

Washtenaw Community College Comprehensive Report

MTH 192 Calculus II Effective Term: Spring/Summer 2024

Course Cover

College: Math, Science and Engineering Tech

Division: Math, Science and Engineering Tech

Department: Math & Engineering Studies

Discipline: Mathematics

Course Number: 192

Org Number: 12200

Full Course Title: Calculus II

Transcript Title: Calculus II

Is Consultation with other department(s) required: No

Publish in the Following: College Catalog , Time Schedule , Web Page

Reason for Submission:

Change Information:

Other:

Rationale: Master syllabus update submitted with assessment report. Updating assessment population.

Proposed Start Semester: Fall 2023

Course Description: In this course, students will explore the application of integration, integration techniques, L'Hôpital's Rule, numerical integration, improper integrals, infinite series, Taylor series, parametric equations and polar coordinates. A graphing calculator is required. See the time schedule for current brand and model. This is the second semester course in single variable calculus.

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

Level 7

Requisites

Prerequisite

MTH 191 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

Ferris State University

Grand Valley State University

Jackson Community College

Kendall School of Design (Ferris)

Lawrence Tech

Michigan State University

Oakland University

University of Detroit - Mercy

University of Michigan

Wayne State University

Western Michigan University

Student Learning Outcomes

1. Solve a variety of applied integration problems.

Assessment 1

Assessment Tool: Outcome-related common departmental exam questions

Assessment Date: Winter 2026

Assessment Cycle: Every Three Years

Course section(s)/other population: All

Number students to be assessed: A random stratified sample of 25% of the students in each section

How the assessment will be scored: Departmentally-developed rubric

Standard of success to be used for this assessment: 70% of students who take the final assessment will score at least 70% on the common exam questions

Who will score and analyze the data: Departmental faculty

2. Evaluate limits of functions and sequences.

Assessment 1

Assessment Tool: Outcome-related common departmental exam questions

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Course section(s)/other population: All

Number students to be assessed: A random stratified sample of 25% of the students in each section

How the assessment will be scored: Departmentally-developed rubric

Standard of success to be used for this assessment: 70% of students who take the final assessment will score at least 70% on the common exam questions

Who will score and analyze the data: Departmental faculty

3. Determine the convergence or divergence of an infinite series using an appropriate test for convergence.

Assessment 1

Assessment Tool: Outcome-related common departmental exam questions

Assessment Date: Winter 2026

Assessment Cycle: Every Three Years

Course section(s)/other population: All

Number students to be assessed: A random stratified sample of 25% of the students in each section

How the assessment will be scored: Departmentally-developed rubric

Standard of success to be used for this assessment: 70% of students who take the final assessment will score at least 70% on the common exam questions

Who will score and analyze the data: Departmental faculty

4. Derive the Taylor Series for a given function, including the interval of convergence.

Assessment 1

Assessment Tool: Outcome-related common departmental exam questions

Assessment Date: Winter 2026

Assessment Cycle: Every Three Years

Course section(s)/other population: All

Number students to be assessed: A random stratified sample of 25% of the students in each section

How the assessment will be scored: Departmentally-developed rubric

Standard of success to be used for this assessment: 70% of students who take the final assessment will score at least 70% on the common exam questions

Who will score and analyze the data: Departmental faculty

5. Solve a variety of differentiation and integration problems in parametric and polar form.

Assessment 1

Assessment Tool: Outcome-related common departmental exam questions

Assessment Date: Winter 2026

Assessment Cycle: Every Three Years

Course section(s)/other population: All

Number students to be assessed: A random stratified sample of 25% of the students in each section

How the assessment will be scored: Departmentally-developed rubric

Standard of success to be used for this assessment: 70% of students who take the final assessment will score at least 70% on the common exam questions

Who will score and analyze the data: Departmental faculty

Course Objectives

1. Calculate the volume of a solid of revolution using the washer and shell methods.
2. Calculate arc lengths and surface areas in rectangular coordinates.
3. Evaluate integrals using integration by parts.
4. Evaluate integrals using trigonometric identities and u-substitutions like $u=\sin x$, $du=\cos x \, dx$.
5. Evaluate integrals using trigonometric substitution involving right triangles.
6. Evaluate integrals using partial fractions.
7. Evaluate limits of indeterminate forms using L'Hôpital's rule.
8. Identify and evaluate improper integrals.
9. Determine the convergence or divergence of geometric and p-series.
10. Determine the convergence or divergence of series using the integral, limit comparison and direct comparison tests.
11. Determine the convergence or divergence of alternating series.
12. Determine the convergence or divergence of series using the ratio and root tests.
13. Graph parametric and polar equations.
14. Calculate the equation of the tangent line, and the concavity of a plane curve at a given point.
15. Calculate the area bounded by the graph of a polar equation.
16. Calculate arc lengths and surface areas in parametric form.

17. Calculate arc lengths and surface areas in polar coordinates.

New Resources for Course

Course Textbooks/Resources

Textbooks

Strang & Herman. *Calculus Volume II*, ed. OpenStax, 2016

Manuals

Periodicals

Software

MyOpenMath. MyOpenMath, MyOpenMath ed.

MyOpenMath is an online course management and assessment system for mathematics and other quantitative fields. MyOpenMath's focus is providing rich algorithmically generated assessment to support the use of free, open textbooks.

Equipment/Facilities

Level III classroom

Testing Center

Computer workstations/lab

Data projector/computer

<u>Reviewer</u>	<u>Action</u>	<u>Date</u>
Faculty Preparer: <i>Clifford Taylor</i>	<i>Faculty Preparer</i>	<i>May 31, 2023</i>
Department Chair/Area Director: <i>Nichole Klemmer</i>	<i>Recommend Approval</i>	<i>Jun 07, 2023</i>
Dean: <i>Tracy Schwab</i>	<i>Recommend Approval</i>	<i>Jun 08, 2023</i>
Curriculum Committee Chair: <i>Randy Van Wagnen</i>	<i>Recommend Approval</i>	<i>Apr 03, 2024</i>
Assessment Committee Chair: <i>Jessica Hale</i>	<i>Recommend Approval</i>	<i>Apr 10, 2024</i>
Vice President for Instruction: <i>Brandon Tucker</i>	<i>Approve</i>	<i>Apr 16, 2024</i>

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Discipline: Mathematics

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Org Number: 12200

Full Course Title: Calculus II

Transcript Title: Calculus II

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

Rationale: Update after assessment report.

Proposed Start Semester: Winter 2022

Course Description: This is the standard second semester single variable calculus course. Students explore topics including applications of integration, integration techniques, L'Hôpital's Rule, numerical integration, improper integrals, infinite series, Taylor series, parametric equations and polar coordinates. A graphing calculator is required. See the time schedule for current brand and model.

Course Credit Hours

Variable hours: No

Credits: 4

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Assessment Date: Winter 2024

Assessment Cycle: Every Three Years

Course section(s)/other population: All

Number students to be assessed: All

How the assessment will be scored: Departmentally-developed rubric

Standard of success to be used for this assessment: 70% of students who take the final assessment will score at least 70% on the common exam questions

Who will score and analyze the data: A subcommittee of the Math 192 instructors

2. Evaluate limits of functions and sequences.

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Assessment Tool: Outcome-related common departmental exam questions

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3. Determine the convergence or divergence of an infinite series using an appropriate test for convergence.

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Who will score and analyze the data: A subcommittee of the Math 192 instructors

4. Derive the Taylor Series for a given function, including the interval of convergence.

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Assessment Tool: Outcome-related common departmental exam questions

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5. Solve a variety of differentiation and integration problems in parametric and polar form.

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16. Calculate arc lengths and surface areas in parametric form.
17. Calculate arc lengths and surface areas in polar coordinates.

New Resources for Course

Course Textbooks/Resources

Textbooks

Larson & Edwards. *Calculus Early Transcendental Functions*, 7th ed. Brooks/Cole, 2019

Manuals

Periodicals

Software

Equipment/Facilities

Level III classroom

Testing Center

Computer workstations/lab

Data projector/computer

<u>Reviewer</u>	<u>Action</u>	<u>Date</u>
Faculty Preparer: <i>Clifford Taylor</i>	<i>Faculty Preparer</i>	<i>Aug 02, 2021</i>
Department Chair/Area Director: <i>Lawrence David</i>	<i>Recommend Approval</i>	<i>Aug 04, 2021</i>
Dean: <i>Victor Vega</i>	<i>Recommend Approval</i>	<i>Aug 10, 2021</i>
Curriculum Committee Chair: <i>Randy Van Wagnen</i>	<i>Recommend Approval</i>	<i>Nov 12, 2021</i>
Assessment Committee Chair: <i>Shawn Deron</i>	<i>Recommend Approval</i>	<i>Nov 13, 2021</i>
Vice President for Instruction: <i>Kimberly Hurns</i>	<i>Approve</i>	<i>Nov 15, 2021</i>