GIS for Engineers  
GISC 1145-23280

Day/Time: Labs: Hybrid-online Dual-Credit course  
Location: eCampus SP2014 GISC-1145-23280

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Lab Coordinator: Jerry Bartz  
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Metta Lab Coordinator: Brian Morrill  
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Office phone: 972-968-5475  
Office hours: M, 7:45 a.m. to 8:15 a.m. T, R, 3:40 p.m. to 4:10 p.m  
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Textbooks: none required. Online periodicals and tutorial documentation will be used.

COURSE INFORMATION

Number: 1145  Section: 23280  Credit Hours: 1

Description: Designed to introduce Geographic Information Systems (GIS) data manipulation procedures as related to engineering applications. Students will learn how to transfer data between various Computer Aided Design (CAD) packages and GIS, and to use a variety of CAD tool operations with GIS.

Prerequisites: None. A knowledge of GIS is recommended.

Learning Outcomes: This course will provide the student with an applied lab experience of Geospatial Technology as it relates to spatially significant engineering concepts and tasks. By completing this course, students will: Understand and associate, to Engineering industry, the practical understanding of GIS concepts. Understand the unique engineering-industry characteristics and purpose of GIS software, geospatial data and projects. Access GIS resources relative to CAD and engineering data. Work with CAD data within the ESRI ArcGIS desktop environment. Model official real property deed records and legal descriptions in GIS. Apply Coordinate Geometry (COGO) tools within ESRI’s ArcGIS. Practice engineering-specific GIS career tasks and workflows. Develop (and document with metadata) database(s) including: defining geometry, attributes, relationships, topology rules, feature behaviors such as types and domains, incorporating data schema models. TSSB KA1.2 Create or add to a geospatial portfolio.
Determine data compatibility (projection), perform data conversion, and populate feature attributes. **TSSB KA1.3**

Create maps. **TSSB KA5.1**


Outline:

<table>
<thead>
<tr>
<th>Unit number</th>
<th>Date</th>
<th>Topic of Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3/03 &amp; 3/04</td>
<td>INITIAL Meeting: Introductions and Q&amp;A with students - expectations and requirements, syllabi calendar, and grading.</td>
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<td></td>
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<td>Course purpose and outcomes/skills.</td>
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<tr>
<td></td>
<td></td>
<td>Terms and the technology of GIS and Engineering tasks; feature GEOMETRIES, common formulas for Engineering support. Page 264 of Map Use 7th Edition graphic review.</td>
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<tr>
<td></td>
<td></td>
<td>Start a journal of notes and formula.</td>
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<tr>
<td>2</td>
<td>3/05 &amp; 3/06</td>
<td>&quot;What goes on each turned in item&quot;, &quot;How we use email for assignments, reflections and communications&quot;, &quot;How we use the network to share data and how we respect data deletion&quot;</td>
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<td>ENG COURSE FIT - Tie this course (micro) to GST program (macro). Prerequisite knowledge. Relate ENG to 5 basic elements (Data, People, Hardware, Software, and Models)</td>
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<td>Parts of a set of “Field notes” - Show and Tell – Eng tools of the trade and Warranty Deeds Return to the mathematics of engineering data and support.</td>
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<td>..\ArcGIS\Documentation conversion_constants.pdf</td>
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<td>Community as a parcel (cadastral) fabric</td>
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<tr>
<td>3</td>
<td>3/17 &amp; 3/18</td>
<td>Engineering differences: Methods: Cogo use and its accuracies, specific data. Surveying collection. As-designed/As-built Data: Sources, ie: field notes, type, age – lineage, abstracts and Surveys, as control Windmill polygon effort – first use COGO and editing shortcuts that support engineering projects or data.</td>
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<tr>
<td>4</td>
<td>3/19 &amp; 3/20</td>
<td>GPS equipment and field collection concepts. Field GPS and laser workflows. Introduction, expectations and assignment to tie Deed Records and County Court file systems data into an applied GIS project. Apply ArcGIS COGO and GPS to create a polygon for the campus; polygon to include bearings and distance attribution. Area and linear measure of perimeter.</td>
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<tr>
<td>5</td>
<td>3/24 &amp; 3/25</td>
<td>Review Editing Geodatabases (COGO) tutorial and expectations. Terms we should know – review terms to date. ArcGIS COGO shortcuts. Concepts we should know (modeling as an overview and then specific models (IE: data importation) coordinates and control as related to CAD Legal Description Polygon – use COGO</td>
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<tr>
<td>6</td>
<td>3/26 &amp; 3/27</td>
<td>CAD data and GIS data Examples and workflow discussion Relocate and repair polygon.</td>
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<tr>
<td>7</td>
<td>3/31 &amp; 4/01</td>
<td>Tutorial Geoprocessing CAD Data with ArcGIS OR Working with CAD Data in ArcGIS</td>
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<tr>
<td>8</td>
<td>4/02 &amp;</td>
<td>Midterm Review and Midterm</td>
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<tr>
<td>Date</td>
<td>Topic</td>
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| 4/07 & 4/08 | Data Characteristics CAD data formats and how they compare and contrast to GIS data formats.  
             | CAD uses and applications and unique data characteristics  
             | Which of these are used in GIS?  
             | Civil Eng CAD VS. Survey CAD  
             | ESRI Links: Workflow, Data Integration and Visualization, CAD Integration |
| 4/09 & 4/10 | Refocus: Coordinates and why they need to be Projected  
             | Working with Map Projections and Coordinate Systems in ArcGIS |
             | Terms and concepts we need to know.  
             | Refocus: We have gone through a few task-specific workflows (Editing Geodatabases (COGO), Map Projections, and CAD Integration) review all are measured representations of a geographic location of the earth. Measure. Calculate. |
| 4/16 & 4/17 | GPS Integration as applied to Question-Collect-Analyze-Decide project. Task-specific workflow discussed and defined.  
             | Calculations and formula – finding the bearing and distance to create our own set of field notes. |
| 4/21 & 4/22 | Field GPS on campus. (weather permitting)  
             | Tutorial calculate bearing and distance measurements and create a set of field notes. |
| 4/23 & 4/24 | Field work – weather date and continuation of Calculation tutorial |
| 4/28 & 4/29 | Final Project |
| 4/30       | Final Project Due |

Recommendations: Industry periodicals and web-sites as mentioned throughout the course.  
Storage device; to be used in this class as well as all other program courses.  
Ask for help before due dates and before test dates.

Assessments: Portfolio of Lab formulas 10 %  
Lecture participation 10 %  
Exercise worksheets 50 %  
Midterm Exam 15 %  
Final Project 15 %

Attendance: You are expected to attend all lectures and labs. It is your responsibility to withdraw from this course if necessary. If you stop attending class your final grade will be determined as shown in the above “Assessments” with zeros for all grades missed.

ADA Statement: If you are a student with a disability and/or special needs who requires accommodations, please contact the college Disability Services Office, in the S Building, Room S-124, 972-860-4847.

Religious Holidays: Absences for observance of a religious holy day are excused. The student is required to notify the instructor 10 days prior to the holiday. A student whose
absence is excused to observe a religious holy day is allowed to take a make-up examination or complete an assignment within a reasonable time after the absence.

Academic Dishonesty: Scholastic dishonesty is a violation of the Code of Student Conduct. Scholastic dishonesty includes, but is not limited to, cheating on a test, plagiarism, and collusion.

As a college student, you are considered a responsible student. Your enrollment indicates acceptance of the Dallas County Community Colleges Code of Student Conduct published in the Dallas County Community Colleges Catalog. [https://www1.dcccd.edu/cat0506/ss/code.cfm](https://www1.dcccd.edu/cat0506/ss/code.cfm)

Within the BHC Geospatial Technology Program, and within DCCCD guidelines, a student’s unacceptable behavior is clarified to include the use of another student’s project, work or data without clear acknowledgment that said content was created by the named student. In each assignment this policy is applied. Instructor reserves the right to amend this syllabus as necessary.

Within the BHC Geospatial Technology Program the instructor reserves the right to apply, within DCCCD guidelines, the following consequences to a student’s unacceptable behavior, the grade of a 0 for any involved assignment, possible suspension from the course and from the Geospatial Technology Program.

Withdrawal Policy: If you are unable to complete this course, it is your responsibility to withdraw formally. The withdrawal request must be received in the Registrar’s Office by Tuesday, April 15th, 2014. Failure to do so will result in your receiving a performance grade, usually an “F”. If you drop a class or withdraw from the college before the official drop/withdrawal deadline, you will receive a “W” (Withdraw) in each class dropped.

Six Drop Issue: **STOP BEFORE YOU DROP**

For students who enrolled in college level courses for the first time in the fall of 2007, Texas Education Code 51.907 limits the number of courses a student may drop. You may drop no more than 6 courses during your entire undergraduate career unless the drop qualifies as an exception. Your campus counseling/advising center will give you more information on the allowable exceptions.

Remember that once you have accumulated 6 non-exempt drops, you cannot drop any other courses with a “W”. Therefore, please exercise caution when dropping courses in any Texas public institution of higher learning, including all seven of the Dallas County Community Colleges. For more information, you may access: [https://www1.dcccd.edu/coursedrops](https://www1.dcccd.edu/coursedrops)

Repeating this course: Effective for Fall Semester 2005, the Dallas County Community Colleges will charge additional tuition to students registering the third or subsequent time for a course. All third and subsequent attempts of the majority of credit and Continuing Education/Workforce Training courses will result in additional tuition to be charged. Developmental Studies and some other courses will not be charged a higher tuition rate. Third attempts include courses taken at any Dallas County Community Colleges since the Fall 2002 Semester.
Classroom Policies: Food IS allowed in the classroom but you take responsibility for any property damage that results from your food or drink; regardless of how the damage occurred. Drinks ARE allowed in the classroom, WITH TIGHT FITTING LIDS ONLY, but you take responsibility for any property damage that results from your food or drink; regardless of how the damage occurred. Cell Phones are to be silent at all times within the classroom. Cell phones are not to be used during class lecture nor during labs. Etiquette will be observed at all times in the classroom. We will not tolerate students talking over the instructor or guests. At no time may a student touch the keyboard or other input devices on any PC except their own. At no time will a student remove, delete or erase any files from any PC other than files they have created on the PC they are using at that class time. At no time will a student write-over an existing file on any PC other than on the PC they are using at that class time. At all times all students will respect shared devices and data. Students will prepare for class as needed and directed. Students will participate in class discussions and will NOT perform other work, email, surf the internet or other activities during class. Behavior unacceptable to the instructor will result in removal from class.

Named folder created Email process and requirements Copy of ArcGIS

If you are receiving Financial Aid grants or loans, you must begin attendance in all classes. Do not drop or stop attending any class without consulting the Financial Aid Office. Changes in your enrollment level and failing grades may require that you repay financial aid funds.

Cell phones and pagers are no longer allowed in the Testing Center.

COURSE EDUCATIONAL OBJECTIVES
1. Understand and apply methods and appropriate technology to the study of the geospatial technologies.
2. Recognize geographic and quantitative methods and the differences between these approaches and other methods of inquiry and to communicate findings, analyses, and interpretation both orally and in writing.
3. Identify and recognize the differences among competing geographic theories.
4. Demonstrate knowledge of the major issues and problems facing geospatial technologies, including issues that touch upon ethics, values, and public policies.
5. Demonstrate knowledge of the interdependence of geospatial technology and their influence on, and contribution to modern culture.

COURSE INTELLECTUAL COMPETENCIES
1. Reading – The ability to analyze and interpret a variety of printed materials – books, documents, and articles.
2. Writing – The ability to produce clear, correct and coherent prose adapted to purpose, occasion and audience.
3. Speaking – The ability to communicate orally in clear, coherent and persuasive language appropriate to purpose, occasion, and audience.
4. Listening – Analyze and interpret various forms of spoken communication, possess sufficient literacy skills of writing, and reading.
5. Critical Thinking – Think and analyze at a critical level.

Right to Change syllabus: The instructor reserves the right to amend this syllabus as necessary.