

**At Louvain-la-Neuve - 120 credits - 2 years - Day schedule - In French**Dissertation/Graduation Project : **YES** - Internship : **optional**Activities in English: **YES** - Activities in other languages : **NO**Activities on other sites : **YES**Main study domain : **Sciences**Organized by: **Faculty of Science (SC)**Programme acronym: **CLIM2M** - Francophone Certification Framework: 7**Table of contents**

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## CLIM2M - Introduction

### Introduction

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## CLIM2M - Teaching profile

### Learning outcomes

The objective of the training is partly an introduction to the three fundamental aspects of the work of a geographer:

- to observe and describe the environment, especially with computerized databases and advanced satellite observation technology ;
- to understand and explain the processes that have been observed, especially by applying models which enable them to be simulated;
- to learn certain concepts in resource management through land development ;

and partly an introduction to the fundamental concepts of physical climatology:

- to understand the dynamics of the atmosphere, the ocean and the overall climatological system;
- to grasp the techniques for modelling the climate, covering both theoretical and technical aspects;
- to be able to analyse and interpret climatic data.

This twin focus enables students to make a critical analysis of issues related to climate change (past and future and to understand and anticipate their impact on the environment and society so they can become responsible players in the current situation. The Master in Geography : Climatology is also suitable preparation for a doctoral thesis.

On successful completion of this programme, each student is able to :

Se préparer à la vie professionnelle

1. Intervenir dans la gestion des ressources
- 2 Evaluer des projets
- 3 Développer des outils d'aide à la décision

Modéliser les processus observés dans la réalité

Identifier les caractéristiques/composantes du système et la manière dont elles interagissent

Formuler des hypothèses/tests de travail

Développer des modèles (statistiques, numériques, conceptuels)

Tester par l'application, calibration et validation

Interpréter les résultats en lien avec la problématique

Porter un regard critique sur les méthodes utilisées

Evaluer la pertinence et la fiabilité des sources générales d'information

Identifier les limites des modèles, méthodes

Contextualiser les résultats, et coupler avec d'autres résultats

Intégrer les concepts de différentes disciplines dans une vision cohérente des ressources

Faire des liens entre différents aspects de la géographie

Analyser les interactions entre l'homme et l'environnement

Prendre en compte les apports des autres disciplines pour résoudre une problématique dans son ensemble

Synthétiser et communiquer

Communiquer oralement et par écrit en français et anglais

Communiquer à des acteurs scientifique (collègues) et acteurs de terrain

Communiquer la démarche, méthodes et résultats, discussion

Communiquer par la réalisation de schémas, de cartographie, graphiques

Se préparer à la vie professionnelle

Intervenir dans la gestion des ressources

Evaluer des projets

Développer des outils d'aide à la décision

7. Communiquer efficacement des résultats, des méthodes à différents types d'acteurs

7.1. Communiquer oralement et par écrit en français et en anglais (niveau C1).

7.2. Communiquer les résultats d'un travail à des acteurs scientifiques et des acteurs de terrain, en s'adaptant au contexte.

7.3. Communiquer de manière synthétique et critique l'état des connaissances dans un domaine donné.

7.4. Communiquer et discuter des données, des méthodes et des résultats.

7.5. Communiquer des résultats par la réalisation de cartes, de schémas et de graphiques.

7.6. Maîtriser les outils informatiques indispensables à la communication.

8. Intervenir dans la gestion des ressources et aborder la vie professionnelle

8.1. Construire un diagnostic sur un territoire et sur la gestion des ressources de ce territoire.

8.2. Evaluer des projets de développement territorial.

8.3. Développer des outils d'aide à la décision.

- 8.4. Concevoir des solutions dans le domaine de la gestion des ressources et de l'aménagement du territoire.  
 8.5 Tester les solutions et évaluer les impacts suivant des objectifs de développement durable.
9. Mobiliser les compétences nécessaires pour réaliser un travail de recherche en climatologie.
- 9.1. Comprendre la dynamique de l'atmosphère, de l'océan, et du système climatologique dans son ensemble.  
 9.2. Appréhender les techniques de modélisation du climat, en couvrant les aspects théoriques et techniques.  
 9.3. Savoir analyser et interpréter des données climatiques.  
 9.4. Mener une analyse critique sur des questions liées aux changements climatiques (passés et futurs) et en comprendre et anticiper les impacts sur la société et l'environnement de façon à devenir un acteur responsable dans le monde d'aujourd'hui.

## Programme structure

The programme comprises core subjects of 60 credits, 30 credits for the focus and 30 credits for optional subjects.

### CLIM2M Programme

## Detailed programme by subject

### CORE COURSES [60.0]

- Mandatory
- ✘ Optional
- △ Not offered in 2024-2025
- ⊙ Not offered in 2024-2025 but offered the following year
- ⊕ Offered in 2024-2025 but not the following year
- △ ⊕ Not offered in 2024-2025 or the following year
- Activity with requisites
- 🌐 Open to incoming exchange students
- 🚫 Not open to incoming exchange students
- [FR] Teaching language (FR, EN, ES, NL, DE, ...)

Click on the course title to see detailed informations (objectives, methods, evaluation...)

Year

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#### Module 1 : Methods for geographical and spatial analyses (10 credits)

● LGEO2211	<a href="#">Advanced statistical methods in geography</a>	Christian Hafner	FR [q1] [30h+30h] [5 Credits] 🌐	X	X
● LGEO2185	<a href="#">Advanced geo-processing</a>	Kristof Van Oost	FR [q2] [30h+30h] [5 Credits] 🌐	X	X

#### Module 2: Physical geography and global change (10 credits)

● LGEO2140	<a href="#">Global environmental challenges in the Anthropocene</a>	Veerle Vanacker Veerle Vanacker (compensates Kristof Van Oost)	FR [q2] [30h+30h] [5 Credits] 🌐	X	X
● LGEO2240	<a href="#">Tectonic geomorphology</a>	Veerle Vanacker	FR [q1] [30h+30h] [5 Credits] 🌐	X	X

#### Module 3 : Human-environment geography and sustainability (10 credits)

● LGEO2110	<a href="#">Mondialisation, développement et environnement</a>	Eric Lambin	FR [q1] [30h+30h] [5 Credits] 🌐	X	
● LGEO2230	<a href="#">Medical and health geography</a>	Sophie Vanwambeke	FR [q1] [30h+30h] [5 Credits] 🌐	X	

### o Module 4 : Integration (10 credits)

o LGEO2160	Integrated project in sustainability	Patrick Meyfroidt Raphaël Rousseau	EN [q1] [30h+30h] [4 Credits] 🌐	X	
o LGEO2250	Mesures de terrain en géographie	François Jonard (compensates Kristof Van Oost)	EN [q2] [30h+30h] [4 Credits] 🌐	X	X

### o Philosophie (2 credits)

Choose one of the following teaching units:

⊗ LSC2001	Introduction to contemporary philosophy	Charles Pence Peter Verdée	EN [q2] [30h] [2 Credits] 🌐	X	X
⊗ LSC2220	Philosophy of science	Alexandre Guay	EN [q2] [30h] [2 Credits] 🌐	X	X
⊗ LFILO2003E	Ethics in the Sciences and technics (sem)		EN [q2] [15h+15h] [2 Credits] 🌐	X	X
⊗ LTHEO2840	Science and Christian faith	Benoît Bourguine Paulo Jorge Dos Santos Rodrigues	EN [q1] [15h] [2 Credits] 🌐	X	X
o LCLIM2999	Mémoire		FR [q2] [] [20 Credits] 🌐		X

**RESEARCH FOCUS [30.0]**

- Mandatory
- ⊗ Optional
- △ Not offered in 2024-2025
- ⊙ Not offered in 2024-2025 but offered the following year
- ⊕ Offered in 2024-2025 but not the following year
- △ ⊕ Not offered in 2024-2025 or the following year
- Activity with requisites
- 🌐 Open to incoming exchange students
- 🌐 Not open to incoming exchange students
- [FR] Teaching language (FR, EN, ES, NL, DE, ...)

Click on the course title to see detailed informations (objectives, methods, evaluation...)

Year

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**o Content:**

○ LGEO2997	Séminaire d'encadrement du mémoire	Michel Crucifix	FR [q1] [15h] [5 Credits] 🌐	X	
○ LGEO2998	Thesis tutorial	Qiuzhen Yin	EN [q2] [15h] [3 Credits] 🌐		X

**o Module 5: Climatology (22 credits)**

○ LPHYS2162	Introduction to the physics of the climate system and its modelling	Hugues Goosse Francesco Ragone	EN [q1] [22.5h+22.5h] [5 Credits] 🌐 > French-friendly	X	
○ LPHYS2163	Atmosphere and ocean : physics and dynamics	Thierry Fichet François Massonnet	EN [q1] [52.5h+7.5h] [10 Credits] 🌐 > French-friendly	X	
○ LGEO2290	Travaux dirigés de modélisation climatique	Pierre-Yves Barriat Qiuzhen Yin	FR [q1] [15h] [2 Credits] 🌐	X	

**o Terrain en géographie (5 credits)**

L'étudiant-e choisit au moins un terrain parmi :

⊗ LCLIM2170	Field in climatology 1	Veerle Vanacker	FR [q2] [60h+30h] [5 Credits] 🌐 ⊙ > English-friendly	X	X
⊗ LCLIM2270	Field in climatology 2	Sylvain Trigalet	FR [q2] [60h+30h] [5 Credits] ⊕ 🌐	X	X

## OPTIONS

- > [List of elective courses](#) [ en-prog-2024-clim2m-lclim920o ]  
 > [Optional courses](#) [ en-prog-2024-clim2m-lsc100o ]

## LIST OF ELECTIVE COURSES

- Mandatory
- ⊗ Optional
- △ Not offered in 2024-2025
- ⊙ Not offered in 2024-2025 but offered the following year
- ⊕ Offered in 2024-2025 but not the following year
- △ ⊕ Not offered in 2024-2025 or the following year
- Activity with requisites
- 🌐 Open to incoming exchange students
- 🌐 Not open to incoming exchange students
- [FR] Teaching language (FR, EN, ES, NL, DE, ...)

Click on the course title to see detailed informations (objectives, methods, evaluation...)

Year

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### Content:

#### Elective courses specific to climatology orientation

Students choose a minimum of 22 credits from this list:

⊗ LPHYS2264	Oscillations and instabilities in the climate system	Michel Crucifix	EN [q2] [30h] [5 Credits] ⊙ 🌐 > French-friendly	X	X
⊗ LPHYS2265	Sea ice-ocean-atmosphere interactions in polar regions	Thierry Fichefet	EN [q2] [30h] [5 Credits] ⊕ 🌐 > French-friendly	X	X
⊗ LPHYS2267	Paleoclimate dynamics and modelling	Qiuzhen Yin	EN [q2] [22.5h+7.5h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LPHYS2268	Forecast, prediction and projection in climate science	François Massonnet	EN [q2] [22.5h+7.5h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LPHYS2269	Remote sensing of climate change	Emmanuel Dekemper	EN [q2] [30h] [5 Credits] ⊕ 🌐 > French-friendly	X	X
⊗ LCLIM2170	Field in climatology 1	Veerle Vanacker	FR [q2] [60h+30h] [5 Credits] ⊙ 🌐 > English-friendly	X	X
⊗ LCLIM2270	Field in climatology 2	Sylvain Trigalet	FR [q2] [60h+30h] [5 Credits] ⊕ 🌐	X	X
⊗ LCLIM2280	Operational meteorology		EN [q2] [] [8 Credits] 🌐	X	X

#### Other elective courses

Students complete their program by choosing teaching units from this list or from the list of elective courses specific to climatology. With the approval of the jury, students may integrate into their program 2nd or 3rd bachelor's degree courses not taken during the bachelor's degree, as well as courses taken at other universities.

⊗ LPHYS2161	Internal geophysics of the Earth and planets		EN [q1] [22.5h+7.5h] [5 Credits] △ 🌐 > French-friendly	X	X
⊗ LPHYS2260	Geodesy and GNSS (Global Navigation Satellite System)		EN [q2] [30h] [5 Credits] ⊙ 🌐 > French-friendly	X	X
⊗ LPHYS2266	Physics of the upper atmosphere and space		EN [q2] [22.5h+7.5h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LGEO2400	Internship in a professional setting		FR [q1 or q2] [15h] [4 Credits] 🌐	X	X
⊗ LENVI2005	Climate change: impacts and solutions		FR [q2] [30h] [3 Credits] 🌐	X	X

## OPTIONAL COURSES

- Mandatory
- ⊗ Optional
- △ Not offered in 2024-2025
- ⊙ Not offered in 2024-2025 but offered the following year
- ⊕ Offered in 2024-2025 but not the following year
- △ ⊕ Not offered in 2024-2025 or the following year
- Activity with requisites
- 🌐 Open to incoming exchange students
- 🌐 Not open to incoming exchange students
- [FR] Teaching language (FR, EN, ES, NL, DE, ...)

Click on the course title to see detailed informations (objectives, methods, evaluation...)

These credits are not counted within the 120 required credits.

Year  
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### Content:

⊗ LSST1001	IngénieursSud	Stéphanie Merle Jean-Pierre Raskin	[FR] [q1+q2] [15h+45h] [5 Credits] 🌐	x	x
⊗ LSST1002M	Information and critical thinking - MOOC		[FR] [q2] [30h+15h] [3 Credits] 🌐	x	x

## Supplementary classes

**To access this Master, students must have a good command of certain subjects. If this is not the case, in the first annual block of their Masters programme, students must take supplementary classes chosen by the faculty to satisfy course prerequisites.**

- Mandatory
- ⊗ Optional
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- △ ⊕ Not offered in 2024-2025 or the following year
- Activity with requisites
- 🌐 Open to incoming exchange students
- 🌐 Not open to incoming exchange students
- [FR] Teaching language (FR, EN, ES, NL, DE, ...)

Click on the course title to see detailed informations (objectives, methods, evaluation...)

### Enseignements supplémentaires



## Course prerequisites

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There are no prerequisites between course units (CUs) for this programme, i.e. the programme activity (course unit, CU) whose learning outcomes are to be certified and the corresponding credits awarded by the jury before registration in another CU.

## The programme's courses and learning outcomes

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For each UCLouvain training programme, a [reference framework of learning outcomes](#) specifies the skills expected of every graduate on completion of the programme. Course unit descriptions specify targeted learning outcomes, as well as the unit's contribution to reference framework of learning outcomes.

## CLIM2M - Information

### Access Requirements

Master course admission requirements are defined by the French Community of Belgium Decree of 7 November 2013 defining the higher education landscape and the academic organisation of courses.

General and specific admission requirements for this programme must be satisfied at the time of enrolling at the university.

Unless explicitly mentioned, the bachelor's, master's and licentiate degrees listed in this table or on this page are to be understood as those issued by an institution of the French, Flemish or German-speaking Community, or by the Royal Military Academy.

**In the event of the divergence between the different linguistic versions of the present conditions, the French version shall prevail.**

#### SUMMARY

- > [General access requirements](#)
- > [Specific access requirements](#)
- > [University Bachelors](#)
- > [Non university Bachelors](#)
- > [Holders of a 2nd cycle University degree](#)
- > [Holders of a non-University 2nd cycle degree](#)
- > [Access based on validation of professional experience](#)
- > [Access based on application](#)
- > [Admission and Enrolment Procedures for general registration](#)

### Specific access requirements

In addition to the access conditions described below, candidates will have to provide proof of a sufficient command of the French language (level B1 of the CEFR, Common European Framework of Reference for Languages).

Students who wish to be admitted on the basis of a dossier (see tables below) are invited to consult the [criteria for the evaluation of application](#).

#### University Bachelors

Diploma	Special Requirements	Access	Remarks
<b>UCLouvain Bachelors</b>			
<a href="#">Bachelor in Geography : General</a>		Direct access	
<a href="#">Bachelor in Physics</a>	Si l'étudiant a suivi la <a href="#">Minor in Geography</a>	Direct access	In some cases, the UCLouvain Enrolment Office, after reviewing their online enrolment or re-enrolment application, will ask the students concerned to provide an enrolment authorisation from the faculty/ school.
<a href="#">Bachelor in Bioengineering</a>		Direct access	
<b>Others Bachelors of the French speaking Community of Belgium</b>			
Tous les bacheliers de la CfB		Direct access	
<b>Bachelors of the Dutch speaking Community of Belgium</b>			
		Direct access	
<b>Foreign Bachelors</b>			
		<a href="#">Access based on application</a>	

#### Non university Bachelors

> Find out more about [links](#) to the university

Diploma	Access	Remarks
BA en agronomie, orientation agro-industries et biotechnologies - crédits supplémentaires entre 45 et 60 BA en agronomie, orientation agronomie des régions chaudes - crédits supplémentaires entre 45 et 60 BA en agronomie, orientation environnement - crédits supplémentaires entre 45 et 60 BA en agronomie, orientation forêt et nature - crédits supplémentaires entre 45 et 60 BA en agronomie, orientation systèmes alimentaires durables et locaux - crédits supplémentaires entre 45 et 60 BA en agronomie, orientation techniques et gestion agricoles - crédits supplémentaires entre 45 et 60 BA en agronomie, orientation techniques et gestion horticolas - crédits supplémentaires entre 45 et 60 BA en agronomie, orientation technologie animalière - crédits supplémentaires entre 45 et 60	Les enseignements supplémentaires éventuels peuvent être consultés dans <a href="#">le module complémentaire</a> .	Type court

### Holders of a 2nd cycle University degree

Diploma	Special Requirements	Access	Remarks
<b>"Licenciés"</b>			
Licence en sciences géographiques		Direct access	Ces étudiants ont directement accès à la deuxième année de master avec éventuellement un programme adapté.
<b>Masters</b>			
Tous les masters		Access with additional training	

### Holders of a non-University 2nd cycle degree

#### Access based on validation of professional experience

> It is possible, under certain conditions, to use one's personal and professional experience to enter a university course without having the required qualifications. However, validation of prior experience does not automatically apply to all courses. Find out more about [Validation of priori experience](#).

Accès selon la procédure de validation des acquis de l'expérience  
Consultez le site [www.uclouvain.be/vae](http://www.uclouvain.be/vae)

#### Access based on application

Access based on application : access may be granted either directly or on the condition of completing additional courses of a maximum of 60 ECTS credits, or refused.

The first step in the procedure is to submit a file online ( see <https://uclouvain.be/en/study/inscriptions/futurs-etudiants.html>).

Students who wish to be admitted on the basis of a dossier are invited to consult the [criteria for the evaluation of application](#).

### Admission and Enrolment Procedures for general registration

## Teaching method

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The teaching strategy takes its inspiration from the idea of "taking responsibility for one's own learning" and offers a wide range of learning situations. The climatologist is at the centre of different scientific fields: physical modeling, teledetection, hydrology and the management of natural resources. The integration between human and physical geography is emphasized. The courses are focused on problems in society: environmental changes, mobility, urbanization, globalization and developing countries. Activities such as seminars and integrated exercises are carried out in advanced areas of geographical research. Ability to use advanced methods of geographical analysis is an important objective of the training: geographical modeling, geographical information systems and satellite teledetection.

Practical work gives students the opportunity of dealing with concrete problems and finding solutions to them, often in small groups. The Master in Climatology is notable for the multidisciplinary background of the teaching staff. Studies will study with lecturers in geography and physics. Activities such as seminars and integrated exercises are designed so that students progressively encounter the complexity of the climatic system. Students in the last year of the Master should therefore be able to use and understand professional climatic modelling systems.

The computer rooms with special software for geographical analysis are always open to students. In the first year of the Master, the field work consists of a week of supervised exercises in the Alps or Spain.

## Evaluation

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**The evaluation methods comply with the [regulations concerning studies and exams](#). More detailed explanation of the modalities specific to each learning unit are available on their description sheets under the heading "Learning outcomes evaluation method".**

Students will mainly be assessed on the basis of individual work (e.g. reading, consultation of databases and bibliographic references, writing monographs and reports, presentation of seminars, dissertation and work placement). Where necessary, students will also be assessed on how much they have learned from lectures. As far as possible, there will be continuous assessment, including regular 'open book examinations'. Certain activities will not be given a precise mark but will be officially certified. Assessment of the dissertation is in two stages : a 'progress report' at the end of the first year of the Master and the final presentation.

## Mobility and/or Internationalisation outlook

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La mobilité des étudiants est fortement encouragée, soit par un échange Erasmus ou Mercator hors Belgique, soit à la KULeuven. Ce séjour se fera durant le 2ème quadrimestre du premier master.

La possibilité sera donnée de suivre des cours en anglais. Ceci permettra non seulement aux étudiants de l'UCL de se familiariser mieux encore avec cette langue, mais aussi aux étudiants Erasmus venant de l'étranger de suivre un semestre de cours en anglais.

Des cours approfondis sont donnés par des professeurs visiteurs venant de diverses Institutions belges mais surtout étrangères. Ces enseignements sont parfois dispensés en anglais.

## Possible trainings at the end of the programme

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The Master in Geography : Climatology gives direct access to a doctorate in science.

## Contacts

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### Curriculum Management

Entity

Structure entity

Denomination

Faculty

Sector

Acronym

Postal address

SST/SC/GEOG

(GEOG)

Faculty of Science (SC)

Sciences and Technology (SST)

GEOG

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Website

<https://uclouvain.be/fr/facultes/sc/geo>

Academic supervisor: [Marie-Laurence De Keersmaecker](#)

Jury

- President: [Marie-Laurence De Keersmaecker](#)
- Secretary and Study advisor: [Bas van Wesemael](#)

Useful Contact(s)

- Administrative manager for the student's annual program: [fatuma.tepatondele@uclouvain.be](mailto:fatuma.tepatondele@uclouvain.be)
- Secretary of the School of geography: [Catherine De Roy](#)

