STATE UNIVERSITY OF NEW YORK
COLLEGE OF TECHNOLOGY
CANTON, NEW YORK

MASTER SYLLABUS

COURSE NUMBER – COURSE NAME
CONS 350 – Introduction to Geographic Information Systems

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Canino School of Engineering Technology

Department: Civil and Construction Technology

Semester/Year: Fall 2018

A. **TITLE**: Introduction to Geographic Information Systems

B. **COURSE NUMBER:** CONS 350

C. **CREDIT HOURS: (Hours of Lecture, Laboratory, Recitation, Tutorial, Activity)**

 # Credit Hours: 3
 # Lecture Hours: 2 **per week**
 # Lab Hours: 3 **per week**
Other: **per week**

Course Length: 15 **Weeks**

D. **WRITING INTENSIVE COURSE**: Yes ☐ No ☒

E. **GER CATEGORY: None:** ☒ **Yes:** GER
***If course satisfies more than one*:** GER

F. **SEMESTER(S) OFFERED: Fall** ☐ **Spring** ☒ **Fall & Spring** ☐

G. **COURSE DESCRIPTION:**

The course introduces students to GIS terminology, the concept of relational databases, spatial data models, topology, raster data and vector data. Data entry methods, including quality control and metadata area discussed. The student is introduced to spatial analysis applications including terrain analysis, cartographic modeling and visualitzation. Students apply knowledge in the laboratory using GIS software.

H. **PRE-REQUISITES: None** ☐ **Yes** ☒ **If yes, list below:**

ENGS 101, CITA 108, CITA 109, or SOET 101, and sophomore status; or permission of the instructor.

CO-REQUISITES: None ☒ **Yes** ☐ **If yes, list below:**

I. STUDENT LEARNING OUTCOMES: (*see key below*)

By the end of this course, the student will be able to:

Course Student Learning Outcome [SLO]	***Program Student Learning Outcome [PSLO]***	***GER*** *[If Applicable]*	***ISLO & SUBSETS***	
a. Define terminology applicable to Geographic Information Systems	2488: 1a		5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
b. Compile and organize spatial and attribute data to create a map that communicates information.	2488: 1b, 7c		5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
c. Comprehend the importance of map projections, datums and coordinate systems and apply corrections to synthesize data from different sources.	2488: 1ab, 6b		5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
d. Create a map by synthesizing and georeferencing data from old drawings.	2488: 1ab, 6b, 7c		5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
e. Evaluate spatial and attribute data to determine trends and impacts.	2488: 2a, 3c, 6b		5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets
f. Create a map from GPS, remotely sensed or independently processed data.	2488: 1ab, 7c, 11ad		5-Ind, Prof, Disc, Know Skills ISLO ISLO	Subsets Subsets Subsets Subsets

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KEY	**Institutional Student Learning Outcomes [ISLO 1 – 5]**
ISLO #	**ISLO & Subsets**
1	**Communication Skills** Oral [O], Written [W]
2	**Critical Thinking** *Critical Analysis [CA] , Inquiry & Analysis [IA] , Problem Solving [PS]*
3	**Foundational Skills** *Information Management [IM], Quantitative Lit,/Reasoning [QTR]*
4	**Social Responsibility** *Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T]*
5	**Industry, Professional, Discipline Specific Knowledge and Skills**

*Include program objectives if applicable. Please consult with Program Coordinator !

J. APPLIED LEARNING COMPONENT: Yes ☒ No ☐

If YES, select one or more of the following categories:

- ☒ Classroom/Lab
- ☐ Internship
- ☐ Clinical Placement
- ☐ Practicum
- ☐ Service Learning
- ☐ Community Service
- ☐ Civic Engagement
- ☐ Creative Works/Senior Project
- ☐ Research
- ☐ Entrepreneurship (program, class, project)

K. TEXTS:

Bolstad, Paul (2012). GIS Fundamentals 4th Edition. White Bear Lake, MN: Eider Press.

L. REFERENCES:

M. EQUIPMENT: None ☐ **Needed:** Computer labs with ArcGIS software.

N. GRADING METHOD: A-F

O. SUGGESTED MEASUREMENT CRITERIA/METHODS:

- Exams
- Quizzes
- Laboratory Projects
- Final Project

P. DETAILED COURSE OUTLINE:

Introduction to GIS A. Components of a GIS B. GIS software C. GIS applications II. Data Models A. Data modeling concepts B. Vector data models C. Raster data models III. Geodesy A. Shape of the earth B. Units of measurement C. Map projections D. Coordinate systems IV. Map creation A. Creating a database B. Digitizing C. Coordinate transformation D. Map outputs E. Metadata V. Global navigation satellite system A. GPS basics B. Differential correction C. GPS applications VI. Aerial and satellite imagery A. Basic principles B. Air photo interpretation C. Satellite imagery i. Sources ii. Interpretation VII. Digital Data A. Sources B. Uses VIII. Attribute data and tables A. Relational databases B. Joining tables C. Normal forms IX. Spatial analysis A. Boolean algebra B. Classification C. Dissolving D. Proximity functions and buffers E. Overlaying F. Clipping G. Network analysis X. Raster analysis A. Map algebra B. Local functions C. Neighborhood functions i. Zonal functions ii. Cost surfaces XI. Terrain analysis A. Slope and aspect B. Hydrologic functions C. Viewsheds D. Profile and contour plots E. Shaded relief maps XII. Spatial models and modeling A. Cartographic models B. Weighting and ranking C. Spatio-temporal models D. Examples

Q. LABORATORY OUTLINE: None ☒ Yes ☐

**IIntroduction to ArcGIS II.
Reprojecting map layers III. Map Design and Layouts IV. Using imagery to prepare a map - V. Georeferencing old data VI. Proposal for student project VII. Using attribute tables VIII. Spatial analysis IX. Terrain analysis X. Cartographic Modeling XI. Student Project**