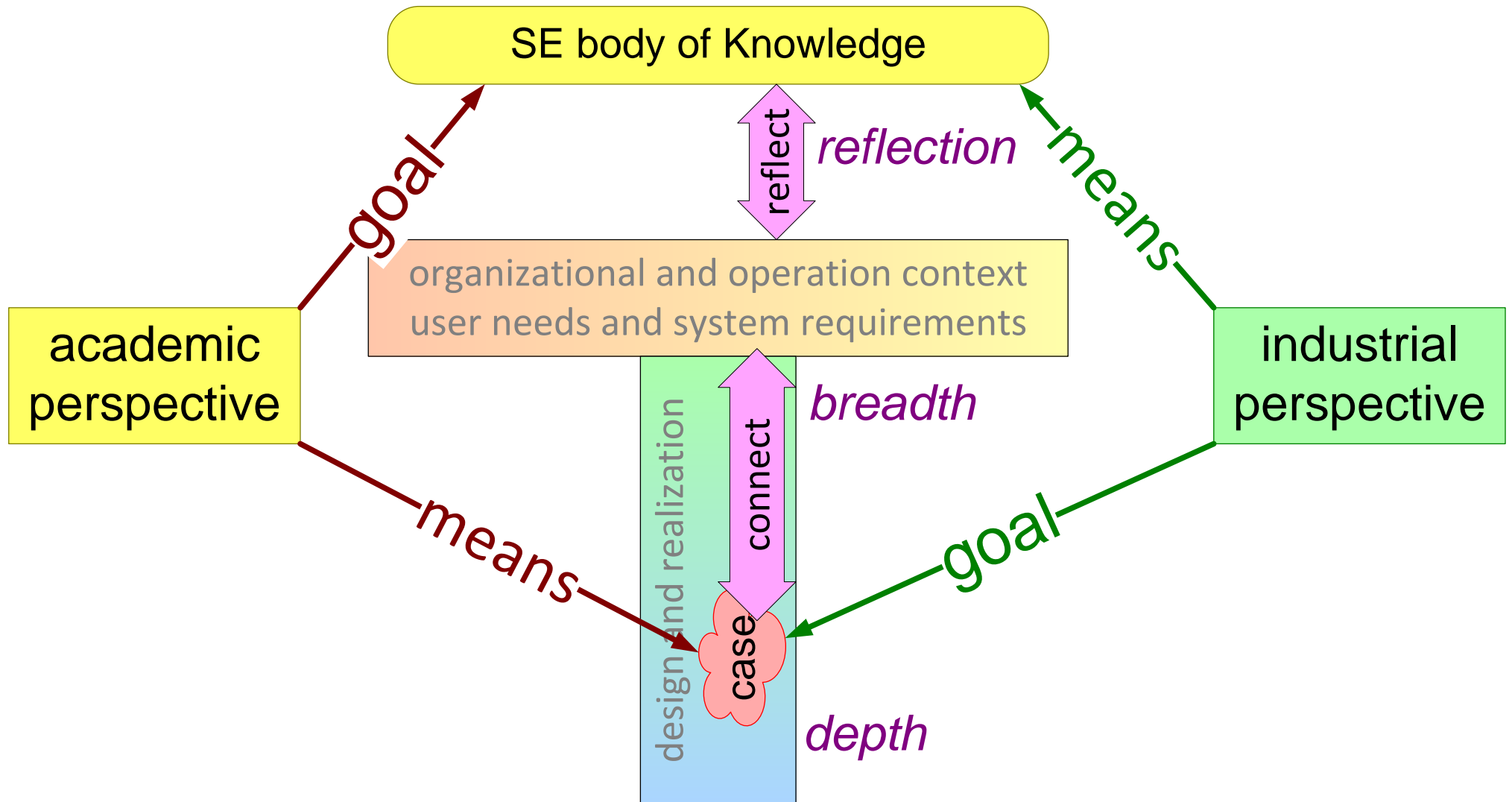
Case Positioning



Depth, Breadth and Reflection



Difference Academic and Industrial Goals



Process of Master Project

Explore company needs and ideas; pick subject

Secure academic supervisor (USN-SE) and company supervisor

Write proposal, project plan; write research approach or abstract

Perform project; involve supervisors regularly

Write paper and iterate with supervisors

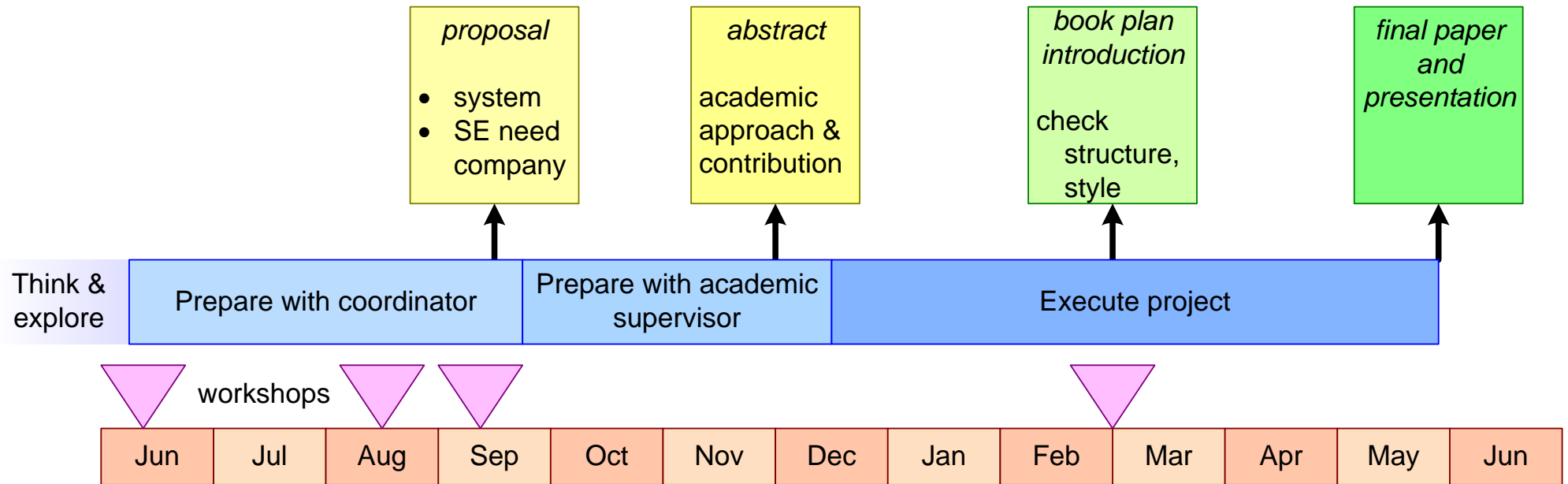
Present master project

Grading by academic and external assessors

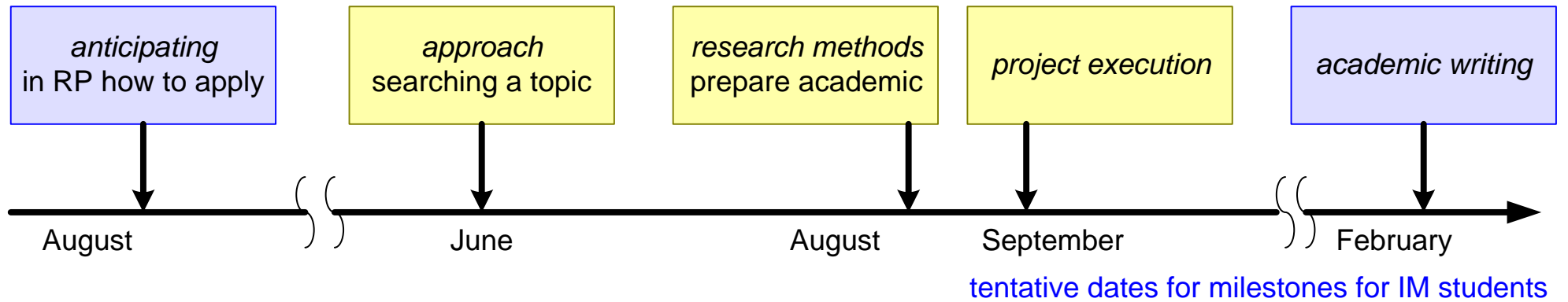
Graduation

Publication in journal or conference

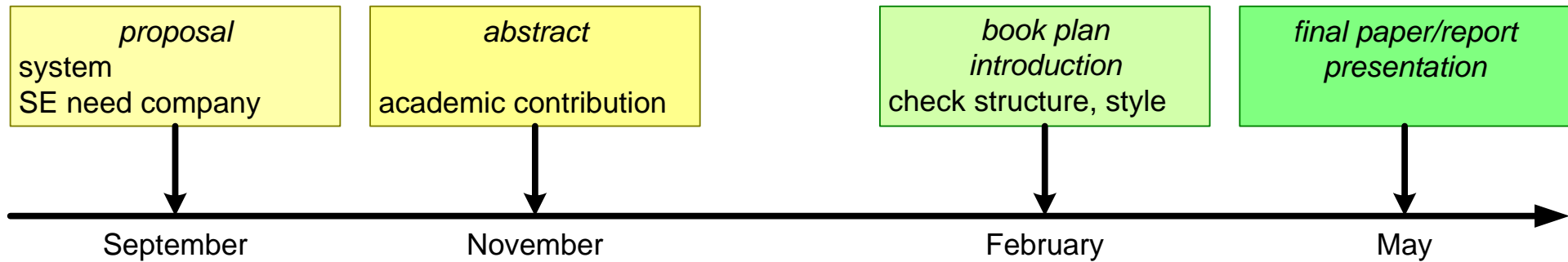
Timeline of the Master Project



SEMP Workshops

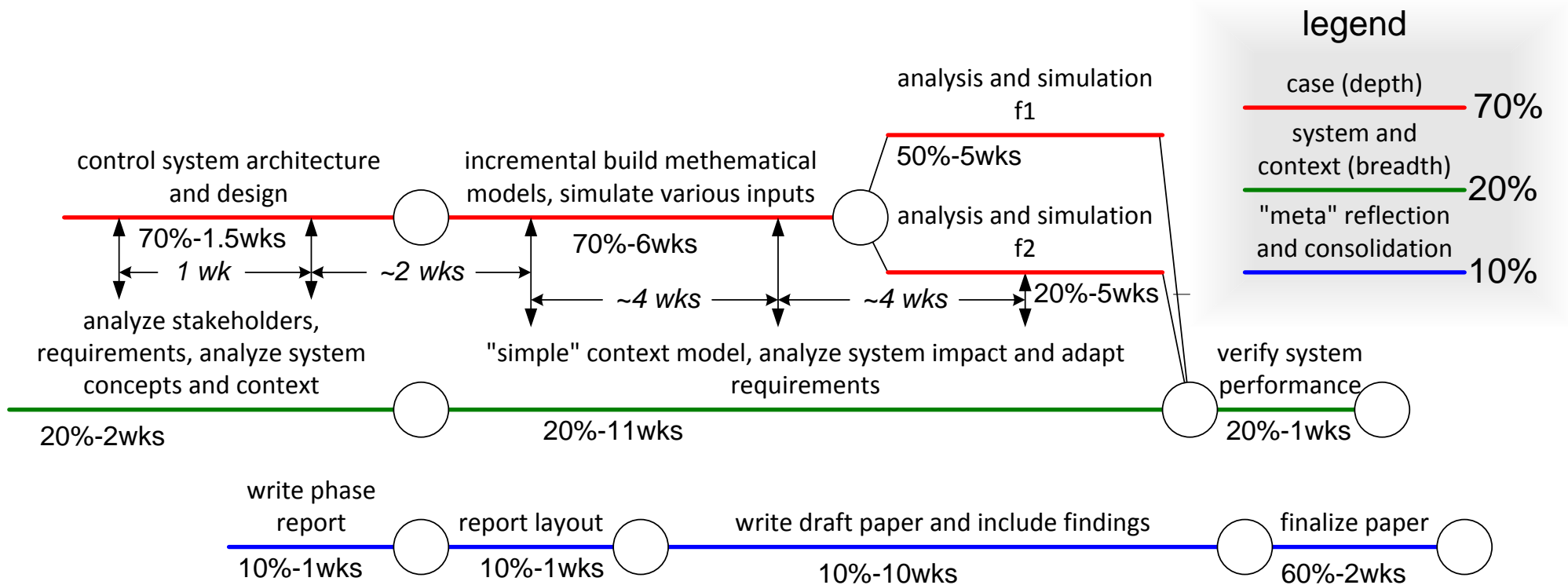


Master Project Milestones



tentative dates for milestones for IM students

Plan: Simple PERT Diagram



"A good abstract should answer three questions:

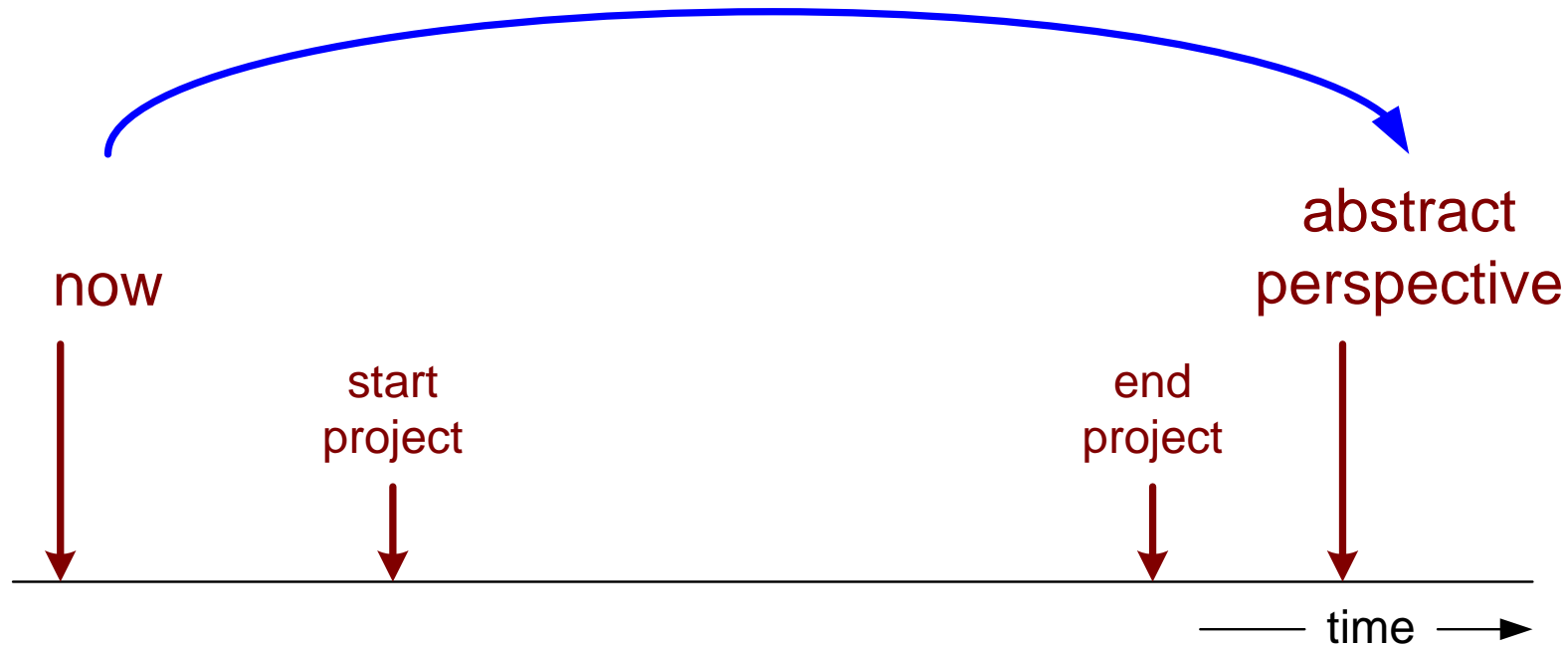
*What did I do,
what did I learn,
and why is that important?*

The key is to identify something or things that can be reused in the future."

Prof. Michael Pennotti, Stevens Institute of Technology

Needed: Time Machine

"fast forward" yourself into the future
what do you expect to be the project outcome?



Students write an initial abstract at the start to think through what can happen. At the end of writing the paper, you write the real abstract. The academic supervisor has to accept the initial abstract before starting the project.

Project Execution

maintain a project log

data, findings
documents
references

keep supervisors involved

regular presentations
regular meetings

time box and iterate

case
system and context
reflection and consolidation

early feedback on paper

start writing early
elicit feedback early
work incremental

1. Explanation of the subject; what is the goal of the project?
2. Positioning of the subject in the academic context and literature; what does this paper add to the Body of Knowledge?
3. How is the project performed, what has been done.
4. Evaluation of the project, reflection on the results and the project itself.
5. Paper should be submittable to a refereed conference or to a journal; the academic supervisor may accept a report as well.

Stevens Guidelines for Paper

1. Clearly introduce the problem that the manuscript is discussing/addressing,
2. Discuss the problem background. That is, discuss the research that has been previously conducted by you or others in the field (or related fields) to solve/address the same or similar problem,
3. Develop a succinct argument for the methods or ideas proposed in your manuscript,
4. Present a clear and understandable justification of why the proposed methods or ideas contribute to a superior or different solution to the problem. A clear statement of your contributions is often crucial to reviewers. Clear specify this when possible. And finally,
5. Discuss the likely future directions of the research being conducted by you (your group).

http://www.stevens-tech.edu/ses/documents/fileadmin/documents/pdf/SE_Master_Project_Guidelines.pdf

Final Presentation at the end of the project

student presentation of master project

~30 minutes presentation

~20 minutes questioning by examiners

~10 minutes examiners conclude

committee:

- academic supervisor
- at least one other academic staff member of SE
- external assessor
- (optional) company supervisor or representative
- at least 3 people

Publication Process

Company screens paper for sensitive or confidential issues, see <http://www.gaudisite.nl/BuskerudSEpublicationProcedureSlides.pdf>

Select target journal or conference, typical choices are:

INCOSE symposium, CSER, Journal of SE

Transform the paper into the prescribed format or template

Review of the paper by USN-SE and Company, adapt paper

Submit paper to journal or conference

Process journal or conference feedback

Final review by company

Submit final version

Visit conference and present paper

Third Party Involvement

If a third party is involved, e.g. a customer or supplier,
then ask the third party to agree with publication procedure:

<http://www.gaudisite.nl/BuskerudSEpublicationProcedureSlides.pdf>

and ask who will be reviewer for the third party

Conventions for Submitting Project Deliverables

Submission instructions

use for all preparation deliverables the following conventions:

filename: SEMP <your name> <subject>.<version>.<extension>

e.g. SEMP John Student abstract.2.doc

where subject = {proposal | abstract | plan | presentation | paper | ...}

email to: <gerrit . muller@ gmail . com>

subject: SEMP <subject>

"standard" file types preferred, e.g. pdf, jpg, doc, xls, ppt

workshop 1 in June

Master Project Description: <http://www.gaudisite.nl/SEthesisProjectPaper.pdf>

workshop 2 in August

Systems Engineering Research Methods: <http://www.gaudisite.nl/SEresearchMethodsSlides.pdf>

workshop 3 in September

Master Project; Writing an Abstract: <http://www.gaudisite.nl/MasterProjectWritingAnAbstract.pdf>

Master Project; Execution Phase: <http://www.gaudisite.nl/MasterProjectProjectExecution.pdf>

Publication procedure: <http://www.gaudisite.nl/BuskerudSEpublicationProcedureSlides.pdf>

Guidelines for visualizations: <http://www.gaudisite.nl/VisualizationGuidelinesSlides.pdf>

Validation of Systems Engineering Methods and Techniques in Industry

http://www.gaudisite.nl/CSER2012_Muller_validationSEinIndustry.pdf

Systems Engineering Research Methods (paper)

http://www.gaudisite.nl/CSER2013_Muller_SEresearchMethods.pdf

Systems Engineering Research Validation <http://www.gaudisite.nl/SEresearchValidationPaper.pdf>

Published Master Project papers: <http://www.gaudisite.nl/MasterProjectPapers.html>

Workshop Academic Writing <http://www.gaudisite.nl/RPacademicWritingSlides.pdf>