SYLLABUS[1]

Identification of teaching subject

Title: **Applied geomatics**

Teaching unit: **UE méthodologique 3**

Number of Credits: **03** Coefficient : **03**

Total number of hours per week :

- Lessons (number of hours per week): **1h30min**
- Tutorial (number of hours per week): **1h30min**

Responsible for teaching subject

Last name, first name and grade of lecturer: **Bourahli Radja Maya.MAA**
Email : **radja.bourahli@univ-constantine3.dz**
Last name, first name and grade of TD instructor(s):

Group 1 **Bourahli Radja Maya.MAA** Email: **radja.bourahli@univ-constantine3.dz**
Group 2 **Benchenna Abdelali .Dr** Email : **abdelali.benchenna@univ-constantine3.dz**

Description of teaching subject

Prerequisites :
 -*Knowledge of GIS (Geographic Information Systems)*: Students should have a solid understanding of fundamental GIS concepts, including cartography, geodesy, geolocation, and spatial data manipulation-Familiarity *with Databases*: Students should be comfortable with database concepts, including database creation and managing geospatial data in a relational database.
-Knowledge in GIS Development: Students should have acquired advanced skills in GIS development, including the collection, acquisition, manipulation, and visualization of geospatial data. They should be able to design complex thematic maps and manage GIS projects.
Mastery of Software Tools: Students should be familiar with commonly used geomatics software, such as ArcGIS or QGIS.

General objective of the teaching subject :

---

[1] This syllabus is a teaching contract to which a teacher commits himself/herself concerning the subject he/she teaches, and of which the learners take cognizance.

The overall aim of the Applied Geomatics teaching subject is to train students to understand, master and apply the principles, methods and technologies of geomatics in a practical context. This may include solving geo-spatial problems, analyzing spatial data, designing projects and using geomatics software and hardware tools to meet the specific needs of the urban field.

Learning objectives to be assessed :

Use of GIS software: Assess students' proficiency in using GIS software to create maps, manage geo-spatial data, perform spatial analysis and visualize results.

Geo-spatial Data Collection: Assess students' ability to collect and process geo-spatial data from a variety of sources, such as field surveys, satellite images, etc.

Analysis and Problem Solving: Assess students' ability to solve complex geo-spatial problems using advanced spatial analysis methods to obtain relevant answers.

-Integration of Geomatics in Specific Areas: linked to the themes of workshop S9 and S10.

Communicating Results: Assess students' ability to effectively communicate the results of their geo-spatial analyses, whether through the creation of reports, maps, visualizations or presentations.

Course titles and timetable

Course titles	Scheduled date
Session#1 and 2: Use of geographic information systems in geomatics, using IT methods and tools, supported by practical exercises.	25/09/2023
Session#1 and 2: Use of geographic information systems in geomatics, using IT methods and tools, supported by practical exercises.	02/10/2023
Session#3 and 4: Using geographic information systems in geomatics to produce topographic and hypsometric maps.	09/10/2023
Session#3 and 4: Using geographic information systems in geomatics to produce topographic and hypsometric maps.	16/10/2023
Session #5 and 6: photo-interpretation as an interpretative tool and diachronic maps.	23/10/2023
Session #5 and 6: photo-interpretation as an interpretative tool and diachronic maps.	30/10/2023

Session#7 and 8: Introduction to the nature of remote sensing and its application its operating mechanisms. Behavior of a few characteristic objects in the face of electromagnetic radiation, the vehicle of information. A brief, non-exhaustive review of the various Earth observation satellites and their technical characteristics.	06/11/2023
Session#7 and 8: Introduction to the nature of remote sensing and its application its operating mechanisms. Behavior of a few characteristic objects in the face of electromagnetic radiation, the vehicle of information. A brief, non-exhaustive review of the various Earth observation satellites and their technical characteristics.	13/11/2023
Session#9 and10: Multi-spectral sensor performance and more in-depth knowledge of the spatial, spectral, radiometric and temporal resolutions of satellite images. Some elements on the thematic approach to Space Remote Sensing.	20/11/2023
Session#9 and10: Multi-spectral sensor performance and more in-depth knowledge of the spatial, spectral, radiometric and temporal resolutions of satellite images. Some elements on the thematic approach to Space Remote Sensing.	27/11/2023
Session#11 Thematic approach to exploiting satellite images using spectral band combinations : case of clues. The aim here is to make simple observations on the behavior of the object in question and consider how to combine specific spectral bands to create indices and extract the object in question from the image. Vegetation, Building, Water and Gloss indices will be covered.	04/12/2023
Session#12 : Supervised classification of multispectral images. This treatment is based on the principle of a priori classification of the objects present in the image and the creation of separate groups. A priori classification involves the deliberate selection of representative samples to serve as references for the classification. At the end of this classification process, we obtain a classified image, i.e. a single thematic information plane according to the user's choice(s). The results will be analyzed to validate the classification in question.	11/12/2023
Session#13: Practical TD test.	18/12/2022

TD titles

Indicate the number of TDs to be performed, their respective titles and objectives:

- GIS project development.

- Preparation of topographic and hypsometric maps.

- Creation of diachronic maps.

- extraction of objects using remote sensing. calculation of vegetation, building, water and gloss indexes.
- Supervised classification of multispectral images.

Evaluation methods

Type of control	Weighting in [2]
1. Review	67
2. Progression :	33
1.1. Inquiry	/
1.2. Tutorial	100
1.3. Practical work	/
1.4. Field trips	/
1.5. Attendance (Presence / Absence)	20
1.6. Other (involvement during sessions)	15
Total	**100%**

References &Main bibliography

-Aronoff, S. (2019). "Remote Sensing for Geoscientists: Image Analysis and Integration." Wiley. - A comprehensive book on remote sensing, image analysis and integration into GIS.
-Campbell, J.B. (2002). "Introduction to Remote Sensing." Guilford Press. - A basic textbook on the principles of remote sensing.

[2] Weightings for exams and progression (mentioned in TD) are to be formulated in accordance with the brochure; the teacher should specify the partial weightings for progression.

-Lillesand, T.M., Kiefer, R.W., & Chipman, J.W. (2015). "Remote Sensing and Image Interpretation." ---
-Wiley. - A reference work on remote sensing and image interpretation.
-Bolstad, P.V. (2012). "GIS Fundamentals: A First Text on Geographic Information Systems." Eider
Press. - An introductory book on GIS.
-Jensen, J.R. (2007). "Remote Sensing of the Environment: An Earth Resource Perspective." Pearson. -
A book on remote sensing with an Earth resource perspective.

-USGS (U.S. Geological Survey) (2007). "Landsat Science Data Users Handbook." - A technical
handbook on the use of Landsat data for remote sensing.
-European Space Agency (ESA). (2010). "Sentinel-2: The Optical High-Resolution Mission for GMES
Operational Services." - A document on the Sentinel-2 mission, which provides data for remote
sensing.
-NASA (National Aeronautics and Space Administration). "Landsat Program." - NASA website offering
information and resources on Landsat missions and the use of their data.

Teacher's signature

We, the students of the ...... year, Urban Planning stream, certify that we have consulted the syllabus for the subject....................., and that we have been informed of the content and assessment methods.

N°	Name First name Signature	N°	Name First name Signature
01		30	
02		31	
03			
04			
05			
06			
07			
08			
09			

10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			

Date:…………………………………