**Affordable Learning Georgia Affordable Materials Grants  
Continuous Improvement Grants Final Report**

*(or Mini-Grants, for R17 and earlier)*

# General Information

Date: Aug 15, 2022

Grant Round: 19

Grant Number: M166

Institution Name(s): Kennesaw State University

Team Members (Name, Title, Department, Institutions if different, and email address for each):

1. Sandip Das, Associate Professor

Electrical and Computer Engineering

Kennesaw State University

[sdas2@kennesaw.edu](mailto:sdas2@kennesaw.edu)

1. Craig Chin, Associate Professor

Electrical and Computer Engineering

Kennesaw State University

[Cchin2@kennesaw.edu](mailto:Cchin2@kennesaw.edu)

1. Sheila Hill, Senior Lecturer

Electrical and Computer Engineering

Kennesaw State University

[sdoneho1@kennesaw.edu](mailto:sdoneho1@kennesaw.edu)

Project Lead: Sandip Das

Course Name(s) and Course Numbers: Circuit Analysis-I (EE 2301)

Final Semester of Project: Summer 2022

***If applicable to your project:***

Average Number of Students Per Course Section: 40

Number of Course Sections Affected by Implementation of Revised Resources: up to 5 sections per semester

Total Number of Students Affected by Implementation of Revised Resources: more than 300 students per year.

# Project Narrative

*The primary objective of this project was to revise the old lab manual and create new lab instructional and learning materials for a sophomore-level course, Circuit Analysis-I (EE 2301). In this project, we have revised and transformed the previous lab manuals, as well as created/added substantial amounts of new instructional materials. We have included detailed technical instructions within the lab manuals, thoroughly revised the contents for improved readability, implemented coherent formatting, introduced interactive links, developed and integrated new pre-lab exercises, 12 new video tutorials, new LTspice exercises, and created 7 handouts integrated within the lab manual. In addition, we have developed new laboratory datasheets and prelab worksheets for easy, structured, and convenient data recording in electronic format using word files and a template for producing the lab reports. Some of the lab exercises have been overhauled with substantial new instructions with more design emphasis to develop students’ circuit design skills by applying the circuit analysis techniques learned in this class.*

# Materials Description

*A total of 10 lab exercises with various ancillary materials (as described above) have been developed under this project:*

LAB EXERCISE # 1: INTRODUCTION TO MATLAB AND LTSPICE

LAB EXERCISE # 2: INTRODUCTION TO CIRCUIT MEASUREMENT

LAB EXERCISE # 3: SERIES AND PARALLEL DC CIRCUITS

LAB EXERCISE # 4: ANALYZING AND DESIGNING SERIES-PARALLEL DC CIRCUITS

LAB EXERCISE # 5: ANALYZING COMPLEX DC CIRCUITS USING NODAL & MESH ANALYSIS

LAB EXERCISE # 6: DESIGN FOR MAXIMUM POWER TRANSFER VIA THÉVENIN’S ANALYSIS

LAB EXERCISE # 7: THE SUPERPOSITION THEOREM

LAB EXERCISE # 8: THE OSCILLOSCOPE AND THE FUNCTION GENERATOR

LAB EXERCISE # 9: TRANSIENT RC AND RL CIRCUITS

LAB EXERCISE # 10: PHASORS AND IMPEDANCES OF RLC CIRCUITS

*Our materials will be hosted at ALG under the (CC BY) license.*

# Materials Links

*All materials that we have produced as part of this project including the lab manual, lab datasheets, prelab worksheets, and tutorial videos can be downloaded from* [*this shared Onedrive folder*](https://kennesawedu-my.sharepoint.com/:f:/g/personal/sdas2_kennesaw_edu/Eqkt0dm64KpJjaBc55ElhV4BEHCT9_ZBQ2Tar8-iE1dBlQ)*.*

# Future Plans

* *We plan to collect feedback and suggestions from all instructors teaching the Circuit Analysis-I Labs after 3 semesters of full implementation. In addition, we also plan to collect student feedback. Following, we will revise the current materials and add new ancillary materials and/or perform further revisions in the future as necessary.*