ECE 475, Modeling, Simulation, and Analysis, Fall, 2023

ECE 475L, Modeling and Simulation Lab, Fall, 2023

- Instructor: Abu Asaduzzaman (DRZ)
- Department: Electrical and Computer Engineering (ECE)
- Office Location: 303 Wallace Hall (WH) building
- Telephone: +1-316-978-5261
- Email: abu.asaduzzaman@wichita.edu
- Preferred Method of Contact: In person during office hours or e-mail
- Student/Office Hours: MW 8:00-9:00 AM and 5:30-6:00 PM
- Classroom, Day/Time: 104-JB, MW 4:05-5:20 PM
- Lab, Day/Time: JBC Lab, TBD
- Prerequisites: ECE 395
- Teaching Assistant (TA): TBD
- TA Contacts: Lab – tbd@shockers.wichita.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 basic concepts of modeling and simulation using popular simulation tools. Presents method to analyze simulated results for making useful decisions. Laboratory and team-project activities give hands-on experience. Special attention are given to various computer and electrical engineering applications.

Measurable Student Learning Outcomes

Measurable Student Learning Outcomes: Undergraduate Level

After passing this course, undergraduate students will experience:

- (SO: EAC 1) an ability to identify and solve modeling and simulation related problems by applying principles of engineering, science, and mathematics
- (SO: EAC 2) an ability to apply modeling concepts, simulation tools, and analysis methods to produce solutions that meet specified needs with consideration of public safety and economic factors

Required Texts/Readings Textbook

No textbook. Please talk to the instructor before buying books for this course.

Book: "Designing Embedded Systems and Semiconductors," Deepak Shankar and Abu Asaduzzaman, under preparation, Copyright by Mirabilis Design 2022.

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

Reference Book: "Modeling and Simulation of Systems Using MATLAB and Simulink," Devendra K. Chaturvedi, CRC Press, 1st ed. 2009.

Other Readings

Class notes and lab manual/assignments will be made available via WSU Blackboard.

Other Equipment/Materials

"ECE475 Tool-Boxes" will be available for students to borrow so that they can complete the lab/project activities. Students will be provided information so that they can develop systems that fulfill public safety requirements and help economic growth.

Class Protocol

Class participation is crucial. ”Participation” involves reading the assignments thoroughly, reading handouts provided by the instructor/TA, watching uploaded videos on Blackboard, contributing to class and lab discussions, and completing tests and labs as assigned. To be successful in this class, you should be checking your student email regularly and logging in to this course at many times as require every week.

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

Email communication is preferred. Feel free to email me any questions or concerns following these guidelines:

- **Always** email me from your WSU email address and/or through Blackboard. Email sent from personal email servers, such as Gmail and Yahoo, have a tendency to end up in my spam folder, and I never see those. 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

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 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 (and Grading Scale)

List of grading assignments/components and values toward final grades are shown below. Homework assignments and their due dates will be announced in class and/or made available via Blackboard. Similarly, the dates for Labs, Exam, and Project will be announced in class and/or made available via Blackboard.

Grading Assignments/Components	Value
Class Performance (individual, random check)	20%
Homework (individual, five of six)	10%
Quiz (individual, two of three)	10%
Project Proposal defense & report (teamwork, Week 5)	10%
Project Presentation (teamwork, before semester ends)	10%
Exam (individual, before semester ends)	20%
Project Report (teamwork, before semester ends)	20%

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.

Missed Tests and Labs/Projects

Makeup for missed tests (Quiz and Exam) and Labs/Projects) 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 test 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@shockers.wichita.edu>

Office Hours/Room: Lab Hours, 262JBC

Grading TA:

TBD <tbd@wichita.edu>

Office Hours/Room: DRZ

Research Lab/Room: CAPPLab, 312WH

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

All students should familiarize themselves with the course-related policies and student resources that can be found at: **www.wichita.edu/syllabuspolicies**

These include, but may not be limited to:

- COVID-19 Conditions
- 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 and Respect for Diversity
- First Generation Students
- Names and Pronouns
- Disability Services
- Title IX
- Concealed Carry Policy

Students with Disabilities

A disability is something that affects a major life activity. These life activities include, but are not limited to, learning, walking, breathing, hearing, and seeing, in addition to many other physical, sensory functions, and psychological disabilities.

If you are a student with a disability, or believe you might have a disability, which requires accommodations, please contact the Office of Disability Services (ODS) www.wichita.edu/ods to discuss reasonable and appropriate accommodations and eligibility requirements. It is the University's goal that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability ODS will review your concerns and determine, with you, what academic accommodations are necessary and appropriate for you. For example, adaptions of teaching methods, class materials or testing may be made on a case-by-case basis if warranted, as required by the Americans with Disabilities Act (ADA). All information and documentation of your disability is confidential and will not be released by ODS without your written permission.

Respect for Diversity

Wichita State University is committed to being an inclusive campus that reflects the evolving diversity of society. To further that goal, Wichita State University does not discriminate in its employment practices, educational programs or activities on the

basis of age (40 years or older), ancestry, color, disability, gender, gender expression, gender identity, genetic information, marital status, national origin, political affiliation, pregnancy, race, religion, sex, sexual orientation, or status as a veteran. Retaliation against an individual filing or cooperating in a complaint process is also prohibited.

Students from all diverse backgrounds and perspectives are welcome in this Course and the diversity that students bring to this course should be viewed as a resource, strength and benefit. All materials and activities are presented with the intent to be respectful of diversity: gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture. Your suggestions are encouraged and appreciated. Please let me know ways to improve the effectiveness of the course for you personally or for other students or student groups. In addition, if any of our class meetings conflict with your religious events, please let me know so that we can make arrangements for you.

Laboratory Information

The lab sessions will be held in <tbd> John Bardo Center. The main purpose of the lab sections is to provide students enough hardware, software, and service supports so that they can complete lab assignments and projects. Students will work in groups (the number of students in a group will be determined after the regular enrolment period is over). A lab TA will assist students with the lab sessions. Students are welcome to use the Computer Architecture and Parallel Programming Laboratory (CAPPLab) for class projects. CAPPLab is physically located in room 312 Wallace Hall (you may visit online at https://www.wichita.edu/academics/engineering/CAPPLab/Lab.php).

Brief List of Topics to Cover

Introduction to Concepts of Modeling and Simulation

- System Design, Modeling, and Simulation
- Analysis of Simulation Results

System Concepts

- Software, Hardware, Network
- Block Diagram, Use Cases, Workloads

Modeling Theories/Components

- Math theory, Physics law, ALU, CPU, Memory
- Inputs / Outputs, Relation among Inputs / Outputs

Constructing Embedded Systems

- Sensors → ADC → CPU → DAC → Actuators
- Embedded Systems for Data Analytics

Results and Analysis

- Tables, Charts/Plots
- Data Analysis

Project/Research/Advanced Topics

- Real-Time Systems
- High Performance Systems

Tentative Schedule

Week	Note	Important topics/readings, assignments, due dates, and reminders are listed here so that you can organize your time and academic work.
1		ECE 475: Course syllabus; Lab/Project; K-probe; Introduction to Modeling and Simulation; Homework discussion;
2		Concepts of Modeling and Simulation; Project: Topics, Grading, Proposal; Groups;
3		System Concepts: Types – Software, Hardware, Network; Quiz discussion; System Concepts: Types;
4		Block Diagram, Use Cases, Workloads; Quiz; Block Diagram, Use Cases, Workloads;
5		Block Diagram, Use Cases, Workloads; Project: Proposal (Teamwork);
6		System Concepts: Sub-Systems (Components/Theories); Week-5 Update; Homework/Lab/Project discussion;
7		System Concepts: Sub-Systems (Components/Theories); Homework/Lab/Project discussion;
8		Modeling Theories/Components: Relation among Inputs / Outputs; Quiz discussion; Modeling Theories/Components;
9		Modeling Theories/Components: Math, Physics, CPU, Memory; Quiz; Modeling Theories/Components;
10		Constructing Embedded Systems: Sensors → CPU → Actuators; Project: Presentation and Report discussion;
11		Results and Analysis: Tables, Charts/Plots; Week-10 Update; Homework/Lab/Project discussion;
12		Results and Analysis: Data Analysis; Quiz discussion; Advanced Topics;

Week	Note	Important topics/readings, assignments, due dates, and reminders are listed here so that you can organize your time and academic work.
13		Advanced Topics: Real-Time Systems; Quiz; Advanced Topics;
14		Advanced Topics: High Performance Systems; Project: Presentation and Report discussion;
15		Project Presentation: Teamwork, PowerPoint slides; Final Report: Teamwork, via Blackboard on Friday;
16		Review materials for Exam. Exam (closed book);
Finals		

1) *May 5, 2023; updated syllabus with lab and scheduling information; DRZ*
2) *July. 15, 2022; prepared draft syllabus for fall 2023 term; DRZ*

Definition of a Credit Hour (https://www.wichita.edu/faculty/development/syllabuspolicies.php)

Example for 3 credit hour class: Success in this 3 credit hour course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally 3 hours per unit per week with 1 of the hours used for lecture) for instruction and preparation/studying or course related activities for a total of 135 hours.

Go to 4.08 / Definition and Assignment of Credit Hours for the policy and examples for different types of courses and credit hour offerings.