

# Course Specifications

Valid as from the academic year 2020-2021

## Information and Communication Technology (C004363)

Due to Covid 19, the education and evaluation methods may vary from the information displayed in the schedules and course details. Any changes will be communicated on Ufora.

Course size (nominal values; actual values may depend on programme)  
Credits 3.0 Study time 90 h Contact hrs 37.0 h

Course offerings and teaching methods in academic year 2020-2021

A (year)	English	Gent	lecture	15.0 h
			practicum	22.5 h

Lecturers in academic year 2020-2021

Huang, Haosheng	WE12	lecturer-in-charge
-----------------	------	--------------------

Offered in the following programmes in 2020-2021

Programme	crdts	offering
<a href="#">Postgraduate Hydrography B</a>	3	A

Teaching languages

English

Keywords

Position of the course

Basic knowledge and application of information and communication tools

**Relation to other courses; knowledge acquired in this course can be used in:**

- HB350 – Geodesy & Cartographic systems,
- HB360 – Hydrographic Surveying
- HB500 – Hydrographic Practice
- HB370 - Data Management

Contents

- 1 A short overview of the components of a modern computer system and the way they interact will be given. Focus will lie on the central processor unit, storage devices, storage media input and output ports and device drivers in general. Particular attention will be paid to input and output devices frequently used in hydrographic computer systems for real-time data acquisition.
- 2 Next, we describe the role and architecture of mainstream operating systems such as Windows, UNIX and Linux. We list the functions and operations provided by an operating system and learn how to work with common application software systems such as spreadsheet, word processor, graphics software, presentation software and internet browser.
- 3 We then turn to software development procedures: we discuss how to state the requirements of the system to be developed, interface design, algorithm development, flowcharts, and pseudocode. We then turn our attention to a modern programming language (e.g. Python) to be used in developing our software. We define the syntax, data types and structures, control structures, arrays, pointers, functions, and file processing procedures. These tools and procedures will demonstrate how (geographical) data/information can be processed, analysed and visualised in a user-friendly way using open-source software and a bottom-up approach.
- 4 Additionally, the implementation and use of user-defined programming applications in Geographical Information Systems will be demonstrated.
- 5 We also investigate basic networking. We discuss the networking concepts underlying Internet and intranet communications and pay attention to the features, available resources and security issues of the Internet. We also learn how to conduct searches for specialized information using Internet tools.
- 6 The final part of this course is dedicated to basic aspects of database management (e.g. Structural Query Language, pgAdmin...) and relational databases. Geospatial databases are foreseen in the Data Management Course.

## Initial competences

Same as to be admitted to higher education.

## Final competences

- 1 To be able to distinguish the different components of a real-time data acquisition computer system, including different methods of communication and time-tagging.
- 2 To clearly explain the operation of device drives and their relation to data exchange.
- 3 Being able to use spreadsheet, word processing, graphical and presentation software.
- 4 To be able to construct and populate a database and query its content.
- 5 Being able to design pseudocode and write out a program for data conversion.
- 6 To clearly and scientifically explain various types of network communication protocols used in remote data exchange applications.

## Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

## Conditions for exam contract

This course unit cannot be taken via an exam contract

## Teaching methods

Lecture, practicum, online lecture

## Learning materials and price

Syllabus

## References

Following books are recommended but not required:

- Davis, S. (2007). GIS for Web Developers: Adding Where to your Web Applications. Pragmatic Booksheft.
- Gutttag John. (2013). Intoduction to Computing and Programming Using Python, MIT Press.
- Hacklay, M., Singleton, A., Parker, C. (2008). Web Mapping 2.0: The Neogeography of the Geoweb. Geography Compass 2.
- Kulawiak et al. (2010). Interactive Visualization of marine monitoring and forecasting data via a Web-based GIS. Computer & Geosciences 36
- MacEachren, A. et al. (2008). Design and Implementation of a mode, Web-based, Gis Enabled Cancer Atlas. The Geographic Journal.
- MacCormick, John. (2013). Nine Algorithms That Changed the Future: The Ingenious Ideas That Drive Today's Computers. Princeton University Press.
- Steiniger, Stefan. Hunter, Andrew J.S. (2011). Free and Open Source GIS Software for Building a Spatial Data Infrastructure.

## Course content-related study coaching

## Evaluation methods

end-of-term evaluation and continuous assessment

## Examination methods in case of periodic evaluation during the first examination period

Written examination with open questions, written examination with multiple choice questions, written examination, skills test

## Examination methods in case of periodic evaluation during the second examination period

Written examination with open questions, written examination with multiple choice questions, written examination, skills test

## Examination methods in case of permanent evaluation

Assignment

## Possibilities of retake in case of permanent evaluation

examination during the second examination period is possible

## Extra information on the examination methods

### **Evaluation form**

Written examination, partly with multiple choice, partly with open questions and programming exercises.

Fieldwork – permanent evaluation of the exercises.

### **Assessment criteria**

Permanent evaluation is based on the training record book in relation to the number of tasks carried out and the comments of the supervisor(s) expressed in writing in the book.

Theory examination: quality of knowledge, insight, relation between subjects, ...

#### Calculation of the examination mark

The final figure of assessment is composed of:

- 70% (written examination)
- 30 % (permanent evaluation)