

**University of Hawaii Maui College**  
**ETRO 210 - Electronic Technology I**

**1. Course Alpha.**

ETRO

**2. Course Number.**

210

**3. Course Title/Catalog Title.**

Electronic Technology I

**4. Number of Credits..**

3

**5. Contact Hours/Type.**

- Hour lecture/lab (4)

**6. Course Description.**

Investigates amplifiers including audio, radio, and infrared sensing applications. Introduces topics including basic theory and operations of solid-state devices. Applies to diodes, bipolar transistors, field effect transistors, and Zener diodes. Studies electronic circuits performing rectifying and amplification.

**7. Pre-Requisites.**

ETRO 105 and MATH 119 or 135 (or higher), both with grade C or better; or consent.

**8. Co-requisites.**

None

**9. Recommended Preparation.**

None

**10. Is this a cross-listed course?**

NO

**11. Reason for Proposal. Why is this course being proposed or modified? This question requires specific information as part of the explanation. Please click on the ? to the right for help.**

The math pre-requisite has changed: MATH 119 replaces MATH 107 to better prepare ECET students for math in the BAS ENGT degree program.

**12. Effective Semester and Year.**

Fall 2015

**13. Grading Method. What grading methods may be used for this course?**

- Standard (Letter,Cr/NCr,Audit) (0)

**14. Is this course repeatable for credit? How often can this course be counted toward a degree or certificate?**

NO

**15. Course Student Learning Outcomes (SLOs). DO NOT ENTER TEXT IN THE TEXT BOX BELOW. Click on the yellow button "COURSE LEARNING OUTCOMES" and enter in that screen.**

Course SLO/Competency	Describe the function, operation and characteristics of solid-state electronic devices.	Measure and test diode circuits.	Measure and test transistor circuits.
Identify types of diodes.	<input checked="" type="checkbox"/>		
Describe forward and reverse bias.	<input checked="" type="checkbox"/>		
Measure the current through a junction diode.		<input checked="" type="checkbox"/>	
Troubleshoot diode circuits.		<input checked="" type="checkbox"/>	
Describe diode limiter operation.		<input checked="" type="checkbox"/>	
Describe diode clamper operation.		<input checked="" type="checkbox"/>	
Identify types of transistors.			<input checked="" type="checkbox"/>
Describe NPN and PNP transistor operation.			<input checked="" type="checkbox"/>
Test transistors.			<input checked="" type="checkbox"/>
Measure the Alpha and Beta of transistors.			<input checked="" type="checkbox"/>
Measure the bias of an amplifier circuit.			<input checked="" type="checkbox"/>
Describe amplifier configurations.			<input checked="" type="checkbox"/>
Measure the input/output waveforms from common emitter, common collector and common base amps.			<input checked="" type="checkbox"/>
Identify and test rectifier circuits.			<input checked="" type="checkbox"/>
Describe Zener operation.		<input checked="" type="checkbox"/>	
Measure and test Zener diode regulator circuits.		<input checked="" type="checkbox"/>	

Course SLO/PSLO	Analyze, design, and implement electro-optic systems, control systems, instrumentation systems, communication systems, computer systems, or power systems.	Utilize appropriate mathematics at the level of algebra and trigonometry to solve technical problems.	Demonstrate critical engineering technology skills and experiences such as: making existing technology operate, creating/selecting new technology, troubleshooting, calibrating, characterizing, and optimizing.	Demonstrate engineer's way of thinking, analyzing technology as systems.
Describe the function, operation and characteristics of solid-state electronic devices.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Measure and test diode circuits.			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Measure and test transistor circuits.			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

**16. Course Competencies. DO NOT ENTER TEXT IN THE TEXT BOX BELOW. Click on the yellow button "COURSE COMPETENCIES/ISSUES/SKILLS" and enter text in that screen. Course competencies are smaller, simpler tasks that connect to and facilitate the SLOs.**

Competency
Identify types of diodes.
Describe forward and reverse bias.
Measure the current through a junction diode.
Troubleshoot diode circuits.
Describe diode limiter operation.
Describe diode clamper operation.
Identify types of transistors.
Describe NPN and PNP transistor operation.

- Test transistors.
- Measure the Alpha and Beta of transistors.
- Measure the bias of an amplifier circuit.
- Describe amplifier configurations.
- Measure the input/output waveforms from common emitter, common collector and common base amps.
- Identify and test rectifier circuits.
- Describe Zener operation.
- Measure and test Zener diode regulator circuits.

**17. Recommended Course Content and Timeline. The course content facilitates the course competencies. Course content may be organized by weeks, units, topics or the like.**

Content
1-2 weeks Introduction to electronic devices, KVL and KCL review.
1-2 weeks Diode action, operation and characteristics; diode limiter, schematic symbols, operating characteristics and waveforms.
1-2 weeks Junction diode faults and troubleshooting; power supplies and diode rectifiers.
1-2 weeks Half and full wave rectifiers, operations and characteristics; Bridge rectifiers and operation.
1-2 weeks Zener diode action and voltage regulation. Power supply filters.
1-2 weeks Bipolar transistor action, testing and biasing; amplifiers, configurations, common emitter amp.
1-2 weeks Common collector amplifiers, circuit values and waveforms; common base amplifiers.
1-2 weeks Amplifier circuits and testing.
1 week Review and Final.

**18. Program Learning Outcomes. DO NOT ENTER TEXT IN THE TEXT BOX BELOW. Click on the yellow button "PLOs" and enter text in that screen. Program Student Learning Outcomes (PLOs) supported by this course. If you are not a "program" use the Liberal Arts PLOs, view them by clicking on ? icon to the right.**

Program SLO
Analyze, design, and implement electro-optic systems, control systems, instrumentation systems, communication systems, computer systems, or power systems.
Utilize appropriate mathematics at the level of algebra and trigonometry to solve technical problems.
Demonstrate critical engineering technology skills and experiences such as: making existing technology operate, creating/selecting new technology, troubleshooting, calibrating, characterizing, and optimizing.
Demonstrate engineer's way of thinking, analyzing technology as systems.

**19. College-wide Academic Student Learning Outcomes (CASLOs). FIRST, fill out the CASLO grid located in the UHMC tab above. Click on the HELP icon for tips on determining support for the CASLOs and indicate your choices below by clicking on the box in front of each supported CASLO. NOTE: Our campus does not use the Preparatory Level, Level 1 and Level 2 designations in the chart below.**

<input checked="" type="checkbox"/>	<b>Creativity</b> - Able to express originality through a variety of forms. <input checked="" type="checkbox"/> Preparatory Level
<input checked="" type="checkbox"/>	<b>Critical Thinking</b> - Apply critical thinking skills to effectively address the challenges and solve problems. <input checked="" type="checkbox"/> Preparatory Level
	<b>Information Retrieval and Technology</b> - Access, evaluate, and utilize information effectively, ethically, and responsibly.
	<b>Oral Communication</b> - Practice ethical and responsible oral communications appropriately to a variety of audiences and purposes.
<input checked="" type="checkbox"/>	<b>Quantitative Reasoning</b> - Synthesize and articulate information using appropriate mathematical methods to solve problems of quantitative reasoning accurately and appropriately. <input checked="" type="checkbox"/> Preparatory Level
	<b>Written Communication</b> - Write effectively to convey ideas that meet the needs of specific audiences and purposes.

20. Linking. CLICK ON CHAIN LINK ICON IN UPPER RIGHT HAND CORNER TO BEGIN LINKING.

21. Method(s) of delivery appropriate for this course.

- Classroom/Lab (0)

22. Text and Materials, Reference Materials, and Auxiliary Materials.

Text(s) may be supplemented with:

- C.A.I. NIDA 130 DAAD Courseware
- Electronics Lab
- Accompanying practice exercises

Other:

- Scientific Calculator
- Engineering Notebook

- Thomas L. Floyd and David M. Bucha. Electronics Fundamentals: circuits, devices, and applications. 8th E. Pearson, Prentice Hall, 2010, 978-0-13-507295-0.

23. Maximum enrollment.

24

24. Particular room type requirement. Is this course restricted to particular room type?

YES

Lab with electronics equipment and computers to carry out the experiments like KAA 217.

25. Special scheduling considerations. Are there special scheduling considerations for this course?

YES

This class must fit the ECET AS degree course scheduling.

26. Are special or additional resources needed for this course?

Electronics equipment: Power supplies, function generators, oscilloscopes, digital multimeter, computers and electronic components.

Software packages: Multisim, MATLAB.

27. Does this course require special fees to be paid for by students?

NO

28. Does this course change the number of required credit hours in a degree or certificate?

No.

29. Course designation(s) for the Liberal Arts A.A. degree and/or for the college's other associate degrees.

Degree	Program	Category
Associate in Arts:	Liberal Arts	LE - Elective
		LE - Elective
AS:	ECET - All	PR - Program Requirement
AAS:		
BAS:		
Developmental/ Remedial:		

30. Course designation(s) for other colleges in the UH system.

This course transfers as an elective.

31. Indicate the year and page # of UHMC catalog referred to. For new or modified courses, please indicate the catalog pages that need to be modified and provide a sheet outlining those changes.

Referred catalog and modifications: pages 45 and 112 in UHMC's 2014-2015 general catalog.

32. College-wide Academic Student Learner Outcomes (CASLOs).

<b>Standard 1 - Written Communication</b>	
Write effectively to convey ideas that meet the needs of specific audiences and purposes.	
Outcome 1.1 - Use writing to discover and articulate ideas.	0
Outcome 1.2 - Identify and analyze the audience and purpose for any intended communication.	0
Outcome 1.3 - Choose language, style, and organization appropriate to particular purposes and audiences.	0
Outcome 1.4 - Gather information and document sources appropriately.	1
Outcome 1.5 - Express a main idea as a thesis, hypothesis, or other appropriate statement.	1
Outcome 1.6 - Develop a main idea clearly and concisely with appropriate content.	1
Outcome 1.7 - Demonstrate a mastery of the conventions of writing, including grammar, spelling, and mechanics.	0
Outcome 1.8 - Demonstrate proficiency in revision and editing.	0
Outcome 1.9 - Develop a personal voice in written communication.	0
<b>Standard 2 - Quantitative Reasoning</b>	
Synthesize and articulate information using appropriate mathematical methods to solve problems of quantitative reasoning accurately and appropriately.	
Outcome 2.1 - Apply numeric, graphic, and symbolic skills and other forms of quantitative reasoning accurately and appropriately.	3
Outcome 2.2 - Demonstrate mastery of mathematical concepts, skills, and applications, using technology when appropriate.	3
Outcome 2.3 - Communicate clearly and concisely the methods and results of quantitative problem solving.	2
Outcome 2.4 - Formulate and test hypotheses using numerical experimentation.	3
Outcome 2.5 - Define quantitative issues and problems, gather relevant information, analyze that information, and present results.	2
Outcome 2.6 - Assess the validity of statistical conclusions.	2

<b>Standard 3 - Information Retrieval and Technology.</b> Access, evaluate, and utilize information effectively, ethically, and responsibly.	
Outcome 3.1 - Use print and electronic information technology ethically and responsibly.	1
Outcome 3.2 - Demonstrate knowledge of basic vocabulary, concepts, and operations of information retrieval and technology.	1
Outcome 3.3 - Recognize, identify, and define an information need.	1
Outcome 3.4 - Access and retrieve information through print and electronic media, evaluating the accuracy and authenticity of that information.	1
Outcome 3.5 - Create, manage, organize, and communicate information through electronic media.	1
Outcome 3.6 - Recognize changing technologies and make informed choices about their appropriateness and use.	1
<b>Standard 4 - Oral Communication</b> Practice ethical and responsible oral communications appropriately to a variety of audiences and purposes.	
Outcome 4.1 - Identify and analyze the audience and purpose of any intended communication.	0
Outcome 4.2 - Gather, evaluate, select, and organize information for the communication.	1
Outcome 4.3 - Use language, techniques, and strategies appropriate to the audience and occasion.	0
Outcome 4.4 - Speak clearly and confidently, using the voice, volume, tone, and articulation appropriate to the audience and occasion.	0
Outcome 4.5 - Summarize, analyze, and evaluate oral communications and ask coherent questions as needed.	1
Outcome 4.6 - Use competent oral expression to initiate and sustain discussions.	1
<b>Standard 5 - Critical Thinking</b> Apply critical thinking skills to effectively address the challenges and solve problems.	
Outcome 5.1 - Identify and state problems, issues, arguments, and questions contained in a body of information.	3
Outcome 5.2 - Identify and analyze assumptions and underlying points of view relating to an issue or problem.	3
Outcome 5.3 - Formulate research questions that require descriptive and explanatory analyses.	2
Outcome 5.4 - Recognize and understand multiple modes of inquiry, including investigative methods based on observation and analysis.	2
Outcome 5.5 - Evaluate a problem, distinguishing between relevant and irrelevant facts, opinions, assumptions, issues, values, and biases through the use of appropriate evidence.	3
Outcome 5.6 - Apply problem-solving techniques and skills, including the rules of logic and logical sequence.	3
Outcome 5.7 - Synthesize information from various sources, drawing appropriate conclusions.	2
Outcome 5.8 - Communicate clearly and concisely the methods and results of logical reasoning.	2
Outcome 5.9 - Reflect upon and evaluate their thought processes, value system, and world views in comparison to those of others.	2
<b>Standard 6 - Creativity</b> Able to express originality through a variety of forms.	
Outcome 6.1: Generate responses to problems and challenges through intuition and non-linear thinking.	2
Outcome 6.2: Explore diverse approaches to solving a problem or addressing a challenge.	2
Outcome 6.3: Sustain engagement in activities without a preconceived purpose.	2
Outcome 6.4: Apply creative principles to discover and express new ideas.	2
Outcome 6.5: Demonstrate the ability to trust and follow one's instincts in the absence of external direction	2
Outcome 6.6: Build upon or adapt the ideas of others to create novel expressions or new solutions.	2

### 33. Additional Information