



STUDY PLAN – MSc in Innovation and Technology Management

* Objectives

The MSc. in Innovation and Technology Management (ITM) is a two-year, full-time study programme awarding 120 ECTS. The programme integrates entrepreneurship, innovation and technology management with the study of change processes as in new venture or existing organisations. The value proposition of the ITM study programme is the education of leaders in a world of change. The study programme aims to enable students to understand change processes in a transitional context and exploit the opportunities fostered by new technology. Additional aims are to enable students to lead development processes as new ventures and/or act as internal change agents in organisations, in addition to giving students an in-depth knowledge of change for utilisation in hi-tech industries, governments and the business world in general, in their role as entrepreneurs or project managers. Key issues covered by the study programme are change drivers in rapid intrusive transitions, such as digitalisation, globalisation and sustainability.

The study programme adopts an important ethical principle through its focus on circular economy and sustainability. The overarching issue is to minimize the footprint of production and societies' resource consumption, while increasing value creation and welfare. Moreover, as sustainability and commercial viable solutions must consider all aspects of production and use of services and products, the study programme shall introduce the students to the characteristics and challenges of global markets.

Contents of study programme:

- Core subjects of business economics and management, providing students with knowledge in entrepreneurship, innovation and technology management for the understanding of change processes as new ventures or in existing organisations
- In-depth studies of entrepreneurial and innovation in industrial processes, providing students with knowledge of industrial development and manufacturing processes, with a focus on entrepreneurship and innovation in an international perspective
- Research methodology and thesis



The core elements of the ITM study programme are, but not limited to:

- Entrepreneurship, with courses in corporate entrepreneurship and courses in new venture entrepreneurship
- Technology management, with courses in technology management and systems engineering
- Innovation Management, with courses in innovation management and creativity
- Change, with courses in organisation and leadership- change management and project management

The programme qualifies graduates academically for admission to Ph.D. programmes in economics and management in Norway or abroad. In common with most industrial management programmes in the Nordic region the focus is on market functioning, innovation, operation management, supply chain management, quality management and project management. The programme includes subjects that provide insight into processes that help players in industrial systems become more efficient, innovative and able to improve their performance. In the courses, students learn how innovation can take place at many levels - from product innovation, to streamlining processes and focusing on advantages developed through a global approach to production and sales. Students are introduced to system design, planning, implementation, working methods, optimization, risk assessment, coordination and collaboration related to industrial production and development processes. In total, the foregoing subjects cover all the traditional topics of industrial management.

The MSc. in Innovation and Technology Management qualifies the graduates for employment in various areas of the private and public sectors. After graduation, the candidates shall be able to address topics and perform tasks when implementing an understanding of technology change. This includes innovation and entrepreneurship within organisations and the ability to develop an active approach in dealing with external and internal change and seizing the opportunity.

* Learning outcomes

The study programme aims to educate candidates with strong multidimensional analytical skills by introducing real life problems from the local business sector of USN. The study programme shall focus on students developing an understanding of the contribution of entrepreneurship, innovation and technology. Further, it will demonstrate how adapting to transition through change can increase value creation and welfare through effective implementation and efficient management. Accordingly, the students must understand how organisations, entrepreneurs and managers can facilitate the development of new technology and business models. This requires students to understand how new technology can be applied in different contexts by consumers and producers, and how these players may change their behaviour due to the introduction of new technology.

The course plans concretise the learning outcomes of the study programme. Overall, the course units in the study programme shall contribute to the total learning outcome of the students.



Knowledge

Upon completion of the study programme, the candidate shall:

- have advanced knowledge of theories relating to entrepreneurship, innovation and technology management and the concept of change
- have advanced knowledge of how to implement change processes related to the fields of entrepreneurship, innovation and technology management
- have thorough knowledge of pertinent fields of scientific theory and methods
- have specialised knowledge about academic issues based on the history, traditions, features and place of the community in the area of specialisation

Skills

Upon completion of the study programme, the candidate shall be able to:

- implement change in existing organisations and/or take advantage of the economic potential of change in establishing new ventures
- apply knowledge and skills in collaboration with others and in new areas to perform advanced tasks in small and larger projects
- analyse existing theories, methods and interpretations in entrepreneurship, innovation and technology management and to work independently with practical and theoretical problems solving relevant topics to the subject of change
- use relevant methods for research and professional development in an independent manner
- conduct an independent, limited research or development project under supervision and in accordance with current research ethical norms

General competence

Upon completion of the study programme, the candidate shall be able to:

- use various sources of information that are pertinent to entrepreneurship, innovation and technology management, and to analyse them critically in terms of formulating professionally relevant reasoning within the specialisations



- analyse relevant academic, occupational and research ethical issues related to society, relevant to entrepreneurship, innovation and technology management
- convey self-assurance and master the field of expression in a manner that is reassuring for collaborators, colleagues and others in various work situations
- communicate on academic issues within entrepreneurship, innovation and technology management, analyse and propose conclusions in the fields, both with specialists and to the general public
- contribute to innovative thinking in processes of change that are pertinent to entrepreneurship, innovation and technology management
- continually acquire knowledge within the fields of entrepreneurship, innovation and technology management

*Structure and completion

The MSc. in Innovation and Technology Management has the following structure:

- 7.5 ECTS of compulsory introduction courses, alternatively in business administration or engineering. The purpose of the two courses is to provide basic knowledge and understanding of the two disciplines for the two different student groups. The aim is to provide insight into and an understanding of the two academic fields, in addition to creating common ground for the fulfilment of the interdisciplinary learning environment in the other courses.
- 52.5 ECTS compulsory core courses, providing an advanced scientific basis, contributing to cross disciplinary competence and a broader perspective within the fields of entrepreneurship, innovation and technology management. This includes a 7.5 ECTS in quantitative research design and research methods course.
- 30 ECTS elective courses in two specialisations, entrepreneurship or systems engineering, alternatively. In the specialisations there is a 7.5 ECTS course in qualitative research design and research methods. Alternatively, 30 ECTS study abroad at a partner institution, giving a specialized competence within the chosen field. The courses must be approved by the programme coordinator. When studying abroad, a 7.5 ECTS course in qualitative research design and research methods is required.
- 30 ECTS, consisting of a research assignment documented in a master's thesis (compulsory). The master's thesis is an independent research work, preferably based on work practice in one or more organisations. The master's thesis should be supported by theoretical and research methodological knowledge to elaborate and analyse a research question. The students shall also have the opportunity to collaborate with the academic staff on R&D projects.



First year		Second year	
First semester	Second semester	Third semester	Fourth semester
Fundamentals of industrial management- Engineering students only	Systems engineering	Electives Specialisation- Study Abroad	Master thesis
Fundamentals of engineering- Business students only	Project management of complex systems	Specialisation- Entrepreneurship	
Quantitative methods	Organisation and leadership- change management	Qualitative methods and the business plan as an entrepreneurial method	
Innovation management	Technology management	Idea generation and evaluation, putting novelty into context	
Corporate entrepreneurship		Entrepreneurial finance	
		Managing firm operations and firm growth	
		Specialisation- Systems engineering	
		Research methods for systems engineering	
		Architecture and design	
		Sustainability and life cycle	
	Knowledge Management		

* Learning activities

The engineering and business students shall attend the same learning activities.

Teaching methods shall be focused on providing students with relevant real-life cases and opportunities. A combination of lectures, group work, project work and supervision is utilized to maximize the learning outcome.

The tuition schedule and method vary throughout the programme. Some courses involve one intensive week of lectures and group work followed by ten weeks of project work, while other courses can last several weeks (for example 3 + 3 + 3) followed by the submission of an individual report. Weekly supervisory sessions with faculty staff and work in study groups may take place during this period.

Full attendance is required in many of the courses. Any absence must be cleared in advance with the course responsible and be documented.

Tuition and seminars

The syllabus and topics for individual courses will be taught by means of lectures and seminars. The teaching method will be research-based since it is an MSc. programme. Follow-up and preparation for teaching are supported by ICT-based facilities. The seminars are set up as interactive processes, where students are expected to contribute actively. Attendance to the seminars is essentially compulsory (cf. course descriptions for details). The reason for compulsory attendance relates to learning activities, argumentation and communication training, as well as reflective learning processes at individual and group levels.

Argumentation and communication training

Students shall practise different skills in oral and written dialogue and communication. Students shall be trained to provide and receive guidance in writing processes, and use writing in their own learning process. Guidance is given on individual writing and group work, and courses in literature reviews and information searches, academic styles and reference management will be given.

Case assignments

Students work individually and in groups across disciplines (i.e. students with engineering and business backgrounds) with case studies that describe practical and theoretical challenges. Students are challenged to derive contexts and consequences, explore different scenarios and make ethical and normative assessments. The cases thus provide practice in business management, as well as abstraction and generalisation.

Thesis

The Master's thesis is an independent scientific study that builds on and further develops the knowledge acquired by the students through the first part of the study. Through the work of the master's thesis, the students will be given the opportunity for theoretical and methodological specialisation, gaining experience in scientific working methods and developing the ability to produce research-based knowledge. In the master's thesis, the students shall have the opportunity to enhance their reflective skills accumulated from the compulsory courses in the first year of study. The students' research work, in connection with the master's thesis, shall be conducted in collaboration with

organisations in the public, voluntary or private sectors. Students will also be given the opportunity to collaborate with the academic staff in ongoing R&D projects. The students are given guidance from the teachers and resource staff in the organisations. The students require fifteen to twenty hours of supervision for the master's thesis that, on completion, awards the student with 30 credits (ECTS).

Supervised professional training

* Forms of assessment

Compulsory work requirements

Compulsory work requirements of the subjects in the study programme shall ensure that students are actively working at all periods to achieve the learning outcomes. The work requirements shall help the student to make consistent progress throughout the semester, in addition to providing a basis for reflection, dialogue and discussion of issues in the subject area. The work requirements include written submissions, oral presentations or prepared discussions to be done individually or in groups. In this way, the work requirements contribute to reinforcing independent work with the ability to collaborate with others and developing communicative skills within all the subject areas of the study programme.

The mandatory work requirements are assessed as approved/unapproved. The student must pass the mandatory work requirements to be eligible for taking the final examination.

Final examinations

The examinations in the master's programme are varied. These test the students individually or in groups, written or orally, by means of proctored examinations or major assignments that extend over set periods. The examination methods are adapted to the specific nature of the courses, thus ensuring that the overall learning outcomes for the study are assessed.

The following examinations shall be used in the study programme:

- Written, proctored exam. This form of examination measures academic and theoretical knowledge, as well as the ability to work under pressure.
- Written exam without supervision. Selected tasks are done individually or in groups. This form of study assesses the following abilities: to apply knowledge in new areas, analytical skills, to think independently and critically, writing proficiency, academic and theoretical knowledge, to acquire fresh knowledge, methodological skills, to manage and coordinate tasks and to collaborate.
- Oral exam (individual and group presentation). This form of study measures academic and theoretical knowledge, oral dissemination, ability to manage and coordinate tasks and ability to collaborate.
- Master thesis. This examination form measures, among other things, theoretical and methodological knowledge written and oral, analytical properties and the ability to produce research-based knowledge and research ethical attitudes.

All subjects are assessed in letter grades, from the highest A down to –E. F is fail.

For compulsory work requirements and exam form for the individual courses, see course plans.

A pass grade shall be attained for each course. Compulsory work, exercises and assignments shall be approved before the student can take the final examination in a course. Details of compulsory exercises, assignments and the assessment method and duration are given in the respective course description.

The students are expected to spend about 1,600 hours on their full-time studies lasting ten months each year. Each course awarding 7.5 ECTS requires 200 study hours. Each student is expected to spend a total of 800 hours studying to complete the master thesis.

* Student exchange and internationalisation

Students are encouraged to take courses at other approved universities abroad. The USN has exchange agreements with several universities abroad. Students intending to participate in our exchange programmes may do so in the third semester of the study programme and must apply at the appropriate time.

The courses of the partner institution must have the prior approval of the programme coordinator at the department, ensuring that students meet the requirements of the study plan after completion of the programme.

For further information about the USN exchange agreements and options please access:

<https://www.usn.no/english/academics/usn-outbound-exchange/>

The ITM programme has an international orientation in the form of English study literature, English as the language of tuition, lecturers with international backgrounds, student exchange and admission for international students.

Authorisation/certification

* Relevance for further studies

The Master's programme focuses on the field of Innovation Technology Management and provides in-depth knowledge and specialized expertise required by the public and private sectors. On completing the ITM programme, students shall be able to conduct R&D work in the business field, and/or proceed with doctoral studies at, for example, the University of Agder (UiA), University of Oslo (UiO), Norwegian University of Science and Technology (NTNU), USN or at institutions abroad.

Miscellaneous

*Approved study plan

Vice- dean, USN School of Business, June 2019.

Change description