ENGT 024: MANUFACTURING OF CIRCUITS

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
024

Full Course Title
Manufacturing of Circuits

Short Title
MANUFACTURING CIRCUITS

Discipline

Disciplines List
Engineering Technology

Modality
Face-to-Face

Catalog Description
This course covers electronic schematic capture, simulation, export to printed circuit board design, layout and auto-routing software. It includes basic Computer Aided Design (CAD) drafting, block diagrams, library component templates, and printed circuit baord (PCB) design, fabrication, and assembly, using through-hole and surface-mount technology and devices (SMT and SMD).

Schedule Description
This course covers electronic Computer Aided Design (CAD), schematic capture, simulation, printed circuit board (PCB) design, fabrication, and assembly.
Prerequisite: ENGT 022
Advisory: MATH 060 or ESYS 004

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 022
Advisory: MATH 060 or ESYS 004

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
Manual

Author
Boylestad, Robert L., Kousourou, Gabriel

Title
Laboratory Manual for Introductory Circuit Analysis

Publisher
Pearson

Year
2015

Resource Type
Software

Title
NI Multisim

Edition
Education

Publisher
National Instruments

Year
2017

Description
Multisim is industry-standard SPICE simulation and circuit design software for analog, digital, and power electronics in education and research.

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

Class Size Maximum
30

Entrance Skills
Practice safety around electronics

Prerequisite Course Objectives
ENGT 022-Practice and demonstrate electrical safety.

Entrance Skills
Define key electromagnetic terms

Prerequisite Course Objectives
ENGT 022-Define electromagnetic terminology concepts such as voltage, current, resistance, capacitance, inductance and alternating current.

Entrance Skills
Obtain electrical measurements

Prerequisite Course Objectives
ENGT 022-Obtain electrical measurements using a digital multimeter.

Course Content
1. CAD Drafting Procedures
   a. Basic layout of electronic and mechanical assemblies
   b. Block diagrams
2. Electronic components and symbols
   a. Use of library
   b. Use of schematic symbols templates
3. Capture complete schematics from supplied sketches
   a. Super-heterodyne receiver
   b. A solid-state television
   c. Series/parallel resistive network, with meters on all resistors
   d. Multistage solid state amplifier
   e. A 555 timer/oscillator circuit
   f. Digital Microcontroller system
4. Printed circuit layout/draw a component layout diagram
   a. Multistage, solid-state amplifier
   b. A complex network
5. Design two-layered printed circuit board patterns

a. Multistage solid-state amplifier
b. Complex network

Lab Content

1. CAD Drafting Procedures
   a. Basic layout of electronic and mechanical assemblies
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5. Design two-layered printed circuit board patterns
   a. Multistage solid-state amplifier
   b. Complex network

Course Objectives

	Objectives
Objective 1	Utilize Computer Aided Design (CAD) tools to design circuits.
Objective 2	Generate a bill of materials from the CAD designs.
Objective 3	Adjust electronic circuit parameters as directed.
Objective 4	Simulate electronic circuits using CAD software.

Student Learning Outcomes

	Upon satisfactory completion of this course, students will be able to:
Outcome 1	Ability to capture and simulate given electronic circuits.
Outcome 2	Demonstrate reverse-engineering in all aspects of an existing printed circuit board (PCB) circuit.
Outcome 3	Ability to draw electronic schematics and related mechanical enclosures, using Computer Aided Design (CAD) tools.

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 the lab. Students will discuss their findings with their lab mates.	In Class Only

Laboratory projects	Laboratory projects and findings will be evaluated to gain a better understanding for the students' comprehension of the material. At home, students will write their lab reports.	In and Out of Class
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 a short written response. Also, lab reports will be written at home.	Out of Class Only

Assignments

Other In-class Assignments

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

Other Out-of-class Assignments

1. Reading assignments
2. Writing assignments
3. Lab write-ups
4. Design a functioning PCB, project
5. Reverse engineer a PCB

Grade Methods

Letter Grade Only

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
11/09/2018

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
CCC000603618

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