



**GEM**  
**MSc**

An **International**  
2-year MSc programme



Geo-information Science and Earth Observation for  
Environmental Modelling and Management



UNIVERSITY  
OF TWENTE.



UNIVERSITY OF TARTU



LUND UNIVERSITY

**UCLouvain**



GEM is co-funded by the Erasmus+ Programme of the European Union

# Shaping tomorrow's world

Tomorrow's world is in the making, and we as humans have a part to play. Selectively shaping the future of our cities, farming systems and natural ecosystems is the only way to ensure sustainable, equitable and resilient growth.

Efforts in this area are greatly helped by incredible recent scientific advancements. Modern technology allows us to acquire vast amounts of geospatial data, and to process such data into clear-cut information about the status and trends in the systems that concern us.

Making plans and decisions based on data analytics and modelling, however, is not as clear-cut. It requires the skills of dedicated professionals in key areas such as business, research and the public sector. As technology develops, these professionals will have an increasing role in informing and determining EU and global agendas through to 2030 and beyond.

In this vital playing field, four European universities decided to join forces in developing the GEM Master's programme. If doing your part for tomorrow's world appeals to you, this programme could be just what you're looking for.



*The GEM MSc program for me is like the missing piece in a jig-saw puzzle that when you find it, everything blends perfectly. Having drifted away from Geography for years due to circular work, GEM provided a platform that integrates my foundation and my aspirations for the future. Irrespective of your discipline or how far you have drifted from GIS, Remote Sensing or Climate change, all you need is just the desire to go back, and you will have a spot in GEM. What is more, there is also the Erasmus+ fully funded scholarship for this program. The world is evolving and you should too – the skills you need are right here in GEM.*

Lilian Akanazu  
GEM Student



*The GEM MSc programme was a gem. I did enjoy and progress on my education and science and it was also an opportunity to engage and study with people all over the world. Today, most of my classmates are now my collaborators as we take Geoinformation Science and Earth Observation for Environmental Management and Modelling to another level.*

Abel Ramoelo (South Africa)  
Regional Ecologist/Remote Sensing Specialist at South African National Parks

# About GEM

GEM is a conveniently simple abbreviation of “Geo-information Science and Earth Observation for Environmental Modelling and Management”. This innovative international MSc programme has the prestigious status of Erasmus Mundus Joint Masters Degree Programme (EMJMD). It is delivered by a consortium of four reputed higher education institutions in Europe, with each partner bringing complementary expertise in environmental modelling with applied geospatial science. The GEM programme enables you to study at two of these universities during your degree.

### Duration

The GEM MSc programme is a two-year (24 months) course.

### Language

The course is taught in English.

### Lessons

This is a full-time course that is taught fully on site at the partner universities

### Start

The GEM MSc programme starts every year in September.

### Degree

Successful graduates are awarded a double MSc degree in Geo-information Science and Earth Observation with a specialisation in Environmental Modelling and Management.

### Website

Visit our website for more information and to stay up to date with the newest information:  
[www.gem-msc.eu](http://www.gem-msc.eu)

## Partner Universities



### ITC-University of Twente

The Netherlands\*

Natural resources management



### Lund University

Sweden

Ecosystems and the environment



### UCLouvain

Belgium

Agriculture and land use planning



### University of Tartu

Estonia

Socio-ecological systems and urban planning

\* ITC-University of Twente also serves as GEM programme coordinator.



*This MSc program offered me an opportunity to hone a practical skill set that was more domain-driven, which I needed to be competitive in the workforce back home. Post-graduation I quickly found work with local government and emergency services and was well-equipped for that position. Now, I work for a multinational software company supporting utilities in adopting GIS to meet their business needs.*

**Melissa Bartee (USA)**  
Account Manager, Esri

# What can you study in the GEM programme?

GEM offers four study tracks, each divided into two years. Each track addresses important societal and environmental challenges where there is high demand for relevant professional and technical skills. At the end of the first year, students from all tracks will get together for a joint event that is co-organized by students and all four universities. After year two, graduates will receive a double degree in Geo-information Science and Earth Observation for Environmental Modelling and Management (GEM).



## Track 1 GEM for Urban-Rural Interactions

Sustainably meeting the natural resource demands of our rapidly urbanising world keeps becoming more difficult. This track was designed to teach you how to address the challenges involved. In year one, University of Tartu will offer you courses in geospatial analysis, basic remote sensing, geo-information method foundation and socio-ecological/urban and planning. In year two, ITC-University of Twente will familiarize you with advanced remote sensing and entrepreneurship for natural resource management.\*

### 4 tracks 2 years of study

TRACK	1. GEM for Urban-Rural Interactions	2. GEM for Land Use Systems	3. GEM for Ecosystems & Natural Resources	4. GEM for Food Security
YEAR 1	<b>University of Tartu</b> Geoinformatics, Remote Sensing & Socio-economic processes	<b>University of Tartu</b> Geoinformatics, Remote Sensing & Socio-economic processes	<b>Lund University</b> Geoinformatics, Remote Sensing & Ecosystem modelling	<b>Lund University</b> Geoinformatics, Remote Sensing & Ecosystem modelling
YEAR 2	<b>ITC-University of Twente</b> Natural Resources Management	<b>UCLouvain</b> Land Management	<b>ITC-University of Twente</b> Natural Resources Management	<b>UCLouvain</b> Food Security



## Track 2 GEM for Land Use Systems

What happens when people start using land differently in a changing climate? In this track you will learn how to assess the impact of such changes. As in track 1, in the first year University of Tartu will teach you about geospatial analysis, basic remote sensing, geo-information method foundation and socio-ecological/urban and planning. Year two will be dedicated to UCLouvain's courses on environmental challenges related to agriculture, forestry and nature conservation in the context of climate change.\*

\* The first year of this track includes an introduction week, an internship, and joint lectures with Lund University. The second year includes thesis co-supervision with University of Tartu.





### Track 3 **GEM for Ecosystems & Natural Resources**

Environmental and societal resilience can be enhanced by carefully managing and valuing natural resources. In this track you will acquire the knowledge and skills you need to be an expert in this field. In the first year, Lund University will provide you with the groundwork in geo-informatics, including courses on GIS/geospatial analysis, remote sensing, ecosystem modelling and dynamic process-based spatial models. In year two ITC-University of Twente will focus on natural resources management, with courses on subjects such as rangelands, ecosystem services and conservation.\*

### Track 4 **GEM for Food Security**

In a changing climate ensuring food security is a source of increasing worry, with associated socio-environmental vulnerabilities making things even more complicated. In this track you will learn how GI and EO can help you to meet the challenges involved. As in track 3, in the first year Lund University will provide you with the groundwork in geo-informatics, including courses on GIS/geospatial analysis, remote sensing, ecosystem modelling and dynamic process-based spatial models. In year two UCLouvain will focus on food security challenges related to crop production, including its inter-annual variability in a context of changing climate and its environmental impacts.\*

\* The first year of this track includes an introduction week and joint lectures with University of Tartu. The second year includes an internship as well as thesis co-supervision with Lund University.



For a more detailed overview of the courses offered per track please visit our website:  
[www.gem-msc.eu](http://www.gem-msc.eu)

## 3 benefits that GEM will bring you

- 1. Real-world experience**

GEM's innovative teaching is based on collaborative studies with universities and academies as well as companies and organizations that deal with social and environmental issues on a daily basis. As a result, real socio-ecological challenges are addressed during the programme and you will have ample opportunity to develop the professional experience you require to address global challenges.
- 2. A rare degree of diversity**

GEM was set up to build capacity by providing equal access to top-tier education. The ensuing diversity will help you to develop your language and culture skills, not to mention broaden your mind to new ways of thinking. To add to that, interdisciplinary learning is assured by extensive use of open-source ICT to bring diverse groups of students, staff, and stakeholders together in virtual environments.
- 3. Access to a unique network**

The stakeholders mentioned under 1. are what we call the GEM Associate Partners. Together they constitute a unique international network that you as a GEM student will have immediate access to, whether through internships, projects, guest lectures or your MSc thesis. This superb network can support you for the rest of your career. For an overview of GEM Associate Partners see pages 10-11.

### As a GEM graduate, you will:

- ✓ Understand the scientific process and be able to apply it in your future career, whether inside or outside academia, to meet sector skill needs;
- ✓ Be able to interact with stakeholders in different sectors, and be comfortable doing so;
- ✓ Be ready to work in multicultural environments globally;
- ✓ Have developed leadership, negotiation, networking, management, and communication skills and be ready to act.



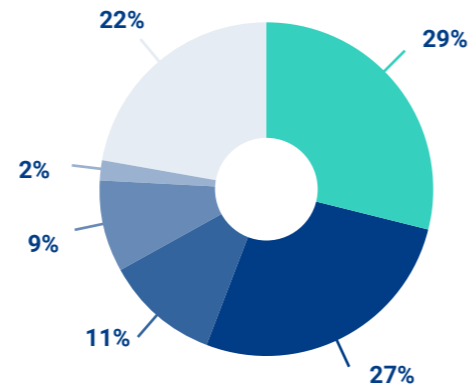
*The GEM course was one of the most wonderful journeys which not only provided me with valuable lifechanging learning but also gave me access to invaluable lifelong friendship.*

**Namrata Bhattacharya Mis (GB)**  
Senior Lecturer and Programme Leader, Geography and International Development, University of Chester

# Facts & figures

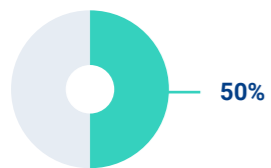
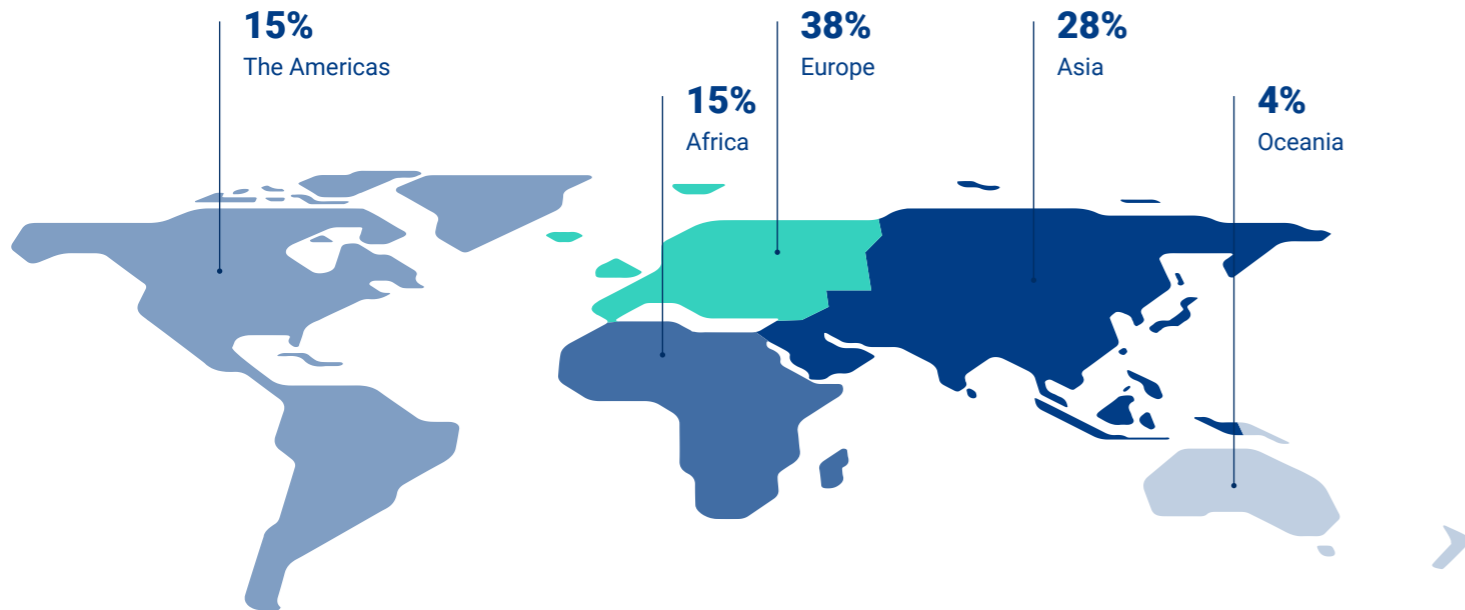
## Our alumni are highly employable

On the job market the GEM programme opens doors in different sectors. Alumni eager to get a job immediately after graduation generally have no problem finding one.



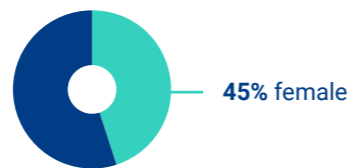
- Academic Organizations
- Government
- Entrepreneurs
- Private Companies
- NGOs
- Other

## Our alumni get to work all over the world



### Our alumni are often future researchers

50% of GEM graduates continue to study in PhD programmes after obtaining their Master's degree.



### GEM stands for equality

The GEM programme is happy to welcome a remarkably high percentage of female students every year.



*"The GEM course gave me the opportunity to meet great people from diverse cultural backgrounds as well as different cities, countries and academic systems. I made authentic friendships and it was the step I needed to continue an academic career."*

**Juan Escamilla Molgora (Mexico)**  
Research Associate, Lancaster University



*"As I read about the GEM program for the first time it instantaneously attracted my attention, since Track 3 combines all skills that are necessary to observe, model, and implement according measures to preserve or re-establish ecosystems. Furthermore, the international student community sounded like a superb opportunity to study with a variety of individuals, get to know diverse opinions and find suitable solutions for environmental problems as a team."*

**Finn Munch**  
GEM Student



## GEM Associate Partners are everywhere

GEM Associate Partners provide a unique network of academic, industry, policy and non-governmental organizations with mandates to address social and environmental challenges.

### Associate universities and academies

• Mekelle University	Ethiopia
• Addis Ababa University	Ethiopia
• Université des Sciences Sociales et de Bamako	Mali
• Cadi Ayyad University	Morocco
• Arbaev Kyrgyz State University	Kyrgyzstan
• Karakalpak State University	Uzbekistan
• Tashkent Institute of Irrigation and Agricultural Mechanization	Uzbekistan
• Urgench State University	Uzbekistan
• National Academy of Science of Kyrgyz Republic	Kyrgyzstan
• Academy of Sciences of Republik of Tajikistan	Tajikistan
• University of the Phillipines	Philippines
• University of Toronto	Canada
• Concordia University	Canada
• King's College London	United Kingdom
• Université de Kinshasa	Democratic Republic of Congo

### Associate companies

• CGI Eesti	Estonia
• Collecte Localisation Satellites (CLS)	France
• Aerospacelab	Belgium
• Spacebel	Belgium

### Associate organizations

• International Centre for Integrated Mountain Development (ICIMOD)	Nepal
• Centre for Agricultural Research in Suriname	Suriname
• Brazilian National Institute for Space Research (INPE)	Brazil
• International Maize and Wheat Improvement Center (CIMMYT)	Mexico
• Land Board of the Republic of Estonia	Estonia
• Action Against Hunger	Spain
• Tropenbos International	Netherlands

### Join the Partners!

Do you represent an organization that could contribute to the quality of the GEM programme, e.g. by offering internships or allowing students to benefit from the expertise of guest lecturers? Then please feel free to get in touch with us by sending an email to [gem-msc-itc@utwente.nl](mailto:gem-msc-itc@utwente.nl) and let us add you to the growing list of GEM Associate Partners.

# A unique proposition

To summarize, no matter where you are from or where you would like to go in your career – if helping to shape tomorrow's world appeals to you, the GEM Master's programme is a unique proposition. It gives you the opportunity to study at two renowned universities in two countries and broaden your view by getting acquainted with different cultures and perspectives. What's more, you will acquire a highly regarded double Master's degree that is certain to unlock many doors in your areas of interest. How's that for added value?

## Practical information

### Admission and eligibility requirements

- A first or upper second class (2.1) BSc honours degree or equivalent in a recognized university in a discipline related to the course.
- An English proficiency score of at least:
  - IELTS: 6.5
  - TOEFL iBT: 90
  - Cambridge Proficiency: Grade C or above

### Scholarships

Thanks to funding from the Erasmus+ programme, we can offer approximately 15 full MSc scholarships per annual intake. The database for applications opens each year around September/October for intakes in September in the following year. If you apply within the deadline, you will automatically be considered for a scholarship. Mind you, admission to the course is not limited to Erasmus+ scholarship students. If you have the opportunity to acquire another type of scholarships or alternative sources of funding, you are also warmly welcomed to apply.

For more detailed information about scholarships, please visit our website: [www.gem-msc.eu](http://www.gem-msc.eu)

### Contact details

Mail address:  
University of Twente, Faculty ITC  
Education Officer GEM  
P.O. Box 217  
7500 AE Enschede  
The Netherlands

Email:  
[gem-msc-itc@utwente.nl](mailto:gem-msc-itc@utwente.nl)

*GEM has been the experience of my life which opened up a lot of opportunities in my professional career. The multi-cultural European experience along with a network of friends from 17 countries was unforgettable. It's been 14 years since I joined GEM and social media has still kept our team together where we share our memories, happiness and sorrow. A course which is bound to change one's life.*

**Niladri Gupta (Thailand)**  
Sr Project Manager/Climate Risk Management, ADPC



*The GEM program enabled me to easily find a job back home where the rate of unemployment is high. I worked for 3 years in a local environmental consulting company, and I moved recently to UNESCWA. On a personal level, I got the chance to meet people from around the world and to make lasting international friendships!*

**Tracy Zaarour (Lebanon)**  
Research assistant at UNESCWA

