VILNIUS UNIVERSITY

STUDY FIELD Physical Geography
SECOND-CYCLE STUDY PROGRAMME
HYDROMETEOROLOGY
CODE: 6211CX012 (621F83001)
SELF-EVALUATION REPORT

Pro-rector of Vilnius University …….....…… Assoc. Prof. Dr Valdas Jaskūnas
(signature)

Head of self-evaluation group .....……. Prof. Dr Arūnas Bukantis
(signature)

Vilnius
2017

Key data on the study programme

Title	HYDROMETEOROLOGY
Code	6211CX012 (621F83001)
Study area	Physical Sciences
Study field	C05 Physical Geography
Kind of study	University studies
Language of instruction	Lithuanian
Study cycle	Second
Mode of study and length in years	Full-time, 2
Scope in credits	120
Qualification awarded	Master‘s degree of Hydrometeorology, accepted in 2017 and later – Master of Physical Sciences
Date of registration and Order No	19–05–1997 No. 565

Abbreviations used in the Self-Evaluation Report:

Assoc. prof. – Associate professor

DH&C – Department of Hydrology and Climatology of Institute of Geosciences in Faculty of Chemistry and Geosciences

FCHG – Faculty of Chemistry and Geosciences of Vilnius University

HMm SP – Hydrometeorology master studies programme

LHMS – Lithuanian Hydrometeorological Service

NRC – Nature Research Centre

SPC – Study Programme Committee

VU – Vilnius University

Composition of the self-evaluation group (SEG)* and their responsibilities

Name, surname, contact information	Position	Area and scope of responsibility in SEG
Prof. dr. Arūnas Bukantis	Head of Department of Hydrology and Climatology Professor of Institute of Geosciences	Head of self-evaluation group Summarizing of the information about aims, competences, learning outcomes and structure, study programme management.
Vida Augulienė	Social partner - Vice director of Lithuanian Hydrometeorological Service	Summarizing of the information about specialist demand
Prof. dr. Egidijus Rimkus	Director of Institute of Geosciences	Facilities and learning resources – collecting and analysing the data
Prof. dr. Gintaras Valiuškevičius	Professor of Institute of Geosciences	Study process and assessment – collecting and analysing the data
Assoc. prof. dr. Gintautas Stankūnavičius	Assoc. prof. of Institute of Geosciences	Annexes – collecting and analysing the data
Assoc. prof. dr. Edvinas Stonevičius	Assoc. prof. of Institute of Geosciences	Study process and assessment – collecting and analysing the data
Assoc. prof. dr Justas Kažys	Assoc. prof. of Institute of Geosciences	Facilities and learning resources – collecting and analysing the data
Ms. Linutė Valiuškevičienė	Administrator of DH&C	Academic staff, annexes – collecting and analysing the data; Curriculum Design
Ms. Lauryna Šidlauskaitė	Graduate student of Vilnius University	Purpose and learning outcomes of the study programme – collecting and analysing the data

*Approved by the Decision of the Faculty Dean 12 September 2016, No 140100–D–6.

Schedule of task implementation

Task	Date of implementation
Collecting all relevant information for the self-evaluation	Oct 2016–Feb 2017
First draft of the text of the Self-evaluation Report (SER)	Mar 2017
Discussing the first draft of SER focusing on three areas of evaluation: purpose and learning outcomes, curriculum design and academic staff	Apr 2017
Discussing the first draft of SER focusing on three areas of evaluation: facilities and teaching/learning resources, study process and assessment of academic progress, study programme (SP) management	May 2017
Presentation of the SER to the teaching staff, social partners of the SP, discussing their feedback	May 2017
Final draft of SER	29 May 2017

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INTRODUCTION

Vilnius University (hereinafter also University or VU), founded in 1579, is the oldest and largest institution of higher education in Lithuania. The University management structure is defined in the Statute of Vilnius University (approved 6 May 2014 by Law of the Republic of Lithuania No XII–862), which stipulates that the University community shall exercise its self-governance through the bodies of governance of the University: the Senate, the Council and the Rector. As of 1 Jan 2017, the University had 3627 employees (including 1337 teaching staff and 450 research staff) and had 20236 students. The University comprises 23 core academic units: 14 faculties, 3 institutes, 5 research and study centres and 8 core non-academic units.

The University implements study programmes of three study cycles in the areas of the humanities, social, physical, biomedical and technological sciences; the total number of undergraduate (bachelor) study programmes is over 76, the number of (graduate) master and integrated study programmes exceeds 106. Doctoral students may enrol in almost 29 and residents in more than 63 study programmes.

The Faculty of Chemistry and Geosciences (hereinafter also Faculty) was founded in 2016 (till 2016 – Faculty of Natural Sciences and Faculty of Chemistry). The Faculty operates in accordance with the Statute of Vilnius University. The Faculty is headed by the Faculty Council and the Dean. Presently, the Faculty comprises 2 institutes (Institute of Chemistry and Institute of Geosciences). They are engaged in research and studies. The main research areas of the Faculty include Physical Sciences (Chemistry, Natural and Social Geography, Geology, Cartography). The research results are disseminated in national and international conferences (http://www.chgf.vu.lt//).

The Faculty implements 7 first cycle (Biochemistry, Chemistry, Nanomaterials chemistry, Geography, Geology, Cartography and GIS, Meteorology and Hydrology,) and 7 second cycle study programmes (Chemistry, Nanomaterial's chemistry, Geography and Land management, Cartography, Geology, Hydrometeorology). The Faculty also implements doctoral studies in the field of Chemistry, 2 joint doctoral study programmes Physical Geography and Geology with NRC and Klaipėda University).

Presently, the Faculty has 133 staff members (teaching, research and administrative), including 35 professors and chief research fellows, 40 associate professors and senior research fellows, 21 lecturers with a PhD, 3 lecturers and assistant lecturers, 3 research assistants, 21 specialists, 10 administrative staff. There are about 950 students in the Faculty.

The study programme of Hydrometeorology is implemented by the Department of Hydrology and Climatology in Institute of Geosciences. The programme has been implemented in 1995. Before 1995 undergraduate and graduate studies were combined in integrated studies (five years long study). ***The Programme went through the external assessment in 2011. The overall assessment of the programme was positive and accredited for 6 years.*** The Assessment Report and the changes induced thereof are discussed in section 6.

ANALYSIS OF THE STUDY PROGRAMME

1. Purpose and learning outcomes of the study programme

1.1. Purpose and learning outcomes of the study programme. Learning outcomes across course units (modules)

The purpose of the study programme is to prepare hydrometeorologists that can work independently in various organizations (scientific, educational, public and private businesses, etc.) and make well-founded decisions on such topics like atmosphere, hydrosphere, climate change, environment protection, ecology, etc. Moreover, they can do scientific and practical research using modern technology, involve themselves

successfully into local and international projects and continue their studies in doctoral programme. The aims and learning outcomes of the HMm SP are formulated in compliance with the "Tuning" methodology.

The competences and learning outcomes of the study programme (hereinafter also SP) are as follows:

Table 1.1 Generic and subject-specific competences and learning outcomes of the HMm SP

Generic competences of the SP		**Learning outcomes of the SP**	
1.	Hydrometeorologist can solve problems in new and unknown environment or multi branched field, perform scientific research, capable of deepening and integrating one's knowledge, work independently or in a group, has information management skills.	1.1	Graduates will be able to innovatively and competently operate the information technologies, work with large data bases, independently deepen and integrate one's knowledge.
		1.2	Graduates will know research methods, they will be capable to apply systemic thinking, , suggesting hypotheses, concepts and objectives, and critically analyse data and projects.
		1.3	Graduates will be able to clearly and professionally convey logical, scientifically proven and well-thought-out ideas and findings, provide spoken or written research reports and conclusions.
Subject-specific competences of the SP		**Learning outcomes of the SP**	
2.	Hydrometeorologist can analyse local phenomena, while referencing one or multiple theoretical viewpoints, combining theory and practice, using various geographical analysis techniques, mathematical models, statistical and analytic research methods.	2.1	Graduates will be able to analyse climate change and hydrosphere parameters, apply numerical mathematical models to explaining natural processes' and environment research.
		2.2	Graduates will be able to evaluate climate change impact to environmental, social, and economic fields.
		2.3	Graduates will be able to combine theoretical concepts and innovations from subjects meteorology, climatology, hydrology and oceanography.
3.	Hydrometeorologist can reasonably apply special hydrometeorological information to various social fields.	3.1	Graduates will know climatological and long-range forecasting techniques, their resort and application to practical uses.
		3.2	Graduates will be able to summarize and critically analyse various atmospheric phenomena impact to human health, habitat, flora and fauna.
		3.3	Graduates will be able to critically analyse coastal conditions and solve various coastal management problems.

Upon completion of the SP of Hydrometeorology, a student may engage in further studies which include doctoral courses in Vilnius University of Physical Geography, Geology, Ecology and Environmental sciences, as well as other higher education institutions in Lithuania and abroad or work in departments of Ministry of Environment of the Republic of Lithuania, air and sea ports, science institutions, universities and other organizations of higher education, governmental, private, public and business offices, information agencies, other places where both hydrometeorological and gained general knowledge and abilities can be applied.

A qualification obtained upon the completion of the second-cycle study programme is in conformity with qualification VII as specified in the Qualifications Framework of the Republic of Lithuania.

1.2. Availability of information about the purpose and learning outcomes of the SP

Information on the purpose, learning outcomes, content of the SP and admission requirements is accessible on the internet to all prospective students, academic community and the society at large. The information is freely accessible at:

- In the catalogue of study programmes of Vilnius University on its official website[1].
- On the official website of the Faculty http://www.chgf.vu.lt//;
- On the official website of the University intended to prospective students[2].
- On the official website of the *Open System of Providing Information, Tutoring and Vocational Orientation*, or AIKOS (a Lithuanian acronym)[3].
- On the official website of the DH&C http://www.hkk.gf.vu.lt/

Every year, the University issues a special publication intended for the dissemination of information about second cycle study programmes *Kviečia Vilniaus universitetas. Antroji pakopa*. (Vilnius University is calling. Second study cycle)[4]. The publication is available during a variety of promotional events, including meetings in secondary schools, where teachers offer advice on further studies, also on the internet, where all interested in studying in Vilnius University can easily access it, etc.

Every year the SP, its purpose/s and learning outcomes are introduced at the following promotional events:

- Vilnius University *Discovery Days*, when the administration, the teaching staff and the students of the FCHG deal with study-related issues on an individual basis.
- Study Fair *Mokymasis, studijos, karjera* (Learning, Studies and Career) held at LITEXPO, where all information related to the studies in the SP is given by the administration, the teaching staff and the students of the FCHG.
- During Vilnius University visits to secondary schools, where study programmes of all levels are introduced.
- Some course units (modules) are accessible to school students when they come to Vilnius University in autumn and spring during an event called *A student for a single day*. At that time, school students have an opportunity to attend lectures held at FCHG together with the University students[5].
- Specially focused video, radio and TV shows.
- Department of Hydrology and Climatology prepares and disseminates special informational brochures, maintains and updates department website (*http://www.hkk.gf.vu.lt*)
- Information about studies is posted on Facebook account: https://www.facebook.com/vuhkk/
- Also, Institute of Geosciences publishes its own brochure which includes information about study programmes. The catalogues and brochures are distributed for gymnasium students and teachers during Open Door events, visits to gymnasiums, exhibitions and other events.

1.3. Information about the revision of learning outcomes and participation of social partners in the SP implementation

Main social partners of HMm in study programme realisation are *Lithuanian Hydrometeorological Service (LHMS)* and *Nature Research Centre (NRC).* Together with these partners, we coordinate and on regular

[1] https://klevas.vu.lt/pls/pub/public_ni$www_progr_app.show
[2] http://www.vu.lt/kviecia/
[3] https://www.aikos.smm.lt/Registrai/_layouts/15/Asw.Aikos.RegisterSearch/ObjectFormResult.aspx?o=PROG&f=Prog&key=4364&pt=of&ctx_sr=za5dHDvp0IGJ2%2fD6Fkt7rIse6a8%3d
[4] http://www.vu.lt/kviecia/rinkis-studijas/priemimas/2-pakopos-studijos
[5] http://www.vu.lt/kviecia/naujienos/visos-naujienos/aplankyk/item/512-tapk-studentu-vienai-dienai

basis discuss programme aims and learning outcomes in the specially designed workshops and Study Programme Committee meetings. Employers of these institutions participate in the students' master thesis preparation and defence processes. Learning outcomes of the SP were revised in 2012 and 2017 depending on the previous self-assessment findings and the upgraded 1.5-year duration of the program's objectives.

1.4. Conformity of learning outcomes to the requirements specified in international and domestic documents focusing on academic and professional standards

Programme aims and learning outcomes meet the requirements of *World Meteorological Organization* (WMO) for university-level graduate meteorologists and hydrologists (*Guidelines for the Education and Training of Personnel in Meteorology and Operational Hydrology, WMO–No. 258, 2001, 2002, 2006; Guide to the Implementation of Education and Training Standards in Meteorology and Hydrology, 2015)* and mission of *Lithuanian Hydrometeorological Service*. Also, implementing of HMm program involve *Bologna Declaration* (1999), *Dublin descriptors* (2004), *Lithuanian Republic Law on Higher education and research* (30 April 2009 No XI–242, Vilnius), rule of law *Ministry of Education and Science of the Republic of Lithuania* (30 December 2016 No V–1168), *Vilnius university Fact Sheet of study Regulation* and *Study Programs Regulation* (2010, 2012, 2013) and other rule of law[6].

In 2011, a group of FCHG teaching staff participated in project devoted to implementation of European Credit Accumulation and Transfer System in Lithuania. As a part of this project a survey of professional field was accomplished. On the basis of project information and activities the learning outcomes of study programme were discussed with participants of this project and with foreign experts who were participating in this project. Goals and learning outcomes of the study programme have been reformulated in 2017 due to transition to 1.5 years of HMm study.

1.5. The SP in the context of other study programmes implemented by VU and other universities

HMm study programme is unique master study programme: there is no such specially designed programme for the integrated study of atmosphere and hydrosphere in any other higher education institutions in Lithuania. Other Geography field master study programmes within Vilnius university are focused on the cartographic, social, economic and demographic sectors of geography. Thus, it can be argued that three master programmes – programme in Hydrometeorology, programme in General Geography and Land Management, programme in Cartography cover the complete set of topics of geography science and study.

1.6. Strengths and weaknesses of the area under evaluation and improvement measures to be taken

Strengths:

- The aims and learning outcomes of the HMm SP are well defined and clear, and they are being coordinated and regularly discussed together with partners. They are formulated in compliance with the "Tuning" methodology.
- Information about the HMm SP, the aims and learning outcomes of the studies are posted on the Internet in Lithuanian and English. Study programme is presented for potential applicants during various Open-Door events, in catalogue of study programs of VU and in brochure of Institute of Geoscience.

[6] Presently, the descriptions of the following study fields approved by the Ministry of Education and Science of the Republic of Lithuania are available: oral hygiene, chemistry, economics, pharmacy, philosophy, finance, accounting, physics, geology, mathematics, medicine, diet and nutrition, music, odontology, heritage, political sciences, rehabilitation, regional cultural studies, nursing, sociology, statistics, law, veterinary medicine, public administration, public security, Geography

- The HMm SP provides very good coverage in applied hydrometeorology and prepares students for future education and partially for starting professional activities.
- The aims and learning outcomes are consistent with the type of study, cycle and level of qualifications.
- The title of the study programme, learning outcomes and programme contents match each other.
- HMm study programme is a unique master study programme: there is no such specially designed programme for the integrated study of atmosphere and hydrosphere.

2. Curriculum design

2.1. Study plan, conformity of curriculum design with the provisions of legal acts

The curriculum design of the currently implemented study programme of Hydrometeorology is in conformity with the *General Requirements for Master Study Programmes* approved by Order No V–826 of the Minister of Education and Science 3 June 2010), the *Regulation of Study Programmes of Vilnius University* approved by Decree No SK–2012–12–4 of Vilnius University Senate Commission 21 June 2012 and a description of the study field of Geography approved by Order NoV–928 of the Minister of Education and Science of the Republic of Lithuania 27 August 2015 and Order NoV-1168 of the Minister of Education and Science of the Republic of Lithuania 30 December 2016.

Table 2.1 The conformity of the SP of Hydrometeorology to the general requirements of the second cycle study programmes

Requirements	In the study programme
The scope of the second cycle study programme shall be between 90 and 120 credits.	120 credits
The total number of course units per semester shall be no more than 5.	no more than 5
A student's individual work shall make no less than 30% of each course unit.	Average 72 %
Course units within the study field shall make at least 60 credits; their content shall be of higher quality level than corresponding first-cycle course units within the same study field.	96 credits
Optional course units offered by the university are intended for specialized studies and shall make no more than 30 credits.	24 credits
The scope of the graduation thesis shall be at least 30 credits.	30 credits

STUDY PLAN (full-time studies)
(COMPETENCES AND LEARNING OUTCOMES ACROSS COURSE UNITS (MODULES))

Code	Course units (modules) according to types	Volume in credits	Total student workload	Contact hours	Individual work	Competences of the study programme								
						Generic competences			Subject-specific competences					
						1.			2.			3.		
						Learning outcomes								
						1.1	1.2	1.3	2.1	2.2	2.3	3.2	3.2	3.3
YEAR 1		**60**	**1600**	**560**	**1040**									
SEMESTER I		**30**	**800**	**328**	**472**									
Compulsory course units (modules)		**23**	**614**	**320**	**294**									
	Coastal Research and Introduction to Coastal Management	*5*	*133*	*80*	*53*	x				x	x			x
	Database Design	*8*	*213*	*96*	*117*	x			x					
	Climate Variability and Changes of Hydrosphere	*7*	*186*	*96*	*90*	x			x	x	x	x		x
	Methodology of Scientific Research	*3*	*80*	*48*	*32*		x	x						
Optional course units (modules)		**7**	**186**	**8**	**178**									
	Research Project in Hydrology	*7*	*186*	*8*	*178*	x	x	x	x	x	x	x	x	x
	Research Project in Meteorology	*7*	*186*	*8*	*178*	x	x	x	x	x	x	x	x	x
SEMESTER 2		**30**	**800**	**232**	**568**									
Compulsory course units (modules)		**21**	**560**	**224**	**336**									
	Introduction to Global Circulation Modelling	*5*	*133*	*48*	*85*	x			x			x		
	Water Management	*5*	*134*	*64*	*70*		x		x		x			
	Microclimatology	*5*	*133*	*48*	*85*		x			x			x	
	Theoretical Seminar of Hydrometeorology	*6*	*160*	*64*	*96*		x	x		x	x			
Optional course units (modules)		**9**	**240**	**8**	**232**									
	Research Project in Hydrology	*9*	*240*	*8*	*232*	x	x	x	x	x	x	x	x	x
	Research Project in Meteorology	*9*	*240*	*8*	*232*	x	x	x	x	x	x	x	x	x

YEAR 2		**60**	**1600**	**310**	**1290**									
SEMESTER 3		**30**	**800**	**280**	**520**									
Compulsory course units (modules)		**22**	**587**	**272**	**315**									
	Sedimentology	*5*	*133*	*48*	*85*		x			x	x			x
	Biometeorology	*6*	*160*	*80*	*80*		x			x			x	
	Introduction to Long Range Weather Prediction	*6*	*160*	*80*	*80*	x			x			x		
	Application of R Programming in Environmental Sciences	*5*	*134*	*64*	*70*	x			x		x			
Optional course units (modules)		**8**	**213**	**8**	**205**									
	Research Project in Hydrology	*8*	*213*	*8*	*205*	x	x	x	x	x	x	x	x	x
	Research Project in Meteorology	*8*	*213*	*8*	*205*	x	x	x	x	x	x	x	x	x
SEMESTER 4		**30**	**800**	**30**	**770**									
Compulsory course units (modules)		**30**	**800**	**30**	**770**									
	Master Final Thesis (Study field: Hydrometeorology.)	*30*	*800*	*30*	*770*	x	x	x	x	x	x	x	x	x

2.2. Principles of curriculum design and rationale of the SP

The scope of the HMm SP is 120 credits; the length of the HMm SP is two years. Starting from 2017, Hydrometeorology study programme was reformed to 1.5-year long programme (90 credits, Table 2.2). This decision was made because of these reasons:

- The main objective was to elevate the quality of studies and to modernize the programme by implementing new and withdrawing less relevant courses, increasing programme's appeal, and providing better circumstances for students and their future careers.
- An increase of number of students who drop out or take academic leave was one of the most significant reasons for this decision, moreover that the main cause according to the students was the length of studying cycle in combination with bachelor's programme (4 + 2 years).
- A survey of students from 1st and 2nd cycles have shown these results: 70 % of students support the proposal of making the programme 1.5 years long, 19 % thought it should stay at 2 years long and 11 % had no opinion on the subject.
- After graduating the 2-year long programme students have insufficient time to prepare for application to 3rd cycle programmes in the same year (time between receiving the diploma and applying for a programme is about a week).
- Also, the proposal was supported by social partners (future employers) and alumnus of VU, who stressed the idea of choosing 1.5-year long programme if they could turn back time.

Table 2.2The HMm SP consists of 120 credits, of which: 24 – optional courses, 30 – final master's thesis, 66 – compulsory courses. First year consists of: Climate Variability and Changes of Hydrosphere, Database Design, Coastal Research and Introduction to Coastal Management, Methodology of Scientific Research, Introduction to Global Circulation Modelling, Microclimatology, Water Management, Theoretical Seminar of Hydrometeorology, and students start their research projects in hydrology or meteorology. In second year students continue their research projects, and study Biometeorology, Introduction to Long Range Weather Prediction, Sedimentology, Application of R Programming in Environmental Sciences. The preparation of final thesis takes up the whole 4th semester. Optional courses are meant to deepen the knowledge in hydrology or meteorology.

To increase informatics/programming direction after external evaluation (2011) new courses of "Database Design" (2012), "Introduction to Global Circulation Modelling" (2012) and "Application of R Programming in Environmental Sciences" were introduced (2017). The subjects "Atmospheric chemistry" and "Ecology of hydrosystems" has been refused from SP (respectively in 2012 and 2016).

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- Also, the proposal was supported by social partners (future employers) and alumnus of VU, who stressed the idea of choosing 1.5-year long programme if they could turn back time.

Table 2.2 Study plan of HMm SP since 2017

Code	Course units (modules) according to types	Volume in credits	Total student workload	Contact hours	Individual work
YEAR 1		**60**	**1600**	**560**	**1040**
SEMESTER 1		**30**	**800**	**296**	**504**
Compulsory course units (modules)		**22**	**614**	**200**	**388**
	Climate Changes	*7*	*186*	*80*	*106*
	Application of R Programming in Environmental Sciences	*5*	*133*	*64*	*69*
	Methodology of Scientific Research	*5*	*134*	*48*	*86*
	Project of Master Final Thesis I/II	*5*	*134*	*8*	*126*
Optional course units (modules)		**8**	**213**	**96**	**117**
	Database Design				
	Applied Programming of Spatial Data Systems				
SEMESTER 2		**30**	**800**	**264**	**536**
Compulsory course units (modules)		**30**	**800**	**264**	**536**
	Introduction to Global Circulation Modelling	*5*	*133*	*48*	*85*
	Water Management	*5*	*134*	*64*	*70*
	Microclimatology	*5*	*133*	*48*	*85*
	Coastal Research and Sedimentology	*10*	*266*	*96*	*170*
	Project of Master Final Thesis II/II	*5*	*134*	*8*	*126*
YEAR 2		**30**	**800**	**310**	**1290**
SEMESTER 3		**30**	**800**	**280**	**520**
Compulsory course units (modules)		**30**	**800**	**152**	**648**
	Biometeorology	*5*	*134*	*60*	*74*
	Introduction to Long Range Weather Prediction	*5*	*134*	*60*	*74*
	Master Final Thesis	*20*	*532*	*32*	*500*

Since 2017 two subjects "Coastal Research and Introduction to Coastal Management" (5 credits) and "Sedimentology" (5 credits) were merged into one course "Coastal Research and Sedimentology" (10 credits).

The subject “Theoretical Seminar of Hydrometeorology” (6 credits) has been refused from SP.

The credits of subjects “Biometeorology” and “Introduction to Long Range Weather Prediction” have been reduced (5 instead of 6).

The subjects “Research Project in Hydrology / Meteorology” (24 credits) and “Master Final Thesis” (30 credits) have been changed into “Project of Master Final Thesis I and II” (10 credits) and “Master Final Thesis” (20 credits).

2.3. Study methods, proportion between contact hours and students’ individual work

To achieve aims and outcomes of SP different study methods are used: Active lectures; seminars; discussions; written project, that includes scientific research and decision making; essay writing; individual scientific research project; analysis of meteorological and hydrological data; experiments using

meteorological and hydrological equipment; practicum in laboratories; group project; presentations; final thesis.

The purpose of the individual work is to develop independent research skills, critical thinking and team working skills, to form a deeper knowledge in the fields of meteorology / climatology / hydrology / oceanography and to prepare for doctoral studies those, who are interested.

At the beginning of 1st semester students freely choose one research project topic from the list of proposed topics. Students may propose their own topics. Students continue research on the same topic during all three semesters and use the same topic to prepare the master final thesis. Students perform original research, which is based on scientific and methodological literature analysis, discussion with the supervisor and independent analysis. Students should apply scientific creativity, up to date and innovative methods in their research. The interpretation of project results should be performed according to high academic standards. The applicability of results should be highlighted.

Table 2.3 Proportion between contact hours and students' individual work

	Compulsory course units			Optional course units		
Semester	**Contact hours**	**Individual work, hrs**	**Total**	**Contact hours**	**Individual work, hrs**	**Total**
1	320	292	612	20	168	188
2	224	335	559	20	221	241
3	272	314	586	20	194	214
4	20	780	800	–	–	–
Total	**836**	**1721**	**2557**	**60**	**583**	**643**

The ratio of contact hours and individual work hours of the compulsory course units are 49 and 51 % respectively in the first semester, while in the second and third semesters more time is provided for the individual work – 53 and 60 % respectively. The optional course units comprise 23–30 % of the total hours.

2.4. Requirements for graduation theses

Graduation theses are prepared in accordance with the *Procedure for the Preparation, Defence and Safekeeping of Graduation Theses* approved by Decree No R–446 of Vilnius University Pro-Rector on 17th of November 2015. Master final thesis must be prepared according to the requirements described in E. Rimkus and G. Valiuškevičius book "Guidelines for Preparing Theses and Term Papers. Work" (2016). Through research, students are acquainted with Lithuanian, regional or global hydrological and meteorological data archives, independently analyses results and methodology of similar studies, if necessary, carries out field studies.

The documents and any other information related to graduation theses and students' other papers are accessible on the website of the DH&C http://www.hkk.gf.vu.lt/studentams/medziaga-studentams/. The criteria for assessing graduation theses are also provided in the description of the course unit (module) *Master Final Thesis.*

The purpose of Master Final Thesis is to develop independent research skills, critical thinking and team working skills, to form a deeper knowledge in the fields of meteorology / climatology / hydrology / oceanography, to prepare for doctoral studies.

By working on their Master Final Thesis, student will acquire skills to carry out scientific research; will have greater understanding of up-to-date knowledge in the field of master final thesis, will be able to realize and communicate the contribution of the thesis to the state of knowledge; will be able to independently formulate research objectives, tasks and find solutions to scientific challenges, to provide science-based recommendations on research methodology; will acquire deeper knowledge in the research field and will be

able to apply it in doctoral studies or in other professional activity; will enhance their creative and innovative potential, the ability to communicate, develop critical and analytical thinking.

The theses are supervised by the academic staff of the HMm SP. Topics for the theses are chosen by the students after having discussed them with potential supervisors and approved by the DH&C.

The initial version of thesis must be completed and delivered to the supervisor in the 12th week of the 4th semester. The supervisor evaluates and submits a written opinion if the theses is prepared according to requirements, provide comments and recommendations for improvement of the thesis. On the 13th week of semester, the master final theses are approbated. Students prepare and present scientific report (10 min). During approbation, students are asked questions about their thesis. Starting in 2019, *the initial version* of thesis must be completed and delivered to the supervisor in the 14th week of the 3th semester. On the 15th week of semester, the master final theses will be approbated.

The final version of master final thesis must be submitted before the date is specified by the DH&C and in website (www.hkk.gf.vu.lt). Master final thesis after supervisor approval can be defended in thesis defence commission session. External expert confirmed by the head of department review each thesis. The commission and defence date are approved by the decree of the dean of Faculty of Chemistry and Geosciences. The master final thesis is defended by the presentation of scientific report. Scientific report should be prepared according requirements presented in E. Rimkus and G. Valiuškevičius book "Guidelines for Preparing Theses and Term Papers. Work" (2016). During defence, students are asked questions about their thesis.

2.5. Strengths and weaknesses of the area under evaluation and improvement measures to be taken

Strengths:

- The curriculum is designed in accordance with formal regulations and oriented to give students a high level of knowledge and skills.
- The contents of courses match master level of education and gives possibility to achieve learning outcomes.
- The student's workload is distributed evenly between semesters. Approximately 28 % of workload goes for contact studies, and 72 % for individual studies.
- Big part of total student's workload is designated for the research work. Research work is connected with scientific research conducted by student's advisor. Some students prepare scientific publications during their Master studies. Students who showed exceptional scientific achievements, innovative thinking and prepare publications are awarded special higher level diploma (Magna Cum Laude diploma).
- The content of the study programme meets the level of modern Hydrometeorology science, all teachers deliver courses that are directly linked with their scientific interests and activities. Contents of the courses are constantly updated following the global trends of research and development as well as the needs of Lithuanian science and economics.

Weaknesses:

- HMm SP cannot involve foreign students, because courses are taught in Lithuanian. There is no consensus if it is necessary to start deliver courses in English. Incoming Erasmus students are taught by supervising professor individually.
- There are no courses taught by visiting professors (this would be too expensive for the HMm SP), only separate lectures are delivered by visiting professors.

Improvement measures:

- In the future, we are planning to invite the visiting professors, whenever financial capabilities will allow to do that.

3. Academic staff

3.1. Composition of academic staff and its conformity to requirements

The study programme of Hydrometeorology (HMm SP) is implemented by FCHG academic staff members, including 4 full professors, 5 associate professors, 2 lecturers (see Table 3.1).

The teaching experience of the HMm SP academic staff, whose main employer is Vilnius University, is 16 years on average; their academic work experience is 17 years on average.

Table 3.1 Composition of academic staff according to academic titles and research degrees and scope of teaching in the SP of Hydrometeorology (see study plan of the academic year 2015/2016)

Academic title, research degree	No of people employed	Scope of teaching in the SP*	
		Credits	Percentage
Professors (Dr Habil. or Prof. Dr)	4	35	29
Associate Professors (Dr)	5	66	55
Lecturers with a doctoral degree	2	19	16
Assistant lecturers, doctoral students	–	–	–
Total	**11**	**120**	**100**

The composition of the academic staff is in conformity to the requirements stipulated in legal acts of the Republic of Lithuania[7], which is reflected in the following table:

Table 3.2 Conformity of the qualifications of academic and other staff in the second-cycle SP of Hydrometeorology to the General Requirements and to the Regulation of Study Programmes of Vilnius University

Requirements	In the study programme
No less than 80% of the academic staff shall have a doctoral degree.	100%
All staff involved in lecturing (reading theoretical courses) shall have a doctoral degree (*Regulation of Study Programmes of Vilnius University*).	All
No less than 60% (or 40%, when a study programme focuses on developing practical skills) of academic staff teaching course units in the study field shall do research in the same field.	90%
No less than 20% of the course units in the study field shall be taught by Vilnius University professors (*Regulation of Study Programmes of Vilnius University*).	29
Graduation theses shall be defended in a meeting of a Viva Voce Defence Committee. The Chairperson of the Committee shall be from a Higher Education Institution other than the one where the second-cycle study programme has been implemented.	Yes

Table 3.3 Composition of academic staff in the SP of Hydrometeorology according to position, academic year 2012–2016

Academic year / Position	2012		2013		2014		2015		2016	
	number	%	number	%	number	%	number	%	number	%
Professors	4	37	3	25	3	25	3	25	4	36
Associate professors	3	27	5	42	5	42	5	42	5	45
Lecturers\doctors	4	36	4	33	4	33	4	33	2	19
Lecturers	–	–	–	–	–	–	–	–	–	–
Assistant lecturers	–	–	–	–	–	–	–	–	–	–
Total	**11**	**100**	**12**	**100**	**12**	**100**	**12**	**100**	**11**	**100**

[7] *General Requirements for Master Study Programmes* approved by Order No V-826 of the Minister of Education and Science 3 June 2010. *Regulation of Study Programmes of Vilnius University* approved by Decree No SK-2012-12-4 of Vilnius University Senate Commission 21 June 2012. Available in Lithuanian at: http://www.vu.lt/lt/studijos/studiju-procesas/studijas-reglamentuojantys-dokumentai#vu_nutarimai

3.2. Recruitment of teaching staff, evaluation, turnover

On 17 December 2013, the Senate of Vilnius University (Decree No SK–2013–8–2) approved the *Regulations for Organising Open Competition for Teaching and Research Staff of Vilnius University*, which stipulate the procedure of evaluating the qualifications of the teaching and research staff of Vilnius University and the procedure of the competition as well as qualification requirements. At the University, teaching and research staff (except for invited professors and researchers) are recruited or promoted to higher positions on the basis of the results of open competition. The competition is started by the order of VU Rector. After the candidate wins the competition, he signs a contract for five years. If the person after five years of his/her work at the University, which is his/her main employer, wins the competition for the same position for the second time in succession, he/she signs a job contract for an unlimited period.

To determine if the qualifications of the teaching and research staff members are adequate for the position taken, every five years they are evaluated. During the evaluation, the following aspects are taken into consideration: the number of research papers, participation in conferences, supervising research projects, lecturing, preparing teaching materials, participation in the third-cycle (doctoral) studies, supervising students' papers, expert, managerial and other research-related activities. Moreover, the students' feedback on the lecturer's teaching is taken into account. During the last years, the system of students' feedback has been expanded paying more attention to student satisfaction and thus contributing to a more objective representation of the student's opinion.

During the period of self-evaluation, the turnover of the academic staff has been hardly noticeable (2 prof. left VU due to the age and 1 assoc. prof – due to job replacement):

Table 3.4 Turnover of academic staff in the SP of Hydrometeorology

Academic year	Full professors		Associate professors		Lecturers/doctors		Lecturers		Assistant lecturers	
	First-time agreement with VU	Left VU	First-time agreement with VU	Left VU	First-time agreement with VU	Left VU	First-time agreement with VU	Left VU	First-time agreement with VU	Left VU
2012	1	2	–	–	–	–	–	–	–	–
2013	–	–	–	–	1	–	–	–	–	–
2014	–	–	–	1	–	–	1	–	–	–
2015	–	–	–	–	–	–	–	–	–	–
2016	–	–	–	–	–	–	–	–	–	–
Total	**1**	**2**	**–**	**1**	**1**	**–**	**1**	**–**	**–**	**–**

The age of the academic staff implementing the SP of Hydrometeorology is 43 years on average (in 2016).

Table 3.5 Distribution of academic staff by age (in 2016)

Position	Age				
	25–34	35–44	45–54	55–64	65 and over
Professors	–	–	3	–	–
Associate professors	–	3	2	–	–
Lecturers\doctors	1	2	1	–	–
Lecturers	–	–	–	–	–
Assistant lecturers	–	–	–	–	–
Total	**1**	**5**	**6**	**–**	**–**

3.3. Competence and professional development of the academic staff

Teacher professional development is encouraged and fostered at three levels: University, Faculty and the Department. In 2009, the Rector by his Order approved the *Introductory training programme of newly*

admitted employees (teaching staff). The purpose of the programme is to introduce employees of the University to key functioning principles of the University, possibilities for information provision, internal rules and regulations, as well as the relevant requirements. Ordinarily such training sessions are held twice per year. *The University Lecturer Manual*, drafted in 2012 provides information to newly-recruited lecturers on work at the University, helping the lecturers to smoothly integrate in the University community.

The DH&C held a variety of workshops on issues of research methodology and techniques as well as on matters of classroom exercises. Also, participants of such workshops share their impressions of just visited international conferences. There are also many ways in fostering teaching traineeship in foreign universities, participating in Erasmus and other exchange programmes

Teachers of HMm study programme have scientific publications related to the topics of their delivering lectures. Professors, associate professors and lecturers of this programme are active and recognised scientists frequently invited to be experts in scientific projects and experts of scientific papers. Many scientific projects are directly related to the educational experience of HMm study programme. Therefore, there is a strong correlation between delivered subjects and practical problems to be solved.

The strategy solving staffing problems is successive: priority is given to teachers with scientific degrees, intensively involved into scientific activity, publishing scientific papers and participating in various scientific projects. Main efforts are directed to invite theoretical and practical high-skilled teachers, who are able to ensure high quality education in HMm study programme. The indices of scientific performance are most important tools in determining the qualifications of teacher's tenure.

The scope of research undertaken by the HMm SP academic staff is shown in Table 3.6.

Table 3.6 Research output of the academic staff of the SP of Hydrometeorology in 2012–2016

	01	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**Total**
2012	5	–	19	–	–	–	1	–	–	25
2013	2	–	12	–	–	2	6	–	–	22
2014	1	–	19	–	–	2	1	–	–	23
2015	–	–	14	–	–	1	6	–	–	21
2016	–	–	11	–	–	3	3	–	–	17
Total	**8**	**–**	**75**	**–**	**–**	**8**	**17**	**–**	**–**	**108**

01	**BOOKS:** (1) Monographs (monograph, study); (2) Literature intended for studies (textbook, teaching aid, other study-related literature); 3) reference publications (dictionary, guidebook, manual, encyclopaedia, atlases, maps, others); 4) other books (publications on the sources of research and scientific heritage, comments of legal acts, reports of projects, and other works, compiled and/or edited work, chapters in books)
02	**SUMMARIES** (summary of a doctoral dissertation, summary of a habilitation thesis, an overview of research papers submitted for the habilitation procedure)
03	**ARTICLES IN SERIAL PUBLICATIONS (JOURNALS) AND SINGLE VOLUMES** (article in ISI Web of Science, article in ISI Master Journal List, article refereed in the databases approved by the Lithuanian Research Council (LRC), article in other peer-reviewed publications, popular science article, article in a publication on research, arts or culture, other articles (overviews, information, introductory)
04	PUBLICATIONS OF RESEARCH SOURCES AND PUBLICATION OF SCIENTIFIC HERITAGE
05	**REVIEWS** (review in ISI Web of Science, review in ISI Master Journal List, review refereed in the databases approved by the LCR, review refereed in other databases, review in other peer-reviewed publications, review in a science popular publication, review in a publication on research, arts or culture)
06	**ARTICLES IN CONFERENCE PROCEEDINGS**: (1) Articles in peer-reviewed conference proceedings (article in ISI proceedings, article in conference proceedings refereed in the databases approved by the LCR, article in conference proceedings refereed in other databases, article in peer-reviewed international conference proceedings abroad, article in peer-reviewed international conference proceedings in Lithuania, article in peer-reviewed conference proceedings in Lithuania); (2) Articles in non-reviewed conference proceedings (article in non-reviewed international conference proceedings abroad, article in non-reviewed international conference proceedings in Lithuania, article in non-reviewed conference proceedings in Lithuania)

07	**CONFERENCE ABSTRACTS:** (1) Conference abstracts in peer-reviewed publications (abstracts in ISI Web of Science and ISI Proceedings, abstracts in ISI Master Journal List, abstracts in other databases, peer-reviewed extended abstracts, abstracts in other peer-reviewed publications); (2) Conference abstracts in non-reviewed publications
08	**PATENTS** (patents registered in the European Patent Office (EPO), patents registered in the US Patent and Trademark Office (USPTO), patents registered in the Japan Patent Office (JPO), patents registered in other countries, patents registered in Lithuania)
09	**TRANSLATION** (translated book, chapter in a book, article)

Table 3.7 Research projects implemented by the SP of Hydrometeorology academic staff in 2011–2018

Title of project	Period	Source of funding/Partner(s)
International projects		
Integrated Drought Management Programme in Central and Eastern Europe.	2013–2015	IDMP CEE / 12 European country
Management of the Niemen River basin with account of adaptation to climate change.	2011–2013	Programme of pilot projects on adaptation to climate change in transboundary basins under the UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention). / 7 partners
Advanced Global Navigation Satellite Systems tropospheric products for monitoring severe weather events and climate (GNSS4SWEC).	2012–2016	COST
A European network for a harmonised monitoring of snow for the benefit of climate change scenarios, hydrology and numerical weather prediction". 2014–2018, E. Rimkus	2014–2018	COST
National projects		
Climate Change and Quantitative and Qualitative Fluctuations of Lithuanian Water Resources.	2009–2013.	Vilnius University Budget
Climate change in peatlands: Holocene record, recent trends and related impacts on biodiversity and sequestered carbon.	2013–2016.	Research Council of Lithuania
Regional analysis of climate and water resources.	2014–2018	Vilnius University Budget
Impact Assessment of Climate Change and Other Abiotic Environmental Factors on Aquatic Ecosystems.	2015–2018	Research Council of Lithuania

3.4. Exchange of academic staff

During the last 5 years, teachers of HMm SP have visited Vienna Technical university, Dresden Technical university, Vancouver Island University, Carinthia University of Applied Sciences, U.S. Department of State, Lund University, University of Gothenburg, CALMet, Reading University, Daugavpils University, Temple university (USA). Teachers delivered lectures abroad and participated in the training courses.

Sources of Financing: EU (ERASMUS), European Flood Awareness System (EFAS), The European Centre for Medium-Range Weather Forecasts (ECMWF), European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT), The Satellite Application Facility on Climate Monitoring (CM SAF).

DH&C cooperates closely with the French Institute (Institut Français) and the French Embassy. We organised common workshops on Climate Change, 2015. We built an informative film about climate change in Lithuania. In this process were involved the staff of DH&C and the HMm SP students. The film is available at: www.institutfrancais-lituanie.info/cop21.

Table 3.8 Internships and study periods of the SP of Hydrometeorology academic staff according to exchange agreements in 2012–2016

Academic title and/or degree	2012		2013		2014		2015		2016	
	LT	Abroad	LT	Abroad	LT	Abroad	LT	Abroad	LT	Abroad
Professors	–	1	–	2	–	1	–	1	–	–
Associate professors	–	4	–	3	–	3	–	5	–	2
Lecturers\ doctors	1	–	–	–	1	–	1	–	1	–
Total	**1**	**5**	**–**	**5**	**1**	**4**	**1**	**6**	**1**	**2**

Table 3.9 Invited academic staff from abroad in the SP of Hydrometeorology in 2012–2016

Year	Name of lecturer	Institution (country)
2012	–	–
2013	–	–
2014	Dr. I. Buynevich Dr. A. Cooper	Temple university, USA Ulster university, UK–
2015	Dr. Laurent Bopp	Laboratoire des Sciencesdu Climate et de I'Environmennement, Universite de Versailles
2016	Dr. Vaughan T.J. Phillips	Lund University (Sweden)

Teaching staff members participate in scientific and pedagogical internships that are funded by Erasmus program and by scientific projects (Table 3.8). When professors from other universities are visiting Faculty, they are giving at least one lecture about their university and research. But we don't have visiting teachers who deliver full module or course. Inviting of foreign teachers for giving full course is too expensive.

3.5. Proportion of academic staff to students in the study programme

Table 3.10 Proportion of academic staff to students admitted to the SP of Hydrometeorology according to year of admission

Year of admission	Number of academic staff	Plan	Proportion number of academic staff / plan	Number of candidates	Proportion academic staff/ number of candidates	Admitted students	Proportion number of academic staff/number of admitted students
		Students (sf and nsf)*		Students (sf and nsf)		Students (sf and nsf)	
2012	11	13 (11+2)	0,8	16 (16+0)	0,7	11 (11+0)	1
2013	12	13 (11+2)	0,9	24 (24+0)	0,5	13 (13+0)	0,9
2014	12	14 (12+2)	0,9	22 (20+2)	0,5	8 (8+0)	1,5
2015	12	15 (10+5)	0,8	11 (11+0)	1,1	4 (4+0)	3
2016	12	15 (10+5)	0,8	22 (21+1)	0,5	8 (8+0)	1,5
Average:			**0,8**	**Average:**	**0,7**	**Average:**	**1,6**

*sf—funded by the state; nsf—not funded by the state

Proportion number of academic staff / plan students is 0.8–0.9 and proportion number of academic staff / number of admitted students is 0,9–3. Such a ratio is possible because the academic staff work in other study programmes too, while in HMm SP he/she teaches just 1–2 subjects per person (Table 3.10).

The ratio of contact hours and individual work hours of the compulsory course units are 49 and 51% respectively in the first semester, while in the second and third semesters more time is provided for the individual work – 53 and 60% respectively. The optional course units comprise 23–30% of the total hours

3.6. Strengths and weaknesses of the area under evaluation and improvement measures to be taken

Strengths:

- The teaching staff is well-qualified, experienced and exceeds formal requirements. The teaching staff is very active at academic community in local and international area. Young scientists are involved in teaching process.
- The distribution of teachers according age is quite even and teacher turnover is satisfactory.
- The teachers develop their professional skills by participating in various projects and programs with partners abroad. Part of the teachers participated in qualification courses organized by the University.
- The teaching staff is active in research and in preparation and granting of scientific projects. Staff members conduct a high-quality research. Educational activities of the teachers relate to the fields of their research.
- In 2012–2016 several teaching books and worksheet for master program courses were prepared by the teachers of HMm SP.
- The staff is usually willing to help students; teachers are available for consultations during their working time.

Weaknesses:

- Pedagogical skills of teaching staff should be improved. Now in the University new project of so called "University teachers academy" is under the creation process. Faculty teaching staff should be encouraged to participate in this "Academy" after launching of this project. Other way is to organize meetings and training sessions for Faculty teachers with experts in the field of Educational Sciences, which present the new training methods of the opportunities and benefits.
- Only small number of teachers uses possibilities of Moodle system in delivering their courses. General information about this system was presented in all teaching staff meeting. It is necessary to talk with teachers individually to encourage to use these possibilities.
- Large workloads of teaching personnel which sometimes 1.5 times exceeded the determined minimum standards.
- The structural transformation is place at the University. Faculty of Natural Sciences has been restructured in 2016 by separating Departments (units) of Biosciences and Geosciences. Departments belonging to Geosciences have been attached to the Faculty of Chemistry and at the end of 2016 the new faculty – Faculty of Chemistry and Geosciences has been established. Such transformations require a lot of extra time for the implementation of the necessary administrative tasks.

Improvement measures:

- The DH&C held a variety of workshops on issues of research methodology and techniques as well as on matters of classroom exercises. Also, participants of such workshops share their impressions of just visited international conferences. There are also many ways in fostering teaching traineeship in foreign universities, participating in Erasmus and other exchange programmes.
- in 2017 Rector of Vilnius university approved the new accounting regulation governing the timework of teaching personnel. It identifies two categories of teachers – pursuing scientific activity (professors, assistant professors, assistants and junior assistants) and not pursuing scientific activity (lecturers). Therefore the lecturers' workload does not include the scientific activity component. Generally there are accounted two components of the workload: time spent for scientific activity

(assessing scientific activity results for tenure track) and the standard teaching time while other working time is accounted in accordance with the regulations of the Faculty

4. Facilities and learning resources

4.1. Rooms available for studies and the number of workplaces

Five differently sized (area and workplaces) and fully equipped rooms are available for studies in DH&M (Table 4.1). There are enough workplaces for SP students. Part of the programme is devoted to the laboratory works (Table 4.2). All the rooms during the last 5 years were reequipped and renovated (Table 4.3). From 2016, our department has a room for master students in which they can work and rest. From 10:00 to 19:00 it is possible to use institute library with 30 workplaces. Every room has password secured internet access. Also, if there is need for longer stay in library, Scholarly Communication and Information Centre (SCIC), which is situated in Saulėtekio ave. 5 is open twenty-four seven.

Every fulltime employee of DH&C has his own workplace, where he/she can consult students. Comfortable environment allows saving personal time, specifically and accurately discussing arising issues. Such an approach is assumed to accelerate the students' independent study.

Table 4.1 Rooms most frequently employed for studies

Room No (or name)	Address	Area, m^2	Number of workplaces	Equipment available in the room
319 (Climatology and meteorology a.)	M. K. Čiurlionio str. 21	47.9	28	Computer, multimedia, whiteboard, wireless internet
318 (Digital methods lab.)	M. K. Čiurlionio str. 21	38.8	28	13 computers with software, multimedia, whiteboard, wireless internet
316 (Hydrology a.)	M. K. Čiurlionio str. 21	43.6	40	Computer, multimedia, whiteboard, wireless internet
111 (block 3, Hydrometeorology a.)	M. K. Čiurlionio str. 21	34.2	24	Computer, multimedia, whiteboard, wireless internet
107 (Master students' seminar room)	M. K. Čiurlionio str. 21	36.9	10	Whiteboard, wireless internet

Table 4.2 Teaching and learning laboratories used in the study process when implementing the SP of Hydrometeorology, including the number of workplaces and the area

No	Teaching and learning laboratories	Number of workplaces	Area, m^2	Area, m^2 per workplace
1.	319 (Climatology and meteorology a.)	28	47.9	1.7
2.	318 (Digital methods lab.)	12	38.8	3.2
3.	111 (block 3, Hydrometeorology a.)	24	34.2	1.4

Table 4.3 Renovation of teaching and learning laboratories

No	Room for teaching and learning	The works completed and their cost, 16 500 EUR
1.	318 (Digital methods lab.)	Full renovation and setting up of room with 12 computed workplaces
2.	316 (Hydrology a.)	Full renovation and setting up of room
3.	107 (Master students' seminar room)	Full setting up room for master students
4.	111 (block 3, Hydrometeorology a.)	Painted walls and extra heating system

4.2. Equipment for studies

All the computers run on official Widows OS and equipped with licenced versions of Microsoft Office, ArcGIS software and other special programmes (Digital Atmosphere, RAOB, Forecast Laboratory, EdGCM, CEDAS (Coastal Engineering Design and Analysis System)). Our study program required special equipment. Automatic training meteorological station was set up in 2011 in the Geoscience institute backyard. It was done with financial support of the European Regional Development Fund & Republic of Lithuania. It includes a complex of 5 meteorological parameters blocks: wind measurements, present weather conditions, solar measurements, cloudiness, thunderstorm detection. Station used for collecting data for individual master research projects. Station data is available since 2012 and present weather conditions are accessible via internet. Moreover, it serves educational purpose for schoolchildren and public excursions. Also, for scientific-educational purpose, various portable devices are used: 6 mobile weather stations and hydrological device for river runoff measurements.

4.3. Teaching and learning resources

Lithuanian is the main language for learning resources. The learning resources were prepared and are being maintained by department teachers. The reasons for this process include poor supply of resources in Lithuanian & special demands for SP subjects. The main goal is to ensure that every subject would be granted with learning material in Lithuanian fulfilling specific requirements of the subjects. Since 2012, new publications are: “Fundamentals of Meteorology” (2012), “Hydrography of Lithuanian water resources” (2012), “Hydrological Measurements” (2012), “Meteorological Forecasts Exercises” (2012), “Physical Geography of Lithuania” (2013), “Guidelines for preparing a course papers and diploma work” (2016), “Meteorological Measurements. Part 1” (2016). Most of the resources are published in electronic versions and freely available in *.pdf* format.

Learning resources could be loaded in DH&C internet site (http://www.hkk.gf.vu.lt, students section) and are freely available for students.

VU library subscribes to full-text databases, where students can really find the information needed for their studies and research.

The shortage of learning resources is compensated by buying publications in other languages (mostly in English). The annual budget for new learning resources (textbooks, handbooks, scientific books, etc.) was relatively stable during the last 5 years (Table 4.4). It assures continuous improving of learning resources quantity and quality and mostly satisfies the requirements of SP students.

Table 4.4 Budget for publications, EUR

2012	2013	2014	2015	2016
500	500	450	500	600

The budget for publications is established for every department. The individual subject supervisor is responsible for revising and picking most useful and required item. Usually, quality, not quantity is prioritized. The budget could support 1 copy of item per year for every individual subject. Electronic learning resources are becoming dominant between available sources (especially for independent work) for study process. They could be classified as: available from department internet database (http://www.hkk.gf.vu.lt); reached via VU library access (https://biblioteka.vu.lt/istekliai); and freely available form internet sites & databases. Currently, the use of electronic resources exceeds 60% and rising. They are frequently used for seminars (90% of all resources) and practicums (~50%).

4.4. Strengths and weaknesses of the area under evaluation and improvement measures to be taken

Strengths:

- All staff has their permanent workplaces, which are equipped with necessary office facilities to ensure the study process;
- Institute of Geosciences has a sufficient number of well-equipped classrooms for studies;
- A lot of classrooms are newly renovated; wireless internet is available in the whole area of Institute of Geosciences;
- VU regularly updates office software in staff computers as well as in all classrooms computers;
- Specialized computer labs are regularly updated with modern software (e.g. for GIS studies);
- Staff and students have free access to international databases of scientific publications, which are subscribed by Vilnius University;
- Students have full access to Institute of Geosciences library and its services (during working hours) and to Scientific Information and Communication centre (24 hours service) in student campus;
- Students have access to all compulsory study literature (books in library or via internet);
- The staff and students have the opportunity to use modern research (a lot of items are purchased after 2011) meteorological and hydrological equipment for their investigations;
- A permanent VU meteorological station provides necessary data for student research work;
- Institute has a well-equipped student internship base outside the city where summer field training takes place. Students have a possibility to test meteorological and hydrological equipment and to enhance their theoretical knowledge;
- DH&C has a student room, where they can study or relax during the free time;

Weaknesses:

- Institute of Geosciences library should be renovated and facilities upgraded;
- The shortage of the foreign recent teaching literature, which could be freely available for all students;
- Lack of funds for meteorological and hydrological equipment repair and maintenance;
- Lack of funds for permanent upgrade and maintenance of computer facilities.

Improvement measures:

- Institute of Geosciences library renovation and modernization is planned to the end of 2017;
- Teaching literature is acquired each year;
- Reorganization of university network in Lithuania may increase study funding.

5. Study process and assessment

5.1. Admission requirements, statistics and major tendencies

All information about admission requirements is available in VU booklets and other publications, study fairs, VU and Geoscience institute Discovery Days “Master Study” and other promotional events in the DH&C.

Candidates to the SP of Hydrometeorology are admitted in accordance with the *Rules of Admission to the Second-cycle Study Programmes of Vilnius University*, approved by the VU Senate. The Rules are accessible on the VU website[8] and DH&C website[9].

A prerequisite for admission is the completion of the first-cycle studies: physical, biomedicine or technological science programmes, social science programmes, education programmes, history, archeology, philosophy or architecture programmes, associate-level programmes, after completing additional Geography studies in Vilnius university (acquiring an equal to bachelor’s degree).

[8] See http://www.vu.lt/kviecia/rinkis-studijas/kaip-istoti/2-pakopos-studijos
[9] See http://www.hkk.gf.vu.lt/

The entrance score is calculated according to a formula, by adding up the mean value of the marks enumerated in the Diploma Supplement and a mark for the graduation thesis or marks for the final examinations. During the period of self-evaluation, the principles of calculating the entrance score have not been modified.

The statistics of the admission to the HMm study programme according to graduated higher education institution and the main study area is presented in Table 5.1. and Table 5.2. Most requests for admission come from the Vilnius University students – 75 to 85 %, also Vilnius university undergraduates make the majority (83–100 %) between invited for and accepted for studies students. Most of applicants to the HMm SP are bachelors of geography study area and graduates of VU Meteorology and Hydrology study programme. 1–2 entrants also occur from Lithuanian University of Educational Sciences, Siauliai University, Vilnius Gediminas Technical University.

Table 5.1 Entrance scores of the candidates admitted to the SP of Hydrometeorology during the period of self-evaluation

Year of admission	No of students funded by the state (sf) / not funded by the state (nsf)		Entrance score of the students who applied to the HMm SP			Mean value of the entrance score of all Faculty programmes
			Highest score	Lowest score	Mean value	
2012	sf	11	28.68	13.50	23.83	26.27
	nsf	–	–	–	–	–
2013	sf	13	29.15	12.80	21.94	25.60
	nsf	–	–	–	–	16.73
2014	sf	8	28.87	18.66	24.02	26.23
	nsf	–	–	–	–	22.53
2015	sf	4	29.60	20.69	25.16	26.50
	nsf	–	–	–	–	22.72
2016	sf	8	29.17	21.85	26.27	25.33
	nsf	–	–	–	–	13.73

According to the analysis of submitted applications to HMm study programme (indicating this programme in application form as the first choice as well as the one from 6 available) the demand on this study programme has not substantially changed during last 5 years. The total number of applications is 11–22, whereas number of applications indicating HMm study programme as the first desirable is steady – from 4 to 10. About 4–13 applicants are accepted to HMm study programme each year (available positions 9–10). Not all invited students (accepted) come to sign the study agreement because the same person at the same time can join the Master programme in other Lithuanian and foreign universities. Also, there are no joint admission option to the all Lithuanian universities' master study programmes.

Table 5.2 Results of candidate admission to the SP of Hydrometeorology during the period of self-evaluation

Year of admission	Number of students funded by the state (sf) / not funded by the state (nsf)	Planned number of students	Number of applications		Regular competition*	Number of admitted students	Admitted students (% of planned number)
			1st priority	Total			
2012	Sf	11	10	16	1.33	11	100.00
	Nsf	2	0	0	0.00	0	0.00
	Total	13	10	16	1.33	11	84.62
2013	Sf	11	8	24	2.18	13	118.00
	Nsf	2	0	0	0.00	0	0.00
	Total	13	8	24	2.18	13	100.00

Year of admission	Number of students funded by the state (sf) / not funded by the state (nsf)	Planned number of students	Number of applications		Regular competition*	Number of admitted students	Admitted students (% of planned number)
			1st priority	Total			
2014	Sf	12	6	20	1.67	8	66.67
	Nsf	2	0	2	1.00	0	0.00
	Total	14	6	22	1.57	8	57.14
2015	Sf	10	4	11	0.40	4	40.00
	Nsf	5	0	0	0.00	0	0.00
	Total	15	4	11	0.73	4	26.67
2016	Sf	10	8	21	2.10	8	80.00
	Nsf	5	0	1	0.20	0	0.00
	Total	15	8	22	1.47	8	53.33

* *Regular competition* defines the competition to the study programme in terms of the total number of applications (candidates) per place

5.2. Changes in the number of students: dropout rate and its causes

Table 5.3 Dropout rate in the study programme of Hydrometeorology

Year of admission	Number of admitted students funded by the state (sf) / not funded by the state (nsf)		Number of dropouts				Dropout rate, %
			1st year of study	2nd year of study	Year of graduation	Total during the SP implementation	Total during the SP implementation
2012	sf	11	3	1	2014	4	36,4
	nsf	0	–	–		–	–
	Total	11	3	1		4	36,4
2013	sf	13	8	–	2015	8	61,5
	nsf	0	–	–		–	–
	Total	13	8	–		8	61,5
2014	sf	8	3	1	2016	4	50
	nsf	0	–	–		–	–
	Total	8	3	1		4	50
2015	sf	4	1	–	2017	1	25
	nsf	0	–	–		–	–
	Total	4	1	–		1	25
2016	sf	8	0	–	2018	0	0
	nsf	0	–	–		–	–
	Total	8	0	–		0	0
Grand total during the period	**sf**	**44**	**15**	**2**	**–**	**17**	**38,6**
	nsf	**0**	**–**	**–**	**–**	**–**	**–**
	Total	**44**	**15**	**2**	**–**	**17**	**38,6**

During 2012–2016 period total dropout rate is 36,8 % students accepted in HMm SP (Table 5.3). Information about dropout numbers and reasons are presented in Table 5.4. There are two main causes of leaving the university:

1) Most often failed students are graduates of other undergraduate programmes (not Meteorology and Hydrology); just started their studies they realise, that their choice for particular master study programme is

impracticable and loose motivation to study. On the other hand, the obtained knowledge in other undergraduate programmes seems to be insufficient for successful studies in HMm SP.

2) The majority of students are both studying and working and they unsuccessfully try to harmonise their study time to the work because of specific job profile or inadequate attitudes of employers. In this case, students often interrupt their studies.

Table 5.4 Causes of leaving the university in the period between 2012 and 2016

	Year of study	Year of admission					Total
		2012	2013	2014	2015	2016	
Failure to meet financial obligations	1st	–	–	–	–	–	–
	2nd	–	–	–	–	–	–
Unsatisfactory academic results	1st	–	–	–	–	–	–
	2nd	1	–	1	–	–	2
Academic dishonesty during the assessment of academic progress	1st	–	–	–	–	–	–
	2nd	–	–	–	–	–	–
Family reasons	1st	1	–	–	–	–	1
	2nd	–	–	–	–	–	–
Failure to renew studies after academic leave or suspension of studies	1st	–	–	–	–	–	–
	2nd	–	–	–	–	–	–
Of the student's own free will	1st	2	8	3	1	–	14
	2nd	–	–	–	–	–	–
Transfer to another higher education institution	1st	–	–	–	–	–	–
	2nd	–	–	–	–	–	–

5.3. Organization of studies and academic support to the students

The aim of the study process is to ensure an effective implementation of the study programme so that the purpose is attained and learning outcomes of the SP are developed.

Information on the studies is provided by different institutions, from the Administration of Studies and the Dean's Office of the FCHG to the academic staff of the HMm SP and tutors appointed by the Students' Representation. The website set up by the Administration of Studies (www.klausk.vu.lt) provides access to the ask-and-get-an-answer system, where answers to questions are provided by representatives of the Administration of Studies or the Faculties. This is a very fast and convenient system saving time and replacing more time-consuming face-to-face communication in the office of DH&C.

All information about the study process (study calendar, timetables of lectures and examinations, optional course and modules, the procedure of assessment and retaking the examinations), about partial studies abroad, tuition fees, grants, funding of studies is provided by the Faculty administrative staff responsible for studies, Vice-dean for Studies and Chair of the Study Programme Committee. The information is available at website of DH&C. Another option would be the Vilnius University information system of studies, or VUSIS. There the students can access personal data, copies of relevant orders, study plan, examination timetable and results, etc. The students can also actively participate in the process of study by enrolling in optional courses and modules or courses of general university education, etc.

All timetables of the upcoming semester become available online in May and December. Upon the completion of the first semester, as provided by the *Regulations for Studies of Vilnius University*, all students have an opportunity to study according to their individual study plans. For that purpose, their applications, including sound motivation, shall be submitted to the Dean's office and approved by the Dean.

Questions related to the learning outcomes, the content of a course unit or module, career opportunities are within the responsibility of the Chair of the Study Programme Committee and the academic staff of the HMm SP. They are all available for consultation at the time specified in advance or between/after the classes, or

can be reached by electronic mail. Career opportunities are discussed during the classes, at the meetings with the Faculty alumni and potential employers.

As provided in the *Regulations for Studies of Vilnius University*, students facing problems ensuing from unsatisfactory academic results are eligible for a second attempt. If they fail an examination, they may retake it once. If they fail the second time, they may repeat the whole course (module) by attending it together with other students who take it for the first time and resit the examination one year later. Those who have accumulated 15 credits of failed courses (modules) shall be expelled from the University and may renew their studies after having passed all relevant examinations.

Those who disagree with the examination procedure or the results, may launch an appeal to the Appeal Commission of the Faculty no later than five days after the results become available. A decision reached by the Appeal Commission on the results shall be final and not subject to further appeal. However, the examination procedure may be subject to further appeal at the VU Dispute Tribunal.

Students having health problems may take academic leave upon submitting a medical certificate; the leave shall be no longer than two years. Academic maternity leave may also be granted; it shall be no longer than three years. Upon the Dean's approval, the student, having a sound reason, may suspend his/her studies for one year.

The Students' Representation of Vilnius University deals with various problems of the students, defends their interests, takes care of their academic and social welfare, organizes events of culture, fosters University traditions of student life, helps first-year students in their integration into the University community. Usually the Student Representation appoints a tutor, a senior student, who is a contact person in matters of different nature for all first-year students.

Every September there are organized meetings with FCHG administration, head of DH&C and teachers. First-year students, with the aid of FCHG and DH&C administration have the opportunity to clarify any concerns of social and academic issues.

5.4. Social support to the students: grants, loans, tuition fees, hostels

The main form of social support to the students is financial allocations. The students may be eligible for the following: special grants for academic excellence (in the year 2012–2016 the students of the HMm SP received 8 such grants), social grants (in the year 2012–2016 the students of the HMm SP received 5 such grants), single social allowances, single special social allowances.

Another form of social support is loans provided to the students by the state (administered by the State Studies Foundation) and allowances for students with disabilities (in the year 2012–2016 the students of the HMm SP received 1 such grants). This is administered by the Department for the Affairs of the Disabled under the Ministry of Social Security and Labour of the Republic of Lithuania. Information on the procedure of allocating and disbursing the above allowances is accessible on the VU website[10]. All the above forms of social support are introduced to the students admitted to the study programme of Hydrometeorology during the introductory lectures of the first semester.

Every other year, one of the HMm SP students may be nominated for the one time prof. Steponas Kolupaila nominal scholarship, which has been established by US Lithuanian Foundation.

Accommodating students, residents of towns and villages outside Vilnius, in the hostels of Vilnius University might also be treated as social support. The demand for hostels is only partially satisfied (85–90 % of all

[10] See http://www.vu.lt/lt/studijos/studiju-procesas/finansine-parama.

applications). Students in need of social support or with disabilities are eligible for a reduction when paying for the hostel.

Especially talented students manifesting academic excellence and taking part in research may be eligible for special VU grants according to study and research fields. More information is available on the VU website[11].

Moreover, Vilnius University offers professional psychological assistance to students and staff through the Psychological Training and Research Centre. Single consultations or cycles of consultations might be helpful to those facing problems of private or family life, social integration or studies.

5.5. Students' participation in research, sports and arts

The students enrolled in the HMm SP, like any other VU students or staff, have multiple opportunities of self-expression outside their classes, usually in sports, arts and music[12].

The Health and Sport Centre of Vilnius University offers the programme of healthy lifestyle intended for the students and academic staff. The Centre has three gyms and/or stadiums in Vilnius (Saulėtekio al. 2, Saulėtekio al. 26, M. K. M. K. Čiurlionio g. 21/27). The students may make use of the facilities and equipment of the Centre, join general training classes or enrol in individual training programmes, choose a particular sport. In the Centre, people may, individually or in groups, engage in a number of sporting activities such as jogging, fitness, basketball, football, table tennis, volleyball, etc.

A number of choirs, drama troupes, orchestras and ensembles are available at the VU Centre of Culture. They can be frequently seen performing in many national and international festivals in Lithuania and abroad.

The students are offered multiple opportunities of participation in the activities of the Students' Representation of the FCHG and of Vilnius University (the latter is referred to as VUSA). The bodies representing the students aim at ensuring that such representation at all levels in VU is based on the students' needs and is high-quality, also at strengthening the self-governance of the students, etc. VUSA issues student-oriented newspaper *Studentų era*, which is the largest publication of its type in Lithuania.

Students of HMm SP participate in OPENREADINGS Scientific Conference for Students of Physics and Natural Sciences where they present their research and discuss in sections.

Students of HMm SP participate in the International Summer School on "Climate change in the Baltic Sea region" co-organized by Baltic Earth, Stockholm University Baltic Sea Centre, Leibniz Institute for Baltic Sea Research Warnemünde and University of Rostock.

5.6. Student exchange programmes

Studies abroad and processes of international cooperation in Vilnius University are administered by the International Programmes and Relations Office. At the Institute of geosciences of FCHG, such responsibility is assigned to Dr. Rasa Šimanauskienė.

Key features include such procedures: selection for Erasmus study (twice a year); selection for Erasmus practice (on demand – every month); new agreements with foreign partners; coordination of incoming students, coordination of proposed courses for incoming students, coordination of bilateral exchange.

Number of students participating in mobility programmes is limited by number of scholarships.

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[11] See http://www.vu.lt/lt/studijos/studiju-procesas/finansine-parama#vardines_stipendijos.
[12] http://www.ssc.vu.lt/cms/ and http://www.kultura.vu.lt/

The students of the Faculty have multiple opportunities to enrol in partial studies of one semester or one academic year study within the exchange programmes Erasmus and Erasmus+ and bilateral agreements. The Faculty has Erasmus agreements with a number of European universities (see Table 5.5).

Number of students participating in mobility programmes is limited by number of scholarships. List of students participated in mobility programmes is given in Table 5.6. Students participation in mobility programmes is still low because part of the students' work, and can't go abroad for a few months or longer.

Table 5.5 ERASMUS agreements concluded by the Faculty (FCHG)

No	Country	University/ other HEI	Number of Erasmus agreements Chemistry and Geosciences
1	Austria	Fachhochschule Technikum Kärnten	1
2	Czech Republic	Masaryk University	1
3	Czech Republic	University of Chemistry and Technology	2
4	Czech Republic	Univerzita Karlova v Praze	1
5	France	L'Universite de Franche-Comte	1
6	France	Universite d'Artois	1
7	France	Universite de Strasbourg	1
8	France	Universite de Toulouse II Le Mirail	1
9	France	Universite D'Orleans, Ecole Polytechnique de l'Universite d'Orleans	1
10	France	Université Montpellier 2	1
11	France	Universite Paul Valery-Montpellier III	1
12	Germany	Christian-Albrechts-Universität zu Kiel	1
13	Germany	Fachhochschule Münster	1
14	Germany	Technische Universität Chemnitz	1
15	Germany	Technische Universität Clausthal	1
16	Germany	Technische Universität Dresden	1
17	Germany	Universität Köln	1
18	Germany	Universität Trier	1
19	Germany	Westfälische Wilhelms-Universität Münster	1
20	Italy	Universita Ca Foscari di Venezia	1
21	Italy	Universita di Camerino	1
22	Latvia	Latvijas Universitate	2
23	Poland	Nicolaus Copernicus University	1
24	Poland	School of Higher Vocational Education in Nysa	1
25	Poland	Silesian University of Technology	1
26	Poland	Uniwersytet Gdanski	1
27	Poland	Uniwersytet im. Adama Mickiewicza	1
28	Poland	Uniwersytet Warszawski	3
29	Portugal	Universidade de Aveiro	1
30	Portugal	Universidade do Porto	3
31	Romania	Universitatea Dunarea de jos Galati	1
32	Slovakia	Slovak University of Technology	1
33	Slovenia	University of Maribor	1
34	Spain	Universidad de Huelva	1
35	Spain	Universidad Politecnica de Madrid	1
36	Spain	University of Cordoba	3
37	Sweden	Göteborgs universitet	1
38	Sweden	Lunds universitet	1
39	Turkey	Abant Izzet Baysal University	1
40	Turkey	Afyon Kocatepe University	1
41	Turkey	Canakkale Onsekiz Mart University	1
42	Turkey	Cukurova University	1
43	Turkey	Dumlupinar University	1
44	Turkey	Pamukkale Univesitesi	1
45	Turkey	Yıldız Technical University	1

HMm SP cannot involve foreign students, because courses are taught in Lithuanian. There is no consensus if it is necessary to start deliver courses in English. Incoming Erasmus students are taught by supervising professor individually.

There are possibilities to choose a variety of courses in English at the Faculty and foreign students are still welcome.

Table 5.6 Student mobility in the SP of Hydrometeorology

Year of study	Number of outgoing students	Institution (country)
2012	2	Saint-Petersburg State University
2013	–	–
2014	1	Christian-Albrechts-Universität zu Kiel (Germany)
2015	–	–
2016	–	–

5.7. Assessment of academic progress

The procedure of assessing academic progress, retaking the examinations and of appeals of students dissatisfied with their assessment results is stipulated in Vilnius University by the *Regulations for Studies*, the *Procedure of Assessing Academic Progress* and the *Regulations of the Appeal Commission for Assessing Academic Progress in a Core Academic Unit of Vilnius University*[13].

All information on the assessment of academic progress, schedule of examinations, failed examinations and retaking them is available on the VU website[14].

During the first class, each SP academic staff member shall introduce the syllabus of the course (module) by focusing on its aim, learning outcomes, content, study and assessment methods as well as assessment strategy. The assessment criteria and the importance of meeting the deadlines are also discussed.

The system of assessment is specified in the course unit (module) description.

Academic progress may be assessed in different ways; several methods may be combined, such as continuous, mid-term and final assessment. The final assessment is mandatory[15]. The final mark for the course unit may be cumulative, calculated on the basis of the proportions specified in the course unit description. The form of the final assessment in Vilnius University is an examination. If the course unit extends over several semesters, all but final semester of the course unit end in a pass/fail assessment.

The examinations may be written and/or oral. Currently, Vilnius University employs a 10-point assessment scale[16]. The points on the scale are defined as "excellent, exceptional knowledge and skills", average knowledge and skills, some inessential mistakes", etc.

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[13] *Regulations for Studies* approved by Decree No SK-2012-12-8 of Vilnius University Senate Commission 21 June 2012; available in Lithuanian at http://www.vu.lt/site_files/SD/Studentams/SP/SRD/VU_studiju_nuostatai_naujoji_redakcija.pdf; *Procedure of Assessing Academic Progress* approved by Decree No SK-2012-20-6 of Vilnius University Senate 13 December 2012, available in Lithuanian at http://www.vu.lt/site_files/SD/Studentams/Studiju_pasiekimu_vertinimo_Tvarka_12.21.pdf; *Regulations of the Appeal Commission for Assessing Academic Progress in a Core Academic Unit of Vilnius University* approved by Decree No SK-2012-20-3 of Vilnius University Senate Commission, available in Lithuanian at http://www.vu.lt/site_files/SD/Studentams/Padalinio_akademines_etikos_komisijos_nuostatai.pdf).

[14] See http://www.vu.lt/lt/studijos/studiju-procesas/egzaminu-sesija.

[15] In the modular system, mid-term assessment is also mandatory.

[16] http://www.vu.lt/lt/studijos/studiju-procesas/egzaminu-sesija/45-studijos/studijos/2591-vertinimo-sistema. Also see the *Procedure of Assessing Academic Progress*: http://www.vu.lt/lt/studijos/studiju-procesas/studijas-reglamentuojantys-dokumentai#vu_nutarimai [1 June 2012]

The final mark is usually calculated on the basis of the marks for the examination paper, participation in seminars, individual or group project, final (oral and/or written) examination. All general principles of the assessment and of ensuring feedback are specified in the documents of Vilnius University: the *Procedure of Assessing Academic Progress* and the *Procedure of Ensuring Feedback to all Involved in the Study Process*[17].

Table 5.7 Vilnius University scale of assessment and marks

Pass, fail	System of assessment	Description
PASS	10 (excellent)	Excellent, exceptional knowledge and skills
	9 (very good)	Very good knowledge and skills
	8 (good)	Knowledge and skills are above average
	7(average)	Average knowledge and skills, some inessential mistakes
	6 (satisfactory)	Knowledge and skills are below average, there are errors
	5 (weak)	Knowledge and skills meet the minimum requirements
FAIL	4, 3, 2, 1 (unsatisfactory)	Below minimum requirements

The Master Final thesis is assessed by the Viva Voce Defence Committee of Graduation Theses in reference to the assessment criteria of graduation theses[18]. The members of the Committee take into consideration the graduation thesis, its presentation during the defence, responses of the author of the thesis to the questions of the reviewer and the members of the Committee, reviews and opinions of the reviewer and the supervisor of the thesis. If there is no unanimous agreement about the final mark, the final decision is taken by the chairperson of the Committee.

To ensure academic honesty during the studies, Vilnius University has taken various measures. The academic staff and the students shall adhere to the principles of ethics laid down in the *Code of Academic Ethics of Vilnius University*[19], which defines general norms of academic, teaching, studies and research ethics. The Code also defines the notion of violation involving cheating, plagiarism, bribery, unsolicited dishonest assistance to the peers, etc.

Campaigns against cheating were organized in cooperation with the Students' Union during which student representatives observed examinations. To verify the independence of the written assignments, a plagiarism check programme operates within the University information system, which compares the written paper with other students' papers registered within the system. All examinations are in written form or both: oral and written. This reduces the possibility of a subjective assessment.

The original individual tasks are formulated for the students' term papers and final theses for reducing the likelihood of plagiarism. Students present their research in public sessions, respond to questions and comments of participants and defend research results. This way reduces the possibility to defend research results obtained by any other person.

5.8. Professional activities of SP graduates

Major employers of graduates of this study program are Lithuanian Ministry of Environment and its structural units including Lithuanian Hydrometeorological Service (LHMS). Also, some graduates work in Lithuanian scientific institutes and universities. Round 85 % of graduates are known as working according their speciality (data from 2012–2016 years). Some graduates are still studying in doctoral studies, the majority of them work according their speciality.

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[17] See http://www.vu.lt/site_files/SD/SK/SP_dalyviu_GR_tvarka.pdf. Approved by VU Rector's Order No 115 2009 05 29.
[18] *: (http://www.vu.lt/site_files/SD/Studentams/Studiju_pasiekimu_vertinimo_Tvarka_12.21.pdf)*
[19] *Code of Academic Ethics of Vilnius University* approved by the Senate Commission of Vilnius University 13 June 2006, Minutes No S-2006-05, available in Lithuanian at http://www.vu.lt/lt/studijos/studiju-procesas/studijas-reglamentuojantys-dokumentai/45-studijos/studijos/2564-akademines-etikos-kodeksas.

Major employers of graduates of this study program are Lithuanian Ministry of Environment and its structural units including Lithuanian Hydrometeorological Service under the Ministry of Environment (LHMS).

5.9. Strengths and weaknesses of the area under evaluation and improvement measures to be taken

Strengths:

- Admission of students to the programme is competitive and based on marks in Bachelor diploma supplement. The admission rules are consistent with the nature of the studies and skills required from the students.
- Students are encouraged to participate in exchange programme.
- Students can join students' organization.
- Students can get scholarships based on their academic results or social scholarships.
- This programme enables students to acquire enough knowledge and skills for future career and studies in PhD programmes in Lithuanian or foreign universities.
- In most courses, cumulative assessment system is applied. Students are assessed during semester and in final exam. Students may appeal to special commission if they do not agree with final assessment.

Weaknesses:

- An increase of number of students who drop out or take academic leave.
- Relatively high student failure occurs due to material and family reasons.
- Not all invited students (accepted) come to sign the study agreement because the same person at the same time can join the Master programme in other Lithuanian and foreign universities. Therefore, there is additional admission in late August. Also, there is no available joint admission to master study programmes between all Lithuanian universities.

Improvement measures:

- The information system for monitoring career of graduates was launched.
- Starting from 2017, study programme of Hydrometeorology was reformed to 1.5-year long programme (90 credits). The main objective of this decision was to elevate the quality of studies and to modernize the programme by implementing new and withdrawing less relevant courses, increasing programme's appeal, and providing better circumstances for students and their future careers.

6. Study Programme management

6.1. Regulation of study quality assurance

Fostering quality culture is a strategic aim of Vilnius University. It is made feasible by adhering to the values specified in the VU mission and in the *Standards and Guidelines for Quality Assurance in the European Higher Education Area*[20]. In Vilnius University, all study programmes and their implementation are administered by the Administration of Studies, which is also responsible for ensuring the quality of functioning of the units of different levels in VU[21].

The main document concerned with the internal quality insurance of studies is: *Vilnius University. Quality Manual*[22]. The document was drafted during the implementation of the Project *Setting up the System of*

[20] *Standards and Guidelines for Quality Assurance in the European Higher Education Area*. See http://www.enqa.eu/index.php/home/esg/
[21] See http://www.kvc.cr.vu.lt/site.
[22] *Vilnius University. Quality Manual*. Vilnius, 2013. available in Lithuanian at http://skvis.vu.lt/pub/book/qm/topic/10298430.

Internal Study Quality Management and its Implementation at Vilnius University (2011-2013). The Centre was later reorganised with its main functions transferred to the Administration of Studies. The key aim of the Project was concerned with ensuring a systemic and continuous improvement of quality of University studies and of all study-quality related activities as well as with consolidating and coordinating the community's efforts. The results of the Project are available on the VU website[23].

When implementing and improving the processes and procedures of internal quality assurance, Vilnius University takes the responsibility for approving, monitoring and evaluating its study programmes and qualifications awarded, the evaluation criteria applicable to the new study programmes, the programme intended for newly recruited academic staff (see the publication *Manual of Vilnius University Lecturer*[24]). The University also organises courses intended for the professional development of the academic staff, etc.[25].

As stipulated by the *Regulation of Study Programmes of Vilnius University*[26], a study programme shall be updated and its quality monitored on a regular basis. The quality is assured and improved through its internal evaluation and external assessment, by making the results of such evaluation and assessment accessible to the community, by accumulating and analysing the data about the programme and the process of study, by monitoring the feedback, ensuring the availability of facilities and learning resources, improving the qualifications of the academic staff, promoting the application of innovative methods of teaching, learning and assessment, improving the management of the programme and disseminating good practice[27].

All modifications of the study programme shall be subject to discussion and approval by the Study Programme Committee and the Faculty Council. When modifications involve changes in the title, field (branch) of studies of the SP, qualification degree, awarded as a result of its completion, professional qualification or scope of the SP, they shall be approved by the SP Committee, the Faculty Council and finally, by the Senate. The process of SP updating is supervised by the Administration of Studies of Vilnius University.

In accordance with the *Regulation of Study Programmes of Vilnius University*, assuring and improving the SP quality is the responsibility of the SP Committee, which operates in accordance with the Regulations of the Study Programme Committee[28]. The Committee is in charge of the SP and the assurance of the quality of its implementation. It is accountable to the Faculty Council for the SP implementation and shall report to it at least once a year. The Committee is composed of academic staff, student and employer representatives; the composition is approved by the Senate upon the recommendation of the Faculty Council. The aims of the Committee are also enumerated in the *Regulations for Studies of Vilnius University*, the *Procedure of Approving Academic Results* and other documents.

6.2. Aims and responsibilities of the Study Programme Committee

The composition of the Study Programme Committee (hereinafter also SPC) is as follows: Prof. dr. Arūnas Bukantis (Leader), Prof. dr. Egidijus Rimkus, Prof. dr. Gintaras Valiuškevičius, Assoc. prof. Regina Prapiestienė, Vida Augulienė (Vice director of LHMS), Linutė Valiuškevičienė, Lauryna Šidlauskaitė (student). The SPC was approved on 18 Oct 2012 upon the Decision of the Senate No. SK–2012–17–4. One of the key goals of the SPC is to seek the high quality of the programme so that its purpose is attained, its learning competences are developed, its content is compatible with the teaching, learning and assessment

[23] See http://www.kvc.cr.vu.lt/site/?q=node/76.
[24] *Manual of Vilnius University Lecturer*. Vilnius, 2013. available in Lithuanian at http://www.kvc.cr.vu.lt/site/sites/default/files/VU_destytojo_vadovas_4_16.pdf.
[25] See http://www.kvc.cr.vu.lt/site/?q=node/90.
[26] Approved 21 June 2012. See http://www.vu.lt/site_files/SD/Studiju_programu_reglamentas_2014_01_27.pdf. The document also specifies requirements for new study programmes (their preparation and registration) and the accreditation, evaluation and improvement of the existing study programmes.
[27] For more information about the processes of study quality improvement see http://www.kvc.cr.vu.lt/site/
[28] Approved 6 March 2014. http://www.vu.lt/site_files/SD/Studentams/SP/SRD/SPK_nuostatai_03.06.pdf

methods and the programme is competitive and relevant to the society. The SPC analyses feedback about the programme and its implementation received from different units of the Faculty, students, graduates, academic staff and social partners. In addition to standardised questionnaires launched by the Administration of Studies, the SPC may, on its own initiative, launch its own questionnaire focusing on the improvement measures to be taken as well as any other issue relevant to the students. In search of viable solutions, the problems are usually discussed by the SPC members with the Faculty administration and the academic staff of the SP. The SPC shall ensure the update of the SP purpose and content; moreover, it shall participate in preparing and approving all documents related thereof (e.g. new course units' descriptions prepared by the academic staff). All decisions of the SPC are taken by the simple majority of votes of its members. Another function of the SPC, usually performed by the chair, is concerned with evaluating the competences acquired by the students in other SPs and deciding about the approval or disapproval of the academic results attained by those students in those SPs.

Structure of the HMm SP, the aims and learning outcomes, subject redistribution between semesters, description of study subjects and their content, the specific changes to the program primarily are discussed in DH&C s and then in HMm SPC. The content of programme subjects' is continuously updated and, if necessary, program structure, subjects' distribution, extent etc. can be replaced. Description of study subjects are being prepared by specially appointed teachers (at the DH&C) who are responsible for the teaching subject, then finalised and approved by HMm Study Programme according to Study regulation principles. The SPC sessions are held 2–3 times per year or more, if necessary. Sometimes, the joint sessions of HMm SPC and DH&C are organised. Usually, sessions resolutions are being recorded. All decisions of the SPC are being approved and authorized by the Board of the FCHG.

The quality of study is tightly related to teaching staff qualification; therefore, all departments take care on the development of faculty teaching and research skills. The development of research skills includes all traditional instruments: independent study and research, traineeships, preparation of scientific publications, participation in scientific conferences and training courses in Lithuania and abroad.

6.3. SP management database: Vilnius University information system of studies

The Faculty administration and the academic staff make use of the Vilnius University information system of studies (VUSIS), which consists of several sub-systems. One of them is meant for managing study programmes, offering access to people responsible for studies (Vice-dean for Studies, administrative staff, etc.). The administrative sub-system is an instrument for making, reviewing and editing study plans. Another subsystem is meant for managing the students and thus helps deal with the students' personal data, their marks for course units (modules), registration for optional course units (modules), titles of graduation theses; it helps issue certificates, approve the course units (modules) attended and assessed in another higher education institution. The sub-system also gives access to the results of considering the students' applications, marks for the course units (modules), etc. All orders related to the student affairs issued by the Dean or Rector (e.g. on the titles of annual papers or graduation theses, on business trips when going for partial studies in foreign universities, etc.) are prepared by VUSIS. The system also assists in issuing diploma supplements. VUSIS also stores admission data (competition, the number of admitted candidates by priority), various statistics related to students and studies. The academic staff members have online workplaces, where they can enter examination results, descriptions of course units (modules); they have access to the list of students enrolled in their course. VUSIS makes information management and the implementation of studies much easier.

6.4. Students' and graduates' feedback about the programme and its implementation

Ways of getting feedback and handling it in Vilnius University are defined in the *Procedure of Ensuring Feedback to all Involved in the Study Process*[29]. Twice a year, at the end of each semester, the University launches questionnaires to be filled in by first and second cycle students through an electronic database. The questionnaires focus on the following:

1) On specific course units (modules) attended during the semester.

For that purpose, the same standardised course questionnaire is used in all the faculties of the University. Upon registration in the VU information system, a special slot on questionnaires opens up. There

- the students may anonymously evaluate their studies, including specific course units (modules);
- the academic staff members have direct access to the students' evaluation and feedback about their course units (modules);
- chair of the SPC has direct access to the students' evaluation and feedback on all course units (modules) of the SP;
- The Faculty administration has direct access to the students' evaluation and feedback on all course units (modules) of the study programmes implemented by the Faculty.

2) On general satisfaction with the studies during the last semester.

Detailed results of the questionnaires according to units and study programmes are available in the slot "Feedback" of the section of the Administration of Studies on the VU intranet. Vilnius University makes use of the results of the standardised questionnaires for the following:

- to improve the SP and a particular course unit (module);
- to ensure the quality assurance and improvement by the SPC and the Faculty administration;
- to prepare for external assessment when drafting the self-evaluation report;
- to analyse new study programmes;
- to evaluate the qualifications of the academic staff;
- to improve other activities of the Faculty and the University.

The survey results conducted by VU Quality Management Centre and concerning students' overall satisfaction with the study in 2012–2016 are presented in Table 6.1. The survey involved 70 percent of HMm SP students. The results are published on an internal website of VU. The survey results reveal that HMm SP students' general satisfaction with studies at the university is close to FCHG average, however, there is a need for more personal expression and independently performed research promotion, and deeper analysis of various issues.

Table 6.1 The survey results concerning HMm study programme, students' overall satisfaction with studies in 2012–2016

Question/ statement	Answers (%)		
	No/ More likely no	Neither no nor yes	Yes/ More likely yes
1. "Are you generally satisfied with study at the Vilnius University?"	0 %	19 %	81 %
2. "Are you generally satisfied with the content quality of the study subjects delivered within this semester?"	10 %	30 %	60 %
3. "Students were encouraged to express their views within semester studies"	10 %	36 %	54 %
4. "Students were encouraged for independent research and analysis of various scientific issues within semester studies"	10 %	10 %	80 %

[29] Approved 29 May 2009. See http://www.vu.lt/site_files/SD/SK/SP_dalyviu_GR_tvarka.pdf

6.5. Cooperation with social partners

FCHG and DH&C organise studies in close cooperation with the authorities that are potential employers for graduates. There are cooperation agreements with the Environmental Protection Agency, Centre for Marine Research, Lithuanian Hydrometeorological Service (LHMS) and Nature Research Centre. Employers of graduates of the program repeatedly expressed a favourable opinion about trained professionals and their level of education received. Alumni surveys are carried out each year, and the programme assessment made by the main users of the program – e. g. students is important indicator in improving and adjusting the curriculum.

The social partners are included into HMm SP and SPC activities: in contributing in preparation process of final thesis (they offer scientific topics, consult, provide necessary conditions for empirical research), in reviewing final thesis and are involved into commission for thesis defence also.

6.6. Strengths and weaknesses of the area under evaluation and improvement measures to be take

Strengths:

- Hydrometeorology master study programme is unique in Lithuania. Programme meets the national and international requirements for the professional's scientific training in this area. It ensures high quality hydrologic and meteorological training for specialists with knowledge and skills that ensure employment and/ or further study at Postgraduate.
- The HMm SP covers broad range scientific areas (meteorology, climatology, hydrology, marine sciences).
- The HMm SP is carried out by highly qualified teachers (professors, associate professors, lecturers), who are the leading scientists in these areas also.
- High overall satisfaction rate of HMm SP students for the studies at Vilnius University.
- Maintained close relations with the future employers, they provide assistance to the students' research, and review their papers, SPC members, as e lecturers of some courses, in activities of Alumni organization.
- Students have good conditions for study; they widely use modern information technologies. They have free access to key electronic databases; there is maintained friendly study atmosphere; they are encouraged to use "good practice" that has been already verified in foreign universities, for example, during reporting period instead of mechanical acquisition of the material, they are encouraged to use task-oriented logical, analytical and critical thinking.

Weaknesses:

- Student surveys showed that students are not encouraged enough to express their views, for independent research and to analyse various problems.
- Student motivation to choose this HMm SP is being reduced by low wages offered by employers.

Improvement measures:

- Good facilities stimulate completion of practical classes. In 2012–2016 the material facilities were complemented by new educational and scientific equipment and computer hardware.
- Classroom and independent students' study loads are properly adjusted in the program, each student has personal supervisor for research and they are consulted individually. The program takes into account the needs of students. Students can suspend their studies at the time of adverse life circumstances.
- Students are actively involved into Students Representative of Vilnius University activity, students' scientific societies and cultural and educational activities.

APPENDICES