

GIS 146 – Introduction to GIS
Course Instructor: Mark Higgins, mhiggins@mcc.commnet.edu
Office Hours: By Appointment Only
Lecture/Lab: Th 5:30 – 9:50 pm, B-116

COURSE DESCRIPTION AND COURSE OBJECTIVES

This course introduces students to the basic principles, techniques, and applications of GIS (Geographic Information Systems), as a computer-based tool that utilizes spatial (geographic) data to analyze and solve multi-disciplinary problems. Students will understand methods of data capture and sources of data, characteristics of spatial data and objects, and demonstrate application through executing typical operations. The lab component will emphasize GIS data collection, entry, storage, analysis, and output using the industry-standard application, ESRI ArcGIS. Students will become familiar with products/applications, various database models, and raster and vector systems. This course is equivalent to ENV* K146.

REQUIRED TEXT AND SOFTWARE

Law, M. and Collins, A. *Getting to Know ArcGIS for Desktop*. 5th ed. (updated for ArcGIS 10.6). Redlands, California: ESRI Press. 2018. (ISBN-13: 9781589485105, ISBN-10: 1589485106)

The text is required for each class meeting and will be used to complete the assignments. The new version of this text comes with a 180-day license for ArcGIS, but I can provide a 1-year license for anyone who requests one. Therefore it is NOT required to purchase the new version of this textbook, a used copy of the 5th edition is adequate (and less expensive).

****A USB flash drive is STRONGLY RECOMMENDED for this course****

Each student will be given instructions and a license for a student version of Esri's ArcGIS for Desktop to install on their personal computer. Additionally, computers in E-112 have the software installed. This will allow assignments and projects to be completed out of class. This will further require the need for a USB flash drive.

COURSE OUTCOMES

- Become comfortable with reading, interpreting, and analyzing maps and associated data;
- Understand how digital earth resource data are collected, created, stored, analyzed and displayed;
- Understand the core functionality of ArcGIS, which is a computer software package that is capable of handling information about the location of features or phenomena on the Earth's surface;
- Appreciate the historical contributions and approach to solving spatial problems;
- Appreciate the use of a GIS and the contribution a GIS has in our understanding of topics within earth sciences, social sciences, and the humanities when used appropriately, critically, and innovatively; and
- Apply knowledge of a GIS to conduct an environmental, demographic, suitability, or transportation-related, research project.

GRADING

20% - Attendance, Participation, in Class Quiz Assignments

Students are required to attend lecture and participate in class discussions. Lecture and discussions are essential in understanding digital representation of geographic information and how the many technologies display and manage information to solve problems or create new ideas. It is also a means to understand the technical and ethical limits of cartography or map making such that these principles are applied in your assignments and class projects.

There will be shot in-class quiz assignments throughout the semester that may be given without notice.

30% - Lecture Exams

There will be three exams (each worth 10%) within the semester and each exam will cover topics taught prior to that point in the course. These exams will be completed through Blackboard and will require the use of ArcGIS® to answer specific questions or create maps to demonstrate knowledge of the software. The first two lecture exams demonstrate an understanding of geographic information systems and the third exam demonstrates your ability to apply your knowledge to a real-world scenario in which geographic information systems are used. These exams assess your ability to explain digital representation of information, solve problems, and think critically.

40% - Laboratory Prep Questions and Assignments

Laboratory Prep Questions: Before your scheduled lab period, you are required to read the corresponding sections of the text. To ensure that you have prepared accordingly for lab and understand the purpose of the lab exercise, you will be required to answer ~5 questions in Blackboard before the start of your lab. You may use your text or the internet as a resource. You should expect to see these questions on an exam. The points associated with these questions will be incorporated into your lab assignment/assessment for the week which is described below.

Lab Assignments/Assessments: Assignments will provide students with industry simulated applications to solve spatial problems using geographic information systems. Assignments are to be completed such that they effectively communicate a message visually and demonstrate the obtainment of lecture content by applying ethical principles to the practical problems presented. Assignments will require the use of the text and will be graded according to the criteria stated below. Assignments will begin in class and students are expected to complete these assignments **by the date stated in class**. Assignments will be introduced and typically begin with a demonstration. All assignments **will be submitted electronically** through Blackboard. In other words, all assignments must be converted to a PDF or JPEG and submitted through Blackboard. If there are any issues for handing in assignments, please let me know as soon as possible.

10% - Final Project

The topic for the project is chosen by the student, but must be within the student's major area of study. The project will require students to research a current or relevant issue and use the scientific method to demonstrate how the use of GIS will improve current practice, enhance knowledge or make a positive difference in their field of study. This demonstrates that the student can create new ideas and think critically to address a problem within their life or area of study which may play a role in achieving their academic goals. Students are required to effectively communicate their project ideas orally by presenting information in a professional poster presentation. More information will be provided within the first few weeks of the semester.

GRADE SCALE: The grading scale is as follows:

A	100 – 93	B-	82 – 80	D+	67 – 69
A-	92 – 90	C+	79 – 77	D	66 – 63
B+	89 – 87	C	76 – 73	D-	62 – 60
B	86 – 83	C-	72 – 70	F	59 – 0

CRITERIA FOR ASSIGNMENTS AND PROJECTS

Assignments completed in this course will be graded using the following rubric. To be successful in this course, students are encouraged to evaluate their assignments according to the criteria listed.

Criteria	Below Proficiency	At Proficiency	Above Proficiency	Exceeds Proficiency Expectations
Clarity of Message: Did the student clearly convey the message through graphics?	Message is confusing or absent. Graphics fail to convey the meaning of the design project and there is a lack of understanding demonstrated by poor sizing or placement.	Message is clear but fails to go beyond something simple or obvious. Most graphics are focused on the message of the design project, but could have been used more effectively by virtue of size or location, rhythm, etc.	Message is clear and compelling. It may not be as subtle as it could be. Most graphics are used and generally have an impact on the message of the design.	Message is bold, compelling, and possibly multilayered. It goes beyond the obvious. Graphics are used effectively and have strong impact on the total design.
Design Principles: Were contrast, repetition, alignment, proximity, and color considered?	Lack of contrast dramatically weakens the work overall. Work overall is disjointed because of a lack of common elements. An absence of clear alignment creates a cluttered overall look. Problems with proximity and understanding what is connected. Elements are not put together or separated in any organized fashion. Color choices clash or clutter the work or weaken the work.	Use of contrast and/or white space could be improved. Repeated elements may not be evident, or repetition may be overdone. Elements are generally lined up appropriately. Graphics/labels are spaced so that related elements are close together. Colors are mostly effective.	Use of light/dark gives prominence where appropriate. White space, if used, is used well. Repetition is evident though not a strong component of the work. Elements are effectively lined up so that the overall look represents order. Graphics are strategically placed/spaced. It is clear what is connected. Colors are used appropriately and do not clash or clutter the work.	Use of light and dark elements creates depth and subtlety. White space is used strategically. Repeated use of elements helps to create unity. Elements are organized and lined up to clearly guide the reader through the message. Placement of elements is precise and the reader can clearly perceive what is important and how things are integrated. Color palette enhances the meaning of the work.
Map Organization: Were the map(s) and poster designed in an organized and effective manner?	The organization of the map is displayed with limited effectiveness.	The organization of the map shows some effectiveness.	Map is displayed and organized in an effective manner.	There is a high degree of effectiveness in the organization.
Map Technology: Has the student exhibited an ability to use the software to achieve the desired results?	Exhibits no command of the software and is able to use it with limited effectiveness.	Exhibits satisfactory command of the software and is able to use it with some effectiveness.	Exhibits good command of the software and is able to use it effectively.	Exhibits a high degree of ability in the use of the software.
Map Application: Does the layout contain all the necessary cartographic elements? Are they designed effectively to give meaning to the data displayed?	The layout is missing several elements. These may include a legend, compass, title etc.	The layout is missing one or two of the following: a legend, compass, title etc.	The layout is designed with effectiveness and includes necessary cartographic elements	The layout contains all necessary elements and is designed with a high degree of effectiveness.
Work Ethic/Craftsmanship: Demonstration of work in and out of class and progression shown.	Imperfections are highly distracting and take away from the overall effectiveness. Project appears "put" together at the last minute.	Work has imperfections that create minor distractions to the reader. Student showed some progression but more time was needed to enhance assignment.	Work may have slight imperfections, but they are not immediately obvious. Student showed gradual progression to meet requirements of the assignment.	Work has no evident imperfections. Work is clean and neat. Time and organization were used to enhance the assignment.

TENTATIVE SCHEDULE

The meaning of “tentative”, as used here, means that the schedule outlined below is under terms that are uncertain or not final. In other words, topics, quizzes/exams, and dates **may** change. However, all changes and variations of the schedule will be discussed in class; thus, class attendance is essential for students and excuses for missed assignments or quizzes/exams will not be accepted.

Date	Topic
August 29 th	Introductions, Syllabus, Course Expectation, Define GIS
September 5 th	Lecture: Introduction to ArcGIS®, demonstrate how applicable GIS is in all disciplines, examine the relevance and importance of maps in history Lab: Explore basics of ArcMap: displaying and navigating map data and feature attributes, learn to use basic tools (Chapters 1, 2, and 3) Assignment 1, Assessment 1
September 12 th	Lecture: Documentation of data, metadata, preservation, and dissemination Lab: Explore basics of ArcCatalog, interacting with data, and exploring online resources (Chapters 4 and 5) Assignment 2, Assessment 2
September 19 th	Lecture: Using GIS to visualize data and cartographic representation cont. Lab: Classifying features and labeling features (Chapter 7 and Chapter 9) Assignment 3, Assessment 3
September 26 th	Lecture: ** EXAM 1 ** , working with coordinate systems, projections and transformations (Chapter 6) Assignment 4, Assessment 4
October 3 th	Lecture: Using GIS to visualize data, cartographic representation, the ethical issues in displaying data through maps (group assignment given) Lab: Classifying features, different types of maps (Chapter 8) Assessment 5, Assessment 5
October 10 th	Lecture: Exploring data through querying, relational databases Lab: Getting information about features by querying data and joining/relating tables (Chapter 15, 16, and 17) Assignment 6, Assessment 6 **Summary of Final Individual/Group Project Idea DUE**
October 17 th	Lecture: Building databases – Microsoft Excel and Microsoft Access Assignment 7, Assessment 7
October 24 th	Lecture: ** EXAM 2 ** and finding places with locators. Lab: Geocoding Addresses (read Chapter 14, lab completed together) Assignment 8/Assessment 8
October 31 st	Lecture: GIS data capture from primary and secondary sources, georeferencing, and creating features (points, lines, or polygons) Lab: Building a geodatabase, creating features, and editing features/attributes (Chapters 11, 12, and 13) Assignment 9/Assessment 9
November 7 th	Lecture: Geographic information analysis and geoprocessing with models and scripts Lab: Selecting features by location, preparing data for analysis, analyzing spatial data (Chapter 18 and 19) Assignment 10/Assessment 10
November 14 th	Lecture: GIS and quantitative spatial analysis Lab: Analyzing spatial data (Chapter 20) Assignment 11/Assessment 11
November 21 nd	** EXAM 3 Issued ** Work on Final Project or EXAM 3
November 28 th	EXAM 3 Work during week November 22nd – Thanksgiving Recess – NO CLASS
December 5 th	*** EXAM 3 DUE *** Lab: Final Project Work
December 12th, 6:00 PM FINAL EXAM PERIOD	FINAL PROJECT POSTER PRESENTATIONS

COURSE POLICIES

Electronic Devices (cell phones, MP3 players, etc.): These devices must be turned off when entering the room to maintain a respectful class atmosphere. You will be asked to leave if you disregard this requirement.

Late/Missed Work: All assignments, projects, and exams are due as stated. All work submitted after the stated deadline will not be accepted and the student will receive a zero.

Attendance: The student will be solely responsible for learning any missed material and handing in assignments that were issued or begun in class. My contact information is provided at the top of this syllabus. If you inform me well in advance of an absence, I will be happy to make appropriate accommodations.

Make-ups: I need adequate notice to schedule make-ups: at least two weeks for normal life situations and at least one day for sudden emergencies. In case of a dire emergency, contact me as soon as possible through email. I reserve the right to ask for documentation of an emergency-related absence, and to deny a make-up in the absence of a clear life-or-death situation.

Learning Portfolio: All students are required to maintain an online learning portfolio in Digication that uses the college template, in as much as it is pertinent and supported by outcome products of this course. Through this electronic tool students will have the opportunity to monitor their own growth in college-wide learning. The student will keep his/her learning portfolio and may continue to use the Digication account after graduation. A Three Rivers General Education Assessment Team will select and review random works to improve the college experience for all. Student work reviewed for assessment purposes will not include names and all student work will remain private and anonymous for college improvement purposes. Students will have the ability to integrate learning from the classroom, college, and life in general, which will provide additional learning opportunities. If desired, students will have the option to create multiple portfolios.

Integrity: Any and all exams, papers or reports submitted by you and that bears your name is presumed to be your own original work that has not previously been submitted for credit in another course unless you obtain prior written approval to do so from your professor. In all of your assignments, including homework or drafts of papers, you may use words or ideas written by other individuals in publications, web sites, or other sources but only with proper attribution. "Proper attribution" means that you have fully identified the original source and extent of your use of the words or ideas of others that you reproduce in your work for this course, usually in the form of a footnote or parenthesis. As a general rule, if you are citing from a published source or from a web site and the quotation is short (up to a sentence or two), place it in quotation marks; if you employ a longer passage from a publication or web site, please indent it and use single spacing. In both cases, be sure to cite the original source in a footnote or in parentheses. (See http://www.plagiarism.org/plag_article_how_do_I_cite_sources.html for more information on citing.) If you are uncertain about the expectations for completing an assignment or taking a test or examination, be sure to seek clarification from your professor beforehand.

Finally, you should keep in mind that as a member of the Three Rivers Community College community, you are expected to demonstrate integrity in all of your academic endeavors and will be evaluated on your own merits. Be proud of your academic accomplishments and help to protect and promote academic integrity. The consequences of cheating and academic dishonesty may include a formal discipline file, possible loss of financial scholarship or employment opportunities, and denial of admission to a four-year college.