Washtenaw Community College Comprehensive Report

MTH 293 Calculus III
Effective Term: Spring/Summer 2020

Course Cover

Division: Math, Science and Engineering Tech
Department: Math & Engineering Studies
Discipline: Mathematics
Course Number: 293
Org Number: 12200
Full Course Title: Calculus III
Transcript Title: Calculus III
Is Consultation with other department(s) required: No
Publish in the Following: College Catalog , Time Schedule , Web Page
Reason for Submission: Three Year Review / Assessment Report
Change Information:
Consultation with all departments affected by this course is required.
Outcomes/Assessment
Other:
Rationale: Three-year syllabus review.
Proposed Start Semester: Fall 2019
Course Description: This is the third course in the standard Calculus sequence. This course covers differential, integral and vector calculus for functions of more than one variable. To confirm transfer equivalency, consult a counselor or check the Web page of the college to which you are transferring. A graphing calculator is required for this course. See the time schedule for current brand and model.

Course Credit Hours

Variable hours: No
Credits: 4
Lecture Hours: Instructor: 60 **Student:** 60
Lab: Instructor: 0 **Student:** 0
Clinical: Instructor: 0 **Student:** 0

Total Contact Hours: Instructor: 60 **Student:** 60
Repeatable for Credit: NO
Grading Methods: Letter Grades
Audit
Are lectures, labs, or clinicals offered as separate sections?: NO (same sections)

College-Level Reading and Writing

College-level Reading & Writing

College-Level Math

No Level Required

Requisites

Prerequisite
MTH 192 minimum grade "C"

General Education

Degree Attributes

Assoc in Applied Sci - Area 3
Assoc in Science - Area 3
Assoc in Arts - Area 3
MACRAO Science & Math

Michigan Transfer Agreement - MTA

MTA Mathematics

Request Course Transfer

Proposed For:

Eastern Michigan University
University of Michigan

Student Learning Outcomes

1. Perform basic operations of Vector Algebra.
   Assessment 1
   Assessment Tool: End of semester exam
   Assessment Date: Winter 2020
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All course sections
   Number students to be assessed: A random sample of 20% of students enrolled or a minimum of 30 students
   How the assessment will be scored: Departmentally-developed rubric
   Standard of success to be used for this assessment: 70% of students sampled will score an average of 70% or higher on each exam question that addresses Outcome 1
   Who will score and analyze the data: Department

2. Differentiate functions of several variables.
   Assessment 1
   Assessment Tool: End of semester exam
   Assessment Date: Winter 2020
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All course sections
   Number students to be assessed: A random sample of 20% of students enrolled or a minimum of 30 students
   How the assessment will be scored: Departmentally-developed rubric
   Standard of success to be used for this assessment: 70% of students sampled will score an average of 70% or higher on each exam question that addresses Outcome 2
   Who will score and analyze the data: Department

3. Integrate and find limits of functions of several variables.
   Assessment 1
   Assessment Tool: End of semester exam
   Assessment Date: Winter 2020
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All course sections
   Number students to be assessed: A random sample of 20% of students enrolled or a minimum of 30 students
   How the assessment will be scored: Departmentally-developed rubric
   Standard of success to be used for this assessment: 70% of students sampled will score an average of 70% or higher on each exam question that addresses Outcome 3
   Who will score and analyze the data: Department

4. Perform calculations in Vector Calculus.
   Assessment 1
   Assessment Tool: End of semester exams
   Assessment Date: Winter 2020
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All course sections
   Number students to be assessed: A random sample of 20% of students enrolled or a minimum of 30 students
   How the assessment will be scored: Departmentally-developed rubric
   Standard of success to be used for this assessment: 70% of students sampled will score an average of 70% or higher on each exam question that addresses Outcome 4
   Who will score and analyze the data: Department

5. Find relative and absolute extrema of functions of several variables.
   Assessment 1
   Assessment Tool: End of semester exam
   Assessment Date: Winter 2020
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All course sections
   Number students to be assessed: A random sample of 20% of students enrolled or a minimum of 30 students
   How the assessment will be scored: Departmentally-developed rubric
   Standard of success to be used for this assessment: 70% of students sampled will score an average of 70% or higher on each exam question that addresses Outcome 5
   Who will score and analyze the data: Department

Course Objectives

1. Add and subtract vectors in plane and space.
2. Evaluate dot/cross products of vectors and solve related application problems.
3. Write equations of lines and planes in space.
4. Find limits and derivatives of functions of more than one independent variable.
5. Find limits and derivatives of vector-valued functions.
6. Use second order partial derivatives to determine if a critical point is a relative extrema.
7. Set up and solve optimization problems involving several variables, with or without constraints.
8. Set up and solve optimization problems using method of Lagrange Multipliers.
9. Write and solve multiple integrals using an appropriate coordinate system.
10. Find length, area, volume, work and flux using an appropriate integral.
11. Solve multiple integrals by changing variables.
12. Demonstrate an understanding of the major theorems (Green's, Gauss' and Stokes').
13. Perform basic operations and selected applications of vector calculus, including divergence and curl.
14. Demonstrate an understanding of the Fundamental Theorem of Line integrals and the relationship between line integrals of conservative vector fields and the values of the potential function at the endpoints of the curve.
15. Perform calculations using the tangential form and normal form of Greens theorem.

New Resources for Course

Course Textbooks/Resources

Textbooks
Larson, R., B. Edwards. *Calculus: Early Transcendental Functions*, 7th ed. Boston: Brooks Cole, 2015, ISBN: 9781285774770.
Manuals
Periodicals
Software

Equipment/Facilities

Level III classroom
Testing Center

Reviewer	Action	Date
Faculty Preparer:		
Yin Lu	*Faculty Preparer*	*Jun 04, 2019*
Department Chair/Area Director:		
Lisa Manoukian	*Recommend Approval*	*Jun 09, 2019*
Dean:		
Kimberly Jones	*Recommend Approval*	*Jul 02, 2019*
Curriculum Committee Chair:		
Lisa Veasey	*Recommend Approval*	*Nov 12, 2019*
Assessment Committee Chair:		
Shawn Deron	*Recommend Approval*	*Nov 15, 2019*
Vice President for Instruction:		
Kimberly Hurns	*Approve*	*Nov 19, 2019*

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Course description
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Objectives/Evaluation
Rationale: three year review
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2. Differentiate functions of several variables.
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   Assessment Tool: End of semester exam
   Assessment Date: Winter 2017
   Assessment Cycle: Every Three Years
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   Number students to be assessed: A random sample of 20% of students enrolled or a minimum of 30 students
   How the assessment will be scored: Departmentally-developed rubric
   Standard of success to be used for this assessment: 70% of students sampled will score an average of 70% or higher on each exam question that addresses Outcome 2.
   Who will score and analyze the data: Department

3. Integrate functions of several variables.
   Assessment 1
   Assessment Tool: End of semester exam
   Assessment Date: Winter 2017
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All course sections
   Number students to be assessed: A random sample of 20% of students enrolled or a minimum of 30 students
   How the assessment will be scored: Departmentally-developed rubric
   Standard of success to be used for this assessment: 70% of students sampled will score an average of 70% or higher on each exam question that addresses Outcome 3.
   Who will score and analyze the data: Department

4. Perform calculations in Vector Calculus.

Assessment 1

Assessment Tool: End of semester exams
Assessment Date: Winter 2017
Assessment Cycle: Every Three Years
Course section(s)/other population: All course sections
Number students to be assessed: A random sample of 20% of students enrolled or a minimum of 30 students
How the assessment will be scored: Departmentally-developed rubric
Standard of success to be used for this assessment: 70% of students sampled will score an average of 70% or higher on each exam question that addresses Outcome 4
Who will score and analyze the data: Department

Course Objectives

1. Add and subtract vectors in plane and space.
2. Evaluate dot/cross products of vectors and solve related application problems.
3. Write equations of lines and planes in space.
4. Find limits and derivatives of functions of more than one independent variable.
5. Find limits and derivatives of vector-valued functions.
6. Use second order partial derivatives to determine if a critical point is a relative extrema.
7. Set up and solve optimization problems involving several variables, with or without constraints.
8. Set up and solve optimization problems using method of Lagrange Multipliers.
9. Write and solve multiple integrals using an appropriate coordinate system.
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12. Demonstrate an understanding of the major theorems (Green's, Gauss' and Stokes') and perform basic operations and selected applications of vector calculus, including divergence and curl.
13. Demonstrate an understanding of the Fundamental Theorem of Line integrals and the relationship between line integrals of conservative vector fields and the values of the potential function at the endpoints of the curve.
14. Make calculations using the tangential form and normal form of Greens theorem.

New Resources for Course

Course Textbooks/Resources

Textbooks

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Periodicals
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Equipment/Facilities

Level III classroom

Reviewer	Action	Date
Faculty Preparer:		
Frank Gerlitz	*Faculty Preparer*	*Dec 05, 2016*
Department Chair/Area Director:		
Lisa Rombes	*Recommend Approval*	*Dec 13, 2016*
Dean:		
Kristin Good	*Recommend Approval*	*Dec 14, 2016*

Curriculum Committee Chair:		
David Wooten	*Recommend Approval*	*Mar 21, 2017*
Assessment Committee Chair:		
Ruth Walsh	*Recommend Approval*	*Mar 22, 2017*
Vice President for Instruction:		
Kimberly Hurns	*Approve*	*Mar 23, 2017*