van hall larenstein
university of applied sciences

Environmental Sciences: Climate and Energy

Minor code	MIN-ESCE
Education cycle	1st cycle (bachelor)
Mode of delivery	On-campus
Study programme	Environmental Sciences
Part of study year	Year 3
Location	Leeuwarden
Semester	Fall semester; terms 1 and 2
Number of credits (ECTS)	30
Language of instruction	English
Target group	Van Hall Larenstein students, Erasmus+ students, external students Students with two years of study in an environmental sciences-oriented or related program at a BSc level, who are interested in learning more about an integrated approach to environmental sciences, water- and environmental technology issues.
Minor co-ordinator and contact person	Leo Bentvelzen, leo.bentvelzen@hvhl.nl
Entry requirements and prerequisites	Two years of study in an (environmental) sciences-oriented or related program at a BSc level. A solid base in mathematics, physics, chemistry and more specifically a good understanding and mastering of the following topics: composition of the atmosphere, chemical bonding , chemical calculations, absorption of radiation, behavior of gases and vapours.
Application procedure	Motivation letter in which the student motivates his choice. Depending on your study background and motivation letter, you may be asked for additional information, e.g. in an intake interview with representatives of this minor. Their advice is binding. Consult Exchange possibilities

Major study units

Term of teaching	Study unit code	Name of the study unit	ECTS
Term 1	LMK320VE	Sustainable Urban Environment	7
Term 1	LMK321VE	Air Quality and Climate	7
Term 2	LMK224VE	Energy and Material Cycles	7
Term 2	LKZ313VE	Sustainable Energy Transition	7
Term 1 and 2	LMK910VNMI	Supplementary Assignment	2

Content

How to deal with environmental issues, concerning climate change and energy transition? That's what this minor is about. Those environmental issues involve urban environment, air quality, climate and energy and material cycles. GIS (Geographic Information System) is a supporting tool. In this minor you are challenged to develop sustainable solutions, taking planet, profit and people into account. Be aware of what will be the impact on the environment, with any change we make. How will it affect climate change, air quality, the lives of people?
The minor consists of three Environmental Sciences courses, one course within the education Coastal & Marine Management and a supplementary assignment.

Competences

ES 1: developing and balancing sustainable solutions; level 2 and 3 (advanced and professional).
ES 2: to work interdisciplinary and internationally; level 2 (advanced).
ES 3: to think, act and perform research in a methodical and reflective way; level 2 and 3 (advanced and professional).
ES 4: project work; level 3 (professional).
ES 5: advising professionally; level 2 and 3 (advanced and professional).
ES 6: to function responsibly; level 3 (professional).

Learning goals

LMK320VE: Sustainable Urban Environment (SURE)
After successful completion of this course the student is able to:

- To integrate the concept of the UNSDG11 and the principles of urban planning into a product or an advice that can be used by the client in one of the aspects of sustainable urban development
- To develop, monitor, control and participate in an interdisciplinary project. He is able to use technical, legal and financial resources efficiently and to organize the collaboration processes effectively.
- to compare and use different tools effectively for the planning and qualitative research processes for developing the professional product

Please note that this course includes an excursion abroad, for which the total extra costs to be paid by the student will be approx. 300 euro

LMK321VE: Air Quality and Climate:
After successful completion of this course the student is able to:

- Describe the relations between the different elements of systems and processes in the environment, to map the effects of human activities on organisms, ecosystems, biodiversity and different types of landscapes.
- Apply norms to identify and analyse the risks and effects of substances on humans and ecosystems.
- Make a sound comparative assessment of different solutions for (simple) environmental problems based on sustainability.
- Use English study materials.
- Apply simple analytical techniques to data processing.
- Interpret the outcomes of the research. Reflect on the used methods and research results.

LMK224VE: Energy and material cycles:
After successful completion of this course the student is able to:

- Apply the taught methods to design socially responsible solutions for environmental problems.
- Make a sound comparative assessment of different solutions for (simple) environmental problems based on sustainability.
- Execute the research plan systematically, and focus on the purpose of the research.
- Present the outcomes of the research to the client in an appropriate way.
- Render an advice on a complex environmental problem for an external client while taking ethical dilemmas into account.

LKZ313VE Sustainable Energy Transition
This module provides you with insight in the challenges of the energy transition and the development of sustainable energy in coastal and marine areas. The focus of the module is on the Energy transition in the Netherlands, and we will discuss this energy transition from three perspectives:
- Technological
- Economical
- Policy

To appreciate the complexity of the energy transition from an international perspective you will play a blue growth board game in the first week of the course. This board game illustrates the complexity of transboundary marine spatial planning. To really experience this complexity you will also play a serious game during the remainder of the course. In this serious game you will play the role of real-life stakeholders and negotiate the placement of 10 GW of wind energy in the Dutch part of the North Sea.

Finally the module aims to stimulate students to analyse and reflect on their own behaviour regarding energy transition processes. In addition you will be challenged to form your own well-

	argued opinion on matters related to the energy transition in the Netherlands. The modules of the specialization need a minimum amount of students. When less than 10 students applied for the module, the moduleteam can decide to cancel the module. The decision whether the module will take place or not will be made at least three weeks before the start of the module. Students will get the chance to choose another module from another specialization. **LMK910VNMI Supplementary Assignment**
Added value	Students will obtain a wider view on environmental issues. They will learn how to apply the knowledge and skills using innovative methods to solve actual problems. It will benefit them and enable to become a professional in environmental sciences and in the end it will benefit the environment. And thus, our society.
Mandatory literature	Materials will be published on Moodle (ELO) in due course.
Teaching methods and student workload	**LMK320VE** • Lectures, workshops • Guest lectures • Group project and individual assignments • (International) excursion(s) • Self-study • Presentations professional products **LMK321VE:** • Air quality • Climate change • Measures (emission control) • Legislation and policy • Lectures, laboratory and computer practical's, excursion or guest lecture, self-study **LMK224VE:** • Lectures • Practical assignments • Project • Excursion **LKZ313VE** • Guest lectures • Serious Game • Excursion • Self study **LMK910VNMI:** • Supplementary assignment, content depends on students background (56 hours)
Assessment	**LMK320VE: 7ECTS** Continuous assessment/Professional product 7ECTS **LMK321VE: 7ECTS** Air Quality (computer) + Legislation/policy (written, individual) Climate Change + Emission control (written, individual) Practical's (reports, partly by group and partly individual) **LMK224VE: 7ECTS** Exam (open questions; 90 min; individual;3ECTS Test Economics (computer test; 90 min; individual;1ECTS Project (group assessment; 3ECTS

	LKZ313VE: 7ECTS Exam Theory Game Presentation **LMK910VNMI: 2ECTS** Report; 2ECTS
Evaluation scale	Grades between: 1-10; 0,1 interval; 5,5 pass View ECTS credits and grading