

Montgomery County Community College
GEO 220
Map Design in Geographic Information Systems (GIS)
3-2-2

COURSE DESCRIPTION:

This introduction to the art and science of cartography and geographic information systems is structured to develop skills in design and use of analytical and computer-mapping systems.

REQUISITES:*Previous Course Requirements*

- MAT 011 Basic Algebra or MAT 011B Beginning Algebra with Review of Arithmetic;
- REA 011 Fundamentals of College Reading or REA 017 Vocabulary and Reading Comprehension Development II; and
- CIS 100 Introduction to PCs or have permission of instructor

Previous Course Requirements

None

LEARNING OUTCOMES Upon successful completion of this course, the student will be able to:	LEARNING ACTIVITIES	EVALUATION METHODS
1. Utilize basic computer vocabulary and common application software.	Laboratory Lecture Discussion/Class Critique Sessions Compilation Exercise Exercises using Excel, Word, Paint, Notepad, and Email	Map Projects Exams Individual Map Critiques
2. Articulate in writing cartographic design processes and decision making.	Laboratory Lecture Discussion/Class Critique Sessions Compilation Exercise Exercises using Word and Email	Map Projects Exams Individual Map Critiques

LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHODS
3. Apply “best” design standards for a variety of map symbol types.	Laboratory Lecture Discussion/Class Critique Sessions Compilation Exercise Exercises using Excel, Paint, and Notepad	Map Projects Exams Individual Map Critiques
4. Navigate the most common GIS software package.	Laboratory Lecture Discussion/Class Critique Sessions Compilation Exercise Exercises Excel, Paint, and Notepad	Map Projects Individual Map Critiques
5. Design, compile, and produce thematic maps that are physiologically accessible and psychologically meaningful to map readers.	Laboratory Lecture Discussion/Class Critique Sessions Compilation Exercise Exercises using Excel, Word, Paint, Notepad, and Email	Map Projects
6. Evaluate in writing various map projections, map symbol selections, and GIS map products.	Laboratory Lecture Discussion/Class Critique Sessions Compilation Exercise Exercises using Word and Email	Exams Individual Map Critiques

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:

Introduction

1. Orientation to the Course
 - a. course components
 - b. course requirements
 - c. course resources
2. Introduction to Computer Systems
 - a. hardware, software, humans & infrastructure
 - b. operating system navigation & file management
 - c. databases
 - d. web publishing
3. Introduction to Map Design

- a. Maps
- b. Cartography
- c. Map Elements
- 4. History of Computer Cartography
 - a. SyMap
 - b. AtlasGraphics & CAD
 - c. GIS

Basic Map Production

- 5. Base Map Creation
 - a. GIS navigation
 - b. Projection selection
 - c. Layout standards
 - 1) Figure/ground
 - 2) Visual center
 - 3) Visual hierarchy
- 6. Type
 - a. Size
 - b. Fonts
 - c. Label Placement

Adding Thematic Information

- 7. Geographic Data
 - a. Phenomena v. data
 - b. Data Types
 - 1) Point, line, area, volume
 - 2) Nominal, ordinal, interval, ratio
 - c. Data Sources
 - 1) Archival
 - 2) Internet
 - 3) Remote Sensing
 - d. Classification Methods
 - 1) Displaying data distributions
 - 2) Equal intervals
 - 3) Quantiles
 - 4) Mean & standard deviation
 - 5) "Natural" breaks
 - 6) Unclassed maps

Thematic Symbol Strategies

- 8. Color Use
 - a. Eyesight
 - b. Color blindness & anomalous vision
 - c. Hue, Chroma & Value
 - d. Color selection
 - e. RGB, CYMB, pantone colors
- 9. Line Symbols
 - a. Streets, streams & boundaries
 - b. Routes
 - c. Flow lines
 - d. Iso-lines (later)

10. Point Symbols
 - a. Dot distribution maps
 - 1) Dot size
 - 2) Dot value
 - 3) Dot placement
 - b. Proportional Symbols
 - 1) Symbol size
 - 2) Symbol placement
 - 3) Range Grading
 - 4) Pictographic Symbols
11. Area Symbols
 - a. Choropleth Maps
 - 1) Area symbols
 - 2) Data standardization
 - 3) Symbol & legend selection
 - 4) Dasymetric maps
 - 5) Cartograms
 - a) discontinuous
 - b) continuous
 - c) Dorling's Circles
12. Volumes/Surface Symbols
 - a. False Shadows
 - b. Hypsometric Tints
 - c. Contour Lines
 - d. Tanaka's Technique
 - e. Fishnetting
 - f. Prisms (rotated)
13. Other Symbols
 - a. Univariate symbols
 - b. Multivariate symbols
 - 1) Weather maps
 - 2) Faces, snowflakes & jacks

Advanced Design

14. Map Animation
 - a. Rate of change
 - b. Viewer control
15. Mapping Uncertainty
 - a. Distortion ellipses
 - b. Fades
 - c. Brewer's Technique
16. Multi-Media & Non-visual Methods
 - a. Sound as a map variable
 - b. Multimedia design
 - c. Tactual map design

LEARNING MATERIALS:

Required Text:

Slocum, Terry A. (2009). *Thematic Cartography and Visualization* (3rd ed.). Prentice Hall, Inc.

ESRI's ArcGIS 10.2 suite of software and other learning materials will be required and will be made available directly to the student and/or via the College's course management system.

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: 2/13/2009
Revised by: Samuel Clay Wallace	Date: 10/25/2010
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: 9/3/2012
Revised by: Samuel Clay Wallace	Date: 7/2013
VPAA/Provost or designee Compliance Verification: Victoria L. Bastecki-Perez, Ed.D.	Date: 7/22/2013
Revised by: Samuel Clay Wallace	Date: 11/26/2017
VPAA/Provost or designee Compliance Verification: Victoria L. Bastecki-Perez, Ed.D.	Date: 12/4/2017
Revised by: Samuel Clay Wallace	Date: 12/5/2018
VPAA/Provost or designee Compliance Verification:	Date: 12/6/2018



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.