



BROWARD COLLEGE COURSE OUTLINE

LAST REVIEW: 20009-10

(i.e. 2003-2004)

NEXT REVIEW: 2014-15 **STATUS:**

(i.e. 2008-2009)

(A, I, D)

COURSE TITLE: Introduction to Geographic Information Systems I

COMMON COURSE NUMBER: _GIS1040C

CREDIT HOURS: 4

CONTACT HOUR BREAKDOWN

(per 16 week term)

CLOCK HOURS:

(Voc. Course ONLY)

Lecture: 48 Lab: 32

Clinic: Other: _5

PREREQUISITE(S): Knowledge of Windows operating system

COREQUISITE(S): None

PRE/COREQUISITE(S):

COURSE DESCRIPTION *(750 characters, maximum):* The intent of this course is to provide the student with a detailed introduction in geographic information systems (GIS) and support this information with laboratory activities. The course will cover all working knowledge of the theory aspects of geographic information systems including data collection, preprocessing, data management and data analysis as well as an introduction to the application of these systems.

General Education Requirements – Associate of Arts Degree (AA), meets Area(s): Area

General Education Requirements – Associate in Science Degree (AS), meets Area(s): Area

General Education Requirements – Associate in Applied Science Degree (AAS), meets Area(s): Area

UNIT TITLES

1. Introduction to Geographic Information Systems (GIS) and Spatial Concepts
2. Mapping the Earth
3. Raster and Vector Based GIS
4. Acquisition of Data
5. Coordinate Systems
6. Spatial Data Bases
7. Analysis and Output Using the GIS
8. Data Management
9. Social and Industry Considerations
10. Applications of GIS

EVALUATION: Upon successful completion of this course, the students should be able to understand the history, operation and applications of geographic information systems (GIS).

Please provide a brief description (250 characters maximum) that details how students will be evaluated on the course outcomes.

Common Course Number:

UNITS

Unit 1- Introduction to Geographic Information systems (GIS) and Spatial Concepts

General Outcome:

- 1.0 The student shall:** The students should be able to discuss the history of GIS and the spatial concepts used in creating and interpreting a GIS.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 1.1 Discuss the history of GIS.
- 1.2 Visualize and describe the world in spatial terms.
- 1.3 Produce spatial descriptions with respect to location distance, direction, physical space, psychological space, scale, geographic detail, and topology.
- 1.4 Describe spatial distribution in terms of pattern, density, and concentration (dispersion).
- 1.5 Describe spatial interactions such as connectivity and spatial hierarchies.
- 1.6 Discuss space and time parameters.
- 1.7 Discuss how spatial systems are defined by boundaries, regions and systems.
- 1.8 Distinguish between natural (physical) and cultural landscapes.
- 1.9 Provide an overview of GIS

Common Course Number:**Unit 2- Mapping the Earth****General Outcome:**

- 2.0 The student shall:** The students should be able to represent the surface features of the earth using fundamental geographic and cartographic concepts.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 2.1 Represent the earth using different map types and different map resolutions.
- 2.2 Describe locations on the earth using coordinate systems, latitude/longitude, discrete geo-referencing and global positioning systems.
- 2.3 Use projections and transformations to map the earth.
- 2.4 Explain the use of cartographic concepts such as symbols, images, variables, points, lines, areas, fields, 3D, and temporality.
- 2.5 Explain the use of metadata.

Common Course Number:

Unit 3- Raster and Vector Based GIS

General Outcome:

The student shall:

- 3.0 The students should be able to identify spatial data structures, how information is stored in these structures and the limitations of these structures.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 3.1 Describe how information can be stored in a vector and in a raster based GIS.
- 3.2 Compare and contrast the characteristics of vector and raster based GIS.
- 3.3 Identify geographic data structures such as rasters, vectors, TINs, and objects.

Common Course Number:

Unit 4- Coordinate Systems

General Outcome:

- 4.0 The student shall:** The students should be able to identify common coordinate systems and explain the transformation of data between different coordinate systems.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 4.1 Describe common coordinate systems.
- 4.2 Transform data between coordinate systems.

Common Course Number:

Unit 5- Acquisition of Data

General Outcome:

5.0 The student shall: The students should be able to develop data through digitizing or scanning or using existing digital data to create and manipulate spatial data.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 5.1 Detail how GIS data can be collected via remote sensing, global positioning systems and scanning.
- 5.2 Describe how data is preprocessed and input into a GIS.
- 5.3 Detail data sources (commercial and public domain) of GIS information.
- 5.4 Convert GIS data from one database to another and discuss the accuracy of the methods.
- 5.5 Import and export data between databases.
- 5.6 Create digital data from existing data.
- 5.7 Discuss topology and how it is created

Common Course Number:

Unit 6- Spatial Data Bases

General Outcome:

- 6.0 The student shall:** The students should be able to describe the components of a spatial database including storage, structure, topology, attributes and relationships.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 6.1 Describe methods of storing data for GIS.
- 6.2 Construct a sample spatial database.

Common Course Number:

Unit 7- Analysis and Output Using the GIS

General Outcome:

- 7.0 The student shall:** The students should be able to create, manipulate, analyze and validate data from pertinent databases.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 7.1 Perform the common types of data manipulation of which a GIS is capable.
- 7.2 Create data output from a GIS using available methods.
- 7.3 Apply buffering operators in data analysis.
- 7.4 Edit spatial data including point data, linear data, polygon data and raster data.
- 7.5 Describe how to manage database files including adding, linking, sorting, deleting, organizing and retrieving files.
- 7.6 Manage digital libraries.
- 7.7 Explain the use of overlay operators.
- 7.8 Explain the use of distance and connectivity operators.
- 7.9 Explain data compression and expansion in relationship to characterization of spatial neighborhoods or regions.
- 7.10 Perform statistical analyses.
- 7.11 Apply reclassification operators.
- 7.12 Apply Boolean search techniques and other spatial analysis functions.

Common Course Number:

Unit 8- Data Management

General Outcome:

8.0 The student shall: The students should be able to manage and design GIS project data.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 8.1 Create and implement directory structures.
- 8.2 Utilize the Internet to access data and information.
- 8.3 Discuss and perform data and maintenance and updating operations.
- 8.4 Apply graphic file formats.
- 8.5 Apply ascii editors and word processors.
- 8.6 Perform common spreadsheet functions.
- 8.7 Describe and operate the hardware for a GIS system.
- 8.8 Prepare data for export to other graphics formats.

Common Course Number:

Unit 9- Social and Industry Considerations

General Outcome:

9.0 The student shall: The students should be able to discuss and evaluate potential uses and abuses of GIS.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 9.1 Discuss the role of GIS in decision making.
- 9.2 Discuss the role of GIS in evaluating human and educational resources.
- 9.3 Discuss the ethical use of a GIS.
- 9.4 Discuss currently used products and services.

Common Course Number:

Unit 10- Applications of GIS

General Outcome:

10.0 The student shall: The students should be able to describe how GIS is used in the workplace and how to present GIS analytical results in the workplace.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 10.1 Describe several applications of GIS.
- 10.2 Design products for printing.
- 10.3 Plot and print spatial data.
- 10.4 Describe various methods for presenting GIS results.