Aarhus University
School of Business and Social Sciences
AU Herning

Academic regulations for the Master of Science in Engineering (Technology Based Business Development)

September 2014

Table of contents

1. The outline provisions of the programme

1.1. Name of degree programme

The Master's programme entitles graduates to the title:

- In Danish: *Cand.polyt. i teknologibaseret forretningsudvikling*
- In English: *Master of Science in Engineering (Technology Based Business Development)*
- In Latin: *Candidatus/Candidata Polytechnics*

1.2. Department and faculty affiliation

The Master's programme is offered by AU Herning, School of Business and Social Science, Aarhus University.

1.3. Board of Studies affiliation

The Master's programme is affiliated to the Board of Studies, Aarhus School of Engineering at Aarhus University.

1.4. The academic direction and primary subject areas of the programme

The objective of the Master's programme in Technology Based Business Development is to produce graduates who contribute to the creation of new innovative production and product concepts, business concepts and business areas. Thus, the programme develops knowledge, competencies and skills primarily within the engineering area, focusing on technical design and technology development and subsequently a business development area supported by the aforementioned engineering area.

1.5. Academic skills and qualifications

The MSc in Engineering (Technology Based Business Development) programme is an interdisciplinary, research-based, individually specialised programme with common course elements which facilitates advanced studies building on a qualifying Bachelor's degree programme. There is a substantial focus on the creation of cross-disciplinary competencies within engineering, technology and business as well as a focus on meta-competencies within development of systematic translation from engineering to application of technologies within business environments. In addition, the programme facilitates business development on the basis of leading scientific theory and method.

More specifically, the graduate will achieve the following knowledge, skills and competencies:

Knowledge

- Can seek out, understand, assess and attract new knowledge, new relevant technologies and appropriate business opportunities for the company through external knowledge networks and knowledge sources.
- Can assess the applicability and expediency of theoretical, experimental and practical methods for analysing and solving technical questions and issues.
- Has obtained methodological and domain-specific insight into engineering management with the chosen specialisation corresponding to the highest level of international research.
- Can understand and, on a scientific basis, reflect on the technical, organisational and market drivers in the convergence of technology as well as the interplay between technology, market and user issues.

Skills

- Can independently plan, manage and execute projects and apply the results of these in a technology-related decision-making process.
- Can assess and compare different technologies for optimal technology selection, strategic decisions and business development.
- Can be a part of a constructive cooperation on a solution to professional issues with a scientific engineering background.
- Can implement this insight into engineering in the company, thereby creating new product features and business areas, including development and adjustment of the technology. This is achieved by creating a creative, physical and organisational learning environment which promotes specialists' and employees' inclination to acquaint themselves with new technologies and business areas.
- Can identify the necessary engineering and professional employee competencies present among the technological and mercantile staff, and is able to create the competencies mentioned above through sufficient and adequate staff development.

Competencies

- Can excel in scientific methods, tools and general skills within technology-based business development.
- Is able to acquaint oneself with new subject areas in a systematic and critical way.
- Can independently and critically structure own competence development.
- Is able to manage work and development situations that are complex, unpredictable and require new solutions.
- Can independently initiate and implement discipline-specific and interdisciplinary cooperation and assume professional responsibility.

- Can convey and communicate technical questions and issues in both a scientific and general forum.

Upon successful completion of the Master's programme, graduates are expected to be employed in companies as business developers, project managers in research development (R&D) or product managers in (technical) sales, sourcing and marketing. Graduates can furthermore act in consultant roles, in governmental planning roles and within roles of distribution of professional knowledge.

1.6. Standard length (ECTS credits)

The prescribed duration of the Master of Science in Engineering (Technology Based Business Development) programme corresponds to 120 ECTS.

1.7. Authority

The academic regulations for the Master of Science in Engineering (Technology Based Business Development) programme are prepared in accordance with the Ministerial Order No. 1520 of 16 December 2013 on Bachelor's and Master's Degree Programmes at Universities.

Additional rules relating to degree programmes can be found in Aarhus University's online rules and regulations.

1.8. Admission requirements and prerequisites

In accordance with the Ministerial Order No. 1488 of 16 December 2013 on Admission to and Enrolment on Master's programmes at universities, the following undergraduate programmes qualify for admission:

- A Bachelor of Science in Engineering with a specialisation in mechanical, chemical, electrical, electronic, construction, bioprocess, health technology or neuroscience engineering.
- A Bachelor of Engineering with a specialisation in mechanics, production or exports, including the Global Management and Manufacturing (GMM) study programme at AU Herning.
- The first three years of the Business Development Engineer (BDE) study programme at AU Herning (corresponding to 180 ECTS).
- A Bachelor of Science in Chemistry, Physics, Geology, Geography, Bioscience, Nuclear, Biology and similar.
- A Bachelor of Engineering in Global Business Engineering or a Bachelor of Value Chain Management from VIA University College in Horsens, Denmark.

- A Bachelor in Materials Science and Product Design from VIA University College, TEKO Design + Business in Herning, Denmark.
- Other similar programmes, provided that the Board of Studies assesses that their level, extent and content correspond to the degrees mentioned above.

The undergraduate programme must contain an element of innovation and business development corresponding to at least 15 ECTS credits. These ECTS credits are typically obtained by means of a final project containing significant elements of innovation and business development or by means of minor subjects.

Seeing that the programme is offered in English, the applicants are subject to a requirement to document English language proficiency at level B, e.g. by means of internationally recognised tests, cf. the Ministerial Order No. 1488, section 7 on Admission to and Enrolment on Master's Degree Programmes at Universities.

1.9. Other regulations

Moreover, the regulations which appear from the general provisions of the academic regulations concerning exemptions, credit, student counselling, etc. apply to the study programme, cf. the above-mentioned ministerial order.

2. The structure of the programme

2.1. Overall structure of the four semesters

The structure, content and progression of the programme are displayed below:

Semester	Course	ECTS	Marking	Examiner	Type of examination
1st	Management of Technology	10	7-step scale	Internal	Scientific paper + oral examination
	Organisational Design and Human Resource Analytics	5	7-step scale	Internal	Written examination
	Research Design in Engineering	5	7-step scale	Internal	Oral examination
	Technology Specialisation 1	10	7-step scale	External	Report + oral examination
2nd	Technological Business Model Innovation	10	7-step scale	Internal	Artefact + oral examination
	Optimisation of Engineering Processes Using Numerical Approaches	10	7-step scale	Internal	Written examination
	Technology Specialisation 2	10	7-step scale	External	Report + oral examination
3rd	Electives	30			
4th	Master's Thesis	30	7-step scale	External	Report + oral examination

The instruction takes place at the AU Herning Campus in Herning. The language of instruction is English, all course materials are in English, all assignments must be completed in English, and examinations are held in English.

The compulsory courses in the first and second semester constitute the main content of the study programme. Please consult the individual course descriptions in AU's course catalogue for specific information about the course content and the learning objectives.

'Technology Specialisation 1' and 'Technology Specialisation 2' as well as the elective course 'Multi-Technology Specialisation' (5 or 10 ECTS credits) in the third semester provide the student with an opportunity for an individual technology specialisation.

2.2. Third semester electives

In the third semester, the student will choose electives within the field of technology-based business development. In addition to the electives described in the course catalogue (see the total list of MSc

in Engineering electives in the AU study guide), the student may also choose courses at other Danish or foreign universities provided that the courses are approved by the Board of Studies. The student may choose from Aarhus University's partner universities or s/he may find a university on his/her own. The options can be combined upon approval from the Board of Studies.

A maximum of 10 ECTS credits can be obtained within traditional areas of social science, predominantly business administration.

As part of the elective block, the student can choose to write one or two company projects (5 or 10 ECTS credits) to apply the theory learned during the first two semesters into practice. The projects should mainly focus on the company's ability to adapt to new technologies and business opportunities by initiating organisational change and development, leading to innovative technological products and product concepts, manufacturing processes and business opportunities.

2.3. Commencement of studies in February

The study programme offers admission twice a year (in September and February). Students enrolled in February follow the courses offered to the students of the previous September enrolment (see the study overview below):

Semester	Course	ECTS	Marking	Examiner	Type of examination
1st	Technological Business Model Innovation	10	7-step scale	Internal	Artefact + oral examination
	Optimisation of Engineering Processes Using Numerical Approaches	10	7-step scale	Internal	Written examination
	Technology Specialisation 1	10	7-step scale	External	Report + oral examination
2nd	Management of Technology	10	7-step scale	Internal	Scientific paper + oral examination
	Research Design in Engineering	5	7-step scale	Internal	Oral examination
	Organisational Design and Human Resource Analytics	5	7-step scale	Internal	Written examination
	Technology Specialisation 2	10	7-step scale	External	Report + oral examination
3rd	Electives	30			
4th	Master's Thesis	30	7-step scale	External	Report + oral examination

Relevant, additional activities in methodology will be offered to February students to make sure they meet the academic requirements.

2.4. Company collaboration

The study programme strongly emphasises the interaction with practice and supports projects completed in collaboration with companies and organisations. Likewise are the courses generally oriented towards learning from empirical cases and real-life cases in exercises as well as assignments. The students are invited to actively identify relevant companies and assignments for the technology specialisation courses and the Master's Thesis.

The third semester can provide the basis of a more profound company collaboration using the company project courses, the multi-technology specialisation courses as well as courses with a distinctive project element to interact with a company under academic supervision.

Potential company collaboration in the third semester is headed by the Programme Coordinator. The student may choose between the companies offered by the study programme, or the student may find a company on his/her own upon agreement with the Programme Coordinator. The Programme Coordinator (or an academic representative) participates in the dialogue with the company, and a contract describing the content of the company-related project(s) in the third semester is prepared. The contract must be approved by the Programme Coordinator, thereby ensuring academic depth, direction and progression.

3. The programme's individual courses and examinations

The courses offered at AU Herning are described in Aarhus University's online course catalogue. The course descriptions include course contents, criteria for achieving objectives, type of examination, etc. The catalogue is updated twice a year (in April and September).

4. Other rules and regulations

4.1. Credits and flexibility

The Board of Studies may approve elements from other programmes or contexts. Credit for the Master's Thesis which entitles the graduate to a degree in a specific Master's degree programme cannot be transferred to a different Master's degree programme, see section 34, item 2 of the Ministerial Order No. 814 of 29 June 2010 on Bachelor's and Master's Degree Programmes at the Universities (the Degree Programme Order).

4.2. Examinations

The assessment and examination methods are in accordance with the Ministerial Order no. 1518 of 16 December 2013 on University Examinations and Grading (the Examination Order) and the Ministerial Order no. 250 of 15 March 2007 on the Grading Scale and Other Forms of Assessment of University Education. The individual courses and their type of examination appear from the course descriptions in Aarhus University's course catalogue.

To participate in the reexamination, at least one examination attempt must have been spent at the ordinary examination. The student must pass courses separately with a mark of at least 02 or achieve the assessment "passed". One mark is allocated for each examination unit.

The ordinary examinations are held in December/January as regards courses taught in the autumn semester with reexaminations held in February, while the ordinary examinations are held in May/June as regards courses taught in the spring semester with reexamination held in August. The reexamination may take a different form or be assessed differently than the ordinary examination (this, however, does not apply to the Master's Thesis), see section 18, item 4, see section 4, item 1 and section 6 of the Examination Order. Should this be the case, it must be announced no later than 10 August/10 February, and no later than 10 days prior to the examination.

Each course is concluded by one of the following forms of examination:

1. Written examination
2. Oral examination
3. Home assignment(s) (written examination)
4. Multiple choice (written examination)
5. Approval of compulsory assignments and/or reports followed by a discussion, if applicable.
6. Active participation in the course followed by a discussion, if applicable, e.g. attendance at a minimum of 80% of compulsory lessons, seminar contributions, submission (and approval) of compulsory assignments etc.
7. Skills test (practical test)

8. Laboratory activities with proper written documentation
9. Other forms of examination approved by the Board of Studies
10. Combinations of 1-9

Examiners can be internal or external. Internal examiners are members of the AU Herning faculty or AU faculty in general – not necessarily lecturers in the specific course. External examiners are members of the Institutions of Higher Education in Engineering's nationwide External Examiner Corps (In Danish: *CensorNet*). Examiners can be either within the study programme's subgroup of examiners ("Management of innovation") or technologically specialised examiners. The Programme Coordinator and the supervisor or teachers must interact with the Chairmanship of the External Examiner Corps for appropriate selection of external examiners given the actual character of the examination in question.

4.3. Written performance

In all major written assignments, the student's spelling and writing skills form part of the assessment. Most important is the academic content, but spelling and writing skills affect the assessment of whether the student meets the overall aims.

4.4. Maximum duration

The duration of the study programme is two years (24 months). The study programme follows the general rules of minimum acceptable activity, leaves of absence and maximum duration as laid out in the university regulations and by law as well as in ministerial orders.

4.5. Exemptions

An exemption is a deviation from the regulations that normally apply for the area in question. The Board of Studies may in cases with special circumstances grant exemptions from the academic regulations (cf. Ministerial Order No. 1520, section 30, item 6).

An application for exemption must be submitted to the Board of Studies. If another authority has the power to grant an exemption, the Board of Studies forwards the application to the appropriate authority (e.g. the Dean, Rector or Ministry).

An application for exemption must be made in writing; it must be substantiated and submitted as soon as possible. For the application to be immediately processed, it must include a precise account of the regulations from which exemption is sought and the objective of such an exemption (e.g. permission to use special aids, extension of examination time and postponement of time limits). Documentation for the unusual circumstances that justify exemption must be enclosed with the application. Normally, undocumented circumstances are not taken into consideration.

4.6. Appeals and complaints

Complaints must be submitted to the Board of Studies. It is a prerequisite for immediate processing that the complaint is made in writing and that it is substantiated.

Complaints regarding examinations must be submitted no later than 14 days after publication of the examination result, cf. the Ministerial Order No. 1518 of 16 December 2013 on University Examinations and Grading (the Examination Order).

5. Changes

The present academic regulations are valid for students commencing the study programme on 1 September 2014. The academic regulations replace the prior academic regulations of 1 September 2012.

Students who have not completed their study programme by 31 August 2016 may be transferred to the 2014 regulations on the basis of an individual evaluation.