COURSE SYLLABUS

Tunxis Community College

Education That Works For a Lifetime

Course Title:	Electronic Circuits and Devices	**Date submitted:**	May 2019 (19-25)
Department:	Advanced Manufacturing Technology		
Curriculum:	Technology Studies		

Course Descriptors: Make certain that the course descriptors are consistent with college and Board of Trustees policies, and the current course numbering system.

Course Code: (eg. ACC 101)	MFG*142
Course Type:	X

A: Clinical B: Lab D: Distance Learning
I: Individual/Independent L: Lecture N: Internship
M: Seminar P: Practicum U: Studio
X: Combined Lecture/Lab Y: Combined Lecture/ Clinical/Lab Z: Combined Lecture/Studio

Elective Type:	G

AH: Art History E: English FA: Fine Arts FL: Foreign Language G: General HI: History HU: Humanities LAS: Liberal Arts & Sciences M: Math S: Science SS: Social Science

Credit Hours:	3
Developmental: (yes/no)	No
Contact Hours: Lecture:	1.5
Clinical:	0
Lab:	1.5
Studio	0
Other:	0
TOTAL:	3
Class Maximum:	24
Semesters Offered:	Fall, Spring

Prerequisites:

Math for Electricity & Electronics(MFG*133), Circuit Theory I (MFG*137), Digital Fundamentals (MFG*138), Circuit Theory II (MFG*139), and Robotics (MFG*140)
or consent of the instructor

Corequisites:

None

Other Requirements:

None

Catalog Course Description:

Electronic Circuits & Devices provides an introduction to electronic materials, components, circuits, devices and their applications. The course will provide an overview of semiconductors, diodes, transistors (bi-polar, field-effect and unijunction), applications of SCR and Triac to circuits, and application of components to rectifiers, amplifiers, and relays.

Topical Outline: List course content in outline format.

1. Semiconductors
2. Power Rating and Heat Sinking Components
3. The P-N Junction; The Light Emitting Diode
4. Single Phase Rectifiers; The Polyphase Rectifier
5. Filters
6. The Transistor; The Transistor Switch; The Transistor Amplifier; The Darlington Amplifier
7. Field Effect Transistors

8. The Unijunction Transistor
9. The SCR in a DC Circuit; The SCR in an AC Circuit; Phase Shifting an SCR; SCR Control of a Full Wave Rectifier
10. The Diac and Silicon Bilateral Switch; The Triac; Phase Shifting the Triac; Other Methods of AC Voltage Control
11. The Solid State Relay
12. The Oscillator
13. The Off-delay Timer; The On-delay Timer; The Pulse Timer; The 555 Timer; The 555 Used as an Oscillator; The 555 On-delay Timer; The 555 Pulse Timer
14. The Operational Amplifier; The 741 Op Amp Level Detector; The 741 as an Oscillator

Outcomes:
Describe measurable skills or knowledge that students should be able to demonstrate as evidence that they have mastered the course content.

Upon successful completion of this course, the student will be able to do the following:

1. Demonstrate an understanding of the construction of semiconductor devices and the material from which they are constructed.
2. Demonstrate an understanding of the significance of heat to semiconductors and the devices and materials used to address this issue.
3. Demonstrate an understanding of basic diode operation and testing.
4. Demonstrate the use of the diode in a variety of rectifier applications.
5. Apply the filtering process to a variety of rectifiers.
6. Select and apply bi-polar transistors to amplifier applications.
7. Select and apply Field Effect Transistors to amplifier applications.
8. Apply unijunction transistor to timing applications.
9. Utilize the silicon-controlled rectifier (SCR) in AC and DC circuits.
10. Apply phase shifting circuitry to the SCR.
11. Select and apply the Triac to AC circuits including phase shifting.
12. Select and apply solid state relays.
13. Explore oscillator applications.
14. Utilize off-delay and on-delay solid state timers.
15. Select and utilize various operational amplifiers.

PROGRAM: *Electronics Technology Certificate and A.S. Degree*

1. Demonstrate an understanding of Shop Safety.
2. Demonstrate an understanding the theory of electrical structure, voltage, current, resistance, and electrical circuit and their measurement.
3. Demonstrate an understanding of the basic laws of arithmetic.
4. Demonstrate an understanding of several number systems and codes that are the foundation of digital theory and digital applications.
5. Make comparisons with personal computers; as well as, develop an understanding of its origin and growth since conception.
6. Demonstrate an understanding of the fundamentals of Automated Manufacturing systems.

	GENERAL EDUCATION: *(Numbering reflects General Education Outcomes as they appear in the college catalog)* **No General Education outcomes.**
Evaluation: List how the above outcomes will be assessed.	**Assessment will be based on the following criteria:** 1. Tests and quizzes
Instructional Resources: List library (e.g. books, journals, on-line resources), technological (e.g. Smartboard, software), and other resources (e.g. equipment, supplies, facilities) required and desired to teach this course.	**Required:** Full electronics lab **Desired:** None
Textbook(s)	Electronics for Industrial Electricians, Stephen L. Herman, Delmar Publishers, Inc., latest edition