Modulkürzel	**CLIC**				
Lehrveranstaltung	**Climate-resilient Cities**				
Modulsprache	English				
Modulverantwortung	Prof. D. Ziegler, Prof. J. Schoonbrood, Prof. J. Ruoff				
Vorkenntnisse	English, Basics of a) water, b) transport or c) buildings				
Termin	Winter semester; Duration 15 weeks				
Lehrform	2,5 weekly hours (wh) lecture; 1,5 wh self-study/ seminar				
Credits	5 CP				
Time	Lecture	Übung	Seminar	Examination	Total
Präsenzzeit	30		30		60
Selbststudium	10		35	45	90
Leistungsnachweis	-		-	PL	150
Legende	SL: Studienleistung; PL: Prüfungsleistung (assessment of performance)				

PL: Portfolio assessment

The seminar includes a one-week trip to Jordan/ Amman for 16 students in November.

Learning outcomes (Lernergebnisse):

After participation in this seminar, the students are able to:

- Demonstrate the relevance of climate change for cities, with a focus on either water management, transport, or buildings, both for Jordan and Germany
- Critically describe approaches for climate-resilient cities, with a focus on either water management (e.g. water reuse, energy-efficient wastewater treatment); sustainable mobility with the goal of low carbon footprints; sustainable buildings (focus energy-efficiency, use of renewable energy)
- Technically conceptualize a selected approach, i.e. applicability, costs, contribution to energy efficiency and reduction of carbon footprints; contribution to adaptation to climate change by saving water and reducing vulnerability to floods
- Communicate in an inter-cultural context with the Arab world (exchange with Jordanian universities, presentation of Germany and Koblenz including cultural aspects)
- Apply and use digital learning and virtual formats in an international setting: presentations, interactive posters, webinars and virtual conferences, films, 360” camera.

Professional competence (Fachkompetenz – Kenntnisse):

The result of learning and information is professional competence. The professional competence are the facts, principles, theories and ptractical applications in the described professional field. Theory and facts:

International development goals

- Definitions and facts related to climate change, climate mitigation and adaptation, with a focus on Jordan and Germany

Facts on one focus area:

a) Water management: water availabiliy, scarcity, reuse in Germany and Jordan
b) Sustainable mobility: public transport (bus and train), motorized individual transport, bicycle transport
c) Sustainable buildings: energy efficient buildings, carbon footprints of building materials, concepts for renovating existing buildings, energy-efficient cooling and heating

Examples for successful practical applications in Jordan and Germany of the relevant focus area:

a) Technical application of energy-efficient wastewater treatment; water reuse and groundwater recharge, water saving in agriculture
b) Application of sustainable mobility such as bicycle and bus lanes, railway systems; reduction of individual motorized transport
c) Sustainable buildings such as passive houses, energy-efficient buildings in the Arab world, cooling and heating with renewable energy, ..

- Increase of technical English vocabulary
- Improved inter-cultural communication (communication tools, salutation, religious values, living conditions for students)

Professional competence – skills (Fachkompetenz- Fertigkeiten):

The competence to apply knowledge to solve problems and fulfill engineering tasks:

- Independent analysis of information around climate change and selected topic in Jordan and Germany
- Independent analysis and documentation of approaches of climate-resilinet cities, including assessment of their relevance, costs and technical applicability.
- Development of assessment criteria to assess the approaches of climate-resilient cities in Germany and in Jordan – also taking into account framework conditions such as BIP, regulatory framework, geographical parameters, skilled staff, maintenance

Other competencies (Weitere Kompetenzebenen):

The proven competence to use knowledge and skills as well as personal, social and methodological competencies in professional contexts and for personal and career development, thereby increasing responsibility and independence.

- Methodolical competencies:
  - Presentation and dialogue in English (films, interactive posters, presentations)
  - Webinars and virtual conferences
  - Scientific report in English language
- Social competencies:
  - Analysis and assessment of climate change challenges for future generations
  - Development of approaches to solve the challenges
  - Critical discussion of potential solutions in an intercultural setting
  - Digital learning and virtual exchange, including new tools
- Self-comptencies:
  - (Travel to a foreign country)
  - Dialogue with foreign students and professors through digital media
  - Reflection of own strengths and learning fields with the learning objectives
  - Development of options to further strengthen technical skills, methodological and social competencies

Requirements for receiving Credit points

Portfolio assessment: Assessment of performance (Prüfungsleistung) by assessing presentations (interactive poster; powerpoint) and a scientific report

Learning Material (Unterrichtsmaterial)

Learning platform including scripts, literature, presentations; student performances including presentations, films, interactive posters, dialogue in webinars

Literature:

General and Climate Change

CIA World Fact Book with data on Germany, Jordan (country information).

Sustainable development goals (SDG); United Nations:

International Panel on Climate Change (IPCC) (2014): Fifth Assessment Report. Climate Change 2013: The Physical Science Basis. Climate change 2014: Mitigation of Climate Change. Climate Change 2014: Impacts, Adaptation and Vulnerability. Part A: Global and Sectoral Aspects. Climate Change 2014: Synthesis Report. URL: https://www.ipcc.ch/report/ar5, Zugriff Mai 2018.

Climate-resilient water management

Global Water Partnership: www.gwp.org including IWRM tool box

Ministry of Water and Irrigation, Jordan (2016): National Water Strategy 2016-2022. The Hashemite Kingdom of Jordan.

Umweltbundesamt (2017): Webseite „Energie und Rohstoffe aus Kläranlagen“. URL https://www.umweltbundesamt.de/themen/energie-rohstoffe-aus-klaeranlagen, Zugriff 08/2018.

Umweltbundesamt (2018a): Water Resource Management in Germany. Pdf- File.

Umweltbundesamt (2018b): Klimalotse. Der Leitfaden zur Anpassung an die Folgen des Klimawandels für Kommunen. URL https://www.umweltbundesamt.de/themen/klima-energie/klimafolgen-anpassung/werkzeuge-der-anpassung/klimalotse#Einführung. Zugriff 05/2018.

UN Websites –in particular UN Water Website.

WaCCliM (2017): Water and Wastewater Companies for Climate Mitigation. Project website. Supported by BMU, implemented by GIZ. URL http://wacclim.org/

Sustainable mobility

GIZ (2020): Sustainable urban transport (SUTP). Publications and SUTP modules on sustainable urban transport, including institutions, bicycles, trains and buses, freight and student mobility. City examples range from Germany to China and Colombia. http://www.sutp.org/en/resources/publications/publications-by-topic.html.

Sustainable buildings

Deutsche Gesellschaft für Nachhaltiges Bauen: Toolbox „Klimaneutrales Bauen“

Deutsche Gesellschaft für Nachhaltiges Bauen: Rahmenwerk für klimaneutrale Gebäude und Standorte

LEED system (Leadership in Energy and Environmental Design), http://leed.usgbc.org/bd-c.html

Ökobaudat – Datenbank zu Baumateralien