

TIØ5225 Project Management, Specialization course

TIØ5230 Project Management, Specialization Project, Fall 2024

Project Management - specialization

Position and function of the specialization:

The course is an obligatory course in the 3rd semester for students in MSPROMAN who take IØT as their main profile and in the 9th semester for students at MTIØT who takes project management as their main profile.

The learning outcomes for the specialization project are as follows:

Knowledge learnt in this course:

- Detailed knowledge about models and concepts within their chosen theme of project management
- Detailed knowledge about possible applications and solutions to theme-specific challenges within their chosen theme of project management

Competences learnt in this course:

- Dealing with integrated problems in project management on a high level

Other competences learnt in this course:

- The student should learn how to write a scientific report
- The student should learn about, and practice, how to search for relevant literature when dealing with a problem within their field of knowledge
- The student should practice gathering empirical data and analysing such data with a method suitable to the theme chosen

Possible supervisors:

Professor Vedran Zerjav

Professor II Wenche Aarseth

Associate professor Tim Torvatn (co-ordinator)

Other supervisors may be available depending upon project chosen and the total number of supervised projects in adjoining scientific areas.

If you wish to know more about the specialization, please contact the coordinator, Tim Torvatn (tim.torvatn@ntnu.no)

Requirements for being able to chose project management as a main profile:

Students from MTIØT who wish to take project management as their main profile need to have taken at least three of the four obligatory courses of the project management program.

The obligatory courses are:

- TIØ5200 Project Organizations
- TIØ5210 Programme and Portfolio Management
- TBA5200 Project Planning and Analysis
- TPK5100 Project Planning and Control

Students who have spent time abroad need to have taken courses with a similar content, or have at least 30sp of other courses relevant to project management, and accepted as such by the coordinator.

Taking the Specialization means to take both TIØ5230 Project Management Specialization Project and TIØ5225 Project Management Specialization Course. The Specialization course is described below, and is followed by a FAQ regarding the specialization, and then a list of the possible projects offered in TIØ5230 Project Management Specialization Project.

Description of TIØ5225 Project Management Specialization Course

Course contents:

The course is a further specialization within relevant subjects of Project Management and builds on subjects presented in the obligatory courses in the 1st year of the Master Programme in Project Management. The choice of subjects for the seminar may vary from one year to another. Included is also a seminar series on research methods, tailored to what is relevant for the students in their projects and master thesis work.

Learning activities:

The student need to participate in a minimum number of methodology and research seminars, but attendance to all is expected. If there is a re-sit examination, the examination form may be changed from written to oral. Re-scheduled examinations will be given in December or January, depending on the teaching schedule.

Learning outcomes for the course:

The position of the course: The course is restricted to students who have an IØT specialization in their 3rd semester of the international master of project management, and students in their 9th semester of the MTIØT program who have chosen project management as their main profile.

Knowledge learnt in this course:

- The student should acquire specific and detailed knowledge about a small set of advanced themes within project management. Preferably, at least one of these themes should be relevant for the theme chosen for the project work that the student is doing in parallel with this course
- The student should acquire general knowledge about the most important methodological challenges when doing research, as well as a set of ways to handle these challenges.

Competences learnt in this course:

- The student should be proficient in handling methodological questions and applying methodological theory to his or her own research work.

Other competences learnt in this course:

- The student should develop his or her ability to discuss advanced theories within project management with colleagues
- The student should develop his or her ability to present scientific work done by others.

FREQUENTLY ASKED QUESTIONS:

What specialisation do I choose?

Students who take Project Management as their main profile within a 5-year integrated study program **must** take the Specialisation Project which corresponds to their study program.

What about the specialisation Course?

For each Specialisation project there is a corresponding Specialisation Course. You **must** take the Specialisation Course at the same department as your Specialization Project.

Examinations are handled by the department giving the Specialization Project and you may thus have a different examination schedule from your classmates.

How do I choose projects?

Below is a list of the projects offered by the IØT department. Students from the MTIØT program should use the web solution which will be sent to you by the administration, and **choose 5 projects before 2/5-2023**. If there are more people on a project than the capacity of the supervisor, we will discuss solutions at that point in time. This is in order to give everyone a fair chance if some projects become very popular. To ensure flexibility, the students are asked to choose projects from more than one supervisor.

What if I have my own suggestions for a suitable project?

In such cases, the challenge is to find a suitable supervisor. Contact the co-ordinator and present your project to him. He should be able to help you with suggesting a supervisor. In the web choice, please indicate a “self-defined” project and the suggested supervisor at the appropriate place on your list.

Please observe that self-defined projects are a possibility, but not a right. The best possible use of the supervisors is the paramount factor when deciding upon distribution of projects, and this may lead to you not being given your self-defined project.

What about the Master project?

The normal situation is that the Master project is on the same area of expertise as the specialisation project. Thus, we will expect that you have the same supervisor for your Master project as for your specialisation project (or at least one from the same department). If, for some reason, you would like to change supervisor from project to master thesis, be sure to contact co-ordinator as soon as possible.

PROJECT PROPOSALS:

FOR TIØ5230 Project Management Specialization at IØT

PRO 01: Self-Defined project

In this project, you must describe a problem yourself. Send the description along to Tim Torvatn (tim.torvatn@ntnu.no), who will decide if a suitable supervisor is available.

Please observe that Self-Defined projects will be acted upon if a suitable situation can be found with respect to supervision. Thus, you may experience that your suggestion will not be followed.

PRO 02: Involvement of external organizations into product development projects

Any product development project may need to include other organizations into the project. Organizations included could be suppliers, customers, competitors, universities/research institutions, consultants and/or other types of organizations. In this project you look at why, how and/or with what results such organizations are involved, and how their involvement affects the product development project in itself.

Supervisor: Tim Torvatn

Linked to strategic initiative: Could be linked to sustainability, green value creation or health and public sector depending on case chosen.

PRO 03: Cooperation and coordination across organizational boundaries in construction projects

Most construction projects involves multiple organizations, such as architects, consulting engineers, main contractor(s) and different types of sub-contractors. This project looks at how construction project managers handle the involvement of other organizations into their construction project.

Supervisor: Tim Torvatn

Linked to strategic initiative: Leading transitions

PRO 04: Project Management in Non-profit organizations

Many Non-profit organizations are Project-oriented or run large Projects as part of their operations. However, they may not be as proficient in using organizations as for example Professional "For-profit" organizations. If you are interested in looking at non-profit organizations this may be of interest to you. I suggest three areas that you may look at, but other areas can also be handled:

- a) Using Portfolio models to choose the right mix of Projects to run in large non-profit organizations.
- b) Handling non-profit goals when choosing Projects and/or partners for Projects.
- c) How can we do Project management that focuses on the longer-term effects and goals of the Project, rather than "just" doing the Project as efficiently as possible?

Supervisor: Tim Torvatn

Linked to strategic initiative: Could be linked to sustainability or green value creation depending on case chosen.

PRO 05: Project management in a non-profit technical student organisations

Problem statement: There are many technical student organizations at NTNU, usually consisting off a wide range of disciplines. Most of these organizations engage in various competitions, also internationally, and to our knowledge all organize their work as projects. Developing project management skills is of major interest and other topics could be:

- How should the project management system be designed and implemented?
- How should you train managers and other members in relevant project management tools and methods?
- What are the main benefits and challenges of being a project manager?
- What can be done to prepare employees for their first job as project manager?
- How does the development of project management skills fit with the students learning in their programs?

Supervisor: Associate Professor Ola Edvin Vie

Contacts: Various technical organizations

Strategic initiative: *Leading Transitions: Co-create a Sustainable Future*

PRO 06: Project management in the NTNU Campus-project

Problem statement: The board at NTNU has received funding for moving students and employees from the Dragvoll Campus to an integrated campus around Gløshaugen. Like other big building projects funded by the government it is a complex project with many actors involved. There is on-going research on the development of Campus called Fremtidens Campus (The future Campus), however there are not too many looking at the project from a project management perspective. There are several possible topics to develop in collaboration with the NTNU-campus project, success-criteria, stakeholder management, collaborations between different project organizations etc., it is also possible to look more into the quality evaluation system for big government investments.

This project is more suitable for students with Norwegian language skills, as all documents are in Norwegian.

Supervisor: Associate Professor Ola Edvin Vie

Contacts: NTNU-Campus prosjektet v/ Kjersti Bjørkeng Størdal, NTNU

Strategic initiative: *Leading Transitions: Co-create a Sustainable Future*

PRO 07: Energy projects and external stakeholder management

Problem statement: The energy sector is dominated by fossil fuels, which accounts for 34 percent of human-caused greenhouse gas emissions. Global CO₂ emissions should be halved by 2030 to meet the objectives of the Paris Agreement. Reliance on fossil fuels must be reduced to source electricity, supply heating and cooling needs, and power industry and transportation. This means accelerating the transition to sustainable energy. In Norway, landbased energy projects (wind turbines) have experienced challenges with external stakeholders, demanding to stop the projects. We are interested in research on the following topic/ problem statement in energy projects: How can project-based organizations reduce the conflicts stemming from external stakeholders? Case: Fosen energy projects (wind turbines).

Supervisor: Professor Wenche Aarseth

Linked to strategic initiative: Sustainability, Green value creation and health and public sector.

PRO 08: Innovative smart road projects

Problem statement: Road transport is one of the challenges in achieving national net zero emissions target as agreed in the Paris Agreement. In Norway, road traffic generates 18% of the total greenhouse gas emissions. This makes road traffic to a serious threat against climate challenges. Technological development is stated to be the most promising solution to the challenges. There are especially four overarching trends that will influence road transport systems in the years to come: Electrification, automated transport, intelligent transport systems and shared transport. These are all based on technologies that will radically change the transport system as we know it and make road transport more climate friendly. However,

to achieve the aim, existing roads must also be calculated into the equation and a different perspective is now arising when dealing with road infrastructures. Instead of building new roads only for bearing loads, new roads will be built with communication and information exchange with possibility to be a source of energy. This new approach introduces the term “Smart Roads”. Sustainable smart road projects include technology and innovation, and it is widely accepted that project owners have not included technology and innovation in the concept and planning phase of the projects. We are interested in research on the following topic/ problem statement: What are the challenges when concept planning for future smart road projects? Case: National road authorities in Norway.

Supervisor: Professor Wenche Aarseth

Linked to strategic initiative: Sustainability, Green value creation and health and public sector.

PRO 09: Grand challenges projects

Problem statement: In January 2024, International Journal of Project management called for papers on grand challenges projects. Grand challenges encompass the world's most pressing issues such as poverty, social protection, global pandemics, sustainability transitions, migration, human rights, urbanism, affordable housing, precarious work and livelihoods, food security, and effective states (Etzion et al., 2017; Fukuda-Parr & Muchhala, 2020; George et al., 2023; Howard-Grenville, 2021; Ika et al., 2020; Oldekop et al., 2020). To date, there have been some calls for project management to become more relevant from a practical standpoint and tackle grand challenges to build a better world (Ika & Munro, 2022; Morris, 2013). The \$18-billion United States (US) Operation Warp Speed and the \$8-billion United Kingdom (UK) Vaccine Task Force are great examples of mega portfolios of global vaccine development projects (Bingham, 2021; Cohen, 2021; Winch et al., 2021). The potential for impact is enormous, because we live in a “project world” where projects are developed to organize work and deliver change (Freeman & Schuller, 2020; Lundin et al., 2015). We are interested in research on the following topics/ problem statements in grand challenges projects suggested by Ika and Munro (2022, pp. 606–607) in their invitation to develop a behavior theory for “grand challenge projects”: 1. Why do grand challenge projects exist? 2. How and why do grand challenge projects differ? 3. What makes grand challenge projects complex to manage? Case: students own projects or conceptual master thesis (literature review).

Supervisor: Professor Wenche Aarseth

Linked to strategic initiative: Sustainability, Green value creation and health and public sector.

PRO 10: 25 Concept planning phase of projects

Case company: Aker BP, oil and energy sector.

Problem statement: The starting point of this project is the lack of implantation of developed technologies in the front-end of projects. Thinkers such as Grimmen (2008) point to how an understanding of the larger context we operate in is taught to us from our surroundings. For instance, the Norwegian Petroleum Safety Authority states that a suboptimal understating of the environment around petroleum extraction contributes to the making of mistakes. Those working with early-phase project development must have a deep comprehension of the context the technology will be utilized, factors that underpin quality decision making (such as

choosing the right business case and optimizing project portfolios) at the planning phase as well as from where and whom they can learn or gather such knowledge from.

In this project you will investigate the importance (or lack of importance) of and sharing of contextualized knowledge in the front-end of projects in the upstream oil and gas industry as a contribution to business transformation. The case company is Aker BP.

Contact Aker BP: Halvard Benjaminsen
Supervisor: Professor Wenche Aarseth
Linked to strategic initiative: Leading transitions.

PRO 11: Industry transformation projects for innovation and productivity growth

In this topic, students select a business organization or sector of their choice and identify a transformative initiative within the business/sector that delivers on the corporate and business strategy. The aim of such industry transformation projects is often to introduce a new product/service that will innovate the business or sector and thus increase its productivity. Examples include digitization of design and production, aspects of introducing AI, agile or automation into project-based industries, etc. Students will choose the sector and the transformation project they want to work with and the research method follows from that. It is anticipated these will be in-depth qualitative analyses of industrial innovation programmes. Projects can include cross-sectoral networks with public and private partners (for example cities or regions).

Supervisor: Professor Vedran Zerjav
Linked to strategic initiative : Leading Transitions

PRO 12: Projects and programmes for sustainability transitions and SDGs

Problem statement: Achieving sustainability transitions, such as net-zero targets or, more broadly, the UN Sustainable Development Goals (SDGs), can only be achieved through projects and programmes with distinct transition goals. The problem that both the public and private sectors are facing is the tension between short-term outputs and long-term outcomes. This MSc thesis project will be based on analysing the alignment, tensions and complementarities between project-level short-term goals and long-term policy objectives to understand the alignment (or lack thereof) between projects and programmes on the one hand and policies or business strategies on the other. Research would mainly be based on in-depth case studies of projects and programmes that achieve sustainability transitions with an important innovation element such as renewable power plant technologies. Other types of system transformation programmes and initiatives are possible (for example taken from Norway's Action Plan for Sustainable Development).

Supervisor: Professor Vedran Zerjav
Linked to strategic initiative : Leading Transitions

PRO 13: Programme and portfolio management in Trondheim Kommune

Problem statement: In 2018, The Norwegian University of Science and Technology (NTNU) and Trondheim municipality entered into a partnership agreement to jointly develop a University City. A national pilot based on five thematic focus areas; Education and Early development, Health and Welfare, Urban development, Innovation and Smart City. One of the

important focal areas for Trondheim Kommune is to develop a robust capability framework for the management of portfolio of their projects including the strategic planning, selection, leadership and control of the execution and closure. There are a number of possible topics related to strategic management of project programmes and portfolios that will be discussed and defined and refined working with our partners in Trondheim Kommune. It could for example involve value and benefit management, stakeholder management, complexity management and performance tracking.

Supervisor: Professor Vedran Zerjav

Linked to strategic initiative: Leading Transitions

PRO 14: In-depth case studies of single major projects and programmes

Problem statement: Public and private clients around world are developing, planning and delivering infrastructure and city development programmes with different purposes. The main features of such initiatives is that they are typically of very large scales (often \$1Bn+) and comprise a number of interdependent projects which together lead to a high-level policy goal (such as reducing carbon emissions, achieving innovation, etc.) and are very often in the public coverage which makes them a good object of analysis. This topic is based on the student selecting a programme of their choice (in their home country or elsewhere) and then developing a study based on publicly available material (or empirical work) on the programme. Topics can include leadership, stakeholder issues, performance issues, financing and involvement with local communities. Some example programmes would include Follobanen, Rosebank oil and gas field and others in Norway, the UK High Speed 2, Crossrail (now known as The Elizabeth Line), Berlin Brandenburg Airport and Stuttgart 21, Olympics Projects around the world, in Norway and many others. This list contains only some of the projects with relatively recent media exposure, but students are invited to choose a project in their home country as the setting. A number of topics can be possible, based on the specific case which will determine the conceptual and methodological focus.

Supervisor: Professor Vedran Zerjav

Linked to Strategic initiative: Leading Transitions, Health and Public Sector

PRO 15: Analysis of government major project portfolios

Problem statement: Governments are implementing programmes and projects of different types, scales and costs to implement their policy goals and deliver on their policy mandates. The portfolio of government projects and programmes is typically large and involves very complex and large investments of different levels of risk and interdependency. In the implementation of such investments, it is their governance that is a key factor of success or failure. This MSc project topic involves working in particular with the Norwegian and the UK datasets of major government projects across different segments such as infrastructure, defence, ICT and transformation. A variety of topics are possible within the governance and management of the front-end of projects and the same is the case for the methodological approach, although it is expected that there will be a focus on quantitative (mixed methods) analysis given the size of the sample of projects (N=80).

Supervisor: Professor Vedran Zerjav

Linked to Strategic initiative: Leading Transitions and Health and Public Sector

PRO 16: Project-based orchestration of supplier networks and development

This project is within the field of orchestration of supplier networks and development. It will challenge you to develop an understanding of factors that can promote or hinder orchestration of supplier networks and development in project-based organizations. You can choose between two different contexts for such an analysis. One is related to large construction projects such as the campus development project at NTNU or the Powerhouse project at Brattørkaia in Trondheim. The other is the context of a large event, such as the student cultural festival UKA or the upcoming World Championship in Nordic Disciplines in Trondheim 2025.

Project-based organizations are prevalent within several key sectors in Norway, and their handling of upstream activities is often key to their ability to operate. In typical large projects, up to 60-80% of the value creation is done through the acquisition of goods and services, and often several key purchases are new to the project and also to the mother organizations in charge of the project. Thus, the orchestration of supplier networks and development is often central to both the economic and technical success of the project.

Orchestration of supplier networks is often related to the complicated communication and organization of large projects, and the project's ability to engage suppliers in a development process is central to the ability to appropriate new technical solutions.

Although we have suggested two specific contexts for this work (large construction projects or large events), the knowledge acquired through working on this challenge is not context-specific, but instead useful for all kinds of project-based activities.

Practical information

We would like to invite student groups of 2-3 persons to this project, and are likely able to handle 2-3 such groups. Since the project work in the Fall semester will normally be a literature study, possibly with some exploratory case work, we would also invite the students to proceed in the Spring semester with a master thesis within the field, were an important task would be to test the framework developed in the project up against one or more relevant cases.

Supervisors: Elsebeth Holmen (elsebeth.holmen@ntnu.no), Ann-Charlott Pedersen (ann.pedersen@ntnu.no), Tim Torvatn (tim.torvatn@ntnu.no)

Linked to strategic initiatives: Leading transitions, Technology-based organizational design and Health and Public Sector.

PRO 17: Public procurement from a project management perspective: mapping national practice in Norway

Much of all public procurement related activity in Norway (and most if not all other countries) is essentially organized and carried out as a complex set of smaller and larger projects. Due its highly regulated nature, expressed through a system of directives at EU level (and implemented in each member and affiliated country in national laws), public purchasers can choose among a limited set of procedures for public procurement that specify how the activities in the procurement process should be carried out, prior to the tender phase, during

the tender process and post-tender. This includes a description of how and when information should be published, how communication with suppliers should take place and strict time windows for processing the information from suppliers and reaching decisions. In other words, in a way, following the EU directives, a public procurement process automatically becomes a project with a given start and end point. Different procedures may imply different ways of managing it as a project (different degrees of interaction with suppliers, shorter or longer processes, different degrees of uncertainty). Furthermore, procurement projects are carried out at different system levels, for example within a single municipality, across a group of municipalities as a joint procurement project, or even at national or international level. Thus, the management of the entire system of public procurement projects in a country quickly becomes very complex and will enforce a balance between overall top-down coordination and lower level autonomy.

Public procurement is a much-researched topic in general, but we lack a holistic model of public procurement through a project management lens. In this project the students will carry out a literature study in public procurement as projects and in addition, start analyzing publicly available (and detailed) information about the larger public procurement projects in Norway available in the national Doffin database. This analysis should lead to better insight into which public procurement procedures are being used in different situations in Norway and provide a basis for hypothesizing about the project management approaches being used. These hypotheses can be combined into a conceptual model of public procurement as a system of projects to be validated and tested in the master thesis.

The project thesis is aligned with IØTs strategic research area Health and Public Sector.

Supervisors: Luitzen de Boer (luitzen.de.boer@ntnu.no) and Vedran Zerjav (vedran.zerjav@ntnu.no)

PRO 18: Circular procurement in construction projects

Several major public contracting authorities have begun to initiate and test strategies for more reuse and reuse of materials and components in their construction projects through their procurements (circular procurements). Examples of this may be to stipulate specific requirements for whether/reuse in the requirement specification or in the award phase. More extensive initiatives may involve establishing dedicated warehouses or marketplaces for storing and sharing materials among several users in the organization (or possibly even outside).

Research in this area and experience so far is that a lot is going on, but that there are also some challenges, such as a lack of overview of (possibly) reusable materials, lack of knowledge to be able to determine what the materials can be used for, uncertainty about quality, legal questions regarding who is responsible for the materials "along the way" and after they have been reused. In addition, the question is how profitability and achieved sustainability benefits can be estimated and documented.

For a buyer, it is therefore not obvious how to work with circular procurement. The literature (Kristensen et al., 2021) suggests that buyers can focus on the procurement process for the materials themselves (specification), work more closely with suppliers or make changes to

contract type and elevate efforts to a larger ecosystem level (e.g. establishment of a shared central).

In the thesis, the student (s) will conduct a literature study and at the same time begin to identify concrete examples of circular procurement projects through desk research and focus group interview. The purpose will be to develop a framework for further validation and testing in the master's thesis.

The thesis is linked to the institute's strategic focus areas Green Value Creation/CE as well as Health and Public Sector. With a view to the master's course, it is relevant to seek cooperation with companies and other relevant external actors.

Supervisor: Luitzen de Boer (luitzen.de.boer@ntnu.no)

PRO 19: Upcycling of food waste in a circular supply chain

Transitioning to a circular economy is necessary to meet society's massive sustainability challenges. In this perspective, circular supply chains and reverse logistics act as “logistics infrastructures” for restoring and preferably upcycling materials what would otherwise have gone to incineration or landfill. Today's food supply chains are responsible for 1/3 of the total greenhouse gas (GHG) emissions, and 6 % of global GHGs emissions are related to food waste.

The objective of this project is to investigate food waste generated in grocery stores. Focus will be on fruit and vegetables since this product group has one of the largest volumes of instore loss and waste, and several actors are interested in exploring its potential use as raw materials for another supply chain cycle.

The project will apply a mix of qualitative and quantitative methods. A literature study should investigate existing studies on waste in grocery retailing, the potential upcycling of food waste in a circular supply chain perspective, and how food waste is managed in other countries.

The empirical part of the study will map and analyse how current food waste is sorted, collected, and stored in grocery stores, including types of waste, volumes, handling, storage methods, material quality, and collection frequencies. Data will be collected through interviews, observations, process mapping, company reports, etc., in collaboration with one of the Norwegian retail chains.

In the master project, students will develop one or more concepts for handling and sorting of grocery store food waste.

Supervisors: Anita Romsdal (anita.romsdal@ntnu.no) and Heidi Dreyer

PRO 20: Circular supply chain management: the case of enhancing circularity of used textiles

The textile industry is one of the most polluting industries in the world and it is therefore important to enhance the circularity of post-user (PU) textiles, extending the life cycle of the material. Doubling the life of textiles will reduce the climate impact by 40-50%. This is however not the case in practice as most of PU textiles end up in the household waste and are incinerated, although studies show that large part of the waste could have been reused or recycled. A European Parliament directive has therefore obliged member states to ensure that textiles are collected separately, latest from 2025.

The key actors in the post-user textile chain are municipalities, non-governmental organization (NGOs), textile producers, waste companies and sorting facilities. This assignment is narrowed to the supply chain of used textiles, and the exploration of circular supply chain management strategies and models which will increase the value creation from used textiles (the flow of reused or the recycled textiles). The research in the assignment can be framed in several ways, but some key questions can be the following:

From a supply chain management perspective:

- what is circular economy and used textile and what are the key barriers and potentials for circular economy in the supply chain of used textile?
- how could the volume of used textile being incinerated be reduced, and what is the effect on the existing supply chain?
- how can digitalization/Industry 4.0 be applied to achieve a circular supply chain of used textile

The assignment will be conducted in the SATIN project (Towards a sustainable circular system of textiles in the Nordic region) constituting of 24 organisations/companies in Sweden, Norway, Denmark, and Finland. SATIN aims to develop and test solutions that can address some of the textile collection and sorting challenges - <https://www.vti.se/en/research/traffic-analysis-and-engineering/project-satin>

Supervisors: Heidi Dreyer and Anita Romsdal