

MSc in Engineering Management and MSc in Management Science (Cycle 2, level 4)

The program leading to a MSc degree in Engineering Management or MSc degree in Management Science is a 2 year full-time graduate study program of 120 ECTS credits (4 semesters, 30 ECTS each semester). Students that enter the program with an undergraduate engineering degree can receive the MSc degree in Engineering Management upon completion of the program. The degree Master of Science in Engineering Management provides education equivalent to the requirements for the professional title of Chartered Engineer (Icelandic: verkfræðingur), as defined by the Ministry of Industry and the Association of Chartered Engineers in Iceland. Students that don't have an undergraduate engineering degree (but fulfill other acceptance criteria) can either add the required fundamental engineering subjects or receive the MSc degree in Management Science.

The aim of the program is to prepare students for careers in the management of functions, projects and companies with emphasis on solutions relevant to the industry in a broad manner. There is emphasis on assimilating a broad scope of diverse disciplines - i.e. fundamental applied science, advanced mathematics, statistical analysis, engineering science, business management, production management, strategic planning, optimisation methods, finance, economics, law, human relations- through interdisciplinary, practically oriented project work. There is a large contribution to the program from visiting professors and invited lecturers who are leading specialists in their respective fields. The research emphasis is on applied research in cooperation with the industry.

On the completion of the MSc program in addition to relevant undergraduate studies, the following criteria shall be fulfilled, in addition to the criteria fulfilled at former levels. For further information, i.e. learning outcomes for each course, see the Course Catalog.

KNOWLEDGE AND UNDERSTANDING

The program draws on science, engineering, social sciences and the humanities to create a knowledge-base that equips students to deal with a range of problems and challenges characterized by increasing interdisciplinary, international and cross-cultural working. The student must combine broad knowledge with a deep understanding of the core discipline of Engineering Management. A substantial part of the knowledge imparted to the student is transferable across many types of projects, organizations and teams.

On completion of the MSc program the student should possess the following systematic generalized understanding and knowledge:

- Knowledge and understanding of the basic principles and the more important theories relevant to the field of Engineering Management and their application.
- Knowledge and understanding of specific features of the subject of each specialized course taken, as seen in relation to the field of Engineering management.
- Integrated knowledge of the subject matter of all specialized courses taken and the application of that knowledge to the field of Engineering management.
- Advanced knowledge of recognized conventions and best practice in the planning, implementing, managing and analyzing of projects; also large

<p>and complicated projects.</p> <ul style="list-style-type: none"> • Advanced knowledge of a broad range of analytical and modelling methodologies and tools commonly used in engineering management and project management. • Advanced knowledge of the professional methods and recognized conventions that are relevant to optimisation, operation and problem-solving in the different stages of functions and projects. • Knowledge of how projects arise and the different stages in the life-cycle of a project, function and organisations. • Knowledge of managing and motivating people by disciplines of human resource management and negotiations skills. • Knowledge of corporate finance, asset management and book-keeping principles. • Knowledge of managing markets and understanding the principles of demand and surplus, value chains and supply management. • Knowledge of the main mythologies and tools used to gather, analyze and interpret data. • Understanding and knowledge of basic research and development principles and practices relevant to the industry. • Understanding of the role of the manager as an important professional in society and the duties, responsibilities, role and liabilities of experts such as engineers, designers and other stakeholders in companies and projects. • Knowledge of key professional, safety and ethical issues. • Knowledge of time-management and work planning issues related to the organization, implementation and successful completion and reporting of an individual Master's level research project. • Research methodology, including the fundamentals of scientific writing, literature search, how to give a scientific presentation, how to evaluate a scientific paper, and research ethics. •
<p>TYPE OF KNOWLEDGE</p>
<p>The program touches on many diverse disciplines with the aim of teaching the student to assimilate and integrate knowledge from many sources. Students can choose to focus on a variety of subjects, depending on their interests and undergraduate background.</p> <p>On completion of the MSc program, the student shall possess specific, advanced knowledge and understanding of the following topics and their context within the broad field of Engineering Management:</p> <ul style="list-style-type: none"> • Supply chain management & logistics; Production management; Cost management; Value management; Design management; Procurement methods; Project management; Scheduling; Strategic organization in projects; Risk analysis & management; Finance in projects; Contractual & tendering law; Facilities management; Process management; Organizational psychology; Human Resource Management; Decision analysis. Optimisation methods; Programming,. <p>On completion of the MSc program, the student shall possess the following significant, in-depth knowledge and understanding of the research leading to his or her MSc thesis:</p> <ul style="list-style-type: none"> • The theories introduced in the specialized courses and the application of these to analyzing and solving problems in the field of engineering management. • The background and theoretical base in the chosen research area. • State-of-the-art knowledge in the chosen research area. • The student will have established knowledge and be competent in applications of techniques developed within the chosen area of research.

PRACTICAL SKILLS

On completion of the MSc program the student should be able to:

- Understand the organisation and underlying features of company operation.
- Understand the functions of companies by applying methods of optimisation and simulation.
- Plan, manage and analyze projects, also large and complicated projects, using recognized conventions as well as current best-practice methods.
- Be able to carry out risk assessment by disciplines of risk management and decision analysis.
- Set the agenda for teamwork, work effectively in a team and provide leadership for a team of individuals in the practice of construction management.
- Plan the work in advance, estimate required resources and comply with deadlines.
- Adapt quickly to new problems and challenges arising in the context of management.
- Choose and use appropriate software in the planning, managing and analysis of functions, project and organisations.
- Propose, plan, structure and manage well defined research projects involving a team of individuals. Prioritise, organise and schedule work activities effectively.
- Undertake research and the development of new methods within the broad field of construction management, recognising their roles in the innovation process.
- Interpret and critically assess existing theories, models, methods and results, both qualitatively and quantitatively, within the field of engineering management..
- Recognize and appreciate problems in relation to management and be able to synthesise, and propose evaluation methods or develop alternative solution strategies.
- Work with technical uncertainty.
- Appreciate the meaning and importance of professionalism, including integrity and adherence to independent, informed judgement.

THEORETICAL SKILLS

The student is exposed to established theory in all subjects and is required to question and apply that in his studies. Effort is concentrated on developing the student's critical faculties for thinking strategically and for interpreting and applying understanding to real world problems and contexts. The program develops intellectual capacity with which to engage in philosophical discussion with peers, tutors and industry managers. Independent learning and thought is encouraged and the student is required to apply himself in an environment that is multidisciplinary and ever-changing. A research approach is needed in most assignments, necessitating independent enquiry and adherence to ethical work practices.

On completion of the MSc program, the student should have sufficient, comprehensive understanding to be able to:

- Assimilate and integrate their knowledge, make assessments and utilize their knowledge and understanding in solving relevant, practical problems in the field of management engineering.
- Identify, adapt and develop models appropriate to the study of a wide range of different systems, processes and products involving engineering management.

COMMUNICATION SKILLS AND INFORMATION LITERACY

On completion of the MSc program, the student should be able to:

- Work as a part of an inter-disciplinary planning, design or research team.
- Communicate effectively and professionally and formulate sound arguments, both in writing and by means of presentations, using appropriate technical language.
- Find information that is relevant to research using search engines, on line libraries and repositories. Effectively utilize modern information resources and technologies.
- Analyze and communicate statistical data.
- Select and apply appropriate methods and ICT-based tools to create and maintain knowledge bases to support a range of applications relating to business ventures, developing best practice through learning from experience.
- Plan, conduct and write up case studies.
- Report on one's own work, and that of others, both to a specialist and a general audience.
- Work with and recognize the importance of a range of different stakeholders and interests, being able to report on a progress from both a client and contractor perspective.
- Report on a research project and execute a research report.
- Discuss ethical issues in research work with their peers in an informed and reasoned fashion and apply an ethical approach to all work.
- Understand the use of technical literature and other information sources.

LEARNING SKILLS

On completion of the MSc program, the student should be able to:

- Use professional judgement in the planning, implementation, management and analysis of projects and functions.
- Solve non-trivial problems independently using the acquired skills or knowledge.
- Ask new questions based on available information and knowledge and use known facts to create new ones.
- Make creative use of known information, methods, concepts and theories in new situations.
- Generalize from a collection of specific instances. Infer possible causes from the available data, discovering patterns in the available information.
- Interpret facts by comparing them and contrasting them with one another, drawing conclusions and predicting possible outcomes.
- Make choices based on reasoned arguments, and evaluate the outcomes of those choices by comparing them with alternative solutions.
- Know how to assess one's own work against accepted standards of performance. Appreciate the factors that evaluators look for when considering proposals, including proposals for research work.
- Understand the need for, and the basis of, peer-group assessment. Understand how performance in a research project is judged and the basis of the criteria for judgement.
- Recognise and apply different approaches to learning.
- Appreciate the importance of continuing education and lifelong learning and undertake the study required to maintain and expand professional competence and keep up with evolving technology.
- Continue studies within this field towards an advanced degree i.e. at PhD level, having developed the necessary personal autonomy and knowledge to do so.