

CSE 2111 (Approved): Modeling and Problem Solving with Spreadsheets and Databases

Course Description

Spreadsheet and database modeling/programming concepts and techniques to solve business related problems; efficient/effective data handling, computational analysis and decision support. Addl topics: computer concepts, networking, project integration.

Prior Course Number: CSE 200

Transcript Abbreviation: Spreadsheets & DBs

Grading Plan: Letter Grade

Course Deliveries: Classroom

Course Levels: Undergrad

Student Ranks: Freshman, Sophomore

Course Offerings: Autumn, Spring, May + Summer

Flex Scheduled Course: Never

Course Frequency: Every Year

Course Length: 14 Week

Credits: 3.0

Repeatable: No

Time Distribution: 2.0 hr Lec, 1.0 hr Rec, 1.0 hr Lab

Expected out-of-class hours per week: 5.0

Graded Component: Lecture

Credit by Examination: Yes

Exam Types: EM Tests via Office of Testing

Admission Condition: No

Off Campus: Never

Campus Locations: Columbus, Lima, Mansfield, Marion, Newark

Prerequisites and Co-requisites: (Math 1130 or higher) or (Math 130 or higher under quarters)

Exclusions: Not open to students with credit for CSE 1111 or CSE 1112 or CSE 101 or CSE 105 or CSE 200

Cross-Listings:

The course is required for this unit's degrees, majors, and/or minors: No

The course is a GEC: Yes

The course is an elective (for this or other units) or is a service course for other units: Yes

Subject/CIP Code: 14.0901

Subsidy Level: Baccalaureate Course

General Information

This course is a GEC for Quantitative and Logical Skills.

Course Goals

Be competent with programming spreadsheets by appropriately using simple and nested functions, including logical and numerical functions, basic statistical functions, time and date functions, and table lookup functions.

Be competent with designing/engineering spreadsheets to minimize errors in construction and modification, including appropriately using relative/absolute cell referencing.

Be competent with aggregating and summarizing multivariate data sets, including both numerical and categorical variables.

Be competent with importing into spreadsheets from large data sets in text format and with more than one data source.

Be competent with applying sound spreadsheet engineering principles in business contexts such as pro forma income and balance sheets, basic analysis of large data sets, and fundamental computations for financial, marketing, and operational analysis.
Be competent with using spreadsheets to effectively communicate their purpose and process, both on the computer and on paper.
Be competent with using spreadsheets to effectively communicate results using appropriate numerical and graphical tools.
Be familiar with concepts of relational databases
Be familiar with using MS Access to create data tables, simple reports, and forms.
Be competent with solving problems using Access Query tools including selection queries, sorts, aggregation, calculations, inner/outer joins, and situations with datasets containing many-to-many relationships using multiple queries.
Be exposed to basic concepts of computing, components of a computer, and concepts of how the internet works.
Be exposed to tools that facilitate lifelong learning of technology.
General Education overall goal statement: Students develop skills in quantitative literacy and logical reasoning including ability to identify valid arguments, use mathematical models, draw conclusions and critically evaluate results based on data.
General Education goal statement for Basic Computational Skills: Students demonstrate computational skills and familiarity with algebra and geometry, and apply these skills to practical problems.
General Education goal statement for Mathematical and Logical Analysis: Students comprehend mathematical concepts and methods to construct valid arguments, understand inductive and deductive reasoning, and increase general problem solving skills.
General Education goal statement for Data Analysis: Students understand basic concepts of statistics and probability, comprehend methods needed to analyze and critically evaluate statistical arguments, and recognize importance of statistical ideas.

Course Topics

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Introduction to Computing - hardware, software, operating system.	2.0		1.0					
Spreadsheet Basics - creating a simple spreadsheet, relative/absolute cell referencing, using functions, using multiple worksheets; simple data analysis.	5.0	3.0	3.0					
Decision Making with Spreadsheets - using Boolean logical operators/functions.	2.0	1.0	1.0					
Financial and Date Functions - solving problems with variable inputs, financial and date computations using reference.	3.0	1.0	2.0					
Programming/Modeling - using spreadsheets and formula auditing for complex problems.	1.0	1.0	1.0					
Introduction to Databases - theory and use of MS Access.	2.0		1.0					
Writing Queries in Access - select queries, sorting, aggregating, writing expressions, using inner and outer joins.	3.0	2.0	2.0					
Summarizing Data - using data with many-to-many relationships and advanced querying techniques.	1.0	1.0	0.5					
Using MS PowerPoint - displaying data from Excel and Access; Object Linking and Embedding.	1.0		0.5					
Using Excel as a Database - importing data, Excel data tables, filtering, sorting, subtotals, pivot tables; using text functions to manipulate data; advanced Excel tools: scenario manager, data analysis tools, and macros.	3.0	1.0	1.0					
Additional Topics - MS Office integration using MS Word mailmerge; lifelong learning; finding information on new/unknown tools in computing.	1.0		0.5					
Basics of Computer Networking - WWW architecture and protocols, and writing your own webpage.	2.0		0.5					

Representative Assignments

Lab 1 - Using the CSE computing environment, web Search on ethical use of technology. Creating a simple spreadsheet.
Lab 2 - Excel basics & writing simple formulas.
Lab 3 - Data analysis using Excel functions.
Lab 4 - Solving Problems with multiple worksheets& charts - requiring unit conversions (area/volume etc).
Lab 5 - Using Boolean Logic in Decision Making.
Lab 6 - Using spreadsheets with variable inputs (Reference functions) and financial calculations (Financial functions).
Lab 7 - Analysis of large problems and design/implementation of a spreadsheet solution.
Lab 8 - Using MS Access - tables, Preset Queries, Forms & Reports.
Lab 9 - Writing simple Queries.
Lab 10 - Advanced Querying in Access to relate data with many-many relationships.
Lab 11 - Data Retrieval & Analysis & Presentation using Access, Excel & PowerPoint .
Lab 12 - Importing Data & Data Manipulation in Excel.
Lab 13 - Mailmerge, Excel tools & Web page.

Grades

Aspect	Percent
Labs	20%
Exams	40%
Final	40%

Representative Textbooks and Other Course Materials

Title	Author
<i>Course notes, Custom text</i>	D. Gross

ABET-EAC Criterion 3 Outcomes

Course Contribution	College Outcome
a	An ability to apply knowledge of mathematics, science, and engineering.
b	An ability to design and conduct experiments, as well as to analyze and interpret data.
c	An ability to design a system, component, or process to meet desired needs.
d	An ability to function on multi-disciplinary teams.
e	An ability to identify, formulate, and solve engineering problems.
f	An understanding of professional and ethical responsibility.
g	An ability to communicate effectively.
h	The broad education necessary to understand the impact of engineering solutions in a global and societal context.
i	A recognition of the need for, and an ability to engage in life-long learning.
j	A knowledge of contemporary issues.
k	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Additional Notes or Comments

Students will solve problems within recitation, assigned homework, graded labs, and exams which require them to perform data summarization (sum, average, count, min, max), pro-rata proportionality (algebra) and calculation of areas and volumes; to analyze data into

groupings (sumif, countif & averageif functions); to formulate specific criteria to answer specific questions requiring the use of relational and boolean logical operations (AND, OR, NOT, IF) and logical constructs (none of, only) requiring combinations on boolean logical operations. Students will be presented with large datasets as part of their practical graded lab assignments requiring them to summarize and organize information. They will be asked to look at two sets of data to see which is less variable, which is closer to the desired outcome and make recommendations based on the outcomes. They will also analyze outlying data by evaluation top and bottom 10 values and compare percent change among datasets.

Prepared by: Bruce Weide