Montgomery County Community College
GEO 210
Introduction to Geographic Information Systems (GIS)
3-2-2

COURSE DESCRIPTION:
This introduction to Geographic Information Systems is structured to develop skills and knowledge of various geographic location systems and skill in basic geographic analysis with industry leading software. The course emphasizes the techniques of spatial problem solving. The weight of the course is on practical analysis skills including data compilation, projection, analysis and reporting.

REQUISITES:
Previous Course Requirements: Students must have successfully completed or tested out of:

- MAT 080 Fundamentals of Mathematics
- REA 011 Fundamentals of College Reading or REA 017 Vocabulary and Reading Comprehension Development II

Concurrent Course Requirements:
None

LEARNING OUTCOMES Upon successful completion of this course, the student will be able to:	LEARNING ACTIVITIES	EVALUATION METHODS
1. Demonstrate command of basic computer vocabulary and common application software.	Research Resources Demonstration and Practice Portfolio Lecture/Discussion Exercises Using Application Software Including Database, Spreadsheet, Word Processing, Editing, Presentation and Graphic Programs, and Email	Written Examinations Demonstration and Practice Portfolio

LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHODS
2. Articulate in writing spatial analytic processes and decision making.	Research Resources Demonstration and Practice Portfolio Lecture/Discussion Exercises Using Application Software Including Database, Spreadsheet, Word Processing, Editing, Presentation and Graphic Programs, and Email	Written Examinations Demonstration and Practice Portfolio
3. Evaluate in writing various data sources' resolution, timeliness, availability and utility.	Research Resources Demonstration and Practice Portfolio Lecture/Discussion Exercises Using Application Software Including Database, Spreadsheet, Word Processing, Editing, Presentation and Graphic Programs, and Email	Written Examinations Demonstration and Practice Portfolio
4. Navigate the most common GIS software package.	Research Resources Demonstration and Practice Portfolio Lecture/Discussion Exercises Using Application Software	Written Examinations Demonstration and Practice Portfolio
5. Demonstrate skill geo-coding street addresses and knowledge of other geo-coding systems including latitude and longitude, Universal Transverse Mercator, State Plane Coordinate Systems, and U.S. Public Lands Survey.	Research Resources Demonstration and Practice Portfolio Lecture/Discussion Exercises Using Application Software	Written Examinations Demonstration and Practice Portfolio

LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHODS
6. Conduct basic geographic analysis such as selection by location, and intersection and union overlays.	Research Resources Demonstration and Practice Portfolio Lecture/Discussion Exercises Using Application Software	Written Examinations Demonstration and Practice Portfolio
7. Compile and publish internet reports of spatial analysis and its results.	Research Resources Demonstration and Practice Portfolio Lecture/Discussion Exercises Using Application Software Including Presentation and Graphic Programs, and Email	Written Examinations Demonstration and Practice Portfolio

At the conclusion of each semester/session, assessment of the learning outcomes will be completed by course faculty using the listed evaluation method(s). Aggregated results will be submitted to the Associate Vice President of Academic Affairs. The benchmark for each learning outcome is that *70% of students will meet or exceed outcome criteria.*

SEQUENCE OF TOPICS:

1. Introduction
    - 1.1. Orientation to the Course
        - 1.1.1. course components
        - 1.1.2. course requirements
        - 1.1.3. course resources
    - 1.2. Introduction to Computer Systems
        - 1.2.1. hardware, software, humans & infrastructure
        - 1.2.2. operating system navigation & file management
        - 1.2.3. databases
        - 1.2.4. web publishing
    - 1.3. Introduction to Geographic Information Systems
        - 1.3.1. analysis and mapping
        - 1.3.2. history of development
2. Geographic Data
    - 2.1. Types of Geographic Data
        - 2.1.1. vector & raster formats
        - 2.1.2. attribute data
        - 2.1.3. point, line, area, surface, volume
        - 2.1.4. nominal, ordinal, interval, ratio
    - 2.2. Geo-Coding

- 2.2.1. Latitude/Longitude & Projection Selection
- 2.2.2. Universal Transverse Mercator
- 2.2.3. State Plane Coordinate Systems
- 2.2.4. U.S. Public Lands Survey
- 2.2.5. TIGER & street addressing

3. Analysis by Selection
   - 3.1. Selection by Attribute
   - 3.2. Selection by Location
   - 3.3. Creating Buffers
4. Analysis by Overlay
   - 4.1. Graphic Overlays
   - 4.2. Union Overlays
   - 4.3. Intersection Overlays
5. Raster Analysis
   - 5.1. Raster Resolution
     - 5.1.1. accuracy & honesty
     - 5.1.2. LandSat, SPOT & other Remote Sensors
   - 5.2. Data Conversions
     - 5.2.1. vector to raster
     - 5.2.2. raster to vector
     - 5.2.3. elevation to hillshade, slope & view shed
   - 5.3. Raster Calculation
6. Demographic Drilling
   - 6.1. Spatial Auto-Correlation
     - 6.1.1. distance decay
     - 6.1.2. self-sorting
     - 6.1.3. residential segregation
   - 6.2. Cluster Analysis
   - 6.3. Community Identification/Segmentation

LEARNING MATERIALS:

John R. Jensen & Ryan R. Jensen, (2013*) Introductory Geographic Information Systems,* 13th ed. Pearson.

Lab Exercises provided by the instructor.

Computer Graphics Laboratory with ESRI's ArcGIS software.

Other learning materials may be required and made available directly to the student and/or via the College's Libraries and/or course management system.

COURSE APPROVAL:

Prepared by: Samuel Clay Wallace Date: 2/21/2009

Revised by: Samuel Clay Wallace Date: 4/1/2011

Interim VPAA/Provost Compliance Verification:

Victoria L. Bastecki-Perez, Ed.D. Date: 5/17/2011

Revised by: Samuel Clay Wallace Date: 6/25/2012
VPAA/Provost or designee Compliance Verification:
Victoria L. Bastecki-Perez, Ed.D. Date: 6/28/2012

Revised by: Samuel Clay Wallace Date: 7/18/2013
VPAA/Provost or designee Compliance Verification:
Victoria L. Bastecki-Perez, Ed.D. Date: 7/22/2013

Revised by: Samuel Clay Wallace Date: 4/12/2024
VPAA or designee Compliance Verification: Date: 11/13/2024

This course is consistent with Montgomery County Community College's mission. It was developed, approved and will be delivered in full compliance with the policies and procedures established by the College.