Curriculum for the Master’s Programme in Engineering in Sustainable Cities

Aalborg University

September 2017
Preface

Pursuant to Act 261 of March 18, 2015 on Universities (the University Act) with subsequent changes, the following curriculum for the Master's programme in Sustainable Cities is stipulated. The programme also follows the Joint Programme Regulations and the Examination Policies and Procedures for The Technical Faculty of IT and Design, The Faculty of Engineering and Science, and The Faculty of Medicine.

The Master’s Programme in Sustainable Cities is a 2-year programme (1\textsuperscript{st} - 4\textsuperscript{th} Semester) which builds on a relevant bachelor’s programme of 3 years. The programme is performed with a special view to the theoretical and methodical handling of complex and new engineering problems. In the last Semester of the programme, a master’s thesis is prepared.

This curriculum takes effect as of September 1, 2017.
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Chapter 1: Legal Basis of the Curriculum, etc.

1.1 Basis in Ministerial Orders
The Master’s programme in Sustainable Cities is organised in accordance with the Ministry of Higher Education and Science’s Order no. 1061 of June 30, 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). Further reference is made to Ministerial Order no. 258 of March 18, 2015 (the Admission Order) and Ministerial Order no. 114 of February 3, 2015 (the Grading Scale Order) with subsequent changes.

1.2 Faculty Affiliation
The Master’s Programme falls under Technical Faculty of IT and Design, Aalborg University.

1.3 Study Board Affiliation
The Master’s Programme falls under the Study Board of Planning, Geography and Surveying, that falls under the School of Architecture, Design and Planning.

1.4 Censorship
The Master’s program falls under the Danish “censorkorps for Ing/bygning”.

Chapter 2: Admission, Degree Designation, Duration and Competence Profile

2.1 Admission
Applicants with a legal claim to admission (retnskrav):
- Bachelor of Science in Urban, Energy and Environmental Planning, AAU

Applicants without legal claim to admission:
Students with another Bachelor’s degree may, upon application to the Board of Studies, be admitted after a specific academic assessment if the applicant is deemed to have comparable educational prerequisites. The University can stipulate requirements concerning conducting additional exams prior to the start of study.

2.2 Degree Designation
The Master’s Programme entitles the graduate to the designation Master of Science (MSc) in Engineering (Sustainable Cities). The Danish designation is: Civilingeniør, cand.polyt. (kandidatus/candidata polyclentes) i Bæredygtig Byudvikling.

2.3 Specification in ECTS Credits
The Master’s program is a 2-year, research-based, full-time study program. The program is set to 120 ECTS credits.

2.4 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 on the basis of 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.

2.5 Competence Profile of the Programme

A student who has completed the programme:

Knowledge

- Has knowledge within one or more fields of sustainable urban development, which in selected areas, is based on the highest national and international research in this field
- Has basic knowledge of the implications of research ethics
- Has thorough knowledge of relevant national and international research work
- Has thorough knowledge of theories and methods in planning, administration and/or management within the public and private sectors
- Possesses specialist understanding in continuation of the previous degree/or a broad perspective within the field of the previous degree/or a new professional competence in addition to the previous degree
- Possesses insight into and understanding of the national and international social conditions and challenges under which strategies, plans and projects within sustainable urban development are implemented.

Skills

- Can handle the methods and tools of sustainable urban development as well as general skills connected with occupation within the field
- Can assess and choose among the theories, methods, tools and general skills in sustainable urban development and, on a scientific basis, draw up new models of analysis and solution
- Can analyse the complex technical, environmental, social and economic contexts of which the strategies and plans for a sustainable urban development form part
- Can analyse and prepare strategies, plans and projects at different levels
- Can assess the impacts of strategies, plans and projects and estimate if these are expedient and feasible in technical, economic, environmental, business and social respects
- Can involve the public and relevant actors at all levels
- Can reflect on ethical matters in connection with professional practice
- Can independently make and substantiate professionally related decisions and, when necessary, carry out investigations procuring a sufficient basis of decision
- Can perform development work on a scientific basis
- Can communicate research-based knowledge within the field of sustainable cities and discuss professional and scientific problems with both peers and non-specialists.
Competences

- Can be part of public organisations as well as private firms or NGOs
- Can understand and on a scientific basis reflect on the knowledge and problems of the field of sustainable cities and, in this relation, identify important social problems
- Can independently assess the expediency of different theories and methods of analysis and professional problem solution
- Can formulate and analyse essential problems independently, systematically and critically by using relevant scientific methods
- Can construct relevant, alternative solutions and make a selection from these
- Can initiate and form part of interdisciplinary teams within the field of sustainable cities, working with the lay-out and implementation of strategies, plans and projects in Danish or international contexts
- Has a basic understanding of the technical, environmental, social, and economic conditions connected with the development and design of cities
- Can independently prepare, structure and evaluate strategies, plans and projects
- Can develop proposals for instruments to secure the implementation of strategies, plans and projects
- Has insight into and understanding of planning and social theory as well as the structure and function of organisations and planning and management systems
- 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 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 in evidence
- Can participate in the research within the field of sustainable cities and thus contribute to the development of the field
- Can independently develop his/her competences and specialisation.
Chapter 3: Contents and Organisation 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.

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

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Modules</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Semester</td>
<td>The Role of Organisations and Business in Developing Sustainable Cities</td>
</tr>
<tr>
<td></td>
<td>Project module 1 (15 ECTS)</td>
</tr>
<tr>
<td></td>
<td>Course module 1 (5 ECTS)</td>
</tr>
<tr>
<td></td>
<td>Theories of Science and Research</td>
</tr>
<tr>
<td>2nd Semester</td>
<td>Sustainable Cities from an Institutional and Societal Perspective</td>
</tr>
<tr>
<td></td>
<td>Project module (15 ECTS)</td>
</tr>
<tr>
<td></td>
<td>Course module 1 (5 ECTS) Policy, Planning and Governance</td>
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<tr>
<td></td>
<td>Course module 2 (5 ECTS) Systems and Structures of the City</td>
</tr>
<tr>
<td>3rd Semester</td>
<td>International or national credit, project work (with or without internship)</td>
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<tr>
<td></td>
<td>or extended final project</td>
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<tr>
<td>4th Semester</td>
<td>Master’s thesis in Sustainable Cities</td>
</tr>
</tbody>
</table>


The table below presents an overview of project modules and course modules of the four Semesters of the Master's Programme. The Master's Programme includes teaching in theories of science and research methods corresponding to a 5 ECTS course module. This course is taught during the first Semester of the programme.

All modules are graded individually according to the 7-point grading scale or pass/fail (P/F). All modules are assessed through an external examination (external examiner) or an internal examination (second internal examiner or no second examiner).

<table>
<thead>
<tr>
<th>Semester</th>
<th>Module</th>
<th>ECTS</th>
<th>Grading 7-point</th>
<th>Exam Internal/external</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The Role of Organisations and Business in Developing Sustainable Cities</td>
<td>15</td>
<td>7-point</td>
<td>I</td>
</tr>
<tr>
<td>1</td>
<td>Theories of Science and Research Designs</td>
<td>5</td>
<td>7-point</td>
<td>I</td>
</tr>
<tr>
<td>1</td>
<td>Challenges and Planning for Sustainable Cities</td>
<td>5</td>
<td>P/F</td>
<td>I</td>
</tr>
<tr>
<td>1</td>
<td>Tools and Approaches to Sustainable Development</td>
<td>5</td>
<td>P/F</td>
<td>I</td>
</tr>
<tr>
<td>2</td>
<td>Sustainable Cities from an Institutional and Societal Perspective</td>
<td>15</td>
<td>7-point</td>
<td>E</td>
</tr>
<tr>
<td>2</td>
<td>Policy, Planning and Governance</td>
<td>5</td>
<td>7-point</td>
<td>I</td>
</tr>
<tr>
<td>2</td>
<td>Systems and Structures of the City</td>
<td>5</td>
<td>7-point</td>
<td>I</td>
</tr>
<tr>
<td>2</td>
<td>Economic, Social and Environmental Impact Assessment</td>
<td>5</td>
<td>7-point</td>
<td>I</td>
</tr>
<tr>
<td>3</td>
<td>Option 1: Project Semester – with or without integrated internship</td>
<td>30</td>
<td>7-point</td>
<td>I</td>
</tr>
<tr>
<td></td>
<td>Option 2: International or National Credit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Option 3: Extended Final Project (Master's Thesis)</td>
<td>+30</td>
<td>7-point</td>
<td>E</td>
</tr>
<tr>
<td>4</td>
<td>Master's Thesis</td>
<td>30</td>
<td>7-point</td>
<td>E</td>
</tr>
<tr>
<td>SUM</td>
<td></td>
<td>120</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

During the 1st and 2nd Semesters, the student is, by prior application, allowed to construct a course of study which meets the objectives of the given Semester. The project work may here be replaced by other study activities (cf. the Joint Programme Regulations).

During the 3rd Semester, the student can choose freely from the following types of Semesters: 1) Project Semester – with or without integrated, project-oriented internship, or 2) International or national courses rewarding credit, or 3) Extended final project (60 ECTS Master’s thesis), (cf. the project module description of the 3rd Semester). In relation to option 1), the student who has completed the 1st and 2nd Semesters of Sustainable Cities may also choose to attend the 1st Semester of the Master’s Programme of Urban, Energy and Environmental Planning or MSc in Geography, or other programmes, upon the specific assessment of the Study Board.

The programme is in English.
3.2 Module Descriptions

1st Semester: Project module

Title: The Role of Organisations and Business in Developing Sustainable Cities (Organisationers og virksomheders rolle i bæredygtig byudvikling)

Objectives: A student who has completed the module:

Knowledge:
- Has thorough knowledge and understanding of the framework conditions, challenges and roles of organisations and businesses in relation to the development and design of sustainable cities, including the tools and systems which are relevant at the organisational level
- Is able to understand and, on a scientific basis, reflect on the development of sustainable cities at the organisational level, as well as to identify relevant problems in this context
- Has basic knowledge and understanding of the structure and operation of organisations
- Has knowledge of theories of science and research methods relevant to the analysis of the roles of organisations in sustainable urban development.

Skills:
- Can identify, analyse and assess relevant problems and impacts related to sustainability
- Can understand, apply and critically reflect on relevant quantitative as well as qualitative economic, social, environmental and/or technical methods of analysis and identify the interests connected to these
- Can independently collect relevant data in relation to the challenges and problems of the project, and assess the quality and reliability of this data
- Can motivate, substantiate and communicate the general structure and methods of the project in a scientific context
- Can relate critically to sources and indicate accurate references
- Can, in relation to sustainable urban development, communicate research-based knowledge and discuss professional and scientific problems with peers as well as non-specialists

Competences:
- Can structure and manage the complex combination of specific challenges related to sustainable urban development at the organisational level (business level) in his/her study and project work
- 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 for the potential work of a business (organisation) with sustainable solutions
- Can independently initiate and participate in interdisciplinary planning tasks and cooperation at the organisational level (business level)
Teaching: Problem-based project work in groups

Examination: Individual oral examination based on the project report.

Assessment criteria: As outlined in the Joint Programme Regulations
1st Semester: Course Module 1

Title: Theories of Science and Research Designs (Videnskabsteori og forskningsdesign)

Objectives: A student who has completed the module:

Knowledge:
- Has an understanding of the history and theoretical framework of theories of science at the Master's level
- Has an understanding of the relation between theories of science, research designs and research methods at the Master's level
- Has an understanding of the contents and interrelation of the positions of theories of science as well as the capability of relating critically to these at the Master's level
- Has a thorough knowledge of the relation of his/her own professional fields to theories of science and research designs.

Skills:
- Can use the basic problems of theories of science in relation to the assessment of sources and references in projects at the Master's level
- Can independently assess the value and reliability of his/her own science production in relation to scientific basic problems
- Can use theories of science, research designs and research methods within his/her own fields at the research level
- Can communicate knowledge of theories of science and research designs to specialists as well as non-specialists.

Competences:
- Is able to reflect critically on project-related choices of values, theories of science and methods
- Is able to continuously develop professionally through the acquisition of new knowledge of the development and renewal of theories of science and research designs.

Teaching: Lectures, workshops, synopses, seminars, assignments, etc.

Examination: Individual written examination.

Assessment criteria: As outlined in the Joint Programme Regulations.
Title: Challenges and Planning for Sustainable Cities (Udfordringer og planlægning for bæredygtige byer)

Objectives: A student who has completed the module:

Knowledge:
- Has understanding of the concepts of sustainability and sustainable development in an international context
- Has knowledge of important sustainability aspects and problems in the urban development, such as population, economy and growth, resources, climate, environment and health as well as biodiversity
- Has knowledge of the social, environmental and economic impacts of urban development.
- Has understanding of cities and their design as complex systems in which different contexts, structures and changes mutually affect each other
- Is able to understand and, on a scientific basis, reflect on the interplay between urban development and sustainable development as well as to identify scientific problems in relation to this
- Has thorough knowledge of important side effects of the most common strategies for the promotion of consideration of sustainability in urban development
- Has knowledge of the interaction of the various actors and aspects of sustainability in an urban context

Skills:
- Can understand and reflect on the relation between institutions, organisations and other actors; their dynamics and their interaction
- Can critically analyse the environmental, social and economic impacts of urban development
- Can reflect critically on the relations between growth, innovation and sustainable development
- Can communicate research-based knowledge and discuss professional and scientific problems in relation to the interplay between urban development and sustainable development with peers and non-specialists

Competences:
- Can carry out simple research investigations of sustainability aspects in an urban context in which the methodological approach takes into account the complex relations of cities

Teaching: Lectures, workshops, seminars, problem solving and presentation, teacher feedback, etc.

Examination: Continuous assessment or active participation.

Assessment criteria: As outlined in the Joint Programme Regulations
1st Semester: Course module 3

Title: Tools and Approaches to Sustainable Development (Værktøjer og tilgange til bæredygtig udvikling)

Objectives: A student who has completed the module:

Knowledge:
- Has thorough knowledge of sustainability problems in organisations
- Has thorough knowledge of selected types of tools and systems for the promotion of sustainable development at the organisational level
- Has understanding of the strengths and weaknesses of selected tools and systems in relation to the organisational context
- Has knowledge of investment economic aspects at the project level
- Has knowledge of impact assessment, including economic impacts at the project and organisational levels, as well as of the interaction between the different instruments applied in an urban development perspective
- Has knowledge of the structure and operation of organisations involved in sustainable urban development

Skills:
- Can analyse and assess selected tools and approaches to embedding the sustainability efforts into an organisation, from mapping and documentation to securing continuous improvements through motivation, participation, etc.
- Can use the selected tools and approaches as the basis for developing proposals for sustainability-related improvements
- Can understand different types of organisations; map important stakeholders and initiate a relevant dialogue with these
- Can, by the use of various tools, assess the effects of initiatives seen in relation to sustainable urban development.

Competences:
- Can reflect critically on the selection of tools and approaches, including critically assess results and conclusions
- Can understand and reflect on theory, assessment methods and analytical tools within the relevant fields
- Can continually adjust and adapt different tools and systems to the present challenges and needs of an organisation

Teaching: Lectures, workshops, seminars, problem solving and presentation, teacher feedback, etc.

Examination: Oral or written individual examination.

Assessment criteria: As outlined in the Joint Programme Regulations
2nd Semester: Project module

Title: Sustainable Cities from an Institutional and Societal Perspective (Bæredygtig byudvikling i et institutionelt og samfundsmæssigt perspektiv)

Requirements: The module adds to the knowledge obtained in 1st Semester.

Objectives: A student who has completed the module:

Knowledge:
- Has thorough knowledge and understanding of the societal framework conditions and challenges in relation to sustainable urban development
- Has knowledge of project-related quantitative and qualitative economic, sociological, environmental and/or technical methods of analysis
- Has thorough knowledge and understanding of different societal interests and roles of actors in relation to sustainable urban development as well as the possibilities and challenges characterising the interplay between different actors
- Has knowledge of planning processes related to sustainable urban development, including the influence of political, economic and other interests in relation to power

Skills:
- 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
- Can analyse and understand the potentials and challenges in the development of cooperation relations, including public-private partnerships, networks, etc.
- Can formulate and analyse potential strategies for sustainable urban development, based on an analysis of the societal conditions
- Can identify, analyse and assess project-related problems and impacts related to sustainability in a societal perspective, including understand the interplay between the local, regional and national levels
- Can analyse and critically reflect on policies, strategies and plans for urban development in terms of their impacts and potentials for urban development
- Can understand, apply and critically reflect on relevant quantitative as well as qualitative economic, sociological, environmental and/or technical methods of analysis and identify the interests connected to these
- Can independently collect data in relation to relevant societal problems and assess the quality and reliability of this data
- Can motivate and substantiate the general structure and methods of the project in a scientific context
- Can relate critically to sources and indicate accurate references
- Can communicate the result of the project to a selected target audience

Competences:
• Can structure and manage the complex combination of specific challenges which relate particularly to environment and sustainable development at the societal level.
• 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 for the institutional and socially determined potentials for working with innovative sustainable solutions.
• Can independently initiate and participate in interdisciplinary planning tasks and cooperation across social levels, nationalities and cultures.

Teaching: Problem-oriented project work in groups

Examination: Individual oral examination based on the project report.

Assessment criteria: As outlined in the Joint Programme Regulations.
2nd Semester: Course Module 1

Title: Policy, Planning and Governance (Politik, planlægning og governance)

Objectives: A student who has completed the module:

Knowledge:
- Has knowledge of power, politics and policies in relation to decision-making processes based on national and international research
- Has knowledge of governance and planning in relation to decision-making processes based on national and international research
- Has knowledge of discourses, institutions and actors as tools of analysis in relation to decision-making processes based on national and international research
- Has the ability to reflect critically on the use of the concepts and methods of analysis presented

Skills:
- Is able to, at an advanced level, apply the concepts and methods of analysis introduced to concrete problems
- Is able to, independently, develop and introduce new concepts and methods of analysis in relation to problems relevant to his/her own professional competence
- Can communicate knowledge of policies, planning and governance to specialists as well as non-specialists.

Competences:
- Is able to critically and independently apply and develop the concepts and methods of analysis presented to problem-based project work
- Is able to develop professionally on a continuous basis through the acquisition of new knowledge of policy, planning and governance.

Teaching: Lectures, workshops, synopses, fieldwork, seminars, assignments, etc.

Examination: Individual written or oral examination.

Assessment criteria: As outlined in the Joint Programme Regulations.
2nd Semester: Course module 2

Title: Systems and Structures of the City (Byens strukturer og systemer)

Objectives: A student who has completed the module:

Knowledge:
- Has knowledge of the basic structures of the city, such as buildings, infrastructure and transport
- Has knowledge of different models for the development and design of cities and the impacts of these models
- Has knowledge of political approaches which influence sustainable urban development, including strategic planning
- Has knowledge of technological approaches to the promotion of sustainable innovation and growth
- Has knowledge of methods and experiences in relation to the social development and conditions of life of the city

Skills:
- Can assess and combine different approaches to promoting sustainable development in an urban context
- Can critically analyse policies, strategies and models for sustainable urban development in a concrete context

Competences:
- Can independently initiate and participate in interdisciplinary planning tasks and cooperation
- Can independently assume responsibility for his/her own professional development and specialisation

Teaching: Lectures, workshops, seminars, problem solving and presentation, teacher feedback, etc.

Examination: Individual oral or written examination.

Assessment criteria: As outlined in the Joint Programme Regulations
2\textsuperscript{nd} Semester: Course module 3

Title: Economic, Social and Environmental Impact Assessment (Økonomisk, social og miljømæssig konsekvensvurdering)

Objectives: A student who has completed the module:

Knowledge:
- Has knowledge of economic impact assessment in the public and private sectors; social and environmental impact assessment, as well as the interaction between assessment, implementation and public regulation
- Has knowledge of economic models and their significance for sustainable development
- Has knowledge of assessment methods and tools, such as feasibility studies, presentation of scenarios/alternatives and risk assessment.

Skills:
- Can assess fields of application of assessment methods and tools, including the critical assessment of results and conclusions based on different methods and tools
- Can understand and critically reflect on theory, assessment methods and tools of analysis in the given fields

Competences:
- Can independently assess economic, social and environmental impacts in relation to sustainable urban development
- Can participate in interdisciplinary cooperation in relation to economic, social and environmental assessment

Teaching: Lectures, workshops, seminars, problem solving and presentation, teacher feedback, etc.

Examination: Individual oral or written exam

Assessment criteria: Joint Programme Regulations
3rd Semester: Project module

Title: Professional Development (Faglig og professionel udvikling)

Requirements: The module adds to the knowledge obtained in 1st Semester (and attended the courses and examinations of the 2nd Semester).

On 3rd Semester, the student may choose among the following options:

Option 1: Project Semester – with or without integrated internship
The student can choose to complete a traditional project Semester, which will usually build on the professional field in which the student has specialised during the 1st and 2nd Semesters, and/or serve as a preparation for the subject which the student wishes to treat in his/her master's thesis. The Semester comprises the writing of a project report or a scientific paper, of which the supervisor may be the co-writer.

The student may choose to integrate an internship either in Denmark or abroad during the project Semester. The internship must be of maximum 2-4 months’ duration and must be approved in advance by the Study Board of Planning, Geography and Surveying. Specific learning goals must be identified for each individual internship, clearly reflecting the professional problem defined for the project.

Objectives: A student who has completed the module:

Knowledge:
- Has knowledge based on the highest international research within a selected part of his/her field of specialisation
- Is able to understand and critically relate to the knowledge of the field and identify scientific or practical problems in a given complex context

Skills:
- Can master the scientific methods and tools of the field as well as general skills in relation to the solution of the chosen problem
- Can assess and choose among the scientific methods, tools and general skills of the field and draw up new models of analysis and solution
- Can discuss professional and scientific problems with both peers and non-specialists

Competences:
- Is able to manage work and development situations which are complex and unpredictable and require new solution models
- Is able to independently initiate and carry through professional and interdisciplinary cooperation and assume a professional responsibility
- Is able to independently assume responsibility for his/her own professional development and specialisation

Teaching: Problem-based project work, possibly with an integrated internship
Examination: Individual oral examination based on the project report or scientific paper.

A student who has followed the 1st and 2nd Semesters of Sustainable Cities may, as an alternative, choose to follow the 1st Semester of one of the specialisations of the Master’s Programme in Urban, Energy and Environmental Planning or MSc Geography. In that case, the student follows the course modules and project module of this Semester in full and thus acquires the knowledge, skills and competences described in the curriculum of this 3rd Semester.

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.

Option 3: Extended Final Project (Master’s Thesis)
Students may choose to complete the 3rd and 4th Semesters as one extended master’s thesis (60 ECTS). An extended final project is especially recommended in the project work which requires an extraordinary collection of data. Final projects must be approved in advance by the Study Board of Planning, Geography and Surveying, and the student must meet the requirements indicated for master’s theses in terms of knowledge, skills and competences (see below).
4th Semester: Project module

Title: Master's Thesis (Kandidatspeciale)

The master thesis can be conducted as a long master thesis using both the 3rd and 4th Semester. If choosing to do a long master thesis, it has to include experimental work and has to be approved by the study board. The amount of experimental work must reflect the allotted ECTS.

Requirements: Has passed the first three Semesters of Sustainable Cities.

Objectives: A student who has completed the module:

Knowledge:
- Has thorough knowledge of relevant theories and methods in relation to the chosen problem and can reflect on these
- Can describe the theory or theories used in such a way that the special characteristics of the theory are brought to light and thereby document the understanding of the possibilities and limitations of the theories applied within the concerned field of problems
- Has knowledge of the scientific and methodical basis of the used theories and can reflect on these
- Has thorough knowledge of the research basis of the chosen problems, including knowledge of the most important national and international research in the field.

Skills:
- Can independently plan and carry through a project course at a high professional level
- Can account for possible methods for solution of the problem presented in the project and describe and assess the suitability of the chosen method, including an account of the chosen limitations and their impact on the results of the product
- Can account for the relevance of the chosen problem for the study programme, including a precise account of the core of the problem and the professional context in which it appears
- Can analyse and describe the chosen problem by using relevant theories and empirical data
- Can analyse and assess the results of empirical studies, both the student’s own investigations and those of others, including an assessment of the impact of the investigation method on the validity of the results
- Can point out relevant future strategies, possibilities of change and/or suggested solutions
- Can communicate knowledge of the problem to both professionals and non-professionals.

Competences:
- Can form a synthesis between the professional problem and theoretical and empirical studies and make a critical assessment of the synthesis formed and the other results of the project work
• Can independently, on the basis of the acquired problem, participate in interdisciplinary discussions and development work
• Can independently acquire the most recent knowledge in the field and is, on this basis, able to continually develop his/her professional skills and competences.

Teaching: Problem-oriented project work in groups

Examination: Individual oral examination based on the group’s project report.

Assessment criteria: As outlined in the Joint Programme Regulations
Chapter 4: Effective date, Interim Provisions and Revision

This curriculum is approved by the Dean of the Technical Faculty of IT and Design and takes effect as of September 1, 2017.

Students who wish to complete their studies under the previous curriculum from 2012 must conclude their education by the summer examination period 2018 at the latest, since examinations under the previous curriculum are not offered after this time.

Chapter 5: Other Rules

5.1 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 spelling and formulation 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 Board of Studies 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.¹ If the project is written in English, the summary must be in Danish.² The summary must be at least 1 page and not more than 2 pages. The summary is included in the evaluation of the project as a whole.

5.2 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
In the individual case, the Board of Studies can approve successfully completed (passed) programme elements from other Master's programmes in lieu of programme elements in this programme (credit transfer). The Board of Studies 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 Board of Studies based on an academic assessment. See the Joint Programme Regulations for the rules on credit transfer.

5.3 Rules for examinations
The rules for examinations are stated in the Examination Policies and Procedures published by The Technical Faculty of IT and Design, The Faculty of Engineering and Science, and the Faculty of Medicine on their website.

5.4 Exemption
In exceptional circumstances, the Board of Studies 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.

¹ Or another foreign language (upon approval from the Board of Studies).
² The Board of Studies can grant exemption from this.
5.5 Rules and requirements for the reading of texts
At programmes taught in Danish, it is assumed that the student can read academic texts in modern Danish, Norwegian, Swedish and English and use reference works, etc., in other European languages. At programmes taught in English, it is assumed that the student can read academic text and use reference works, etc., in English.

5.6 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.