NTNU
Norwegian University of
Science and Technology

SPECIALIZATION PROJECT

DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING

PROCEDURE FOR PROJECT EXECUTION

STUDY YEAR 2024 – 2025

(Last update: July 5th, 2024, AS)

Table of Contents

1. Target Group of the Document

This document contains information about Specialization Projects and Specialization Courses at Department of Mechanical and Industrial Engineering (MTP), for students from the following study programs:

5-year MSc programs:

- Mechanical Engineering (MTPROD),
- Engineering and ICT (MTING)
- Materials Science and Engineering (NT/MTMT)
- Nano Technology (MTNANO)

2-year MSc programs:

- Mechanical Engineering (MIPROD)
- Subsea Technology (MSSUBSEA)
- Reliability, Availability, Maintainability and Safety (MSRAMS)
- Project Management (MSPROMAN)
- Global Manufacturing Management (MSGLOMAN)

2. Introduction

The objective with this memo is to present administrative information about the specialization project. It is important that you read this information carefully and that you follow what is written in the document. If you have questions, please, get in touch with your supervisor or one of the contact persons mentioned at the end of the document.

2.1. Project Start

The official project start is week 34 (from August 19th, 2024).

2.2. Start-up Meeting

1. Your supervisor will invite you to a “start-up” meeting during week 34/35. During this meeting the following topics will be discussed/agreed upon.

2. Definition of the project content including a project title. The following has been decided for MTP projects:

   A plan for the Specialization Project shall be developed by the student and discussed and agreed with the main supervisor no later than 2 weeks after the start-up of the project. During the project period this plan can be revised.

3. Establish a routine for supervision/follow up meetings between the student and the supervisor(s).

4. Expectation from the supervisor regarding e.g. working methodology and working effort.

5. Discuss alternative specialization courses ("fordypningsemner") and agree upon one course.

6. For specialization projects executed at an external company premise, a special agreement describing rules and responsibilities has to be developed and agreed upon between the student and the supervisor(s).

2.3. Use of Artificial Intelligence

MTP refers to the information published about the use of AI-tools in bachelor's and master's theses:
https://i.ntnu.no/wiki/-/wiki/English/Artificial+intelligence+in+bachelor%E2%80%99s+and+master%E2%80%99s+theses
The same applies for the project assignments.

"**You are allowed to use AI-tools as an aid** (…). All use of AI-tools must be referred to in the assignment. Students refer to AI-tools both in the text and in the reference list. (…)

You as a student are responsible for assessing how eventual AI-tools are used in your thesis. Make sure that your thesis contains enough critical reflection. Be thorough when referring to AI-tools and use them only as support material in your thesis. (…)

Keep in mind that **language models such as ChatGPT cannot be cited for facts**. Use original sources.»

2.4. Standard Agreements

If you have a project where an external company is involved, please consult with your supervisor before you implement a contract with the company.

MTP has established a system where projects defined by an external company will be charged with a fee to cover internal direct costs at MTP. *It is the responsibility of the supervisor to negotiate with the external company to cover this cost. The student shall not be involved in this discussion.*

2.5. Student Workspaces

All our student workplaces will be clean desk.

You can find updated information on available rooms on our website:
https://www.ntnu.edu/mtp/study-programmes/maprog

3. Voluntary Courses

MTP offers the following courses to help you in executing the research work and to prepare the research report:

3.1. Lab Access for Project & Master Students – an Intro to HSE & Risk Assessments

Date: August 28th, 2024

Time: 8:15-10:00

Place: GL-VE VE1
(No streaming; the slides will be made available to the students after the lecture.)

Lecturer: Rebecca Sandtrøen

Content/Information on:

- how to get access to the labs,
- how to do a risk assessment,
- how to use/fill in NTNUs “Risk Assessment Form”.

3.2. Literature Research and Citation Management

Date: September 4th, 2024

Time: 8:15-10:00

Place: GL-VE VE1

(The slides will be made available after the lecture: Students who cannot make it to the lecture will get access to a recording from previous years.)

Lecturer: Almuth Gastinger

Content/Learning outcome:

- Know how to choose relevant information sources.
- Be able to create a good strategy for your search and choose meaningful keywords.
- Know how to use the CRAP-test (source criticism and information evaluation).
- Be able to use the library catalogue Oria, manage your loans and order material.
- Know how to use the scientific search engine Google Scholar, and the citation database Scopus, find full text material in these tools and save it to your preferred reference management system.
- Know how to use subject databases, find full text material, and save it to your preferred reference management system.
- Know how you can refine your result lists.
- Know where you can find eBooks offered by the library.
- Be able to get citations right and to avoid plagiarism.
- Know that there are several reference management systems to choose between.

3.3. Scientific Writing and Use of AI tools

Date: September 11th, 2024

Time: 8:15-10:00

Place: GL-VE VE1

Lecturer: Christer W. Elverum

Content/learning outcome:

- Know what characterizes scientific writing.
- Understand that scientific writing takes practice.
- Know how to structure a scientific report/thesis.
- Know what to include in the main parts of a scientific report/thesis.
- Know how to carry out and document a literature study.
- Know how your thesis will be assessed.
- Understand the benefits and basic functions of a reference management software.
- Know how to (and how not to) use AI tools for scientific work and writing.

3.4. HMS/Introduction course for the particular lab(s) you will be using

The scientific groups will inform the concerned students about the specific dates. This course may be classroom-based or online.

4. Risk Assessment

It is mandatory to perform a risk assessment for all experimental work. A specific "Risk Assessment Form" is available and should be used. This form will be presented in the course “Lab Access for Project & Master Students – an Intro to HSE & Risk Assessments” (see 3.1). Known activities should be risk assessed before work can start. Risk assessment is an ongoing activity. It must be carried out before you start the activity, and the risk assessment must be updated continuously if you make changes to your activity. Your risk assessment must state whether your activities could cause harm to people, damage to materials/equipment, reputation, or the external environment.

You are asked to make such a risk assessment within 3 weeks of receiving the assignment. The form must be signed by you and delivered to your supervisor who will also sign it. Before you can start work in the workshop or lab, you must also have the approval and signature of the room manager at the laboratory in question and the signature of the laboratory manager. You keep this form with all the signatures and attach it to the final report. It is the supervisor's responsibility to decide whether such a risk assessment is not necessary, for example in the case of purely theoretical work. A risk assessment must always be carried out for work in the lab.

5. Project Report

Reference is given to the information given in the *voluntary course* “Literature Research and Report Writing”.

The report must be written as a *scientific report* with summary of important findings, conclusion, literature references, table of contents, etc. Specific problems to be addressed in the project are to be stated in the beginning of the report and briefly discussed. The number of the report pages should be limited and *preferably* not exceed 50 pages. Additional pages with tables, drawings, detailed sketches, photographs, etc. can be included in an appendix at the end of the report. References to the appendix must be specified. Figures and tables must be presented with explanations.

Literature references should be indicated by means of a number in brackets in the text, and each reference should be further specified at the end of the report in a reference list. References should e.g., be specified with name of author(s) and book, title and year of publication, and page number.

Integrating your formal Problem Description into the Report:

A detailed problem description is supposed to be part of the introduction, e.g., such as below:

5.1. Report Submission

- The official deadline for the submission of the project report is

  Tuesday, December 17th, 2024 at 2 p.m.

- You will submit your report via NTNU's digital examination system Inspera. Your study advisor will **open** Inspera for **submission a few days before the deadline**.
- Don't use Internet Explorer, but Chrome or another browser, when you log in to Inspera Assessment.
- Click on the exam sets ("prøver") you see there. Make sure to choose the set in the correct specialization project course code.
- There you submit one **PDF-file including attachments** which belong to the report.
- It will also be possible to upload **supplementary attachments** as a zip-file (e.g., data files, model files, programming codes, multimedia files).
- To change the language setting in Inspera, press the gear wheel in the right corner.
- **When your exam set in Inspera** is open (a few days before the official deadline), you can submit your report any time until the deadline.
- You can submit your report **as many times as you want** until the final submission deadline. The sensor(s) will get access to the report after your final submission deadline.
- **After the submission** you will find a copy of the report under "Archive".
- You do NOT have to submit a printed report.

5.2. Need for a postponed Submission Deadline

Under certain circumstances you can apply for an extended deadline.

In case of sickness a doctor's certificate is required. If you have other reasons, please, be aware that your supervisor needs to approve your application, and that this can take a few days.

If necessary, get in touch with your supervisor, explain your reasons and suggest a specific new deadline. Please, forward the supervisor's approval (signature or e-mail confirmation), to your study advisor, who will register the new deadline.

5.3. Assessment

The project reports will be assessed by the supervisor and another internal sensor. Every 3. Year there will be an external sensor instead of the internal sensor. Attachment 1 shows the Assessment Form that will be the basis/guideline for the evaluation.

5.4. Library Resources

MTP's contact person at the NTNU university library is Almuth Gastinger (almuth.gastinger@ntnu.no). You can get in touch with her with questions on how and where to find literature for your project, how to get your citations and references right, how to use a reference management system (like EndNote) or how to search in the library tool Oria or in subject databases like Scopus or Compendex.

5.5. Your Contact at MTP

Administrative questions:

Please send an email to studier@mtp.ntnu.no

Problem with supervision:

Deputy Head of Education: Christer Westum Elverum (christer.elverum@ntnu.no)

6. Attachment: Standard Assessment Form Specialization Projects

CANDIDATE			DATE:	
ASSESSMENT PARAMETERS			ASSESSMENT OF CANDIDATE	
Category	Criteria	Max. score	Score	Comments/grounds
Introduction and theory (max 25)	Academic foundation	10		
	Theoretical insight	10		
	Description of objectives	5		
Methods and working practice (max 25)	Skill level	10		
	Working methods	5		
	Effort	5		
	Degree of independence	5		
Results and discussion (max 35)	Results/ Work	10		
	Analysis and discussion	20		
	Conclusion and achievements	5		
Presentation of the report (max 15)	Structure	5		
	Language	5		
	Form	5		
SUM		100		
GRADE				
SIGNATURE				
Supervisor:		Co-Supervisor (opt.) / External sensor (every 3. year):		

Use of the Standard Assessment Form

The purpose of the Assessment Form is mainly to be a working document for the examiner(s).

The Assessment Form will be useful documentation in case of complaints. It will be sent to the student when s/he asks for an explanation of a given grade.

Assessment Criteria

The examiner(s) will assess the degree to which the candidate has achieved the specified objectives for the following criteria on the Standard Assessment Form.

- **Academic foundation**

Is the theoretical and scientific basis described well enough so that the work is in line with international research in this field?

- ***Theoretical insight***

Does the work, especially the introduction, document that the candidate has good knowledge of the theory and methods in this field in general and specialization in a defined area that is particularly relevant to the issue addressed? Does the candidate use relevant resources (databases etc.) to provide current and updated literature and background knowledge for the work?

- **Description of objectives**

Are the objectives and/or current hypotheses presented in a clear and understandable manner?

- **Skill level**

Does the candidate have command of the relevant methods (e.g., test methods) and can use them in his/her work in a suitable and integrated manner?

- **Working methods**

Does the candidate show ability to systematic and methodical work?

- **Effort**

Does the candidate show ability to high effort and solid professional commitment?

- **Degree of independence**

Assess the candidate's ability to work and use relevant methods in an independent way, and to complete an independent research- or development project under guidance. Does he/she show personal initiative? What kind of help and guidance has the candidate received in the different stages in the work? Does the candidate have ability to make use of the research groups' professional competence in their own work?

- **Results/Work**

Does the work demonstrate creativity and/or contribute to new knowledge/innovation? Does the work appear extensive? How do you assess the quality and importance of the new knowledge/new results generated in the work?

- **Analysis and discussion**

Are the analysis, interpretation/synthesis and discussion scientifically grounded, justified, and clearly linked to the issue addressed? Is the discussion at a high disciplinary level? Can the candidate apply his/her knowledge and skills in new areas and place the results in a more extensive context? Does the candidate provide a reasonable assessment of the significance of the results? Is the candidate critical to various sources of information? Are uncertainties, methodological errors, measurement errors, and other sources of error considered and discussed?

- **Conclusion and achievements**

Are the conclusions clear and unambiguous? Are the results clearly linked to the objectives set at the beginning? Is there a good explanation for any deviations from the objectives?

- **Structure**

Is there a logical and structural form in the written work (Standard IMRaD: Introduction, Methods, Results and Discussion)? Is the work generally well-arranged?

- **Language**

Does the candidate present the given task/problem and the results with the necessary scientific precision? Is the work readable and in high-quality language?

- **Form**

Is there a uniform style for the references, figures and tables? Is the quality of figures and tables satisfactory? Does the candidate master the forms of expression in this scientific field?

Scoring

There is a max score for each assessment point, so the total is 100. Every sub-assessment criteria has a score, so that the sum of the sub-criteria equals the main assessment's max scoring. If a sub-criterion, like "academic foundation" has a max score of 5, the points shall be divided after the following scaling:

5 points – Almost perfect

4 points – Very good, only minor shortcomings

3 points – Good, but with clear shortcomings

2 points – Just enough to be an acceptable performance for the master's grade.

1 point – Something(s) of value, but not enough to be acceptable.

0 points – Little or nothing of value

This means that the assessment of the sub-criterions is done according to the primary description of grades. Where other maximum results than 5 points is used, the scaling must be done accordingly.

Assessment

The supervisor and the internal sensor (every 3rd year the external sensor) edit an Assessment Form. The document has to be signed by the sensors and archived by the supervisor.

Table of grades and scores

Grade	Scores (intervals)
A	89 – 100
B	77 – 88
C	65 – 76
D	53 – 64
E	41 – 52
F	0 – 40