Manual

of the Masters degree programme

„Sustainable Urban Technologies“

in the Masters programme

“Urban Systems”

Duisburg and Essen, October 2010

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Note: The course of studies is organized so as to allow students to choose from a broad range of courses *within* modules. Technically, all modules are therefore compulsory modules.

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DESCRIPTION OF THE MASTERS PROGRAMME

Objectives of the Course of Studies

In the course of the masters degree programme "Sustainable Urban Technologies", students acquire the specific competences, abilities and methods necessary for successful employment and professional life. Special attention is paid to the teaching of strategies, competences and abilities required for successful planning, development and deployment or realization of concepts and projects reflecting the high degree of urban complexity. As a consequence of the complex objectives, the entire course of study is closely linked to the second course of study in the "Urban Systems" masters program: "Urbane Kultur, Gesellschaft und Raum". It is the declared aim of the course to enable students to work on topics from the various interdisciplinary scientific fields of research, to critically evaluate and contextualize research results and to act responsibly and sustainably in complex urban contexts.

Course of Study

Nine modules, offered in the course of terms 1-4, form the core base of the four-term program leading towards the degree of "Master of Science" (M.Sc.). All nine modules are compulsory, but students are free to choose from a broad range of courses feeding into these obligatory modules. Thereby the program allows the students to build and construct their individual and specialized career profiles from the very beginning of the programme. Two courses of choice are to be completed in the Introductory Module 2A; three courses in the Intermediate Module 5A, and three courses in the Advanced Module 8A. The additional interdisciplinary flanking modules 3A and 6A, offered in the course of the second and third term, require the obligatory election of one course. All modules end with a module-specific final exam.

The master program in total comprises 120 points and closes with a master thesis; however, only modules 4-9 count towards the final grade of the course of studies.

Structure and Organization of the Course of Studies

ECTS

European Credit Transfer System: The assumed student workload is estimated for all tasks that can be attributed to the course of study. The entire workload for the complete program is then calculated. The workload is defined as the total amount of time spent in classes (contact hours), during the individual preparation and learning exercises, just as much as the time spent on examination and the preparation thereof, needed for successful accomplishment of the course of study. The ECTS enables universities internationally to compare and recognize course completed elsewhere.

Workload and Credit (CR)

A workload of 30 hours equals one credit (CR). The total workload of a fulltime student amounts to 60 credits per year or 30 credits per term. The total time spent on the program is calculated at 1.800 hours per year and can be broken down to 45 weeks/year with a weekly workload of 40 hours/week.

Modules

The program comprises different modules. A module is defined as a thematically coherent study unit which can be completed in a fixed amount of time.

Continuous Assessment

All examinations are completed during the course of studies. Exams are distributed evenly over the program duration and are directly linked to the topics touched upon in the courses. The form of the examination can vary, depending on the type of course and may take the form of end-of-term assessments or continuous assessment in the course of the semester. Possible forms of examination are written exams, oral exams, presentations, research papers, reports on excursions, or combinations of these forms. The description of the module in the program outline provides detailed information on the relevant form of examination. Resits of examinations are scheduled for the following term at the latest. Any exam can be repeated twice at the most (three attempts in total per exam required).

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Structure of the Master programme „Sustainable Urban Technologies”

Sem.	WS/SS	Module	CP	CH
1.	WS	1	15	8
			3	2
			4	2
			4	2
			4	2
		2+3	10+5	4+2
2.	SS	4	10	4
		5+6	15+5	6+2
3.	WS	7	20	
		8	10	4
4.	SS	9	25	
			5	

Masters Programme "Sustainable Urban Technologies"

Module 1: Integrative Module I - "Introduction to Urban Systems"

- 1.1: Key issues in Urban Systems (lecture)
- 1.2: Introduction: Sustainable Urban Technologies (lecture/seminar)
- 1.3: Introduction: Urban Culture, Society and Space (lecture/seminar)
- 1.4: Introduction: First Steps into Urban Planning (lecture/seminar)

Module 2.A.
Introductory Module "Sustainable Urban Technology I"
(students have to choose 2 from various courses on offer)

Interdisciplinary Complementary Module 3.A.: "Urban Culture, Society and Space I"

Module 4: Integrative Module II - "Healthy City" practically oriented seminar (internal)

Module 5.A.
Intermediate Module "Sustainable Urban Technology II""
(students have to choose 3 from various courses on offer)

Interdisciplinary Complementary Module 6.A. "Urban Culture, Society and Space II"

Module 7: Internship Project (external, three months)

Module 8.A.
Advanced Module "Sustainable Urban Technology III"
(students have to choose 2 from various courses on offer)

Modul 9: Masters Thesis

Oral Examination

Σ disciplinary (without MA Thesis/Colloq.)	**35**	**14**
Σ Integration	**25**	**12**
Σ Complementary	**10**	**4**
Masters Thesis + Oral Examination	**30**	
Practical Project/Internship (Module 7)	**20**	
Σ	**120**	**30**

Annotations

(1) Interdisciplinary Complementary Modules: These will be specially offered courses from the "other" masters programme

(2) Introductory Modules, Intermediate Modules, Advanced Modules: There will be several classes on offer (5 CP each), individual specialisation

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1 Module 1: Integrative Module I „Introduction to Urban Systems“ (Compulsory module)

<table>
<tr><td colspan="6">Module 1 – Integrative Module I “Introduction to Urban Systems”</td></tr>
<tr><td colspan="2">module code
SUT/UKGR – IM 1</td><td>student workload
450 h</td><td>credits
15</td><td>semester
1st Sem.</td><td>frequency
every winter semester</td><td>duration
1 semester</td></tr>
<tr><td>1</td><td colspan="6">Types of courses | contact hours | independent study (h) | class size
a) Lecture: Key issues in Urban Systems — 2 SWS / 30 h — 60 — 40 students
b) Lecture/ Seminar: Introduction: Sustainable Urban Technologies — 2 SWS / 30 h — 90 — 40 students
c) Lecture/ Seminar: Introduction: Urban Culture, Society and Space — 2 SWS / 30 h — 90 — 40 students
d) Lecture/Seminar: Introduction: Urban Planning — 2 SWS / 30 h — 90 — 40 students</td></tr>
<tr><td>2</td><td colspan="6">Prerequisites for participation
None</td></tr>
<tr><td>3</td><td colspan="6">Learning outcomes
a) The students are aware of the central fields of metropolitan research and understand the basic key historical and contemporary issues.
b) The students will have an insight into systemic approaches to urban technologies, infrastructures and ecological implications.
c) Students are aware of key issues and debates in urban cultural studies, urban sociology and approaches to urban space.
d) Awareness of complex interdependencies in cities, understanding the basic forms of urban planning, awareness of the history and perspectives of urban development, familiarity with today’s and future challenges in urban planning and urban design.
Overall learning outcomes of the module: understanding of systemic thinking and complex interdependencies in urban systems. Awareness of benefits and potential obstacles in inter- and transdisciplinary cooperation.</td></tr>
</table>

4	**Subject aims (exemplary)** a) Different definitions of and approaches to the concept of “system”, awareness of different scientific cultures and codes in urban research, overview of selected major fields of urban research, basics of urban governance and management. b) Awareness of the different concepts of sustainability, introduction to key issues in urban infrastructures and technologies (energy, transportation and mobility, water and waste water, urban ecology, economic, social and ecological implications). c) Insights into key issues and debates in urban cultural studies, urban sociology and socio-spatial research (definitions of metropolis, city, urbanity; key historical developments, urban habitus, the role of urban cultural expression in urban systems, urban cultural ecology, segregation, gentrification, urban imaginaries, key issues in the sociology of space). d) Complexity and interdependencies in cities, basic forms of urban planning, survey of the history and perspectives of urban development, central present and future challenges in urban planning and urban design.
5	**Teaching methods** a) Lecture series held by different lecturers central to the programme b) - d), combined lecture/seminar, each with active participation of students, group work
6	**This module is used in the following degree programmes as well** The module is designed and offered exclusively for the two courses of study in the Masters programme “Urban Systems”
7	**Examinations** Written exam (120 min.) covering the entire module
8	**Contribution of the Module Grade for the Final Grade** 0/90 The grades acquired in the first semester do not count towards the finale grade.
9	**Responsibility for module/lecturer** Prof. Dr. Alexander Schmidt
10	**Other Information**

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2 Module 2.A: "Introductory Module "Sustainable Urban Technologies I" (Compulsory module[1])

Module 2.A – Introductory Module "Sustainable Urban Technologies I"					
module code SUT – 2A	**student workload** 300 h	**credits** 10	**semester** 1st Sem.	**frequency** every winter semester	**Duration** 1 semester

1	**Types of courses**	**contact hours**	**independent study (h)**	**class size**
	Lecture/Seminar: Key Urban Infrastructures and Technologies (2 x)	2 x 2 SWS / á 30 h	2 x 120	max. 25 students

2	**Prerequisites for participation** None
3	**Learning outcomes** Students are aware of the basic technical, planning and maintenance aspects of urban infrastructures and their economic and social implications. They are familiar with selected urban applications of natural sciences such as urban climatology. Students know the essential interdependencies between technical, economic and ecological issues in an urban environment. They get an insight into basic approaches to address them.
4	**Subject aims (exemplary)** Familiarity with key aspects in several of the following areas: - Introduction to municipal water management - Basics of urban climatology - External urban transport - Basics of urban water technology - Operations research methods in the analysis of urban systems - Urban planning and quality of life
5	**Teaching methods** Lecture, seminar, exercise; field trips and site visits (where applicable), each with active participation of students

[1] In these modules, students choose from a range of courses offered within the module. The modules themselves are compulsory.

6	**This module is used in the following degree programmes as well** The module as such is only part of the degree programme “Sustainable Urban Technologies”. The courses offered in this module are also part of other master or bachelor programmes as well (dependent on faculty and subject): Water science (B.A, M.Sc.), International Studies in Engineering (M.Sc.), Public Transport Management (M.Sc.), Construction Engineering (M.Sc.), Technical Logistics (M.Sc.), Management and Technology of Water and Waste Water (M.Sc.)
7	**Examinations** Examinations in the two courses, which have been selected from the student.
8	**Contribution of the Module Grade for the Final Grade** 0/90 The grades acquired in the first semester do not count towards the finale grade.
9	**Responsibility for module/lecturer** Prof. Dr. Ing. Widmann
10	**Other Information** Each winter semester, a variety of courses in the areas named above will be offered. Students choose two such fields with 5 CP each and can thus establish an individual profile in the area of urban infrastructures and technologies.

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3 Module 3.A: Interdisciplinary Complementary Module "Urban Culture, Society and Space" (Compulsory module[2])

<table>
<tr><td colspan="6">Module 3.A - Interdisciplinary complementary Module "Urban Culture, Society, and Space</td></tr>
<tr><td colspan="2">module code

SUT – 3A</td><td>student workload

150 h</td><td>credits

5</td><td>semester

1st Sem.</td><td>frequency

every winter semester</td><td>duration

1 semester</td></tr>
<tr><td>1</td><td colspan="2">Types of courses
a) Lecture: The European City in History
b) Seminar: Key Texts in Urban Studies</td><td>contact hours
2 SWS / 30 h
2 SWS / 30 h</td><td>independent study (h)
120
120</td><td>class size
max. 25 students
max. 40 students</td></tr>
<tr><td>2</td><td colspan="5">Prerequisites for participation
None</td></tr>
<tr><td>3</td><td colspan="5">Learning outcomes
<u>a) The European City in History</u>
Students are familiar with the interrelations between urban space and society, with the basic sociological and socio-spatial categories that structure the historical typology of European cities, with the preconditions and factors that influenced the uniqueness of European urban history, with the socio-spatial order of the main traditional and modern urban epochs and with the application of sociological theories such as 'service society', 'knowledge society' or 'experience society' to present European cities.
<u>b) Key Texts in Urban Studies</u>
Students are familiar with central texts, issues and debates in 20th- and 21st-century urban studies. They are acquainted with various definitions of the concepts of "urbanity", "city", "metropolis" and can contextualize current approaches and research questions within these debates. They are thus sensitized to the social and cultural implications of urban development and infrastructure projects.</td></tr>
<tr><td>4</td><td colspan="5">Subject aims
<u>a) The European City in History</u>
The lecture offers an insight into the social and cultural history of the European city from its beginning until today. Emphasis will be put on basic categories of social history and urban sociology, urban typology of traditional and modern society, the big transformation (Renaissance and Absolutism), the capital city, the modern big city (metropolis, mega city, world city), big city enmity, big city alternatives (garden city, machine-city), liberal and Fordistic city, the city in our time.</td></tr>
</table>

[2] In these modules, students choose from a range of courses offered within the module. The modules themselves are compulsory.

	The lecture provides a broad understanding for the social and cultural implications of urban, urbanised and even rural space to all future experts for urban space. It aims at improving the competence of socio-spatial reflection of architects, urban designers, urban planners etc. and thus contributes to a “dialogical” understanding or urban design and construction. **b) Key Texts in Urban Studies** Through a discussion of classic texts by Simmel, Lefebvre, Mumford, Wirth, Jacobs, de Certeau, Castells, Sassen, Sennett, Harvey, Soja, Löw, Häußermann, Siebel and others, this seminar provides an overview of key issues, debates and texts in 20th- and 21st-century urban studies.
5	**Teaching methods** a) Lecture, b) Seminar
6	**This module is used in the following degree programmes as well** a) Only offered in the Master programme “Urban Systems” b) Also offered in the Master programme “Anglophone Studies”
7	**Examinations** Written exam (45 minutes) or oral exam (30 minutes) in the course, which has been selected from the student.
8	**Contribution of the Module Grade for the Final Grade** 0/90 Grades acquired in the first semester do not count towards the final grade.
9	**Responsibility for module/ lecturer** Prof. Dr. Jens M. Gurr a) Prof. Dr. Dieter Hassenpflug b) Prof. Dr. Jens Martin Gurr
10	**Other Information** A reader with central texts will be provided before the semester; further materials will be supplied for download.

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4 Module 4: Integrative Module I „Healthy City" – Project seminar (Compulsory module)

<table>
<tr><td colspan="6">Module 4 – Integrative Module II "Healthy City" – Project Seminar</td></tr>
<tr><td colspan="2">module code
SUT/UKGR – IM 4</td><td>student workload
300 h</td><td>Credits
10</td><td>semester
2nd Sem.</td><td>frequency
every summer semester</td><td>duration
1 semester</td></tr>
<tr><td>1</td><td colspan="2">Types of courses</td><td>contact hours</td><td>independent study (h)</td><td colspan="2">class size</td></tr>
<tr><td></td><td colspan="2">a) Lecture (Part I): Urban Systems and Population Health</td><td>2 SWS / 30 h</td><td>60</td><td colspan="2">max. 40 students</td></tr>
<tr><td></td><td colspan="2">b) Seminar/ Practice (Part II): Urban Systems and Population Health</td><td>2 SWS / 30 h</td><td>180</td><td colspan="2">max. 40 students</td></tr>
<tr><td>2</td><td colspan="6">Prerequisites for participation
None</td></tr>
<tr><td>3</td><td colspan="6">Learning outcomes
Lecture (Part I): After the lecture, students will have a broad understanding of the relations between Urban Systems and health/disease as well as the principles of preventive strategies in urban settings.
Practice (Part II): After the project work, students will be able to apply the theoretically evolved framework to 'real life' problems in an interdisciplinary perspective.
Overall learning outcomes of the module: understanding of systemic thinking and complex interdependencies in urban systems and population health; awareness of the benefits and opportunities as well as the potential pitfalls of inter- and trans-disciplinary cooperation; strategies of solving potential problems in communication.</td></tr>
<tr><td>4</td><td colspan="6">Subject aims (exemplary)
- Awareness of basic medical understanding of chronic and acute diseases and their risk factors
- Insights into basic concepts of epidemiological methods
- Insights into methods to measure and evaluate risk factors in urban settings
- Awareness of the major determinants of health in cities
- Insights into the mechanisms through which urban life affects health
- Insights into methods of planning and implementing community-based health interventions</td></tr>
<tr><td>5</td><td colspan="6">Teaching methods
Lecture/seminar project work</td></tr>
<tr><td>6</td><td colspan="6">This module is used in the following degree programmes as well
The module is designed and offered exclusively for the two courses of study in the Masters programme "Urban Systems"</td></tr>
</table>

7	**Examinations** Written report (app. 7.000 words) and presentation (presenting the results of the project work)
8	**Contribution of the Module Grade for the Final Grade** 10/90
9	**Responsibility for module/lecturer** PD Dr. Susanne Moebus
10	**Other Information** The methods of community-based health interventions are described and practiced using small group (interdisciplinary) project work.

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5 Module 5.A: "Intermediate Module "Sustainable Urban Technologies II" (Compulsory module[3])

Module 5.A – Intermediate Module "Sustainable Urban Technologies II"						
module code SUT – 5A	**student workload** 450 h	**credits** 15	**semester** 2nd Sem.	**frequency** every summer semester	**duration** 1 semester	
1	**Types of courses** Lecture/Seminar: Key Urban Infrastructures and Technologies (3 x)	**contact hours** 3 x 2 SWS / 30 h	**independent study (h)** 3 x 120	**class size** 40 students		
2	**Prerequisites for participation** Successful examination in Module 2A					
3	**Learning outcomes** Students are familiar with further technical, planning and maintenance aspects of selected central urban infrastructures and technologies from areas such as transportation and mobility, energy, municipal water and waste management or hygiene technology. They are aware of the multiple interdependencies as well as of social, economic, ecological and health implications.					
4	**Subject aims (exemplary)** Familiarity with key aspects in several of the following areas: - Intermodal transport chains in urban areas (lecture) - Procedures of urban water technologies - Traffic route engineering - Management of urban route maintenance - Urban electrical energy supply - Municipal water and waste management - Use of computer modelling in describing processes in urban environments - Urban ecology					
5	**Teaching methods** Lecture, seminar, exercise; field trips and site visits (where applicable), each with active participation of students					
6	**This module is used in the following degree programmes as well** The module as such is only part of the degree programme "Sustainable Urban Technologies". The courses offered in this module are also part of other master or bachelor programmes as well (dependent on faculty and subject): Water science (B.A, M.Sc.), International Studies in Engineering (M.Sc.), Public Transport Management (M.Sc.), Construction Engineering (M.Sc.), Technical Logitics (M.Sc.), Management and Technology of Water and Waste Water (M.Sc.)					

[3] In these modules, students choose from a range of courses offered within the module. The modules themselves are compulsory.

7	**Examinations** Examinations in the three courses, which have been selected from the student.
8	**Contribution of the Module Grade for the Final Grade** 15/90
9	**Responsibility for module/lecturer** Prof. Dr. Bernd Noche
10	**Other Information** Each summer semester, a variety of courses in the areas named above will be offered. Students choose three such fields with 5 CP each and can thus develop an individual profile in the area of urban infrastructures and technologies.

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6 Module 6.A: Interdisciplinary Complementary Module "Urban Culture, Society and Space" (Compulsory module[4])

<table>
<tr><td colspan="7">Module 6.A - Interdisciplinary Complementary Module "Urban Culture, Society, and Space</td></tr>
<tr><td colspan="2">module code
SUT – 6A</td><td>student workload
150 h</td><td>credits
5</td><td>semester
2. Sem.</td><td>frequency
every summer semester</td><td>duration
1 semester</td></tr>
<tr><td>1</td><td colspan="2">Types of courses
a) Lecture: Metropolitan areas - structures, problems and management
or
b) Seminar: Key Issues in Urban Cultural Studies</td><td>contact hours
2 SWS / 30 h

2 SWS / 30 h</td><td>independent study (h)
120

120</td><td colspan="2">class size
max. 25 students

max. 40 students</td></tr>
<tr><td>2</td><td colspan="6">Prerequisites for participation
Successful examination in Module 3A</td></tr>
<tr><td>3</td><td colspan="6">Learning outcomes
<u>a) Metropolitan areas - structures, problems and management</u>
Students understand the complex structures and processes that exist in the economies, social environments and urban designs of metropolitan areas; they can collect empirical data on special issues in a European metropolitan area and analyse them by using statistical methods
<u>b) Key Issues in Urban Cultural Studies</u>
Students are familiar with fundamental research questions, fields of inquiry and methods of urban cultural studies. Students are able to formulate their own research questions and can contextualize them within current research contexts. They are familiar with the basics of analyzing urban forms of cultural expression in their urban contexts.</td></tr>
</table>

[4] In these modules, students choose from a range of courses offered within the module. The modules themselves are compulsory.

4	**Subject aims** **<u>a) Metropolitan areas - structures, problems and management</u>** The course is focussed on trends in e.g. retailing, demography and urban design and their effects and impacts on metropolitan areas. Particular reference is given to current issues by undertaking empirical in situ research. **<u>b) Key Issues in Urban Cultural Studies</u>** - the role of different forms of cultural expression in the negotiation of central issues in past and contemporary societies - central research questions, fields of inquiry and approaches to urban cultural studies - methods of contextualizing analysis of different forms of cultural expression (literature, film, popular culture …) - Urban imaginaries and their effects on the perception of urban spaces and phenomena
5	**Teaching methods** a) Lecture, b) Seminar
6	**This module is used in the following degree programmes as well** a) Teacher training programme (“Lehramt”) Geography b) “Anglophone Studies” (M.A.)
7	**Examinations** Written exam (45 minutes) or oral exam (30 minutes) in the course, which has been selected from the student.
8	**Contribution of the Module Grade for the Final Grade** 5/90
9	**Responsibility for module/ Lecturer** Prof. Dr. Jens M. Gurr a) Prof. Dr. Rudolf Juchelka b) Prof. Dr. Jens Martin Gurr
10	**Other Information**

7 Module 7: Internship Project (external) (Compulsory module)

Module 7 – External practical project in „Sustainable Urban Technologies“ (Compulsory module)						
module code SUT/UKGR - 7	**student workload** 600 h	**credits** 20	**semester** 3rd semester	**frequency** project work will normally take place in the period of July-October	**duration** 3 months	
1	**Types of courses** none	**contact hours** none	**independent study (h)** 600 h	**class size**		
2	**Prerequisites for participation** Successful completion of modules 1-3					
3	**Learning outcomes** Practical insight into exemplary major projects in key urban contexts (urban development and redevelopment, city planning, urban management, infrastructure projects, urban administration and urban research); application of competencies acquired in earlier modules; experience in cross-disciplinary project work.					
4	**Subject aims (exemplary)** Key practical experience in selected fields in urban contexts dependent on the individually chosen external project partner, e.g. urban planning, urban development and redevelopment projects, urban administration, waste water management at local purification plants, local logistics or interregional logistic systems, urban infrastructure projects and urban research.					
5	**Teaching methods**					
6	**This module is used in the following degree programmes as well**					
7	**Examinations** Written report (app. 5250 words)					
8	**Contribution of the Module Grade for the Final Grade** 20/90					
9	**Responsibility for module/lecturer** University advisor is chosen depending on the individual project.					
10	**Other Information** The total of 20 credit points is given for the written report based on the practical project. Each student is responsible for his/her individual planning of the project time as well as for contacting project partners, but will be assisted by the internship office/coordinator of the course of studies.					

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8 Module 8.A: "Advanced Module "Sustainable Urban Technologies III" (Compulsory module[5])

Module 8.A – Advanced Module "Sustainable Urban Technologies III"						
module code SUT – 8A	**student workload** 300 h	**Credits** 10	**semester** 3rd Sem.	**frequency** every winter semester	**duration** 1 semester	
1	**Types of courses** Lecture/Seminar: Key Urban Infrastructures and Technologies (2 x)	**contact hours** 2 x 2 SWS / á 30 h	**independent study (h)** 2 x 120	**class size** 40 students		
2	**Prerequisites for participation** Successful examination in Module 5A					
3	**Learning outcomes** Students have in-depth insight into and understanding of at least two of the subjects from areas such as transportation and mobility, energy, municipal water and waste management. They are aware of the multiple interdependencies as well as of social, economic, ecological and health implications. They are able to use this knowledge in terms of "good scientific practise" for the following Master thesis.					
4	**Subject aims (exemplary)** Familiarity with key aspects in several of the following areas: - Urban waste management, operation and management - Cleaning of urban waste water - IT in energy management - Resilient cities: Green, energy-efficient and climate-proof - Urban traffic networks - Traffic route engineering – design and dimensioning of traffic area, railroading - Logistics in urban public transport					
5	**Teaching methods** Lecture, seminar, exercise; field trips and site visits (where applicable), each with active participation of students.					

[5] In these modules, students choose from a range of courses offered within the module. The modules themselves are compulsory.

6	**This module is used in the following degree programmes as well** Each curricular activity of this module is part of other master programmes as well (dependent on faculty and subject). Water science (B.A, M.Sc.), International Studies in Engineering (M.Sc.), Public Transport Management (M.Sc.), Bauwissenschaften and Bauingenieurwesen (M.Sc.), Techn. Logistik (M.Sc.), Management and Technology of Water and Waste Water (M.Sc.)
7	**Examinations** Examinations in the two courses, which have been selected from the student.
8	**Contribution of the Module Grade for the Final Grade** 15/90
9	**Responsibility for module/lecturer** Prof. Dr.-Ing. Renatus Widmann
10	**Other Information** Every winter semester, a variety of courses in the areas named above will be offered. Students choose two such fields with 5 CP each and can thus develop an individual profile in the area of urban infrastructures and technologies.

9 Module 9: Master Thesis with accompanying Colloquium (Compulsory module)

Module 9 – Master Thesis in „Sustainable Urban Technologies“ (Compulsory module)						
module code SUT/UKGR - 9	**student workload** 900 h	**credits** 30	**semester** 4th semester	**frequency** every semester	**duration** 1 semester	
1	**Types of courses** Written thesis and colloquium	**contact hours** 2 SWS (not obligatory)	**independent study (h)** 900 h	**class size**		
2	**Prerequisites for participation** Successful examination in Module 8A					
3	**Learning outcomes** Application of systemic thinking to own scientific research building on the modules completed earlier; ability to identify, formulate and pursue research questions and to situate results in interdisciplinary research contexts; familiarity with techniques and strategies of scientific writing.					
4	**Subject aims (exemplary)** Dependent on the individual topic					
5	**Teaching methods** Colloquium accompanying the writing of the master thesis (not obligatory)					
6	**This module is used in the following degree programmes as well** None					
7	**Examinations** Written Master Thesis (at least 20.000 words), oral examination (30 minutes)					
8	**Contribution of the Module Grade for the Final Grade** 30/90					
9	**Responsibility for module/lecturer** Supervisor and second examiner are chosen depending on the individual topic.					
10	**Other Information** The total of 30 credit points is awarded for the written thesis (25 CP) and the successful passing of the oral examination/defence of the Master Thesis (5 CP). Participation in colloquia is optional. These are offered every semester to make sure students who need an extra semester can also write their thesis in the winter term.					