

EE 302

Modeling and Simulation

EE 302 Lab

- The lab is scheduled in the 7th level of plan to make sure that students have enough background on electrical engineering such that they can be introduced to practical electrical engineering applications. The following sections summarize guidelines about this course.

Software Tools

- Matlab/Simulink
- For Electronics Experiment (Tina-TI)

Install Matlab

- The lab depends mostly on recent version of Matlab/Simulink program. Students can download Matlab and obtain a license at
- https://www.mathworks.com/downloads/web_downloads
- Creating your mathworks account using KSU email to be able to obtain a license for your installed Matlab/Simulink program
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Course Objectives:

- To acquaint students with basic techniques in computational analysis.
- To train students to write basic simulation programs.
- To introduce students to the use of modern tools to model and simulate electrical engineering applications.
- To prepare students for capstone design projects.

List of Topics	No. of Weeks	Contact Hours	Note
Introduction to Simulation using Matlab and Simulink: Introduction to modeling and simulation of electrical engineering systems using Matlab and Simulink	3	6	Report 1
Introduction to Control Systems: Introduction to feedback systems with transient and steady-state response.	1	2	Report 2
Introduction to Power Systems: Simulation of power systems using Matlab/Simulink.	1	2	Report 3
Introduction to Communication Systems: Simulation of communication systems using Matlab/Simulink.	1	2	Report 4
Introduction to Electronic Engineering: Introduction to electronic design tools. Circuit and system Simulation example	1	2	Report 5

Introduction to Design Groups and Class Projects: Introduction about design groups. Discussion of class projects of each design group. Students work in teamwork on a class project on simulation of an application on electrical engineering.	2	4	
Advanced Simulation Tools : Steady Solver, Linearization, Optimization, Simulation Acceleration, and Dynamic Error	2	4	Report 6
Discussion of Class Projects:	2	4	Class Project Report and Presentation
Review	1	2	
Final Exam	1	2	
Total	15	30	Six Experiment Reports + Class Project Report

Course Outcomes:

- **Identify** modeling techniques.
- **Recognize** dynamic system modeling strategies.
- **Categorize** optimization techniques.
- **Conduct** simulation of electrical engineering systems.
- **Prepare** reports and **present** results.
- **Appreciate** teamwork.
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Course Assessment

	Assessment task	Week Due	Proportion of Total Assessment	
1	Lab Attendance and Participation	Weekly	10 %	Class work 60
2	Quizzes / Class exercises	Weekly	20 %	
3	Experiment Report	Biweekly	30 %	
4	Project Report and Presentation	Week 14	20 %	Final Grade 40
5	Final Exam-	Week 15	20 %	

Lab Report

- Lab procedure will be available on LMS before the experiment date.
- The lab report should be submitted into LMS before the deadline.
- The report should include a report file in addition to all program files that the students develop. The following table shows the main contents of the report file and the weight of each part.

	Report File Section	Description	Total Marks
1	Background and Theory Section	Student explains the background and theoretical aspects of the experiment. He main refers to the experiment reference, in addition to other textbook.	10
2	Experiment Procedure	Student describes all steps he made in conducting the experiment. Student should submit the programs he developed and refer to them in this section.	10
	Results	Student presents the results he obtained	10
	Analysis and Conclusions	Student presents analysis of obtained results and summarizes the conclusions	17
	References	All references that the student used	3
	Report Total Marks		50

Discussion