MSC IN SUSTAINABLE MANAGEMENT OF NATURAL RESOURCES

Study guide

2024-2025

Accreditation of the master's program SMNR, in accordance with the Law NOVA article 12, 13, 14, 15, 16, 18 (SB 2007, No 74), has been granted on Dec. 5, 2015 for the period: 27-11-2015 till 27-11-2021. Renewed for the period 31st of October 2022 until 31st of October 2028.

This program is supported by the Suriname Conservation Foundation (SCF GREEN PARTNERSHIP PROGRAMMA - SGPP) for the period 2018-2022 [http://www.scf.sr/]

In the period 2009-2018, this program was supported by the VLIRUOS [http://www.vliruos.be]

Partial funding comes from the SMNR program, ADEKUS and other donor agencies and private companies in Suriname [http://vlir-iuc.uvs.edu/smnr/index.html]

vliruos SHARING MINDS, CHANGING LIVES

2009-2018

ANTON DE KOM UNIVERSITEIT VAN SURINAME

2009-present

CARING FOR NATURE, FOR LIFE SURINAME CONSERVATION FOUNDATION

2018-2022

NOVA NATIONAAL ORGAAN VOOR ACCREDITATIE

First accreditation

2015-2021

NOVA NATIONAAL ORGAAN VOOR ACCREDITATIE

Second accreditation

2022-2028

Welcome the MSc in SMNR

Welcome to the Master of Science program in Sustainable Management of Natural Resources (SMNR) at the Faculty of Technology (FTeW) of the Anton de Kom University of Suriname (AdeKUS). As the FTeW plays an important part in the development of human capital in the field of natural resources, the SMNR department offers this MSc in SMNR programme. The objective of this programme is to contribute to the sustainable development and management of natural resources in Suriname with specialization in the fields of land management, renewable energy, food security, and water management. This for the benefit of present and future generations in Suriname.

The coming years you will obtain advanced knowledge at master level in the field of basic and applied sciences in the following domains: applied mathematics, modeling, spatial information techniques, international and national policies on sustainable development, system management of natural resources, and economy and management. Highly qualified lecturers from AdeKUS as well as from other universities, state of the art books, instruments and softwares are 100% guaranteed. The program consists of lectures, computer exercises, individual and group assignments and presentations, fieldwork during excursions, guest lectures, participation in trainings, workshops and seminars, and different information sessions.

This handbook will provide you with information such as the aims and objectives of the master program, the course structure, courses and description, MSc graduate profile and qualifications, admission requirements, examination guidelines, other regulations and procedures, sources of information and support.

Further information of the MSc in SMNR program can be found at the website **http://vlir-iuc.uvs.edu/smnr/** and **www.msc-smnr.org** or can be obtained from the program coordinator via msc-smnr@uvs.edu. We have also included more information on the Moodle website (moodle.uvs.edu => go to FTeW). We hope that you will enjoy your study with us. The Faculty of Technology will assure a good study environment to undertake your studies. Furthermore, are the management and staff of the MSc in SMNR program committed to provide an excellent education at master level.

On behalf of the Faculty of Technology, we thank you for having chosen the MSc in SMNR,

U. Satnarain, MSc.
Program coordinator

Prof. dr. ir. P. Willems
External program coordinator

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Introduction

Suriname features a wealth of natural resources, with a considerable potential for socio-economic development. In order to preserve these resources for present and future generations, sustainable management is an urgent need. Are you interested to become a key professional on the pathway to sustainable management of Suriname's natural resources?

The Faculty of Technology (FTeW) of the Anton de Kom University of Suriname (AdeKUS) in collaboration with international universities and other international experts offer you a **Master of Science program in Sustainable Management of Natural Resources (MSc-SMNR**).

Management and staff

The management of the program consists of the Department Head, Acting Head, Thesis coordinator and a course secretary. The academic staff consist of highly qualified lecturers, with at least 70% having a PhD degree, from the Anton de Kom University of Suriname and foreign universities. A list of the contact addresses of the academic staff can be found on the SMNR website and Moodle.

Department Head/Programme Coordinator Usha Satnarain, MSc Phone: (+597) 465558 # 2355, 2357 Mobile: (+597) 8529991 Email: gaitrie.satnarain@uvs.edu
Acting Department Head Kimberley Fung-Loy, MSc. Phone: (+597(465558 # 2355, 2357 Mobile: (+597)8555659 Email: Kimberley.Fung-Loy@uvs.edu
Thesis coordinator Angelika Namdar MSc. Email: angelika.namdar@uvs.edu

This master program offers education and research in the following four themes: **land resources management, sustainable energy management, sustainable food systems, and water resources management. After successful completion of the master program** the "**Master of Science"**degree will be obtainedThe duration of the Master of Science program is **3 years.**

Aim of the MSc program in SMNR

To provide highly motivated and highly qualified academics equipped with knowledge and understanding of SMNR who are able to conduct problem-solving scientific research from an integrated social and technology perspective. Students are trained to identify the opportunities of globalization and the impact on local development and to present integrated social and technological solutions to achieve the sustainable development goals in Suriname, the region, but also internationally.

Profile of the MSc graduates

The MSc graduate is able to contribute to the sustainable management of the natural resources in Suriname according to the guidelines for sustainable development of the United Nations (SDGs) and laws and regulations in Suriname, from an integrated social and technical perspective. The graduate is also able to independently conduct advanced scientific research on SMNR, in the themes of land, energy, food and water, in order to propose solutions to current and anticipated complex problems and to participate in decision-making processes.

The graduate of this program is optimally equipped with knowledge and skills to perform as a researcher or policy maker in various (international/ regional or national) institutions or organizations such as governmental agencies, quasi-governmental agencies, non-governmental agencies, private sector, and in education and research institutions. Depending on the number of years of experience, the MSc graduate starts as a junior or senior researcher, but can also decide, after having gained a few years of experience, to start his/her own research office. In time, at national and international level the MSc graduate can hold positions such as a staff member, head of a department, project manager, consultant, policy maker or policy advisor



The learning outcomes are:

A. Knowledge and insight - The SMNR graduate:

1. has demonstrable broad knowledge about and insight into the sustainable development and management of various renewable and non-renewable natural resources in the world and Suriname.
   - 1.1. has demonstrable knowledge and understanding of aquatic and terrestrial ecosystems and ecosystem services.
   - 1.2. has demonstrable knowledge and understanding of climate change and its impact on natural resources.
   - 1.3. has demonstrable knowledge and understanding of the principle of sustainable development in relation to the management and use of natural resources.
   - 1.4. has demonstrable knowledge and understanding of national and international legislation and policy regarding natural resources.
   - 1.5. has demonstrable knowledge and insight into economic valuation of natural resources.
   - 1.6. has demonstrable knowledge and understanding of project management related to natural resources**.**

2. has demonstrable in-depth knowledge and insight into the sustainable development of renewable and non-renewable natural resources in the world and Suriname, within one of the specific specializations.

   Specialization: Land Resources Management:
   - 2.1 has knowledge and insight into the most important characteristics and processes of different land use systems.
   - 2.2 has knowledge and insight into the mutual interactions between different land uses and the interactions with the ecosystem.
   - 2.3 has knowledge and insight into the causes of land use changes.
   - 2.4 has knowledge and insight into different planning strategies for sustainable land use.

   Specialization: Sustainable energy management
   - 2.5 has knowledge and understanding of energy supply systems and the potential of renewable energy sources.
   - 2.6 has insight into current conversion technologies for the generation of usable energy from different energy sources.
   - 2.7 has knowledge about the economics of energy supply.
   - 2.8 has insight in evaluating the environmental impact of current and future energy systems.

   Specialization: Sustainable food systems
   - 2.9 has knowledge and insight into sustainability of food systems.
   - 2.10 has knowledge and insights with regard to economic and environmental aspects of the agri-food chain.
   - 2.11 has knowledge of managing sustainable agricultural and food supply chains

2.12 has knowledge and understanding of food quality assurance and food safety.

Specialization: Water resources management

2.13 has knowledge and understanding of different aspects of the global hydrological cycle and the Earth's climate system

2.14 has knowledge and insight into both surface water and groundwater resources and the influences of the climate on them.

2.15 has knowledge about pollution of water sources and its impact on people and nature

2.16 has knowledge and understanding of how hydrological processes are dynamically linked to human activities, including land and water use.

3 has advanced knowledge and understanding of scientific research methods and techniques

3.1 has knowledge and insight into applied statistical methods.

3.2 has knowledge and insight into applied mathematical models.

3.3 has knowledge and insight into the use of GIS.

3.4 has knowledge about and insight into scientific methods in the field of data collection and data analysis.

B. Applying knowledge and insight - The SMNR graduate:

4 is able to independently conduct advanced scientific research and develop, monitor, evaluate and further optimize solution models for complex problems.

5 is able to analyze complex problems regarding natural resources in Suriname from technological, ecological, economic and social perspectives, within one of the specific specializations, with the integrated knowledge and insights and the problem-solving capacity.

C. Critical Attitude - The SMNR Graduate:

6 is able to reflect critically on one's own work and the work of others and to display a critical attitude.

7 is able, based on scientific research, to formulate judgments depending on incomplete or limited information, taking into account the social and ethical responsibilities associated with the application of one's own knowledge and judgments.

D. Communication, Collaboration and Leadership - The SMNR Graduate:

8 is able to clearly and unambiguously communicate conclusions arising from scientific research, as well as the knowledge, motives and considerations underlying them, to an audience of specialists or non-specialists.

9 is able to collaborate in a multidisciplinary team and contribute effectively to solving complex problems related to the management of natural resources.

E. Learning Skills – The SMNR Graduate:

10 possesses the learning skills and a self-directed learning attitude that enable him or her to engage in ever deeper scientific theories, reflect on them and, where deemed necessary, undertake further studies with a largely self-directed or autonomous character.

COHORT 2024-2025

For **cohort 2024-2025**, the specializations offered are:

1. **Water Resources Management**

   Water is one of the fundamental resources for life on Earth. Internal (such as population growth) and external factors (such as climate change) are increasing the pressure on fresh water in the world. Although Suriname has a high annual rainfall (> 2,000 mm) and sufficient fresh water (4,800 m3/s), fresh water in Suriname is also under severe pressure. Freshwater in our rivers is abundantly present in the upstream. Fresh groundwater can still be found in the coastal strip, especially at great depths (> 100 m). This water is mainly used for drinking water supply. However, sea level rise is causing saltwater to penetrate further downstream of the river and the aquifer, which means that freshwater supplies for drinking water, agricultural areas and a healthy ecosystem and biodiversity such as in swamps and nature reserves along the coast is under threat for some years now. Changes in the climate such as less precipitation cause longer droughts and therefore less (fresh) water and more precipitation leads to longer rain periods, resulting in flooding. Longer periods of less precipitation have a direct impact on, among other things, the Afobakka hydropower plant, but also agricultural areas and nature reserves. Flooding is one of the biggest threats to Suriname now and in the coming years, because of the low location of the coastal strip and the fact that a lot of economic activities take place in this strip. Both sea level rise and flooding (damage to land surface) also affect water quality.

2. **Sustainable energy management**

   The need for sustainable energy supply is becoming increasingly important with decreasing fossil energy sources, environmental pollution and climate change. This theme focuses on the sustainable development of the energy sector. The emphasis is placed on the optimal use of renewable energy sources, such as wind, sun and water. The core value here is sustainable development based on an optimally balanced energy matrix, in line with the environmental policy as contained in the national objectives in line with the Paris Agreement, which also highlights the financial-technical aspects of optimization.

Admission requirements

The MSc in SMNR program has the following **main** admission requirements:

- At least a BSc degree (or equivalent) in a relevant field of science
  (For deficiency courses, see next page);
- An average grade for the BSc study of at least 7.0;
  Students with an average mark of 6.5 to 6.9 are conditionally admitted;
- Fluency in English, both written and spoken.

Persons in possession of an equivalent (international) bachelor's degree can be admitted to the study program, only after the screening of possible deficiency courses.

Deficiency courses

Students of other BSc programmes must have the required courses in their BSc course package or complete them at the BSc programs of the AdeKUS, before the MSc in SMNR programme starts.

SMNR specialisations	DIRECT INTAKE		DEFICIENCY COURSES*
	BSc programme	*Orientation*	
Land resources management	Agrarische produktie Infrastructuur Milieuwetenschappen	Bosbouw	Ruimtelijke ordening (IS/MW)
Sustainable energy management	Electrotechniek	Energietechniek	Energietransformaties in elektrische centrales (ET)
Sustainable food systems	Agrarische productie Biologie		Plantaardige- en dierlijke produktie (AP)
Water resources management	Geowetenschappen Infrastructuur Milieuwetenschappen Biologie	Sedimentaire Geologie	Hydrologie (CT) of Hydrogeologie (GW)

For more information, contact the Programme Coordinator.

Application and selection

Applicants must complete the application form and submit it with all required documents **by 21th of August 2024** via https://forms.gle/rkEdWtp8JZArhDAh6 .
The following documents are considered per dossier, before final acceptance takes place:

- Bachelor of Science Diploma and transcripts,
- a short essay in English (max. one A4) about the motivation to enroll in the MSc program in SMNR and about the professional expectations upon graduation,
- CV (in English), and
- a letter of recommendation from the employer (if applicable).

By 31st of August 2024, the selected candidate will receive a notification by email followed by an invitation for the final registration.

Costs

The MSc in SMNR program has the following costs for a student:

- Registration fee : SRD 4,200
- Tuition fee : USD 2,100 (as of 2024)
- Additional administration costs at exceeding study duration SRD 950

Students may wish to seek financial assistance to cover all, or part, of the costs of this program. The N.O.B. offers possibilities to finance your registration and tuition fee. (http://fss.nobsuriname.com).

Structure three-year MSc program in SMNR

The MSc program accounts for a total of **120 ECTS spread over three years**. A number of **common courses** serves to meet the final qualifications of all future graduates, irrespective of specialization. A limited list of **specialization courses** serves to allow in depth study of one specialization.

MSc in SMNR curriculum

			Lecture hours			Other hours			
	Courses	**ECTS**	**Co**	**In/Pr**	**We**	**Excursion**	**Exam**	**CON**	**ZE**
Year 1	Introduction to sustainable resource management	4	16	4	20			40	63
	Research methods and scientific communication	4	10	10	20			40	67
	Project management	3	10	10	20			40	50
	Applied statistics and data modeling	4.5	10	20	10		3	43	84
	GIS and remote sensing	4.5	10	10	20		0.5	41	87
	Law on natural resources and environment	5	20	4	16			40	99
	Tropical aquatic and terrestrial ecology	5	16		16	8	3	43	95
	Biodiversity conservation	5	12	8		20		40	101
	Climate change adaptation and mitigation	5	10	10	16	4	3	43	94
Year 2	Environmental pollution and sanitation	5	20		10	8	3	41	96
	Economy and valuation of natural resources	5	10	10	20		1.5	42	97
	Water resources management	5	10	10	20		3	43	100
	Spatial planning	5	10	10	16	4		40	101
	Renewable energy resources	5	20	4	16		2	42	97
	Energy policy, sustainability, society	5	10	10	16	4	0.5	41	100
	Energy an the environment	5	10	10	20		0.5	41	100
	Economics of renewable energy technologies	5	10	10	12	8	3	43	97
	Surface hydrology and modeling	5	10	10	16	8	3	47	93
	Hydrogeology and modeling	5	10	10	10	8	0.5	39	103
	Water quality Assessment and Modeling	5	10	12	10	8		40	101
Year 3	Research project: Modeling and simulation of energy	5	10	10	12	8		40	100
	Research project: water resources modeling	5	10	10	12	8		40	100
	Integrated Project natural resource management	5	10	10	12	8		36	103
	Thesis preparation	5	0	10	30			40	99
	Thesis	25	0	0	25			25	675

Co= Lectures, In= Instruction, Pr=Practicum, We= Work classes, CON= Contact hours, ZE= Self-study hours

Courses of the MSc program in SMNR will be placed on the "AdeKUS Digitale Leeromgeving MOODLE" via http://moodle.uvs.edu/ [go to Faculty of Technology, choose SMNR]. Students are requested to visit this website regularly for updates. At the beginning of the academic year, you will receive your Moodle passwords and uvs email address. For more information on Moodle and email services, contact UCIT at the AdeKUS campus (support@uvs.edu).

Academic program 2024

Sustainable Energy Management | Water Resources Management

	Courses	Total weeks	Number of lecture weeks	Start lectures	End lectures	Exam	Re-exam	Test type
Year1	Research methods and scientific communication	4	2	28-Oct-24	22-Nov-24	22-Nov-24	23-Dec-24	Presentation Reflection Assignment Essay
	Introduction to sustainable resource management	4	2	25-Nov-24	20-Dec-24	20-Dec-24	7-Feb-25	Poster
	Project management	3	2	6-Jan-25	31-Jan-25	31-Jan-25	14-Mar-25	Assignments
	Applied statistics and data modeling	4.5	2	10-Feb-25	7-Mar-25	7-Mar-25	18-Apr-25	Written exam
	GIS and remote sensing	4.5	2	17-Mar-25	11-Apr-25	11-Apr-25	23-May-25	Skills test Oral Exam Report
	Law on natural resources and environment	5	2	21-Apr-25	16-May-25	16-May-25	27-Jun-25	Presentation Essay
	Tropical aquatic and terrestrial ecology	5	3	26-May-25	20-Jun-25	20-Jun-25	1-Aug-25	Presentation Written exam Essay
	Biodiversity conservation	5	2	30-Jun-25	26-Jul	26-Jul	5-Sep-25	Skills test Presentation Report
	Climate change adaptation and mitigation	5	2	4-Aug-25	29-Aug-25	29-Aug-25	10-Oct-25	Report Presentation
Year2	Environmental pollution and sanitation	5	2	13-Oct-25	7-Nov-25	7-Nov-25	6-Feb-26	Written exam
	Economy and valuation of natural resources	5	2	10-Nov-25	12-Dec-25	12-Dec-25	13-Mar-25	Peer discussion Presentation Report Written exam
	Water resources management	5	2	5-Jan-26	6-Mar-26	6-Mar-26	13-Mar-26	Report
	Spatial planning	5	2	9-Feb-26	6-Mar-26	6-Mar-26	17-Apr-26	Report Presentation
	Renewable energy resources	5	2	16-Mar-26	10-Apr-26	10-Apr-26	22-May-26	Essay Written exam Report
	Energy policy, sustainability, society	5	2	20-Apr-25	15-May-25	15-May-25	26-Jun-26	Written exam Peer discussion
	Energy an the environment	5	2	25-May-26	19-Jun-26	19-Jun-26	28-Jul-26	Oral exam Essay Presentation assignments Peer discussion
	Economics of renewable energy technologies	5	2	29-Jun-26	24-Jul-26	24-Jul-26	4-Sep-26	Written exam Report
	Surface hydrology and modeling	5	2	20-Apr-25	15-May-25	15-May-25	26-Jun-26	Written exam Report
	Hydrogeology and modeling	5	2	25-May-26	19-Jun-26	19-Jun-26	28-Jul-26	Written exam Assignments
	Water quality Assessment and Modeling	5	2	29-Jun-26	24-Jul-26	24-Jul-26	4-Sep-26	Report Presentation Skills test Lab/field experiments
Year3	Research project: Modeling and simulation of energy	5	2	2-Aug-26	28aug201	28aug201	9-Oct-26	Report Poster Reflection assignment
	Research project: water resources modeling	5	2	3-Aug-26	28aug202	28aug202	9-Oct-26	Report Poster Reflection assignment
	Integrated Project natural resource management	5	2	12-Oct-26	4-Dec-26	4-Dec-26	15-Jan-27	Oral exam Essay
	Thesis preparation	5	2	7-Dec-26	8-Jan-27	8-Jan-27	19-Feb-27	Thesis report Presentation
	Thesis	25	25	1-Mar-27	10-Mar-27			
		120 ECTS						

Study progress

Students who have successfully obtained more than 75% of the number of credits of the previous year, can continue with the courses of the following year. Students with obtained credits between 50% and 75%, will receive a warning notification. They will be allowed to participate in courses of the following year, only if this will not affect the successful completion of the courses. In both cases, priority must be given to the subjects from the previous year that still needs to be completed. If students have obtained less than 50% of the number of credits per year, they are referred to the student counselor for study guidance. They are not allowed to take courses of the following year. They will also receive a warning notificationto give priority to the subjects of the previous year.

Evaluation of courses and program

Evaluation assessments are organized with students and lecturers after every course. Please make sure you fill in the course evaluations on Moodle after each course via https://student.uvs.edu/course/view.php?id=2033

Language

Teaching is in English and ocassionally in Dutch while examinations are mainly in English. It is thus essential that students have a good knowledge of **English.**

Time of lectures and examinations

Courses are thaught from **Monday to Friday** mainly from **14.00 till 18.30** hour (occasionally from 18.00-21.00 hour) including breaks. The program is based on **block system**. This allows the students to have concentrated periods of on-site, face-to-face learning and focus on one module at a time, followed by more self-directed and collaborative learning periods. Excursions may be organized as much as possible during the weekends.

Examins are from **14.00-17.00** hours in Room 71 at FTeW. Note that some courses only offer one exam per year.

A detailed timetable is issued via Moodle at the beginning of the academic year. Any timetable alterations are notified via email.

Lecture notes, books and software's

Lecture notes, relevant course material (e.g. assignments) and software's of the different courses can be required via the Moodle website (http://moodle.uvs.edu/). Original books for each course are available in the AdeKUS library (http://ub.uvs.edu/) and the SMNR library. Students are allowed to make copies of these if there is a need. Lecture notes (e.g. ppt files) are provided by the lecturer. All required software's are installed at UCC, Room 3-Palulu.

Lecture rooms and research facilities

The main lecture room, room 71, located in building 16, is equipped with a black board, white board, beamer, computer and wifi.. Research facilities are offered by different institutes at the AdeKUS campus such as the laboratories of the departments of the FTeW, FMeW, Center for Environmental Research (CMO at the National Zoological Collection of Suriname) and other relevant research institutes such as CELOS, the Hydraulic Lab, the Energy lab, the National Herbarium of Suriname and the National Zoological Collection of Suriname.

Computer room

Computer sessions are held in UCC at AdeKUS, building 7, room 3 - Palulu. This room is equipped with 30 computers with the required . softwares. The computer room is accessible for students for practical work,assignments and reports between 7.30-15.00 hr. Registration at the front desk is required for using the computers in this room.

General information

Anton de Kom University of Suriname

Bureau Studentenzaken (StuZa)

The Student Affairs Office (StuZa) is concerned with general student activities at the University such as: registrations, ombudspersons, mediation in scholarship matters (Surinamese and study abroad scholarships), student loans, sport affairs, life insurance, student-assistant application, among others.
This office is located in the BAK building and can be reached through the phone number 465558 ext. 2212, 2213 or 2214 / +597 8592017 and email: stuza@uvs.edu.
Opening hours are Monday to Friday: 7.30am - 2.30pm.

Student housing

The Student Housing Campus Village (SSHCV) is an initiative of the Anton de Kom University of Suriname and the Surinamese Government to provide Surinamese from all districts in the country with student housing in Paramaribo and thus offer them the opportunity to study at the university or to attend another public higher education institution. For more information, see www.sshcv.org.

Faculty of Technology (FTeW)

The Faculty Board

The daily management of the faculty is the responsibility of the Dean and the Secretary of the Faculty Board, who currently are:
- Mr. Sanjeev Bissesar, MSc. (dean)
- Mr. Gordon Babel, MSc. (secretary)

Contact information of the Faculty of Technology:
Telephone: 465558 ext. 2317 | E-mail: ftew-decanaat@uvs.edu

The Examination Board of the FTeW

The Examination Board of the FTeW is a supervisory committee set up by the Faculty Board with the main task of validating examination results taking in consideration the exam quality and procedures. For the SMNR, the Examination Board consists of:

- L. Joyette-Jubitana, MSc., Chair | Email:
- A. Namdar, MSc., Secretary MSc Programs | Email:

The Examination Board can be contacted via: (597)465558 ext. 2315 | mobile (597) 8873951 | E-mail: examencie-ftew@uvs.edu
Students who require letters regarding their grades or registration can send their request to Examination Board.

Student Dean

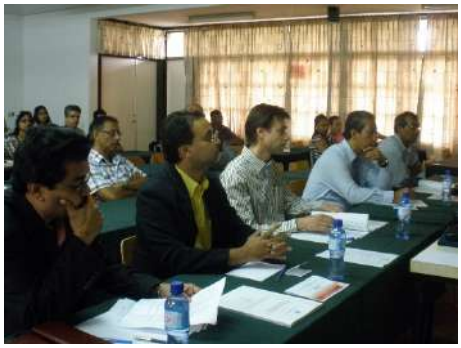
A Student Dean has been appointed at faculty level, who can be consulted by students

for advice and support. Students can also go through the RC for referrals to the Student Dean. The Student Dean also provides central training courses on effective studying. Contact the Student Dean, Drs. Denise Sumter at Building 17 - Room 52 | Phone number: 465558 ext. 2314 /WhatsApp: 8988701 | Online: via MOODLE: https://student.uvs.edu/course/view.php?id=1713 | make an appointment online via http://bit.ly/maakeenafspraakftewstuddec.

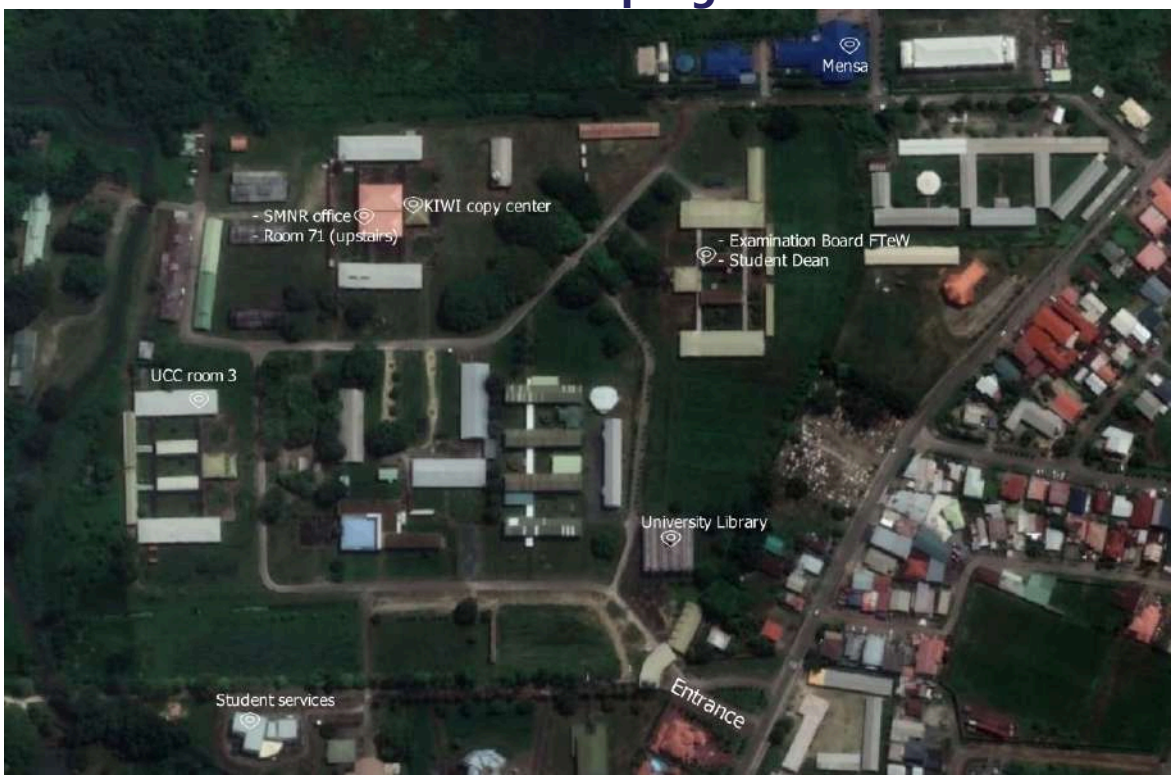
Kiwi Copy & More
Telephone: 8524788/8962090
Email: kiwicopynmore@gmail.com
Open: Monday- Friday, 9:00am- 7:00pm
Facebook: https://www.facebook.com/KiwiCopy/about

Graduation and alumni

Graduation takes place according to the guidelines of the FTeW in collaboration with the FTeW Examination Board. Two or four times a year gradutes can receive the master diploma. After graduation, the alumni are kept informed about new developments in this program e.g. short courses. You will also receive the annual report of the MSc in SMNR program.



Contact address MSc in SMNR program



MSc in SMNR office

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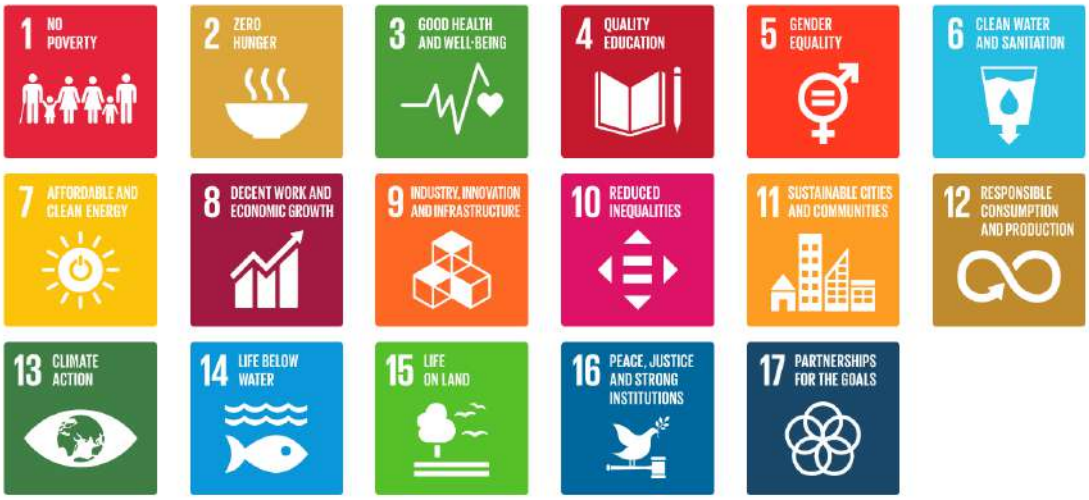
Phone: (597) 465558 # 2355
E: msc-smnr@uvs.edu

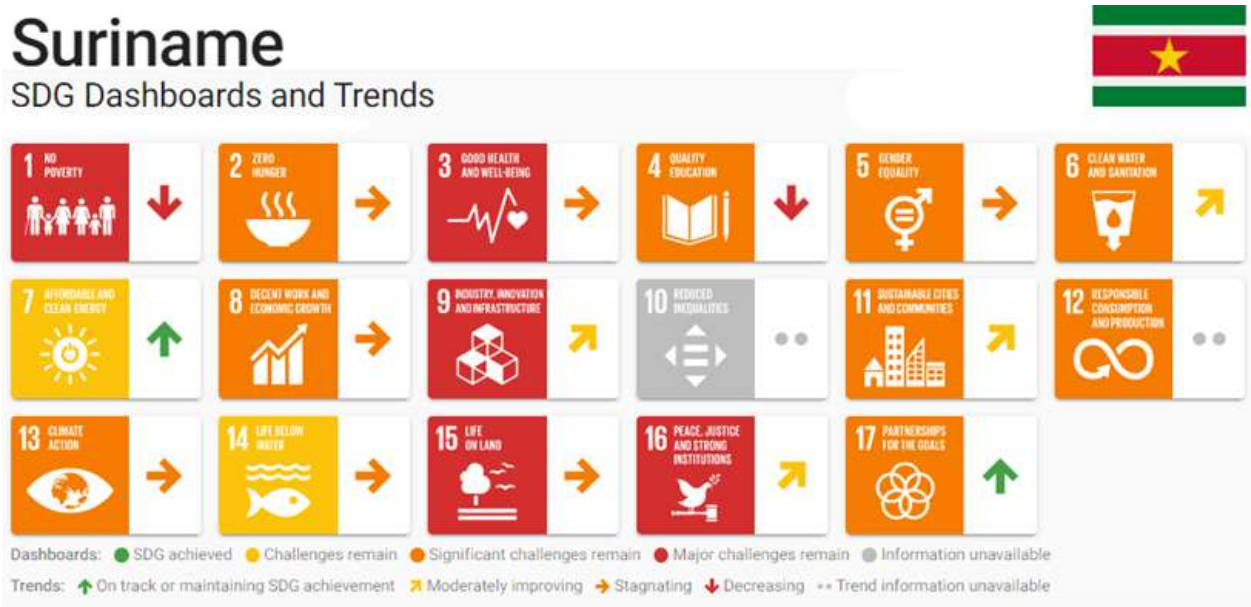
17 Goals to Transform Our World

In 2015, countries adopted the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals.

In 2016, the Paris Agreement on climate change entered into force, addressing the need to limit the rise of global temperatures.

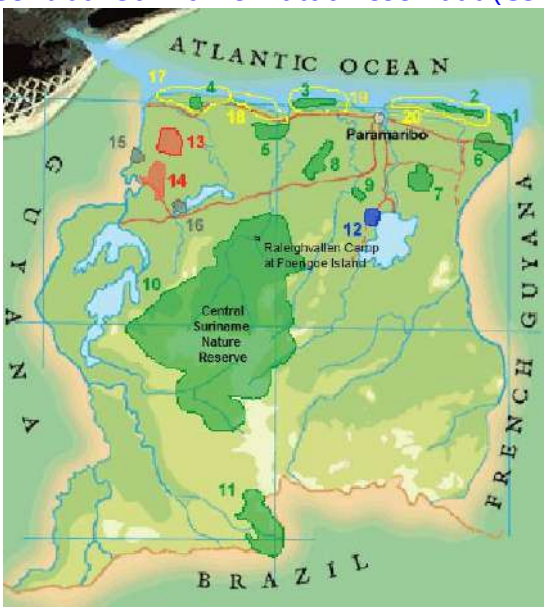
Governments, businesses and civil society together with the United Nations are mobilizing efforts to achieve the Sustainable Development Agenda by 2030. Universal, inclusive and indivisible, the Agenda calls for action by all countries to improve the lives of people everywhere.





SMNR is supporting research in the Nature Reserves in Suriname

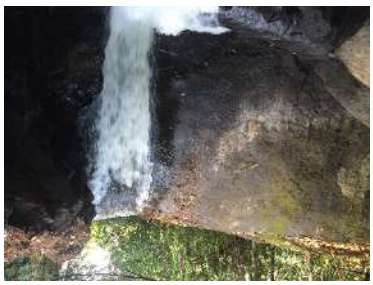
Centraal Suriname Natuurreservaat (CSNR)

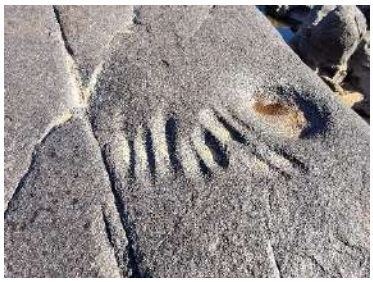


The Central Suriname Nature Reserve comprises 1.6 million ha of primary tropical forest of west-central Suriname. It protects the upper watershed of the Coppename River and the headwaters of the Lucie, Oost, Zuid, Saramacca, and Gran Rio rivers and covers a range of topography and ecosystems of notable conservation value due to its pristine state.

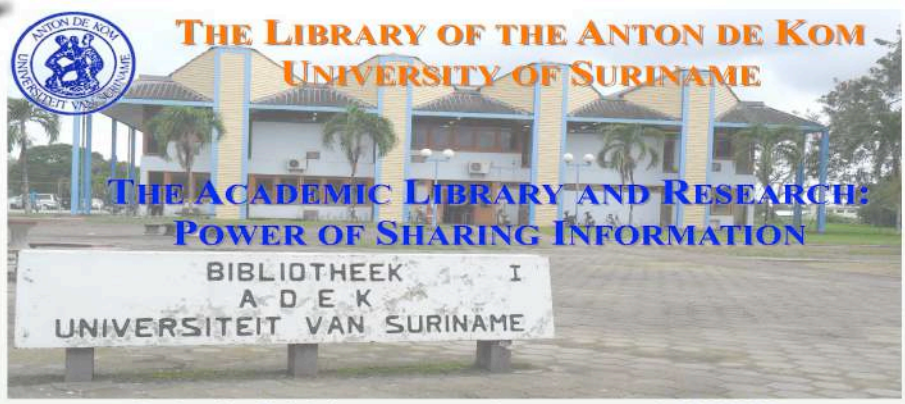
Its montane and lowland forests contain a high diversity of plant life with more than 5,000 vascular plant species collected to date. The Reserve's animals are typical of the region and include the jaguar, giant armadillo, giant river otter, tapir, sloths, eight species of primates and 400 bird species such as harpy eagle, Guiana cock-of-the-rock, and scarlet macaw.





In the period 2018-2022 students will execute field work also in this study area via different courses.



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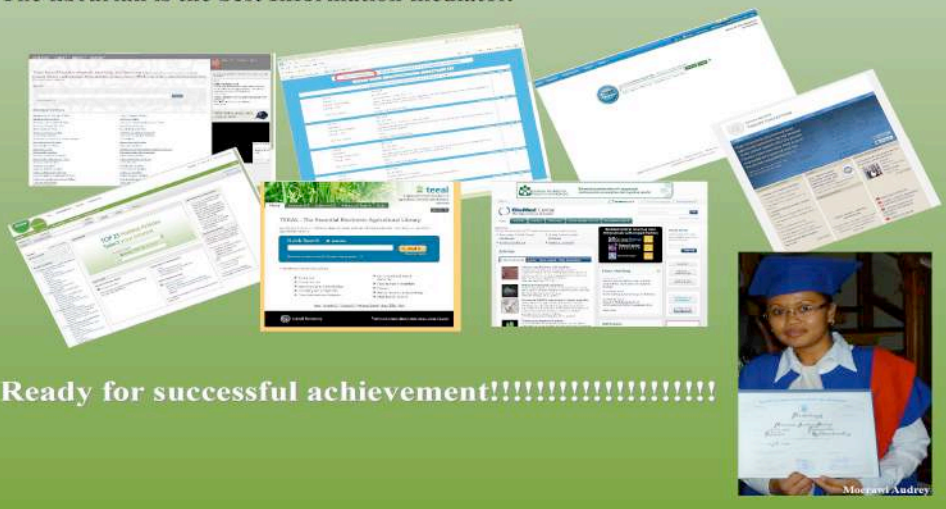

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Field work during some courses

Appendix 1: Description of courses (in order of appearance and per track)

Common courses

Introduction to sustainable resource management

<table>
<tr><th colspan="6">Introduction to sustainable resource management</th></tr>
<tr><td>Blok</td><td colspan="2">1</td><td>Credits (ECTS)</td><td colspan="2">4</td></tr>
<tr><td>Lecturer</td><td colspan="2"></td><td>Format</td><td colspan="2">Fysiek</td></tr>
<tr><td>Learning objectives</td><td colspan="5">1. Explain and discuss aspects concerning the management of the natural resources and the socio-ecological systems
2. Critically evaluate management strategies and their environmental and social impacts.
3. Critically assess his/her own role in the group work and apply knowledge about communication and group processes in a constructive way to enhance the outcome of a group work situation.
4. Communicate knowledge among peers as well as to a broader audience in an oral presentation in English
5. Communicate his/her academic discipline and thereby strengthen his/her own academic identity.</td></tr>
<tr><td>Recommended prerequisite knowledge</td><td colspan="5">-</td></tr>
<tr><td>Required facilities</td><td colspan="5">Laptop, books including course material, software.</td></tr>
<tr><td rowspan="4">Teaching methods and hours</td><td colspan="2">Lectures (Co):</td><td colspan="3">20 hours</td></tr>
<tr><td colspan="2">Instructions (In):</td><td colspan="3">10 hours</td></tr>
<tr><td colspan="2">In class work (We):</td><td colspan="3">10 hours</td></tr>
<tr><td colspan="2">Self-study (Ze):</td><td colspan="3">47 hours</td></tr>
<tr><td rowspan="6">Assessment with weights</td><td colspan="2">Test Type</td><td>Group presentation (with individual marks)</td><td>Essay (Individual)</td><td>Reflection assignment</td></tr>
<tr><td colspan="2">Weight of test</td><td>40%</td><td>50%</td><td>10%</td></tr>
<tr><td colspan="2">Type of mark</td><td>1-10</td><td>1-10</td><td>1-10</td></tr>
<tr><td colspan="2">Required minimum mark per test</td><td>5.0</td><td>5.0</td><td>5.0</td></tr>
<tr><td colspan="2">Number of test opportunities per academic year</td><td>2</td><td>2</td><td>2</td></tr>
<tr><td colspan="2">Learning objectives adressed</td><td>1,2,4</td><td>1,2</td><td>3,5</td></tr>
<tr><td>Course content</td><td colspan="5">Part 1: Sustainable development and de SDGs

Part 2: Natural and human systems and their interactions
○ Socio-ecological systems
○ Interactions

Part 3: The Resource nexus
Drivers and pressures
○ Global change (climate, demographics, economy)
○ Environmental variability and risks
○ Environmental challenges</td></tr>
</table>

	○ Food/water/energy crisis ○ Soil degradation and desertification ○ Uncontrolled urbanization ○ Natural disasters Part 4: Natural resources and development ○ International agenda and goals of development ○ Concepts and paradigms of natural resources management
Literature	1. IPCC Website. http://www.ipcc.ch/ 2. Petrosillo I., Aretano R. and Zurlini G , Socioecological Systems, Reference Module in Earth Systems and Environmental Sciences, Elsevier, 2015. 22-July-15 doi: 10.1016/B978-0-12-409548-9.09518-X. Available from: https://www.researchgate.net/publication/281630887_Socioecological_Systems [accessed Jun 28 2021] 3. Herrero-Jáuregui, C., Arnaiz-Schmitz, C., Reyes, M., Telesnicki, M., Agramonte, I., Easdale, M., … Montes, C. (2018). What do We Talk about When We Talk about Social-Ecological Systems? A Literature Review. Sustainability, 10(8), 2950. doi:10.3390/su10082950 4. Ringler, C., A. Bhaduri and R. Lawford. (2013). The Nexus Across Water, Energy, Land and Food (WELF): Potential for Improved Resource Use Efficiency? Current Opinion in Environmental Sustainability, 5(6):617–624http://dx.doi.org/10.1016/j.cosust.2013.11.002 5. Bleischwitz, R., Spataru, C., VanDeveer, S.D. et al. Resource nexus perspectives towards the United Nations Sustainable Development Goals. Nat Sustain 1, 737–743 (2018). https://doi.org/10.1038/s41893-018-0173-2 6. Elagib, N. A., & Al-Saidi, M. (2020). Balancing the benefits from the water–energy–land–food nexus through agroforestry in the Sahel. Science of The Total Environment, 140509. doi:10.1016/j.scitotenv.2020.140509 Lecture notes, presentations, literature and assignments are available at the AdeKUS Electronische Leeromgeving at http://moodle.uvs.edu/.

Research methods and scientific communication

Research methods and scientific communication			
Blok	1	**Credits (ECTS)**	4
Lecturer		**Format**	- Physical or online
Learning objectives	1. To be able to conduct a small research through quantitative, qualitative, and mixed methods approaches 2. To be able to communicate the research and challenges in scientific language, according to ethical principles, via a poster presentation		
Recommended prerequisite knowledge	-		

Required facilities	Laptop, books including course material, software.	
Teaching methods and hours	Lectures (Co):	10 hours
	Instructions (In):	10 hours
	In class work (We):	20 hours
	Self-study (Ze):	64 hours
Assessment with weights	Test Type	Poster presentation
	Weight of test	100%
	Type of mark	1-10
	Required minimum mark per test	5.5
	Number of test opportunities per academic year	2
	Learning objectives addressed	1, 2
Course content	Part 1. Foundations • Introduction to Research and the Research Process • Research Ethics and Integrity Part 2. Quantitative Research • Introduction to Quantitative Research, Study Designs and Methods • Analysis and Interpretation of Quantitative Data Part 3. Qualitative Research • Introduction to Qualitative Research, Study Designs and Methods • Analysis and Interpretation of Qualitative Data Part 4. Mixed Methods Research • Introduction to Mixed Methods Research, Study Designs and Methods • Analysis and Interpretation of Mixed Methods Data Part 5. Scientific communication of research • how to produce a journal article, poster, presentation • how to produce a journal article, poster, presentation	
Literature	American Psychological Association. (2020). Publication manual of the American Psychological Association (7th ed.). https://doi.org/10.1037/0000165-000 Editor(s): Gregory S. Patience, Daria C. Boffito, Paul A. Patience. (2015). Communicate Science Papers, Presentations, and Posters Effectively. Academic Press, ISBN 9780128015001, https://doi.org/10.1016/B978-0-12-801500-1.09989-7. (https://www.sciencedirect.com/science/article/pii/B9780128015001099897) Newing, H. (2011) Conducting research in conservation: a social science perspective. Routledge, England. Kumar, R. (2011). Research methodology: A step-by-step guide for beginners. Los Angeles: SAGE. Lecture notes, presentations, literature and assignments are available at the AdeKUS Electronische Leeromgeving at http://moodle.uvs.edu/.	

Project management

Project management			
Blok	1	**Credits (ECTS)**	3
Lecturer		**Format**	Physical

Learning objectives	1. Summarize the role, responsibilities and skills of the project manager, and know when and how to apply the required skills for the successful completion of large complex projects 2. Identify the precedence logic relationships in a project, and create a project network diagram, including the critical path, the time float between interrelated activities, and the overall project duration 3. apply different project methods and systems for the effective realization of projects and is familiar with various ways to finance and administer research and development work 4. understand the courses of action of organizations, groups and individuals within various fields and sectors of society	
Recommended prerequisite knowledge	-	
Required facilities	Laptop, books including course material, software.	
Teaching methods and hours	Lectures (Co):	10 hours
	Instructions (In):	10 hours
	In class work (We)	20 hours
	Exam:	
	Self-study (Ze):	50 hours
Assessment with weights	Test Type	Assignment
	Weight of test	100%
	Type of mark	1-10
	Required minimum mark per test	5.5
	Number of test opportunities per academic year	2
	Learning objectives adresses	1,2,3,4
Course content	1 Project planning and design 2 Project management approaches and techniques 3 Project roles and responsibilities 4 Leadership and motivation of teams 5 Resource planning and financial forecasting 6 Procurement systems and contracts 7 Managing quality, constraints and risks 8 Sustainable approaches to project management 9 Project management tools and software	
Literature	Meredith, Jack R., Scott M. Shafer, and Samuel J, Mantel. 2017. Project Management: A Strategic Managerial Approach. 10th ed. Hoboken, NJ: John Wiley & Sons. ISBN-13: 9781119369097 Lecture notes, presentations, literature and assignments are available at the AdeKUS Electronische Leeromgeving at http://moodle.uvs.edu/.	

Applied statistics and data modeling

Applied statistics and data modeling			
Blok	1	**Credits (ECTS)**	4.5

<table>
<tr><td>Lecturer</td><td colspan="2"></td><td>Format</td><td>- Physical and online</td></tr>
<tr><td>Learning objectives</td><td colspan="4">1. apply statistical techniques needed to understand the statistical models related to the management of natural resources
2. compute statistical models with the software packages R (or SPSS)
3. to be able to correctly interpret and communicate the result of a statistical analysis in the professional community.</td></tr>
<tr><td>Recommended prerequisite knowledge</td><td colspan="4">-</td></tr>
<tr><td>Required facilities</td><td colspan="4">Laptop, books including course material, software.</td></tr>
<tr><td rowspan="5">Teaching methods and hours</td><td>Lectures (Co):</td><td colspan="3">10 hours</td></tr>
<tr><td>Instructions (In):</td><td colspan="3">20 hours</td></tr>
<tr><td>In class work (We):</td><td colspan="3">10 hours</td></tr>
<tr><td>Exam:</td><td colspan="3">3 hours</td></tr>
<tr><td>Self-study (Ze):</td><td colspan="3">80 hours</td></tr>
<tr><td rowspan="6">Assessment with weights</td><td colspan="3">Test Type</td><td>Written exam</td></tr>
<tr><td colspan="3">Weight of test</td><td>100%</td></tr>
<tr><td colspan="3">Type of mark</td><td>1-10</td></tr>
<tr><td colspan="3">Required minimum mark per test</td><td>5.5</td></tr>
<tr><td colspan="3">Number of test opportunities per academic year</td><td>2</td></tr>
<tr><td colspan="3">Learning objectives adresses</td><td>1,2,3</td></tr>
<tr><td>Course content</td><td colspan="4">Part 1: Probability and Inference
• Chapter 1 Probability Theory: a survey
Probabilities. Conditional probability. Independence. Random variables. Expectations. Random vectors. Survey of standard discrete and continuous distributions.
nsformations of a random variable. Convergence. Limit theorems
• Chapter 2 Statistical Inference: a survey
rametric Point estimation. Confidence intervals for means, variances, proportions in the one and two sample situation Testing hypothesis for means, variances and proportions in the one and two sample situation.
• Chapter 3 Reliability theory
ucture functions. Survival distributions. Hazard rate functions. Parametric models (exponential, Weibull). Survival distribution of a system. Mean failure time of a system.
Chapter 4 Tables
Chapter 5 Exercises Chapter 1
Chapter 6 Exercises Chapter 2
Chapter 7 Exercises Chapter 3
Chapter 8 Solutions to exercises

Part 2: Regression
• Chapter 1 Linear regression with one predictor
rmal statement of the model. Estimation of regression parameters. Estimation of error variance. Problems.
• Chapter 2 Inference in regression analysis
erence for regression coefficients, for mean response, for individual observation.</td></tr>
</table>

	ANOVA, general linear model tests. Problems. • Chapter 3 Diagnostics eck for linearity, for homoscedasticity, for normality, for independence (a graphical approach). Problems. • Chapter 4 Multiple linear regression atrix notation for the multiple regression model. Variance inflation (VIF) and multicollinearity. Partial F-test. Problems. For all techniques in Chapters 1 -4, the corresponding R-commands are discussed (use of R software). Part 3: Analysis of Variance • Chapter 1 Basic concepts of experimental design roduction of important concepts used in experimental design: blocking, nesting, experimental unit. Replication versus repeated measurement. Power and sample size calculations. The use of these concepts is demonstrated in real life examples. • Chapter 2 One way ANOVA th the cell means model and factor effects model are introduced. The theory for testing general and specific. Hypothesis is explained and applied to real life examples using R. • Chapter 3 Two way ANOVA e one way ANOVA model is extended to two factors, with the important addition of the concept of interaction. Also, the analysis of data with only 1 replication per treatment combination is discussed and the randomized complete block design is given as an example.
Literature	Part 1: Course text Part 2: Course text in slides format Part 3: Course text in slides format Recommended literature: Neter, J; Kutner, M, Nachtsheim, C and Wasserman W. (2005) Applied Linear Statistical Models (5th edition). McGraw-Hill, ISBN 007-112221-4 Rossner, B. (2018). Fundamentals of Biostatistics (8th edition). Duxbury, ISBN 978-1305268920 Free electronic version: http://galaxy.ustc.edu.cn:30803/zhangwen/Biostatistics/Fundamentals+of+Biostatistics+8th+edition.pdf Faraway, J (2005). Linear Models with R. Chapman&Hall/CRC, ISBN 1-58488 425-8 Lecture notes, presentations, literature and assignments are available at the AdeKUS Electronische Leeromgeving at http://moodle.uvs.edu/.

GIS and remote sensing

GIS and remote sensing			
Blok	1	**Credits (ECTS)**	4.5
Lecturer		**Format**	- Physical or online
Learning	1. Understand the basic concepts of GIS and remote sensing and their relation to		

<table>
<tr><td>objectives</td><td colspan="4">natural resources management
2. Acquire, interpret and manage spatial information using remote sensing and GIS
3. Use spatial analysis techniques to solve geographic problems related to natural resource management, in order to support planning and decision making
4. assess the state of resource base and changes that occur and progresses to the assessment of impacts.</td></tr>
<tr><td>Recommended prerequisite knowledge</td><td colspan="4">-</td></tr>
<tr><td>Required facilities</td><td colspan="4">Laptop, books including course material, software.</td></tr>
<tr><td rowspan="5">Teaching methods and hours</td><td>Lectures (Co):</td><td colspan="3">10 hours</td></tr>
<tr><td>Instructions (In):</td><td colspan="3">10 hours</td></tr>
<tr><td>In class work (We):</td><td colspan="3">20 hours</td></tr>
<tr><td>Exam:</td><td colspan="3">0.5 hours</td></tr>
<tr><td>Self-study (Ze):</td><td colspan="3">87 hours</td></tr>
<tr><td rowspan="6">Assessment with weights</td><td colspan="2">Test Type</td><td>Oral exam</td><td>Report</td><td>Skills</td></tr>
<tr><td colspan="2">Weight of test</td><td>50%</td><td>40%</td><td>10%</td></tr>
<tr><td colspan="2">Type of mark</td><td>1-10</td><td>1-10</td><td>1-10</td></tr>
<tr><td colspan="2">Required minimum mark per test</td><td>5.0</td><td>5.0</td><td>5.0</td></tr>
<tr><td colspan="2">Number of test opportunities per academic year</td><td>2</td><td>2</td><td>2</td></tr>
<tr><td colspan="2">Learning objectives adresses</td><td>1,4</td><td>2,3,4</td><td>2</td></tr>
<tr><td>Course content</td><td colspan="4">• Basic GIS concepts
• Introduction to GIS and Remote sensing and its relation to Natural Resource Management
• Collection of GIS data for NRM
• Spatial analysis of the data collected. Application of GIS on:
◦ Land management
◦ Water resource management
◦ Forestry
◦ Agriculture
◦ Management of Flora and Fauna
◦ Renewable energy management</td></tr>
<tr><td>Literature</td><td colspan="4">Required Reading(s)
• Heywood, I. An Introduction to Geographic Information Systems, 4th ed. Pearson, 2012.
• Maarseveen, Martin van, Javier Martinez and Johannes Flacke (Eds.), 2018.
• GIS in Sustainable Urban Planning and Management: A Global Perspective. CRC
• Press, 2016.
• GIS Best Practices - GIS for Urban and Regional Planning www.esri.com/library/bestpractices/urban-regional-planning.pdf

Recommended Reading(s)
• Easa, Said and Yupo Chan (Eds.). Urban Planning and Development Applications of GIS. USA:
• American Society of Civil Engineers, 1999.
• Stillwell, John and Graham Clarke (Eds.). Applied GIS and Spatial Analysis. Wiley,</td></tr>
</table>

	2018. • Brewer, C. A. (2005) Designing Better Maps - A Guide for GIS Users, ESRI Press • GIS Solutions for Urban and Regional Planning - Esri www.esri.com/library/brochures/pdfs/gis-sols-for-urban-planning.pdf • Yiougo, L.S.A., Oyedotun, T. D. T., Some, C. Y. C and Da, E. C. D. (2013) Urban cities and waste generation in developing countries: A GIS evaluation of two cities in Burkina Faso. Journal of Urban and Environmental Engineering, V. 7, n.2, p. 280 – 285. ISSN 1982-3932 doi: 10.4090/juee. 2013.7:2. 28-285 Lecture notes, presentations, literature and assignments are available at the AdeKUS Electronische Leeromgeving at http://moodle.uvs.edu/.

Law on natural resources and environment

Law on natural resources and environment						
Blok	2			**Credits (ECTS)**	5	
Lecturer				**Format**	- Physical or online	
Learning objectives	1. Describe the basic principles of environmental law 2. Understand the sources of environmental law 3. Explain the existing national, regional and international legal frameworks for environmental protection 4. Evaluate the practical tools available to address, with some level of familiarity, issues of environmental law as it applies to industry 5. Critically assess and present on topics relevant to environmental law in Suriname					
Recommended prerequisite knowledge	-					
Required facilities	Laptop, books including course material, software.					
Teaching methods and hours	Lectures (Co):	20 hours				
	Instructions (In):	4 hours				
	In class work (We):	16 hours				
	Self-study (Ze):	99 hours				
Assessment with weights	Test Type		Group pre-sentation 1	Individual Presentation	Group pre-sentation 2	Group pre-sentation 3	Individual paper
	Weight of test		20%	30%	20%	20%	10%
	Type of mark		1-10	1-10	1-10	1-10	1-10
	Required minimum mark per test		5.0	5.0	5.0	5.0	5.0
	Number of test opportunities per academic year		1	1	1	1	2
	Learning objectives adresses		1,5	2,3,4,5	2,3,4,5	2,3,5	5
Course content	• Introduction to Environmental Law a. Fundamental Legal Principles of Environmental Management • Sources of Environmental Law a. Common Law						

	b. Statutory Law • Institutional Arrangements for Environmental Protection a. Draft Environmental Law of Suriname • Specific Legal Regimes for Environmental Protection a. Planning and Development b. Water Pollution c. Biodiversity and nature protection d. Air Pollution e. Waste Management • Enforcing Environmental Law a. Role of Judiciary b. Role of State Agencies c. Role of Citizens • International and Regional Environmental Law a. Introduction to International and Regional Environmental Law
Literature	<u>Compulsory Reading: Cases (to be provided by lecturer)</u> Ahmad Mohammed, Ali Mohammed Rahaman, Ramrajie Mohammed, Shyira Rahaman, Shahreefa Halima Mohammed, Saladin Rasul Mohammed Claimants v Ameer Mohammed and Amcoweld Engineering Services Ltd Defendants Claim No. CV2008-01297 BACONGO Case: Belize Alliance of Conservation Non-Governmental Organization v. The Department of the Environment and (2) Belize Electric Company Limited Privy Council Appeal No. 47 of 2003; [2004] UKPC 6 Bhadose Sooknanan First Applicant, Fishermen And Friends Of The Sea, Second Applicant v The Environmental Management Authority, Respondent and Minister Of Energy And Energy Affairs, Interested Party Claim No. CV2014-00813 Cambridge Water Company Limited v Eastern Counties Leather Plc [1994] AC 264 (HL) Concerned Residents of Cunupia v Environmental Management Authority RPN Enterprises Limited Cv. No: 2012-3024 Environmental Management Authority Appellant v Fishermen and Friends of the Sea Respondent Civil Appeal No. 199 of 2008 (CA) Environmental Management Authority Appellant v South West Tobago Fishermen Association Respondent Civil Appeal No. 219 of 2009 (CA) Fishermen and Friends of the Sea v The Environmental Management Authority and bpTT, [2005] UKPC 32 Fishermen and Friends of the Sea v The Environmental Management Authority and Atlantic LNG Company of Trinidad and Tobago, HCA Cv 2148 of 2003 Fishermen and Friends of the Sea v The Minister of Planning, Housing and the Environment, Claim Number CV2008-04593 (HC) Fishermen and Friends of the Sea (Appellant) v The Minister of Planning, Housing and the Environment (Respondent), [2017] UKPC 37 Karan Ramlal v Simon Macoon and Wendy Ramsanahie, HCA No 2812 of 2004 Oceana in Belize, Citizens Organised for Liberty through Action, Minister of Natural Resources and the Environment, Claim No 810 of 2011

	Odhai Mathura, Rubeth Mathura, Narace Mathura and Seeraj Mathura v Petroleum Company Of Trinidad And Tobago Limited, Claim No. HCA S589 of 1998 Pear Tree Bottom Case: The Northern Jamaica Conservation Association and others vs The Natural Resources Conservation Authority and the National Environment and Planning Agency, Claim No. HCV 3022 OF 2005 Peninsula Citizens for Sustainable Development v Department of the Environment and Placencia Marina Limited, Claim No 550 of 2010 People United Respecting the Environment and Rights Action Group v Environmental Management Authority and ALUTRINT Limited, CV 2007- 02263 (HC) Ramdeo Seewah v Vishnu Siewah, No. CV2009-2498 Talisman (Trinidad) Petroleum Limited v The Environmental Management Authority, No EA 3 of 2002 The Minister of Planning, Housing and the Environment v Fishermen and Friends of the Sea, H.C.C. No. CV2008-04593 (CA) The Southwest Tobago Fishing Association Ltd. v The Attorney General Of Trinidad & Tobago, Tobago House Of Assembly, The Environmental Management Authority and Petroleum Geo-Services Limited, CV2008-02926 <u>Recommended Reading</u> Ramlogan, R. Sustainable Development: Towards a Judicial Interpretation. Leiden: Martinus Nijhoff, 2010. Ramlogan, R. and Persadie, N. Developing Environmental Law and Policy In Trinidad and Tobago. San Juan, Trinidad: Lexicon Press, 2004. <u>Reference Materials</u> Birnie, P., Boyle, A. & Redgwell, C. International Law & the Environment. Oxford: Clarendon Press, 2009. Environmental Management Authority. State of the Environment Report 1999: The Legislative and Institutional Landscape for Protection of the Environment in Trinidad and Tobago. Port of Spain: Environmental Management Authority, 1999. Gillespie, A. International Environmental Law, Policy & Ethics. Oxford: Oxford University Press, 2000. Kiss, A. & Shelton, D. International Environmental Law. Ardsley, NY: Transnational Publisher, Inc., 2004. Margraw, D., Szasz, P., & Weiss, E. International Environmental Law: Basic Instruments and References (1992-1999). Leiden: Martinus Nijhoff, 1992. Perry-Kessaris, A. Corporate liability for environmental harm. In Fitzmaurice, M., and Ong, D., eds. Research Handbook on International Environmental Law, Cheltenham: Edward Elgar, 2010.

	Ramlogan, R. The Environment and International Law: Rethinking the Traditional Approach. Vermont Journal of Environmental Law, vol 3, 2001-2002. Ramlogan, R. and Persadie, N. Commonwealth Caribbean Business Law. London: Routledge- Cavendish, 2010. Sands, P. Principles of International Environmental Law, vol 1. Cambridge: Cambridge University Press, 2003. Weiss, E., McCaffrey, S., Margraw, D. and Tarlock, A. International Environmental Law and Policy (Casebook). New York: Aspen Law and Business, 2006. Internet Resources: http://www.academicinfo.net/lawenviron.html Lecture notes, presentations, literature and assignments are available at the AdeKUS Electronische Leeromgeving at http://moodle.uvs.edu/.

Tropical aquatic and terrestrial ecology

Tropical aquatic and terrestrial ecology			
Blok	2	**Credits (ECTS)**	5
Lecturer		**Format**	- Physical or online
Learning objectives	1. gain insight in the abiotic (physical and chemical) characteristics as well as the qualitative and quantitative composition of different biological communities, materials budget and interactions between living and non-living components, 2. describe and illustrate the fundamental concepts and general processes of coastal ecosystems,. 3. gain insight in the ecology of pelagic and benthic organisms, productivity of marine systems, exploration and management of marine ecosystems with the emphasis on mangrove forests, their interaction with other ecosystems 4. gain insight into social and economic value, and services of mangrove forests and marine habitat management, 5. gain insight into the exchange processes between living organisms and their terrestrial environment, with special attention paid to plant-radiation interactions and the micro-climates in vegetations and soils, 6. describe the main terrestrial ecosystems of their characteristics, carbon, water and energy budgets of ecosystems, 7. understand and analyse actual anthropogenic impact on terrestrial ecosystems (e.g. climatic change, stratospheric ozone problem		
Recommended prerequisite knowledge	Knowledge of BSc level biology, (environmental) chemistry, ecology, physics and mathematics.		
Required facilities	Laptop, books including course material, software.		
Teaching	Lectures (Co):	16 hours	

methods and hours	Instructions (In):			
	In class work (We):	16 hours		
	Excursion:	8 hours		
	Exam:	3 hours		
	Self-study (Ze):	95 hours		
Assessment with weights	Test Type	Written exam	Presentation	Short essay
	Weight of test	60%	20%	20%
	Type of mark	1-10	1-10	1-10
	Required minimum mark per test	5.0	5.0	5.0
	Number of test opportunities per academic year	2	1	2
	Learning objectives adresses	1,2,3,4,5,6,7	1,2,3,4,5	6,7
Course content	Part 1. Freshwater Distribution, age and genesis of inland water, Structure and physical properties of water, Physical relationships in natural water bodies, Chemical properties of water, dissolved gases and solids, salt water intrusion, organic solutes in natural waters, Associations of living organisms in inland waters, effects of the salinity changes (wetlands, lake, ponds and bogs, flowing waters). Material budget of inland waters (production, consumption, destruction and the role of bacteria, material transport and energy flux in aquatic ecosystems. Part 2. Course content coastal ecosystems General characteristics of the marine environment, differences between oceans and seas, zonations in the marine environment, physical and chemical factors, ecology of pelagic and benthic organisms, productivity of marine systems, exploitation of marine systems, Mangrove forests; distribution, faunal and floral biodiversity including morphological, physiological and ethological adaptations to intertidal and marine life, ecosystem function, ecological benefits, food webs and trophic relationships, ethno-biology and anthropogenic impacts, social, economic and cultural value and services of mangrove forests and the impact of erosion. Monitoring, modelling and experiments in relation to marine tropical habitat management Part 3: Course content terrestrial ecology The main terrestrial ecosystems and their characteristics are reviewed. Special attention is paid to plant-radiation interactions and the micro-climates in vegetations and soils. The carbon, water and energy budgets of ecosystems are discussed in detail. Actual anthropogenic impact on terrestrial ecosystems (e.g. climatic change, stratospheric ozone problem) is also considered. Experimental set-up for terrestrial ecological research is discussed, and the theoretical knowledge is applied in calculation exercises.			
Literature	Part 1. Freshwater ecology - J. Schwoerbel - Handbook of limnology. Ellis Horwood Ltd. Chichester (1984). 228p - R.G. Wetzel - Limnology. Saunders College Publishing. Forth Worth (1983). 767p Part 2. Marine ecology - R. Barnes, Invertebrate Zoology, Saunders College Publishing (1986) - J.W. Day et al, Estuarine Ecology, John Wiley and Sons (1989) - H. Thurman and H. Weber, Marine Biology, Merill Publ. Comp. (1984) Part 3. Terrestrial ecology - Physiological Plant Ecology (ed. W. Larcher), Springer, 4th edition, (2003), 513 p Other references: - Frissell, Christopher A.; Bayles, David. 1996. "Ecosystem Management and the Conservation of Aquatic Biodiversity and Ecological Integrity" Water Resources Bulletin			

	32(2):229-240 - Nielsen, D.L.; Brock M.A.; Rees, G.N; Baldwin D.S. 2003. "Effects of increasing salinity on freshwater ecosystems in Australia" Australian Journal of Botany 51:655-665 - Odum, E. P. 1971. Fundamentals of ecology. 3rd edition. W. B. Saunders Co., Philadelphia and London. 544 p - Alongi, D.M.; The Energetics of Mangrove Forests. Springer; 1 edition, (February 6, 2009), ISBN-13: 978-1402042706. 216 p Lecture notes, presentations, literature and assignments are available at the AdeKUS Electronische Leeromgeving at http://moodle.uvs.edu/.

Biodiversity conservation

Biodiversity conservation					
Blok	2		**Credits (ECTS)**	5	
Lecturer			**Format**	- Physical or online	
Learning objectives	1. Understands the objectives and methods of biodiversity conservation 2. Is able to carry out a simple biodiversity assessment 3. Is able to design a monitoring program				
Recommended prerequisite knowledge	-Knowledge of ecology				
Required facilities	Field equipment				
Teaching methods and hours	Lectures (Co):	12 hours			
	Instructions (In):	8 hours			
	Excursion:	20 hours			
	Self-study (Ze):	101 hours			
Assessment with weights	Test Type		Report	Presentation	Skills test
	Weight of test		50%	30%	20%
	Type of mark		1-10	1-10	1-10
	Required minimum mark per test		5.0	5.0	5.0
	Number of test opportunities per academic year		2	1	1
	Learning objectives addressed		1,3	1,2,3	2
Course content	Part 1. Ecosystems: their values and uses • Ecosystem functions, goods and services • The Millennium Ecosystem Assessment: Ecosystems and human well-being • Quantifying ecosystem services (provisioning services, regulating services, cultural services) Part 2. Biodiversity • Biodiversity and its value • Biodiversity loss as a global problem • The problem of invasive species • Traditional knowledge and biodiversity • Biodiversity in cultural landscapes				

	• Biodiversity and climate change • Measuring biodiversity, species distribution modelling • Biodiversity and conservation Part 3. Ecosystem management • Concepts, approaches and applications of ecosystem management and nature conservation • Nature conservation strategies (Community-based ecosystem management, Payment for Ecosystem Services (PES) and Reducing Emissions from Forest Degradation and Deforestation (REDD+)) • Ecotourism Part 4. Conservation of natural and cultural landscapes • Concepts, their evolving and transformation • UNESCO instruments: world heritage sites, Man and Biosphere program • Cultural landscape concept • Combining management of cultural and natural heritage • Conservation strategies and instruments
Literature	Lecture notes, presentations, literature and assignments are available at the AdeKUS Electronische Leeromgeving at http://moodle.uvs.edu/.

Climate change adaptation and mitigation

Climate change adaptation and mitigation				
Blok	2		**Credits (ECTS)**	5
Lecturer			**Format**	- Physical or online
Learning objectives	1. Identify the natural and anthropogenic drivers of climate change 2. Summarize the direct observations of climate change 3. Describe the impacts of climate change for agriculture, forestry, ecosystems, water and energy resources and human health 4. Refer to common climate change models and scenarios 5. Select and apply relevant scientific tools to analyze the options, constraints, costs and benefits for climate change adaptation 6. Compare different climate change mitigation strategies and climate change policy options			
Recommended prerequisite knowledge	-			
Required facilities	Laptop, books including course material, software.			
Teaching methods and hours	Lectures (Co):	10 hours		
	Instructions (In):	10 hours		
	In class work (We)	16 hours		
	Excursion:	4 hours		
	Exam:	3 hours		
	Self-study (Ze):	94 hours		
	Test Type		Individual presentation	Group Report

Assessment with weights	Weight of test	20%	30%
	Type of mark	1-10	1-10
	Required minimum mark per test	5.0	5.0
	Number of test opportunities per academic year	1	2
	Learning objectives addressed	1,2,3,4	5,6
Course content	Part 1: A basic understanding of the physical science of climate change is given, together with a brief introduction to the ongoing climate change debate. Natural and anthropogenic drivers, and direct observations of recent climate change are presented. Different climate change models and scenarios are presented and discussed in relation to future climate change projections. Part 2: Potential adaptation strategies in different sectors are presented. After a short introduction to different approaches to climate change adaptation, the climate change impacts and adaptation practices for ecosystems, land use, water resources and human health are presented and discussed in relation to both options, constraints, costs and benefits. In addition, objectives of the UNFCCC and the Kyoto Protocol and their implications for mitigation and adaptation in the Caribbean are also discussed. Part 3: After a general introduction to potential mitigation strategies, the most relevant technological and economic mitigation strategies are presented and discussed, including carbon sequestration, energy system transformation and renewable energy technologies, carbon trading and carbon offsetting. Part 4: In the fourth and final part of the course the focus is climate change policy and social change. First, the current status of international climate change negotiations is discussed. Afterwards, climate change policy is discussed in relation to the green economy paradigm. Finally, the course ends with a discussion of the need for social change in order to reduce the negative impacts of climate change.		
Literature	IPCC Website. http://www.ipcc.ch/ Petrosillo I., Aretano R. and Zurlini G , Socioecological Systems, Reference Module in Earth Systems and Environmental Sciences, Elsevier, 2015. 22-July-15 doi: 10.1016/B978-0-12-409548-9.09518-X. Available from: https://www.researchgate.net/publication/281630887_Socioecological_Systems [accessed Jun 28 2021] Herrero-Jáuregui, C., Arnaiz-Schmitz, C., Reyes, M., Telesnicki, M., Agramonte, I., Easdale, M., … Montes, C. (2018). What do We Talk about When We Talk about Social-Ecological Systems? A Literature Review. Sustainability, 10(8), 2950. doi:10.3390/su10082950 Ringler, C., A. Bhaduri and R. Lawford. (2013). The Nexus Across Water, Energy, Land and Food (WELF): Potential for Improved Resource Use Efficiency? Current Opinion in Environmental Sustainability, 5(6):617–624http://dx.doi.org/10.1016/j.cosust.2013.11.002 Bleischwitz, R., Spataru, C., VanDeveer, S.D. et al. Resource nexus perspectives towards the United Nations Sustainable Development Goals. Nat Sustain 1, 737–743 (2018). https://doi.org/10.1038/s41893-018-0173-2 Elagib, N. A., & Al-Saidi, M. (2020). Balancing the benefits from the water–energy–land–food nexus through agroforestry in the Sahel. Science of The Total Environment,		

	140509. doi:10.1016/j.scitotenv.2020.140509 Lecture notes, presentations, literature and assignments are available at the AdeKUS Electronische Leeromgeving at http://moodle.uvs.edu/.

Environmental pollution and sanitation

Environmental pollution and sanitation				
Blok	3		**Credits (ECTS)**	5
Lecturer			**Format**	- Physical or online
Learning objectives	1. understand the most important environmental (water and sediment, soil and air) problems, sources and threats. 2. understand preventive or sanitation measures 3. assess and plan programmes of sustainable environmental management.			
Recommended prerequisite knowledge	- Knowledge of chemistry, physics and mathematics.			
Required facilities	Laptop, books including course material, software.			
Teaching methods and hours	Lectures (Co):	20 hours		
	Instructions (In):			
	In class work (We)	10 hours		
	Excursion:	8 hours		
	Exam:	3 hours		
	Self-study (Ze):	96 hours		
Assessment with weights	Test Type		Written exam	
	Weight of test		100%	
	Type of mark		1-10	
	Required minimum mark per test		5.5	
	Number of test opportunities per academic year		2	
	Learning objectives addressed		1,2,3	
Course content	Part 1: Water Pollution sources, threats and remediation techniques - Physical and chemical properties of drinking water, surface water and groundwater; - important water quality parameters, comparison with international guidelines and norms, water ecology and ecology of flowing waters; - saltwater life zones (oceans, coastal zone: estuary, wetlands, swamps) and freshwater life zones; - threats: over-consumption, pollution, acidification , wet and dry deposition, desertification, water pollution, sources (Industrial, domestic, point, diffuse), self-purification of rivers, oxygen sag curve analysis, single variable and two variables diagram, ecology and threats of lakes and impounded waters; - Eutrophication; - prevention and management (clean technologies), significance and use of phosphorous loading, water resources and soil (interaction between water and soil), remediation techniques, laws and regulation; - transboundary regulations, national standards, international standards etcetera; - water pollution surveys and modeling (e.g.Streeter and Phelps model, Mc Kay models, Visual Minteq, Phreq C).			

	Part 2: soil - Soil profile, soil types, physical and chemical properties of soil - Pollution sources, threats and remediation techniques - distribution between different compartments, NAPL's, heavy metals, presence, behavior and threats (Mercury, special case), - Organic pollutants (e.g. pesticides and POP's), presence, behavior and risk of organic pollutants, - pollutants transport and degradation in soil - Impact of landfills, - biological indicators, - modeling transport and reaction in the soil remediation techniques for soil and groundwater pollution (e.g. Adsorbent for mercury). - Biotechnological versus physical chemical methods, laws and regulation (national and international). Part 3: Air : Pollution sources and abatement techniques - Importance of the atmosphere, - physical characteristics, - sources of air pollution(natural, anthropogenic), - current issues of the atmosphere, - types of air pollutants (atmospheric behavior and composition), - modeling air pollution and effects on environment, - chemical and photochemical processes (self-purification of the atmosphere), - indoor air pollution control techniques, outdoor air pollution control techniques, Laws and regulations
Literature	Part water and soil: - Collegediktaat Milieutechnologie, Prof. Dr. ir. W. Verstraete, 2008-2009, Lab. Microbiele Ecologie & Technologie (LabMET) Part soil: - Everzwijn, T.S., Hoffman, F.R., Ramhit, H., Schultz, C.E. and Verwaart, J.W.A. 1992. Bodemreiniginstechnieken- Aanpak van vervuilde droge en waterbodems, Boom, Antwerpen, 141 p. - Van Dwynze, J., Gevaerts, W., Lauryssen, K., Vancolen, D., Pyls, Wiepkema, J. and Dijkmans, R.. 1998. Gids Bodemsaneringstechnieken, Academia press, Gent, 213 p. - Van De Steene, J., Van Vooren, H., Verplancke H., De Becker, G. & Pensaert, S. 2003. Petroleum hydrocarbon remediation in biopiles: optimizing aeration and heating. Proceedings of the Seventh International In Situ and On-site Bioremediation Symposium, Orlando, Florida, June 2-5, 2003.Part O: Landfarming, biopiles, composting and bioreactors. Part air: ……. Lecture notes, presentations, literature and assignments are available at the AdeKUS Electronische Leeromgeving at http://moodle.uvs.edu/.

Economy and valuation of natural resources

Environmental pollution and sanitation			
Blok	3	**Credits (ECTS)**	5
Lecturer		**Format**	- Physical or

<table>
<tr><td></td><td colspan="3"></td><td>online</td></tr>
<tr><td>Learning objectives</td><td colspan="4">1. Demonstrate an understanding of the role of economic analysis, valuating techniques, and the use of economic instruments in guiding resource management decisions
2. to conduct a cost/benefit analysis of the development project and/or issue under analysis.</td></tr>
<tr><td>Recommended prerequisite knowledge</td><td colspan="4">-</td></tr>
<tr><td>Required facilities</td><td colspan="4">Laptop, books including course material, software.</td></tr>
<tr><td rowspan="5">Teaching methods and hours</td><td>Lectures (Co):</td><td colspan="3">10 hours</td></tr>
<tr><td>Instructions (In):</td><td colspan="3">10 hours</td></tr>
<tr><td>In class work (We)</td><td colspan="3">20 hours</td></tr>
<tr><td>Exam:</td><td colspan="3">1.5 hours</td></tr>
<tr><td>Self-study (Ze):</td><td colspan="3">101 hours</td></tr>
<tr><td rowspan="6">Assessment with weights</td><td>Test Type</td><td>Discussion</td><td>Written exam</td><td>Presentation</td><td>Research paper</td></tr>
<tr><td>Weight of test</td><td>20%</td><td>40%</td><td>10%</td><td>30%</td></tr>
<tr><td>Type of mark</td><td>1-10</td><td>1-10</td><td>1-10</td><td>1-10</td></tr>
<tr><td>Required minimum mark per test</td><td>5.0</td><td>5.0</td><td>5.0</td><td>5.0</td></tr>
<tr><td>Number of test opportunities per academic year</td><td>1</td><td>2</td><td>2</td><td>2</td></tr>
<tr><td>Learning objectives addressed</td><td>1</td><td>1</td><td>1,2</td><td>1,2</td></tr>
<tr><td>Course content</td><td colspan="4">An introduction to natural resources and environmental economics including projections of the development of natural resources :
• global trends in natural resource use, global environmental problems, and relationship with other global issues (population growth, industrialization, climate change, carbon credits, food security, energy security, water scarcity, environmental pollution - water, air, land pollution, etc) (chapter 10, 11, 13, 15 of (no author)), (chapter 1 of F.A. Ward), (chapter 1 of Perman, R.), Part II, chapter 10 of Perman, R.)
• Economic theory (chapter 3 of (no author))
• Decision support for environmental policy (chapter 5 of (no author))
• The discount rate (chapter 6 of (no author))
• Valuing the environment (chapter 7 of (no author)), (chapter 2, 3 of F.A. Ward)
• Natural resources exploitation (PART IV, chapter 14, 15, 16, 17, 18, 19 of Perman, R., chapter 7, 8, 9, 10, 11, 12, 13 of F.A. Ward) [students cases reading these chapters and present to class]
• Project appraisal (PART III, chapter 11, 12, 13 of Perman, R.)
• Natural resources, economic growth, and policies for sustainable resource-based development (chapter 22, 23, 24 of F.A. Ward)</td></tr>
<tr><td>Literature</td><td colspan="4">- Environmental and natural resource economics, F. A. Ward, New Mexico State University, Prentice Hall.
- Environmental and natural resources economics (no author)
- The economics of the environment and natural resources, Crafton, R. Q., et al, Black Well Publishing
- Natural resources and environmental economics, R. Perman, et al., Pearson Addison Wesley.</td></tr>
</table>

	- Natural Resource Conservation: Management for a Sustainable Future, 10th edition, 659 pages, Daniel D. Chiras & John P. Reganold, 0132251388, 9780132251389, Pearson, 2010. Lecture notes, presentations, literature and assignments are available at the AdeKUS Electronische Leeromgeving at http://moodle.uvs.edu/.

Water resources management

Water resources management				
Blok	3		**Credits (ECTS)**	5
Lecturer			**Format**	- Physical or online
Learning objectives	1. To describe the range of global issues facing water resources 2. To describe and explain key hydrological characteristics of water resources 3. To introduce and critically evaluate the economic characteristics of water resources. 4. To identify and critically assess the major uses and users of water resources. 5. To introduce and critically evaluate a range of well-established assessment and management tools and frameworks. 6. To define, introduce and critically discuss the governance, policy and politics of water.			
Recommended prerequisite knowledge	BSc level: hydrology MSc level: environmental pollution and sanitation, applied statistics			
Required facilities	Laptop, books including course material, software.			
Teaching methods and hours	Lectures (Co):	10 hours		
	Instructions (In):	10 hours		
	In class work (We)	20 hours		
	Exam:	3 hours		
	Self-study (Ze):	100 hours		
Assessment with weights	Test Type		Individual Short paper	
	Weight of test		100	
	Type of mark		1-10	
	Required minimum mark per test		5.5	
	Number of test opportunities per academic year		2	
	Learning objectives addressed		1,2,3,4,5,6	
Course content	The aim of this course is to educate students of methods used in water resources management and obtains interdisciplinary understanding of integrated water resources management. 1. Overview: • History of global water resource development: ancient water systems, trends in water use (irrigation development, green revolution and irrigation expansion, industrialization, blue revolution), factors determining water demand and management (e.g. population growth, land use changing, urbanization, intense agriculture, farming, and industrialization), water scarcity, water values, water use efficiency, reclaimed water, rainwater and floodwater harvesting techniques, grey-water use of recycled water and recycling systems, non-conventional water, re-use of wastewater, conservation of water • Surface and ground water resources utilization and potential, type of water uses and the balance of supply with the demand for drinking, irrigation, industry, ecological-forest			

	systems (wetlands, biodiversity), major sustainability issues, in Suriname. 2. Water resources planning and management: • Concepts of sustainable water resources management, sustainable use of water resources (household, agriculture, urban areas and industries: principles and concepts of efficient water use, techniques and systems of water use efficiency) • System components, planning scales, sustainability • Strategy for sustainable water management for groundwater, lakes, rivers, coastal waters in a resource perspective, urban, rural and industrial water use and management. 3. Tools and techniques in water resources management: • Instruments, networks, data sampling, data collection, data analyses, GIS applications • Introduction to water resources system modeling: • Modeling of water resources systems: types of models, data needs, integration of sub models of different water system components • Modeling methods and simulations for evaluating alternatives, optimization methods, fuzzy optimization • Post-processing of model simulation results (in support of the decision making process) based on concepts in probability, statistics and stochastic modeling, model sensitivity and uncertainty analysis, model performance evaluation • Methods for real-time forecasting and control 4. River basin planning, modeling and analysis: • Physical and terrestrial systems of basins, land use impacts (forestry, agriculture, mining, dams and diversions, urbanization, transport development) • Basin concepts, modeling the natural resources system and infrastructure, modeling the socio-economic functions in a basin, river basin analysis • Conservation and planning of river basins 5. Agricultural water management: • Sources of irrigation water (reservoir, groundwater, surface water); water loss, conveyance (earth and concrete channels, pipelines); sprinkler, drip technologies, Rain fed agriculture. Optimization potential of agricultural water use; rainwater harvesting and storage, soil water management, Irrigation and drainage: technologies and management • Irrigation methods, costs, efficiencies, water losses, impacts (terrestrial, surface water, groundwater), Salinization: Process, mitigation, management, Irrigation management: crop water demands, scheduling, water allocation, economic aspects, institutional aspects, Water use efficiency and water productivity, Field efficiency versus basin efficiency, Physical efficiency vs. water productivity, Implications for agricultural water management • Simulation models of water use efficiency, irrigation methods, water balance, crop water requirement, irrigation water requirement, rainwater harvesting techniques, flood-water harvesting techniques, Irrigation water demand/forecasting 6. Flood management: Introduction, hydrological extremes, variability of hydrology and climate, statistical description, definition and types of floods, causes of floods: hydrological risks and climate change, vulnerability and flood damage analysis (socio-cultural, economic, environmental aspects), approaches and techniques to manage these natural occurrences: floodplain zoning and management, set-back levees and flood easements, environmental enhancement and restoration as part of floodplain management, opportunities for conjunctive use and recharge as part of floodplain management, structural flood management measures; levees, walls, floodways, bank stabilization, flood forecasting and monitoring, flood emergency services, flood damage reduction, mitigation and adaptation strategies (evaluation and comparison of different measures), flood risk management, floods forecasting and warning systems, flood management programmes and project management, modeling and GIS applications

	7. Drought management: Introduction, definitions and types of droughts, meteorological droughts, hydrological droughts, agricultural droughts, impacts of droughts on rainfed and irrigated agriculture, forestry, grassland, ecosystems, drought impacts, defining droughts, causes of droughts, drought indices, drought triggers, virtual drought exercises, adaptation strategies and drought risk management, land use systems and drought management, drought and desertification, role of climate change. - Cases (to be read by students): Managing Floods in the Netherlands, Flood Frequency and Protection, The Rhine River Basin (case: Problems and Solutions, Managing Risk, Storage, Discharge-Increasing Measures, Green Rivers, Use of Existing Water Courses, The Overall Picture, Dealing With Uncertainties), Flood Management on the Mississippi, Flood Risk Reduction, Decision Support and Prediction, Floodplain Modeling 8. Principles of integrated water resources management (IWRM): • Water as a social, economic and environmental good • Water legislation: conflicts, water laws and institutions related to water resources allocation and protection (e.g case waterschappen Nickerie), hydro-politics of water (international river systems, trans-boundary water transfers), water security, water ethics, human rights to water (MDG), access and equity.
Literature	Water resources systems planning and management - An introduction to methods, models and applications, D. L. Loucks and E. van Beek, WL-Delft hydraulics, 2005, Unesco Integrated water resources management plans - training manual and operational guide, March 2005, Cap-Net, GWP, UNDP (http://www.cap-net.org/TMUploadedFiles/FileFor67/IWRM_Plan.doc) World Bank, Water Resources Management, a World Bank Policy Study, 1993 (ISBN 0-8213-2636-8) Principles of Water Resources: History, Development, Management, and Policy., Cech, T.V., 2003. Wiley: NY. World Bank's 2003 Water Resources Sector Strategy Heathcote IW. 1998. Integrated Watershed Management: Principles and Practice. Wiley. Debarry, PA. 2004. Watersheds: Processes, Assessment and Management. Wiley EPA 2006. Handbook for Developing Watershed Plans to Restore and Protect Our Waters. United States Environmental Protection Agency, Office of Water, 30 Nonpoint Source Control Branch, Washington, DC 20460 Lecture notes, presentations, literature and assignments are available at the AdeKUS Electronische Leeromgeving at http://moodle.uvs.edu/.

Spatial planning

Spatial planning			
Blok	3	**Credits (ECTS)**	5
Lecturer		**Format**	- Physical or online
Learning objectives	1. articulate the concept and practice of spatial planning and its application at a range of spatial scales; 2. prepare coherent and integrated strategies that take into account relevant institutional frameworks and combine creative direction for the future with credible means of implementation; 3. apply a variety of techniques that aid spatial analysis and help develop spatial strategies;		

	4. examine and assess the linkages between the use, management and development of built and natural environment, and understand the implications of climate change; 5. explain and critically appraisal spatial planning policies employed to protect the natural environment, conserve historical buildings and facilitate place-making, and promote sustainable development; 6. work effectively on individual and group-based tasks.			
Recommended prerequisite knowledge				
Required facilities	Laptop, books including course material, software.			
Teaching methods and hours	Lectures (Co):	10 hours		
	Instructions (In):	10 hours		
	In class work (We)	16 hours		
	Excursion:	4 hours		
	Self-study (Ze):	101 hours		
Assessment with weights	Test Type		Report	Presentation
	Weight of test		60%	40%
	Type of mark		1-10	1-10
	Required minimum mark per test		5.0	5.0
	Number of test opportunities per academic year		2	1
	Learning objectives addressed		1,2,3,4,5,6	1,2,3,4,5,6
Course content				
Literature	Lecture notes, presentations, literature and assignments are available at the AdeKUS Electronische Leeromgeving at http://moodle.uvs.edu/.			

Renewable energy

Renewable energy			
Blok	4	**Credits (ECTS)**	5
Lecturer		**Format**	Physical or online
Learning objectives	1. To assess the impact of using technical systems for renewable energy systems, 2. to achieve knowledge of unconventional energy converters, 3. to evaluate the use of renewable energy technology in relation to the resource usage, 4. to manipulate computer models of energy systems to determine the likely effect of varying input parameters on energy output or economic viability.		
Recommended prerequisite knowledge			
Required facilities	Laptop, books including course material, software.		
Teaching	Lectures (Co):	20 hours	

methods and hours	Instructions (In):	4 hours		
	In class work (We)	16 hours		
	Exam:	2 hours		
	Self-study (Ze):	97 hours		
Assessment with weights	Test Type	Written exam	Report	Short essay
	Weight of test	40%	40%	20%
	Type of mark	1-10	1-10	1-10
	Required minimum mark per test	5.0	5.0	5.0
	Number of test opportunities per academic year	2	2	2
	Learning objectives addressed	2,3	3,4	1,3
Course content	• Thermodynamics of Energy conversion • Latent heat state changes • Chemistry and biology of biomass and biofuels • Physics of wind energy • Physics of solar energy • Physics of other sources of energy: waves, tides, hydro, geothermal energy • Technical systems for solar energy utilization • Thermal collectors • Operation • Operating characteristics of photovoltaic systems • Operating characteristics of wind systems • Operating characteristics of hydro systems • Operating characteristics of bio-fuels • Operating characteristics of hybrid systems • Sizing renewable energy systems with the help of simulation program • Simulation of thermal solar • Simulation of photovoltaic systems and/or wind power and/or fuel cells • Greenhouse gas limiting technologies • Co-generation, capturing and sequestering CO2			
Literature	1. Renewable Energy, Power for a sustainable future, Godfrey Boyle (2004) (ISBN 0-19-926178-4) 2. Boyle, Godfrey; Everett, Robert and Ramage, Janet eds. (2003). Energy Systems and Sustainability. Oxford, UK: Oxford University Press 3. Study guide: Renewable Energy Lecture notes, presentations, literature and assignments are available at the AdeKUS Electronische Leeromgeving at http://moodle.uvs.edu/.			

Integrated project natural resource management

Integrated project natural resource management			
Blok	5	**Credits (ECTS)**	5
Lecturer		**Format**	- Physical or online
Learning objectives	1. Explain and discuss aspects concerning the management of the natural resources in question, the environmental consequences and the conflicting interests among different stakeholders involved. 2. Obtain expertise in most of the offered aspects of sustainable management of natural resources.		

<table>
<tr><td></td><td colspan="4">3. Critically evaluate alternative management strategies and to some extent identify their environmental impacts as well as the consequences for stakeholders with overlapping and/or conflicting interests.
4. execute an integrated research project in a multidisciplinary team,
5. Critically evaluate his/her own role in the group collaboration situation and apply knowledge about communication and group processes in a constructive way to enhance the outcome of a group work situation.
6. Disseminate knowledge and communicate both among peer-colleagues as well as to a broader audience in written and oral presentations in English
7. Communicate the student's own academic discipline and thereby strengthen the students' own academic identity.
8. Work on a project independently and in collaboration with others in interdisciplinary groups with expanded perspectives of the prerequisites for good interdisciplinary teamwork</td></tr>
<tr><td>Recommended prerequisite knowledge</td><td colspan="4">-</td></tr>
<tr><td>Required facilities</td><td colspan="4">Laptop, books including course material, software.</td></tr>
<tr><td rowspan="5">Teaching methods and hours</td><td>Lectures (Co):</td><td colspan="3">10 hours</td></tr>
<tr><td>Instructions (In):</td><td colspan="3">10 hours</td></tr>
<tr><td>In class work (We)</td><td colspan="3">8 hours</td></tr>
<tr><td>Excursion:</td><td colspan="3">8 hours</td></tr>
<tr><td>Self-study (Ze):</td><td colspan="3">105 hours</td></tr>
<tr><td rowspan="5">Assessment with weights</td><td colspan="2">Test Type</td><td>Report</td><td>Presentation</td><td>Reflection</td></tr>
<tr><td colspan="2">Weight of test</td><td>50%</td><td>35%</td><td>15%</td></tr>
<tr><td colspan="2">Type of mark</td><td>1-10</td><td>1-10</td><td>1-10</td></tr>
<tr><td colspan="2">Required minimum mark per test</td><td>5.0</td><td>5.0</td><td>5.0</td></tr>
<tr><td colspan="2">Number of test opportunities per academic year</td><td>2</td><td>1</td><td>1</td></tr>
<tr><td></td><td colspan="2">Learning objectives addressed</td><td>1,2,3,4,6,8</td><td>6,8</td><td>5,7,8</td></tr>
<tr><td>Course content</td><td colspan="4">Part 1:
The integrated project requires that the students apply in an integrated way the knowledge and competences acquired during their first and second year of the MSc in SMNR in order to (1) identify problems or issues related to SMNR in the study area and formulate a problem analyses, problem statement, and define objective(s), (2) collect relevant data, prior to going into the field and in the field, to increase the understanding in SMNR, (3) set up field experiments and questioners, and execute them, (4) make an analyses of the collected data including maps, (5) identify and document possible solutions, (6) work them out, and (7) make a critical evaluation of the chosen solution.

Students are encouraged to use as much as possible scientific tools for analyses (e.g. statistical methods, software packages, instruments and norms), graphical methods (e.g. GPS, CAD) and the technology (e.g. aerial photographs) available in preparation of their report and presentation.

The various SMNR aspects have to be covered taking into account the integrated aspect defined in SMNR and the multidisciplinary approach of sustainable</td></tr>
</table>

	development. The project reflects the complexity of a similar problem that may be encountered during their future professional careers. Students are encouraged to consult experts within the frame of the project. Part 2 (EIA study): Theory: Introduction, and Objectives, Purpose and EIA process, Impact identification, Mitigation and impact management, Role and Purpose of EIA Review, Review Procedures, Review of case study – Project description, Review of case study - Description of environment. Field visit based on case study, Review of case study - Environmental impacts and mitigation measures, Review of case study – Environmental, management and monitoring plan, Planning Community Consultations, Field visit (excursion).
Literature	Online course ESIA: https://cursos.iadb.org/en/principles-reviewing-environmental-impact-assessments Lecture notes, presentations, literature and assignments are available at the AdeKUS Electronische Leeromgeving at http://moodle.uvs.edu/.

Thesis preparation

Thesis preparation				
Blok	5		**Credits (ECTS)**	5
Lecturer			**Format**	- Physical or online
Learning objectives	1. Identify his/her research field and problem domain 2. Properly assess pertinent research needs and the actual state-of-the-art 3. Identify knowledge gaps, research questions and objectives 4. Balance derived research questions and objectives with the empirical complexities and challenges of the problems at hand, 5. Identify adequate methodologies, research approaches and data needs 6. Develop a plan for (field) research 7. Communicate and discuss the intended research proposal to peers			
Recommended prerequisite knowledge	-			
Required facilities	Laptop, books including course material, software.			
Teaching methods and hours	Lectures (Co):			
	Instructions (In):	10 hours		
	In class work (We)	30 hours		
	Excursion:			
	Self-study (Ze):	101 hours		
Assessment with weights	Test Type	Report (thesis proposal)	Presentations	Peer assessment
	Weight of test	60%	25%	15%
	Type of mark	1-10	1-10	1-10
	Required minimum mark per test	5.0	5.0	5.0
	Number of test opportunities per academic year	2	2	1
	Learning objectives addressed	1,2,3,4,5,6	7	7
Course	The course is structured in four phases.			

content	• Decision phase: students have to decide on their supervisors and topic of the master thesis • Exposé phase: students are asked to produce a 1-page summary of their research proposal. It should already include a small description of the addressed region and problems and possible research needs and solution paths. • Proposal phase: students develop their research proposals following a scientific structure according to the advisement of supervisors • Conclusion phase: present the research proposal to their peers. For this purpose, several presentation days are foreseen in the time schedule of the. The final proposal must obey a scientific structure as agreed with supervisors and should also include a detailed time plan for the field research.
Literature	Lecture notes, presentations, literature and assignments are available at the AdeKUS Electronische Leeromgeving at http://moodle.uvs.edu/.

Thesis

Thesis				
Blok	6		**Credits (ECTS)**	25
Lecturer			**Format**	- Physical or online
Learning objectives	1. To conduct comprehensive literature review, 2. To collect data and/or analyse data or critically evaluate secondary data, 3. To correctly process and interpret data, and 4. To summarize the objectives, methods, materials, results and discussions into a thesis 5. To defend the thesis			
Recommended prerequisite knowledge	Course Thesis preparation successfully passed			
Required facilities	Laptop, books including course material, software.			
Teaching methods and hours	Lectures (Co):			
	Instructions (In):			
	In class work (We)	25 hours		
	Excursion:			
	Self-study (Ze):	675 hours		
Assessment with weights	Test Type	Report (thesis)	Presentation	
	Weight of test	90%	10%	
	Type of mark	1-10	1-10	
	Required minimum mark per test	5.0	5.0	
	Number of test opportunities per academic year	2	1	
Course content	Having finished the course Thesis preparation, the student has a concrete description of the MSc topic, addressed problem, methodology and research plan to be followed and deepened in the MSc thesis writing process. The thesis work, will allow students to			

	put into practice the relevant theories and methods learned in the course of the MSc program. The student should refer to thesis coordinator and thesis regulations for further instructions.
Literature	Lecture notes, presentations, literature and assignments are available at the AdeKUS Electronische Leeromgeving at http://moodle.uvs.edu/.

Specialization in Sustainable Energy management

Energy Policy, Sustainability, Society

Energy Policy, Sustainability, Society				
Blok	4		**Credits (ECTS)**	5
Lecturer			**Format**	Physical or online
Learning objectives	1. Demonstrate a thorough understanding of global energy supply and delivery systems 2. Has substantial knowledge and understanding of important policy and social issues regarding energy 3. Identify, deploy and critically evaluate a selection of techniques and procedures used in energy policy analysis and decision-making 4. Demonstrate an understanding of the role of stakeholder involvement in energy decisions			
Recommended prerequisite knowledge				
Required facilities	Laptop, books including course material, software.			
Teaching methods and hours	Lectures (Co):	10 hours		
	Instructions (In):	10 hours		
	In class work (We)	20 hours		
	Exam:	0.5 hours		
	Self-study (Ze):	102 hours		
Assessment with weights	Test Type		Written exam	Peer discussion in class
	Weight of test		70%	30%
	Type of mark		1-10	1-10
	Required minimum mark per test		5.0	5.0
	Number of test opportunities per academic year		2	1
	Learning objectives addressed		1,2,3,4	1,2,3,4
Course content	The aim of this course is that students understand the energy production chain, use their knowledge on energy policy and law, related to energy market decisions, discuss the sustainability problems associated with energy use and how they might be resolved by technological and social measures. Contents: • Principles of Energy policy and law • Energy planning • Energy production chain • Supply side vs demand side management • Integrating resource planning • Energy markets • Stakeholders			

	• International agreements and contracts and development cooperation
Literature	Lecture notes, presentations, literature and assignments are available at the AdeKUS Electronische Leeromgeving at http://moodle.uvs.edu/.

Energy and the environment

Energy and the environment						
Blok	4			**Credits (ECTS)**	5	
Lecturer				**Format**	Physical or online	
Learning objectives	1. Demonstrate understanding of global energy supply and delivery systems 2. explain the energy transition towards renewables for reducing emissions from conventional energy sources 3. compare the efficiency measures in residential, commercial, industrial and transport sector for energy auditing and energy management 4. Appraise examples of green building practices that could significantly improve energy conservation 5. Effectively communicate scientific findings that can be understood by the public, by writing several short papers, including one focused on applying energy innovations to Suriname's energy problems. 6. Demonstrate an understanding of the role of stakeholder involvement in energy decisions by participating in a role play for a real-world case, from the point of view of one stakeholder group.					
Recommended prerequisite knowledge						
Required facilities	Laptop, books including course material, software.					
Teaching methods and hours	Lectures (Co):	10 hours				
	Instructions (In):	10 hours				
	In class work (We)	20 hours				
	Exam:	0.5 hours				
	Self-study (Ze):	102 hours				
Assessment with weights	Test Type		Assignment and projects	Discussion and internet-based activities	Presentations and roleplay	Papers	Oral exam
	Weight of test		36%	10%	20%	17%	17%
	Type of mark		1-10	1-10	1-10	1-10	1-10
	Required minimum mark per test		5.0	5.0	5.0	5.0	5.0
	Number of test opportunities per academic year		2	1	1	2	2
	Learning objectives addressed		1,2,3,4	1,2,3,4	6	5	1,2,3,4
Course content	• Why Sustainable Energy Matters – General Overview & Framing Issues • Energy Systems – Energy Services - Efficiency Global Perspectives – Local Applications • Changing Delivery Systems – Smart Grids and Challenges of Change Global Energy Flow & Population Growth						

	• Tracking Fuel Cycles – Limits to Nuclear Power Running the Energy System – Ownership/Privatization/Public Oversight • Production, Transmission & Distribution of Electricity Transportation Challenges • Green Building Trends & Energy Savings Toxicity Ratios – Assessing Environmental and Health Impacts • Making Energy Processing Safer and Cleaner Determining the True Cost of Energy Systems • Need for Innovators and Entrepreneurs Role Play – Community Energy Decision Making
Literature	Textbook: Boyle, G., B. Everett, and J. Ramage, (eds.). 2003. Energy Systems and Sustainability: Power for a Sustainable Future, 1st Edition. Oxford University Press. New York, NY. Other materials: • Borump, M., P.D. Andersen, S. Jacobsson, and A. Midttun, Nordic Energy Research. 2008. "Nordic energy innovation systems – patterns of need integration and cooperation." NEIS Final Report. http://www.nordicenergy.net • Boyle, G. (ed.). 2nd Edition. 2011. Renewable energy: Power for a sustainable future. Oxford University Press. Oxford, England. • Energy Innovations (Solar company associated with Idealab, a Pasadena, CA technological innovation incubator) http://www.energyinnovations.com/ • Intergovernmental Panel on Climate Change (IPCC) "Special Report on Renewable Energy Sources and Climate Change Mitigation." May 2011. http://www.ipcc.ch/news_and_events/docs/ipcc33/SRREN_FD_SPM_final.pdf • M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson (eds). 2007. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. http://www.ipcc.ch/publications_and_data/ar4/wg2/en/contents.html • Shell Oil's Innovation Center http://www.shell.com/home/content/innovation/?gclid=CILOiarD6asCFcFo4AodZkK5gQ • U.S. DOT, RITA – Research and Innovative Technology Administration – Volpe National Transportation Systems Center, Environmental and Energy Systems, Center of Innovation (RVT-40) - Gregg G. Fleming, Director. http://www.volpe.dot.gov/coi/bios/fleming.html • World Resources Institute. 2011. IPCC Study: Renewable energy Could Provide Majority of World's Energy by 2050. Available at: http://www.wri.org/stories/2011/05/ipcc-study-renewable-energy-could-provide-majority-worlds-energy-2050 Lecture notes, presentations, literature and assignments are available at the AdeKUS Electronische Leeromgeving at http://moodle.uvs.edu/.

Economics of renewable energy technologies

Blok	4	**Credits (ECTS)**	5
Lecturer		**Format**	Physical or online
Learning objectives	1. explain the fundamental differences between scaling up different energy technologies and their implications 2. explain the cost evolution of different RETs 3. explain the various discourses regarding the ingredients constituting energy cost; this includes the discussion of subsidies and externalities 4. determine the levelized Cost of Electricity 5. explain how electricity tariffs are set, including feed-in tariffs 6. explain the various new business models viable with the new structures set by RETs		

	7. explain the global business context and implications for business start-ups and business strategies, both opportunities and problems 8. define the industries of decreasing returns versus industries of increasing returns			
Recommended prerequisite knowledge				
Required facilities	Laptop, books including course material, software.			
Teaching methods and hours	Lectures (Co):	10 hours		
	Instructions (In):	10 hours		
	In class work (We)	20 hours		
	Exam:	3 hours		
	Self-study (Ze):	97 hours		
Assessment with weights	Test Type		Written exam	Report
	Weight of test		60%	40%
	Type of mark		1-10	1-10
	Required minimum mark per test		5.0	5.0
	Number of test opportunities per academic year		2	2
	Learning objectives addressed		1,2,3,4,5,6,7,8	1,2,3,4,5,6,7,8
Course content	scaling RET's, LCOE, lifecycle analysis, driving forces for costs, RET investments, the global business environment and implications for business start-ups and business strategy (accessing funding and problems associated with it, business plan, assessing opportunities, innovation and valorization)			
Literature	• Lovins A. 2011. Reinventing Fire. Bold business solutions for the new energy era. Chelsea Green Publishing, White River Junction • Lovins A. B. 1979. Soft Energy Paths. Toward a durable peace. Harper Colophon, New York • Lovins A. B. 2010. Efficiency and Micropower for Reliable and Resilient Electricity Service: An Intriguing Case-Study from Cuba. Rocky Mountain Institute, Snowmass • Friedman Hot, Flat and Crowded • Friedman The world is flat • papers on resource curse • papers on transitions • Super Cycle report Lecture notes, presentations, literature and assignments are available at the AdeKUS Electronische Leeromgeving at http://moodle.uvs.edu/.			

Research project: Modeling and simulation of energy systems

Research project: Modeling and simulation of energy systems			
Blok	5	**Credits (ECTS)**	5
Lecturer		**Format**	Fysiek
Learning objectives	1. Demonstrate full knowledge and understanding of technical, economic and environmental parameters related to renewable energy systems. 2. Identify steps and data required to perform a simulation and analysis when designing energy systems and services. 3. Perform system modeling, simulation and analysis using LEAP software. 4. Describe and define energy system optimization goals and constraints to find the best system solution.		

Recommended prerequisite knowledge				
Required facilities	Laptop, books including course material, software.			
Teaching methods and hours	Lectures (Co):	10 hours		
	Instructions (In):	10 hours		
	In class work (We)	16 hours		
	Excursion:	4 hours		
	Self-study (Ze):	98 hours		
Assessment with weights	Test Type	Report	Poster Presentation	Reflection assignment
	Weight of test	60%	30%	10%
	Type of mark	1-10	1-10	1-10
	Required minimum mark per test	5.0	5.0	5.0
	Number of test opportunities per academic year	2	2	1
	Learning objectives addressed	1,2,3,4	1,2,3,4	1
Course content	Using LEAP, students will create and then evaluate alternative scenarios by comparing their energy requirements, their social costs and benefits and their environmental impacts. Topics: energy demand modeling, energy supply (Transformation) modeling, electric system simulation modeling, emissions analysis and cost-benefit analysis			
Literature	N. R. Nannan, P. Colonna, Modeling the dynamic behavior of processes and energy conversion systems, Syllabus, 1st ed., 2011 https://leap.sei.org/default.asp?action=trainingmaterials Lecture notes, presentations, literature and assignments are available at the AdeKUS Electronische Leeromgeving at http://moodle.uvs.edu/.			

Specialization in Water Resources Management

Energy Policy, Sustainability, Society

Energy Policy, Sustainability, Society					
Blok	4			**Credits (ECTS)**	5
Lecturer				**Format**	Physical or online
Learning objectives	1. Demonstrate a thorough understanding of global energy supply and delivery systems 2. Has substantial knowledge and understanding of important policy and social issues regarding energy 3. Identify, deploy and critically evaluate a selection of techniques and procedures used in energy policy analysis and decision-making 4. Demonstrate an understanding of the role of stakeholder involvement in energy decisions				
Recommended prerequisite knowledge					
Required facilities	Laptop, books including course material, software.				
Teaching methods and hours	Lectures (Co):	10 hours			
	Instructions (In):	10 hours			
	In class work (We)	20 hours			
	Exam:	0.5 hours			
	Self-study (Ze):	102 hours			
Assessment with weights	Test Type		Written exam	Peer discussion in class	
	Weight of test		70%	30%	
	Type of mark		1-10	1-10	
	Required minimum mark per test		5.0	5.0	
	Number of test opportunities per academic year		2	1	
	Learning objectives addressed		1,2,3,4	1,2,3,4	
Course content	The aim of this course is that students understand the energy production chain, use their knowledge on energy policy and law, related to energy market decisions, discuss the sustainability problems associated with energy use and how they might be resolved by technological and social measures. Contents: • Principles of Energy policy and law • Energy planning • Energy production chain • Supply side vs demand side management • Integrating resource planning • Energy markets • Stakeholders • International agreements and contracts and development cooperation				
Literature	Lecture notes, presentations, literature and assignments are available at the AdeKUS Electronische Leeromgeving at http://moodle.uvs.edu/.				

Energy and the environment

Energy and the environment			
Blok	4	**Credits (ECTS)**	5

<table>
<tr><td>Lecturer</td><td colspan="3"></td><td>Format</td><td colspan="2">Physical or online</td></tr>
<tr><td>Learning objectives</td><td colspan="6">1. Demonstrate understanding of global energy supply and delivery systems
2. explain the energy transition towards renewables for reducing emissions from conventional energy sources
3. compare the efficiency measures in residential, commercial, industrial and transport sector for energy auditing and energy management
4. Appraise examples of green building practices that could significantly improve energy conservation
5. Effectively communicate scientific findings that can be understood by the public, by writing several short papers, including one focused on applying energy innovations to Suriname's energy problems.
6. Demonstrate an understanding of the role of stakeholder involvement in energy decisions by participating in a role play for a real-world case, from the point of view of one stakeholder group.</td></tr>
<tr><td>Recommended prerequisite knowledge</td><td colspan="6"></td></tr>
<tr><td>Required facilities</td><td colspan="6">Laptop, books including course material, software.</td></tr>
<tr><td rowspan="5">Teaching methods and hours</td><td>Lectures (Co):</td><td colspan="5">10 hours</td></tr>
<tr><td>Instructions (In):</td><td colspan="5">10 hours</td></tr>
<tr><td>In class work (We)</td><td colspan="5">20 hours</td></tr>
<tr><td>Exam:</td><td colspan="5">0.5 hours</td></tr>
<tr><td>Self-study (Ze):</td><td colspan="5">102 hours</td></tr>
<tr><td rowspan="6">Assessment with weights</td><td>Test Type</td><td>Assignment and projects</td><td>Discussion and internet-based activities</td><td>Presentations and roleplay</td><td>Papers</td><td>Oral exam</td></tr>
<tr><td>Weight of test</td><td>36%</td><td>10%</td><td>20%</td><td>17%</td><td>17%</td></tr>
<tr><td>Type of mark</td><td>1-10</td><td>1-10</td><td>1-10</td><td>1-10</td><td>1-10</td></tr>
<tr><td>Required minimum mark per test</td><td>5.0</td><td>5.0</td><td>5.0</td><td>5.0</td><td>5.0</td></tr>
<tr><td>Number of test opportunities per academic year</td><td>2</td><td>1</td><td>1</td><td>2</td><td>2</td></tr>
<tr><td>Learning objectives addressed</td><td>1,2,3,4</td><td>1,2,3,4</td><td>6</td><td>5</td><td>1,2,3,4</td></tr>
<tr><td>Course content</td><td colspan="6">• Why Sustainable Energy Matters – General Overview & Framing Issues
• Energy Systems – Energy Services - Efficiency Global Perspectives – Local Applications
• Changing Delivery Systems – Smart Grids and Challenges of Change Global Energy Flow & Population Growth
• Tracking Fuel Cycles – Limits to Nuclear Power Running the Energy System – Ownership/Privatization/Public Oversight
• Production, Transmission & Distribution of Electricity Transportation Challenges
• Green Building Trends & Energy Savings Toxicity Ratios – Assessing Environmental and Health Impacts
• Making Energy Processing Safer and Cleaner Determining the True Cost of Energy Systems
• Need for Innovators and Entrepreneurs Role Play – Community Energy Decision Making</td></tr>
</table>

Literature	Textbook: Boyle, G., B. Everett, and J. Ramage, (eds.). 2003. Energy Systems and Sustainability: Power for a Sustainable Future, 1st Edition. Oxford University Press. New York, NY. Other materials: • Borump, M., P.D. Andersen, S. Jacobsson, and A. Midttun, Nordic Energy Research. 2008. "Nordic energy innovation systems – patterns of need integration and cooperation." NEIS Final Report. http://www.nordicenergy.net • Boyle, G. (ed.). 2nd Edition. 2011. Renewable energy: Power for a sustainable future. Oxford University Press. Oxford, England. • Energy Innovations (Solar company associated with Idealab, a Pasadena, CA technological innovation incubator) http://www.energyinnovations.com/ • Intergovernmental Panel on Climate Change (IPCC) "Special Report on Renewable Energy Sources and Climate Change Mitigation." May 2011. http://www.ipcc.ch/news_and_events/docs/ipcc33/SRREN_FD_SPM_final.pdf • M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson (eds). 2007. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. http://www.ipcc.ch/publications_and_data/ar4/wg2/en/contents.html • Shell Oil's Innovation Center http://www.shell.com/home/content/innovation/?gclid=CILOiarD6asCFcFo4AodZkK5gQ • U.S. DOT, RITA – Research and Innovative Technology Administration – Volpe National Transportation Systems Center, Environmental and Energy Systems, Center of Innovation (RVT-40) - Gregg G. Fleming, Director. http://www.volpe.dot.gov/coi/bios/fleming.html • World Resources Institute. 2011. IPCC Study: Renewable energy Could Provide Majority of World's Energy by 2050. Available at: http://www.wri.org/stories/2011/05/ipcc-study-renewable-energy-could-provide-majority-worlds-energy-2050 Lecture notes, presentations, literature and assignments are available at the AdeKUS Electronische Leeromgeving at http://moodle.uvs.edu/.

Economics of renewable energy technologies

Blok	4	**Credits (ECTS)**	5
Lecturer		**Format**	Physical or online
Learning objectives	1. explain the fundamental differences between scaling up different energy technologies and their implications 2. explain the cost evolution of different RETs 3. explain the various discourses regarding the ingredients constituting energy cost; this includes the discussion of subsidies and externalities 4. determine the levelized Cost of Electricity 5. explain how electricity tariffs are set, including feed-in tariffs 6. explain the various new business models viable with the new structures set by RETs 7. explain the global business context and implications for business start-ups and business strategies, both opportunities and problems 8. define the industries of decreasing returns versus industries of increasing returns		
Recommended prerequisite knowledge			
Required facilities	Laptop, books including course material, software.		
	Lectures (Co):	10 hours	

Teaching methods and hours	Instructions (In):	10 hours		
	In class work (We)	20 hours		
	Exam:	3 hours		
	Self-study (Ze):	97 hours		
Assessment with weights	Test Type		Written exam	Report
	Weight of test		60%	40%
	Type of mark		1-10	1-10
	Required minimum mark per test		5.0	5.0
	Number of test opportunities per academic year		2	2
	Learning objectives addressed		1,2,3,4,5,6,7,8	1,2,3,4,5,6,7,8
Course content	scaling RET's, LCOE, lifecycle analysis, driving forces for costs, RET investments, the global business environment and implications for business start-ups and business strategy (accessing funding and problems associated with it, business plan, assessing opportunities, innovation and valorization)			
Literature	• Lovins A. 2011. Reinventing Fire. Bold business solutions for the new energy era. Chelsea Green Publishing, White River Junction • Lovins A. B. 1979. Soft Energy Paths. Toward a durable peace. Harper Colophon, New York • Lovins A. B. 2010. Efficiency and Micropower for Reliable and Resilient Electricity Service: An Intriguing Case-Study from Cuba. Rocky Mountain Institute, Snowmass • Friedman Hot, Flat and Crowded • Friedman The world is flat • papers on resource curse • papers on transitions • Super Cycle report Lecture notes, presentations, literature and assignments are available at the AdeKUS Electronische Leeromgeving at http://moodle.uvs.edu/.			

Research project: Modeling and simulation of energy systems

Research project: Modeling and simulation of energy systems			
Blok	5	**Credits (ECTS)**	5
Lecturer		**Format**	Fysiek
Learning objectives	1. Demonstrate full knowledge and understanding of technical, economic and environmental parameters related to renewable energy systems. 2. Identify steps and data required to perform a simulation and analysis when designing energy systems and services. 3. Perform system modeling, simulation and analysis using LEAP software. 4. Describe and define energy system optimization goals and constraints to find the best system solution.		
Recommended prerequisite knowledge			
Required facilities	Laptop, books including course material, software.		

Teaching methods and hours	Lectures (Co):	10 hours
	Instructions (In):	10 hours
	In class work (We)	16 hours
	Excursion:	4 hours
	Self-study (Ze):	98 hours

Assessment with weights	Test Type	Report	Poster Presentation	Reflection assignment
	Weight of test	60%	30%	10%
	Type of mark	1-10	1-10	1-10
	Required minimum mark per test	5.0	5.0	5.0
	Number of test opportunities per academic year	2	2	1
	Learning objectives addressed	1,2,3,4	1,2,3,4	1
Course content	Using LEAP, students will create and then evaluate alternative scenarios by comparing their energy requirements, their social costs and benefits and their environmental impacts. Topics: energy demand modeling, energy supply (Transformation) modeling, electric system simulation modeling, emissions analysis and cost-benefit analysis			
Literature	N. R. Nannan, P. Colonna, Modeling the dynamic behavior of processes and energy conversion systems, Syllabus, 1st ed., 2011 https://leap.sei.org/default.asp?action=trainingmaterials Lecture notes, presentations, literature and assignments are available at the AdeKUS Electronische Leeromgeving at http://moodle.uvs.edu/.			

Appendix 2: Examination regulations (Dutch version)

Examenreglement 2014
van de
Masteropleidingen van de

Faculteit der Technologische Wetenschappen
van de

Anton de Kom Universiteit van Suriname

Paramaribo, Mei 2014

INHOUDSOPGAVE

1. ALGEMEEN

Artikel 1. Begripsomschrijvingen

a. Examen: het Masterexamen ter afronding van de gehele studie. Hiermee wordt bedoeld de uitslag van de examencommissie aan het eind van de studie.
b. Examencommissie: een door het faculteitsbestuur ingestelde commissie die verantwoordelijk is voor de controle op en het bekrachtigen van examens, de organisatie en de coördinatie van de tentamens van de faculteit dan wel van een door de faculteit aangeboden opleiding of groep van opleidingen;
c. Examinandus: degene die zich onderwerpt aan een tentamen of examen;
d. Examinator: degene die de module (het curriculumonderdeel) verzorgt c.q. begeleidt, de toets afneemt en beoordeelt en de uitslag vaststelt;
e. Faculteit der Technologische Wetenschappen (FTeW): de organieke eenheid belast met de verzorging van onderwijs, onderzoek en dienstverlening en het afnemen van tentamens zoals omschreven in artikel 21 van de Universiteitswet (G.B. 1966 no. 78);
f. Fraude: het plegen van oneigenlijke handelingen door of ten behoeve van de student;
g. Module / curriculumonderdeel: de onderdelen van de opleiding door middel waarvan het wetenschappelijk onderwijs verzorgd wordt;
h. Student: degene die als zodanig is ingeschreven aan de universiteit als bedoeld in art. 3 van de Universiteitswet;
i. Studielast: de studieduur in werkuren (colleges, practica, voorbereiding op het onderwijs en op het tentamen) van de normstudent, geldend voor een bepaalde module;
j. Studiepunt: maatstaf ter vaststelling van de studielast: 28 uren studie(arbeid);
k. Studierichting: samenhangend geheel van modules, gericht op de verwezenlijking van welomschreven doelstellingen op het gebied van kennis, inzicht en vaardigheden waarover degene die de opleiding voltooit, dient te beschikken;
l. Tentamen: is een toetsing van kennis, inzicht en vaardigheden van de examinandus met betrekking tot een bepaalde module. Het tentamen wordt 2 keer per jaar afgenomen: eenmaal aansluitend op het semester waarin het curriculumonderdeel is verzorgd en eenmaal in de herkansingsperiode;
m. Universiteit: de Anton de Kom Universiteit van Suriname, zoals omschreven in art. 2 van het Academisch Besluit (S.B. 1986 no. 39);
n. Wet: de wet van 25 juni 1966 tot regeling van het Universitair Onderwijs in Suriname (G.B. 1966 no. 78) (de Universiteitswet);

2. MODULES, EXAMENS, GELDIGHEIDSDUUR, TENTAMENS, EXAMENCOMMISSIE

Artikel 2. Modules, studielast en studiepunten

1. Modules

Het wetenschappelijk onderwijs wordt verzorgd door middel van modules (curriculumonderdelen). Modules kunnen bestaan uit:

a. een cursus, zijnde een geheel van hoorcolleges, instructies, werkcolleges, werkgroepen, practica, of een combinatie daarvan, gedurende een studiejaar of een gedeelte daarvan;
b. stages, excursies en het verslaan daarvan;
c. het schrijven van papers, essays, leeronderzoeken, verslagen, scripties, werkstukken e.d.;
d. het schriftelijk rapporteren op grond van deelname aan seminars, congressen, symposia, e.d.;
e. het verrichten van literatuurstudie ter voorbereiding op tentamens, referaten en soortgelijke opdrachten;
f. elementen of combinaties van bovenstaande modules (curriculumonderdelen).

2. Studielast en studiepunten

a. Teneinde de studielast zo objectief mogelijk aan te geven, wordt gebruik gemaakt van het European Credit Transfer System (ECTS). Hierbij wordt voor elke module (curriculumonderdeel) de studielast bepaald.
b. Een credit is gelijk aan 28 uren studie(arbeid).
c. De totale studielast voor een 2 jarige master of science opleiding bedraagt 120 credits.
d. Procedures en standaarden voor het bepalen van de reële studielast (zie artikel 2 lid 2a), worden gegeven door het faculteitsbestuur.

Artikel 3. Examens

1. De Masterstudie wordt afgesloten door het Masterexamen, ter afronding van de gehele studie.
2. De afronding van de gehele studie door de student wordt vastgesteld en bekrachtigd door de examencommissie.

Artikel 4. Geldigheidsduur

De beoordeling voor een volledig afgeronde module (curriculumonderdeel) waarvoor de student is geslaagd, is geldig tot tweemaal de studieduur van de betreffende opleiding. Hierbij dient wel rekening gehouden te worden met het bepaalde in Artikel 10.

Artikel 5. Toetsing

1. De student die een cursus volgt kan beoordeeld worden via:
   a. Schriftelijke tentamens
   b. Cursusopdrachten, welke kunnen bestaan uit praktisch werk, papers, project werk/onderzoek, opdrachten e.d.
   c. Mondelinge tentamens (zie artikel 8.2a).
2. Aan het begin van elke cursus dient de docent de student een schriftelijk overzicht te geven van de wijze waarop het eindcijfer zal worden vastgesteld.
3. Aan een student wordt twee maal per cursusjaar de gelegenheid geboden een tentamen af te leggen.
4. In voorkomende gevallen kan door de examencommiessie een extra gelegenheid geboden worden om een tentamen af te leggen.

Artikel 6. Tentamens

1. Tot tentamens worden alleen diegenen toegelaten die zich hiervoor hebben ingeschreven bij de administratie van de masteropleidingen. Bij het afleggen van tentamens dienen studenten zich te legitimeren middels een studentenkaart.
2. De intekenperiode begint tien (10) werkdagen voor de aanvang van het tentamen, met dien verstande dat de student uiterlijk twee (2) werkdagen voor een tentamen moet hebben ingetekend.
3. Indien blijkt dat een student zonder in te tekenen heeft deelgenomen aan een tentamen, is dit tentamen ongeldig.

Artikel 7. Examencommissie

1. Voor het vaststellen, bekrachtigen en controleren van examens en tentamens stelt het faculteitsbestuur ten behoeve van de faculteit of ten behoeve van een door de faculteit aangeboden opleiding of groep van opleidingen een examencommissie in.
2. De examencommissie treedt in overleg met het faculteitsbestuur indien en zodra zulks nodig is. Zij verstrekt aan het faculteitsbestuur alle gevraagde inlichtingen.
3. De examencommissie kan voorstellen doen aan het faculteitsbestuur met betrekking tot aanwijzingen voor ordelijk verloop van tentamens.
4. De examencommissie heeft mede tot taak het jaarlijks evalueren van het examenreglement.
5. De examencommissie brengt binnen twee maanden na het eerste semester een tussentijds verslag uit, en binnen twee maanden na aanvang van het nieuwe collegejaar een jaarverslag over haar werkzaamheden.
6. Het faculteitsbestuur benoemt de leden van de examencommissie uit de leden van het personeel dat met de verzorging van onderwijs aan de faculteit, in die opleiding of groep van opleidingen zijn belast.
7. De examencommissie wordt voor twee jaar benoemd en krijgt voor de uitvoering van haar werkzaamheden ondersteuning van het faculteitsbureau.
8. De examencommissie bestaat uit tenminste een voorzitter en een secretaris. De verdere samenstelling van de examencommissie wordt door het faculteitsbestuur vastgesteld.
9. Examinatoren, vakgroepen, disciplines en studierichtingen zijn gehouden de examencommissie alle gevraagde inlichtingen te verschaffen.
10. De examencommissie adviseert het faculteitsbestuur over de inrichting van de administratie van de tentamen- en examengegevens

3. BEOORDELING: SLAGINGSNORMEN, NORMEN VOOR DOORSTROMING

Artikel 8. Beoordeling

1. Examinatoren

   a. Indien wegens bijzondere omstandigheden geen examinator beschikbaar is, wijst de examencommissie na overleg met de verantwoordelijke opleidingscoördinator een

examinator aan.

b. Indien voor een bepaalde module meerdere examinatoren zijn, bepalen deze onderling wie van hen de beoordeling coördineert en de resultaten ervan doorgeeft aan het faculteitsbureau.

2. Wijze van examineren, inzagerecht, nabespreking

a. Mondelinge tentamens worden afgenomen door een examinator en tenminste nog een lid van het wetenschappelijk personeel van de desbetreffende faculteit.
b. De examinatoren stellen terstond na het afnemen van een mondeling tentamen de uitslag vast.
c. Schriftelijke tentamens worden afgenomen en beoordeeld door de examinator. Papers, essays e.d. worden eveneens beoordeeld door de examinator.
d. De wijze van beoordeling is zodanig dat de examinandus kan nagaan hoe de uitslag van zijn tentamen tot stand is gekomen.
e. Zo spoedig mogelijk, doch uiterlijk 60 werkdagen na afname van een schriftelijk tentamen, wordt de door de examinator vastgestelde uitslag via het faculteitsbureau bekendgemaakt.
f. Uiterlijk 10 werkdagen na de bekendmaking van de uitslag van een schriftelijk tentamen vindt er gelegenheid tot inzage van het tentamenwerk plaats op een door de examinator te bepalen tijdstip en plaats.
g. Indien de student daartoe behoefte heeft kan het verzoek voor een nabespreking schriftelijk aangevraagd worden via de coordinator van de opleiding. De nabespreking moet binnen een maand na het schriftelijk verzoek plaatsvinden.
h. Indien na het verstrijken van de genoemde termijnen nog geen **inzage en nabespreking van het tentamenwerk** heeft plaats gehad, bepaalt de examencommissie, op verzoek van de student, een tijdstip en plaats voor inzage en nabespreking van het tentamenwerk. Het verzoek van de student dient, **binnen 10 werkdagen** na het verstrijken van de termijn voor inzage, gedaan te worden.
i. Op de dag van inzage en nabespreking van het tentamenwerk is de student in de gelegenheid kennis te nemen van de tentamenopgaven en het gecorrigeerde werk. Van elke beoordeling van een module (curriculumonderdeel) ontvangt de student, via het faculteitsbureau, een schriftelijk bewijsstuk. Een afschrift daarvan wordt op dit bureau bewaard.
j. De regels voor de afstudeeropdracht zijn vastgelegd in het Afstudeerreglement van de opleiding.

3. Beoordeling

a. De beoordeling geschiedt door toekenning van een cijfer in de schaal van 1 tot en met 10. Bij het beoordelen van sommige modules of curriculumonderdelen kan hiervan worden afgeweken (bv. deelname aan werkgroepen).
De cijfers 1 tot en met 10 hebben de volgende betekenis:

1 = zeer slecht	6 = voldoende
2 = slecht	7 = ruim voldoende
3 = gering	8 = goed

4 = zeer onvoldoende 9 = zeer goed
5 = onvoldoende 10 = uitmuntend

b. Aan de toetsing van een module is voldaan wanneer het desbetreffende cijfer met in achtneming van art. 8 lid 4a, 5,5 of hoger bedraagt.
c. Voor de geldigheid van een deeltentamen mag het desbetreffende cijfer niet lager zijn dan 5,0. Het cijfer voor een tentamen wordt, zonder enige afronding, tot op tienden berekend.
d. Bij tentamens wordt het onderlinge gewicht van de vragen c.q. opdrachten op het tentamenblad vermeld. Indien dit niet is geschied worden alle vragen geacht hetzelfde gewicht te hebben.
e. Een afgelegd tentamen kan opnieuw worden afgelegd. De laatste uitslag geldt.

4. Herbeoordeling

a. Een student die ook na inzage en nabespreking niet akkoord gaat met de uitslag van een tentamen, kan de examencommissie schriftelijk om herbeoordeling van het tentamenwerk vragen. De aanvraag om de herbeoordeling moet gemotiveerd worden.
b. Bovengenoemd verzoek dient uiterlijk binnen 5 werkdagen na de dag waarop inzage en nabespreking heeft plaatsgevonden te worden gericht aan de examencommissie.
c. Tegelijk met het verzoek om herbeoordeling dient de student over te leggen een bewijs (kwitantie) waaruit blijkt dat hij een door het faculteitsbestuur vastgesteld bedrag bij het faculteitsbureau heeft gestort. De hoogte van dit bedrag zal vóór de aanvang van het nieuwe collegejaar door het faculteitsbestuur worden bekendgemaakt.
d. Bij een verzoek om hercorrectie zal de examencommissie een interne of externe deskundige aanwijzen die met de herbeoordeling zal worden belast. Deze laatste rapporteert aan de examencommissie die vervolgens na consultatie van de examinator de uitslag vaststelt.
e. **De herbeoordelaar dient binnen 60 werkdagen** na ontvangst van het tentamenwerk het herbeoordeelde tentamenwerk met een schriftelijke toelichting aan de examencommissie te doen toekomen. De student dient **binnen 45 werkdagen** na indiening van het verzoek, op de hoogte te worden gesteld van de uitslag en heeft recht te weten wie de herbeoordelaar is.
f. Het resultaat na herbeoordeling is bindend.

Artikel 9. Slagingsnormen en judicium

1. Voor het halen van het examen van de masteropleiding, zoals omschreven in artikel 3 lid 1 en 2, moet de student alle modules die voor het examen van de betrokken opleiding, verplicht zijn gesteld, succesvol hebben afgerond. De resultaten en de modules waarvoor zij zijn behaald, worden vermeld op de resultatenlijst.
2. Heeft de student meer dan het vereiste aantal studiepunten en/of meer dan het vastgestelde aantal modules gehaald voor het examen, dan wordt dit apart vermeld op de cijferlijst.
3. a. Predikaten worden toegekend indien de student alle modules bij de eerste poging succesvol heeft afgerond, en anderhalf maal de nominale studieduur niet is overschreden.
   b. Voor het examen wordt het predikaat “cum laude” toegekend indien aan lid 3 sub a voldaan is, wanneer voor de modules het gemiddelde cijfer van 8,0 of hoger is behaald, en de beoordeling voor de thesis minimaal 8,0 is.

c. Het predikaat “met genoegen” wordt toegekend wanneer aan lid 3 sub a. voldaan is en voor de modules het gemiddelde cijfer van minstens 7,0 is behaald.

Artikel 10. Normen voor doorstroming: studieduur en dispensatie

1. a. De student dient uiterlijk binnen vier jaar na aanvang van de master’s studie het examen behaald te hebben. Indien hij daartoe in gebreke blijft, kan hij door het Universiteitsbestuur van de opleiding worden afgeschreven. De mogelijkheid van vrijstelling bij een eventuele nieuwe inschrijving is in dit geval niet aanwezig.
   b. De student wordt geacht tijdens het eerste collegejaar, minimaal 80% van het totaal aantal ECTS van het eerste jaar gehaald hebben om toegelaten te worden tot het 2e jaar. Bij het in gebreke blijven hiervan, kan het Universiteitsbestuur de student afschrijven.

2. a. Een student kan een verzoek doen bij de examencommissie om in aanmerking te komen voor een dispensatiekans, op de gronden vermeld in lid 3 sub c en d van dit artikel.
   b. Een student die in aanmerking wenst te komen voor de in lid 3 sub a bedoelde dispensatiekans, dient tijdig een gemotiveerd verzoek, vergezeld van relevante bewijsstukken, in bij de examencommissie.
   c. Het verzoek voor een dispensatiekans dient uiterlijk 20 (twintig) werkdagen voor de tentamenperiode ingediend te worden. De examencommissie beslist binnen 15 (vijftien) werkdagen, na ontvangst van het dispensatieverzoek. Indien na vijftien werkdagen geen besluit wordt bekend gemaakt aan de student, wordt dit vezoek geacht te zijn goedgekeurd. Uiterlijk de vijftiende werkdag na ontvangst van het dispensatieverzoek zal de schriftelijke mededeling ten aanzien van het besluit hieromtrent voor de betrokkenen bij de studentenadmininstratie beschikbaar zijn. De student is gehouden dit besluit zelf op te halen.
   d. Studieduurverlenging kan slechts op de volgende gronden worden verleend:
   i. afwezigheid wegens ziekte, waardoor studeren niet (goed) mogelijk was. De examencommissie moet gedurende de periode van de ziekte hiervan in kennis worden gesteld, onder overlegging van een doktersverklaring;
   ii. afwezigheid wegens zwangerschap en bevalling voor een periode van maximaal drie maanden;
   iii. afwezigheid wegens dringende redenen (zulks ter beoordeling van de examencommissie, na overleg met de studentendecaan);
   iv. onmogelijkheid tot participatie aan de onderwijseenheden om redenen van overmacht (zulks ter beoordeling van de examencommissie, na overleg met de studentendecaan);
   v. ongunstige, zeer bijzondere (huiselijke) omstandigheden, ter beoordeling door de examencommissie, na overleg met de studentendecaan.
   e. De examencommissie legt schriftelijk vast de motieven en het besluit met betrekking tot het verzoek van de student voor een dispensatiekans of studieverlenging.

Artikel 11. Vrijstelling

1. De examencommissie kan een student gehele of gedeeltelijke vrijstelling verlenen voor modules behorende tot het studieprogramma, op grond van eerder, aan of buiten de universiteit, door de student behaalde cijfers voor respectievelijk de desbetreffende of overeenkomstige modules.
2. Het besluit tot het verlenen van vrijstelling wordt genomen, op basis van een daartoe strekkend

schriftelijk verzoek van de student vergezeld van relevante bescheiden, aan de examencommissie, en na advies van de desbetreffende docent c.q. examinator. De examencommissie beslist binnen drie maanden.

3. Voor onderdelen waarvoor een student vrijstelling heeft gekregen is de datum van vrijstellingverlening bepalend voor toepassing van Artikel 4.

4. FRAUDE

Artikel 12. Fraude bij tentamens

Van fraude bij tentamens is sprake in onder andere de volgende gevallen :

1. het vóór het tentamen inzicht verwerven of proberen te verwerven in af te nemen tentamenopgaven;
2. het aanwezig hebben en/of gebruik maken van niet toelaatbare aantekeningen in tijdens tentamens gebruikte of te gebruiken boeken, hulpmiddelen en dergelijke. Onderstrepingen, arceringen, accentueringen en anderszins markeren van teksten vallen hier niet onder;
3. onder andere, het voorhanden hebben en/of gebruiken van boeken, stencils, aantekeningen etc. waar zijdens de examinator of surveillant geen uitdrukkelijke toestemming voor gegeven is;
4. het gebruik maken van de zogenaamde spiekbriefjes;
5. het tijdens tentamens overnemen van gegevens uit het tentamenwerk van een andere kandidaat c.q. het bieden van gelegenheid voor het laten overnemen;
6. het tijdens tentamens mondeling dan wel schriftelijk (eventueel via de mobiele telefoon) vragen naar en/of ontvangen van niet toelaatbare gegevens;
7. het zich tijdens het tentamen uitgeven voor iemand anders dan wel het zich op het tentamen door iemand anders laten vertegenwoordigen;
8. het op enigerlei andere wijze door bedrieglijk handelen de gelegenheid om een juist oordeel omtrent zijn kennis, inzicht en vaardigheden geheel of gedeeltelijk onmogelijk maken.
9. bij medeplichtigheid tot en bij fraude worden dezelfde sancties toegepast als bij fraude.

Artikel 13. Fraude bij onderzoek

Zoals te doen gebruikelijk is er sprake van fraude bij onderzoek, in de volgende gevallen:

1. het opzettelijk verdraaien, verzinnen, of onverantwoord selectief weergeven van gegevens gebruikt voor of verkregen door het onderzoek.
2. het met opzet verdraaid weergeven van standpunten, interpretaties en conclusies.

Artikel 14. De vaststelling van fraude

1. Van het vermoeden van fraude wordt, onder overlegging van eventuele bewijsstukken en/of verklaringen, schriftelijk melding gemaakt bij de examencommissie.
2. In geval van fraude bij een tentamen dient dit te geschieden door:
   a. De surveillant (die al dan niet de examinator is) onverwijld, in elk geval binnen vijf werkdagen na de tentamendatum, indien hij tijdens het tentamen op de vermoedelijke fraude stuitte

b. De examinator onverwijld, in elk geval binnen 15 werkdagen na de tentamendatum, indien hij na het tentamen (bijvoorbeeld tijdens het corrigeren van het tentamenwerk), fraude vermoedt

3. In geval van fraude bij onderzoek, dient de aangifte hiervan te geschieden door de examinator of begeleider van het onderzoek.
4. Bij de vaststelling van fraude is de examencommissie gehouden te horen de examinator/de surveillant/de begeleider, de student en relevante personen.
5. Het faculteitsbestuur stelt voor de examencommissie de overige procedures en richtlijnen vast voor het behandelen van gevallen van fraude.
6. Onverlet het bepaalde in lid 5 dient de examencommissie het proces van fraude-vaststelling binnen 14 werkdagen nadat dit kenbaar is gemaakt, af te ronden en het resultaat hiervan aan betrokkene te hebben meegedeeld.
7. Alle besluiten ten aanzien van fraude behelzen de gronden waarop deze zijn gebaseerd.
8. In gevallen van fraude waarin dit reglement niet voorziet, beslist de examencommissie. Men kan in beroep gaan tegen zo'n besluit bij het faculteitsbestuur.

Artikel 15. Plagiaat

1. Onder plagiaat wordt zoals te doen gebruikelijk, verstaan:
   a. het nagenoeg woordelijk overnemen van passages uit het werk van een ander zonder bronvermelding
   b. het parafraseren van passages uit het werk van een ander zonder aan te geven dat het hier om de opvatting of gedachtengang van een ander gaat.
   c. het presenteren van het gedachtengoed of vondsten van een ander als te zijn de eigen gedachtengoed of vondsten.
2. Van het vermoeden van plagiaat wordt, onder overlegging van eventuele bewijsstukken en/of verklaringen, schriftelijk melding gemaakt bij de examencommissie
3. De examencommissie stelt binnen 7 werkdagen schriftelijk vast of er sprake is geweest van plagiaat.
4. Bij de vaststelling van plagiaat is de examencommissie gehouden te horen de examinator, de student en relevante personen.

Artikel 16. Sancties betreffende fraude en plagiaat

1. Ingeval van fraude door een student kan de examencommissie de volgende sancties toepassen:
   a. ongeldigverklaring van het betrokken tentamen;
   b. uitsluiting van tentamens in het desbetreffende vak voor ten hoogste drie opeenvolgende tentamenperioden nadat de fraude is geconstateerd;
   c. uitsluiting voor alle tentamens voor maximaal drie opeenvolgende tentamenperioden;
   d. ongeldigverklaring van alle tentamenresultaten van dat semester.
2. Ingeval van herhaling verklaart de examencommissie de behaalde resultaten van alle modules van de betreffende fase, als te zijn vervallen. De student wordt tevens met onmiddellijke ingang voorgedragen voor afschrijving van de universiteit. De student mag zich gedurende 5 (vijf) jaren niet meer inschrijven voor het volgen van een studie aan de Universiteit. De mogelijkheid van vrijstelling bij een eventuele nieuwe inschrijving is niet aanwezig.

3. Bij constatering van plagiaat binnen 5 jaar na het afstuderen, kan het diploma worden ingetrokken.

5. KLACHTEN, BEROEP EN SANCTIES

Artikel 17. Klachten

1. Een student (dan wel een groep van studenten) kan een klacht over de gang van zaken tijdens het tentamen c.q. de beoordeling daarvan c.q. het niet of niet tijdig nakomen van verplichtingen voortvloeiende uit dit reglement, voorleggen aan de examencommissie.
2. De klacht dient schriftelijk te geschieden.
3. De klacht wordt ingediend zo spoedig mogelijk maar uiterlijk 10 werkdagen nadat het tentamen is afgenomen dan wel nadat de uitslag bekend is gemaakt, dan wel na het vermeend onjuist handelen of nalaten.
4. De examencommissie zal binnen tien werkdagen in overleg met de examinator en de student een oplossing zoeken voor de klacht. Indien de student zulks wenst, kunnen andere organen of personen eveneens worden geraadpleegd.
5. Bij overschrijding door de examencommissie van de genoemde termijnen, kan het faculteitsbestuur een besluit nemen.

Artikel 18. Beroep

1. Tegen een besluit van de examencommissie staat beroep open bij het faculteitsbestuur. Het faculteitstuur beslist, gehoord de examencommissie en de student.
2. Het beroep tegen een besluit van de examencommissie, dient binnen een periode van 10 werkdagen nadat het desbetreffende besluit ter kennis van de belanghebbende is gebracht, schriftelijk te worden ingediend bij het faculteitsbestuur.
3. Een besluit over het beroep is met redenen omkleed en dient binnen 20 werkdagen na de schriftelijke indiening ervan te zijn genomen en schriftelijk ter kennis van de belanghebbende(n) te zijn gebracht.
4. Beroep heeft geen schorsende werking.
5. Tegen het besluit van het faculteitsbestuur staat beroep open bij het Bestuur van de Universiteit.

Artikel 19. Sancties betreffende toepassing van het Examenreglement

Ingeval organen of personen zich (bij herhaling) niet houden aan de bepalingen van dit (dan wel voortvloeiende uit dit) reglement, kan het faculteitsbestuur sancties treffen al dan niet op voordracht van de examencommissie.

INVOERINGS, OVERGANGS- EN SLOTBEPALINGEN

Artikel 20. Invoeringsbepalingen

1. Dit examenreglement treedt in werking getreden op 1 Okt 2014

2. Het is van toepassing op alle studenten die zich hebben ingeschreven voor een Master opleiding aan de Faculteit der Technologische Wetenschappen.
3. Dit examenreglement kan worden aangehaald als: 'Examenreglement 2014' van de Masteropleidingen van de Faculteit der Technologische Wetenschappen van de Anton de Kom Universiteit van Suriname.

Artikel 21. Overgangsbepalingen

1. Voor alle masterstudies geldt dat het eerste jaar van inschrijving bepalend is voor welk examenreglement van toepassing is.
2. Per 1 oktober 2014 komt het examenreglement van 2009 te vervallen en gelden uitstluitend de bepalingen zoals vastgesteld in dit reglement.

Artikel 22. Slotbepalingen

1. In alle gevallen waarin dit reglement niet voorziet, beslist de examencommissie na overleg met het faculteitsbestuur en de daarvoor in aanmerking komende commissies en betrokken partijen.
2. Deze besluiten worden daarna aan het examenreglement toegevoegd.

Goedgekeurd door de Faculteitsvergadering FTeW, d.d. 11 Juli 2014

R. Tjien Fooh
Dekaan FTeW

Aldus vastgesteld door het Bestuur van de Anton de Kom Universiteit van Suriname op

Dr. ir. R. Sidin
Voorzitter Bestuur van de Anton de Kom Universiteit van Suriname

Appendix 3: Complaint or advice form MSc in SMNR

Summarize the problem or advice briefly, but clearly, and submit this form in a sealed envelope in the name of: "Program coordinator MSc in SMNR" at the FTeW Administration, Building 16, Room 51-52 in the MAILBOX or via email. You are not required to fill in every cell.

Name(s):	Date: Subject:
Phone or email address contact person:	
Problem or advice description:	
Suggestions:	

This complaint/advice form is intended to quickly inform MSc in SMNR management of identified problems in the field of educational activities. It can therefore be about a subject, a teacher, a student, the facilities or simply a study problem, or another problem that you have that you request the attention of the study program for, etc. This form will be treated confidentially. The program coordinator maintains close contact with the student representative, the examination board member and the student counselor.

MSc in SMNR office
Department SMNR
Faculty of Technology, Building 16, Room 52
Anton de Kom University of Suriname, Leysweg, POB 9212, Suriname
Phone: (597) 465558 # 2355
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Prepared by the management of the SMNR program, Faculty of Technology, Anton de Kom University of Suriname.