

The University of Łódź  
The Faculty of Geographical Sciences  
The Institute of Earth Sciences

Full-time undergraduate  
degree programme

**CLIMATOLOGY**

Łódź 2014

**Name of field of study:** *Climatology*

**1. Brief description:**

The field of study *Climatology* is offered at the Faculty of Geographical Sciences, University of Łódź.

This degree course is intended for all students interested in contemporary problems of climate change and its impact on the environment and the economy, in how the global climate system works, in the research methods of modern climatology, the directions of its development and the practical application of knowledge about the atmosphere.

The idea of studying *Climatology* is to provide students with the knowledge of the basic branches of modern climatology as well as with the skills to use the acquired knowledge in solving environmental and socio-economic problems following from climatic factors. This degree programme provides a general academic level of education in the area of Earth sciences in the field of climatology, putting a strong emphasis on understanding the basic atmospheric processes at different scales of time and space. During the courses of the core module, students will acquire knowledge and skills constituting a basis allowing them to become acquainted with more complex problems of modern climatology. The programme modules devoted to the methods of data collection and analysis, as well as to climatological and numerical modelling of the atmosphere will provide students with research tools necessary in the work of a climatologist. By participating in the module activities dedicated to applications, students will become acquainted with the possibilities of practical use of their acquired knowledge in various fields of life and economy. Those interested in further development of their climatological expertise will be able to get to know the contemporary trends in climatology by participating in a module dedicated to such issues.

**2. Level of qualification** – first cycle study (undergraduate).

**3. Educational profile** – general academic

**4. Mode of study** – full-time

**5. Educational objectives**

The aim of first cycle education in the field of *Climatology* is to:

- form professionals having thorough knowledge and skills in the field of climatology, understanding the effects of the climate system on a global and local scale, its relation to other environmental processes and the relations between man and climate;
- provide students with the knowledge and skills allowing them to perform climatological analyzes on their own, to collect and make use of atmospheric data and to solve practical problems in the field of the science of the atmosphere;
- educate the graduates in the skill of critical thinking allowing them to use a comprehensive approach towards environmental, economic and social problems conditioned by climate factors;
- prepare the graduates for developing their professional skills on their own and for undertaking second cycle study;

- prepare the graduates for working in positions requiring an in-depth knowledge of the Earth's atmosphere and the skills of analyzing meteorological data.

## **6. Professional title – Licencjat (Bachelor's) degree**

## **7. Employment opportunities**

Graduates will be prepared for work in units of government departments concerned with the collecting and analysing of atmospheric data, in state research institutes, in enterprises engaged in the use of natural energy sources (e.g. solar energy, wind energy), institutions engaged in environmental consulting in a broad sense, in the assessment impact of climate on a local and global scale, the methods of prevention and adaptation, as well as the potential consequences of climate change. A good language and substantive background will also enable them to undertake work with international institutions working for the natural environment, both in the countries of the European Union and worldwide (e.g. the World Meteorological Organization).

Studies realize general academic instead of professional profile, therefore do not provide specific professional qualifications. According to the Polish standards Graduate will be essentially prepared to act mainly in the area of “Professional, scientific and technical activity”, in particular to:

- activity connected with weather prediction
- consulting on environmental safety
- consulting on natural environment issue,

In the area of “Public administration and national defense; compulsory social security” Graduate will be prepared for work including:

- statistical services activity aimed at problems of climatological analysis in the various levels of public administration

Among the activities listed in the international ISCO-08 standards Graduate will be prepared to take up the activities mainly concerning:

- professional in the field of earth sciences (211) with specialization in meteorology (2112).
- professional in the field of life sciences (213) with specialization in environmental protection (2133) aimed at climate protection
- professional in the field of databases (252) with a focus on climate databases.

**8. Entry requirements – *matura* (maturity certificate) (or its equivalent in the case of foreign students) and willingness to take up studying the field of *Climatology*.**

**9. Areas and disciplines of science to which learning outcomes refer – the general area of Earth sciences, the discipline: geography**

**10. Assignment of degree programme to an area or areas of education – the area of natural sciences**

## 11. Field-specific learning outcomes with reference to area-specific learning outcomes determined for a given type of qualification

Table 1. The learning outcomes for the field of study *Climatology* as referred to the learning outcomes in the area of natural sciences

<b>Field-specific learning outcomes</b>	<b>Description of field-specific learning outcomes</b> Having completed the first cycle degree programme in the field of geography, the graduate:	<b>Reference to learning outcomes for the area of natural sciences</b>
<b>KNOWLEDGE</b>		
14K-1A_W01	describes the basic phenomena and processes taking place in all spheres of the Earth, and particularly the atmospheric processes; knows the basic concepts and terms in this area	P1A_W01 P1A_W04 P1A_W05
14K-1A_W02	has knowledge about the Earth and the atmosphere on the basis of empirical data and the application of mathematical and statistical methods in order to describe it	P1A_W02
14K-1A_W03	has knowledge of mathematics and physics necessary for the understanding of the processes occurring in the atmosphere and other natural processes and phenomena	P1A_W01 P1A_W03
14K-1A_W04	has knowledge of the most important problems of science of the atmosphere and Earth sciences, conceptual categories and terminology used in them	P1A_W04 P1A_W05
14K-1A_W05	knows the basics of mathematical modelling of complex natural phenomena, in particular the basics of climate and weather modelling	P1A_W03 P1A_W04 P1A_W07
14K-1A_W06	characterizes the relations man - environment, man - climate	P1A_W04 P1A_W08
14K-1A_W07	knows the research techniques and tools used in climatology and has knowledge of statistics and computer science at a level sufficient to describe and interpret natural phenomena	P1A_W06 P1A_W07
14K-1A_W08	knows the possibilities of practical application of the knowledge of climate in agriculture, economy, urban planning, power industry, environmental protection, medicine	P1A_W04 P1A_W05 P1A_W08
14K-1A_W09	knows the principles of planning and conducting laboratory tests as well as field measurements	P1A_W07 P1A_W09
14K-1A_W10	knows the basic principles of occupational health and safety and ergonomics	P1A_W09
14K-1A_W11	knows how to use the results of meteorological measurements and climate analysis in expert opinions and economic projects with regard to sustainable development. Knows the rules of functioning of enterprises and companies involved in environmental monitoring and protection	P1A_W08 P1A_W10 P1A_W11
14K-1A_W12	knows the basic concepts and principles related to copyright and intellectual property law	P1A_W10

<b>Field-specific learning outcomes</b>	<b>Description of field-specific learning outcomes</b> Having completed the first cycle degree programme in the field of geography, the graduate:	<b>Reference to learning outcomes for the area of natural sciences</b>
<b>SKILLS</b>		
14K-1A_U01	can perform basic meteorological measurements and observations	P1A_U01 P1A_U04 P1A_U06
14K-1A_U02	can perform simple laboratory experiments associated with the sciences of the atmosphere	P1A_U01 P1A_U04 P1A_U06
14K-1A_U03	can elaborate the results of measurements statistically and present them in the form of a report or a scientific article	P1A_U05
14K-1A_U04	can use climatological and meteorological databases	P1A_U03
14K-1A_U05	can perform a climatological analysis using statistical techniques	P1A_U05 P1A_U09
14K-1A_U06	uses specialist scientific journals and other literature publications in order to expand the acquired knowledge	P1A_U02 P1A_U03 P1A_U08 P1A_U11 P1A_U12
14K-1A_U07	can prepare and deliver a presentation on a completed project or a theoretical issue	P1A_U02 P1A_U03 P1A_U04 P1A_U07 P1A_U09 P1A_U10 P1A_U11 P1A_U12
14K-1A_U08	learns independently in a targeted manner	P1A_U11
14K-1A_U09	knows the editorial rules of correct thesis writing, of editing specialist publications and scientific articles	P1A_U08 P1A_U12
<b>SOCIAL COMPETENCIES</b>		
14K-1A_K01	understands the need of lifelong learning, of development of professional and personal skills	P1A_K01 P1A_K05
14K-1A_K02	is aware of the rapid development of climatology and understands the need for continuous keeping the expert knowledge up-to-date	P1A_K01 P1A_K05 P1A_K07
14K-1A_K03	correctly identifies and resolves dilemmas associated with people's functioning in the climate system, shows criticism in relation to information coming from the mass media	P1A_K04
14K-1A_K04	is reliable with respect to work safety of self and others; knows how to act in emergency situations	P1A_K06
14K-1A_K05	is capable of working in a team, both as a leader organizing group work and as a team member carrying out concrete tasks	P1A_K02 P1A_K03 P1A_K06
14K-1A_K06	sees the possibility of using the acquired skills in business practice, including in his/her own company	P1A_K08

Table 2. The learning outcomes in the area of natural sciences as referred to the learning outcomes for the field of study *Climatology*

Area-specific learning outcomes	The area of natural sciences – description of area-specific learning outcomes	Field-specific learning outcomes
<b>KNOWLEDGE</b>		
P1A_W01	describes the basic natural phenomena and processes	14K-1A_W01 14K-1A_W03
P1A_W02	in the interpretation of natural phenomena and processes, relies on an empirical basis, fully understanding the importance of mathematical and statistical methods	14K-1A_W02
P1A_W03	has knowledge of mathematics, physics and chemistry necessary for the understanding of basic natural phenomena and processes	14K-1A_W03 14K-1A_W05
P1A_W04	has knowledge of the most important problems concerning scientific fields and disciplines relevant to the studied field of study and knows their relationships with other natural disciplines	14K-1A_W01 14K-1A_W04 14K-1A_W05 14K-1A_W08
P1A_W05	has knowledge of the basic conceptual categories and nature-related terminology and has knowledge of the development of scientific fields and disciplines relevant to the studied field of study as well as the methods used in their research	14K-1A_W01 14K-1A_W04 14K-1A_W08
P1A_W06	has knowledge of statistics and computer science at a level which enables to describe and interpret natural phenomena	14K-1A_W07
P1A_W07	has knowledge of the basic techniques and tools applied in the fields of science and scientific disciplines relevant to the studied field of study	14K-1A_W05 14K-1A_W07 14K-1A_W09
P1A_W08	understands the relationships between the achievements of the chosen field of science and the discipline of natural sciences, and the possibilities of their use in socio-economic life including the sustainable use of biodiversity	14K-1A_W06 14K-1A_W08 14K-1A_W11
P1A_W09	knows the basic principles of occupational health and safety as well as ergonomics	14K-1A_W09 14K-1A_W10
P1A_W10	knows and understands the basic concepts and principles of the protection of industrial property and copyright law; is able to use the resources of patent information	14K-1A_W11 14K-1A_W12
P1A_W11	is acquainted with the general principles of creating and developing the forms of individual entrepreneurship, using the knowledge of the fields of science and scientific disciplines relevant to the studied field of study	14K-1A_W11

<b>Area-specific learning outcomes</b>	<b>The area of natural sciences – description of area-specific learning outcomes</b>	<b>Field-specific learning outcomes</b>
<b>SKILLS</b>		
P1A_U01	applies the basic research techniques and tools in the fields of science and scientific disciplines specific to the studied field of study	14K-1A_U01 14K-1A_U02
P1A_U02	understands literature in Polish which refers to the fields of science and scientific disciplines relevant to the studied field of study; is capable of reading and understanding simple scientific texts in English	14K-1A_U06 14K-1A_U07
P1A_U03	uses available sources of information, including the electronic sources	14K-1A_U04 14K-1A_U07
P1A_U04	performs commissioned simple research tasks or prepares expert opinions under the guidance of a tutor	14K-1A_U01 14K-1A_U02 14K-1A_U07
P1A_U05	uses basic statistical methods as well as computer algorithms and techniques to describe phenomena and analyse data	14K-1A_U03 14K-1A_U05
P1A_U06	carries out observations and performs simple field or laboratory physical, biological and chemical measurements	14K-1A_U01 14K-1A_U02
P1A_U07	demonstrates ability to draw correct conclusions on the basis of data coming from different sources	14K-1A_U07
P1A_U08	uses scientific language in discourses undertaken with specialists in a selected scientific discipline	14K-1A_U06 14K-1A_U09
P1A_U09	knows how to prepare a well documented elaboration of problems related to the fields of science and scientific disciplines relevant to the studied field of study in Polish and in a foreign language	14K-1A_U05 14K-1A_U07
P1A_U10	is capable of delivering speeches in Polish and in a foreign language concerning specific issues from the fields of science and scientific disciplines relevant to the studied field of study	14K-1A_U07
P1A_U11	learns independently in a targeted manner	14K-1A_U06 14K-1A_U07 14K-1A_U08
P1A_U12	has foreign language skills concerning the fields of science and scientific disciplines relevant to the studied field of study, in accordance with the requirements for level B2 of the European Framework of Reference for Languages	14K-1A_U06 14K-1A_U07 14K-1A_U09
<b>SOCIAL COMPETENCIES</b>		
P1A_K01	understands the need of lifelong learning	14K-1A_K01 14K-1A_K02
P1A_K02	is capable of working in a team, assuming various roles therein	14K-1A_K05
P1A_K03	can adequately define the priorities for the performance of tasks determined by self or others	14K-1A_K05
P1A_K04	correctly identifies and resolves dilemmas associated with performing the occupation	14K-1A_K03
P1A_K05	understands the necessity of improving professional and personal skills	14K-1A_K01 14K-1A_K02
P1A_K06	is reliable with respect to work safety of self and others; knows how to act in emergency situations	14K-1A_K04
P1A_K07	shows the need for continuous keeping specialist knowledge up-to-date	14K-1A_K02
P1A_K08	is able to think and act in an entrepreneurial manner	14K-1A_K06

## **12. Compatibility with the mission of the University and its development strategy**

The field of study *Climatology* is consistent with the mission of the University of Łódź and with the development strategy of the University for the years 2010-2015.

In formulating its mission, the University of Łódź emphasizes openness to the world and harks back to the multinational and multicultural heritage of Łódź. The degree conducted in English, which is nowadays the international language of science, makes it possible for students coming from different countries and cultures to take up the study. Attending classes, carrying out projects, preparing scheduled papers together by students from different cultures teaches them respect for diversity and mutual tolerance. In this way, the field of study *Climatology* forms persons with wide intellectual horizons, tolerant and open to different views and ideas, thereby being composed within another point of the mission of the University of Łódź. The harmony of learning, teaching and education in general is the basic principle of the University's functioning. In the field of *Climatology*, classes are conducted by highly qualified specialists engaged in scientific research in various branches of modern climatology, who distinguish themselves by recognized scientific achievements and collaboration with many national and international bodies.

The development strategy of the University of Łódź for the years 2010-2015 was established by Resolution No. 141 of the Senate of University of Łódź of November 23, 2009. Education in the field of *Climatology* is consistent with the University's strategy priority, i.e. the strong internationalization of the University of Łódź through the expansion of the offer of programmes in foreign languages. The establishment of *Climatology* corresponds with the targets of the strategy concerning the development of new fields of study. It also meets the demand of strengthening the competitiveness of the University on the education market.

## **13. Differences in relation to other educational programmes with similarly defined objectives and learning outcomes, conducted at the University of Łódź**

The study programme of *Climatology* is unique and no other similar studies are conducted at the University of Łódź.

The most similar programme content is offered by the degree course of *Geomonitoring* conducted at the Faculty of Geographical Sciences. However, its climatological content constitutes only a portion of the programme. Moreover, *Geomonitoring* is aimed mainly at obtaining information about the geographic environment. *Climatology* studies offer a more extensive knowledge and specialist skills. Some learning outcomes typical of a climatologist are also achieved by Geography studies at the Faculty of Geographical Sciences. However, the forced process of reducing the climatological content in the aforementioned studies which has taken place in recent years has caused the current *Geography* graduates to be relatively poorly prepared for the tasks posed before climatologists.

Both the above mentioned fields of study implement the curriculum in Polish, therefore they are practically inaccessible to foreign students. *Climatology* studies will make it possible for foreign students who are interested in achieving the learning outcomes defined in the curriculum to study at the University of Łódź.

#### 14. Plan of first cycle study in the field *Climatology*, general academic profile

Table 3. Plan of first cycle study in the field *Climatology*

	Code	Hours			Form of assessment	ECTS		
		lecture	classes	Total		lecture	classes	Total
<b>Year 1</b>								
Physical and Astronomical Basis of Atmospheric Sciences		52	52	104	E	5	10	15
Mathematical Methods in Climatology		52	52	104	E	5	10	15
Foreign Language			60	60	Z		2	2
General Meteorology		26	26	52	E	2	5	7
General Climatology		26	26	52	E	2	5	7
Fundamentals of Physical Geography for Climatologists		26	26	52	Z	2	5	7
Mountain Climate – field work			30	30	Z		7	7
<b>Total after year 1:</b>		<b>182</b>	<b>272</b>	<b>454</b>		<b>16</b>	<b>44</b>	<b>60</b>
<b>Year 2</b>								
Hydrology and Oceanography		26	26	52	E	2	5	7
Statistical Methods in Climatology		26	52	78	E	2	10	12
Climatological Databases			13	13	Z		2	2
Fundamentals of GIS		26	52	78	E	5	10	15
Measuring Methods and Instruments		13	13	26	Z	1	3	4
Optional Subjects**		78		78	Z	5		5
Foreign Language			60	60	Z		2	2
Foreign Language Examination					E		3	3
Physical Education			30	30	Z		1	1
Internship*			120	120	Z		4	4
Meteorological Protection of the Coast and Lake Districts – field work			30	30	Z		6	6
<b>Total after year 2:</b>		<b>169</b>	<b>396</b>	<b>565</b>		<b>15</b>	<b>46</b>	<b>61</b>
<b>Year 3</b>								
Methods of Numerical Modelling of the Atmosphere		26	52	78	E	3	10	13
Bachelor's Seminar			52	52	Z		11	11
Optional Subjects**		403		403	Z	36		36
<b>Total after year 3:</b>		<b>429</b>	<b>104</b>	<b>533</b>		<b>39</b>	<b>21</b>	<b>60</b>
<b>TOTAL DURING THE STUDY:</b>		<b>780</b>	<b>772</b>	<b>1552</b>		<b>70</b>	<b>111</b>	<b>181</b>

\* Internship will be held in an individual, continuous or interim mode

Forms of assessment: E – exam; Z – credit with grade

\*\* Student is required to select subjects from the humanities and social sciences for a total of not less than 5 ECTS credit points

The following conditions must be met in order to complete the first cycle study programme in *Climatology* and be awarded a degree of *licencjat klimatologii* (Bachelor of Science in Climatology):

- ✓ achievement of learning outcomes required in the field of study and specialization\*
- ✓ completion of professional internship;
- ✓ obtaining the number of ECTS credits required by the plan of study;
- ✓ completion of compulsory training courses;
- ✓ passing the diploma examination;
- ✓ writing a thesis and defending it before the board of examiners.

\* the achievement of learning outcomes required in the field of study and specialization is guaranteed by completing all the subjects specified in the study plan for each specialization. Students can also achieve concrete effects outside their home department, e.g. within such programmes as MOST or Erasmus. In such cases, it is the Dean who decides about granting such outcomes.

## 15. Balance of ECTS with indicators characterizing the study programme

Pursuant to the regulations in force, the individual elements of the programme of study are assigned ECTS credit points (Table 3). ECTS credits are awarded based on the estimated average student workload. In accordance with the guidelines contained in Resolution No. 192 of the Senate of the University of Łódź of 10 June 2013, the contact activities (*lectures, classes, tutorials, laboratories, seminars, internships, consultations, examinations*) and independent student work (*preparation for current classes, work on activity sheets, projects, presentations, preparation for assessments*) are taken into account. It is assumed that 1 ECTS credit point corresponds to 25-30 hours of the average student workload. To sum up:

- the total number of credit points which a student must have in order to obtain a qualification is at least 180 ECTS credit points;
- the total number of ECTS credit points which a student must obtain within activities requiring direct participation of the teacher (e.g. lectures, classes, internships, consultations, examinations) is 39;
- the total number of ECTS credit points which a student must obtain within courses in core subjects to which the field-specific learning outcomes refer is 58 credits, including the student's own work;
- the total number of ECTS credit points which a student must obtain within courses of practical nature (e.g. during practical classes, laboratories, preparation for such activities), is 81 ECTS credits;
- the minimum number of credits which a student is obliged to obtain on completion of university-wide programme modules or a different field of study is 7 ECTS credit points;
- the total number of ECTS credit points which a student must obtain within optional courses is 59 (33%) ECTS credits (including foreign language classes and the seminar).

## 16. Description of individual courses or learning process modules

The courses in the study programme are divided into modules (the letter W indicates the examples of optional subjects):

I. Core module:

Physical and Astronomical Basis of Atmospheric Sciences  
Mathematical Methods in Climatology  
General Meteorology  
General Climatology  
Fundamentals of Physical Geography for Climatologists  
Hydrology and Oceanography

II. Methods of data collection and analysis:

Statistical Methods in Climatology  
Climatological Databases  
Fundamentals of GIS  
Measuring Methods and Instruments

III. Modelling:

Methods of Numerical Modelling of the Atmosphere

IV. Applications:

W4.2. Agricultural Meteorology  
W5.1. Biometeorology  
W5.2. GIS in Climatology  
W6.1. Pollution in the Atmosphere  
W6.1. Atmospheric Chemistry  
W6.2. Synoptic Meteorology  
W6.2. Photographic Interpretation  
W6.3. Topoclimatology

V. Current Trends in Climatology:

W4.1. Urban Climate  
W5.1. Historical Climatology  
W6.1. Micrometeorology  
W6.3. Contemporary Problems of Climate Change  
W6.3. Renewable Energy Sources

VI. Supplementary Courses:

Bachelor's Seminar  
Mountain Climate – field work  
Meteorological Protection of the Coast and Lake Districts – field work  
W5.3. Soil Processes and Soil Science  
W5.3. Geoecosystems of the World  
Foreign Language  
Physical Education  
Internships

Detailed course descriptions can be found in the Catalogue of Courses of the University of Łódź.

## 17. Relations between field-specific and course-specific learning outcomes

### Competency Matrix - Knowledge

	Field-specific learning outcomes- knowledge											
	14K-1A_W01	14K-1A_W02	14K-1A_W03	14K-1A_W04	14K-1A_W05	14K-1A_W06	14K-1A_W07	14K-1A_W08	14K-1A_W09	14K-1A_W10	14K-1A_W11	14K-1A_W12
Physical and Astronomical Basis of Atmospheric Sciences	+		+	+	+				+	+	+	
Mathematical Methods in Climatology			+		+		+					
Foreign Language												
General Meteorology	+	+	+		+							+
General Climatology	+	+	+	+		+						+
Fundamentals of Physical Geography for Climatologists	+	+	+	+	+	+						+
Mountain Climate – field work	+	+	+	+		+	+	+	+	+	+	
Hydrology and Oceanography	+	+	+	+	+	+			+			
Statistical Methods in Climatology			+		+		+					
Climatological Databases	+	+	+		+	+	+	+	+			
Fundamentals of GIS		+	+	+		+	+	+				
Measuring Methods and Instruments	+	+	+	+		+	+	+	+	+	+	+
Physical Education										+		
Internship	+					+	+	+	+	+	+	
Meteorological Protection of the Coast and Lake Districts – field work	+	+	+		+	+	+	+	+	+	+	
Methods of Numerical Modelling of the Atmosphere		+			+		+	+			+	+
Bachelor's Seminar				+			+					+
Optional Subjects	+	+	+	+	+	+	+	+	+	+	+	+

## Competency Matrix - Skills

	Field-specific learning outcomes- skills								
	14K-1A_U01	14K-1A_U02	14K-1A_U03	14K-1A_U04	14K-1A_U05	14K-1A_U06	14K-1A_U07	14K-1A_U08	14K-1A_U09
Physical and Astronomical Basis of Atmospheric Sciences	+	+	+					+	
Mathematical Methods in Climatology	+	+	+		+		+		
Foreign Language						+			
General Meteorology						+	+		
General Climatology			+		+	+	+		+
Fundamentals of Physical Geography for Climatologists						+	+	+	
Mountain Climate – field work	+		+	+	+	+			
Hydrology and Oceanography	+		+	+				+	
Statistical Methods in Climatology	+	+	+		+		+		
Climatological Databases				+	+	+	+		
Fundamentals of GIS	+	+		+		+	+		
Measuring Methods and Instruments	+	+	+			+	+	+	
Physical Education									
Internship	+		+	+					+
Meteorological Protection of the Coast and Lake Districts – field work	+		+	+	+	+	+	+	
Methods of Numerical Modelling of the Atmosphere		+	+	+	+		+	+	
Bachelor's Seminar				+	+	+	+	+	+
Optional Subjects	+	+	+	+	+	+	+	+	+

## Competency Matrix - Social Competencies

	Field-specific learning outcomes – social competencies					
	14K-1A_K01	14K-1A_K02	14K-1A_K03	14K-1A_K04	14K-1A_K05	14K-1A_K06
Physical and Astronomical Basis of Atmospheric Sciences	+	+		+		
Mathematical Methods in Climatology					+	
Foreign Language	+				+	
General Meteorology	+	+			+	
General Climatology	+	+				+
Fundamentals of Physical Geography for Climatologists	+	+				+
Mountain Climate – field work	+	+		+	+	
Hydrology and Oceanography	+	+	+			
Statistical Methods in Climatology					+	
Climatological Databases	+	+				
Fundamentals of GIS	+				+	
Measuring Methods and Instruments	+	+	+			
Physical Education				+	+	
Internship	+	+	+	+	+	+
Meteorological Protection of the Coast and Lake Districts – field work	+	+	+	+	+	
Methods of Numerical Modelling of the Atmosphere	+	+	+		+	+
Bachelor's Seminar	+				+	
Optional Subjects	+	+	+		+	+

## **18. Description of the method to assess the learning outcomes within a programme with reference to specific courses or modules of the learning process**

At the Faculty of Geographical Sciences of the University of Łódź, there is the internal system of teaching and learning quality assurance based on the multi-level monitoring of the study programmes offered, as well as on the student survey performed every semester.

Students are interrogated every semester, and each academic employee concerned has access to the results of their survey on the USOS website. Since 2012, the University's graduates' careers have been monitored.

The field-specific and specialization learning outcomes are achieved and verified within the individual courses listed in section 16 and Table No. 3. The process of verifying specific learning outcomes on the basis of, inter alia: final papers, projects, examination papers, is described in the context of each course in the Catalogue of Courses of the University of Łódź. In addition, the field-specific and specialization learning outcomes are also assessed in the diploma awarding process.

An analysis of verification of learning outcomes is the subject of work of, among others, the Faculty Commission on the Quality of Education.

## **19. Internships**

Internships of 120 hours will be carried out upon the completion of semester 3. They will be held on an individual basis, continuous or interim, in accordance with the Internship Rules in force at the Faculty of Geographical Sciences.

## **20. Specification of possible activities conducted by visiting lecturers.**

At present, no courses conducted by visiting lecturers are planned.

## **21. List of compulsory training courses and their duration**

Every student is required to complete:

- compulsory occupational health & safety training via e-learning in semester 1,

## **Annex No. 1**

Table of forms of activities with assigned proportions of student working time in full-time undergraduate study "**Climatology**", Faculty of Geographical Sciences, University of **Łódź**

Form	Manner of conversion	Proportions			No. of ECTS points for <b>base*</b> no. of didactic hours
		Class work	Routine work	Preparation for assessment	ECTS
Lecture - type 1	<i>Rate of proportions</i>	2	1	2	<b>5</b>
	<i>Base hours</i>	52	30	60	
Lecture – type 2	<i>Rate of proportions</i>	1	1	1	<b>3</b>
	<i>Base hours</i>	26	30	30	
Lecture - type 3	<i>Rate of proportions</i>	1	0	1	<b>2</b>
	<i>Base hours</i>	26	0	30	
Lecture – type 4	<i>Rate of proportions</i>	1	2	2	<b>5</b>
	<i>Base hours</i>	26	60	60	
IT classes – type 1	<i>Rate of proportions</i>	1	3	1	<b>5</b>
	<i>Base hours</i>	26	90	30	
Field classes – type 1	<i>Rate of proportions</i>	1	3	2	<b>6</b>
	<i>Base hours</i>	30	90	60	
Field classes – typ e 4	<i>Rate of proportions</i>	1	3	3	<b>7</b>
	<i>Base hours</i>	30	90	90	
Tutorial classes – type 1	<i>Rate of proportions</i>	1	2	2	<b>5</b>
	<i>Base hours</i>	26	60	60	
Tutorial classes – type 2	<i>Rate of proportions</i>	0,5	1,5	1	<b>3</b>
	<i>Base hours</i>	13	45	30	
Tutorial classes – type 3	<i>Rate of proportions</i>	0,5	1	0,5	<b>2</b>
	<i>Base hours</i>	13	30	15	
Foreign language	<i>Rate of proportions</i>	2	0	0	<b>2</b>
	<i>Base hours</i>	60	10	0	
Language repetitory 1 <sup>st</sup> degree	<i>Rate of proportions</i>	0	1	2	<b>3</b>
	<i>Base hours</i>	0	30	60	
Internship	<i>Rate of proportions</i>	0	4	0	<b>4</b>
	<i>Base hours</i>	0	120	0	
Bachelor's/Engineer's seminar – type 1	<i>Rate of proportions</i>	1	2	2	<b>5</b>
	<i>Base hours</i>	26	60	60	
Bachelor's/Engineer's seminar - type 2	<i>Rate of proportions</i>	1	2	3	<b>6</b>
	<i>Base hours</i>	26	60	90	

Form	Manner of conversion	Proportions			No. of ECTS points for <b>base*</b> no. of didactic hours
		Class work	Routine work	Preparation for assessment	ECTS
Physical education	<i>Rate of proportions</i>	1	0	0	<b>1</b>
	<i>Base hours</i>	30	0	0	

\* The actual number of hours may be different, while maintaining the proportion of hours in accordance with the given rate

## Annex No. 2

**Table of variants of pursuing course work involving several forms of activities with assigned proportions of student working time in full-time undergraduate study "Climatology", Faculty of Geographical Sciences, University of Łódź**

Variant of course work	Manner of conversion	Student workload (in hours)			ECTS points/ Student base working hours
		Class work	Out of class work		
			Routine work	Preparation for assessment	
Lecture – type 1	<i>Rate of proportions</i>	2	1	2	5
	<i>Base hours</i>	52	30	60	142 h
Tutorial classes – Type 1	<i>Rate of proportions</i>	1	2	2	5
	<i>Base hours</i>	26	60	60	146 h
<b>Course 1</b>	<b>Total hours</b>	<b>78</b>	<b>90</b>	<b>120</b>	<b>288 h</b>
	<b>Total ECTS</b>				<b>10</b>
Lecture – type 2	<i>Rate of proportions</i>	1	1	1	3
	<i>Base hours</i>	26	30	30	86 h
IT classes – type 1	<i>Rate of proportions</i>	1	3	2	5
	<i>Base hours</i>	26	90	30	146 h
<b>Course 2</b>	<b>Total hours</b>	<b>52</b>	<b>120</b>	<b>60</b>	<b>232 h</b>
	<b>Total ECTS</b>				<b>8</b>
Lecture – type 3	<i>Rate of proportions</i>	1	0	1	2
	<i>Base hours</i>	26	0	30	56 h
Tutorial classes – Type 1	<i>Rate of proportions</i>	1	2	2	5
	<i>Base hours</i>	26	60	60	146 h
<b>Course 3</b>	<b>Total hours</b>	<b>52</b>	<b>60</b>	<b>90</b>	<b>202 h</b>
	<b>Total ECTS</b>				<b>7</b>
Lecture – type 4	<i>Rate of proportions</i>	1	2	2	5
	<i>Base hours</i>	26	60	60	146 h
IT classes – type 1	<i>Rate of proportions</i>	1	3	2	5
	<i>Base hours</i>	26	90	30	146 h
<b>Course 4</b>	<b>Total hours</b>	<b>52</b>	<b>150</b>	<b>90</b>	<b>292 h</b>
	<b>Total ECTS</b>				<b>10</b>
Lecture – type 3	<i>Rate of proportions</i>	0,5	0	0,5	1
	<i>Base hours</i>	13	0	15	28 h
Tutorial classes – Type 2	<i>Rate of proportions</i>	0,5	1,5	1	3
	<i>Base hours</i>	13	45	30	88 h
<b>Course 5</b>	<b>Total hours</b>	<b>26</b>	<b>45</b>	<b>45</b>	<b>116 h</b>
	<b>Total ECTS</b>				<b>4</b>

Variant of course work	Manner of conversion	Student workload (in hours)			ECTS points/ Student base working hours
		Class work	Out of class work		
			Routine work	Preparation for assessment	
Foreign language	<i>Rate of proportions</i>	2	0	0	2
	<i>Base hours</i>	60	0	0	60 h
<b>Course 6</b>	<b>Total hours</b>	<b>60</b>	<b>0</b>	<b>0</b>	<b>60 h</b>
	<b>Total ECTS</b>				<b>2</b>
Language repetitory 1 <sup>st</sup> degree	<i>Rate of proportions</i>	0	0	3	3
	<i>Base hours</i>	0	0	90	90
<b>Course 7</b>	<b>Total hours</b>	<b>0</b>	<b>0</b>	<b>90</b>	<b>90 h</b>
	<b>Total ECTS</b>				<b>3</b>
Field classes – type 1	<i>Rate of proportions</i>	1	30	2	6
	<i>Base hours</i>	30	90	60	180 h
<b>Course 8</b>	<b>Total hours</b>	<b>30</b>	<b>90</b>	<b>60</b>	<b>180 h</b>
	<b>Total ECTS</b>				<b>6</b>
Field classes – type 4	<i>Rate of proportions</i>	1	3	3	7
	<i>Base hours</i>	30	90	90	210 h
<b>Course 9</b>	<b>Total hours</b>	<b>30</b>	<b>90</b>	<b>90</b>	<b>210 h</b>
	<b>Total ECTS</b>				<b>7</b>
Tutorial classes – Type 3	<i>Rate of proportions</i>	0,5	1	0,5	2
	<i>Base hours</i>	13	30	15	58 h
<b>Course 10</b>	<b>Total hours</b>	<b>13</b>	<b>30</b>	<b>15</b>	<b>58 h</b>
	<b>Total ECTS</b>				<b>2</b>
Bachelor's/Engineer's seminar – type 1	<i>Rate of proportions</i>	1	2	2	5
	<i>Base hours</i>	26	60	60	146 h
<b>Course 11</b>	<b>Total hours</b>	<b>26</b>	<b>60</b>	<b>60</b>	<b>146 h</b>
	<b>Total ECTS</b>				<b>5</b>
Bachelor's/Engineer's seminar - type2	<i>Rate of proportions</i>	1	2	3	6
	<i>Base hours</i>	26	60	90	176 h
<b>Course 12</b>	<b>Total hours</b>	<b>26</b>	<b>60</b>	<b>90</b>	<b>176 h</b>
	<b>Total ECTS</b>				<b>6</b>
Physical education	<i>Rate of proportions</i>	1	0	0	1
	<i>Base hours</i>	30	0	0	30 h
<b>Course 13</b>	<b>Total hours</b>	<b>30</b>	<b>0</b>	<b>0</b>	<b>30 h</b>
	<b>Total ECTS</b>				<b>1</b>
Internship	<i>Rate of proportions</i>	0	4	0	4
	<i>Base hours</i>	0	120	0	120 h
<b>Course 14</b>	<b>Total hours</b>	<b>0</b>	<b>120</b>	<b>0</b>	<b>120 h</b>
	<b>Total ECTS</b>				<b>4</b>

**University of Łódź**  
**Faculty of Geographical Sciences**  
**Major course: *Climatology***

### **The proposed minimum academic staffing**

<b>Independent academic teachers</b>	
1	Prof. Dr hab. Joanna Wibig
2	Prof. Dr hab. Krzysztof Fortuniak
3	Dr hab. Agnieszka Podstawczyńska
<b>Academic teachers with a PhD degree</b>	
1	Dr Mariusz Siedlecki
2	Dr Włodzimierz Pawlak
3	Dr Anna Majchrowska
4	Dr Piotr Piotrowski
5	Dr Joanna Petera-Zganiacz
6	Dr Arkadiusz Niewiadomski or Dr Wojciech Tołoczko

### The proposed academic personnel

<b>Courses in Climatology studies</b>	<b>ACADEMIC TEACHERS</b>
<b>Year 1</b>	
Physical and Astronomical Basis of Atmospheric Sciences	Prof. Dr hab. Krzysztof Fortuniak
Mathematical Methods in Climatology	Prof. Dr hab. Joanna Wibig, Prof. Dr hab. Krzysztof Fortuniak
General Meteorology	Prof. Dr hab. Joanna Wibig, Prof. Dr hab. Krzysztof Fortuniak, Dr hab. Agnieszka Podstawczyńska, Dr Włodzimierz Pawlak
General Climatology	Prof. Dr hab. Joanna Wibig, Prof. Dr hab. Krzysztof Fortuniak, Dr hab. Agnieszka Podstawczyńska, Dr Włodzimierz Pawlak
Fundamentals of Physical Geography for Climatologists	Dr hab. Agnieszka Podstawczyńska, Dr Joanna Petera-Zganiacz
Foreign Language	
Mountain Climate – fieldwork	Dr hab. Agnieszka Podstawczyńska, Dr Piotr Piotrowski, Dr Włodzimierz Pawlak
<b>Year 2</b>	
Hydrology and Oceanography	Dr hab. Edmund Tomaszewski
Statistical Methods in Climatology	Prof. Dr hab. Joanna Wibig, Dr Mariusz Siedlecki
Climatological Databases	Dr Mariusz Siedlecki
Fundamentals of GIS	Prof. Dr hab. Joanna Wibig, Dr Mariusz Siedlecki
Measuring Methods and Instruments	Dr Włodzimierz Pawlak
Optional Subjects	Prof. Dr hab. Joanna Wibig, Dr Mariusz Siedlecki, Dr Włodzimierz Pawlak, Prof. Dr hab. Krzysztof Fortuniak, Dr hab. Agnieszka Podstawczyńska, Dr Piotr Piotrowski, Dr Wojciech Tołoczko, Dr Joanna Petera-Zganiacz, Dr Arkadiusz Niewiadomski, Dr Anna Majchrowska, Dr hab. Edmund Tomaszewski
Foreign Language	
Foreign Language Examination	
Physical Education	
Internship	
Meteorological Protection of the Coast and Lake Districts – fieldwork	Dr hab. Edmund Tomaszewski, Dr Piotr Piotrowski

Courses in <i>Climatology studies</i>	ACADEMIC TEACHERS
<b>Year 3</b>	
Methods of Numerical Modelling of the Atmosphere	Prof. Dr hab. Krzysztof Fortuniak, Dr Mariusz Siedlecki
Bachelor's Seminar	Dr hab. Agnieszka Podstawczyńska, Dr Mariusz Siedlecki, Dr Włodzimierz Pawlak, Dr Piotr Piotrowski
Optional Subjects	Prof. Dr hab. Joanna Wibig, Dr Mariusz Siedlecki, Dr Włodzimierz Pawlak, Prof. Dr hab. Krzysztof Fortuniak, Dr hab. Agnieszka Podstawczyńska, Dr Piotr Piotrowski, Dr Wojciech Tołoczko, Dr Joanna Petera-Zganiacz, Dr Arkadiusz Niewiadomski, Dr Anna Majchrowska, Dr hab. Edmund Tomaszewski