SPECIALIZATION IN 5th (2nd) YEAR AT DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING

STUDY YEAR 2024 – 2025

(Last updated: April 9th, 2024)

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 (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)

Specialization in the 5th (2nd) year

In the MSc study in technology at NTNU a major part of the 5th (2nd) year shall be a specialization in a selected area. Typically, three quarters (22.5 SP) of the study points in the autumn semester and 100% of the spring semester are dedicated to specialization. The following is mandatory:

Autumn semester 2024

- Specialization Project – 15 SP (Exception: MSSUBSEA: 7.5 SP)
- Specialization Course – 7.5 SP

Spring semester 2025

- MSc Thesis – 30 SP

In the autumn semester, the students shall, in addition, select:

- Complimentary Course (*Komplementæremne*) – 7.5 SP (Exception: MSSUBSEA)

The following information describes the selection a of Specialization Project and a Specialization Course for students at the Department of Mechanical and Industrial Engineering (MTP) to be done during Spring 2024.

Main profiles at MTP

The Specialization Project and the Master Thesis are linked to one of the main profiles at MTP. We offer the following main profiles:

Main profile	Responsible
Composites and Polymers (Kompositter og polymerer)	Professor Andreas Echtermeyer
Integrity of Metals (Metalliske materialers integritet)	Associate Professor Nima Razavi
Nano Technology (Nanoteknologi)	Professor Nuria Espallargas Alvarez
Structural Integrity (Produkters integritet)	Associate Professor Bjørn Haugen
Engineering Design (Produktutvikling)	Associate Professor Christer W. Elverum
Manufacturing Technology (Produksjonsteknologi)	Associate Professor Sigmund A. Tronvoll
Robotics and Automation (Robotteknikk og automatisering)	Associate Professor Christian Holden
Automation (Automatisering)	Associate Professor Christian Holden
Production Management (Produksjonsledelse)	Professor Fabio Sgarbossa
Project and Quality Management (Prosjekt- og kvalitetsledelse)	Professor Bjørn Andersen
Reliability, Availability, Maintainability and Safety - RAMS (Sikkerhet, pålitelighet og vedlikehold)	Professor Jørn Vatn

The table below shows the **main profiles** which can be selected by students from different study programs and study options (*studieretning*).

Study program - *Study Option*	**Selectable Main profile at MTP**
• Mechanical Engineering (MTPROD, MIPROD) - *PUMA* • Engineering and ICT (MTING) - *IKT og maskinteknikk *)*	Composites and Polymers Integrity of Metals Structural Integrity Engineering Design Manufacturing Technology Robotics and Automation
• Mechanical Engineering (MTPROD, MIPROD) – *Ledelse og systemfag*	Project and Quality Management Production Management RAMS
• Mechanical Engineering (MTPROD) - *Industriell mekanikk*	Composites and Polymers Integrity of Metals Structural Integrity
• Engineering and ICT (MTING) - *IKT og produksjonsledelse* • Global Manufacturing Management (MSGLOMAN) - *Production Management*	Production Management
• Materials Science and Engineering (MTMT) - *Materials Development and Properties*	Composites and Polymers Integrity of Metals
• Nano Technology (MTNANO) - *Nanotechnology for materials, energy and the environment*	Nano Technology
• Subsea Technology (MSSUBSEA **) – *Production and Processing*	Automation
• Subsea Technology (MSSUBSEA **) - *Operations and Maintenance*	RAMS Engineering Designs and Materials
• Reliability, Availability, Maintainability and Safety (MSRAMS)	RAMS
• Project Management (MSPROMAN) - *Production and Quality Engineering*	Project and Quality Management

*) Students from the Engineering and ICT (MTING) program do not select a main profile, but they can select from the same portfolio the courses.

**) Students from the Subsea Technology (MSSUBSEA) program can also select the main profile Petroleum Technology at the Department of Geoscience and Petroleum.

When you select a main profile, you also select the course code for your specialization project. In addition, you will have to take a **specialization course** that is linked to your profile. The table below shows the main profiles and the corresponding specialization projects and specialization courses.

Main profile	Specialization Project	Specialization Course
Composites and Polymers (Kompositter og polymerer)	TMM4560 Engineering Design and Materials [1,2]	• TMM4151 Products and Materials Testing • TMM4250 Advanced Product Simulation • [3]
Integrity of Metals (Metalliske materialers integritet)	TMM4560 Engineering Design and Materials [1, 2]	• TMM4151 Products and Materials Testing • [3]
Engineering Design and Materials	TMM4561 Engineering Design and Materials	• TMM4151 Products and Materials Testing • [3]
Nano Technology (Nanoteknologi)	TMM4550 Nanotechnology	• TMT4515 Chemical Methods for Synthesis and Characterization of Nanomaterial
Structural Integrity (Produkters integritet)	TMM4560 Engineering Design and Materials [1])	• TMM4250 Advanced Product Simulation • [3]

Engineering Design (Produktutvikling)	TMM4560 Engineering Design and Materials [1])	• Suggested courses:
		  • TMM4250 Advanced Product Simulation
		  • TMM4151 Products and Materials Testing
		• [3]

Manufacturing Technology (Produksjonsteknologi)	TPK4540 Manufacturing Technology	Suggested courses: • TPK4195 Manufacturing Metrology • TMM4182 Fundamentals of Metal Forming and Sustainable Manufacturing Processes • [3]
Robotics and Automation (Robotteknikk og automatisering)	TPK4560 Robotics and Automation	• TDT4195 Visual Computing Fundamentals • TTK4150 Nonlinear Control Systems • TTK4115 Linear System Theory • TTK4190 Guidance, Navigation and Control of Vehicles (in Norwegian) • TPK4170 Robotics • TPK4126 Subsea Control Systems • [3]
Automation (Automatisering)	TPK4561 Robotics and Automation	• TDT4195 Visual Computing Fundamentals • TTK4150 Nonlinear Control Systems • TTK4115 Linear System Theory • TTK4190 Guidance, Navigation and Control of Vehicles (in Norwegian) • TPK4170 Robotics • [3]
Production Management (Produksjonsledelse)	TPK4530 Production Management TPK4550 RAMS [4] TPK4520 Project and Quality Management [4]	• TPK4430 Production Management and Logistics

Project and Quality Management (Prosjekt- og kvalitetsledelse)	TPK4520 Project and Quality Management	• TPK4420 Project Flexibility
Reliability, Availability, Maintainability and Safety - RAMS (Sikkerhet, pålitelighet og vedlikehold)	TPK4550 Reliability, Availability, Maintainability and Safety (MSSUBSEA: TPK4551 Reliability, Availability, Maintainability and Safety)	• TPK4450 Data Driven Prognostics and Predictive Maintenance

[1]) Students from the Engineering and ICT (MTING) program may use the code TMM4540.

[2]) Students from the Materials Science and Engineering (MTMT) program who find themselves/will be accepted by an MTP-supervisor will use the code TMM4560. MTP-students who should be accepted by the supervisors at the Department of Material Science and Engineering will use the code TMT4500.

[3]) An ordinary 4th year course can be selected in agreement with the supervisor for the Specialization Project.

[4]) Precondition is that the student finds a supervisor who approves a relevant topic for the project and that the student has the required previous knowledge for the course.

The final selection of the Specialization Course shall be done no later than two weeks after the start of the autumn semester.

Specialization Projects

The Specialization Projects can be established/defined in different ways as shown in A to D below.

A. Projects defined by MTP supervisors: Valid for existing research projects and/or prioritized target areas for the research groups. These projects are financed e.g. by the Norwegian Research Council, EU or internal funding (target areas). The supervisors will describe these projects and they *are available for all students.*

B. Projects defined by MTP supervisors in cooperation with industrial partners: These projects will be outlined by the supervisor in cooperation with the industrial partner. *These projects are (normally) available to all students.*

C. Projects affiliated with technical student organizations (e.g. Revolve or DNV GL Fuel Fighter): The students or the student organization will define these projects. The students need to establish contact with a supervisor who accepts the project. *These projects are (normally) available to all students.*

D. Projects defined by an industrial partner for a specific student: A company in direct contact with a student or through a supervisor prepare a project description. A supervisor needs to accept the project and take the responsibility for supervision. *These projects will not be announced to other students.*

One main requirement for all Specialization Projects is that the main supervisor shall be an MTP employee. In addition, the project can have one (or more) co-supervisor(s) from the industry or NTNU. *It is the responsibility of the student for project type C and D to establish an agreement with the main supervisor.*

Selection of Specialization Project

- On **March 13th, 2024** you will have access to all projects via MTP's website. The SharePoint link will be published on https://www.ntnu.edu/mtp/study-programmes/projects
- Each student is encouraged to review the actual projects and to contact the supervisor for the most interesting project(s) to get more information and/or discuss the project content.
- Due to company contract obligations and research related needs, some supervisors will pre-select students to specific projects before this deadline.
- The supervisors will register a possible pre-selection until **April 4th, 2024.** In this case, they will change the availability of the project in SharePoint (to not-available), publish the student's name next to the project and send an e-mail with the project title, student's name and e-mail address to the responsible study advisor. In this case the pre-selected student does not have to fill in a formal application.
- All other students have to fill in an online application form, which will be available in SharePoint. In the application the student can prioritize two projects (Priority 1 and 2).
- The deadline for completing the online application form is **April 24th, 2024.**
- The deadlines given above are also valid for 4th year MTP students spending this year abroad and for exchange students.
- Some Research Groups will invite to separate information meetings to present some of their projects in detail. The actual Research Group will send separate invitations to these meetings.

Distribution of Specialization Projects – feedback to the students

- The max. number of projects for each supervisor will be limited to 8 to i) secure quality of the supervision, and ii) capacity for supervision in the Research Groups.
- After the deadline of the online application form (**April 24th, 2024**), the projects will be distributed among the students based on their prioritized projects (Priority 1 and 2). The supervisors will be involved in this distribution process. That's why it is important that the students contact the supervisor before they complete the online application form.

- All students should have received feedback concerning their project choice by **June 5th, 2024**.
- 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 startup of the project. During the project period, this plan can be revised.

Master's Thesis

The MSc Thesis is normally a continuation of the Specialization Project. However, some students decide to change topic for the MSc Thesis. This can be accepted by the MTP department assuming that the student finds a project and a main supervisor for the new project.