ENGT 021: DC CIRCUIT ANALYSIS II

Originator
dcgonzalez

Justification / Rationale
Labor market indicators show that there are jobs available and an advisory committee recommended the course.

Effective Term
Fall 2019

Credit Status
Credit - Degree Applicable

Subject
ENGT - Engineering Technology

Course Number
021

Full Course Title
DC Circuit Analysis II

Short Title
DC CIRCUITS II

Discipline

Disciplines List
Engineering Technology

Modality
Face-to-Face

Catalog Description
This is the second course in a two-part series of DC Circuit Analysis courses. Topics covered in this course include: Ohm's Law, series and parallel circuit analysis, voltage and current dividers, Kirchhoff's laws, magnetic circuits, and network theorems.

Schedule Description
This is the second course in a two-part series of DC Circuit Analysis courses. Prerequisite: ENGT 020

Lecture Units
2

Lecture Semester Hours
36

Lab Units
1

Lab Semester Hours
54

In-class Hours
90

Out-of-class Hours
72

Total Course Units
3

Total Semester Hours
162

Prerequisite Course(s)
ENGT 020

Required Text and Other Instructional Materials

Resource Type
Book

Author
Boylestad, Robert L.

Title
Introductory Circuit Analysis

Edition
13

Publisher
Pearson

Year
2015

College Level
Yes

ISBN #
978-0133923605

Resource Type
Book

Author
Boylestad, Robert L., Kousourou, Gabriel

Title
Laboratory Manual for Introductory Circuit Analysis

Publisher
Pearson

Year
2015

College Level
Yes

ISBN #
978-0133923780

For Text greater than five years old, list rationale:
Lab manual ISBN: 978-0133923780

Class Size Maximum
30

Entrance Skills

Basic DC Circuit skills

Prerequisite Course Objectives

ENGT 020-Identify and define electrical terminology concepts, such as, voltage, current, and resistance.
ENGT 020-Analyze and apply different mathematical methods in the analysis of series and parallel circuits.
ENGT 020-Practice electrical safety.
ENGT 020-Calculate voltage, current, resistance using Ohm's Law.

Course Content

1. Introduction
   a. Review of DC Circuit Analysis I
2. Series-Parallel Circuits
   a. Reduce and Return
   b. Block diagram
   c. Ladder networks
   d. Voltage divider supply
3. Methods of Analysis
   a. Current Sources
   b. Source conversions
   c. Current Sources in parallel
   d. Current Sources in series
   e. Branch-current analysis
   f. Mesh analysis
   g. Nodal Analysis
   h. Bridge Networks
4. Network Theorems
   a. Superposition Theorem
   b. Thevenin's Theorem
   c. Norton's Theorem
   d. Maximum Power Transfer Theorem
   e. Millman's Theorem
   f. Substitution Theorem
   g. Reciprocity Theorem
5. Capacitors
   a. The Electric-field
   b. Capacitance
   c. The charging phase
   d. The discharging phase
   e. Initial conditions
   f. Thevenin equivalent
   g. Capacitors in Series and in parallel
6. Inductors
   a. The magnetic-field
   b. Inductance
   c. Induced voltage
   d. The storage phase
   e. Initial conditions
   f. The release phase
   g. Thevenin equivalent
   h. Inductors in series and in parallel
7. Magnetic Circuits
   a. Ohm's law for magnetic circuits
   b. Ampere's Circuital Law
   c. Flux

d. Series magnetic circuits
e. Series-parallel magnetic circuits

Lab Content

1. Safety Procedures
2. Series-parallel DC circuits
3. Rheostats and potentiometers
4. Methods of analysis
5. Superposition theorem
6. Capacitor Circuits
7. R-L & R-L-C DC Circuits

Course Objectives

	Objectives
Objective 1	Calculate power usage of electrical devices
Objective 2	Practice electrical safety.
Objective 3	Identify how resistors, capacitors and inductors can affect a DC circuit.
Objective 4	Work with lab partners in a team atmosphere.
Objective 5	Identify series circuits.
Objective 6	Identify parallel circuits.
Objective 7	Apply mesh analysis in a direct current circuit to determine the voltages and current in each component.
Objective 8	Apply nodal analysis in a direct current circuit to determine the voltages and current in each component.
Objective 9	Analyze the simplification of direct current circuits using Norton's Theorem.
Objective 10	Analyze the simplification of direct current circuits using Thevenin's Theorem.

Student Learning Outcomes

	Upon satisfactory completion of this course, students will be able to:
Outcome 1	Read a direct current circuit schematic and apply Kirchhoff's Voltage and Current Laws to determine the voltage and current of each component in the circuit.
Outcome 2	Identify direct current circuit behavior of basic circuit components like resistors, capacitors and inductors.
Outcome 3	Use mesh and nodal analysis to analyze a circuit.

Methods of Instruction

Method	Please provide a description or examples of how each instructional method will be used in this course.
Discussion	Students will discuss the material during lecture and lab.
Laboratory	Laboratory will be used to gain a hands-on understanding of the material presented in lecture.
Lecture	Lecture will provide a theoretical introduction and explanation of the material being covered.
Participation	Students will be asked questions during lecture and lab.

Methods of Evaluation

Method	Please provide a description or examples of how each evaluation method will be used in this course.	Type of Assignment
Mid-term and final evaluations	Students will be tested through Canvas to determine their understanding of the material.	In Class Only
Group activity participation/observation	During lab students will work in teams to perform and solve the lab report.	In and Out of Class
Laboratory projects	During Lab students will be expected to discuss with their classmates the purpose of the lab and their findings. Laboratory projects and findings will be evaluated to gain a better understanding for the students' comprehension of the material.	In Class Only

Student participation/contribution	Students will be evaluated by their participation in both lecture and lab.	In Class Only
Tests/Quizzes/Examinations	Quizzes and Exams will include multiple choice questions.	In Class Only
Written homework	Homework will be assigned via Canvas and some questions will require a short written response.	Out of Class Only

Assignments

Other In-class Assignments

1. Take notes
2. Lab work
3. Lab notebook
4. Quizzes
5. Exams
6. Discussion

Other Out-of-class Assignments

1. Reading assignments
2. Writing assignments
3. Lab write ups

Grade Methods

Letter Grade Only

Comparable Transfer Course Information

University System

CSU

Campus

CSU Long Beach

Course Number

ET 250

Course Title

Circuit Analysis I

Catalog Year

2018

Rationale

Fundamentals of DC theory, units of measurements, systems of units. Current, voltage, resistance, Ohm's law, power, energy. Series and parallel circuits.

University System

CSU

Campus

California State Polytechnic University, Pomona

Course Number

ETE 102

Course Title

DC Circuit Analysis

Catalog Year

2018

MIS Course Data

CIP Code
15.0000 - Engineering Technology, General.

TOP Code
092400 - Engineering Technology, General

SAM Code
C - Clearly Occupational

Basic Skills Status
Not Basic Skills

Prior College Level
Not applicable

Cooperative Work Experience
Not a Coop Course

Course Classification Status
Credit Course

Approved Special Class
Not special class

Noncredit Category
Not Applicable, Credit Course

Funding Agency Category
Not Applicable

Program Status
Not program-applicable

Transfer Status
Transferable to CSU only

Allow Audit
No

Repeatability
No

Materials Fee
No

Additional Fees?
No

Files Uploaded

Attach relevant documents (example: Advisory Committee or Department Minutes)
EngrTech Advisory 02-27-18 Minutes and Handouts.pdf

Approvals

Curriculum Committee Approval Date
11/06/2018

Academic Senate Approval Date
11/29/2018

Board of Trustees Approval Date
12/14/2018

Chancellor's Office Approval Date
3/20/2019

Course Control Number
CCC000603616

Programs referencing this course
Engineering Technology AS Degree (http://catalog.collegeofthedesert.eduundefined?key=209)
Electronics Certificate of Achievement (http://catalog.collegeofthedesert.eduundefined?key=210)