GEM MSc

A globally recognised 2-year Erasmus Mundus Joint Master's programme

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

Shaping tomorrow's world with geospatial intelligence

Tomorrow's world is being shaped by those who harness data and technology to drive sustainable change. The GEM Programme equips future leaders with the skills to model, manage, and restore socio-environmental systems across the globe.

Recent advances in Earth Observation (EO), GeoAI, and cloud computing have revolutionised our ability to monitor and model environmental systems. Yet, turning data into decisions requires skilled professionals who understand both the technology and the societal context. GEM brings together four leading European universities to offer an innovative MSc programme that prepares students to tackle global challenges - from climate resilience to sustainable land use - using geospatial intelligence.

GEM is not only a masters course; it's an international journey. You get to explore different European countries, as well as gaining extraordinary knowledge from some of the best universities in the world and their academic environments. Read more

Sahar Naeimi Darestani (Iran)
Graduate 2025

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 an unforgettable one. A programme which is bound to change one's life.

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

About GEM

GEM stands for Geo-information Science and Earth Observation for Environmental Modelling and Management. It is a prestigious Erasmus Mundus Joint Master's programme delivered by a consortium of four top-tier European universities.

The GEM Programme combines the strengths of ITC-University of Twente, Lund University, UCLouvain, and University of Tartu. Students will select two of these institutions, gaining access to world-class expertise, innovative technology, and a global network of academic and industry partners.

GEM offers a unique interdisciplinary curriculum that integrates geospatial science, environmental modelling, and policy applications, preparing MSc students to lead in the green and digital transitions.

Duration

The GEM Programme spans two years (120 ECTS), combining foundational and advanced coursework, internships, and a co-supervised MSc thesis across two European universities.

Language

GEM is fully taught in English, with local language courses available at each host university.

Lessons

GEM is a full-time, immersive programme delivered on-site at partner universities, complemented by online joint lectures, virtual collaboration, and access to lifelong learning resources via Geoversity.

Start

The GEM Programme begins annually in September, with pre-arrival onboarding and access to preparatory online modules.

Double Degree

Graduates receive a double MSc degree from two partner universities, tailored to their chosen track. The degree reflects expertise in Geo-information Science, Earth Observation, and applied environmental modelling.

Website

Visit www.gem-msc.eu for full programme details, course descriptions, application guidance, and updates on scholarships, events, and alumni stories.

Partner universities

ITC-University of Twente (ITC)

The Netherlands*

Expertise in natural resources, EO, and geospatial innovation

Lund University (LU)

Sweden

Climate and ecosystem modelling, sustainability science

UCLouvain (UCL)

Belgium

Applied remote sensing for agriculture and land use

University of Tartu (UT)

Estonia

Socio-economic systems, urban planning, and spatial analysis

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

GEM was a milestone in my life because of the structure and the design of the programme. In the GEM MSc, you start with classmates from all around the world, with different nationalities, backgrounds, and cultures. We lived together, learned from each other, and learned together.

Aidin Niamir
Scientist at the Senckenberg Biodiversity and Climate Research Institute and head of the technical support unit for knowledge and data of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)

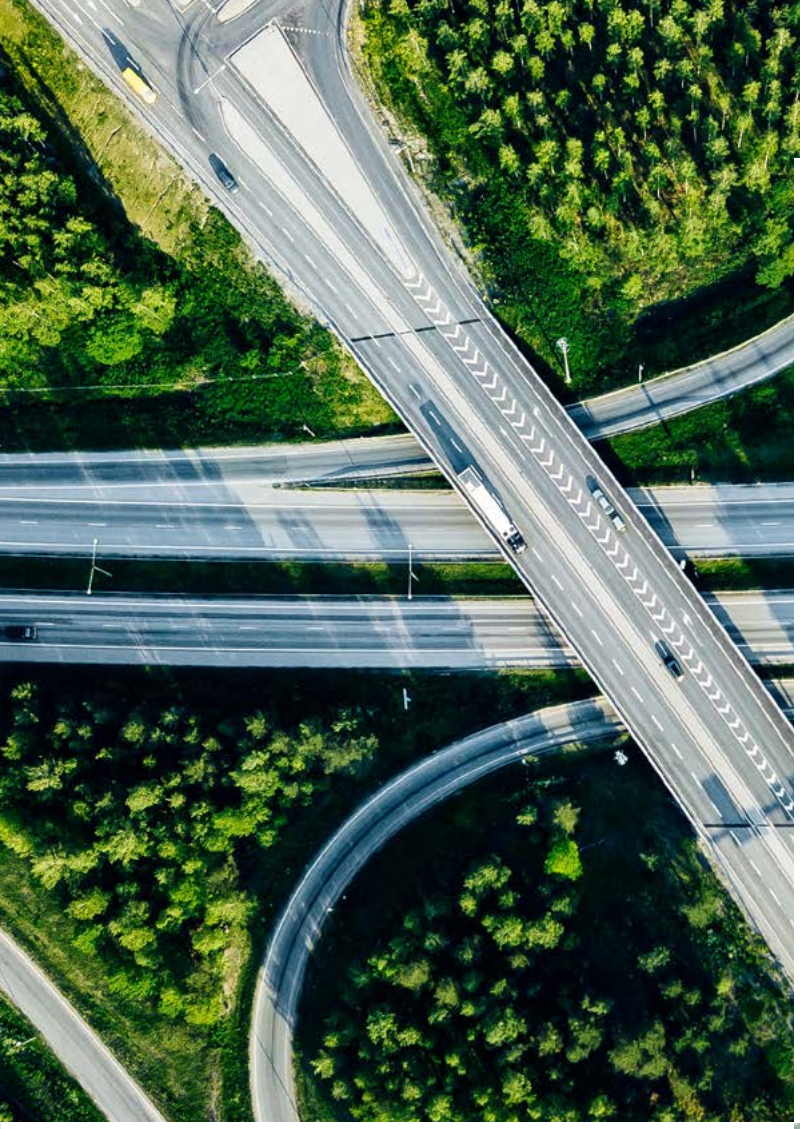
What can you study in the GEM programme?

The GEM Programme offers four career-focused tracks that combine geospatial science, environmental modelling, and societal applications. Each track addresses important societal and environmental challenges where there is high demand for relevant professional and technical skills.

Each track includes foundational and advanced coursework, internships, and a co-supervised MSc thesis. At the end of the first year, students from all tracks will get together for a joint event that is co-organised by students and all four universities Students study at two universities and engage with global experts and real-world challenges.

4 specialised tracks
2 years of immersive study across Europe

TRACK	1. **Geospatial Planner (UT → ITC)** Focuses on using geospatial technologies for urban and environmental planning.	2. **Geospatial Analyst (UT → UCL)** Trains students to use geospatial data for land use and environmental monitoring.	3. **Geospatial Developer (LU → ITC)** Designed for students aiming to build custom geospatial solutions.	4. **Geospatial Modeller (LU → UCL)** Focuses on spatial modelling and simulation for food security and environmental sustainability.
YEAR 1	Year 1 at the University of Tartu covers spatial analysis, EO, and planning studios.	Year 1 at the University of Tartu includes EO and geovisualisation.	Year 1 at Lund University covers EO and data processing.	Year 1 at Lund University includes GIS programming, EO, and GeoAI.
YEAR 2	Year 2 at ITC-University of Twente includes participatory planning, ecosystem services, and entrepreneurship	Year 2 at UCLouvain focuses on spatial modelling, landscape ecology, and land monitoring.	Year 2 at ITC-University of Twente focuses on quantitative remote sensing and AI-driven geospatial applications.	Year 2 at UCLouvain covers Earth system monitoring, spatial dynamics, and bioscience modelling.



Track 1
Geospatial Planner

Shape the future of cities and landscapes with cutting-edge geospatial tools. This track combines spatial data science, remote sensing, and 3D modelling with planning studio experience and electives in mobility, migration, and blue-green infrastructure. Year 2 deepens your expertise in GIS and Earth Observation for environmental assessment and participatory planning.
Ideal for students from Urban Planning, Geography, Environmental Science, or Civil Engineering, this track prepares you for roles such as Urban Planner, Environmental Policy Advisor, or Spatial Strategy Specialist—or for PhD research in sustainable spatial development.

Track 2
Geospatial Analyst

Turn data into insight for environmental and spatial decision-making. This track builds strong foundations in spatial analysis, remote sensing, and programming, with advanced training in land dynamics, landscape ecology, and smart Earth Observation technologies.
Designed for students from Geography, Environmental Science, Data Science, or Earth Sciences, it opens doors to careers as GIS Analyst, Environmental Data Scientist, or Remote Sensing Specialist, and provides a solid base for doctoral research in land use and environmental monitoring.

Track 3
Geospatial Developer

Build the next generation of geospatial technologies. This track blends programming, AI, and remote sensing to create smart solutions for environmental and spatial challenges. Year 1 focuses on geospatial AI and 3D data analysis, while Year 2 advances your skills in quantitative remote sensing and cloud-based geospatial systems.
Ideal for students with backgrounds in Computer Science, Geoinformatics, or Engineering, this track leads to careers as GIS Developer, Spatial Software Engineer, or AI-Powered Geospatial Specialist, and supports research in geospatial innovation.

Track 4
Geospatial Modeller

Model the planet to understand and predict change. This track equips you with advanced skills in spatial simulation, Earth system monitoring, and bioscience modelling. You'll learn to apply geospatial AI and dynamic modelling techniques to tackle complex environmental problems across scales.
Suited to students from Environmental Science, Ecology, Earth Observation, or Climatology, this track prepares you for roles such as Environmental Modeller, Climate Data Scientist, or Earth Observation Researcher, and is an excellent launchpad for PhD studies in environmental modelling.

All GEM tracks begin with an introduction week and include joint online lectures across institutions. Internships are completed in the first year, and MSc theses are co-supervised by both host universities to ensure academic depth and professional relevance.

For detailed course descriptions, learning outcomes, and track-specific content, visit www.gem-msc.eu

Why choose GEM?
Three key benefits:

1.

Real-world experience

GEM integrates academic learning with real-world challenges through internships, joint events, and applied research projects. MSc students collaborate with Associate Partners from industry, government, and NGOs to solve pressing environmental and societal problems. GEM graduates are in high demand with very high employment rates across different sectors.

2.

A truly global and inclusive learning environment

GEM attracts MSc students from over 75 countries and ensures equal access to top-tier education. Diversity is embedded in the curriculum, with interdisciplinary collaboration, open-source ICT tools, and inclusive policies that foster cultural exchange and equity. The GEM international classroom provides you with a global network of peers that will benefit you for your whole career.

3.

Access to a global network of experts and organisations

GEM MSc students benefit from direct engagement with Associate Partners across academia, industry, policy, and NGOs. This network offers internships, guest lectures, co-supervised theses, and career mentoring, supporting your lifelong professional development.

As a GEM MSc graduate, you will:

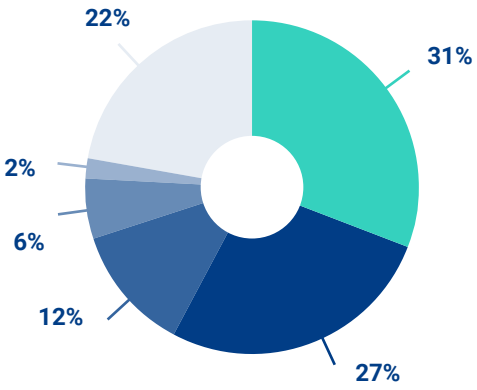
- ✓ Master advanced geospatial technologies and environmental modelling
- ✓ Collaborate across disciplines and cultures
- ✓ Apply scientific and ethical reasoning to real-world challenges
- ✓ Lead projects and communicate effectively with diverse stakeholders
- ✓ Be equipped for careers in academia, industry, and policy worldwide

GEM truly offers an opportunity of a lifetime. It ignited my passion in cartography and spatial modelling with some of the best professors and lecturers all the while making long-lasting friendships.

Sinoj Kokulasingam (Sri Lanka)
Graduate 2025

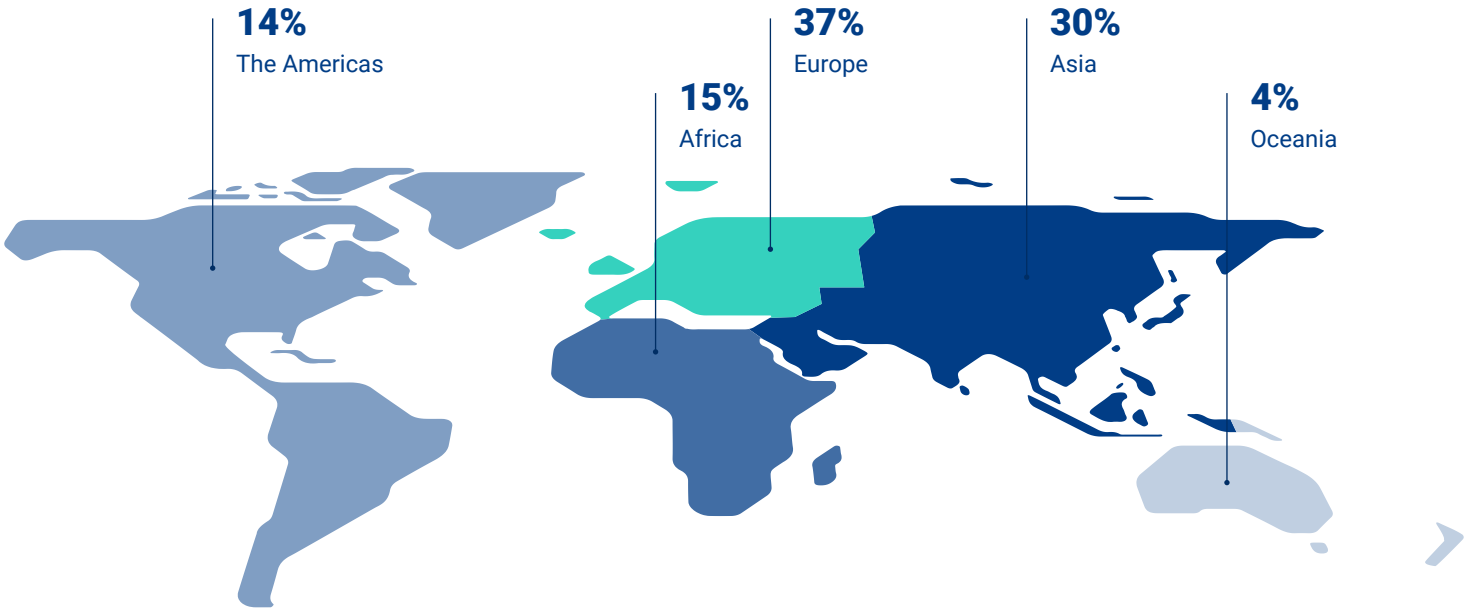
Facts & figures

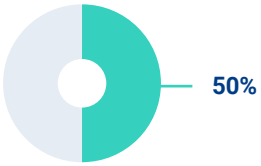
GEM MSc graduates are in high demand across sectors with an **employment rate >95%**



- Private companies
- Academia
- Government
- NGOs
- Entrepreneurs
- Other

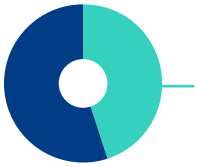
Global reach – our alumni work all over the world





Our alumni are often future researchers

50% of GEM MSc 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 whole GEM experience has enabled me to live much more than an academic programme, opening professional doors and going through multicultural environments. It allowed me to gather holistic knowledge, being the perfect choice to sharpen my skills in remote sensing."

Yan de Paoli (Italy)
Graduate 2024

"GEM, an interdisciplinary programme, has equipped me with the right skills and knowledge required to analyze, understand, and interpret spatial and non-spatial data to derive insights."

Blaise Nkubiyaho (Rwanda)
Graduate 2024

GEM Associate Partners: Your gateway to global impact

GEM's Associate Partners include leading organisations in academia, industry, policy, and NGOs. They provide internships, guest lectures, co-supervision, and career mentoring, helping MSc students apply their skills to real-world challenges and build lasting professional networks.

Academic Associate Partners

GEM collaborates with universities and academies worldwide, offering students access to research networks, field sites, and co-supervised thesis opportunities. These partners contribute expertise in EO, sustainability, and spatial planning.

This academic network expands GEM's research capacity, international visibility, and joint projects while attracting top-tier students and researchers to regionally relevant challenges. For example, ***The Quantitative Biosphere Dynamics group from the Technical University of Madrid*** collaborates on research in the Mediterranean, providing MSc students with applications and challenges in environments exposed to climate change.

Industry Partners

GEM's industry partners include space tech firms, geospatial consultancies, and innovation labs. They provide internships, project collaboration, and career pathways in EO, GeoAI, and environmental analytics.

Network organisations: EARSC, GeoForum Sweden, and ***SamGIS Skåne*** provide market intelligence, access to professional networks, workshops, and industry events.

Private (space) companies and New Space companies: Rabobank, KappaZeta, GIM Wallonie, Sweco, Airbus Defence and Space, Constellr GmbH, Aerospacelab, and ***Esri BeLux*** provide access to innovative EO technologies in relevant and diverse application areas for GEM.

Commercialisation and innovation: NL Space Campus facilitates student access to commercialisation programmes such as ESA BIC, ESA Phi-Lab Netherlands, and ESA Technology Broker.

Policy and NGO Partners

Policy: The Joint Research Centre (JRC) Food Security Unit offers expertise in global agricultural monitoring, crop forecasting, and food security assessments aligned with EU policies like the Common Agricultural Policy.

International organisations: GRID-Arendal and ***CIMMYT*** offer global opportunities and expertise in environmental management, agricultural sustainability, and disaster resilience, providing real-world learning opportunities for MSc students.

A smart investment in your future

The GEM Programme offers a unique opportunity to study at two top European universities, gain hands-on experience, and earn a double MSc degree in a high-demand field. With access to global networks, innovative technology, and expert mentorship, GEM is a transformative investment in your career and impact.

Practical information

Admission and eligibility requirements

- A first or upper second class (2.1) BSc honours degree or equivalent in a recognised university in a discipline related to the GEM programme.
- An English proficiency score of at least:
  - IELTS: 6.5
  - Internet-based TOEFL (iBT): 90
    (with a minimum sub-score of 21 for speaking)
  - Cambridge Proficiency: Grade A, B or C with an overall score of at least 176 and a minimum score on each section of at least 169.
- A background in GIS, EO, or environmental science is recommended, with bridging courses available for diverse academic profiles.

Scholarships

Thanks to funding from the Erasmus+ programme GEM offers 17 or 18 full scholarships annually. The scholarship provides you with €1,400 per month for 24 months to cover your living costs and travel expenses. It also fully covers the insurance and tuition fees. All applicants who submit a complete application on time and meet the eligibility requirements are automatically considered.

Tuition fees and other costs for self-funded students

Self-funded students are equally welcome and supported through guidance on alternative scholarships, sponsorship, and flexible payment options. For the September 2026 intake the costs for the 24 month programme are:

Cost Item	Non-EU students	EU students
Tuition fee	€ 18.000,-	€5.000,-
Visa & sundry costs	€ 400,-	€400,-
Living expenses	€ 30.000,-	€30.000,-
Total estimated cost	**€ 48.400,-**	**€35.400,-**

Important notes:

- All fees are in euros and may be subject to change.
- Living expenses, including housing, are estimated at €1,250/month and vary by study location.
- Travel (international/local/inter-European) and laptop costs are not included.

Contact details

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

For inquiries, partnership proposals, or application support, contact us at *gem-msc-itc@utwente.nl*

Enrolling in the GEM Programme has been pivotal in my pursuit of understanding trends and effectively managing resources. GEM not only help my build my skillset but also equipped me to thrive in the competitive international corporate world.

Akua Oparebea (Ghana)
Graduate 2024

The GEM Programme offers a fresh way of understanding the socio-economic challenges in the world, and the approaches to solving them and as a decision support tool.
These range from urban planning, risk disaster management, or climate change and global warming.
It is international, multi-perspective, challenging, and fulfilling. It has everything you want in a postgraduate course. The best part is that the skills I have learnt so far could be useful across many fields, regardless of where I end up.

Taurai Chigovanyika (Zimbabwe)
Graduate 2025

For full details on scholarships, alternative funding options, estimated living costs, and support for self-funded students, visit:
www.gem-msc.eu.

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UNIVERSITY OF TARTU

LUND UNIVERSITY

UCLouvain

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