



VILNIUS UNIVERSITY

**STUDY FIELD Physical Geography
FIRST-CYCLE STUDY PROGRAMME
METEOROLOGY AND HYDROLOGY
CODE: 6121CX010
SELF-EVALUATION REPORT**

Pro-rector of Vilnius University

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(signature)

Assoc. Prof. Dr Valdas Jaskūnas

Head of self-evaluation group

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Prof. Dr Arūnas Bukantis

Vilnius
29 May 2017

Key data on the study programme

Title	Meteorology and Hydrology
Code	6121CX010
Study area	Physical Sciences
Study field	Physical Geography
Kind of study	University studies
Language of instruction	Lithuanian
Study cycle	First
Mode of study and length in years	Full-time, 4
Scope in credits	240
Qualification awarded	Bachelor's degree of Hydrometeorology, accepted in 2017 and later – Bachelor's degree in Physical sciences
Date of registration and Order No	23–04–1999 No. 560

Abbreviations used in the Self-Evaluation Report:

Assoc. prof. – Associate professor (Docent)

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

M&H SP – Meteorology and Hydrology studies programme

LHMS – Lithuanian Hydrometeorological Service

NRC – Nature Research Centre

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	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
Simona Dalinkeviūtė	Student of Vilnius University	Study process and assessment – 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

Table of Contents

INTRODUCTION	5
ANALYSIS OF THE STUDY PROGRAMME	5
1. Purpose and learning outcomes of the study programme.....	5
2. Curriculum design	9
3. Academic staff.....	17
4. Facilities and learning resources	23
5. Study process and assessment	26
6. Study Programme management	35
APPENDICES	40

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 11096 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 (Chemistry, Nanomaterials 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 Meteorology and hydrology is implemented by the Department of Hydrology and Climatology in Institute of Geosciences. The programme has been implemented from 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 graduate level meteorologists and hydrologists by studying physical processes in atmosphere, seas, rivers, lakes, wetlands. For meteorologists and hydrologists, it is important to develop critical and analytical thinking, research and practical skills, in order

to be able to independently analyze hydrosphere and atmosphere, their monitoring, hydrological and meteorological forecasting, climate and water resource management.

The competences and learning outcomes of the study programme of Meteorology and Hydrology (hereinafter also M&H SP) are as follows:

Table 1.1 Generic and subject-specific competences and learning outcomes of the M&H SP

Generic competences of the Study Programme		Learning outcomes of the Study Programme	
1.	Meteorologists and hydrologists are advanced IT users, can use critically and mathematically chosen methods.	1.1	Graduates will have sufficient IT knowledge skills; will be able to apply mathematical thinking to various professional activities; search for, collect and manage information using software and internet.
		1.2	Graduates will be able to independently and innovatively analyze problems, make decisions based on critical thinking.
2.	Meteorologists and hydrologists can apply theoretical knowledge to specific scientific or practical use.	2.1	Graduates will be able to write scientific and technical findings and reports, analyze, organize and summarize information.
		2.2	Graduates will be able to work on scientific or practical tasks either independently or in a group.
3.	Meteorologists and hydrologists can independently improve their knowledge and qualification.	3.1	Graduates will be able to evaluate (reflect on) their everyday professional activities and choose improvement courses and techniques effectively by themselves.
		3.2	Graduates will be able to improve their knowledge based on national and World Meteorological Organization standards.
Subject-specific competences		Learning outcomes of the Study Programme	
4.	Meteorologists and hydrologists can comprehend current problems of geographical sciences, and are capable of complex analysis in this field.	4.1	Graduates will be able to integrate various meteorological, climatological, hydrological and other geographical scientific ideas, methods and innovations.
		4.2	Graduates will be able to understand current topics and methodology in geography.
5.	Meteorologists and hydrologists can analyze hydrometeorological processes and provide required information to concerned consumers.	5.1	Graduates will be able to organize and perform research on hydrometeorological processes, apply GIS and mathematical statistical methods to their analysis, interpret received outcome.
		5.2	Graduates will be able to generate and provide special hydrological, meteorological and climatological information, evaluate climate and water resources in an applied sense.
6.	Meteorologists and hydrologists can make meteorological and hydrological forecasts.	6.1	Graduates will be able to compose short and medium range weather forecasts while applying current forecasting and modelling techniques.
		6.2	Graduates will be able to compose hydrological forecasts while applying current forecasting and modelling techniques.

Generic and subject-specific competences and learning outcomes of the M&H SP have been updated in 2012 according to the expert comments after the external assessment held in 2011; The second update has been performed in 2017 during the preparation of current SELF-EVALUATION REPORT.

Upon completion of the M&H SP, a student may engage in the further studies in hydrometeorology, geography, cartography, environment management and other field areas for Master's degree in Lithuania and abroad or work in Lithuania's ministries and their departments of environment, transport, national security. Also, Hydrometeorological service, sea research institutions, industrial and commercial businesses, and everywhere where both hydrometeorological and general knowledge and abilities, like critical and analytical thinking or IT skills, can be applied.

A qualification obtained upon the completion of the first-cycle study programme is in conformity with qualification VI 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 M&H 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 website¹.
- On the official website of the Faculty <http://www.chgf.vu.lt/>.
- On the official website of the University intended to prospective students².
- 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 first (or second cycle) study programmes *Kviečia Vilniaus universitetas. Pirmoji pakopa ir vientisosios studijos* (Vilnius University is calling. First study cycle and integrated studies)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 students⁵.
- Specially focused video, radio and TV shows, excursions in VU meteorological station.
- 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

Major social partners of M&H SP realisation – *Lithuanian Hydrometeorological Service (LHMS)* and *Nature Research Centre (NRC)*. Together with partners, we coordinate and regularly discuss programme aims and learning outcomes in the specially designed workshops. Employers of these institutions participate in the students' bachelor thesis preparation and defence processes. Learning outcomes of the SP were revised in 2012 according to the expert comments after the external assessment held in 2011. The

¹ [https://klevas.vu.lt/pls/pub/public_ni\\$www_progr_app.show](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/studiju-programos/1-pakopos-studiju-programos>

⁵ <http://www.vu.lt/kviecia/nauijenos/visos-nauijenos/aplanky/item/512-tapk-studentu-vienai-dienai>

formulation of competence 5.1 description in Table 1.1 was updated by including “GIS and mathematical statistical methods”. The second update has been performed in 2017 during the preparation of current SELF-EVALUATION REPORT according *Guide to the Implementation of Education and Training Standards in Meteorology and Hydrology* (WMO, 2015).

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 M&H SP involve *Bologna Declaration* (1999), *Dublin descriptors* (2004), *Lithuanian Republic Law on Higher education and research* (30 April 2009 No XI–242, Vilnius), orders issued by *Ministry of Education and Science of the Republic of Lithuania* (30 December 2016 No V–1168 and Nov 17, 2016 No V-1012), *Vilnius university Fact Sheet of study Regulation and Study Programs Regulation* (2010, 2012, 2013) and other rule of law⁶.

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

M&H SP is the unique study programme. There is no specially designed study programme for the atmosphere and hydrosphere in other higher education institution in Lithuania. Other Geography field study programmes within Vilnius University are focused on the social, economic and demographic sectors of geography. Thus, it can be argued that both programmes – programme in Meteorology and Hydrology and the second programme in Geography cover the entire set of topics of geography science and study. There is a possibility to get a double degree in this field (for those that applied till 2016).

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

Strengths:

- Meteorology and Hydrology 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 master study.
- The aims and learning outcomes of the M&H SP are well defined and clear, and they are being coordinated and regularly discussed together with partners.
- Information about the M&H 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.
- The M&H SP provides very good coverage in fundamental 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.

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

- M&H SP is a unique study programme in Lithuania: there is no such specially designed programme for the integrated study of atmosphere and hydrosphere.

Improvement measures:

- Learning outcomes will be constantly adjusted according to job market, recommendations from social partners, and global innovations and prevailing tendencies.

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 Meteorology and Hydrology is in conformity with the *General Requirements for First-Cycle and Integrated Study Programmes* approved by Order No V-501 of the Minister of Education and Science of the Republic of Lithuania 9 April 2010 (see Žin.⁷, 2010, No 44-2139), 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.

Table 2.1 The conformity of the M&H SP to the general requirements of the first-cycle study programmes

Requirements	In the study programme
The scope of the first-cycle university study programmes, whose graduates are granted a bachelor's degree in the study field (branch), shall be within the scope of 210 and 240 credits.	240
No fewer than 165 credits shall be allocated to course units within the study field.	190
No fewer than 15 credits shall be allocated to course units focusing on general university studies.	15
No more than 60 credits shall be allocated to course units offered by the university and chosen by the students; the course units (modules) are intended for more specialised studies in the same study field (branch) or for studies in another study field (branch), or for general university studies, internship/s, also to course units freely chosen by the student.	60
The total scope of internships/s shall be at least 15 credits.	20
The total number of course units per semester shall be no more than 7.	no more than 6
The study programme is completed by assessing the student's competence during the viva voce defence of his/her bachelor thesis and final examinations (if they are stipulated in relevant legal acts) by allocating to the bachelor thesis and final examinations no fewer than 12 credits.	to the bachelor thesis 15 credits

⁷ Valstybės Žinios, or the *Official Gazette*, where all legal acts are published and are only held enforced after the publication.

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.		4.		5.		6.	
						Learning outcomes											
						1.1	1.2	2.1	2.2	3.1	3.2	4.1	4.2	5.1	5.2	6.1	6.2
YEAR 1		60	1600	856	744												
SEMESTER 1		30	800	384	416												
Compulsory course units (modules)		30	800	384	416												
	Chemistry	5	133	64	69			x		x		x			x		
	English for Specific Purposes I/II p.	4	107	64	43		x	x		x	x						
	Principles of Hydrology	6	160	64	96				x		x	x				x	
	Standard Language and Professional Phraseology	3	80	32	48			x		x							
	Mathematics	6	160	80	80	x			x					x	x	x	
	Fundamentals of Meteorology	6	160	80	80				x		x	x				x	
SEMESTER 2		30	800	472	328												
Compulsory course units (modules)		30	800	472	328												
	General Physical and Human Geography	5	133	80	53	x	x	x	x			x	x				
	English for Specific Purposes II/II p.	6	160	80	80		x	x		x	x						
	Physics	5	133	80	53			x	x	x			x		x		
	Methods of Mathematical Statistics in Hydrology and in Meteorology	6	161	80	81	x		x							x	x	
	Training Practice in Topography	3	80	72	8			x	x				x	x			
	Topocartography and Geomorphology	5	133	80	53		x					x	x	x			
YEAR 2		60	1600	745	855												
SEMESTER 3		30	800	313	487												
Compulsory course units (modules)		25	667	304	363												
	Atmospheric Chemistry	5	133	48	85		x							x	x		
	Physical Geology	5	133	80	53		x					x	x				
	Hydrometry	5	135	48	87					x		x		x			
	Computer-based Algorithms of Mathematical Modelling	5	133	80	53	x	x	x						x		x	
	Geography of Lithuanian Water Resources	5	133	48	85		x	x				x	x		x		

Optional course units (modules)		5	133	9	124												
	<i>Research Project in Hydrology</i>	5	133	9	124	x	x	x	x	x	x	x		x	x		x
	<i>Research Project in Meteorology</i>	5	133	9	124	x	x	x	x	x	x	x		x	x	x	
SEMESTER 4		30	800	432	368												
Compulsory course units (modules)		25	670	384	286												
	<i>Introduction to GIS</i>	4	107	48	59	x								x	x		
	<i>Hydrochemistry</i>	5	133	64	69		x			x				x	x		
	<i>Hydrological Forecasts</i>	5	137	80	57		x			x	x			x	x		x
	<i>Meteorological Measurements</i>	5	133	48	85					x		x		x			
	<i>Hydrological and Meteorological Field Training</i>	6	160	144	16		x	x	x	x		x		x			
General education units (modules)		5	130	48	82												
	<i>General Education Modules</i>																
YEAR 3		60	1600	660	940												
SEMESTER 5		30	800	320	480												
Compulsory course units (modules)		20	537	208	329												
	<i>Fundamentals of Environmental Modelling</i>	5	138	64	74	x	x			x		x	x			x	x
	<i>Introduction to Remote Sensing in Hydrometeorology</i>	5	133	48	85					x	x	x		x		x	
	<i>Basics of Synoptic Meteorology</i>	10	266	96	170					x	x				x	x	
Optional course units (modules)		5	133	64	69												
	<i>Environmental Law</i>	5	133	64	69		x		x			x					
	<i>Pedology</i>	5	133	64	69		x			x		x	x				
	<i>Environmental Impact and Monitoring</i>	5	133	64	69		x	x	x			x	x		x		
General education units (modules)		5	130	48	82												
	<i>General Education Modules</i>																
SEMESTER 6		30	800	329	471												
Compulsory course units (modules)		19	510	272	238												
	<i>Weather Prediction with Basics of Dynamic Meteorology</i>	6	160	96	64					x	x				x	x	
	<i>Climatology</i>	8	213	96	117			x	x		x	x			x	x	
	<i>Oceanography I/II p.</i>	5	137	80	57		x	x	x			x	x				x
Optional course units (modules)		6	160	9	151												
	<i>Research Project in Hydrology</i>	6	160	9	151	x	x	x	x	x	x	x		x	x		x
	<i>Research Project in Meteorology</i>	6	160	9	151	x	x	x	x	x	x	x		x	x	x	
General education units (modules)		5	130	48	82												
	<i>General Education Modules</i>																

YEAR 4		60	1600	451	1149												
SEMESTER 7		30	800	308	492												
Compulsory course units (modules)		30	800	308	492												
	<i>GIS Use in Hydrology and Meteorology</i>	4	108	48	60	x			x					x	x		
	<i>Lithuanian Climate</i>	5	133	48	85			x				x		x	x	x	
	<i>Oceanography II/II p.</i>	5	133	60	73		x	x	x			x	x				x
	<i>Professional Practice</i>	6	160	8	152	x	x	x	x	x	x	x	x	x	x	x	x
	<i>Applied Hydrology</i>	5	133	72	61			x		x	x	x		x	x		x
	<i>Applied Meteorology</i>	5	133	72	61			x		x	x	x		x	x	x	
SEMESTER 8		30	800	143	657												
Compulsory course units (modules)		25	667	95	572												
	<i>Bachelor Final Thesis (Study field: Hydrometeorology)</i>	15	400	15	385	x	x	x	x	x	x	x	x	x	x	x	x
	<i>Limnology</i>	5	134	60	74	x		x				x		x	x		
	<i>Professional Practice in Scientific Research</i>	5	133	20	113	x	x	x	x	x	x	x		x	x	x	x
Optional course units (modules)		5	133	48	85												
	<i>Applications of Meteorological Information</i>	5	133	48	85			x		x	x			x	x	x	
	<i>Urban Climate</i>	5	133	48	85	x	x	x				x	x	x			

2.2. Principles of curriculum design and rationale of the SP

The scope of the M&H SP is 240 credits; the length of the SP is four years. The SP consists of the following blocks: course units developing the main subject-specific competences of the SP (190 credits including 21 credits optional courses for more specialised studies in the same study field), general university studies (15 credits), final bachelor's thesis (15 credits). 60 credits can be allocated for studies in another study field (branch), or for general university studies, internship/s, also to course units freely chosen by the student. The total scope of internships is 20 credits (9 – training practice, 11 – professional practice).

The students have possibility to individualize their studies by: 1) choosing minor study programme Subject Pedagogy (delivered by Faculty of Philosophy), 2) electing General Education courses from all University list (that includes culture, history, health, management, psychology, philosophy etc.), 3) electing courses of narrow specialization in one of the main branches of climatology, oceanography, meteorology or hydrology and preparing Bachelor thesis in that area.

During the 1st year students study basics of meteorology and hydrology, methods of mathematical statistics, physics, mathematics, chemistry, topocartography and geomorphology, and English. The 2nd year: meteorological measurements and hydrometry, geology, geography of Lithuanian water resources, atmospheric chemistry, hydrochemistry, hydrological forecasts, introduction to GIS, research projects in hydrology or meteorology. Also, during the 2nd year there is 4-week-long hydrological and meteorological field training. The 3rd year: basics of synoptic meteorology, introduction to remote sensing in hydrometeorology, fundamentals of environmental modelling, climatology, oceanography and student continue their research project in hydrology or meteorology. The 4th year: applied meteorology and hydrology, Lithuanian climate, GIS use in hydrology and meteorology, limnology, professional practice and final thesis.

Basics of the study programme are included since the first semesters, and cover such subjects as Chemistry, Mathematics, Physics, Principles of Hydrology, Fundamentals of Meteorology et al. (Table STUDY PLAN). Subjects of special education are presented since the second and third semester alongside with some basic subjects. This allows students to be able to reveal, analyse and suggest the ways for solution of hydrological and meteorological problems. The individually planned teaching procedures and / or individual study programmes could be arranged for disabled students with special needs.

H&M SP students in the first and second year just after spring examination session have training practice (two and four weeks respectively). After those practices summer holiday time starts (up to the 31st of August). At the beginning of VII semester students have their professional practice in various agencies and institutions, which lasts 4 weeks (on the 1st–28th of September). Lectures for them starts on the 29th of September.

Major changes in H&M SP in 2011–2016:

- Since 2011 – the name of SP Hydrology and Meteorology was changed by Meteorology and Hydrology;
- Since 2012 – optional subjects Philosophy of Biology, Principles of Evolutionary Theory, Theory of Economics, Introduction to Sociology, Introduction to Philosophy, Fundamentals of Business, Civil and Labour Law and Introduction to Politology was replaced by optional General Education Modules;
- Since 2012 – the subject Atmospheric chemistry has been included into M&H SP.
- Since 2012 – subjects Oceanology and Oceanography were united to Oceanography I and II;
- Since 2012 – 60 credits can be allocated for studies in another study field (branch), or for general university studies, internship/s, also to course units freely chosen by the student;
- Since 2015 – subject Essentials of Weather Forecasting was replaced by Weather Prediction with Basics of Dynamic Meteorology;

These changes take into account stakeholders', employers' and students' recommendations to strengthen the teaching of main study field subjects, pursuing to develop key learning outcomes and taking into account the new provisions of the *Regulation of Study Programmes of Vilnius University* approved by Decree No SK–2012–12–4 of Vilnius University Senate Commission 21 June 2012.

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

Study methods: active lectures; seminars; discussions; practicum and laboratory work; individual work with literature; essay writing; individual scientific research project; analysis of meteorological and hydrological data; experiments using meteorological and hydrological equipment; field practice; professional practice; group project; presentations; projects; 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 master studies.

At the beginning of the 3rd semester students freely choose one research project topic in either Meteorology or Hydrology from the list of proposed topics. Students continue research on the same topic during the 5th semester and use the same topic to prepare the final thesis. Students perform original research, which is based on scientific and methodological literature analysis, discussion with the supervisor and independent analysis. The interpretation of project results should be performed according to high academic standards. The applicability of results should be highlighted.

Proportion between contact hours and students' individual work is 42 % and 58 % Table 2.2.

Table 2.2 Proportion between contact hours and students' individual work

Semester	Compulsory course units			Optional course units		
	Contact hours	Individual work, hrs	Total	Contact hours	Individual work, hrs	Total
1	384	416	800			
2	472	328	800			
3	304	363	667	9	124	133
4	384	286	670	48	82	130
5	208	329	537	112	151	263
6	272	238	510	57	233	290
7	308	492	800			
8	95	572	667	48	85	133
Total	2427	3024	5451	274	675	949

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. Bachelor's thesis must be prepared according to the requirements described in E. Rimkus and G. Valiūškevičius 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 analyse results and methodology of similar studies, if necessary, carry 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) Bachelor's thesis.

The aim of the bachelor thesis is – development of an independent scientific work skills, critical thinking and team working skills, to form a deeper knowledge in meteorology / climatology / hydrology / oceanography fields and prepare for postgraduate studies.

By working on their graduation theses, the students develop the following skills: students will acquire skills to carry out systematic analytical activities; will be able to understand the contemporary problems in their chosen field of science, level of investigation analysed problems in the world and Lithuania and importance of their work in the context of other authors' research; will be able to self-formulate research problem, research tasks and to tackle them; will acquire skills that will enable them single-mindedly and independently deepen their knowledge and to continue their studies in the second cycle in another professional field; will enhance their creative and innovative potential, the ability of communication, develop their critical and analytical thinking.

The theses are supervised by the academic staff of the M&H SP. Topics for the theses are chosen by the students after having discussed them with potential supervisors and approved by the Department of Hydrology and Climatology.

Bachelor thesis (BT) must be drawn up provided to the supervisor in written form by a specific deadline. Supervisor assesses whether the BT fulfils the requirements and decides whether it can be defended.

The submitted BT (with supervisor permission) is being defended in the meeting of final theses Commission. Theses are reviewed by experts (who were appointed by the head of a department). Cast of Commission and defending date are appointed by order of the Dean of Faculty of Chemistry and Geosciences. BT is presented (defended) by a short 9–10 min. presentation. Presentation requirements are described in the abovementioned publication "Methodical instructions..." (2016). During the defence, the student must answer questions about BT topic.

Before the Defence the members of Commission have evaluated the thesis, according to the reviewer's opinion. These scores (T) represent 60% of the final assessment.

Criteria for evaluation: execution of tasks, scientific level of analysis, completeness, consistency, objectivity, polemics validity, formulation accuracy, conclusions certainty and technical design.

The last part of the assessment (40%) are points given for the quality of defence and presentation (P). Criteria include: logic and reasoning, smoothness of presentation, clarity, consistency, accuracy of formulation, objectivity, informativity, the ability to convincingly answer the questions.

2.5. Internship

The total scope of internships is 20 credits (9 – field training practice, 11 – professional practice). Field training for H&M SP students are compulsory part of the study process. This is also the indispensable remedy for the shaping of students' skills and allows introducing the theoretical knowledge into practice. All practices – training topographic practice, training hydrological and meteorological practice as well as two professional practices – take place in different sites and use different techniques and equipment. The friendly environment and proper conditions allow the accomplishment of practice aims whereas the material facilities are regularly updated and improved. *Training Practice in Topography* (2 semester) starts after spring session in "Vingis" park located not far from FCHG building. Field training data processing are exercised in FCHG auditoriums. Four sets of theodolites, dumpy levels, measuring roulettes, level rods are used in field training. Additional 2 GPS receivers and other devices (busolas, goniometers) are used also. New 4 sets of theodolites, dumpy levels, level rods & 2 GPS receivers were purchased in 2012–2016.

Hydrological and Meteorological Field Training (the 4th semester) starts just after spring session in VU field training base located in Šližiškiai (Molėtai district, ~70 km away from Vilnius). Base is fully equipped for 30 H&M study programme students together with M&H SP teachers for living & learning during the 4 weeks.

In the beginning of the field training students build Meteorological training station on their own. Continuous (24 h per day) meteorological observations are being run strictly to WMO standards. Station consists of air & soil temperature, air pressure, precipitation, wind speed & direction, evaporation, sun radiation measuring devices. Most of parameters are measured using several devices. More devices (mobile psychrometers & anemometers, soil thermometers, GPS receivers, theodolites) are used in meteorological field expeditions. Room with 15 workplaces are arranged for data & results processing and learning process. Also, students mount Hydrological measurement places in Virintai & Varnynas Lake and adjacent streams. Flow speed, thermal properties, water levels are measured in streams using various devices and methods. Furthermore, thermal & optical parameters, water levels are examined in the lakes. Number of devices fully supply training process for small groups (2–3 students). Additional hydrological field expeditions use current profilers, boats, GPS receivers. 15 workplaces are arranged for data & results processing and learning process.

Equipment for field training facilities is renovated every year. In the recent 5 years (2012–2016) the following equipment were obtained: current & bathymetric profilers (2 units); universal water quality meters (2 units); water level radar; water temperature, level, conductivity meters (2 units); water level, runoff & flow speed gauge; mobile automatic weather stations (6 units); & inflatable boat was purchased. Moreover, with financial support of the European Regional Development Fund & Republic of Lithuania automatic training meteorological station was set up in 2011 in the backyard of Institute of Geosciences. Station helps to improve knowledge for students in Applied Meteorology, Fundamentals of Meteorology, Meteorological Measurements, Synoptic Meteorology subjects and to collect data for individual research projects.

Professional Practices (the 4th year autumn & spring semesters) are organized in potential employer organizations with consulting of DH&C and recipient organizations employees. Number of workplaces varies within yearly demand. Approved contracts with hosting organizations and students are available. The main hosting organizations are: Lithuanian Hydrometeorological Service (LHMS), The Environmental Protection Agency, Ministry of Environment, Institute of Geology and Geography, Centre of Marine Research. A student can choose training place from various locations in Lithuania (e.g. Kaunas, Klaipėda HMT divisions, Centre of Marine Research). Students are provided with a supervisor, workplace, equipment and qualified support from specialists. Practice's programme and schedule is negotiated with the responsible teacher.

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

Strengths:

- The M&H SP covers broad range scientific areas (meteorology, climatology, hydrology, marine sciences).
- 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 first level of education and give possibility to achieve learning outcomes.
- The student's workload is distributed evenly between semesters. Approximately 42 % of workload goes to contact studies, and 58 % to individual studies.
- The sequence of courses is oriented to develop deep understanding of meteorology and hydrology and gives necessary background from chemistry, physics and mathematics.
- The theory in lectures and laboratory practice is well linked.

- Students 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.
- The content of the M&H SP meets the level of modern Hydrology and Meteorology sciences, 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.
- Incoming Erasmus students are taught by supervising professor individually.
- Students are actively involved into Students Representative of Vilnius University activity, students' scientific societies and cultural and educational activities.

Weaknesses:

- There are no courses taught by visiting professors (this would be too expensive for the FCHG), only separate lectures are delivered by visiting professors.
- 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 M&H SP is being reduced by low wages offered by employers.

Improvement measures:

- The future structure of M&H SP and contents of courses will constantly be adjusted according to needs of employers, recommendations from WMO and social partners, and student filled surveys.
- Students will be further encouraged to express their views, research independently and analyse various problems.

3. Academic staff

3.1. Composition of academic staff and its conformity to requirements

The study programme of Meteorology and Hydrology (M&H SP) is implemented by Faculties of Chemistry and Geosciences, Physics and Mathematics academic staff members, including 5 full professors, 14 associate professors, 6 lecturers with a doctoral degree, 1 lecturer and 1 assistant lecturer (see Table 3.1 below).

The teaching experience of the M&H SP academic staff, whose main employer is Vilnius University, is 16,5 years on average; their academic work experience is 23,5 years on average.

Table 3.1 Composition of academic staff according to academic titles and research degrees and scope of teaching in the M&H SP (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)	5	59	25
Associate Professors (Dr)	14	130	54
Lecturers with a doctoral degree	6	38	16
Lecturers	1	10	4
Assistant lecturers, doctoral students	1	3	1
Total	27	240	100

The composition of the academic staff is in conformity to the requirements stipulated in legal acts of the Republic of Lithuania⁸, which is reflected in the following Table 3.2:

Table 3.2 Conformity of the qualifications of academic and other staff in the first-cycle M&H SP to the General Requirements and to the Regulation of Study Programmes of VU

Requirements	In the study programme
No less than half of the course units (modules) in the study field shall be taught by researchers.	95 %

Table 3.3 Composition of academic staff in the M&H SP according to position, academic years 2012–2016

Academic year Position	2012		2013		2014		2015		2016	
	number	%	number	%	number	%	number	%	number	%
Professors	7	18	5	14	7	22	5	17	5	18
Associate professors	14	36	14	40	12	38	14	47	14	50
Lecturers/doctors	9	23	9	26	8	25	7	23	7	25
Lecturers	6	15	5	14	2	6	3	10	1	3
Assistant lecturers	3	8	2	6	3	9	1	3	1	3
Total	39	100	35*	100	32*	100	30*	100	28*	100

* Since 2012 optional subjects Philosophy of Biology, Principles of Evolutionary Theory, Theory of Economics, Introduction to Sociology, Introduction to Philosophy, Fundamentals of Business, Civil and Labour Law and Introduction to Politology gradually were replaced by optional General Education Modules. The number in the table doesn't include teachers of General Education Modules, therefore net number of teachers has decreased since 2012.

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 lecturers and 1 assoc. prof. left VU due to the age, other – due to job replacement and M&H SP modification):

Table 3.4 Turnover of academic staff in the M&H SP

Academic year	Full professors	Associate professors	Lecturers/doctors	Lecturers	Assistant lecturers
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⁸ *General Requirements for First-Cycle and Integrated Study Programmes* approved by Order No V-501 of the Minister of Education and Science of the Republic of Lithuania 9 April 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

	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	–	–	–	–	2	–	–	1	–	1
2013	–	1	–	–	–	–	1	1	–	–
2014	–	–	–	–	1	–	–	–	–	–
2015	–	–	–	–	–	–	–	–	–	–
2016	–	–	–	1	–	–	–	1	–	–
Total	–	1	–	1	3	–	1	3	–	1

The age of the academic staff implementing the M&H SP is 48 years on average.

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	–	–	2	2	1
Associate professors	1	6	2	3	2
Lecturers/doctors	1	5	2	–	–
Lecturers	–	–	–	–	–
Assistant lecturers	–	–	–	1	–
Total	2	11	6	6	3

3.2. 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 M&H SP 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 M&H SP. 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 M&H SP. The indices of scientific performance are most important tools in determining the qualifications of teacher's tenure.

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

Table 3.6 Research output of the academic staff of Institute of Geosciences of CHGF in 2012–2016

	01	02	03	04	05	06	07	08	09	Total
2012	14	5	57	0	0	6	3	0	0	85
2013	9	3	62	0	1	8	12	0	0	95
2014	2	10	133*	0	1	0	13	0	0	159*
2015	5	6	51	0	0	3	15	0	0	80
2016	1	3	58	0	0	0	15	0	0	77
Total	31	27	361	0	2	17	58	0	0	496
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)									

* This number includes original maps that were published in National atlas.

Table 3.7 Research projects implemented by the DH&M 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

3.3. Exchange of academic staff

Table 3.8 Internships and study periods of the M&H SP academic staff (only academic staff of DH&M) 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 M&H SP in 2012–2016

Year	Name of lecturer	Institution (country)
2012	–	–
2013	Dr. I. Buynevich	Temple university, USA
2014	–	–
2015	Dr. Laurent Bopp	Laboratoire des Sciences du Climate et de l'Environnement, Universite de Versailles
2016	–	–

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

Teaching staff members participate in scientific and pedagogical internships that are funded by Erasmus program and by scientific projects (Table 3.9). 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.

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

Table 3.10 Proportion of academic staff to students admitted to the M&H SP 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	39	32 (30+2)	1.2	210 (182+28)	0.2	27 (24+3)	1.4
2013	35	32 (30+2)	1.1	198 (171+27)	0.2	16 (15+1)	2.2
2014	32	35 (30+5)	0.9	270 (220+50)	0.1	18 (13+5)	1.8
2015	30	35 (30+5)	0.9	185 (134+41)	0.2	20 (14+6)	1.5
2016	28	35 (30+5)	0.8	156 (118+38)	0.2	24 (19+5)	1.2
Average:			1.0	Average:	0.2	Average:	1.6

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

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

Strengths:

- The M&H SP is carried out by highly qualified teachers (professors, associate professors, lecturers), who are the leading scientists in these areas also.
- The DH&C held a variety of workshops on issues of research methodology and techniques as well as 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.
- 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 (doctoral students) are involved in teaching process.
- The distribution of teachers according to 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. 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 M&H SP program courses were prepared by the teachers of FCHG.
- The staff is willing to help the students; teachers are available for consultations during their working time.

Weaknesses:

- The structural transformation is at place of 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.

- Large workloads of teaching personnel which sometimes 1.5 times exceeded the determined minimum standards.

Improvement measures:

- Pedagogical skills of teaching staff should be improved. Now in the University new project “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.
- 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 two accounted 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

Most of the lectures and practical classes for the students of M&H SP proceed in specially designed DH&C facilities. Optimal number of seats (workplaces) and intimate design creates comfortable environment-friendly working conditions. 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 last 5 years were reequipped and renovated (Table 4.3).

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.)	Čiurlionio str. 21	47.9	28	Computer, multimedia, whiteboard, wireless internet
318 (Digital methods lab.)	Čiurlionio str. 21	38.8	28	13 computers with software, multimedia, whiteboard, wireless internet
316 (Hydrology a.)	Čiurlionio str. 21	43.6	40	Computer, multimedia, whiteboard, wireless internet
313 (1st geography a.)	Čiurlionio str. 21	70.0	63	Computer, multimedia, whiteboard, wireless internet
214 (Aula Magna a.)	Čiurlionio str. 21	111.0	94	Computer, multimedia, whiteboard, wireless internet
111 (block 3, Hydrometeorology a.)	Čiurlionio str. 21	34.2	24	Computer, multimedia, whiteboard, wireless internet

Table 4.2 Teaching and learning laboratories used in the study process when implementing the SP of XX, 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 15 100 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.	111 (block 3, Hydrometeorology a.)	Painted walls and extra heating system

Approximately students spend 91 % of all study time in FCHG and 9 % – in other faculties of Vilnius university.

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 is able to 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.

4.2. Equipment for studies

All the computers run on official Windows OS and are equipped with licenced versions of Microsoft Office, ArcGIS and other special software (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 improvement of knowledge for students in Applied Meteorology, Fundamentals of Meteorology, Meteorological Measurements, Synoptic Meteorology subjects and for collecting data for individual research projects. Station data is available since 2012 and present weather conditions is accessible via internet. Moreover, it serves an 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. Internship centres

Department has internship centre situated in Sližiškiai village (Molėtai district), a bit more than 70 km from Vilnius. Every year bachelor second year students of M&H SP have 4-weeks field training. Two rooms (both with 15 workplaces) are designed for indoor training. The centre is fully equipped with new meteorological and hydrological equipment, including automated weather station, devices for solar activity, thunderstorm, water level and runoff measurements. Computers, multimedia, whiteboards and wireless internet are available for learning process. The internship centre is renovated constantly: repainting of walls and floors, installing showers, toilets, kitchen equipment. New stoves, fridges and a washing machine were purchased to improve living conditions in the centre.

4.4. Teaching and learning resources

Most of learning resources are in Lithuanian and are prepared 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 special 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 are uploaded to DH&C internet site (<http://www.hkk.gf.vu.lt>, students section) and are freely available for students.

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 almost stable during last 5-year period (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
400	400	400	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. Use of electronic resources now exceeds 60% and further increases. They are frequently used for seminars (90% of all resources) and practicums (~50%).

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

Strengths:

- All staff have their permanent workplaces, which are equipped with necessary office facilities to ensure the study process;
- DH&C 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;
- VU regularly update office software in staff computers as well as in all classrooms computers;
- Students have good conditions for study; they widely use modern information technologies, they have free access to international databases of scientific publications, which are subscribed by Vilnius University;
- Specialized computer labs are regularly updated with modern software (e.g. for GIS studies);
- Students have full access to Institute 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);
- Staff and students can 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 students' 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 their free time;

- Institute has canteen and fitness facilities, which can be used by staff and students.

Weaknesses:

- Institute 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 library renovation and modernization is planned for the end of 2017;
- More funding will be designated to acquiring new up-to-date teaching literature every year;
- Reorganization of university network in Lithuania may increase study funding;
- Encouraging more funding from social partners and potential employers.

5. Study process and assessment

5.1. Admission requirements, statistics and major tendencies

Candidates to first-cycle or integrated studies are admitted through the System of General Admission administered by LAMA BPO (a Lithuanian acronym for the *Association of Lithuanian Institutions of Higher Education for General Admission*) authorized by the Ministry of Education and Science of the Republic of Lithuania and the procedure of admission approved by Vilnius University. Candidates are admitted to the study programme of Meteorology and Hydrology in accordance with the *Rules of Admission to the First-cycle Studies in Vilnius University* (approved by the VU Senate; available on the VU website⁹). Admission to each study programme is competitive and based on the entrance score. The score and the principles of its calculation are defined in the above *Rules*. A prerequisite for admission to each programme is secondary education. The entrance score (ESc) is based on the results of some school subjects and Matura examinations: geography (40 %), mathematics (20 %), Lithuanian language (20 %) and foreign language (20 %). All information about admission requirements is available in VU booklets and other publications, study fairs, VU Discovery Days and other promotional events. The Rules of admission are accessible on the VU website¹⁰ and DH&C website¹¹.

Since the admission conditions as well as calculation method of ESc have changed in 2014 there is no possibility for objective comparison of ESc between 2006–2013 and 2014–2016. However, we can state, that ESc difference between the first and last accepted student seems to be stable – 20–30 %. During all analysed period ESc of first accepted student makes about 75–91 % of the maximum available while of last – 57 % (sf) and 31 % (nsf). Students accepted to the non-state-funded places (nsf) have lower ESc because the pretenders to such places tend to be students who failed to get the state-financed place (Table 5.1).

⁹ See <http://www.vu.lt/kviecia/rinkis-studijas/kaip-istoti/1-pakopos-studijos>.

¹⁰ See <http://www.vu.lt/kviecia/rinkis-studijas/kaip-istoti/2-pakopos-studijos>

¹¹ See <http://www.hkk.gf.vu.lt/>

Table 5.1 Entrance scores of the candidates admitted to the M&H SP 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 admitted to the HMm SP			Mean value of the entrance score of all Faculty programmes
			Highest score	Lowest score	Mean value	
2012	sf	24	20.48*	14.14*	16.470*	17.849*
	nsf	3	16.68*	11.12*	12.310*	15.643*
2013	sf	14	18.46*	15.50*	16.701*	18.478*
	nsf	1	14.34*	14.34*	14.340*	16.143*
2014	sf	13	7.66	4.94	6.016	7.914
	nsf	4	4.70	3.59	4.300	5.518
2015	sf	14	9.08	5.86	7.309	8.404
	nsf	6	5.69	3.10	4.302	5.932
2016	sf	19	9.36	4.82	6.532	7.730
	nsf	5	4.88	3.66	4.310	5.463

*The admission conditions as well as calculation methodic of ESc have changed in 2014

According to the analysis of submitted applications to M&H SP (indicating this programme in application form as the first choice as well as the one from 12 available) the demand on this study programme has not substantially changed during last 5 years. The total number of applications is 129–251, whereas number of applications indicating M&H SP as the first desirable is steady – from 19 to 27. About 15–27 applicants are accepted to M&H SP each year (available positions 32–35). About 24 % of accepted students are residents of Vilnius and Vilnius district, the rest – arrived from different sites of Lithuania. These numbers show that Vilnius University is not a regional university (Table 5.2).

Table 5.2 Results of candidate admission to the M&H SP during the period of self-evaluation (2012–2016)

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)
				1 st priority	Total			
2012	sf	24	30	27	143	4.77	24	80.00
	nsf	3	2	1	29	14.50	3	150.00
	total	27	32	28	172	5.38	27	84.38
2013	sf	14	30	35	171	5.70	14	46.67
	nsf	1	2	2	39	19.50	1	50.00
	total	15	32	37	210	5.56	15	46.88
2014	sf	13	30	26	191	6.37	13	43.33
	nsf	4	5	1	60	12.00	4	80.00
	total	17	35	27	251	7.17	17	48.57
2015	sf	14	35	30	134	5.00	14	57.14
	nsf	6		3	41		6	
	total	20	35	33	175	5.00	20	57.14
2016	sf	19	35	19	96	3.69	19	68.57
	nsf	5		1	33		5	
	total	24	35	20	129	3.69	24	68.57

* *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

During 2012–2016 period 30 (28.6 %) students have dropped out. Comparing to 2006–2010 period the dropout has increased by 11.5 %. The main reasons of students' wastage were determined to be two: 1 – academic failure (lack of motivation and insufficient knowledge and skills obtained in the secondary school); 2 – perception that M&H SP does not match their early imagination and interests concerning programme. Major concern is poor knowledge of enrolled students in mathematics, geography and other sciences. Therefore, more frequently students dropout during the first year and in the next year students prefer choosing other study programme. On the other hand, some students suspend their studies due to worse circumstances, family problems and other personal reasons (Table 5.3 and Table 5.4).

Table 5.3 Dropout rate in the M&H SP (2012–2016)

Year of admission	Number of admitted students		Number of dropouts					Dropout rate, %	
			1st year of study	2nd year of study	3rd year of study	4th year of study	Year of graduation	Total during the SP implementation period	Total during the SP implementation period
2012	sf	24	8	–	–	–	2016	8	33,3
	nsf	3	1	–	–	–		1	33,3
Total	sf+nsf	27	9	–	–	–		9	33,3
2013	sf	14	2	–	–	–	2017	2	14,3
	nsf	2	1	–	–	–		1	50
Total	sf+nsf	16	3	–	–	–		3	18,7
2014	sf	13	3	–	–	–	2018	3	23,1
	nsf	5	2	–	–	–		2	40
Total	sf+nsf	18	5	–	–	–		5	27,8
2015	sf	14	2	1	–	–	2019	3	21,4
	nsf	6	1	–	–	–		1	16,7
Total	sf+nsf	20	3	1	–	–		4	20
2016	sf	19	8	–	–	–	2020	8	42,1
	nsf	5	1	–	–	–		1	20
Total	sf+nsf	24	9	–	–	–		9	37,5
Grand total during the period	sf	84	23	1	0	0		24	28,6
	nsf	21	6	0	0	0		6	28,6
	sf+nsf	105	29	1	0	0		30	28,6

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

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

Cause	Year of study	Year of admission					Total
		2012	2013	2014	2015	2016	
Failure to meet financial obligations	1 st	–	–	–	–	–	–
	2 nd	–	–	–	–	–	–
	3 rd	–	–	–	–	–	–
	4 th	–	–	–	–	–	–
Unsatisfactory academic results	1 st	2	1	–	–	–	3
	2 nd	–	–	–	–	–	–
	3 rd	–	–	–	–	–	–
	4 th	–	–	–	–	–	–

Academic dishonesty during the assessment of academic progress	1 st	–	–	–	–	–	–
	2 nd	–	–	–	–	–	–
	3 rd	–	–	–	–	–	–
	4 th	–	–	–	–	–	–
Family reasons	1 st	–	–	–	–	–	–
	2 nd	–	–	–	–	–	–
	3 rd	–	–	–	–	–	–
	4 th	–	–	–	–	–	–
Failure to renew studies after academic leave or suspension of studies	1 st	–	–	1	–	–	1
	2 nd	–	–	–	–	–	–
	3 rd	–	–	–	–	–	–
	4 th	–	–	–	–	–	–
Of the student's own free will	1 st	7	1	4	3	9	24
	2 nd	–	–	–	–	–	–
	3 rd	–	–	–	–	–	–
	4 th	–	–	–	–	–	–
Transfer to another higher education institution	1 st	–	1	–	–	–	1
	2 nd	–	–	–	1	–	1
	3 rd	–	–	–	–	–	–
	4 th	–	–	–	–	–	–

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 M&H 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 M&H 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 M&H SP received 19 such grants), social grants (in the year 2012–2016 the students of the M&H SP received 18 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 M&H 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 website¹². 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 M&H 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 applications). Students in need of social support or with disabilities are eligible for a reduction when paying for the hostel.

¹² See <http://www.vu.lt/lt/studijos/studiju-procesas/finansine-parama>.

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 website¹³.

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 M&H SP, like any other VU students or staff, have multiple opportunities of self-expression outside their classes, usually in sports, arts and music¹⁴.

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 M&H SP participate in OPENREADINGS Scientific Conference for Students of Physics and Natural Sciences, in conference "Bioateitis: prospect of natural sciences" (Lithuanian Academy of Sciences) where they present their research and discuss in sections.

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.

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 below).

¹³ See http://www.vu.lt/lt/studijos/studiju-procesas/finansine-parama#vardines_stipendijos.

¹⁴ <http://www.ssc.vu.lt/cms/> and <http://www.kultura.vu.lt/>

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		University of Chemistry and Technology	2
4		Univerzita Karlova v Praze	1
5	France	L'Universite de Franche-Comte	1
6		Universite d'Artois	1
7		Universite de Strasbourg	1
8		Universite de Toulouse II Le Mirail	1
9		Universite D'Orleans, Ecole Polytechnique de l'Universite d'Orleans	1
10		Université Montpellier 2	1
11		Universite Paul Valery-Montpellier III	1
12	Germany	Christian-Albrechts-Universität zu Kiel	1
13		Fachhochschule Münster	1
14		Technische Universität Chemnitz	1
15		Technische Universität Clausthal	1
16		Technische Universität Dresden	1
17		Universität Köln	1
18		Universität Trier	1
19	Italy	Westfälische Wilhelms-Universität Münster	1
20		Universita Ca Foscari di Venezia	1
21		Universita di Camerino	1
22	Latvia	Latvijas Universitate	2
23	Poland	Nicolaus Copernicus University	1
24		School of Higher Vocational Education in Nysa	1
25		Silesian University of Technology	1
26		Uniwersytet Gdanski	1
27		Uniwersytet im. Adama Mickiewicza	1
28	Portugal	Uniwersytet Warszawski	3
29		Universidade de Aveiro	1
30		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		Universidad Politecnica de Madrid	1
36		University of Cordoba	3
37	Sweden	Göteborgs universitet	1
38		Lunds universitet	1
39	Turkey	Abant İzzet Baysal University	1
40		Afyon Kocatepe University	1
41		Canakkale Onsekiz Mart University	1
42		Cukurova University	1
43		Dumlupinar University	1
44		Pamukkale Univesitesi	1
45		Yıldız Technical University	1

Table 5.6 Student mobility in the M&H SP

Year of study	Number of outgoing students	Institution (country)
2012	1	Universidad de Sevilla (Spain),
2013	–	–
2014	–	–
2015	2	Göteborgs universitet (Sweden),
2016	2	Lunds universitet (Sweden)

Number of students participating in mobility programmes is limited by number of scholarships. List of students participated in mobility programmes is given in Table 5.5.

M&H 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.

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*¹⁵.

All information on the assessment of academic progress, schedule of examinations, failed examinations and retaking them is available on the VU website¹⁶.

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 mandatory¹⁷. 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 scale¹⁸. The points on the scale are defined as “excellent, exceptional knowledge and skills”, average knowledge and skills, some inessential mistakes”, etc.

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*¹⁹.

The Bachelor Final thesis is assessed by the Viva Voce Defence Committee of Graduation Theses in reference to the assessment criteria of graduation theses²⁰. The members of the Committee take into consideration the graduation thesis, its presentation during the defence, responses of the author of the thesis

¹⁵ *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).

¹⁶ See <http://www.vu.lt/lt/studijos/studiju-procesas/egzaminu-sesija>.

¹⁷ In the modular system, mid-term assessment is also mandatory.

¹⁸ <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]

¹⁹ 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.

²⁰ : (http://www.vu.lt/site_files/SD/Studentams/Studiju_pasiekimu_vertinimo_Tvarka_12.21.pdf)

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.

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

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*²¹, 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

Preliminary information concerning professional activities of M&H SP graduates has shown that 83,3 % of graduates are working after 12 months from finishing university. Some of them continued further studies in various master's degree programs, and some – worked parallel with studies. Round 30 % graduate students, who finished university in 2014–2016, are known working according their speciality. Some SP graduates are still studying in postgraduate studies, the vast majority of them work according their speciality (2014–2016 year data).

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). Most of the staff in the LHMS is graduated from Vilnius University M&H SP. In recent years, the Hydrometeorological Service employs an average of 3–4 graduates of bachelor M&H SP at Vilnius University. Some of them work part-time workload, whereas at the same time, they are studying in VU to get master degree in Hydrometeorology or other study programme.

²¹ *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>.

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

Strengths:

- Students are being involved in research, that's performed by staff;
- Requirements for acceptance to M&H SP are clear and up-to-date;
- The program takes into account the needs of students. Students can suspend their studies at the time of adverse life circumstances.
- For preparation of Bachelor thesis each student has his/her own personal supervisor;
- Students can join students' organization;
- Students can get scholarships based on their academic results or social scholarships;
- In all courses, cumulative assessment system is applied. Students are assessed during both semester and 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;
- Although students are encouraged to participate in exchange programmes, they tend to remain in Lithuania because of family or financial reasons.

Improvement measures:

- In order to reduce student failure rates / dropouts, one of the measures will be to attract as many motivated students as possible;
- The information system for monitoring career of graduates will be updated and improved;
- Faculty is preparing for participation in pilot project of organization of Freshmen integration week; The purpose of this week is to familiarize students with all possibilities that is offered by the University and the Faculty, to motivate students for purposive studies.

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*²². 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 VU²³.

The main document concerned with the internal quality insurance of studies is: *Vilnius University. Quality Manual*²⁴.

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

²² Standards and Guidelines for Quality Assurance in the European Higher Education Area. See <http://www.enqa.eu/index.php/home/esg/>

²³ See <http://www.kvc.cr.vu.lt/site>.

²⁴ Vilnius University. Quality Manual. Vilnius, 2013. available in Lithuanian at <http://skvis.vu.lt/pub/book/qm/topic/10298430>.

intended for newly recruited academic staff (see the publication *Manual of Vilnius University Lecturer*²⁵). The University also organises courses intended for the professional development of the academic staff, etc.²⁶.

As stipulated by the *Regulation of Study Programmes of Vilnius University*²⁷, 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 practice²⁸.

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 Committee²⁹. 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, Simona Dalinkevičiūtė (student). 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 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 unit 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

²⁵ *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.

²⁶ See <http://www.kvc.cr.vu.lt/site/?q=node/90>.

²⁷ 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.

²⁸ For more information about the processes of study quality improvement see <http://www.kvc.cr.vu.lt/site/>

²⁹ Approved 6 March 2014. http://www.vu.lt/site_files/SD/Studentams/SP/SRD/SPK_nuostatai_03.06.pdf

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 M&H 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 M&H 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 who are responsible for the teaching subject, then finalised and approved by M&H SPC according to Study regulation principles. The SPC sessions are held 2–3 times per year or more, if necessary. Sometimes, the joint sessions of M&H 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*³⁰. 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

³⁰ Approved 29 May 2009. See http://www.vu.lt/site_files/SD/SK/SP_dalyviu_GR_tvarka.pdf

- 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 **Error! Reference source not found.** The survey involved 70 % of M&H SP students. The results are published on an internal website of VU. The survey results reveal that M&H 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?"	5 %	20 %	75 %
2. "Are you generally satisfied with the content quality of the study subjects delivered within this semester?"	10 %	25 %	65 %
3. "Students were encouraged to express their views within semester studies"	20 %	30 %	50 %
4. "Students were encouraged for independent research and analysis of various scientific issues within semester studies"	5 %	15 %	80 %

6.5. Cooperation with social partners

Social partners are potential employers for graduates, so, it is important to get information from them about knowlage of our students. There are cooperation agreements with the Environmental Protection Agency, Centre for Marine Research, Lithuanian Hydrometeorological Service (LHMS) and Nature Research Center. Employers of graduates of the program repeatedly expressed a favourable opinion about trained professionals and their level of education received. Valuable information comes directly communicating with employers and social partners (Lithuanian Hydrometeorological Service (LHMS), Ministry of Environment et. al.), they are explaining what knowledge students need to have that to work for them. It is important to know what is changing in organizations and what is important to change in studies that prepare employees for them. For example, subject Essentials of Weather Forecasting was replaced by Weather Prediction with Basics of Dynamic Meteorology.

The Study Programme Committee supervises its implementation, social partners of LHMS are the members of Committee and directly participate in all process. Structure of the study programme, 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 Study Programme Committee. The content of programme subjects' is continuously updated and, if necessary, program structure, subjects' distribution, extent etc could be replaced considering the needs of social partners.

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

Strengths:

- Maintained close relations with the future employers, they provide assistance to the students' research, and review their papers, Study Programme Committee members, as e lecturers of some courses, in activities of Alumni organization.
- The Study Programme Committee analyses feedback about the programme and its implementation received from different units of the Faculty, students, graduates, academic staff and social partners.
- The academic staff members have direct access to the students' evaluation and feedback about their course units (modules).

Weaknesses:

- SP contents and aquired competences are not always compatable with different recommendations by various future employers.

Improvement measures:

- Study Programme Committee will be renewed more often, in order to attract more representatives from social partners.
- In case of Lithuanian government agreeing to change the length of bachelor studies to 3 years, new study programme management challenges may arise.

APPENDICES