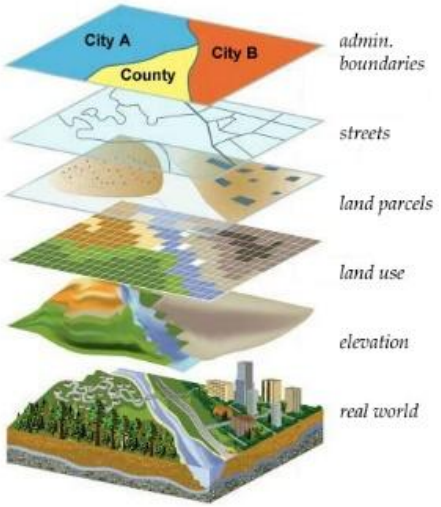
COLLEGE OF ARTS AND SOCIAL SCIENCES

ADI KEIH, ERITREA

MASTER OF SCIENCE IN GEOINFORMATICS

Discovering the World through GIS

Geographic Information System (GIS) is concerned with the description, explanation, and prediction of patterns and processes at different geographic scales. GIS is a science, a technology, a discipline, and an applied problem solving methodology.



Geoinformatics has been described as "the art, science and technology dealing with the acquisition, storage, processing, production, presentation and dissemination of geoinformation".

Need for a new way of thinking

The advent of new technologies, globalization of the world economy and various environmental concerns have created a growing demand for specialized skills. In Eritrea, a dire need for trained personnel in different sectors of the economy has created the impetus for initiating new skills and qualifications. Since its establishment in 2006, *College of Arts and Social Sciences* (CASS) has promoted an intellectual agenda through conducting research and expanding its academic programmes. As part of a long-term strategy, CASS is introducing new fields of study, including MSc programme in Geoinformatics.

A baseline *Training Needs Assessment* and *Gap Analysis* was conducted in Eritrean Higher Education Institutes (HEIs) in 2015 and major gaps in staff capacities of teaching and research in Geoinformatics were identified. HEIs lacked qualified teachers, training materials, hardware and software.

CASS, Dept. of Geography was selected as the host institution for a new MSc degree programme in Geoinformatics, which was launched in 2016. The funding for planning and implementing the programme came from *Ministry for Foreign Affairs of Finland* through *Finnish National Agency for Education.* The GIERI project (Nov 2015 – Jun 2018) was run in collaboration between experts from CASS and other Eritrean HEIs, and University of Helsinki (UH), Dept. of Geosciences and Geography, Finland.

Why should I study Geoinformatics?

Geoinformatics is an effective approach to the study and understanding of complex spatial problems. Geoinformatics studies and develops computational methods for collecting, processing, analysing, and presenting spatial data. As a part of geography, geoinformatics is a research method on the one hand, to be used in the study of complex regional issues from urban to natural environments, from studying local spatial phenomena up to global scale. On the other hand, the methods are the object of research. In urban environments, the methods of geoinformatics can be used to study accessibility, for example, or to plan a good water supply network. In the context of studying the environment, the research into climate change, land cover change, or interaction between humans and environment with the help of quantitative and qualitative methods emerges.

Undergraduate students in the Geography BSc programme reach a basic understanding of geoinformatics methods in the study of geographical issues, the sources and use of different sets of data, basic analysis methods, and effective visualisation of results.

At the Master's level, as a student specialising in geoinformatics, you will advance your skills both theoretically and technically, developing your methodological expertise from data acquisition to data refinement and visualisation with the help of geoinformatics methods. After graduating, you will be able to utilise versatile approaches in geoinformatics in research into geographical questions. You will be able to follow the rapid development of the subject independently, and participate on your own.

The job market

GIS experts are highly valued professionals who can find employment in the public or private sectors. If a scientific or teaching career is not for you, numerous job opportunities are available in different sectors of the economy: private companies, organizations, government authorities, departments and ministries. Examples of just a few application areas of GIS are

- Agricultural sector (land use suitability analysis, soil fertility mapping, precision agriculture)
- Fisheries sector (sustainable management of marine resources, mapping of potential fishing grounds)
- Regional and urban planning (planning and management of urban infrastructure, environmental impact assessments)
- Energy and transport (optimal site selection for renewable energy plants, transport logistics)
- Land sector (land use planning, cadastral management, land adjudication and surveying)
- Water sector (flood risk mapping, water quality mapping, management of watersheds)
- Natural resources, mapping and their sustainable use (mining, forestry, marine)
- Environmental issues (assessment and mitigation of environmental degradation, adaptation strategies to climate change, mapping of biodiversity)

Entry requirements

For the year 2016-2018 students, the applications for admission were assessed against the following formal admission criteria:

1. All applicants need to have an adequate Bachelor degree based on a 4-year full time study or more recognized in Eritrea for admission to graduate studies.
2. All applicants have to present English proficiency certificate corresponding to a TOEFL test score (or equivalent test score) as certified by the National Commission for Higher Education, Eritrea.
3. All applicants will have to comply with the admission procedure including complete and correct personal information.

Applicants from the following institutions are eligible for the programme:

- BSc in applied geography from Adi-Keih College of Arts and Social Sciences,
- BSc in the fields of environmental sciences and engineering from the Eritrea Institute of Technology (EIT),
- BSc in marine technology from the College of Marine Sciences and Technology (COMSAT),
- BSc in agricultural sciences from the Hamelmalo Agricultural College (HAC),
- Applicants with a closely related BSc from governmental and non-governmental institutions may be also admitted after assessing their academic credentials.

All applicants must have adequate IT skills. No previous experience in Geoinformatics is required, although preferable. Female applicants are highly encouraged to apply!

NOTE: Interested applicants are requested to check the latest admission criteria from CASS.

The curriculum

The curriculum was designed in collaboration between experts from UH and CASS, and was approved by NCHE. Studying in the MSc. programme shall normally extend over a period of two years and no more than two and half years.

Year 1 Semester I
Basics of ICT Applications (2 cr)
Principles of Geoinformatics (3 cr)
Spatial Data Collection and Cartography (3 cr)
Remote Sensing and Image Interpretation (4 cr)

Year 1 Semester II
GIS Modelling and Spatial Analysis (3 cr)
Spatial Statistics (4 cr)
Remote Sensing Applications (4 cr)
Seminar on Research Methodology (3 cr)

Year 2 Semesters I and II
MSc Thesis on Geoinformatics (12 cr)

A designated computer laboratory room has been refurbished with the latest GIS hardware: desktop computers, GNSS receivers, and related accessories. Two GIS Lab technicians were trained from existing IT staff at CASS to run and maintain the hardware and software. All teaching is done using Free Open-Source Software (QGIS, GRASS, OTB, SAGA, R).

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GIERI
Strengthening Geoinformatics Teaching and Research Capacity in Eritrea Higher Education Institutions

UNIVERSITY OF HELSINKI
FACULTY OF SCIENCE

FINNISH NATIONAL AGENCY FOR EDUCATION

SUPPORTED BY OFFICIAL DEVELOPMENT AID FROM THE MINISTRY FOR FOREIGN AFFAIRS OF FINLAND