Curriculum Details

Course Record ID

651

1. Entry Type

Active

Notes and Special Changes

2. Justification

Math 232 is the fourth course in the calculus sequence. The offering of this course further supports STEM initiatives and programs and provides students the opportunity to complete the calculus sequence here at WCC. Furthermore, WCC is a participating member of a pre-engineering grant to increase the enrollment of native Hawaiian students into engineering. For the pre-engineering program, students will need to take Math 232.

3. Course Alpha

Math

4. Course Number

232

5. Course Title (long)

Calculus IV

6. Course Title Short

Calculus IV

7. Course Credits

3

8. Course Credit Upper Range

0
Repeatable
Will default to 98

9. Course Description
Math 232 is the fourth course in the calculus sequence. Topics include multiple integrals, line integrals, Green's Theorem, surface integrals, Stokes' Theorem, Gauss' Theorem and differential equations.

10. Course Pre-Requisites
"C" or better in Math 231 or equivalent or consent of instructor.

11. Course Co-Requisites

12. Course Recommended Preparation

13. Contact Hours (lecture, lab, lecture/lab)
3 hours lecture

14. Maximum Credits Towards an AA Degree
3

Grading Options
Will be set to Banner default

15. Department
Mathematics and Business

16. Cross-Listing

17. Course Content
Topics include multiple integrals, line integrals, Green's Theorem, surface integrals, Stokes' Theorem, Gauss' Theorem, and differential equations

18. Course Competencies
19. Assessments, Tasks, and Grading

The student will demonstrate competency in the objectives through assignments, in-class activities, quizzes, unit exams and a comprehensive final exam. Tentatively, the course grade will be evaluated as follows, however, the instructor reserves the right to make changes if needed: Homework/in-class activities/quizzes 150 points 25% 3 Unit exams (100 points each) 300 points 50% Final Exam 150 points 25% Total: 600 points Each letter grade for the course will be assigned according to the level of achievement as provided in the table below: Letter Grade Definition A 90% - 100% of the possible points B 80% - 89% of the possible points C 70% - 79% of the possible points Cr 70% - 79% of the possible points D 60% - 69% of the possible points F Below 60% of the possible points NC Less than 70% of the possible points Note: Cr/NC grade require written instructor consent. Students must apply for the Cr/NC grading option at the Records and Admissions Office by the deadline. This grading option is not available to majors in required courses. If a student does not apply for the Cr/NC grading option by the posted deadline and is s/he does not withdraw, a letter grade (A, B, C, D, or F) will be assigned for the course.

20. Auxiliary Materials and Content

Multivariable Variable Calculus, by Briggs & Cochran as a suggested textbook with MyMathLab (online homework) access code. A TI-83, TI-83+, TI-84 or TI-84+ calculator is required for this class. The TI-84+ Smartview for the smartboard is needed and is currently available in the Mana'opono classrooms. Software for 3 dimensional graphing would be helpful.

21. Additional Activities outside of class and class time

Homework; consultation with instructor; Math Lab work; computer assignments, or any activity that the student must complete outside of regularly scheduled class time.

22. Special Costs connected to the course

No special costs to students except for cost of a TI graphing calculator. However, students who have taken Math 231 at WCC will already have the calculator and the tool is considered a basic supply for this level course. Also, if the instructor chooses to utilize online homework and if the student purchases a used book or a book other than from the WCC bookstore that is packaged with an access code for online homework, the student may need to purchase a separate access code for online homework.

23. What are the Student Learning Outcomes?

compute multiple integrals in various coordinate systems. Use multiple integrals or vector calculus techniques to solve application and/or theoretical problems. Solve basic differential equations and applications. Utilize precise mathematical language and symbols and effectively communicate in written and/or oral form.

24. How does the proposal connect to the college's strategic plan?

University of Hawai'i System Strategic Outcome #4: Global Competitive Workforce Address critical workplace shortages and prepare students (undergraduate, graduate, and professional)
for effective engagement and leadership in a global environment. Community College System Action Outcomes 4.3 Increase by 3% per year the number of degrees and certificates awarded in Science, Technology, Engineering, and Math (STEM) fields. Windward Community College Action Outcomes 4.1. Contribute to the development of a high-skilled, high-wage workforce through the establishment of at least one new specific, career-focused degree, certificate or career pathway per year that leads to employment in emerging fields (innovative, knowledge-intensive DBEDT fields, including life sciences, health and wellness, information technology, film and digital media, alternative energy, ocean and marine science, earth and space sciences, astronomy, diversified agriculture, and dual-use (military/civilian) technology. 4.3 Expand the curriculum that prepares students for nursing, social work, information technology, and other critical workforce shortage areas by adding at least one new course per year. 4.5 Promote the knowledge, skills, and opportunities that support current and emerging STEM fields and careers by increasing credit and noncredit STEM course enrollments by 3% per year.

25. Describe the staff that will be needed

No additional staffing will be needed. Current faculty will be able to teach this course.

26. Describe the facilities that will be needed, including special rooms

Classroom with Smartboard and TI Smartview and Derive software. The classroom in Manaʻopono building are equipped with these items.

27. Describe any other resources that will be needed

28. How will the staff, facilities, and other resources for the course be secured?

New software could be purchased with math discipline supplies budget.

29. Certificates

30. Connection to the AA degree

AAElect

31. Connection between the Course SLOs and the College's General Education Outcomes

Draw on knowledge from the liberal arts to succeed in upper division courses.

Use research and technology skills to access information from multiple sources; use critical thinking and problem-solving skills to evaluate and synthesize information to form conclusions, ideas, and opinions.

Express ideas clearly and creatively in diverse ways through the fine and performing arts, speech and writing.
Enter and perform effectively in the work force.

Develop skills that improve personal well-being and enhance professional potential.

32. List any similar classes taught at outside of the UH system

UCLA: Math 32B Calculus of Several Variables Oregon State University: Mth 255 Vector Calculus II University of Arizona: Math 223 Vector Calculus University of Cincinnati: Math 264 Calculus and Analytic Geometry IV

33. List any similar classes taught at campuses in the UH System.

Kapiolani CC Math 232 Calculus IV UHM Math 244 Calculus IV Leeward CC Math 232 Calculus IV UH Maui College Math 232 Calculus IV Honolulu CC Math 232 Calculus IV UH Hilo Math 232 Calculus IV

34. How, if at all, is the course intended to count in lieu of a course taught at a four-year campus.

35. How, if at all, is the course similar to upper-division courses in the UH System.

36. How does the course articulate with four-year programs (Gen Ed)?

37. List any articulations between this course and any four-year program.

UHM course articulation with Math 244 UHH course articulation with Math 232

End of Proposal
Signatures to New (draft) Math

Requested by: Jean Okumura

Departmental Review by:
- Member: Younga Choi
- Member: Nadej Sing
- Member: Deacon Honor
- Member: Vanessa Gao
- Chair: Clayton K Akata

Was the proposal discussed in a department meeting? yes

Division Dean: Ceman Richardson

IEC (for SLOs): Jen Lubin

Approved by:
- Curriculum Committee Chair: Kathleen French
- Faculty Senate Chairperson: Ross Langston
- Vice-Chancellor for Academic Affairs: Richard Fulton
- Chancellor: Doug Dykstra

Date
- Jean Okumura: 9/19/2011
- Younga Choi: 9/21/2011
- Nadej Sing: 9/21/2011
- Deacon Honor: 9/21/2011
- Vanessa Gao: 9/21/2011
- Clayton K Akata: 9/21/2011
- Ceman Richardson: 9/26/11
- Jen Lubin: 9/14/2011
- Kathleen French: 10/11/11
- Ross Langston: 10/13/11
- Richard Fulton: 10/20/11
- Doug Dykstra: 11/25/11
MATH 232 – CALCULUS IV - 3 credits
TR 8:00 – 9:15 a.m.

INSTRUCTOR: Jean Okumura
OFFICE: Mana'opono 112A
OFFICE HOURS: Other Hours by Appointment
TELEPHONE: 247-5362 Attention:
FAX NUMBER: 
EMAIL ADDRESS: 
EFFECTIVE DATE: Spring 2012

Windward Community College Mission Statement

Windward Community College offers innovative programs in the arts and sciences and opportunities to gain knowledge and understanding of Hawai‘i and its unique heritage. With a special commitment to support the access and educational needs of Native Hawaiians, we provide Oʻahu's Koʻolau region and beyond with liberal arts, career and lifelong learning in a supportive and challenging environment — inspiring students to excellence.

Catalog Description

Math 232 is the fourth course in the calculus sequence. Topics include multiple integrals, line integrals, Green's Theorem, surface integrals, Stokes' Theorem, Gauss' Theorem, and differential equations.

PREREQUISITES: Grade of "C" or better in Math 231 or equivalent, or consent of instructor.

Suggested Basic Skills

Good study skills and habits; Competency with Calculus I, II, & III

DISABILITIES ACCOMMODATION STATEMENT

If you have a physical, sensory, health, cognitive, or mental health disability that could limit your ability to fully participate in this class, you are encouraged to contact the Disability Specialist Counselor to discuss reasonable accommodations that will help you succeed in this class. Ann Lemke can be reached at 235-7448, lemke@hawaii.edu, or you may stop by Ilale 'Akoakoa 213 for more information.
Learning Resources and Materials

Required Texts: Multivariable Calculus by Briggs & Cochran

Note: The full textbook Calculus by Briggs & Cochran may be used instead of the required text. The required text is a subset of the full textbook.

Required Material: MyMathLab (MML) access code

Required Technology Tool: TI-83, TI-83+, TI-84, or TI-84+ calculator.

MATH LAB: Mana`opono 113 – free drop-in tutoring

THE LEARNING CENTER (TLC): Alaka`i 106 – phone number 235-7498

UH Manoa Online Learning Academy: http://manoa.hawaii.edu/ola/

Free online tutorial assistance M – F: 9 am to 10 pm

Smarthinking: http://windward.hawaii.edu/smarthinking

Free online tutorial assistance

STUDENT LEARNING OUTCOMES

These student learning outcomes will be assessed via course activities (homework, in-class work, and/or additional assignments) and via tests or quizzes.

1. Compute multiple integrals in various coordinate systems.
2. Use multiple integrals or vector calculus techniques to solve application and/or theoretical problems.
3. Solve basic differential equations and applications.
4. Utilize precise mathematical language and symbols and effectively communicate in written and/or oral form.
Course Goals

1. To acquire skills with various analytical problem-solving strategies.

2. To gain competency with the theoretical and practical foundations of differential and integral calculus.

3. To learn about multiple integrals in various coordinate systems and in applications, Green's Theorem, Gauss' Theorem, and Stokes' Theorem, line integrals, surface integral and basic differential equations.

4. To inculcate the relevance of calculus through applications.

5. To prepare the student for endeavors which have Calculus IV as a prerequisite.

Activities Required at Scheduled Times Other Than Class Times

Homework; possibly quizzes or exams; consultation with instructor.

It is expected that students spend, at the minimum, 9 hours per week outside of class time studying and doing homework and readings for this class.

Responsibilities of Students

Success in this course will be enhanced by:

1. A positive, inquiring attitude toward mathematics;

2. Setting aside adequate time for studying, working on problems, and careful cogitation of the material;

3. Reading the text carefully and making use of other learning materials whenever necessary;

4. Seeking assistance from the instructor and the Math Lab whenever necessary;

5. Regularly attending class and, notifying the instructor of an absence and responsibly obtaining and completing assignments by the designated date.

Email and Laulima Website

You are responsible for checking your UH email regularly for important announcements. You are also expected to check the Math 135 course homepage at the Laulima website for important resources for the course.
Academic Honesty

All quizzes and exams are closed books and notes and must be done by your individual effort. You may not consult with any classmates while taking quizzes or exams. You are not allowed to tell a friend the type of questions on the quiz or exam, the answers, or help a classmate in any way (e.g. by explaining how to solve the problem). This would fall under the guidelines of academic integrity and any evidence of cheating will result in a score of 0 for all parties involved. Also keep in mind that we are assessing your knowledge and understanding of the concepts and strategies – attempting to find the answers online or through other sources is not in the spirit of academic honesty. An “F” will be assigned to students involved in cheating and will be reported to the Dean.

Graded assignments that apply to the course activities portion of your grade may be discussed with your classmates and you may seek guidance from the instructor, the Math Lab tutors, or the Trio tutors (if you are a Trio client), however, the write up of the solution for each problem must be done on your individual effort unless otherwise specified by the instructor. Graded assignments are not group assignments where all members of the group write the same responses for each problem. Any evidence of plagiarism will result in a score of 0 for all parties involved. If plagiarism persists, then an “F” will be assigned to the students involved in plagiarism and will be reported to the Dean.

Disruptive Behavior

Disruptive Behavior leads to a loss of learning time. Examples are activated beepers and cell phones, texting messages, making offensive remarks, packing books before class is over, making noise, leaving class early, coming to class late, sleeping in class, prolonged chattering, reading other materials not relevant to this class, etc. If a student takes part in disruptive behavior, the instructor reserves the right to exclude the student immediately from the class meeting, and will be marked absent.

MyMathLab (MML)

This course will utilize MML for some assignments. The textbook purchased from the WCC bookstore is packaged with MML. If you purchase the textbook from elsewhere, be sure that it comes with the MML access code.

The MML access code also provides an e-book so if you prefer, you may purchase just the MML access code online for $80.
Course Tasks and Grading Information

Grades for this course are based on the following course tasks:

<table>
<thead>
<tr>
<th>Task</th>
<th>Points</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 exams @100 pts</td>
<td>300</td>
<td>(50% of possible pts)</td>
</tr>
<tr>
<td>Course Activities</td>
<td>150</td>
<td>(25% of possible pts)</td>
</tr>
<tr>
<td>(Total percent earned)(150) = pts for CA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final Exam</td>
<td>150</td>
<td>(25% of possible pts)</td>
</tr>
<tr>
<td>Total points</td>
<td>600</td>
<td></td>
</tr>
</tbody>
</table>

Course activities may include but are not limited to:

- Homework Problems
- Journal entries (writing assignments)
- Reports or Presentations
- In-Class or Other Problems
- MML Problems
- Guided Projects

There are no make-up opportunities for missed or late assignments, in-class activities, or other activities that are graded for the course activities portion of your grade. The total percent correct will be multiplied by 150 (rounded to the nearest whole number) to obtain your score for the course activities portion of your grade. However, the maximum score possible for the course activities portion of your grade is 150 points.

Each letter grade for the course will be assigned according to the level of achievement as provided in the table below:

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90% - 100% of the cumulative points possible</td>
</tr>
<tr>
<td>B</td>
<td>80% - 89% of the cumulative points possible</td>
</tr>
<tr>
<td>C</td>
<td>70% - 79% of the cumulative points possible</td>
</tr>
<tr>
<td>D</td>
<td>60% - 69% of the cumulative points possible</td>
</tr>
<tr>
<td>F</td>
<td>Less than 60% of the cumulative points possible</td>
</tr>
<tr>
<td>Cr</td>
<td>70% - 100% of the cumulative points possible</td>
</tr>
<tr>
<td>NC</td>
<td>Less than 70% of the cumulative points possible</td>
</tr>
<tr>
<td>W</td>
<td>Official Withdrawal</td>
</tr>
<tr>
<td>I</td>
<td>Incomplete - given when a student has failed to complete a SMALL part of the course due to circumstances beyond his/her control.</td>
</tr>
</tbody>
</table>

Note: Cr/NC grades require written instructor consent. Students must apply for Cr/NC grading option at the Admissions Office by the posted deadline. If a student does not apply for Cr/NC grading option at the Admissions Office by the required deadline and if s/he does not withdraw, a letter grade (A, B, C, D, F) will be assigned for the course.

Note: W grade is given only when the student officially withdraws from the course at the Admissions Office by the posted deadline.
Math 232 Course Outline

Tentative Schedule

Wks 1 – 6  Multiple Integrations and Applications

Wks 7 – 12  Vector Calculus and Applications

Wks 13 – 16  Basic Differential Equations