

NRE 423 GIS & Data Systems

Fall 2018, 3 Credits, SEC 101 (CRN 3388)

W: 04:00 – 06:20 pm

Room: WAEC 1104

Instructor

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Teaching Assistant

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University Policies

By enrolling in this course, you agree to the University Policies listed below. Please read the full text of each policy by going to www.marshall.edu/academic-affairs and clicking on “Marshall University Policies.” Or, you can access the policies directly by going to www.marshall.edu/academic-affairs/policies/. Academic Dishonesty/Excused Absence Policy for Undergraduates/Computing Services Acceptable Use/Inclement Weather/Dead Week/Students with Disabilities/Academic Forgiveness/Academic Probation and Suspension/Academic Rights and Responsibilities of Students/Affirmative Action/Sexual Harassment

Required Texts, Additional Reading, and Other Materials

- 1) Main Text 01 (for lecture & lab.): *The GIS 20: Essential Skills* (3rd Ed.). ESRI Press (<https://esripress.esri.com/display/index.cfm?fuseaction=display&websiteID=349&moduleID=0>).
- 2) Main Text 02 (for lab. only): *Getting to Know ArcGIS* (4th Ed.). ESRI Press (<http://esripress.esri.com/display/index.cfm?fuseaction=display&websiteid=286&moduleid=0>)
- 3) Additional reading/lab materials will be assigned by the instructor as needed.

Software Installation: ArcGIS 10 (or higher) for Desktop

- 1) Working at School (University Computer)
- 2) Working at Home (Personal Computer)
 - a. Remote Access (remote desktop connection → type “muremote.marshall.edu”)
 - b. ESRI Global Account (180-day-use version): A free, fully functioning 180-day-use version, with advanced license level, can be directly downloaded at http://esripress.esri.com/display/dsp_ArcGIS10Eval.cfm or <http://www.esri.com/180daytrial> (create an account → an authorization number can be found on the inside back cover of our textbooks: **EVA*******).

Data Installation

- 1) Working at School (University Computer): All data needed to perform the exercises will be installed on a network server (College of Science).
- 2) Working at Home (Personal Computer): Please install the textbook DVD or download the data required.

Data & Copyright

The data, maps, and resources contained in the textbook DVD are educational/exercise purpose only, including teaching and classroom use. If you have more questions regarding the copyright, please see the ESRI Data License Agreement included in the textbook DVD.

Course Description

(From Catalog: Course focuses on the relationships among the scientific method, data structure, and geographic images. Students related hypothesis formation and databases through the development of ArcMap Documents) The course is designed to help students of all disciplines to understand the key concepts and techniques used for spatial data analysis in Geographic Information Systems (GIS). Additionally, this course focuses on understanding the fundamentals of GIS data system. In order to develop problem-solving and analytical skills, students will accomplish a series of spatial analyses in a computer laboratory with minimal input from the instructor. In addition, various case studies (e.g. via ESRI, <http://edcommunity.esri.com/Resources/Collections/SpatialLabs>) will be reviewed and analyzed by student during the semester (**Pre/co-requisites:** NRRM 200 or other course related to basic statistics is highly recommended).

Course Student Learning Outcomes and Assessment Measures

Upon completion of this course, student will be able to

Course Student Learning Outcomes (Questions)	How students will practice each outcome in the course	How student achievement of each outcome will be accessed in the course
Students will <i>understand</i> the key concepts and spatial data analysis techniques widely used in GIS.	In-class examples/materials/lab exercises	Lab exercise, exam 1 and 2, weekly map document, final presentation
Students will <i>understand</i> the data systems utilized in GIS applications.	In-class examples/materials/lab exercises	Lab exercise, exam 1 and 2, weekly map document, final presentation
Students will <i>demonstrate</i> proficiency in the utilization of ESRI major products such as ArcMap, ArcCatalog, and ArcToolbox.	In-class examples/materials/lab exercises	Lab exercise, exam 1 and 2, weekly map document
Students will <i>demonstrate</i> their understandings by writing a brief weekly map document in appropriate technical style.	In-class examples/materials/lab exercises, low-stake writing	Weekly map document
Students will independently <i>analyze</i> techniques used in case studies and effectively <i>communicate</i> in relating to findings resulting from the case studies.	In-class examples/materials/lab exercises	Final presentation

Course Requirements

- 1) **Exam**: There will be one in-class exam during the semester (a closed book test).
- 2) **Weekly Map Documents**: Almost every week, students will be required to submit a weekly document based on the laboratory exercise/work (**Clemmer Chapters**). Weekly map document is expected to be professionally presented. The instructor will provide instructions for the expected style of this assignment.
- 3) **Weekly Chapter Questions**: Almost every week, students will be required to submit

chapter question answers based on the laboratory exercise/work (**Ormsby *et al.* Chapters**). The instructor will provide instructions for the weekly chapter questions.

- 4) **Final Presentation (Toolbox Project)**: A case study will be assigned to each student later this semester and presentation schedule will be arranged. All students are expected to prepare a power point presentation bases on the topic assigned. The instructor will provide instructions for the expected style of assignment.
- 5) **Attendance & Participation**: Attendance will be part of your grade as noted below. If students miss more than 30 percent of the lectures/labs, the instructor reserves the right to summarily assign you a failing grade for the course. Absences will only be excused if they have been pre-approved by the instructor or if the student is able to document a valid reason for their absence (i.e. illness, death in family, automobile accident, the Dean of Students, etc.).

Grading Policy

Exam (30 %)

Weekly Map Documents (15 %)

Weekly Chapter Questions (15 %)

Final Presentation (30 %)

Attendance (10 %)

Total: 100 %

Grading Scale

100 – 93

92.9 – 85

84.9 – 77

76.9 – 70

69.9 – 0

A

B

C

D

F

Additional Policies and Expectations

- 1) ***Class participation*** is essential for the successful completion of the course. Students are expected to read the assigned papers prior to class and to come to class ready to discuss what they have read. In the absence of meaningful classroom discussions/activity, quizzes may be given to ensure that readings have been done.
- 2) ***Class materials*** can be found at MU-online (<http://www.marshall.edu/muonline>). The instructor will upload all lecture and class discussion files (pdf format) at MU-online in a timely manner. It is mandatory that students monitor the MU-online for updated class materials at least once a week.
- 3) ***Course Evaluation***: Mid-semester evaluation will be done by the instructor to identify students' suggestions on the course (i.e. pace and topic/subject of the course). Final student course evaluation will be conducted during the last two weeks of the semester in a manner that maintains the integrity of the process and the anonymity of evaluators (online format).

Course Outline (Please note this is a tentative schedule and it may change upon class progress)

NRE 423: GIS & Data Systems		
Date	Topic	Assignment Due
Aug. 22	Introduction & Overview Getting familiar with ArcGIS, Data & Software Installation	
Aug. 29	Clemmer Chapter 1: Shapefile and essential ArcMap tools Ormsby <i>et al.</i> Chapters 1 & 2	
Sept. 05	Clemmer Chapter 2: Creating basic maps and layouts Ormsby <i>et al.</i> Chapters 3 & 4	
Sept. 12	Clemmer Chapter 3: Projecting shapefile Ormsby <i>et al.</i> Chapters 6 (<u>a, b, & c only</u>)	<i>Chapter Question Report 1</i> <i>Weekly Map Document 1</i>
Sept. 19	Clemmer Chapters 4, 5 & 16: Preparing data, joining and spatial join Ormsby <i>et al.</i> Chapters 7	<i>Chapter Question Report 2</i> <i>Weekly Map Document 2</i>
Sept. 26	Clemmer Chapters 6 & 7: Thematic maps Ormsby <i>et al.</i> Chapters 8	<i>Chapter Question Report 3</i> <i>Weekly Map Document 3</i>
Oct. 03	Clemmer Chapters 7 & 9: Basic editing, geocoding and categorical maps Ormsby <i>et al.</i> Chapters 12	<i>Chapter Question Report 4</i> <i>Weekly Map Document 4</i>
Oct. 10	Clemmer Chapter 10: GPS mapping Ormsby <i>et al.</i> Chapters 13	<i>Chapter Question Report 5</i> <i>Weekly Map Document 5</i>
Oct. 17	Clemmer Chapters 11, 12 & 13: Editing and attribute/location queries Ormsby <i>et al.</i> Chapters 15 & 16	<i>Chapter Question Report 6</i> <i>Weekly Map Document 6</i>
Oct. 24	Clemmer Chapters 14 & 15: Geoprocessing tools and geodatabase Ormsby <i>et al.</i> Chapters 18	<i>Chapter Question Report 7</i> <i>Weekly Map Document 7</i>
Oct. 31	Clemmer Chapters 17 – 20: Remote sensing and other useful tips Ormsby <i>et al.</i> Chapters 19 <u>Exam Review</u>	<i>Chapter Question Report 8</i> <i>Weekly Map Document 8</i>
Nov. 07	<u>Exam (4 pm, lecture room)</u>	<i>Chapter Question Report 9</i> <i>Weekly Map Document 9</i>
Nov. 14	Workflow for GIS Case Study/Project/Toolbox, Presentation Schedule / O & A *GIS Day (Poster Presentation, Geocaching, etc.) at MSC	
Nov. 21	NO CLASS – Thanksgiving/Fall Break	

Nov. 28	Case Study/Toolbox Presentation Preparation	
Dec. 05	Case Study/Toolbox Presentation	