



**THE OHIO STATE UNIVERSITY**  
COLLEGE OF ENGINEERING

# Modeling and Problem Solving with Spreadsheets and Databases

## CSE 2111

**Credit Hours:**

3.00 - 3.00

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**Course Levels:**

Undergraduate (1000-5000 level)

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**Course Components:**

Lecture

Lab

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**Course Description:**

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

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**Prerequisites and Co-requisites:**

Prereq: Math 1130 or above, or Math Placement Level L.

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### **Course Goals / Objectives:**

- 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 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.
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**Course Topics:**

- Introduction to Computing - hardware, software, operating system
  - Spreadsheet Basics - creating a simple spreadsheet, relative/absolute cell referencing, using functions, using multiple worksheets; simple data analysis
  - Decision Making with Spreadsheets - using Boolean logical operators/functions
  - Financial and Date Functions - solving problems with variable inputs, financial and date computations using reference
  - Programming/Modeling - using spreadsheets and formula auditing for complex problems
  - Introduction to Databases - theory and use of MS Access
  - Writing Queries in Access - select queries, sorting, aggregating, writing expressions, using inner and outer joins
  - Summarizing Data - using data with many-to-many relationships and advanced querying techniques
  - Using MS PowerPoint - displaying data from Excel and Access; Object Linking and Embedding
  - 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
  - Additional Topics - MS Office integration using MS Word mailmerge; lifelong learning; finding information on new/unknown tools in computing
  - Basics of Computer Networking - WWW architecture and protocols, and writing your own webpage
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**Designation:**

Elective

General Education Course