Curriculum Action Request (CAR) Form
COURSE (New Course, Course Modification, Five Year Review)
University of Hawai'i Maui College

Curriculum Proposal # 2015.10
(for CURCOM use only)

1. Curriculum Action

☐ New Course ☑ Course Modification ☐ Five Year Review

2. Proposer

Clifford Rutherford

3. Department

☐ Allied Health ☐ Business & Hospitality ☑ Career & Tech Education
☐ English ☐ Humanities ☐ Social Science
☐ Science/Tech/Eng/Math

4. Course Alpha

ELEC

5. Course Number

20

6. Course Title

Introduction to Electricity

7. If this is a course modification or a five year review, please check the curriculum items being modified.

☐ 1. Course Alpha ☐ 2. Course Number ☐ 3. Course Title
☐ 4. Credits ☐ 5. Contact Hours ☐ 6. Course Description
☐ 7. Prerequisites ☐ 8. Corequisites ☐ 9. Rec Prep
☐ 10. Cross-list w other course ☐ 13. Grading Method ☐ 14. Repeatable for credit?
☐ 15. SLOs ☐ 16. Course Competencies ☐ 17. Content & Timeline
☑ 18. PLOs ☐ 19. CASLOs ☐ 21. Method of Delivery
☐ 22. Text and Materials ☐ 23. Maximum Enrollment ☐ 29. Course Designation
☑ 31. Catalog Modification
☐ Other

8. Proposed Semester

Fall 2015

9. Effective Semester (1 Year from Proposed Semester)

Fall 2016

2015.10

University of Hawaii Maui College
ELEC 20 - Introduction to Electricity

1. **Course Alpha.**

   ELEC

2. **Course Number.**

   20

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

   Introduction to Electricity

4. **Number of Credits.**

   3

5. **Contact Hours/Type.**

   - Hour lecture (3)

6. **Course Description.**

   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.**

   ENG 19 with grade C or better, or placement at least ENG 22, and MATH 22 with grade C or better, or placement at least MATH 82, 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.**

    Modify Existing Course
    To address new PLOs

12. **Effective Semester and Year.**

    Fall 2016

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).

Course SLO/Competency	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 Kirchhoff'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 Kirchhoff's Law, Lorentz's Law, and Faraday's Law.	Apply Left Hand and Right Hand Rules when analyzing motor physics.
Discuss and compare the relationships of voltage, resistance, current, and power	☑	☑	☑	☑	☑				☑	
Apply fundamental calculations of Ohm's Law to support electrical theories	☑	☑	☑	☑	☑			☑	☑	
Identify magnetism and electromagnetism in AC and DC circuits	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Recognize and identify AC and DC equipment	☑	☑	☑	☑	☑	☑			☑	☑
Differentiate and estimate induction and capacitance in AC systems	☑	☑	☑	☑					☑	☑
Explain the importance of electrical grounding for equipment	☑				☑	☑	☑	☑		
Determine electrical values in series, parallel, and combination circuits	☑	☑	☑	☑		☑	☑		☑	☑
Demonstrate proper selection and use of volt, ohm, and amp meters and their related functions	☑	☑	☑			☑	☑	☑	☑	
Discuss electrical theory related to common motor technology.	☑	☑	☑	☑	☑				☑	☑

Course SLO/PSLO	Use and maintain appropriate materials, tools, equipment, and procedures to carry out tasks performed on construction projects according to safety and industry standards.	Use math, computer, and oral and written communication skills to solve construction project problems.	Create and maintain accurate documentation of construction and maintenance projects.	Describe industry standard Green Building practices in construction and maintenance projects.	Read and interpret blueprints, and/or schematics, and specifications to plan projects.	Demonstrate the craftsmanship standards of dependability, punctuality, and quality.	Examine and use proper mechanical, electrical, and carpentry codes and standards applicable to construction and repair.
Discuss and compare the relationships of voltage, resistance, current, and power	☑	☑	☑	☑	☑		☑
Apply fundamental calculations of Ohm's Law to support electrical theories		☑	☑	☑	☑		☑
Identify magnetism and electromagnetism in AC and DC circuits	☑	☑			☑		☑
Recognize and identify AC and DC equipment	☑		☑	☑	☑		☑
Differentiate and estimate induction and capacitance in AC systems	☑	☑	☑		☑		☑
Explain the importance of electrical grounding for equipment	☑				☑	☑	☑
Determine electrical values in series, parallel, and combination circuits	☑	☑			☑		☑
Demonstrate proper selection and use of volt, ohm, and amp	☑	☑					☑

meters and their related functions							
Discuss electrical theory related to common motor technology.		☑		☑	☑		☑

16. Course Competencies.

Competency
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 Kirchhoff'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 Kirchhoff's 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.

Program SLO
Use and maintain appropriate materials, tools, equipment, and procedures to carry out tasks performed on construction projects according to safety and industry standards.
Use math, computer, and oral and written communication skills to solve construction project problems.
Create and maintain accurate documentation of construction and maintenance projects.
Describe industry standard Green Building practices in construction and maintenance projects.
Read and interpret blueprints, and/or schematics, and specifications to plan projects.
Demonstrate the craftsmanship standards of dependability, punctuality, and quality.
Examine and use proper mechanical, electrical, and carpentry codes and standards applicable to construction and repair.

19. College-wide Academic Student Learning Outcomes (CASLOs).

	Creativity - Able to express originality through a variety of forms.
☑	**Critical Thinking** - Apply critical thinking skills to effectively address the challenges and solve problems. ☑ Level 1
	Information Retrieval and Technology - Access, evaluate, and utilize information effectively, ethically, and responsibly.
	Oral Communication - Practice ethical and responsible oral communications appropriately to a variety of audiences and purposes.
☑	**Quantitative Reasoning** - Synthesize and articulate information using appropriate mathematical methods to solve problems of

	quantative reasoning accurately and appropriately. ☑ Level 1
	Written Communication - Write effectively to convey ideas that meet the needs of specific audiences and purposes.

20. Linking.

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

- Classroom/Lab (0)

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

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.

20 (Voctech classroom capacity)

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

NO

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

NO

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

None

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:		
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 2015-2016: Program Map, page 53; Course prereqs, page111

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

Standard 1 - Written Communication 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
Standard 2 - Quantitative Reasoning Synthesize and articulate information using appropriate mathematical methods to solve problems of quantative 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.	3
Outcome 2.4 - Formulate and test hypotheses using numerical experimentation.	2
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
Standard 3 - Information Retrieval and Technology. Access, evaluate, and utilize information effectively, ethically, and responsibly.	
Outcome 3.1 - Use print and electronic information technology ethically and responsibly.	0
Outcome 3.2 - Demonstrate knowledge of basic vocabulary, concepts, and operations of information retrieval and technology.	0
Outcome 3.3 - Recognize, identify, and define an information need.	0
Outcome 3.4 - Access and retrieve information through print and electronic media, evaluating the accuracy and authenticity of that information.	0
Outcome 3.5 - Create, manage, organize, and communicate information through electronic media.	0
Outcome 3.6 - Recognize changing technologies and make informed choices about their appropriateness and use.	0
Standard 4 - Oral Communication 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.	0

Outcome 4.3 - Use language, techniques, and strategies appropriate to the audience and occasion.	2
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.	2
Outcome 4.6 - Use competent oral expression to initiate and sustain discussions.	2
Standard 5 - Critical Thinking 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.	2
Outcome 5.2 - Identify and analyze assumptions and underlying points of view relating to an issue or problem.	2
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.	2
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.	3
Outcome 5.8 - Communicate clearly and concisely the methods and results of logical reasoning.	3
Outcome 5.9 - Reflect upon and evaluate their thought processes, value system, and world views in comparison to those of others.	0
Standard 6 - Creativity Able to express originality through a variety of forms.	
Outcome 6.1: Generate responses to problems and challenges through intuition and non-linear thinking.	0
Outcome 6.2: Explore diverse approaches to solving a problem or addressing a challenge.	1
Outcome 6.3: Sustain engagement in activities without a preconceived purpose.	0
Outcome 6.4: Apply creative principles to discover and express new ideas.	0
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.	0

33. Additional Information