

PALOMAR COLLEGE
COURSE OUTLINE OF RECORD FOR
DEGREE CREDIT COURSE

X Transfer Course X A.A. Degree applicable course
(check all that apply)

COURSE NUMBER AND TITLE: ECHT 101 Discrete Electronics Circuits

UNIT VALUE: 4.5

MINIMUM NUMBER OF SEMESTER HOURS: 96

BASIC SKILLS REQUIREMENTS: Appropriate language and computational skills.

ENTRANCE REQUIREMENTS

PREREQUISITE: ECHT 100

COREQUISITE: None

RECOMMENDED PREPARATION: None

SCOPE OF COURSE:

Fundamentals of discrete semiconductors, linear and non-linear, analog: diodes, power supplies, transistors, and amplifiers. Laboratory covers application of theory, use of test equipment, circuit design, reconstruction techniques, and troubleshooting carried out through traditional workstation procedures and by computer simulation programs.

SPECIFIC COURSE OBJECTIVES:

Successful students will be able to:

1. Demonstrate basic safety procedures designed to protect the technician, circuit components, and test equipment.
2. Compare and contrast the electrical characteristics of materials that are classified as semiconductors.
3. Explain how the most important semiconductor devices are constructed and operated.
4. Manipulate semiconductor components properly without exceeding their maximum ratings or damaging them with improper handling procedures.
5. Identify the most commonly used semiconductor packages and schematic symbols.
6. Test various semiconductor devices and circuits to determine if they are functioning properly.
7. Predict the conductivity of junction diodes under the conditions of forward and reverse bias.
8. Identify common power supply rectifier and regulator filter configurations and list their characteristics.

9. Explain the difference between the different types of amplifiers.
10. Analyze and design simple inverting and noninverting amplifiers.
11. Construct basic electronic circuits like amplifiers using resistors, capacitors, inductors, transformers, diodes, transistors, power supplies, and generators following traditional lab station procedures using standard equipment, as well as through computer simulated construction, design, and analysis.
12. Apply developed troubleshooting techniques to solve electronic circuit problems utilizing electronic test equipment and computer simulated programs.
13. Utilize Excel to handle lab data and plot graphs.

CONTENT IN TERMS OF SPECIFIC BODY OF KNOWLEDGE:

- I. Semiconductor Materials
 - A. Digital or Analog
 - B. Trends in Electronics
 - C. Conductors
 - D. Semiconductors
 - E. N-Type Semiconductors
 - F. P-Type Semiconductors
 - G. Majority and Minority Carriers
- II. Junction Diodes
 - A. The PN Junction
 - B. Characteristic Curves of Diodes
 - C. Diode Lead Identification
 - D. Diode Types and Applications
- III. Power Supplies
 - A. Power Supplies
 - B. Rectification
 - C. Full-Wave Rectification
 - D. Conversion of RMS Values to Average Values
 - E. Filters
 - F. Voltage Multipliers
 - G. Ripple and Regulation
 - H. Zener Regulators
 - I. Troubleshooting
 - J. Replacement Parts
- IV. Junction Transistors
 - A. Amplification
 - B. Transistors
 - C. Characteristic Curves
 - D. Transistor Data
 - E. Transistor Testing
 - F. Other Transistor Types
- V. Small Signal Amplifiers
 - A. Measuring Gain
 - B. Common-Emitter Amplifier
 - C. Stabilizing the Amplifier
 - D. Other Configurations
 - E. Amplifier Coupling
 - F. Field-Effect Transistor Amplifiers

- G. Negative Feedback
- VI. Largest Signal Amplifiers
 - A. Amplifier Class
 - B. Class A Power Amplifiers
 - C. Class B Power Amplifiers
 - D. Class AB Power Amplifiers
 - E. Class C Power Amplifiers
- VII. Amplifier Troubleshooting
 - A. Preliminary checks
 - B. No Output
 - C. Reduced Output
 - D. Distortion and Noise
 - E. Intermittents

REQUIRED READING:

Malvino, Albert P. Electronic Principles. 6th ed. Westville, OH: McGraw Hill Book Company, 1999.

Malvino, Albert P. Experiments for Electronic Principles. 6th ed. Westville, OH: McGraw Hill Book Company, 1999.

SUGGESTED READING:

Berlin, Howard M. The Illustrated Electronics Dictionary. Columbus, OH: Merrill Publishing Company, 1986.

Floyd, Thomas L. Electronics Fundamentals; Circuits, Devices, and Applications. 5th ed. Columbus, OH: Merrill Publishing Company, 1998

Beitzel, Wallace D., and James H. Harter. Mathematics applied to Electronics. 3rd ed. Englewood Cliffs, NJ: Prentice Hall, 1988

REQUIRED WRITING:

1. Approximately 12 problem solving exercises of approximately one to three paragraphs in length used in evaluation testing.
2. Approximately 16 laboratory reports (writings related to conclusions/discussions of results of experimental findings) of approximately one to three paragraphs in length.

OUTSIDE ASSIGNMENTS:

Students are expected to spend a minimum of three hours per unit per week in class and on outside assignments, prorated for short-term classes.

Reading assignments are from the text, laboratory manuals, and handouts in preparation for quizzes and tests. Approximately 300 pages in the textbook and 200 pages in the laboratory manuals are required readings for the course. Writings as stated in "Required Writings."

INSTRUCTIONAL METHODOLOGY:

Check all that apply:

- lecture
- laboratory
- lecture-laboratory combination
- directed study

DISTANCE LEARNING:

This course may be offered as a distance learning course and meets Title 5 regulations 55370, 55372, 55374, 55376, 55378, and 55380.

Yes No

If yes, check all that apply:

- Television Course (Video one-way, e.g. ITV, video cassette, etc.)
- Online Course (Text one-way, e.g. newspaper, correspondence, electronic file, etc.)
- Two-Way Video Conferencing (Two-way interactive video and audio)
- One-Way Video Conferencing (One-way interactive video and two-way interactive audio)
- Computer Assisted Instruction (A specialized form of mediated instruction relying primarily on student access to information and prepared lessons or teaching materials through a computer terminal, but not under immediate supervision of a qualified instructor.)

GRADING POLICY AND STANDARDS (include methods of determining whether the stated objectives have been met by students):

Quizzes	9%
Homework	29%
Class Tests	30%
Average of Laboratory Experiments	29%
Computer Circuit Simulations	3%

IS COURSE REPEATABLE FOR REASON(S) OTHER THAN DEFICIENT GRADE?

Yes No Number of times course may be taken for credit: one

If yes, identify specific provision of Title 5 Division 2 section(s), 55761-55763 and 58161 which qualifies course as repeatable:

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SIGNATURES ON FILE