

AGEN / BSEN 112 – Computer-Aided Problem Solving
Department of Biological Systems Engineering
University of Nebraska-Lincoln

COURSE SYLLABUS

Schedule and Classroom

Wednesday and Friday 1:00-1:50 PM Chase Hall room 116

Instructor

Dr. Rossana Villa Rojas

Office hours: Wednesdays 2 to 3 pm Chase Hall room 231 or by appointment

Office: 263 Food Innovation Center

Email: rvillarojas2@unl.edu

Teaching Assistants

Adan Redwine

Office hours: Wednesdays 4:30 - 5:30 p.m. Chase Hall 149 or by appointment

Office: Morrison Life Sciences Research Center

Email: aredwine@huskers.unl.edu

Cell: (308) 390-9589

Asya Macon

Office hours: Tuesdays 3-4 pm or by appointment

Office: Splinter Laboratories 203

Email: amacon2@huskers.unl.edu

Graders

Ahlam Al Kiyumi

Claire Weir

Catalog Description

AGEN/BSEN 112: Computer-Aided Problem Solving (2 cr.) Lect.

Prerequisite: AGEN/BSEN 100 and high school physics or permission.

Problem solving techniques and procedures through the use of Excel and graphical methods and MATLAB. Emphasis on problem/solution communication with topics and problems from agricultural engineering and biological systems engineering.

Learning Objectives

- Upon successful completion of this course a student will be able to:
- Use knowledge and skills to solve problems related to science and engineering.
- Employ modern engineering tools (e.g., basics of spreadsheets and MATLAB).

- Choose which Excel function and MATLAB command is most appropriate to use in solving individual science and engineering problems.
- Use the engineering problem solving process effectively to communicate solution processes and answers.

Textbook and Required Materials

No textbook will be required. All needed sources and references will be provided electronically for download.

Students must have access to Excel (Office 2010+) and MATLAB (Release 2018+).

Course Outline: The tentative course outline is as follows:

Schedule is subject to change. Changes will be announced in class, emailed to students, and posted on Canvas.

Week	Date	Weekday	Module	Lecture Topic	Homework
1	19-Jan	Wednesday		Class intro and effective learning	Personalized study schedule (extra credit) and intro video
1	21-Jan	Friday	1. Introduction and engineering concepts review	Dimensions, units and conversions	
2	26-Jan	Wednesday		Significant figures, precision and accuracy	Unit conversions and measurements
2	28-Jan	Friday	2. Engineering design and problem solving	The process of engineering design and how to frame problems	
3	2-Feb	Wednesday		Estimations	
3	4-Feb	Friday		SOLVEM method	
4	9-Feb	Wednesday		Data collection methods	Problem analysis
4	11-Feb	Friday		Data analysis and basic statistics (Adan Redwine)	
5	16-Feb	Wednesday		Engineering communication	
5	18-Feb	Friday	3. Computation tools for problem solving	Excel basics	Excel basics
6	23-Feb	Wednesday		Guest speaker: Biomedical engineering	

6	25-Feb	Friday		Matlab basics (Asya Macon)	Matlab
7	2-Mar	Wednesday		Types of graphs and charts	
7	4-Mar	Friday		Excel graphs/charts	
8	9-Mar	Wednesday		The complete engineer (Dr. D Keshwani)	
8	11-Mar	Friday		The complete engineer (Dr. D Keshwani)	
	16-Mar	Wednesday	Spring break		
	18-Mar	Friday			
9	23-Mar	Wednesday			MATLAB graphs/charts
9	25-Mar	Friday		Excel statistics / curve fitting	
10	30-Mar	Wednesday		Guest speaker: Food and bioprocessing engineering	
10	1-Apr	Friday		MATLAB statistics / curve fitting	Curve fitting
11	6-Apr	Wednesday		Excel sorting/filters	
11	8-Apr	Friday		MATLAB sorting/filters	Sorting and filters
12	13-Apr	Wednesday		Guest speaker: Agricultural Engineering	
12	15-Apr	Friday		Excel Logic statements	
13	20-Apr	Wednesday		MATLAB Logic statements	Logic statements
13	22-Apr	Friday		Project Q&A or topic review	
14	27-Apr	Wednesday		Excel: Vlookup	

14	29- Apr	Friday	MALAB: Indexing/Large data	Vlookup and indexing
15	4-May	Wednesday	Project Q&A or topic review	
15	6-May	Friday	Guest speaker: Soil and water resources (Natural resources and irrigation engineering)	
16	10- May	Wednesday	Due date for final project by 3:00 pm	

Grading System

<u>Component of Work</u>	<u>Contribution to Course Average</u>
Attendance/Participation	200 (~6 points each class period)
Homework	450 (10 homework)
Final project	350
<hr/>	<hr/>
Total	1000

The semester average will be determined as a composite of attendance, homework, and project grades. The portion each component contributes to the course average is shown in the table above. The grade assigned will be based on the semester average as shown in the table below. The instructor reserves the right to adjust the scale. If the student requires clarifications with grades on any assignment, homework or activity please contact the instructor directly.

<u>Semester</u> <u>Average</u>	<u>Grade</u>	<u>Semester</u> <u>Average</u>	<u>Grade</u>	<u>Semester</u> <u>Average</u>	<u>Grade</u>
≥97.0%	A+	≥83.0%	B	≥70.0%	C-
≥93.0%	A	≥80.0%	B-	≥67.0%	D+
≥90.0%	A-	≥77.0%	C+	≥63.0%	D
≥87.0%	B+	≥73.0%	C	≥60.0 %	D-
				<60.0%	F

Pass/No Pass Option -- Students enrolled under this option must achieve at least the percentage required for a C letter grade to receive a passing grade (P).

See Grading policies under Academic Policies & Procedures in the Undergraduate Bulletin online.

University policy regarding marks of I (incomplete) and W (withdraw) will be followed in this course. See Grading Policies under Academic Policies & Procedures in the Undergraduate Bulletin online.

Homework

Modules 1 and 2 homework is to be completed by and turned in according to the instructor's specified format.

Module 3 homework is to be done using engineering computational tools (Excel and MATLAB) and must be turned in as announced for the particular assignment, either in Excel or MATLAB format.

All homework is to be turned in at the beginning of class on the due date (1:00 p.m. sharp). Assignments not submitted at the scheduled time will be worth 1/2 credit if submitted within one week of the scheduled time. Special extraneous circumstances may be discussed on an individual basis if necessary.

Project

One individual project will be assigned during the semester and will require the use of both computational tools. Files submissions for MATLAB should use .m file, Excel submission .xls or .xlsx files. Additional files/formats may also be required.

Attendance/Participation Policy

It is important for you to attend class. Attendance will be counted during lectures and/or responses to in-class activities and work group sessions depending on the structure of the particular class period. Many of the PowerPoint presentations used in class by instructors and guests will be placed on Canvas. However, the PowerPoint presentations typically provide only the minimum information, and discussions during class. Answers to questions asked by students, examples worked in class, and other information may NOT be in PowerPoint presentations placed in Canvas.

Each student is responsible for everything discussed in class sessions. If, for any reason, you are not able to attend class or participate due to illness, unforeseen circumstance, computer connection issue, or other reason, please communicate with the instructors immediately.

If in-person classes are canceled, you will be notified of the instructional continuity plan for this class by Canvas announcement.

CoVid-19 Classroom Policy

Given the current transmission level of COVID-19 in our community, I respectfully request that you join me in wearing a face covering during our classes.

For up to date Covid-19 updates and policies please visit <https://covid19.unl.edu/>

UNL Course Policies and Resources

Students are responsible for knowing the university policies and resources found on this page (<https://go.unl.edu/coursepolicies>):

- University-wide Attendance Policy
- Academic Honesty Policy (see Student Code of Conduct, Section B. Conduct - rules and Regulations, 1. Acts of Academic Dishonesty)
- Services for Students with Disabilities (see [Services for Students with Disabilities](#))

- Mental Health and Well-Being Resources
- Final Exam Schedule
- Fifteenth Week Policy
- Emergency Procedures
- Diversity & Inclusiveness
- Title IX Policy
- Other Relevant University-Wide Policies

The BSE Department process for grade and academic dishonesty appeals can be found <http://bse.unl.edu/academicadvising-index>

Students are encouraged to contact the instructor for clarification of these guidelines if they have questions or concerns.