

SYLLABUS

DATE OF LAST REVIEW:	09/2019
CIP CODE:	15.1201
SEMESTER:	Departmental Syllabus
COURSE TITLE:	Semiconductor Electronics
COURSE NUMBER:	ENGR-0109
CREDIT HOURS:	3
INSTRUCTOR:	Departmental Syllabus
OFFICE LOCATION:	Departmental Syllabus
OFFICE HOURS:	Departmental Syllabus
TELEPHONE:	913-334-1100
EMAIL:	<i>KCKCC issued email accounts are the official means for electronically communicating with our students.</i>
PREREQUISITE(S):	Concurrent enrollment in ENGR-0108, Electronic Circuit Fundamentals recommended.

REQUIRED TEXT AND MATERIALS: Please check with the KCKCC bookstore, <http://www.kckccbookstore.com/>, for the required texts for your particular class.

COURSE DESCRIPTION:

Semiconductor Electronics is an introduction to semiconductor materials, the concept of junction and biasing, diodes, and transistors. Students use semiconductor components in circuits and construct circuits in laboratory experiments as well as recognize various semiconductor components and their characteristic data from the manufacturer's data books.

METHOD OF INSTRUCTION: A variety of instructional methods may be used depending on content area. These include but are not limited to: lecture, multimedia, cooperative/collaborative learning, labs and demonstrations, projects and presentations, speeches, debates, and panels, conferencing, performances, and learning experiences outside the classroom. Methodology will be selected to best meet student needs.

COURSE OUTLINE:

- I. Unit 1. Fundamental Solid-State Principles
 - A. Atomic Theory
 - B. Doping
 - C. The PN Junction
 - D. Bias
- II. Unit 2. Diodes
 - A. Introduction to pn-junction Diode
 - B. The Ideal Diode
 - C. The Practical Diode Model
 - D. Other Practical Considerations
 - E. The Complete Diode Model
 - F. Diode Specification Sheets
 - G. Zener Diode
 - H. Zener Diode Specification Sheets
 - I. Light-Emitting Diodes (LED)
 - J. Diode Testing
- III. Unit 3. Common Diode Applications (Basic Power Supply Circuits)
 - A. Transformers
 - B. Half-Wave rectifiers
 - C. Full-Wave Rectifiers
 - D. Working With Rectifiers
 - E. Filters
 - F. Zener Voltage Regulators
 - G. Power Supply Troubleshooting
- IV. Unit 4. Common Diode applications
 - A. Clippers
 - B. Clipper Applications
 - C. Clampers(DC Restorers)
 - D. Voltage Multipliers
 - E. LED Applications
 - F. Diode Troubleshooting
- V. Unit 5. Bipolar Junction Transistor
 - A. Introduction to Bipolar Junction Transistors
 - B. Transistor construction and Operation
 - C. Transistor Currents, Voltages, and Ratings
 - D. Transistor Characteristic Curves
 - E. Transistor Specification Sheets
 - F. Transistor Testing

EXPECTED LEARNER OUTCOMES:

- A. Upon completion of the course the student will be able to describe the fundamental solid-state principles.
- B. Upon completion of the course the student will be able to identify common types Diodes.
- C. Upon completion of the course the student will be able to identify common type of power supplies.

- D. Upon completion of the course the student will be able to identify common Diode applications.
- E. Upon completion of the course the student will be able to identify a Bipolar Junction Transistors.

COURSE COMPETENCIES:

Upon completion of the course the student will be able to describe the fundamental solid-state principles.

1. Upon completion of the course the student will be able to describe fundamental atomic theory, doping theory, and a junction theory.

Upon completion of the course the student will be able to identify common types of Diodes.

2. Upon completion of the course the student will be able to identify types of Diodes.
3. Upon completion of the course the student will be able to read a Diode specification sheet.
4. Upon completion of the course the student will be able to test a Diode.
5. Upon completion of the course the student will be able to identify common types of power supplies.
6. Upon completion of the course the student will be able to identify clippers, clampers and other common Diode applications.

Upon completion of the course the student will be able to identify common types of power supplies.

7. Upon completion of the course the student will be able to construct a Half-Wave Rectifier.
8. Upon completion of the course the student will be able to construct a Full-Wave Rectifier.
9. Upon completion of the course the student will be able to construct a Bridge Rectifier.
10. Upon completion of the course the student will be able to troubleshoot a basic power supply circuit.
11. Upon completion of the course the student will be able to discuss the power supply characteristics.
12. Upon completion of the course the student will be able to discuss power supply troubleshooting techniques.

Upon completion of the course the student will be able to identify common Diode applications.

13. Upon completion of the course the student will be able to construct a clipper circuit.
14. Upon completion of the course the student will be able to construct a clamper circuit.
15. Upon completion of the course the student will be able to construct a voltage multiplier circuit.
16. Upon completion of the course the student will be able to discuss where specific types of diodes are used.
17. Upon completion of the course the student will be able to discuss the equipment used to test a diode.
18. Upon completion of the course the student will be able to discuss the waveform characteristics for a clamper.

19. Upon completion of the course the student will be able to discuss the waveform characteristics for a clipper.
20. Upon completion of the course the student will be able to determine the proper output voltage from a voltage multiplier.

Upon completion of the course the student will be able to identify a Bipolar Junction Transistors.

21. Upon completion of the course the student will be able to construct a bipolar junction transistor circuit.
22. Upon completion of the course the student will be able to test a bipolar junction transistor.
23. Upon completion of the course the student will be able to discuss how a pn junction is formed.
24. Upon completion of the course the student will be able to discuss what equipment can be used to check a transistor.

ASSESSMENT OF LEARNER OUTCOMES:

Assessment methods may include, but are not limited to, the following: Homework, Assignments, Quizzes, Class Participation, Chapter Tests, and Final Exam. The grading scale and the process for calculating the course grades are to be determined by the individual instructors. This information will be included in each instructor's syllabus.

SPECIAL NOTES:

This syllabus is subject to change at the discretion of the instructor. Material included is intended to provide an outline of the course and rules that the instructor will adhere to in evaluating the student's progress. However, this syllabus is not intended to be a legal contract. Questions regarding the syllabus are welcome any time.

Kansas City Kansas Community College is committed to an appreciation of diversity with respect for the differences among the diverse groups comprising our students, faculty, and staff that is free of bigotry and discrimination. Kansas City Kansas Community College is committed to providing a multicultural education and environment that reflects and respects diversity and that seeks to increase understanding.

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All enrolled students at Kansas City Kansas Community College are subject to follow all rules, conditions, policies and procedures as described in both the Student Code of Conduct as well as the Student Handbook. All Students are expected to review both of these documents and to

understand their responsibilities with regard to academic conduct and policies. The Student Code of Conduct and the Student Handbook can be found on the KCKCC website.