

University of Hawaii Maui College

MATH 231 - Calculus III

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

MATH

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

231

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

Calculus III

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)

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

Studies functions of several variables including vectors, vector functions, the calculus on these functions, and three dimensional analytic geometry.

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

MATH 206 with grade C or better, or consent

8. **Co-requisites.**

9. **Recommended Preparation.**

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.

5-year course outline update

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	Use parametric and/or polar forms to describe motion and define a curve as the path of a moving particle whose position is moving over time.	Describe the geometric definitions and standard equations of conic sections such as parabolas, ellipses, and hyperbolas, and use them to model the path traveled by moving objects.	Use vectors and vector operations to study the analytic geometry of space and define equations for lines, planes, curves, and surfaces in space.	Apply calculus techniques such as differentiation and integration to vector-valued functions to study the paths and motions of moving objects in a plane or in space including the turning and twisting in their paths.	Apply and extend the basic ideas of single-variable calculus, including limit, partial derivatives, directional derivatives, and optimization techniques to functions of several variables.
Apply appropriate mathematical processes to solve problems that can be modeled by functions of several variables including vectors-valued functions and 3-dimensional surfaces.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Use multivariable calculus techniques to analyze and describe these functions and solve application problems.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<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"/>
Communicate the solution of such problems using standard English, numeric, graphic, or symbolic representation.				<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	Use theories, concepts, and practices of a field of study to analyze evidence, artifacts, and/or texts and produce	Apply theories and/or methods of a field of study to perform practical, scholarly, and/or creative tasks

	essential terminology and concepts of the discipline.	interpretations, hypotheses, evaluations, or conclusions.	that respond to social, cultural, environmental, or economic issues.
Apply appropriate mathematical processes to solve problems that can be modeled by functions of several variables including vectors-valued functions and 3-dimensional surfaces.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Use multivariable calculus techniques to analyze and describe these functions and solve application problems.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Demonstrate effective use of technology in solving such problems.			<input checked="" type="checkbox"/>
Communicate the solution of such problems using standard English, numeric, graphic, or symbolic representation.			<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
Use parametric and/or polar forms to describe motion and define a curve as the path of a moving particle whose position is moving over time.
Describe the geometric definitions and standard equations of conic sections such as parabolas, ellipses, and hyperbolas, and use them to model the path traveled by moving objects.
Use vectors and vector operations to study the analytic geometry of space and define equations for lines, planes, curves, and surfaces in space.
Apply calculus techniques such as differentiation and integration to vector-values functions to study the paths and motions of moving objects in a plane or in space including the turning and twisting in their paths.
Apply and extend the basic ideas of single-variable calculus, including limit, partial derivatives, directional derivatives, and optimization techniques to functions of several variables.

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.

Weeks 1-3: Parametric equations and polar coordinates

Weeks 4-7: Vectors and geometry of space

Weeks 8-11: Vector-valued functions and motion in space

Weeks 12-16: Partial derivatives

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
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).** **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.**

	Creativity - Able to express originality through a variety of forms.
<input checked="" type="checkbox"/>	Critical Thinking - Apply critical thinking skills to effectively address the challenges and solve problems. <input checked="" type="checkbox"/> Preparatory Level
	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.
<input checked="" type="checkbox"/>	Quantitative Reasoning - Synthesize and articulate information using appropriate mathematical methods to solve problems of quantitative reasoning accurately and appropriately. <input checked="" type="checkbox"/> Preparatory Level
	Written Communication - 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.**

- Cable TV (0)

- Classroom/Lab (0)
- HITS/Interactive TV (0)
- Hybrid (0)
- Online (0)

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

Thomas Calculus text and access code.

Internet access

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

30

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

YES

Computer room

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.

Recommended Software: Maple or Mathematica

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:	Liberal Arts	FS - Symbolic Reasoning
		LE - Elective
AS:	ANY	QR - Quantitative Reasoning
AAS:	ANY	QR - Quantitative Reasoning

BAS:	ANY	QR - Quantitative Reasoning
Developmental/ Remedial:		

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

UH Manoa 243 Calculus III 3 credits

UH Hilo MATH 231 Calculus III 3 credits

UH West Oahu MATH 243 Calculus III 3 credits

Honolulu CC Math 231 Calculus III 4 credits

Kapiolani CC Math 231 Calculus III 4 credits

Windward CC Math 231 Calculus III 3 credits

Leeward CC MATH 231 Calculus III 3 credits

Kauai CC MATH 231 Calculus III 3 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.

2014-15 catalog P. 133 no changes

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

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.		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

Standard 2 - Quantitative Reasoning 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.		0
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
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.		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.		2
Outcome 3.6 - Recognize changing technologies and make informed choices about their appropriateness and use.		1
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.		1
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
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.		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.		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.		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.		0
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