Module Card

Master Resource Efficiency in Architecture and Planning
HCU Hamburg

Module Number	Module Name	Type (C/CE/E)	Semester (proposed)	Module Coordinator
REAP-M-Mod-101	**Facets of Sustainability**	**C**	**1.**	**Prof. Irene Peters**

Subject Area	Duration
Fundamentals and Methods	1 semester

CP (according to ECTS)	Contact Hours/Week (SWS)	Self-study
5 CP (= 150 h workload)	2 (=21h contact hours)	129h

Objectives and Contents

Objective of Qualification (competencies)

- A notion of the concept of natural resource flows (e.g., carbon cycle, urban hydrology, phosphorus cycle)
- "Ecological numeracy": Knowledge of key data (e.g., the distribution of population across continents and their growth trends, statistical reach of fossil fuel resources, per capita energy and water consumption in different parts of the world), capability of estimating them in broad strokes and performing computations with them.
- Knowledge of international political efforts to promote sustainability.
- Basic notion of different disciplinary approaches towards operationalising the concept of sustainability (e.g., ecology, economics …)

Contents

- Overview of selected global ecological sustainability deficits (e.g., climate change; depletion of freshwater, soil and forest resources; habitat fragmentation; persistent organic pollutants, etc.) with a revisiting of their natural science foundations (at high school diploma level)
- The role of human activities in creating these deficits: Historically, at present, and in scenarios of the future
- How sustainability and sustainability deficits have been perceived over the last centuries. Classics of sustainability literature (e.g., Malthus, Carson, Schumacher, Club of Rome, also Lomborg); disciplinary and interdisciplinary approaches for the analysis of the sustainability theme
- Sustainability politics: Guiding principles and action plans the world has come up with, at international, national and local levels (Agenda 21, Green communities movement, NGOs, etc.)

Recommended Literature

- The United Nations Report of 1987 *Our Common Future* („Brundtland Report") http://www.un-documents.net/our-common-future.pdf
- Materials on the Website of the Intergovernmental Panel on Climate Change (IPCC), f.ex. current Assessment and Special Reports https://www.ipcc.ch

Teaching and Learning Methods

Lecture (HCU colleagues and a range of external experts in the respective fields), Plenum, Excursions occasionally

Exam(s)

Precondition of Examination

Type of Examination	Duration of Examination (if written or oral exam)
Term paper (S), written assignment (H)	

Composition of Module Mark

S, H = 100%

Additional Information

Previous Knowledge / Conditions for Participation (in form and content)

Applicability of Module

Frequency of Offering

Every winter term

Course Language

English

Valid from: WS 15/16 Update: 08.03.17

Module Card

Master Resource Efficiency in Architecture and Planning
HCU Hamburg

Module Number	Module Name	Type (C/CE/E)	Semester (proposed)	Module Coordinator
REAP-M-Mod-102	**Research Methods and Statistics**	**C**	**1.**	**Prof. Irene Peters**

Subject Area	Duration
Fundamentals and Methods	1 semester

CP (according to ECTS)	Contact Hours/Week (SWS)	Self-study
5 CP (= 150 h workload)	3 (= 31,5 h contact time)	118,5 h

Objectives and Contents

Objective of Qualification (competencies)

- Ability to appreciate what constitutes the scientific method.
- Ability to critically reflect the scientific authority of different information sources.
- Ability to perform some basic inferential statistical analyses.

Contents

- Rules of academic work, esp. referencing sources.
- What constitutes scientific information? Case studies.
- Basics of inferential statistical analyses (hands-on work).

Recommended Literature

- Website „Understanding Science“ of the University of California, Berkeley http://undsci.berkeley.edu
- Hand, David (2008). *Statistics.* A Very Short Introduction. Oxford University Press.
- Khan Academy. *Statistics and Probability* https://www.khanacademy.org/math/statistics-probability

Teaching and Learning Methods

Lecture (complemented by tutorial and individual student inputs for specific subjects), Plenum, excursions occasionally

Exam(s)

Precondition of Examination

Type of Examination	Duration of Examination (if written or oral exam)
Term paper (S), written assignment (H)	

Composition of Module Mark

S, H = 100%

Additional Information

Previous Knowledge / Conditions for Participation (in form and content)

Applicability of Module

Frequency of Offering

Winter term

Course Language

English

Valid from: WS 15/16 Update: 08.03.17

Module Card

Master Resource Efficiency in Architecture and Planning
HCU Hamburg

Module Number	Module Name	Type (C/CE/E)	Semester (proposed)	Module Coordinator
REAP-M-Mod-103	**Legal and Economic Instruments of Environmental Policy**	**C**	**1.**	**Prof. Dr. Martin Wickel**

Subject Area	Duration
Fundamentals and Methods	1 semester

CP (according to ECTS)	Contact Hours/Week (SWS)	Self-study
5 CP (= 150 h workload)	3 (= 31,5 h contact time)	118,5 h

Objectives and Contents

Objective of Qualification (competencies)

- Understanding of the legal and economic concepts of human and organisational action.
- Understanding of the rationale of different types of environmental policy measures.
- Basic knowledge of international and European environmental law and policy
- Understanding of the concept of multilevel governance.
- Understanding of key types of instruments of environmental policy applied in selected jurisdictions (a. o. Germany and the U.S.).

Contents

- Human action, as conceptualised in law and economics.
- Types of instruments of environmental policy: command-and-control regulation (limit values, BACT regulation), economic instruments (emissions trading, feed-in-tariffs, taxes and fees), information (right to know regulation), and planning (land-use and infrastructure planning) in theory and practice, with examples from Europe and around the world.
- Role of international and European law in the construction of national law.

Recommended Literature

Chasek, P., Downie, D., Welsh Brown, J., Global Environmental Politics, 6th edition, 2013 (chapters 1 and 7 and whatever you consider interesting, e.g. actors in chapter 2 or subchapter on climate change)
Harrington, W., Morgenstern, R., Sterner, T. (eds.), Choosing Environmental Policy, 2004 (overview, chapter 12, maybe chapter 1, available at HCU library)
Wurzel, R., Zito, A. , Jordan, A., Environmental Governance in Europe, 2013 (chapters 1, 2, 8, 9; available at HCU library)
Rydin, Y., Governing for Sustainable Urban Development, 2010 (chapters 1, 2, 8, 9, available at HCU library)
Zaspel-Heisters_Haury, Synoptic Overview of Spatial Planning in Germany: http://journals.lepenseur.it/flipping-issues/cse_issue_2_2015/cse-issue-2-2015.html (pages 17-32)

Teaching and Learning Methods

Lecture (complemented by student inputs for specific subjects), Plenum, excursions occasionally

Exam(s)

Precondition of Examination

Type of Examination	Duration of Examination (if written or oral exam)
Term paper (collection) (S), oral presentation (PR), written assignment (H).	

Composition of Module Mark

Term paper (1/4), oral presentation (1/4), written assignment (1/2)

Additional Information

Previous Knowledge / Conditions for Participation (in form and content)

None

Applicability of Module

Frequency of Offering

Winter term

Course Language

English

Valid from: WS 15/16 Update: 08.03.17

Module Card

Master Resource Efficiency in Architecture and Planning
HCU Hamburg

Module Number	Module Name	Type (C/CE/E)	Semester (proposed)	Module Coordinator
REAP-M-Mod-104	**Methods of Integrated Urban Planning**	**C**	**1.**	**Prof. Dr. Wolfgang Dickhaut**

Subject Area	Duration
Fundamentals and Methods	1 semester

CP (according to ECTS)	Contact Hours/Week (SWS)	Self-study
5 CP (= 150 h workload)	I: 1 (= 10,5 h contact time) II: 2 (= 21 h contact time)	I: 61,5 h II: 54 h

Objectives and Contents

Objective of Qualification (competencies)

- Knowledge of methods of integrated planning, decision making and presentation skills.
- Self-organization and project-organization.
- Implementation of different methods and support of REAP project work (P1, P2 and P3).

Contents

I. Tools of Integrative Urban Planning (2,5 CP/ 1 SWS)

- Methodology of scenario techniques, thinking about the future in different variations, pictographic descriptions of different future scenarios.
- Introduction to instruments of economic evaluation of projects, application-oriented simplified methodology.
- Introduction to the goal tree (approaches, leading lines, objectives, assessment criteria).
- Project planning phases (site analysis, concept, development of overall framework, details, SWOT-analysis).
- Project structures, time management, (multicultural) decision making and network in projects/ working groups.
- Certification system „sustainability in neighborhoods“ (introduction to DGNB system).
- Development of illustrations of existing data and concepts overlapping contents (integration).
- Graphic presentation methods (posters, flyers, brochures).

II. Introduction to GIS (2,5 CP/ 2 SWS)

- Knowledge about characteristics and complexity of spatial data (geometrical, thematic, topological, temporal-components) and the importance of a proper data modeling stage.
- Introduction to suitable GIS data models for a given application (advantages and disadvantages of vector and raster as well as methods for the transformations between each other).
- Introduction to suitable operations for a given application based on an understanding of the principles of basic geometrical, thematic and topological operations.

Basic principles of modern cartographical representation of qualitative and quantitative data

Recommended Literature

- Lo, C.P. & Yeung, A.K.W. (2002): Concepts and Techniques of Geographic Information Systems. Prentice Hall.
- Longley, P.A et al. (2005): Geographic Information Systems and Science. Wiley.
- Wheeler, S.M. (2013): Planning for Sustainability. Creating Livable, Equitable and Ecological Communities. Routledge.
- Couch, C. (2016): Urban Planning: an introduction. Palgrave Macmillan.
- Fürst, D.; Scholles, F. (2008): Handbuch Theorien und Methoden der Raum- und Umweltplanung. Rohn.
- Therivel, R. (2010): Strategic environmental assessment in action. Earthscan.
- Wood, C. (2003) Environmental Impact Assessment – A Comparative Review. Prentice Hall.
- Kiker, G.A.; Bridges, T.S.; Varghese, A.; Seager, T.P.; Linkov, I. (2005): Application of Multicriteria Decision Analysis in Environmental Decision Making. In: Integrated Environmental Assessment and Management 1 (2), 95-108.

Teaching and Learning Methods

Lecture (connected to REAP projects, implementation of methods in REAP projects; coaching in following semesters), Plenum, excursions occasionally

Exam(s)

Precondition of Examination

Type of Examination	Duration of Examination (if written or oral exam)
Term paper (S)	
Composition of Module Mark	
S = 100%	

Additional Information

Previous Knowledge / Conditions for Participation (in form and content)
None
Applicability of Module
The successful completion of this module is required for the attendence of the module REAP-M-Mod-105 Project I
Frequency of Offering
Winterterm
Course Language
English

Valid from: WS 15/16	Update: 17.11.16

Module Card

Master Resource Efficiency in Architecture and Planning
HCU Hamburg

Module Number	Module Name	Type (C/CE/E)	Semester (proposed)	Module Coordinator
REAP-M-Mod-105	**Project I**	**C**	**1.**	**Prof. Dr. Wolfgang Dickhaut**

Subject Area	Duration
Projects	1 semester

CP (according to ECTS)	Contact Hours/Week (SWS)	Self-study
5 CP (= 150 h workload)	2 (= 21 h contact time)	129 h

Objectives and Contents

Objective of Qualification (competencies)

- Ability of planning and conducting bigger and interdisciplinary exercises in a short, fixed period.
- Self-organization of more independent, integrated and work-related exercises.
- Project-organization and development of core skills such as communication, cooperation and a multi- and interdisciplinary approach.

Contents

- Targets and contents of the project will been elaborated each semester by the REAP-team.
- Students can make suggestions about the contents of the project.
- Targets and contents of the project are based on the modules of the current semester (see modules REAP-M-Mod-101 – REAP-M-Mod-104).

Recommended Literature

- World Future Council/HafenCity University, Regenerative Cities (available online)
- Christopher Kennedy, The study of urban metabolism and its applications to urban planning and design, Environmental Pollution 2011, p. 1965–1973.

Teaching and Learning Methods

Project: Autonomous project work in groups (complemented by seminar and content of the modules of the current semester), Plenum, excursions occasionallyw

Exam(s)

Precondition of Examination	
Regular participation, individual oral input, successful completion of student report and oral presentation.	
Type of Examination	Duration of Examination (if written or oral exam)
Term paper (S), presentation (R).	
Composition of Module Mark	
S, R = 100%	

Additional Information

Previous Knowledge / Conditions for Participation (in form and content)

Students currently participating in modules REAP-M-Mod-101 to REAP-M-Mod-104 (in form)

Applicability of Module

The successful completion of this module is required for the attendance of the module REAP-M-Mod-204 Project II.

Frequency of Offering

Winterterm

Course Language

English

Valid from: WS 15/16 Update: 08.03.17

Module Card

Master Resource Efficiency in Architecture and Planning
HCU Hamburg

Module Number	Module Name	Type (C/CE/E)	Semester (proposed)	Module Coordinator
REAP-M-Mod-201	**Urban Material Cycles**	**C**	**2.**	**Prof. Dr.-Ing. Ingo Weidlich**

Subject Area	Duration
Fundamentals and Methods	1 semester

CP (according to ECTS)	Contact Hours/Week (SWS)	Self-study
5 CP (= 150 h workload)	3 (= 31,5 h contact time)	118,5 h

Objectives and Contents

Objective of Qualification (competencies)

- Survey of the basic strategies for sustainable urban material cycles.
- Competence of perception, assessment and decision making in the field of selection of material related urban and building planning procedures.

Contents

- Introduction into lifecycles, quantities and qualities of urban waste materials, data of waste material quantities and qualities, future development prognosis and scenarios.
- Typology of materials incl. construction and demolition waste, industrial production waste and communal waste.
- Strategies of prevention, reduction and recycling of waste by means of political decision, planning, organization and technology as well as priority order of product recycling, material recycling with recycling, re-recycling and downcycling.
- Reciprocal effects of design, construction, material and energy strategical targets for optimized solutions on the national, regional, urban, building and detailed scale.
- Examples for projects and strategies.

Recommended Literature

- Thomas Christensen (Editor): Solid Waste Technology and Management, 2 Volume Set, ISBN: 978-1-4051-7517-3, November 2010
- Karl J. Thomé-Kozmiensky, Stephanie Thiel (Editors): Waste Management, ISBN 978-3-944310-29-9, ViVis 2016

Teaching and Learning Methods

Lecture complemented by individual student inputs for specific subjects and project visits, Plenum, excursions occasionallyw

Exam(s)

Precondition of Examination

Regular participation, individual oral input, successful completion of student report and oral presentation

Type of Examination	Duration of Examination (if written or oral exam)
term paper (S), Presentation (R)	

Composition of Module Mark

Presentation 25%, term paper 75%

Additional Information

Previous Knowledge / Conditions for Participation (in form and content)

- Basic understanding of the physics of building construction and demolition, industrial and municipal waste materials. (content)
- Basic understanding of regional, urban and building construction planning procedures (content)

Applicability of Module

The successful completion of this module is required for the attendance of the module REAP-M-Mod-204 Project II.

Frequency of Offering

Summerterm

Course Language

English

Valid from: WS 15/16 Update:08.03.17

Module Card

Master Resource Efficiency in Architecture and Planning
HCU Hamburg

Module Number	Module Name	Type (C/CE/E)	Semester (proposed)	Module Coordinator
REAP-M-Mod-202	**Urban Energy Flows**	**C**	**2.**	**Prof. Dr.-Ing. Ingo Weidlich**

Subject Area	Duration
Fundamentals and Methods	1 semester

CP (according to ECTS)	Contact Hours/Week (SWS)	Self-study
5 CP (= 150 h workload)	3 (= 31,5 h contact time)	118,5 h

Objectives and Contents

Objective of Qualification (competencies)

- Knowledge of simple calculation approaches for energy needs and demands in complex urban systems.
- Knowledge of dynamics and interdependencies of energy demand and supply sides in urban contexts.
- Understanding of a city as a system (system dynamics) and the role of energy as the driving force (motor) of it, its energy models and balances.
- Ability to construct energy balances for different fields of energy use (heating, electrical power, transport) and to access magnitudes of energy end uses.

Contents

- Basics on energy demand and supply (forms of energy, conversions, efficiency etc, balancing, visualization etc) and the interdependencies between different energy systems/ grids.
- Introduction into energy flows in cities (areas of energy use (domestic, industrial, public) providing data on energy qualities and quantities.
- Energy use and demand due to (thermal) comfort needs (heating, cooling ventilation) in residential and non-residential buildings.
- Energy demand of public services and due to mobility needs.
- Using renewable energies in an urban environment (techniques and contributions).
- Modelling and visualisation of urban energy flows.
- Methods to define priorities in urban energy saving strategies (strategic planning targets).

Recommended Literature

Varying

Teaching and Learning Methods

Lecture (complemented by tutorial and individual student inputs for specific subjects), Plenum, excursions occasionally

Exam(s)

Precondition of Examination

regular participation, successful completion of student report and oral presentation

Type of Examination	Duration of Examination (if written or oral exam)
Term paper (S), Presentation (R)	

Composition of Module Mark

S, R = 100%

Additional Information

Previous Knowledge / Conditions for Participation (in form and content)

Awareness of energy needs in Cities and of urban and architectural planning and building procedures (Content)

Applicability of Module

The successful completion of this module is required for the attendence of the module REAP-M-Mod-204 Project II.

Frequency of Offering

Summerterm

Course Language

English

Valid from: WS 15/16 Update: 08.03.17

Module Card

Master Resource Efficiency in Architecture and Planning
HCU Hamburg

Module Number	Module Name	Type (C/CE/E)	Semester (proposed)	Module Coordinator
REAP-M-Mod-203	**Urban Water Cycles**	**C**	**2.**	**Prof. Dr. Wolfgang Dickhaut**

Subject Area	Duration
Fundamentals and Methods	1 semester

CP (according to ECTS)	Contact Hours/Week (SWS)	Self-study
5 CP (= 150 h workload)	3 (= 31,5 h contact time)	118,5 h

Objectives and Contents

Objective of Qualification (competencies)

- Understanding of the basic water-cycle situation in urban areas and the key strategies for sustainable water resource management.
- Skills development: perception, assessment and decision making in the field of water-cycle management.

Contents

- Water-cycle in urban areas – present situation and key strategies, using international examples:
  - The water-cycle in urban areas, differences from the natural water-cycle (precipitation e.g. rainfall, rate of flow, infiltration, evaporation, differences between the world's regions, available water supply in urban areas, differences between the world's regions, effective water consumption in urban areas, differences between the world's regions (communal, industrial, agricultural), potential for change) Water-cycle in buildings (differences in consumption between different users).
  - Flowing waters and groundwater in urban areas, differences from natural flowing water and groundwater.
  - Wastewater and its impact on human beings water bodies, potentials for recycling, criteria for treatment selection.
- Overview of alternative technologies in water supply and rainwater/ wastewater treatment:
  - Consolidation of standard technologies of water supply, wastewater treatment and rainwater treatment (in Europe), e.g. centralized wastewater plants (treatment processes, mechanical and biological; sewer system).
  - Wastewater: Potentials for recycling, criteria for treatment selection, advantages and disadvantages of different treatment systems.
  - Different key strategies for wastewater/ rainwater harvesting (e.g. ECOSAN, ecological sanitation): centralised and decentralised technologies, High tech and low tech solutions, Separation of wastewater streams.
  - Overview of present technologies in wastewater and rainwater management (e.g. for wastewater: grey water treatment, water toilets with liquid/ solid separation, dry toilets, membrane filtration, biogas plant; for rainwater: rainwater usage, decentralised rainwater infiltration).

Recommended Literature

- Hoyer, Jacqueline / Dickhaut, Wolfgang / Kronawitter, Lukas / Weber, Björn; Water Sensitive Urban Design – Principles and Inspirations for Sustainable Stormwater Management in the City of the Future; Jovis Verlag, 2011
- United Nations Environment Programme, 2008, Every Drop Counts Environmentally Sound Technologies for Urban and Domestic Water Use Efficiency
- SUSTAINABLE SANITATION AND WATER MANAGEMENT TOOLBOX; http://www.sswm.info/
- The United Nations World Water Development Report 3; WATER IN A CHANGING WORLD; 2009

Teaching and Learning Methods

Lecture (complemented by seminar discussions, individual student inputs for specific subjects), Plenum, excursions occasionallyw

Exam(s)

Precondition of Examination

regular participation, successful completion of student report and oral presentation.

Type of Examination	Duration of Examination (if written or oral exam)
Term paper (S), Presentation (R).	

Composition of Module Mark

S, R = 100%

Additional Information

Previous Knowledge / Conditions for Participation (in form and content)
• Awareness of the water-cycle, ecological topics and the standard technologies of water supply. Wastewater treatment and rainwater treatment (in Europe). (Content)
Applicability of Module
The successful completion of this module is required for the attendence of the module REAP-M-Mod-204 Project II.
Frequency of Offering
Each Summer term
Course Language
English

Valid from: WS 15/16	Update: 08.03.17

Module Card

Master Resource Efficiency in Architecture and Planning
HCU Hamburg

Module Number	Module Name	Type (C/CE/E)	Semester (proposed)	Module Coordinator
REAP-M-Mod-204	**Project II**	**C**	**2.**	**Prof. Dr.-Ing. Ingo Weidlich**

Subject Area	Duration
Projects	1 semester

CP (according to ECTS)	Contact Hours/Week (SWS)	Self-study
10 CP (= 300 Std. Workload)	3 (= 31,5 h contact time)	268,5 h

Objectives and Contents

Objective of Qualification (competencies)

- Ability of planning and conducting bigger and interdisciplinary exercises in a short, fixed period.
- Self-organization of more independent, integrated and work-related exercises.
- Project-organization and development of core skills such as communication, cooperation and a multi- and interdisciplinary approach.

Contents

- Targets and contents of the project will been elaborated each semester by the REAP-team.
- Students can make suggestions about the contents of the project.
- Targets and contents of the project are based on the modules of the current semester (see modules REAP-M-Mod-201 – REAP-M-Mod-203).

Recommended Literature

Serge Salat "Cities and Forms"

Teaching and Learning Methods

Project: Autonomous project work in groups (complemented by seminar and content of the modules of the current semester), Plenum, excursions occasionally

Exam(s)

Precondition of Examination

regular participation,(min. 11 of 14), individual oral input, successful completion of student report and oral presentation

Type of Examination	Duration of Examination (if written or oral exam)
Term paper (S), Presentation (R).	

Composition of Module Mark

S, R = 100%

Additional Information

Previous Knowledge / Conditions for Participation (in form and content)

- Students currently participating in modules REAP-M-Mod-201 to REAP-M-Mod-203. (In form:
- Successful completion of 4 modules of REAP-M-Mod-101 to REAP-M-Mod-104.

Applicability of Module

The successful completion of this module is required for the attendance of the module REAP-M-Mod-309 Project III.

Frequency of Offering

Each summer term

Course Language

English

Valid from: WS 15/16 Update: 08.03.17

Module Card

Master Resource Efficiency in Architecture and Planning
HCU Hamburg

Module Number	Module Name	Type (C/CE/E)	Semester (proposed)	Module Coordinator
REAP-M-Mod-301	**Climate Responsive Architecture and Planning**	**CE**	**3.**	**Prof. Dr. Udo Dietrich**

Subject Area	Duration
Resources, Technologies and Environment	1 semester

CP (according to ECTS)	Contact Hours/Week (SWS)	Self-study
5 CP (= 150 h workload)	3 (= 31,5 h contact time)	118,5 h

Objectives and Contents

Objective of Qualification (competencies)

- Potential to reach Zero-Energy-Situations in the different main climates zones.
- Knowledge of interdependencies between buildings, their arrangement in urban space, energy demand, comfort and user behaviour.

Contents

- Comfort criteria (specially thermal in summer and visual).
- Passive-solar optimization of buildings, passive cooling methods and their application to different climatic locations.
- Low-energy planning strategies for urban quarters and buildings.
- Urban design requirements for climate-responsive energy applications.
- Urban buildings as energy generators.
- Vernacular architecture and best practice examples as sources for climate responsive building design.
- Building user behaviour and its impact on energy performance of buildings and the sustainability of urban environments.
- Tools for the assessment of climate and derivation of design rules.

Recommended Literature

- Special script for this course
- David Mackay: Without the hot air, www.withouthotair.com

Teaching and Learning Methods

Lecture (complemented by seminar discussions, individual student inputs for specific subjects), Plenum
Students work in groups, each group deals with another climate / location. , excursions occasionally

Exam(s)

Precondition of Examination

regular participation – obligatory 9 of 11 seminars
successful completion of student report and oral presentation

Type of Examination	Duration of Examination (if written or oral exam)
Term paper (S), presentation (R), as a sequence of short oral presentations and printed summaries.	

Composition of Module Mark

S, R = 100%

Additional Information

Previous Knowledge / Conditions for Participation (in form and content)

Recommended:
Successful completion of the module REAP-M-Mod-101 and REAP-M-Mod-202 is required. (in form)

Applicability of Module

Students have to select 2 modules of the block “Resources, Technologies and Environment” to attend REAP-M-Mod-309 Project III.

Frequency of Offering

Each Winterterm

Course Language

English

Valid from: WS 15/16 Update: 08.03.17

Module Card

Master Resource Efficiency in Architecture and Planning
HCU Hamburg

Module Number	Module Name	Type (C/CE/E)	Semester (proposed)	Module Coordinator
REAP-M-Mod-302	**Technologies for Sustainable Water Resource Management**	**CE**	**3.**	**Prof. Dr. Wolfgang Dickhaut**

Subject Area	Duration
Resources, Technologies and Environment	1 semester

CP (according to ECTS)	Contact Hours/Week (SWS)	Self-study
5 CP (= 150 h workload)	3 (= 31,5 h contact time)	118,5 h

Objectives and Contents

Objective of Qualification (competencies)

- Knowledge of different technologies in sustainable decentralised domestic wastewater management and rainwater management.
- Skills development: dimensioning, perception, assessment and decision making in the field of sustainable decentralised domestic wastewater management and rainwater management.

Contents

- Technologies for a sustainable decentralised domestic wastewater management:
  - Technologies, e.g.grey water treatment, water toilets with liquid/solid separation, dry toilets, membrane filtration, biogas plants, DEWATs.
  - Integration of wastewater management in urban/ settlement planning.
  - Integration of wastewater management in the planning of individual buildings and sites.
  - Wastewater management – examples and assessment criterion in the selection of technologies in developing countries.
- Technologies for decentralised sustainable rainwater management:
  - Technologies, e.g. Rainwater infiltration technologies, e.g. surface, trench, gulley and trench, shaft, Water evaporation, Decentralised retention, Rainwater usage, Planted roofs, Rainwater treatment, e.g. soil filter.
  - Integration of rainwater management in urban/settlement and landscape planning.
  - Integration of rainwater management in the planning of individual buildings and sites.
  - Rainwater management – examples and assessment criterion in the selection of technologies in developing countries

Recommended Literature

- Hoyer, Jacqueline / Dickhaut, Wolfgang / Kronawitter, Lukas / Weber, Björn; Water Sensitive Urban Design – Principles and Inspirations for Sustainable Stormwater Management in the City of the Future; Jovis Verlag, 2011
- United Nations Environment Programme, 2008, Every Drop Counts Environmentally Sound Technologies for Urban and Domestic Water Use Efficiency
- SUSTAINABLE SANITATION AND WATER MANAGEMENT TOOLBOX; **http://www.sswm.info/**
- Elizabeth Tilley, Lukas Ulrich, Christoph Lüthi,Philippe Reymond and Christian Zurbrüg; Compendium of Sanitation Systems and Technologies; EAWAG; 2014; www.sandec.ch/compendium.
- English translations of significant publications of the DWA Set of Rules, 52 DWA-Standards and Guidelines, 6 DWA-Topics and various brochures in pdf format (single user) - Edition April 2016
- ICLEI; SWITCH Training Kit _ Integrated Urban Water Management in the City of the Future; 2011
- BORDA; Decentralised Wastewater Treatment Systems (DEWATS) and Sanitation in Developing Countries; 2009

Teaching and Learning Methods

Lecture (complemented by seminar discussions, individual student inputs for specific subjects), Plenum, excursions occasionally

Exam(s)

Precondition of Examination	
regular participation, successful completion of student report and oral presentation	
Type of Examination	Duration of Examination (if written or oral exam)

Term paper (S), Presentation (R).	
Composition of Module Mark	
S, R = 100%	

Additional Information

Previous Knowledge / Conditions for Participation (in form and content)
Successful completion of the module REAP-M-Mod-203 is required (in form)
Applicability of Module
Students have to select 2 modules of the block “Resources, Technologies and Environment” to attend REAP-M-Mod-309 Project III.
Frequency of Offering
Each winter term
Course Language
English

Valid from: WS 15/16	Update: 08.03.17

Module Card

Master Resource Efficiency in Architecture and Planning
HCU Hamburg

Module Number	Module Name	Type (C/CE/E)	Semester (proposed)	Module Coordinator
REAP-M-Mod-303	**Technologies for Sustainable Material Cycles**	**CE**	**3.**	**Prof. Dr.-Ing. Ingo Weidlich**

Subject Area	Duration
Resources, Technologies and Environment	1 semester

CP (according to ECTS)	Contact Hours/Week (SWS)	Self-study
5 CP (= 150 h workload)	2 (= 21 h contact time)	129 h

Objectives and Contents

Objective of Qualification (competencies)

- Knowledge of the standard technologies for material cycles and recycling.
- Competence of decision making in the field of selection of material related technologies.

Contents

- Planning strategies for long life cycles of buildings, building elements and building materials.
- Technologies for material conservation and appropriate construction.
- Technologies for building element (product) and building material (material) recycling.
- Planning procedures for recycling adapted construction and selection of materials.

Recommended Literature

varied

Teaching and Learning Methods

Lecture (complemented by seminar discussions, individual student inputs for specific subjects), Plenum, excursions occasionally

Exam(s)

Precondition of Examination

regular participation, individual oral input, successful completion of student report and oral presentation

Type of Examination	Duration of Examination (if written or oral exam)
Term paper (S), Presentation (R).	

Composition of Module Mark

S, R = 100%

Additional Information

Previous Knowledge / Conditions for Participation (in form and content)

Successful completion of the module REAP-M-Mod-201 is required. (in form)

Applicability of Module

Students have to select 2 modules of the block “Resources, Technologies and Environment” to attend REAP-M-Mod-309 Project III.

Frequency of Offering

Each winter term

Course Language

English

Valid from: WS 15/16 Update: 08.03.17

Module Card

Master Resource Efficiency in Architecture and Planning
HCU Hamburg

Module Number	Module Name	Type (C/CE/E)	Semester (proposed)	Module Coordinator
REAP-M-Mod-304	**Economics and Planning of Technical Urban Infrastructure Systems**	**CE**	**3.**	**Prof. Irene Peters**

Subject Area	Duration
Resources, Institutions and Instruments	1 semester

CP (according to ECTS)	Contact Hours/Week (SWS)	Self-study
5 CP (= 150 h workload)	3 (31,5h contact time)	118,5 h

Objectives and Contents

Objective of Qualification (competencies)

- Appreciation of principles underlying the (economic) functioning of technical urban service markets (elements of “Industrial Organisation” and “Regulatory Economics”).
- Appreciation of the need for regulation of technical infrastructural services markets.
- Appreciation of infrastructural planning law in concert with urban development and stakeholder actions.

Contents

- Basic economic and legal concepts relevant for technical infrastructure service markets
- Glimpses into the history of regulation, liberalization, de- and re-regulation of technical infrastructure sectors in the U.S. and Europe with exemplary emphasis on Germany
- Examples of infrastructural planning law at European Community and German national levels
- Examples of real-world implementation of technical urban services projects (e.g. heating grids, renewable power facilities installations …), in their technical and project development aspects
- Reflection on aims and success of regulatory reform and planning law provisions in the technical urban service sectors, esp. in light of their contribution to sustainability goals

Recommended Literature

Varying, will be provided prior to course.

Teaching and Learning Methods

Seminar including excursions during lecture time period plus one weekend workshop for dealing with case study. Plenum

Exam(s)

Precondition of Examination	
regular participation	
Type of Examination	Duration of Examination (if written or oral exam)
Term paper (collection) (S).	
Composition of Module Mark	
S = 100%	

Additional Information

Previous Knowledge / Conditions for Participation (in form and content)

A basic understanding of the (technical) functioning of technical urban infrastructure systems like energy (power and heat) and water supply, wastewater and solid waste management. (content)

Applicability of Module

Students have to select 2 modules of the block “Resources, Institutions and Instruments” to attend REAP-M-Mod-309 Project III.

Frequency of Offering

Each winter term

Course Language

English

Valid from: WS 15/16 Update: 08.03.17

Module Card

Master Resource Efficiency in Architecture and Planning
HCU Hamburg

Module Number	Module Name	Type (C/CE/E)	Semester (proposed)	Module Coordinator
REAP-M-Mod-305	**Decision Support and Project Evaluation**	**CE**	**3.**	**Prof. Irene Peters**

Subject Area	Duration
Resources, Institutions and Instruments	1 semester

CP (according to ECTS)	Contact Hours/Week (SWS)	Self-study
5 CP (= 150 h workload)	3 (= 31,5 h contact time)	118,5 h

Objectives and Contents

Objective of Qualification (competencies)

For students to be able to understand, to critically appraise and to perform simple versions of ex-ante and ex-post decision support and project evaluation studies along different methodological lines, like

- Cost-Benefit Analysis,
- Decision Analysis,
- Logical Framework Technique

Contents

- Economic cost-benefit analysis: theoretical foundations (in economics). Essential elements such as different accounting frameworks (financial and economic accounting), valuation of intangibles, shadow pricing.
- Decision Analysis: theoretical foundations (mainly elements of decision theory)
- Logical Framework Technique for Project Evaluation

The emphasis on individual methods may vary between different years. However, theoretical elements common to all of these methods (uncertainty and its valuation, the issue of monetization vs. refraining from monetization; aggregation over different decisionmakers) will be addressed in any case. For each method discussed, case studies will be presented to illustrate the working of these concepts in practice.

Recommended Literature

Ackerman, Frank (2008). Can We Afford the Future? The Economics of a Warming World. London: ZED Books.
Further literature will be given prior to seminar.

Teaching and Learning Methods

Seminar (incl. seminar discussions and individual student inputs for specific subjects), Plenum, excursions occasionally

Exam(s)

Precondition of Examination

regular participation and one or more of the following: Successful completion of several small homeworks, student report, oral presentation, take-home written exam

Type of Examination	Duration of Examination (if written or oral exam)
Term paper (S) (Homeworks during lecture time) or Presentation (R) (student presentation incl. a written version thereof)	

Composition of Module Mark

S, R = 100%

Additional Information

Previous Knowledge / Conditions for Participation (in form and content)

Knowledge of mathematical methods at O-Level exams or General Certificate of Secondary Education (Calculus: Differentiation and Integration)

Applicability of Module

Students have to select 2 modules of the block “Resources, Institutions and Instruments” to attend REAP-M-Mod-309 Project III.

Frequency of Offering

Each winter term

Course Language

English

Valid from: WS 15/16 Update: 08.03.17

Module Card

Master Resource Efficiency in Architecture and Planning
HCU Hamburg

Module Number	Module Name	Type (C/CE/E)	Semester (proposed)	Module Coordinator
REAP-M-Mod-306	**Material Flow Analysis and Life Cycle Assessment**	**CE**	**3.**	**Prof. Dr.-Ing. Ingo Weidlich**

Subject Area	Duration
Resources, Institutions and Instruments	1 semester

CP (according to ECTS)	Contact Hours/Week (SWS)	Self-study
5 CP (= 150 h workload)	2 (= 21 h contact time)	129 h

Objectives and Contents

Objective of Qualification (competencies)

- Understanding the principles and application of Material Flow Analysis and Life Cycle Assessment.

Contents

- Principles of Material Flow Analysis (MFA) and Life Cycle Assessment (LCA), their foundations, extensions and limitations.
- Computer-aided application of MFA and LCA.
- Computer aided Life Cycle Assessment (according to ISO 14044), application:
  - Goal and scope definition.
  - Life cycle inventory analysis (LCI); including data collection, definition of system boundaries, modelling of material flows.
  - Life cycle impact assessment (LCIA); including selection of impact categories, category indicators, characterization models, normalization.
  - Life cycle interpretation.

Recommended Literature

Varying, will be provided prior to course.

Teaching and Learning Methods

Lecture (complemented by seminar discussions, individual student inputs for specific subjects, case studies of LCA), Plenum, excursions occasionally

Exam(s)

Precondition of Examination

regular participation, successful completion of student report and oral presentation

Type of Examination	Duration of Examination (if written or oral exam)
Term paper (S), Presentation (R)	

Composition of Module Mark

S, R = 100%

Additional Information

Previous Knowledge / Conditions for Participation (in form and content)

None

Applicability of Module

Students have to select 2 modules of the block “Resources, Institutions and Instruments” to attend REAP-M-Mod-309 Project III.

Frequency of Offering

Each winter term

Course Language

English

Valid from: WS 15/16 Update: 08.03.17

Module Card

Master Resource Efficiency in Architecture and Planning
HCU Hamburg

Module Number	Module Name	Type (C/CE/E)	Semester (proposed)	Module Coordinator
REAP-M-Mod -307/-308	**General Elective**	**C**	**3.**	Prof. Dr. jur. Martin Wickel

Subject Area	Duration
General Elective	1 semester

CP (according to ECTS)	Contact Hours/Week (SWS)	Self-study
5 CP (= 150 h workload)	2 - 4 (= 21 – 42 h contact time)	118,5 - 108 h

Objectives and Contents

Objective of Qualification (competencies)
• Preparation and support of students Master theses (e.g. statistic courses for statistic evaluation of public survey).
Contents
• Students will be advised by the dean according to their Master thesis theme to find the appropriate course. • Students can select one of the modules of offered study courses at HCU or other universities in Hamburg.
Recommended Literature
Defined by selected module.
Teaching and Learning Methods
Defined by selected module.

Exam(s)

Precondition of Examination	
Defined by selected module.	
Type of Examination	**Duration of Examination (if written or oral exam)**
Defined by selected module.	Defined by selected module.
Composition of Module Mark	
Defined by selected module.	

Additional Information

Previous Knowledge / Conditions for Participation (in form and content)
Defined by selected module.
Applicability of Module
Defined by selected module.
Frequency of Offering
Each summer and winter term.
Course Language
German/English

Valid from: WS 15/16	Update: 30.09.16

Module Card

Master Resource Efficiency in Architecture and Planning
HCU Hamburg

Module Number	Module Name	Type (C/CE/E)	Semester (proposed)	Module Coordinator
REAP-M-Mod-309	**Project III (Joint project)**	**C**	**3.**	**Prof. Dr. Wolfgang Dickhaut**

Subject Area	Duration
Projects	1 semester

CP (according to ECTS)	Contact Hours/Week (SWS)	Self-study
10 CP (= 300 h workload)	3 (= 31,5 h contact time)	268,5 h

Objectives and Contents

Objective of Qualification (competencies)

- Ability of planning and conducting bigger and interdisciplinary exercises in a short, fixed period.
- Self-organization of more independent, integrated and work-related exercises.
- Project-organization and development of core skills such as communication, cooperation and a multi- and interdisciplinary approach.
- Joint project means that it is taught by instructors of different degree programmes and attended by students of different degree programmes

Contents

- Targets and contents of the project will been elaborated each semester by the REAP-team.
- Students can make suggestions about the contents of the project.
- Targets and contents of the project are based on the modules of the current semester.

Recommended Literature

- Bates, G. & Jones, L. (2012): Monitoring and Evaluation: A guide for community projects. URL: http://www.cph.org.uk/wp-content/uploads/2013/02/Monitoring-and-evaluation-a-guide-for-community-projects.pdf
- Clark, W.; Cooke, G. (2016): Smart green cities: toward a carbon neutral world. Routledge.
- EC (2004): Aid delivery methods - Project cycle management guidelines. URL: http://ec.europa.eu/europeaid/multimedia/publications/documents/tools/europeaid_adm_pcm_guidelines_2004_en.pdf
- Lehmann, S. (2015): Low carbon cities: transforming urban systems. Routledge.
- Wheeler, S.M. (2013): Planning for Sustainability. Creating Livable, Equitable and Ecological Communities. Routledge.

Teaching and Learning Methods

Project: Autonomous project work in groups (complemented by seminar and content of the modules of the current semester), Plenum, excursions occasionally, field trip (if possible abroadw)

If teachers of more study programmes involved, SWS are teached proportionately.

Exam(s)

Precondition of Examination	
regular participation, successful completion of student report and oral presentation	
Type of Examination	Duration of Examination (if written or oral exam)
Term paper (S), Presentation (R)	
Composition of Module Mark	
S, R = 100%	

Additional Information

Previous Knowledge / Conditions for Participation (in form and content)

- Students currently participating in modules REAP-M-Mod-301 to REAP-M-Mod-308. (in form)
- Successful completion of 5 modules of REAP-M-Mod-101 to REAP-M-Mod-204. (in form)

Applicability of Module

The successful completion of this module is required for the attendence of the module REAP-M-Mod-401 Thesis.
Frequency of Offering
Each winter term
Course Language
English

Valid from: WS 15/16	Update: 08.03.17

Module Card

Master Resource Efficiency in Architecture and Planning
HCU Hamburg

Module Number	Module Name	Type (C/CE/E)	Semester (proposed)	Module Coordinator
REAP-M-Mod-401	**Thesis**	**C**	**4.**	**Prof. Dr. Wolfgang Dickhaut**

Subject Area	Duration
Projects/ Thesis	1 semester

CP (according to ECTS)	Contact Hours/Week (SWS)	Self-study
30 CP (= 900 h workload)	-	-

Objectives and Contents

Objective of Qualification (competencies)

- Application of the appropriate technical, scientific and/ or artistic methods proving the ability to work independently on a special topic in a short, fixed period and demonstration of a thorough knowledge/ understanding of the subject.
- Deepening abilities in interdisciplinary work alongside the ability to develop disciplinary methods/ knowledge and applying them in other fields.
- Development of core skills: communication, cooperation and a multi- and interdisciplinary approach.

Contents

- Students should make suggestions about the contents of their thesis.
- Targets and contents of theses outside the REAP-contents have to be approved.

Recommended Literature

Defined by selected thesis topic

Teaching and Learning Methods

Thesis: Autonomous work (students are supported by the appropriate REAP-specialist).
Further important information can be found on the HCU-Website (Master > REAP > For Students > REAP Master Thesis Infos)

Exam(s)

Precondition of Examination

The thesis has to be written by single student, students wishing to work together (maximum 2) have to apply for, the thesis must be completed within 22 weeks, at the end of the fixed period the student has to submit a written report).

Type of Examination	Duration of Examination (if written or oral exam)
The final assessment of the thesis is an oral exam (colloquium) and a presentation (TH, PR, KO). Submission: 2 copies (print and digital version (CD/DVD) respectively)	Time limit 22 weeks

Composition of Module Mark

TH = 75%, PR + KO = 25%
The grade is determined by both reviewers equally.

Additional Information

Previous Knowledge / Conditions for Participation (in form and content)

- Successful participation in modules REAP-M-Mod-104 REAP-M-Mod-205 and REAP-M-Mod-309. (in form)
- Successful participation in all modules of the 1. and 2. semester. (in form)
- Successful participation in 3 of 4 modules in the 3. semester. (in form)

Applicability of Module

The thesis is the final-assessment for the master-programme REAP.

Frequency of Offering

Each winter and summer term.

Course Language

English

Valid from: WS 15/16 Update: 28.06.17

Module Card

Master FaSt
HCU Hamburg

Module Number	Modul Name	Type (C/CE/E)	Semester (proposed)	Module Coordinator
Q-M-Mod-001	[Q] STUDIES	C	each Semester	Prof. Dr. Thomas Schramm

Subject Area	Duration
Fachübergreifende Studienangebote (FaSt)/cross-curricular Programme	1 Semester

CP (according to ECTS)	Contact Hours/Week (SWS)	Self-study
5 CP (= 150 h Workload)	4 (= 42 h contact time)	108 h

Objectives and Contents

Objective of Qualification (competencies)
- Reflection competencies: scientific analysis and reflection - Cultural competencies: transdisciplinary and intercultural communication - Perception and design competencies: creative and innovative design - The ability to act: proactive and responsible action
Contents
a) [Q] STUDIES I - Different courses with theoretical emphasis - Opportunities to train the perception and creativity through - Practical project work such as the development of course concepts and their implementation b) [Q] STUDIES II - see above Fields of Study: - Science | Technology | Knowledge - Media | Art | Culture - Economy | Politics | Society
Recommended Literature
will be announced in the lecture
Teaching and Learning Methods
2x seminar / lecture + tutorial / project (2x 2,5 CP; 2x 2 SWS) Excursion (optional)

Exam(s)

Precondition of Examination	
80% participation, active participation, accompanying as-signments	
Type of Examination	Duration of Examination (if written or oral exam)
to be defined by each teacher and course	
Composition of Module Mark	
2 x 50%	

Additional Information

Previous Knowledge / Conditions for Participation (in form and content)
none
Applicability of Module
Frequency of Offering
each Semester
Course Language

German and english

valid from	valid to	last updated
WiSe 15/16		18.03.2019

Module Card

Master FaSt
HCU Hamburg

Module Number	Modul Name	Type (C/CE/E)	Semester (proposed)	Module Coordinator
BS-M-Mod-001	BASICS: Project Management	C	Winter term	Prof. Dr. Thomas Krüger

Subject Area	Duration
Fachübergreifende Studienangebote (cross-curricular Programme)	1-2 Semester

CP (according to ECTS)	Contact Hours/Week (SWS)	Self-study
5 CP (= 150 h Workload)	4 (= 42 h contact time)	1-2 Semester

Objectives and Contents

Objective of Qualification (competencies)
project management competencies including soft skills ability to survey, apply and critically reflect project management tools
Contents
1) Lecture a) Basics: Projektmanagement Vorlesung b) Basics: Project Management Lecture (English-language Programms) Tools, Instruments, Parties and organisational Context of project management 2) Seminar (organized by the master programs) Each cohort deepens an area of project management relevant for the respective discipline in an interactive way that fits to and supports the program students needs and uses program-related topics as examples.
Recommended Literature
1) Lecture a) Basics: Projektmanagement Vorlesung GPM (2008): ProjektManager. 3. Aufl. Nürnberg: GPM Deutsche Gesellschaft für Projektmanagement. b) Basics: Project Management Lecture Meredith, Jack R.; Mantel, Samuel J.; Shafer, Scott M. (2016): Project management. A managerial approach. 9. ed., internat. student version. Singapore: Wiley. Project Management Institute (2013). A Guide to the Project Management Body of Knowledge (PMBOK Gui-de) (5th ed.). Newton Square, PA: Project Management Institute, Inc. 2) Seminar Literature will be announced in the lecture
Teaching and Learning Methods
1) Lecture (2,5 CP; 2 SWS) 2) Seminar (2,5 CP; 2 SWS) / Excursion (optional)

Exam(s)

Precondition of Examination	
1) Lecture: none 2) Seminar: 80% Participation	
Type of Examination	**Duration of Examination (if written or oral exam)**
1) Lecture: Exam / term paper 2) Seminar: form of examination to be defined by each program	1) Lecture: 90 min / - 2) Seminar: to be defined by each program
Composition of Module Mark	
1) Lecture: 50% 2) Seminar: 50%	

Additional Information

Previous Knowledge / Conditions for Participation (in form and content)
none
Applicability of Module

Frequency of Offering
1) each winter term 2) to be defined by each program
Course Language
German and English

valid from	valid to	last updated
WiSe 15/16		18.03.2019