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Henry Hall 123E

MA-311: CALCULUS III

Prerequisite: MA-211, or MA-210 and instructor approval.

Description: Calculus of functions of several variables. Polar coordinates, parametric equations, vectors and vector calculus, plane and space curves, partial derivatives, directional derivatives and gradients, extreme values and second-partials test, double and triple integrals, cylindrical and spherical coordinates, Green's and Stokes' theorems. Offered annually.

Textbook: I am on a quest to not require textbooks for upper division courses, so I will be uploading course notes to Canvas. I will primarily be following

- (1) *Calculus, Early Transcendentals, 8th Edition*, by James Stewart. This is what I followed when I taught multivariable calculus at UH Manoa, so I know it works!

I may also draw inspiration/exercises from

- (2) *Multivariable Calculus*, by Ron Larson and Bruce H. Edwards.

Time/Location: Lecture TR, 10:00 - 11:20, Fourth Hour W, 2:30 - 3:20, Henry 203.

Office Hours: Officially, my office hours are TR 11:30 - 1:00, in Henry 123 E. But in general, if my office door is open, feel free to stop in! I am also happy to meet by appointment, if you schedule at least a day in advance. My schedule can be found [here](#).

Grading: The percentage breakdown for the course will be

- 10% Attendance (lecture)
- 35% Homework
- 25% Midterm (Midway through the semester)
- 30% Final Exam (consult the final exam schedule set by the university)

I may alter traditional grade cutoffs, but only to your benefit (for instance an 88% may be an A, but a 91% would never be a B).

I generally grade on a five point scale (or some multiple thereof):

- 5 (a complete and perfect response)
- 4 (excellent with only minor errors)
- 3 (the right idea or approach)
- 2 (some understanding of the relevant ideas, but has substantial errors)
- 1 (some understanding of some ideas, quite off-track)
- 0 (no response)

Homework: Homework will be posted to Canvas intermittently, to be uploaded to Canvas (for my records) and presented in 4th hour. An genuine incomplete or wrong answer is still *vastly* more valuable than a non-attempt or a copied solution, as we can work as a class from the place you got stuck.

Exams: Problems in a math course come in two flavors: computations and demonstrations of deeper understanding. The former can be done in on homework and in class, but for the latter, I

prefer take-home assignments (to alleviate the time pressure). Thus while our final will be take-home, it will involve more than merely doing rote calculations! We will use our assigned exam time (see here) as an extended office hours period in our classroom.

In addition, on the final you will be expected to work through at least one problem with me. It could be anything from a problem you've completed (you present it and I check your work) to something you haven't touched yet (I ask Socratic questions and you solve it). One way or another, **I want to see your thinking, and how you explain it.**

Late/Makeup Work: I reserve the right not to accept late work without a request in advance - I may still take it, but it's not a guarantee! Instead, I will drop your lowest homework score at the end of the semester.

Deadlines: The add/drop period this semester runs until **Tuesday, August 25th**. The deadline to Withdraw without Record is **Friday, September 18th**, and the deadline to Withdraw is **Friday, October 23rd**.

Electronics: Out of consideration for your classmates, please set your cell phone to silent during class. You are of course more than welcome to take notes digitally, or consult your online textbook during class, whether on a tablet or laptop.

Getting Help: If you feel you are falling behind or struggling with the coursework, please get in touch with me - either come to office hours or send me an e-mail. Rather than let you suffer in silence, I want to help you succeed in this course! I am more than happy to meet outside of office hours if those times don't work, but it's your responsibility to get in touch with me to schedule something.

Academic Honesty: You are encouraged to discuss homework problems with others, but the solutions you submit should be your own. Similarly for exams - there, please note any collaboration when you write up your solutions (e.g. "I worked with X on problems 2 and 5" or "Y and I compared solutions, which helped me catch an error in problem 4").

I will additionally include the university policy below.

On AI and Other Tools: I realize that there are plenty of resources out there, from online calculators to frontier LLMs, that can do calculus for you (we may see some of them in class!). This reality is, in part, why there are some in-class components to our exams - there are some skills you just *have to have*. I think these tools have a place, but if you do not understand the foundational concepts, you will not be able to check their work, and you will be at the mercy of whatever mistakes are served to you.

So for the homework, I would **strongly** encourage you to struggle through a problem that's giving your trouble before you reach for a tool that can do it for you (even better, only use these things to check your solutions!). **On exams, I expect your solutions to be human generated.**

Also: **show your work!** This has been the slogan of mathematics courses for time immemorial, and will be for aeons to come. But in addition, **be prepared to explain your answer.** This is why on our final I will ask you to work through a problem/solution with me, as some check that you truly do understand what is going on, and aren't just blindly copying solutions down.

Again, I will include the university policy below.

University Policy on Academic Honesty: Academic honesty is an essential aspect of all learning, scholarship, and research. It is one of the values regarded most highly by academic communities throughout the world. Violations of the principle of academic honesty are extremely serious and will not be tolerated.

Students are responsible for promoting academic honesty at Chaminade by not participating in any act of dishonesty and by reporting any incidence of academic dishonesty to an instructor or to a University official. Academic dishonesty may include theft of records or examinations, alteration of grades, plagiarism, and **unauthorized and/or undisclosed AI usage**, in addition to more obvious dishonesty. See catalog section Student Use of Artificial Intelligence in Academic Work for further information.

Questions of academic dishonesty in a particular class are first reviewed by the instructor, who must make a report with recommendations to the Director of the Academic College. Punishment for academic dishonesty will be determined by the instructor, Director, and the Dean of Academic College and may include an “F” grade for the work in question, an “F” grade for the course, academic notice, or dismissal from the University.

University Policy on AI Use: Chaminade University recognizes the increasing role of artificial intelligence (AI) technologies in academic and professional environments. AI encompasses, but is not limited to, generative AI platforms, automated writing or content generation software, coding assistants, and similar tools. Students must ensure all submitted work genuinely reflects their knowledge and effort. Using AI to produce or significantly complete graded assignments, exams or other academic tasks – defined as use that substitutes for or substantially replaces a student’s own analysis, reasoning or written expression – without explicit instructor approval is considered academic misconduct and will be dealt with according to the University’s Academic Honesty Policy.

If an instructor has reasonable grounds to question whether submitted work genuinely reflects a student’s own knowledge, authorship, or mastery of course material — or whether it meets the course’s expectations for AI use — the instructor may require the student to provide additional or alternative evidence of authorship and content mastery. Such evidence may include drafts, notes, revision history, source materials, process explanations, oral discussion, in class work, or completion of an alternative assessment. A student’s refusal or inability to provide such evidence may be considered, along with other available information, in evaluating whether the work meets course requirements and stated learning outcomes. Instructors will not rely solely on AI detection software or other automated tools in making grading or academic integrity determinations. Such determinations will be based on the totality of the available information and handled in accordance with applicable University policies and procedures. See the catalog section Student Use of Artificial Intelligence in Academic Work for further information.

Disability Access: Accessibility Services recognizes disability as a valued aspect of diversity and ensures equal access to the educational environment in accordance with Section 504 of the Rehabilitation Act; the Americans with Disabilities Act, as amended; and the principles and professional standards of the Association on Higher Education and Disability Access is supported through reasonable accommodations and referrals to campus and community resources.

Appointments with the Accessibility Services Coordinator are available through Stellic and may be held virtually or in person. Drop-in appointments are also welcome.

Students seeking support must meet with the Accessibility Services Coordinator **as early as possible**, even if they are unsure whether they have appropriate documentation of their disability or its impacts. The Accessibility Services Coordinator prioritizes listening to students’s experiences and will discuss any documentation needs during the initial intake meeting. Students may seek support at any time. Learn more at <https://chaminade.edu/ada-accommodations>.

Tutoring and Writing Services: Chaminade is proud to offer free tutoring and academic coaching through the Kōkua ‘Ike: Center for Student Learning. Tutoring is available in a variety of subjects (including math! But also biology, chemistry, nursing, English, etc.) from trained Peer and Professional Tutors. Please check with Kōkua ‘Ike for more specific information.

University Attendance Policy: See the academic handbook. In general, you are expected to attend regularly all classes regularly, and notify me when illness or other extenuating circumstances prevents them from attending class (preferably via email, so I have a written record).

Course Learning Outcomes (CLOs)

Students who successfully complete this course will be able to

- (1) Represent and analyze curves, surfaces, and vector-valued functions in three-dimensional space, and use vector operations (the dot and cross products) to solve geometric problems.
- (2) Compute partial derivatives, and use them to determine tangent planes and other geometric information for multivariable surfaces.
- (3) Compute and apply the gradient, divergence, curl, Laplacian, Jacobian, and Hessian to analyze multivariable functions.
- (4) Set up and compute multiple integrals to compute areas and volumes.
- (5) Solve optimization problems using Lagrange multipliers.
- (6) Convert between the Cartesian, cylindrical, and spherical coordinate systems, and apply the appropriate system to simplify multivariable problems.
- (7) State and apply the various generalizations of the Fundamental Theorem of Calculus: Green’s, Stokes’, and the Divergence Theorem.
- (8) Select appropriate algebraic, geometric, or computational methods for solving multivariable calculus problems, and communicate solutions clearly.

Marianist Values: An education in the Marianist Tradition is marked by five principles:

- (1) Education for formation in faith
- (2) Provide an integral, quality education
- (3) Educate in family spirit
- (4) Educate for service, justice and peace
- (5) Educate for adaptation and change

Any course here at Chaminade should be focused on (2), and any course in the sciences is going to touch on (5)¹ - how can we adequately adapt to change if we do not adequately understand the present? How can we forecast the future without understanding the phenomena driving that change? Calculus is an important tool in almost any scientific endeavor - so important that I would deem it “the language of the sciences”.

Native Hawaiian Values: Education is central to both Marianist and Native Hawaiian culture — both seek transformative, value-centered learning that serves the marginalized. This is reflected in the ‘Olelo No‘eau (Hawaiian proverbs):

- (1) **Mana:** E ola au i ke akua (‘Ōlelo No‘eau 364)
May I live by God
- (2) **Na‘auao:** Lawe i ka ma‘alea a kū‘ono‘ono (‘Ōlelo No‘eau 1957)
Acquire skill and make it deep
- (3) **‘Ohana:** ‘Ike aku, ‘ike mai, kōkua aku kōkua mai; pela iho la ka nohana ‘ohana (‘Ōlelo No‘eau 1200)
Recognize others, be recognized, help others, be helped; such is a family relationship

¹How appropriate, for a course on rates of change and integrals, that these would be the values at the heart of the course!

- (4) **Aloha:** Ka lama kū o ka no‘eau (‘Ōlelo No‘eau 1430)
Education is the standing torch of wisdom
- (5) **Aina:** ‘A‘ohe pau ka ‘ike i ka hālau ho‘okahi (‘Ōlelo No‘eau 203)
Not all knowledge is taught in the same school

Student Conduct Policy: Campus life is a unique situation requiring the full cooperation of each individual. For many, Chaminade is not only a school, but a home and a place of work as well. That makes it a community environment in which the actions of one students may directly affect other students. Therefore, each person must exercise a high degree of responsibility. Any community must have standards of conduct and rules by which it operates. At Chaminade, these standards are outlined so as to reflect both the Catholic, Marianist values of the institution and to honor and respect students as responsible adults. All alleged violations of the community standards are handled through an established student conduct process, outlined in the Student Handbook, and operated within the guidelines set to honor both students’ rights and campus values.

Students should conduct themselves in a manner that reflects the ideals of the University. This includes knowing and respecting the intent of rules, regulations, and/or policies presented in the Student Handbook, and realizing that students are subject to the University’s jurisdiction from the time of their admission until their enrollment has been formally terminated. Please refer to the Student Handbook for more details. A copy of the Student Handbook is available on the Chaminade website under Student Life. For further information, please refer to the Chaminade Catalog.

Title IX Compliance: Chaminade University of Honolulu is committed to providing a learning, working and living environment that promotes the dignity of all people, inclusivity and mutual respect and is free of all forms of sex discrimination and gender-based violence, including sexual assault, sexual harassment, gender-based harassment, domestic violence, dating violence, and stalking. As a member of the University faculty, I am required to immediately report any incident of sex discrimination or gender-based violence to the campus Title IX Coordinator. For pregnant and parenting students, I am also obligated to provide you with similar resources for support and protections available to you. My goal is to make sure that you are aware of the range of options available to you and have access to the resources and support you need.

Contact information and reporting options can be found here, and reports can be filed via the Campus Incident Report Form.

Nondiscrimination Policy & Notice of Nondiscrimination: The university is committed to comply with all State and Federal statutes, rules, and regulations which prohibit discrimination. The university is committed to a policy of nondiscrimination on the basis of race, sex, gender identity and expression, age, religion, color, national origin (including shared ancestry and ethnic characteristics), ancestry, citizenship, disability, genetic information, marital status, breastfeeding, arrest and court record (except as permissible under State law), sexual orientation, or status as a covered veteran. Inquiries about Title IX or general Civil Rights concerns may be referred to the University’s Title IX Coordinator, the U.S. Department of Education’s Office for Civil Rights, or both and contact information may be found here. The University webpage contains the University’s Nondiscrimination Policy and Grievance Procedures, its Notice of Nondiscrimination, and on-campus confidential resources.

To report information about conduct that may constitute sex discrimination or make a complaint of sex discrimination under Title IX, please refer to the Campus Incident Report form.

Credit Hour Policy: The unit of semester credit is defined as university-level credit that is

awarded for the completion of coursework. One credit hour reflects the amount of work represented in the intended learning outcomes and verified by evidence of student achievement for those learning outcomes. Each credit hour earned at Chaminade University should result in a minimum of 45 hours of engagement, regardless of varying credits, duration, modality, or degree level. This equates to one hour of classroom or direct faculty instruction and a minimum of two hours of out-of-class student work each week for approximately fifteen weeks for one semester. Terms that have alternative lengths, such as 10 week terms, should have an equivalent amount of faculty instruction and out-of-class student work to meet each credit hour. Direct instructor engagement and out-of-class work result in total student engagement time of 45 hours for one credit. The number of engagement hours may be higher, as needed to meet specific learning outcomes.

Specific Credit Situation: The minimum 45 hours of engagement per credit hour can be satisfied in fully online, internship, or other specialized courses through several means, including (a) regular online instruction or interaction with the faculty member and fellow students and (b) academic engagement through extensive reading, research, online discussion, online quizzes or exams; instruction, collaborative group work, internships, laboratory work, practica, studio work, and preparation of papers, presentations, or other forms of assessment. This policy is in accordance with federal regulations and regional accrediting agencies.

How This Course Meets The Credit Hour Policy: This is a four-credit hour course requiring 180 clock hours of student engagement, per the official CUH Credit Hour Policy. Students enrolled in this course are anticipated to spend 50 hours in class, 10 hours studying for each midterm, and 20 hours studying for the final. There will be an additional 6 hours of work required each week beyond what is listed here, mainly in the form of homework assignments.

CUH Alert Emergency Notification: To get the latest emergency communication from Chaminade University, students' cell numbers will be connected to Chaminade's emergency notification text system. When you log in to the Chaminade portal, you will be asked to provide some emergency contact information. If you provide a cellphone number, you will receive a text from our emergency notification system asking you to confirm your number. You must respond to that message to complete your registration and get emergency notifications on your phone.

Assessment for Student Work: With the goal of continuing to improve the quality of educational services offered to students, Chaminade University conducts assessments of student achievement of course, program, and institutional learning outcomes. Student work is used anonymously as the basis of these assessments, and the work you do in this course may be used in these assessment efforts.