



ECE 475, Modeling, Simulation, and Analysis, Spring, 2022

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- Preferred Method of Contact: Via email or zoom/phone during office hours
- Student/Office Hours: Zoom/phone, Monday and Wednesday 2:00-3:00 PM
- Classroom, Day/Time: 3??JBC, Monday and Wednesday 12:30-1:45 PM
- Lab, Day/Time: During class day/time in classroom
- Prerequisites: ECE 282 (Circuit-I) & Phys 313 (Physics-I), or equivalent
- Teaching Assistant (TA): Lab – TBD | Grading – TBD
- TA Contacts: Lab – [tbd\[at\]wichita\[dot\]edu](mailto:tbd[at]wichita[dot]edu) | Grading – [tbd\[at\]wichita\[dot\]edu](mailto:tbd[at]wichita[dot]edu)

How to use this syllabus

This syllabus provides you with information specific to this course, and it also provides information about important university policies. This document should be viewed as a course overview; it is not a contract and is subject to change as the semester evolves. Any changes should be shared via lecture and/or Blackboard.

University Policies and Procedures

The Wichita State University Policies and Procedures Manual can be found at: <https://www.wichita.edu/about/policy/>.

Academic Integrity

Students at Wichita State University are expected to uphold high academic standards. WSU will not tolerate a lack of academic integrity. Students are responsible for knowing and following the Student Code of Conduct http://webs.wichita.edu/inaudit/ch8_05.htm and the Student Academic Honesty policy http://webs.wichita.edu/inaudit/ch2_17.htm. When the faculty member determines sanctions are warranted for violations of academic integrity, regardless of severity, the faculty member must report the infraction to the Office of Student Conduct and Community Standards. If you need more information about the process or wish to appeal a decision, please visit https://www.wichita.edu/about/student_conduct/ai.php

Homework (HW) assignments in this course are individual assignments (unless otherwise stated). Students can discuss with others, but they should not write the solution together; one's submission (wording/coding) should be reasonably different from other submissions. "Collaboration is good, cheating is not!" There will be severe consequences for academic dishonesty. Cheating (such as copying word-for-word from other sources) in any test will automatically result a Fail grade in this course; this grading policy applies to all parties involved (including the ones who help/show).

Course Description

Introduces modeling methods and simulation tools for a wide range of natural phenomena including topics from Science, Technology, Engineering, and Math (STEM) fields. Presents a basic guideline towards system/data analysis to solve problems and help make the best decisions. Lab activities and assignments provide opportunity for hands-on experience.

Measurable Student Learning Outcomes

After passing this course, undergraduate students will be able to:

- (EAC 1) an ability to identify and solve problems through modeling, simulation, and analysis methodology by applying principles of STEM fields
- (EAC 2) an ability to apply modeling and simulation methodology for analyzing systems/data and making informed decisions with consideration of public welfare and economic factors

Required Texts/Readings Textbook

Please contact the instructor before buying books for this course.

Textbook: "Modeling, Simulation, and Analysis – A Step-By-Step Manual using VisualSim," Shankar and Asaduzzaman, Copyright by Mirabilis Design, 2021.

Reference Book: "System Design, Modeling, and Simulation using Ptolemy II," Claudius Ptolemaeus, Publisher lulu.com, 1st edition, 2013.

Other Readings

Class/lecture notes, lab manual/assignments, and project topics will be made available via WSU Blackboard.

Other reading materials (such as handouts on VisualSim tool and related research articles) will be made available via WSU Blackboard.

Other Equipment/Materials

Students will be provided information about VisualSim software package, license, and service supports so that they can complete lab assignments and projects. More information will be provided during class/lab lectures as/if needed.

Class Protocol

There are points on class/lab performance. It is expected that students join the instructor and/or TA before classes/labs start. Students are always encouraged to ask questions, especially if they find ambiguity in assignments and materials covered.

Contact Policy

Use telephone during student/office hours. Email communication is also preferred. Feel free to email me any questions or concerns following these guidelines:

- **Always** email me from your WSU email address. Email sent from personal email servers like Gmail, Yahoo, etc., have a tendency to end up in my spam folder, and I never see them. You may also email me through Blackboard via the Email My Instructor tab. I also offer a Discussion Forum on Blackboard which allows common questions to be seen and responded to publicly.
- Always use the course name in the subject line of the email.
- Remember to sign your name.
- If you have a problem with accessing or uploading assignments, you should let me know as soon as possible before the assignment is due. You will also have to accompany this notification with the file in question, so I can verify that it is completed by the due date/time.
- You **should NOT** contact me for tech support.
 - Any technical problems involving your computer, or issues regarding file uploading or sharing, should go through the OneStop. You can contact them at 316-978-3909. You can also fill out a request for help form at their [website](https://wichita.edusupportcenter.com/sims/helpcenter/common/layout/SelfHelpHome.seam?inst_name=wichita):
https://wichita.edusupportcenter.com/sims/helpcenter/common/layout/SelfHelpHome.seam?inst_name=wichita

Response Time

To Email and Discussion Forum Questions:

As soon as possible within 24 hours. If you do not receive reply to your email within 24 hours, please re-send me the email, probably the email did not arrive to my Inbox.

Feedback on Assignments:

As soon as possible after the due date including the late submission date/time. Answer key will be discussed in lecture sessions and/or shared via Blackboard.

Grading Scale

WSU uses a +/- grading scale for final grades and to calculate grade point averages. In this class, grades are assigned according to the following chart. (Other classes might assign grades differently: Be sure to understand the different grading scales in all of your classes.)

Points/Percentage	Letter Grade	Grade Points	Interpretation
93 and up	A	4.00	A range denotes excellent performance
90 – less than 93	A-	3.70	
87 – less than 90	B+	3.30	
83 – less than 87	B	3.00	B range denotes good performance
80 – less than 83	B-	2.70	
77 – less than 80	C+	2.30	
73 – less than 76	C	2.00	C range denotes satisfactory performance
70 – less than 73	C-	1.70	
67 – less than 70	D+	1.30	
63 – less than 67	D	1.00	D range denotes unsatisfactory performance
60 – less than 63	D-	0.70	
0 – less than 60	F	0.00	

Assignments

List of grading assignments/components and values toward the final grades are shown below. Homework and lab assignments and their due dates will be announced in class/lab and/or made available via Blackboard. Similarly, the dates for Quiz, Exam, and Project will be announced in class and/or made available via Blackboard. Assignments and their values may be changed as/if required!

Grading Assignments/Components	Undergraduate
Class/Lab Performance	4%
Homework (eight of nine, take home)	16%
Lab (ten, experiment and pop-quiz)	20%
Quiz (two of three, 30-minute, class-time)	20%
Project (Proposal, Presentation, and Report)	40% [(5+5) + 15 + 15]
(Proposal: defense and write-up; Presentation: oral, 15-min; Report: 10+ pages)	

Extra Credit

Extra credits are possible as/if needed. Depending on class performance after Week 10, if required, extra credit assignments and their due dates will be determined.

Late Assignments

For homework assignments, late submissions will not be accepted after five days from the original due date/time. Up to 50% points may be subtracted for any late submission. Exceptions include documented emergency situations and prior consents. No late submission for project reports.

Missed Labs and Quizzes

Makeup for missed labs and quizzes will be given only when there is a genuine reason, with clear proof. It is students' responsibility to provide the proof; if the reason for missing a lab or a quiz is illness, a doctor's note will be required. Students should contact the instructor before any makeup test.

Teaching Assistant(s)

Laboratory TA:

TBD, tbd[at]wichita[dot]edu

Office Hours/Room: Lab Hours, 3??JBC

Grading TA:

DRZ <DRZ>

Office Hours/Room: DRZ

The Lab TA should be in the lab for the entire session to assist students and grade lab assignments. The Grading TA (if any) should grade test papers. However, the TAs are not allowed to solve student problems (any problem). If students have any questions regarding the course materials and/or laboratory assignments, they should immediately contact the course instructor.

Syllabus Policies and Student Resources available at www.wichita.edu/syllabuspolicies

Information on:

- Important Academic Dates
- Academic Integrity
- Definition of a credit hour
- Video and Audio recording
- Shocker Alert System
- Intellectual Property
- CARE Team
- Counseling and Prevention Services
- Student Health Services
- Heskett Center and Campus Recreation
- Inclusive Excellence
- First Generation Students
- Names and Pronouns
- Disability Services
- Title IX
- Concealed Carry Policy

Laboratory Information

The lab sessions (and lectures) will be held in ??? John Bardo center. The main purpose of the lab section is to provide students the required software and service supports so that they can complete lab assignments and projects. A lab TA (or the course instructor) will assist students with the lab assignments. If there is a TA, the course instructor will also be available as/if needed. If required and possible, the students can meet the TA and/or instructor in the Computer Architecture and Parallel Programming Laboratory (CAPPLab) in 312 Wallace Hall.

Brief List of Topics to Cover

Introduction to Modeling, Simulation, and Analysis

- Basic concepts of modeling and simulation
- Basic concepts of system/data analysis

Modeling and Simulation of Natural Phenomena using VisualSim

- Introduction to Mirabilis Design VisualSim
- Math/Physics Examples: Pythagoras' Theorem; the Fourier Transform; Euler's Identity; Newton Laws of Motion: Second Rule ($F = m * a$); the First Law of Thermodynamics; the Second Law of Thermodynamics; Chaos Theory
- Electrical Examples: Ohm's Law; Kirchhoff's Law: $\sum(I) = 0$ and $\sum(V) = 0$; Joule's Law (about heat produced by an electric current, $H = I^2 * R * t$)

Modeling and Simulation of Computing Systems

- Introduction to Computing Systems (i.e., Microcontrollers)
- Computer Examples: Arithmetic-Logic Unit (ALU) (execution of Add, Sub, Mul, Div, AND, OR); Memory; Central Processing Unit (CPU) (execution of a Datapath using Registers, Memory, ALU); Simple Computer Systems (i.e., Microcontrollers)

System/Data Analysis for Making Effective Decisions

- Analysis using Microsoft Excel
- Analysis using Mirabilis Design VisualSim

Project Examples

- Microcontrollers to monitor/control systems with sensors/motors
- Electrical Circuit analysis (also can be, network analysis)
- Signal Processing System analysis (sender-receiver, modulation-demodulation, medium/channel, attenuation, Gaussian noise, signal loss, etc.)
- Smart Power Grid analysis
- Data analysis
- Texas Cold Weather 2021
- Any System analysis

Tentative Schedule for 15-week fall classes

Week	Dates	Note	Important topics/readings, assignments, due dates, and reminders are listed here so that you can organize your time and academic work.
1			ECE 497A (L): Course syllabus; Lab/Project; K-probe; Modeling, Simulation, and Analysis; VisualSim;
2			Modeling and Simulation of Natural Phenomena; Lab-01 (discussion); HW-1 (assign); Lab/Project Groups;
3		Lab HW	Project (Proposal, Presentation, Report): Topics, Grading; Lab-01 (due); HW-1 (due); Math/Physics Examples;

Week	Dates	Note	Important topics/readings, assignments, due dates, and reminders are listed here so that you can organize your time and academic work.
4		Lab HW	Math/Physics: Pythagoras' Theorem; the Fourier Transform; Lab-02 (due); HW-2 (due); Quiz-1 discussion;
5		Lab Quiz	Math/Physics: Euler's Identity; Newton Laws; Lab-03 (due); Quiz-1 (30-min, 30-points);
6		Lab	Electrical Examples: Ohm's Law; Kirchhoff's Law: Lab-04 (due); Electrical Examples: Joule's Law:
7		Lab HW	Introduction to Computing Systems (Microcontrollers) Lab-05 (due); HW-3 (due);
8		Lab HW	Computer Examples: ALU, Memory, CPU (Datapath); Lab-06 (due); HW-4 (due); Quiz-2 discussion;
9		Lab Quiz	Computer Examples: Microcontrollers Lab-07 (due); Quiz-2 (30-min, 30-points);
10		Lab	Project: Proposal, Presentation, and Report; Lab-08 (due); Project: Proposal (defense and write-up) due;
11		Lab HW	System/Data Analysis: Making Decisions using MS Excel; Lab-09 (due); HW-5 (due);
12		Lab HW	System/Data Analysis: Making Decisions using VisualSim; Lab-10 (due); HW-6 (due); Quiz-3 discussion;
13		Lab Quiz	System/Data Analysis: Making Decisions using VisualSim; Quiz-3 (30-min, 30-points);

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Week	Dates	Note	Important topics/readings, assignments, due dates, and reminders are listed here so that you can organize your time and academic work.
14			System/Data Analysis: Making Decisions using VisualSim; Project: Presentation and Report;
15		Project	Project Presentation: Team-work, PPT slides; Final Report: Team-work, via Blackboard on Study day;
Finals			None

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