

**University of Hawaii Maui College  
ELEC 20 - Introduction to Electricity**

1. **Course Alpha.** Please click on the ? to the right for help.

ELEC

2. **Course Number.** Please click on the ? to the right for help.

20

3. **Course Title/Catalog Title.** Please click on the ? to the right for help.

Introduction to Electricity

4. **Number of Credits.** Please click on the ? to the right for help.

3

5. **Contact Hours/Type.** Please click on the ? to the right for help.

- Hour lecture (3)

3 Hour lecture

6. **Course Description.** Please click on the ? to the right for help.

Examines residential, commercial, and industrial wiring systems. Studies current, voltage, resistance and Ohm's Law. Discusses magnetism, Electrical measurements, DC circuits, induction, and capacitance.

7. **Pre-Requisites.** Please click on the ? to the right for help.

MATH 22 with a grade of C or better, or placement at MATH 82, or consent;  
and ENG 19 with a grade of C or better, or placement at least ENG 22, or consent.

8. **Co-requisites.**

None

9. **Recommended Preparation.**

None

10. **Is this a cross-listed course?** Please click on the ? to the right for help.

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.

Modify Existing Course  
Add Math and English Prerequisites

12. **Effective Semester and Year.** For new or modified courses, the effective year is one year from the semester proposed. For example, if proposed in Spring 2012, the effective semester is Spring 2013. Please click on the ? to the right for help.

Spring 2016

13. **Grading Method.** What grading methods may be used for this course? Please click on the ? to the right for help.

- 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? Please click on the ? to the right for help.

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. Please click on the ? to the right for help.

Course SLO/Competency	Express and	Identify series,	Apply Ohm's Law	Explain Kirchoff's	Explain the properties of	Identify the different	Explain the proper use of	Explain electrical	Interpret motor	Apply Left
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	employ basic electrical theory to include current, voltage, and resistance.	parallel, and series-parallel circuits.	calculations to series and parallel circuits.	Current and Voltage Laws and its corollaries.	conductors and the differences of conductors, insulators, and semiconductors	types of electrical test equipment to include: analog, digital, and solenoid types including the various accessories.	these electrical testing instruments along with safety procedures and safety equipment requirements.	safety principles and basic lockout/tagout procedures.	electrical values related to Kirchoff Law, Lorentz's Law, and Faraday's Law.	Hand and Right Hand Rules when analyzing motor physics.
Discuss and compare the relationships of voltage, resistance, current, and power	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	
Apply fundamental calculations of Ohm's Law to support electrical theories	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Identify magnetism and electromagnetism in AC and DC circuits	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Recognize and identify AC and DC equipment	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Differentiate and estimate induction and capacitance in AC systems	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Explain the importance of electrical grounding for equipment	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Determine electrical values in series, parallel, and combination circuits	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Demonstrate proper selection and use of volt, ohm, and amp meters and their related functions	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Discuss electrical theory related to common motor technology.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Course SLO/PSLO	Use appropriate materials, tools equipment and procedures to carry out tasks performed on construction projects according to safety and industry standards.	Use math skills to solve problems related to construction plans and processes.	Introducing the requirements of the Green Building certification program. To include, waste stream management, locally developed energy sources, renewable sustainable materials and resources.	Gain knowledge of how to implement the sustainable living practices of the host Hawaiian culture.
Discuss and compare the relationships of voltage, resistance, current, and power	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		

Apply fundamental calculations of Ohm's Law to support electrical theories	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Identify magnetism and electromagnetism in AC and DC circuits	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Recognize and identify AC and DC equipment	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Differentiate and estimate induction and capacitance in AC systems	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Explain the importance of electrical grounding for equipment	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Determine electrical values in series, parallel, and combination circuits	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Demonstrate proper selection and use of volt, ohm, and amp meters and their related functions	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Discuss electrical theory related to common motor technology.		<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.**

<b>Competency</b>
Express and employ basic electrical theory to include current, voltage, and resistance.
Identify series, parallel, and series-parallel circuits.
Apply Ohm's Law calculations to series and parallel circuits.
Explain Kirchoff's Current and Voltage Laws and its corollaries.
Explain the properties of conductors and the differences of conductors, insulators, and semiconductors
Identify the different types of electrical test equipment to include: analog, digital, and solenoid types including the various accessories.
Explain the proper use of these electrical testing instruments along with safety procedures and safety equipment requirements.
Explain electrical safety principles and basic lockout/tagout procedures.
Interpret motor electrical values related to Kirchoff Law, Lorentz's Law, and Faraday's Law.
Apply Left Hand and Right Hand Rules when analyzing motor physics.

**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.**

- Electrical Safety (1 Week)
- Electrical Theory and Ohm's Law (2 Weeks)
- Electrical Testing and Measurement Instruments (1 Week)
- Series, Parallel, and Combination Circuits (2-3 Weeks)
- Wiring Tables (1Week)
- Alternating Current (1 Week)
- Magnetic Induction and Inductive Circuits (2-3 Weeks)
- Capacitors and Capacitive Circuits (2-3 Weeks)
- Single Phase Transformers (1Week)
- Single Phase Motors (1 Week)

**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.**

<b>Program SLO</b>
Use appropriate materials, tools equipment and procedures to carry out tasks performed on construction projects according to safety and industry standards.
Use math skills to solve problems related to construction plans and processes.
Introducing the requirements of the Green Building certification program. To include, waste stream management, locally developed energy sources, renewable sustainable materials and resources.
Gain knowledge of how to implement the sustainable living practices of the host Hawaiian culture.

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.

	<b>Creativity</b> - Able to express originality through a variety of forms.
<input checked="" type="checkbox"/>	<b>Critical Thinking</b> - Apply critical thinking skills to effectively address the challenges and solve problems. <input checked="" type="checkbox"/> Level 1
	<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"/> Level 1
	<b>Written Communication</b> - Write effectively to convey ideas that meet the needs of specific audiences and purposes.

**GenED SLO**

Critical Thinking - Apply critical thinking skills to effectively address the challenges and solve problems.

Quantitative Reasoning - Synthesize and articulate information using appropriate mathematical methods to solve problems of quantitative reasoning accurately and appropriately.

20. Linking. CLICK ON CHAIN LINK ICON IN UPPER RIGHT HAND CORNER TO BEGIN LINKING. Please click on the ? to the right for help.

21. Method(s) of delivery appropriate for this course. Please click on the ? to the right for help.

- Classroom/Lab (0)

22. Text and Materials, Reference Materials, and Auxiliary Materials. Please click on the ? to the right for help.

Appropriate text(s) and materials will be chosen at the time the course is offered from those currently available in the field.

Example: Electrical Principles, 2nd Edition by Stephen L. Herman, Publication Date: 2012, Delmar, Cengage Learning, ISBN-13: 978-1-111-30647-2, ISBN-10: 1-111-30647-8

Text may be supplemented with but not limited to videos, internet resources, workbooks, demonstration equipment and visual aids at the discretion of the instructor.

23. Maximum enrollment. Please click on the ? to the right for help.

20 (Voctech classroom capacity)

24. Particular room type requirement. Is this course restricted to particular room type? Please click on the ? to the right for help.

NO

25. Special scheduling considerations. Are there special scheduling considerations for this course? Please click on the ? to the right for help.

NO

26. Are special or additional resources needed for this course? Please click on the ? to the right for help.

None

27. Does this course require special fees to be paid for by students? Please click on the ? to the right for help.

NO

28. Does this course change the number of required credit hours in a degree or certificate? Please click on the ? to the right for help.

No

29. Course designation(s) for the Liberal Arts A.A. degree and/or for the college's other associate degrees. Please click on the ? to the right for help.

Degree	Program	Category
Associate in Arts:		
AS:		
AAS:	Sustainable Construction Technology	PR - Program Requirement
BAS:		
Developmental/ Remedial:		

CO: Electrical Maintenance

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

ELEC 20 Kauai CC

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.

UHMC 2014-2015: Program Map, page 53; Course Title- page111

32. College-wide Academic Student Learner Outcomes (CASLOs). Please click on the HELP icon for more information.

<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.		1
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.		0
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		

<b>reasoning accurately and appropriately.</b>		
<b>Outcome 2.1 - Apply numeric, graphic, and symbolic skills and other forms of quantitative reasoning accurately and appropriately.</b>		3
<b>Outcome 2.2 - Demonstrate mastery of mathematical concepts, skills, and applications, using technology when appropriate.</b>		3
<b>Outcome 2.3 - Communicate clearly and concisely the methods and results of quantitative problem solving.</b>		3
<b>Outcome 2.4 - Formulate and test hypotheses using numerical experimentation.</b>		2
<b>Outcome 2.5 - Define quantitative issues and problems, gather relevant information, analyze that information, and present results.</b>		2
<b>Outcome 2.6 - Assess the validity of statistical conclusions.</b>		2
<b>Standard 3 - Information Retrieval and Technology. Access, evaluate, and utilize information effectively, ethically, and responsibly.</b>		
<b>Outcome 3.1 - Use print and electronic information technology ethically and responsibly.</b>		0
<b>Outcome 3.2 - Demonstrate knowledge of basic vocabulary, concepts, and operations of information retrieval and technology.</b>		0
<b>Outcome 3.3 - Recognize, identify, and define an information need.</b>		0
<b>Outcome 3.4 - Access and retrieve information through print and electronic media, evaluating the accuracy and authenticity of that information.</b>		0
<b>Outcome 3.5 - Create, manage, organize, and communicate information through electronic media.</b>		0
<b>Outcome 3.6 - Recognize changing technologies and make informed choices about their appropriateness and use.</b>		0
<b>Standard 4 - Oral Communication Practice ethical and responsible oral communications appropriately to a variety of audiences and purposes.</b>		
<b>Outcome 4.1 - Identify and analyze the audience and purpose of any intended communication.</b>		0
<b>Outcome 4.2 - Gather, evaluate, select, and organize information for the communication.</b>		0
<b>Outcome 4.3 - Use language, techniques, and strategies appropriate to the audience and occasion.</b>		2
<b>Outcome 4.4 - Speak clearly and confidently, using the voice, volume, tone, and articulation appropriate to the audience and occasion.</b>		0
<b>Outcome 4.5 - Summarize, analyze, and evaluate oral communications and ask coherent questions as needed.</b>		2
<b>Outcome 4.6 - Use competent oral expression to initiate and sustain discussions.</b>		2
<b>Standard 5 - Critical Thinking Apply critical thinking skills to effectively address the challenges and solve problems.</b>		
<b>Outcome 5.1 - Identify and state problems, issues, arguments, and questions contained in a body of information.</b>		2
<b>Outcome 5.2 - Identify and analyze assumptions and underlying points of view relating to an issue or problem.</b>		2
<b>Outcome 5.3 - Formulate research questions that require descriptive and explanatory analyses.</b>		2
<b>Outcome 5.4 - Recognize and understand multiple modes of inquiry, including investigative methods based on observation and analysis.</b>		2
<b>Outcome 5.5 - Evaluate a problem, distinguishing between relevant and irrelevant facts, opinions, assumptions, issues, values, and biases through the use of appropriate evidence.</b>		3
<b>Outcome 5.6 - Apply problem-solving techniques and skills, including the rules of logic and logical sequence.</b>		3
<b>Outcome 5.7 - Synthesize information from various sources, drawing appropriate conclusions.</b>		3
<b>Outcome 5.8 - Communicate clearly and concisely the methods and results of logical reasoning.</b>		3

<b>Outcome 5.9 - Reflect upon and evaluate their thought processes, value system, and world views in comparison to those of others.</b>		0
<b>Standard 6 - Creativity</b> <b>Able to express originality through a variety of forms.</b>		
<b>Outcome 6.1: Generate responses to problems and challenges through intuition and non-linear thinking.</b>		0
<b>Outcome 6.2: Explore diverse approaches to solving a problem or addressing a challenge.</b>		1
<b>Outcome 6.3: Sustain engagement in activities without a preconceived purpose.</b>		0
<b>Outcome 6.4: Apply creative principles to discover and express new ideas.</b>		0
<b>Outcome 6.5: Demonstrate the ability to trust and follow one's instincts in the absence of external direction</b>		2
<b>Outcome 6.6: Build upon or adapt the ideas of others to create novel expressions or new solutions.</b>		0

### 33. Additional Information

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