AALBORG UNIVERSITET

CURRICULUM FOR THE MASTER'S PROGRAMME IN SUSTAINABLE CITIES, 2019, COPENHAGEN

MASTER OF SCIENCE (MSC) IN ENGINEERING
COPENHAGEN

Link to this studyline

Link(s) to other versions of the same line:

Curriculum for the Master's Programme in Sustainable Cities - 2017 - Copenhagen

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§ 1: PREFACE

Pursuant to consolidation Act 172 of February 27, 2018 on Universities (the University Act), the following is established. The programme also follows the Joint Programme Regulations and the Examination Policies and Procedures for The Faculty.

§ 2: BASIS IN MINISTERIAL ORDERS

The Master's programme is organised in accordance with the Ministry of Higher Education and Science's Ministerial Order no. 1328 of November 15, 2016 on Bachelor's and Master's Programmes at Universities (the Ministerial Order of the Study Programmes) and Ministerial Order no. 1062 of June 30, 2016 on University Examinations (the Examination Order) with subsequent changes. Further reference is made to Ministerial Order no. 106 of February 12, 2018 (the Admission Order) and Ministerial Order no. 114 of February 3, 2015 (the Grading Scale Order) with subsequent changes.

§ 3: CAMPUS

The programme is offered in Copenhagen.

§ 4: FACULTY AFFILIATION

The Master's programme falls under The Technical Faculty of IT and Design, Aalborg University.

§ 5: STUDY BOARD AFFILIATION

The Master's programme falls under Study Board of Planning and Surveying

§ 6: AFFILIATION TO CORPS OF EXTERNAL EXAMINERS

The Master's programme is associated with the external examiners corps on Nationwide engineering examiners/Building

§ 7: ADMISSION REQUIREMENTS

Applicants with a legal right of admission (retskrav)

- Bachelor of Science (BSc) in Urban, Energy and Environmental Planning, Aalborg University

Applicants without legal right of admission

- Bachelor of Science (BSc) in Engineering (Surveying, Planning and Land Management), Aalborg University
- Bachelor of Science (BSc) in Geography, Aalborg University

§ 8: THE PROGRAMME TITLE IN DANISH AND ENGLISH

The Master's programme entitles the graduate to the Danish designation Civilingeniør, cand.polyt. i bæredygtig byudvikling. The English designation is: Master of Science (MSc) in Engineering (Sustainable Cities).

§ 9: PROGRAMME SPECIFICATIONS IN ECTS CREDITS

The Master's programme is a 2-year, research-based, full-time study programme. The programme is set to 120 ECTS credits.

§ 10: RULES CONCERNING CREDIT TRANSFER (MERIT), INCLUDING THE POSSIBILITY FOR CHOICE OF MODULES THAT ARE PART OF ANOTHER PROGRAMME AT A UNIVERSITY IN DENMARK OR ABROAD

The Study Board can approve successfully completed (passed) programme elements from other Master's programmes in lieu of programme elements in this programme (credit transfer). The Study Board can also approve successfully completed (passed) programme elements from another Danish programme or a programme outside of Denmark at the same level in lieu of programme elements within this curriculum. Decisions on credit transfer are made by the Study Board based on an academic assessment. See the Joint Programme Regulations for the rules on credit transfer.

§ 11: EXEMPTIONS

In exceptional circumstances, the Study Board study can grant exemption from those parts of the curriculum that are not stipulated by law or ministerial order. Exemption regarding an examination applies to the immediate examination.

§ 12: RULES FOR EXAMINATIONS

The rules for examinations are stated in the Examination Policies and Procedures - published at this website: https://www.studieservice.aau.dk/Studielegalitet/

§ 13: RULES CONCERNING WRITTEN WORK, INCLUDING THE MASTER'S THESIS

In the assessment of all written work, regardless of the language it is written in, weight is also given to the student's formulation and spelling ability, in addition to the academic content. Orthographic and grammatical correctness as well as stylistic proficiency are taken as a basis for the evaluation of language performance. Language performance must always be included as an independent dimension of the total evaluation. However, no examination can be assessed as 'Pass' on the basis of good language performance alone; similarly, an examination normally cannot be assessed as 'Fail' on the basis of poor language performance alone.

The Study Board can grant exemption from this in special cases (e.g., dyslexia or a native language other than Danish).

The Master's Thesis must include an English summary (or another foreign language: French, Spanish or German upon approval by the Study Board). If the project is written in English, the summary must be in Danish (The Study Board can grant exemption from this). The summary must be at least 1 page and not more than 2 pages (this is not included in any fixed minimum and maximum number of pages per student). The summary is included in the evaluation of the project as a whole.

§ 14: REQUIREMENTS REGARDING THE READING OF TEXTS IN A FOREIGN LANGUAGE

It is assumed that the student can read academic texts in his or her native language as well as in English and use reference works etc. in other European languages.

§ 15: COMPETENCE PROFILE ON THE DIPLOMA

The following competence profile will appear on the diploma:

A Candidatus graduate has the following competency profile:

A Candidatus graduate has competencies that have been acquired via a course of study that has taken place in a research environment.

A Candidatus graduate is qualified for employment on the labour market based on his or her academic discipline as well as for further research (PhD programmes). A Candidatus graduate has, compared to a Bachelor, developed his or her academic knowledge and independence so as to be able to apply scientific theory and method on an independent basis within both an academic and a professional context.

§ 16: COMPETENCE PROFILE OF THE PROGRAMME

The curriculum for the Master's programme in Engineering in Sustainable Cities takes point of departure from the possibilities and barriers cities and regions have globally to create sustainable futures and to address the United Nations Sustainable Development Goals (SDGs). The curriculum focuses on the environmental sustainability of the three Sustainable Development pillars and focuses mainly on cities in developed countries. The curriculum focuses on elements from the following 7 goals out of the 17 SDGs: Clean water and sanitation, Affordable and clean energy, Decent work and economic growth, Industry, innovation and infrastructure, Sustainable cities and communities, Responsible consumption and production, and Climate action.

The graduate of the Master's programme

Knowledge

- Has knowledge, based on the latest international research, on four key areas of sustainable cities that cover assessment, implementation and governance
- Has knowledge of concepts of sustainability and sustainable development in cities: Sustainable Development and the United Nations Sustainable Development goals:
    - Challenges and problems with resources, climate change, pollution, health impacts, population and biodiversity caused by or in the city/urban area

    - Infrastructure and technology alternatives within resources, energy, mobility and water/climate change that address environmental sustainability
    - Has knowledge of the design and development of sustainable cities
    - Framework conditions (local, regional, international)
    - Roles of actors and society and interplay between them
    - Power, politics and policies, implementation and public regulation
    - Economic, social and environmental impacts
- Has knowledge of the organisational structures of sustainable cities and barriers in relation to sustainable urban transitions
- Economic aspects at the national, regional, city and project level including socio-economy and business models
- Urban planning processes and activities
- Has knowledge of the relevant research methods, theories of science relevant to the analysis of sustainable urban and infrastructural system development, and research ethics

Skills

- Use selected theories, methods and tools to develop proposals for relevant sustainable alternatives for resource consumption, energy, mobility, water/climate change and synergies between these
- Critically reflect on theory, assessment methods and tools, and the results and conclusions of analysis in the given fields
- Can combine and use relevant theories, understandings, methods and analyses in such a way that these form a synthesis aimed at the formulation of concrete strategies and plans with sustainable solutions
- Can understand and reflect on the relation between institutions, organisations and other actors; their dynamics and their interaction
- Can reflect critically on the relations between growth, innovation and sustainable development
- Can analyse and understand the handling of problems related to sustainable urban development at a societal level, including the integration of policies, instruments and institutional aspects seen in relation to the way in which society handles problems of sustainability

Competencies

- Can independently work to fulfil the United Nation’s Sustainable Development Goals by:
- Independently preparing, structuring and evaluating strategies, plans and projects
- Independently collecting data in relation to relevant societal problems and assessing the quality and reliability of this data
- Assessing the sustainability impacts of different sustainable alternatives
- Can reflect critically on the selection of theories, methods, tools and approaches and critically assess results and conclusions of the problem-based project work
- Can address the complex combination of challenges related to sustainable urban development at the organisational, institutional and societal level in their study and problem-based project work
- Can independently assess technical, economic, social and environmental impacts in relation to sustainable urban development
- Can participate in interdisciplinary cooperation in relation to economic, social and environmental assessment
- Can construct relevant, alternative solutions and make a justified selection from these based on scientific theory and methods
- Can initiate and participate in interdisciplinary teams within the field of sustainable cities, working with the implementation of strategies, plans and projects in Danish or international contexts
- Can understand the complex processes taking place in connection with the design and implementation of strategies, plans and projects in which both public and private interests are evident
- Can use the acquired knowledge to create and initiate open and democratic decision processes in planning through public participation in the development, design and implementation of strategies, plans and projects
- Can independently assume responsibility for his/her own professional development and specialisation
- Can independently develop his/her competences and specialisation on a continuous basis through the acquisition of new knowledge

§ 17: STRUCTURE AND CONTENTS OF THE PROGRAMME

The programme is modular and organised as a problem-based study. A module is a discipline or a group of disciplines, which has the objective of giving the student a series of professional qualifications within a specified time frame,

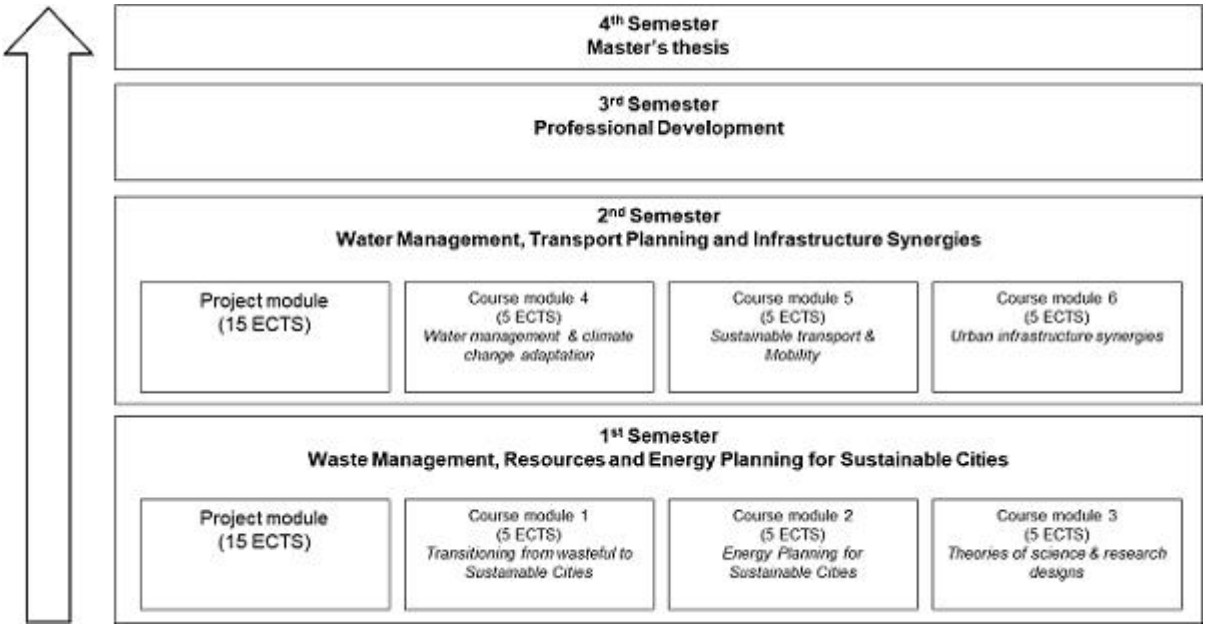
indicated in ECTS credits and completed with one or more examinations within certain examination periods. The examinations are described and delimited in the curriculum.

The programme builds on a combination of professional, problem-oriented and interdisciplinary approaches and is organised on the basis of the following work and evaluation forms combining skills and professional reflection:

- lectures
- class teaching
- project work
- workshops
- assignment work (individually and in groups)
- teacher feedback
- professional reflection
- portfolio work
- pin-up presentations, etc.

§ 18: OVERVIEW OF THE PROGRAMME

The figure below presents an overview of the contents and course of the programme:



The programme's first two semesters are focused on the four infrastructure sectors, theories of science and research design as well as infrastructure synergies. Within each of the infrastructure courses tools, theories and methods are introduced that may also be relevant to apply for other sectors or across sectors. Cross-disciplinary courses address the cross-sectoral concerns. The courses for each infrastructure sector use a stepwise approach:

1. Mapping the sector (e.g. CO_2 amounts, water amounts)
2. Sustainable engineering solutions (e.g. waste water basins, biking, district heating)
3. Implementation and planning i.e.
    - Mapping the market
    - Policy change and/or economic assessmentOpportunities / challenges (e.g. new jobs, risks, health)
4. Opportunities / challenges (e.g. new jobs, risks, health)

The first semester themes are waste, resources and energy planning and students are encouraged to focus the project module on these sectors. In the second semester, transport/mobility as well as water management and climate change adaptation are the focus. Students are encouraged to focus the project module on these two sectors, but are required to

also include at least one other sector to identify potential conflicts and synergies within challenges and solutions. This is supported by the urban infrastructure synergies course.

The focus of the third and fourth semester is to further develop and enhance the skills acquired in semester one and two. The focus throughout the program is environmental sustainable development and 7 of the 17 United Nations Sustainable Development Goals (SDGs).

In general, these are related in the following way to the courses:

- *Transitioning from Wasteful to Sustainable Cities*
  - SDG: Responsible consumption and production; Decent work and economic growth
- *Energy Planning for Sustainable Cities*
  - SDG: Affordable and clean energy
- *Water Management and Climate Change Adaptation*
  - SDG equivalent: Clean water and sanitation; Climate action
- *Sustainable Transport and Mobility*
  - SDG equivalent: Sustainable cities and communities
- *Urban Infrastructure Synergies*
  - SDG equivalent: Industry, innovation and infrastructure; Sustainable cities and communities

The table below presents an overview of project modules and course modules of the four semesters of the Master's programme:

Offered as: 1-professional					
Module name	Course type	ECTS	Applied grading scale	Evaluation method	Assessment method
1 SEMESTER					
Waste Management, Resources and Energy Planning in Sustainable Cities	Project	15	7-point grading scale	Internal examination	Oral exam based on a project
Theories of Science and Research Designs	Course	5	7-point grading scale	Internal examination	Written or oral exam
Transitioning from Wasteful to Sustainable Cities	Course	5	7-point grading scale	Internal examination	Written or oral exam
Energy Planning for Sustainable Cities	Course	5	7-point grading scale	Internal examination	Written or oral exam
2 SEMESTER					
Water Management, Transport Planning and Infrastructure Synergies	Project	15	7-point grading scale	External examination	Oral exam based on a project
Water Management and Climate Change Adaptation	Course	5	7-point grading scale	Internal examination	Written or oral exam
Sustainable Transport and Mobility	Course	5	7-point grading scale	Internal examination	Written or oral exam
Urban Infrastructure Synergies	Course	5	7-point grading scale	Internal examination	Written or oral exam
3 SEMESTER Option 1					
Professional Development	Project	30	7-point grading scale	Internal examination	Oral exam based on a project
3-4 SEMESTER Option 3					
Master's Thesis	Project	60	7-point grading scale	External examination	Oral exam based on a project
4 SEMESTER					

Master's Thesis	Project	30	7-point grading scale	External examination	Oral exam based on a project

Option 2 - International or National Credit

By prior approval of the Study Board, the 3rd Semester may be transferred to another educational institution in Denmark or abroad. Prior approval (pre-credit) may be expected if the studies at another educational institution can give the student knowledge, skills and competences corresponding to the extent and knowledge, skills and competences that could otherwise be acquired by following the "Project Semester – with or without Integrated Internship", see above.

§ 19: ADDITIONAL INFORMATION

The current version of the curriculum is published on the Board of Studies' website, including more detailed information about the programme, including exams.

All students who have not participated in Aalborg University's PBL introductory course during their Bachelor's degree must attend the introductory course "Problem-based Learning and Project Management". The introductory course must be approved before the student can participate in the project exam. For further information, please see Department of Planning's website.

§ 20: COMMENCEMENT AND TRANSITIONAL RULES

The curriculum is approved by the dean of the Techincal Faculty for IT and Design and enters into force as of 01.09.2019.

Students, who wish to complete their studies under the previous curriculum from 2017, must conclude their education by the summer examination period 2020 at the latest, since examinations under the previous curriculum are not offered after this time.

§ 21: AMENDMENTS TO THE CURRICULUM AND REGULATIONS