Course Descriptor
COEN585 GIS Applications in Civil Engineering

Proposed Academic Year	2019-2020	**Last Reviewed Academic Year**	2019-2020
Course Code	COEN585	**Course Title**	GIS Applications in Civil Engineering
Credit hours	3	**Level of study**	Undergraduate
College / Centre	COE	**Department**	CVEN
Co-requisites	Nil	**Pre-requisites**	Nil

1. COURSE OUTLINE

[This course is the study of the principles of Geographic Information System (GIS) technology for spatial design/analysis and its applications in facilities management, urban infrastructure, water resources, environmental engineering.]

2. AIMS

[This course prepares students with the basic knowledge and skills of Geographic Information System so that they can be applied efficiently in civil, construction and environment engineering.]

3. LEARNING OUTCOMES, TEACHING, LEARNING and ASSESSMENT METHODS

Learning Outcomes ***(Definitive)*** Upon successful completion of this course, students will be able to**:**	**Teaching and Learning methods** ***(Indicative)***	**Assessment** ***(Indicative)***
1. Underlying concepts and principles of geographic information system (GIS) technology and its application to the design and analysis of civil and environmental engineering systems	Lecturer, Presentation	*Assignments, Midterms, and Final Exam*
2. Ability of spatial data acquisition, geo-processing, geo-statistical methods; visualization, and querying of spatial data	Lecturer, Presentation	*Assignments, Midterms, and Final Exam*
3. Network modeling, terrain mapping, and spatial	Lecturer, Presentation	*Assignments, Midterms, and Final Exam*

	analysis		
4.	Proficiency in usage of ESRI ArcGIS 10.6	Lecturer, Presentation	*Assignments, Midterms, and Final Exam*

4. ASSESSMENT WEIGHTING

Assessment	**Percentage of final mark (%)**
Assignments	20%
Mid-term Examination	40%
Final Examination	40%
TOTAL	**100%**

5. ACHIEVING A PASS

Students will achieve **4** credit hours for this course by passing **ALL** of the course assessments *[alternatively, list the compulsory pass assessments*]* and achieving a **minimum overall score of 50%**

NB *Ensure that ALL learning outcomes are taken into account

6. COURSE CONTENT (Indicative)

Introduction to GIS
Spatial data structures
Map projections and coordinate systems
Raster and vector spatial data models
Topology and relational query
Selecting and editing features;
Feature proximity, containment, intersection; spatial joins
Overlays; buffers; geo-processing
Image processing
Supervised and unsupervised classification

TOTAL HOURS	**45**
Plus **RECOMMENDED INDEPENDENT STUDY HOURS**	**90**
TOTAL COURSE HOURS	**135**

7. RECOMMENDED REFERENCES

Core text/s:

Getting to Know ArcGIS Desktop: Updated for ArcGIS 10.6 5th Edition by Michale Law and Amy Collins, ESRI Press, Redlands, CA,

Library + online resources:

1. ArcGIS support (http://support.esri.com/en/)
2. Maps (http://www.usgs.gov/pubprod/)
3. Satellite images (http://edcsns17.cr.usgs.gov/EarthExplorer/)
4. Core Curriculum in GIS (http://www.ncgia.ucsb.edu/giscc)

Open Educational Resources: