

Course description

BB903: Technologies and tools used in climate adaptation

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The Study Board for Science	STADS ID (UVA): N150012101 ECTS value: 7.5
Teaching language: Danish EKA: N150012112, N150012102 Assessment: Second examiner: None, Second examiner: Internal Grading: Pass/Fail, 7-point grading scale Offered in: Odense Offered in: Autumn Level: Master(s)	Date of Approval: 19-01-2023 Duration: 1 semester Version: Archive

▼ Comment
The course includes a trip to Svanninge Field Station in week 46 (5 days). Registration for the course is therefore associated with a small participant payment of 500 kr. to cover the field trip. The trip is with an overnight stay at the station. The students will be asked to pay a couple of weeks before the field trip via itslearning.
Partly taught together with BB836: Geographical Information systems (GIS) in Environmental monitoring and Climate adaption.

▼ Entry requirements
The course cannot be taken as an elective on bachelor or master programmes.

▼ Academic preconditions
Students who follow the course are expected to have an academic level at least equal to a 3rd-year bachelor student.

▼ Course introduction
The purpose of the course is to provide the students with a basic knowledge of dynamic and static hydrological and ecological models as well as GIS as key professional tools within climate adaptation. Students need to understand the impact of climate-based changes in cities and the countryside, be able to process and analyze the derived impacts, and analyze and unravel opportunities for climate adaptation tools.
Furthermore, the aim is to give the students practical experience in using the tools to evaluate the effects of climate change in essential ecosystems, agricultural land and cities, design specific tools for climate adaptation, run scenarios to predict possible outcomes on existing climate adaptation solutions under different conditions in the future, and develop action plans and spatial planning. This will be done through multidisciplinary thematic teaching.
The course is built on knowledge about climate change and adaptation as well as possibly already known technologies and provides an academic basis for a wide range of tools the students can use in the future, including in their later projects in the education.

- In relation to the competence profile of the degree, it is the explicit focus of the course to:
- give basic knowledge about different statistical and mechanical modelling techniques (static and dynamic)
 - give competencies in GIS
 - give practical experience in the new tools used for climate adaptation in Denmark
 - give an understanding of model results, including their limitations, and the impacts in the environment, cities, etc. within climate change and climate adaptation.

▼ Expected learning outcome
In order to achieve the purpose of the course, the learning objective of the course is that the student demonstrates the ability to:

- experiment with models for comparing naturally slow water flow via infiltration (Darcy) and surface run-off due to impermeable surfaces (flow, roughness) in different precipitation scenarios (Powersim)
- explain and analyze semi-urban hydrodynamic regulations (pumping station, overflow structure) in catchment areas with common and separate sewer systems
- analyze and assess the design and efficiency of stormwater ponds as hydrological buffers and the retention of xenobiotics and nutrients
- model and analyze precipitation pressure and elevation models – (GIS, SCALGO) – as well as doing calculations of the effects on land use (agricultural land, nature, cities) (GIS)
- identify lowland areas - hydraulic buffers (new wetlands, reservoirs in the landscape)
- analyze the pressure on nature, agricultural land and cities at elevated sea levels (SCALGO, GIS), as well as assess nature loss on land and production and habitat losses in shallow coastal areas (GIS)
- model N and P substance cycles in water action plans including climate change effects (GIS)

▼ Content
The course contains the following main academic areas:

- Understand the consequences of climate-based change in cities, the countryside and in nature
- Process/analyze the derived consequences
- Analyze/unravel opportunities for climate adaptation tools.

In weekly assignments, the students will process GIS themes and data from public and private databases, research projects, etc. that exemplify the data collection and use of the state, regions and municipalities in environmental management and climate adaptation.

- The themes are:
- Introduction to terrestrial models
 - Introduction to water quality models
 - Introduction to effect modeling of xenobiotics
 - Introduction to environmental management models
 - Introduction to climate and climate adaptation models
 - Coupling of models and GIS tools.
 - Using GIS tools (Mapinfo)
 - Use of SCALGO live model
 - Mapping our protected nature areas, analyzing nature and habitat fractionation
 - Land use and its impact on nutrient load are analyzed in catchment areas in relation to compliance with the EU Water Framework Directive
 - Climate-related runoff problems due to increased precipitation intensity are analyzed using altitude models; where the effect on stream condition is calculated
 - Use of GIS for marine environmental status assessment
 - Introduction to climate and environmental modelling
 - Classification of models: empirical, statistical, static and dynamic models

▼ Literature
See itslearning for syllabus lists and additional literature references.

▼ Examination regulations

▼ Prerequisites for participating in the exam a)

▼ Timing
Autumn

▼ Tests

▼ Reports

▼ EKA
N150012112

▼ Assessment
Second examiner: None

▼ Grading

Pass/Fail

▼ Identification

Full name and SDU username

▼ Language

Normally, the same as teaching language

▼ Examination aids

To be announced during the course.

▼ ECTS value

0

▼ Additional information

The prerequisite examination is a prerequisite for participation in exam element a)

▼ Exam element a)

▼ Timing

Autumn and January.

▼ Prerequisites

Type	Prerequisite name	Prerequisite course
Examination part	Prerequisites for participating in the exam a)	N150012101, BB903: Technologies and tools used in climate adaptation

▼ Tests

▼ Portfolio exam with oral defense

▼ EKA

N150012102

▼ Assessment

Second examiner: Internal

▼ Grading

7-point grading scale

▼ Identification

Full name and SDU username

▼ Language

Normally, the same as teaching language

▼ Examination aids

Allowed, a closer description of the exam rules will be posted in itslearning

▼ ECTS value

7.5

▼ Additional information

Portfolio exam consisting of: Submission of Project report, presentation and defence of report.
The oral defence takes places during the examination period in January month

▼ Indicative number of lessons

75 hours per semester

▼ Teaching Method

At the Faculty of Science, the teaching is organized according to the three-phase model, ie. intro, training and study phase.

Activities during the study phase:

- Finishing analysis
- Weekly report writing

The course includes a 5 day trip with mandatory overnight stay at the Department of Biology's field station in Svanninge Bjergein week 46. Here, the focus is on tasks. The rest of the course is structured in lessons of 1-hour introductory lecture followed by 3 hours of exercises.

▼ Teacher responsible

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Paula Canal-Vergés	canal@biology.sdu.dk	Biologisk Institut

▼ Additional teachers

Name	E-mail	Department	City
Mogens Flindt	Mrf@biology.sdu.dk	Økologi	

▼ Timetable

Odense

Show full time table

▼ Administrative Unit

Biologisk Institut

▼ Team at Registration

NAT

▼ Offered in

Odense

▼ Recommended course of study

Profile	Education	Semester	Offer period
AO i klimatilpasning - Optag 1.september 2021, 2022 og 2023	Master of Climate Adaptation Master of Climate Adaptation Odense	1	E23
AO i klimatilpasning - Optag 1.september 2022 og 2023	Master of Climate Adaptation Master of Climate Adaptation Odense	1	E24

▼ Transition rules

Transitional arrangements describe how a course replaces another course when changes are made to the course of study.
If a transitional arrangement has been made for a course, it will be stated in the list.
See transitional arrangements for all courses at the Faculty of Science.