

1. Curriculum Action

- New Course
- Course Modification
- Five Year Review

2. Proposer

Enica Brown

3. Department

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

4. Course Alpha

MATH

5. Course Number

205

6. Course Title

Calculus I

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 all items being added to curriculum central

8. Proposed Semester

Fall 2015

9. Effective Semester (1 Year from Proposed Semester)

Fall 2016

**University of Hawaii Maui College**  
**MATH 205 - Calculus I**

**1. Course Alpha.**

MATH

**2. Course Number.**

205

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

Calculus I

**4. Number of Credits.**

4

**5. Contact Hours/Type.**

- Hour lecture (4)

**6. Course Description.**

Explores basic concepts of differential and integral calculus. Reviews functions, focuses on differentiation and its applications. Introduces integration.

**7. Pre-Requisites.**

MATH 119 or MATH 140, either with grade C or better, or placement at MATH 205, and ENG 100 with grade C or better (or concurrent), 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.**

This course is being modified because of an addition to the pre-requisite list.

**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	Understand and apply the formal definition of a limit to describe the way a function varies, and use this definition to classify and study properties of continuous functions.	Choose and apply appropriate limit laws and properties to compute limits of functions, one-sided limits, and limits involving infinity.	Extend the ideas of limits to the derivative function.	Choose and apply appropriate derivative rules to compute derivatives of functions, interpret the derivative as a rate of change, apply implicit differentiation, and find higher order derivatives.	Interpret the derivative in applications such as related rates, extreme values of functions, curve sketching, optimization, and the Mean Value Theorem.	Compute antiderivatives, definite integrals, and indefinite integrals, including those requiring substitution.	Solve application problems involving integration, including area under and between curves, and the Fundamental Theorem of Calculus.
Choose and apply appropriate formulas or algorithms to compute limits, derivatives, definite integrals and indefinite integrals of elementary 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"/>
Solve application problems involving derivatives and integrals of these functions, including, but not limited to, curve sketching, related rates, optimization, and areas under or between curves.				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Demonstrate effective use of technology in solving such problems.	<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"/>
Communicate the solution of such problems using standard English, numeric, graphic, and symbolic representations.	<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	Demonstrate an understanding of theories, practices, histories, and key issues of a field of study using essential terminology and concepts of the discipline.	Use theories, concepts, and practices of a field of study to analyze evidence, artifacts, and/or texts and produce interpretations, hypotheses, evaluations, or conclusions.	Apply theories and/or methods of a field of study to perform practical, scholarly, and/or creative tasks that respond to social, cultural, environmental, or economic issues.
Choose and apply appropriate formulas or algorithms to compute limits, derivatives, definite integrals and indefinite integrals of elementary functions.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Solve application problems involving derivatives and integrals of these functions, including, but not limited to, curve sketching, related rates, optimization, and areas under or between curves.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Demonstrate effective use of technology in solving such problems.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Communicate the solution of such problems using standard English, numeric, graphic, and symbolic representations.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

**16. Course Competencies.**

Competency
Understand and apply the formal definition of a limit to describe the way a function varies, and use this definition to classify and study properties of continuous functions.
Choose and apply appropriate limit laws and properties to compute limits of functions, one-sided limits, and limits involving infinity.
Extend the ideas of limits to the derivative function.
Choose and apply appropriate derivative rules to compute derivatives of functions, interpret the derivative as a rate of change, apply implicit differentiation, and find higher order derivatives.
Interpret the derivative in applications such as related rates, extreme values of functions, curve sketching, optimization, and the Mean Value Theorem.

Compute antiderivatives, definite integrals and indefinite integrals, including those requiring substitution.  
Solve application problems involving integration, including area under and between curves, and the Fundamental Theorem of Calculus.

**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.**

Week 1: Review of Functions  
Weeks 2-4 Limits, Limit Theorems, Continuity  
Weeks 5-8 Rate of Change, Differentiation, Derivative formulas and algorithms, higher order derivatives  
Weeks 9-12 Applications of Differentiation including curve sketching, related rates, optimization, linear approximation, the Mean Value Theorem  
Weeks 13-16 Antiderivatives, indefinite and definite integrals, the Fundamental Theorem of Calculus, areas under curves.

**18. Program Learning Outcomes.**

<b>Program SLO</b>
Demonstrate an understanding of theories, practices, histories, and key issues of a field of study using essential terminology and concepts of the discipline.
Use theories, concepts, and practices of a field of study to analyze evidence, artifacts, and/or texts and produce interpretations, hypotheses, evaluations, or conclusions.
Apply theories and/or methods of a field of study to perform practical, scholarly, and/or creative tasks that respond to social, cultural, environmental, or economic issues.

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

	<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"/> 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.**

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

- Cable TV (0)
- Classroom/Lab (0)
- HITS/Interactive TV (0)
- Hybrid (0)
- Online (0)
- Other, explain (0)

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

Thomas' Calculus text and access code.

Internet access.

**23. Maximum enrollment.**

27

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

YES

Computer room

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

NO

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

Recommended software: Maple or Mathematica

**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	FS - Symbolic Reasoning LE - Elective
AS:	ANY	QR - Quantitative Reasoning
AAS:	ANY	QR - Quantitative Reasoning
BAS:	ET	QR - Quantitative Reasoning
Developmental/Remedial:		

AA Hawaiian Studies: FS - Symbolic Reasoning

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

UH Manoa MATH 241 Calculus I, 4 credits  
UH Hilo MATH 205 Calculus I, 4 credits  
UH West Oahu MATH 241 Calculus I, 4 credits  
Honolulu CC MATH 205 Calculus I, 4 credits  
Leeward CC MATH 205 Calculus I, 4 credits,  
Kauai CC MATH 205 Calculus I, 4 credits  
Kapiolani CC MATH 205 Calculus I, 4 credits  
Windward CC MATH 205 Calculus I, 4 credits

**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.**

MATH205 is referenced in the UHMC General Catalog 2015-2016: p. 13, 18, 20, 22, 131, 132

Changes needed on page 131: Prerequisite needs to be "MATH 119 or MATH 140, either with grade C or better, or placement at MATH 205, and ENG 100 with grade C or better (or concurrent), or consent."

### 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.	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.	0
Outcome 1.5 - Express a main idea as a thesis, hypothesis, or other appropriate statement.	0
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.	3
Outcome 2.4 - Formulate and test hypotheses using numerical experimentation.	1
Outcome 2.5 - Define quantitative issues and problems, gather relevant information, analyze that information, and present results.	3
Outcome 2.6 - Assess the validity of statistical conclusions.	0
<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.	0
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.	1
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.	0
<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.	1
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.	3
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.	3
Outcome 5.9 - Reflect upon and evaluate their thought processes, value system, and world views in comparison to those of others.	1
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.	1
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.	0
Outcome 6.4: Apply creative principles to discover and express new ideas.	1
Outcome 6.5: Demonstrate the ability to trust and follow one's instincts in the absence of external direction	1
Outcome 6.6: Build upon or adapt the ideas of others to create novel expressions or new solutions.	0

### 33. Additional Information