

Tompkins Cortland Community College

Master Course Syllabus

Course Discipline and Number: MATH 202

Year: 2024-2025

Course Title: Calculus II

Credit Hours: 4

I. Course Description: This course is a continuation of *Calculus I*. Topics include: slope fields, applications of separable differential equations, area between two curves, volumes of revolution, arc-length, work, advanced integration techniques (parts, trig integrals, trig substitution, and partial fractions), L'Hopital's Rule, improper integrals, infinite series, parametric equations, and polar coordinates. Use of a graphing calculator is required. MATH 202 fulfills the SUNY General Education Mathematics (and Quantitative Reasoning) Knowledge and Skills area. Prerequisites: C or better grade in MATH 201. 4 Cr. (4 Lec.) Fall and spring semesters.

II. Additional Course Information:

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| 1. This course is intended for students in the Computer Science, Engineering Science, Liberal Arts-Adolescence Teacher Education: Mathematics and Physics concentrations, and the Liberal Arts-Math/Science A.S. Mathematics and Physics concentrations. |
| 2. For fully asynchronous sections of this course <u>only</u> , a proctored, pass/fail final exam is required for which students must score 50% or more to pass the class. |

III. Student Learning Outcomes

Upon successful completion of this course, students will be able to:

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| 1. Solve simple differential equations graphically, algebraically, and in applications. |
| 2. Identify and use appropriate integration techniques to calculate antiderivatives; apply L'Hopital's Rule to calculate the limit of an indeterminate form. |
| 3. Set up and use definite integrals to solve application problems including volume of solids, surface area, arc length, and work. |
| 4. Work with polar and parametric equations and graphs; identify rates of change, area, arc length, and surface of revolution of polar and parametric curves. |
| 5. Identify convergence or divergence of infinite series; use infinite series to represent transcendental functions, their derivatives, and/or antiderivatives and identify the interval of convergence. |

IV. Tompkins Cortland Institutional Learning Outcomes; Program Learning Outcomes; SUNY General Education Competencies and Knowledge and Skills Areas

Tompkins Cortland ILOs – N/A

Complete this section for “service” courses only (e.g., courses that are required of all students; courses that are not program specific but satisfy liberal arts requirements; or commonly used in multiple academic programs to meet non-program-specific requirements). Check only Institutional Learning Outcomes (ILOs) that are meaningfully developed and assessed in this course. For each ILO chosen, include the SLO to which it aligns.

Students will:

- Communicate effectively, in oral and written forms, taking into consideration audience and purpose.

- Apply principles and methods of scientific inquiry and quantitative reasoning appropriate to their discipline.
- Use information, critical thinking, and the creative process to solve problems and reach conclusions.
- Use technology appropriate to their discipline.
- Describe the ways in which social, economic, or environmental sustainability depends on their own and the collective contributions of a diversity of ideas and people.

Program Learning Outcomes – N/A

Complete this section for program-specific courses (e.g., those that share the same discipline code as the academic program or satisfy requirements in related programs). List the academic program(s) here and note which Student Learning Outcomes align to specific Programmatic Learning Outcomes. Please see the MCS Instructions for more details.

SUNY General Education Competencies – N/A

If this course assesses a SUNY GEN ED Competency, check all that apply and indicate which course outcome(s) address each checked item:

CRITICAL THINKING & REASONING- Students will:

- a. clearly articulate an issue or problem;
- b. identify, analyze, and evaluate ideas, data, and arguments as they occur in their own or others' work; acknowledge limitations such as perspective and bias; and
- c. develop well-reasoned (logical) arguments to form judgments and/or draw conclusions.

INFORMATION LITERACY - Students will:

- a. locate information effectively using tools appropriate to their need and discipline; evaluate information with an awareness of authority, validity, and bias; and demonstrate an understanding of the ethical dimensions of information use, creation, and dissemination.

SUNY GENERAL EDUCATION KNOWLEDGE AND SKILLS AREA(s): **Mathematics (and Quantitative Reasoning)**

For courses that are approved to meet one (or more) of the ten SUNY General Education Knowledge and Skills Areas, indicate which area the course fulfills, and which outcome(s) are aligned with the SUNY outcomes for that area:

SUNY SLO: Students will demonstrate mathematical skills and quantitative reasoning, including the ability to

- interpret and draw inferences from appropriated mathematical models such as formulas, graphs, tables, or schematics;

Course SLO(s):

SLO #1 Solve simple differential equations graphically, algebraically; and in applications.

SLO #4 Work with polar and parametric equations and graphs; identify rates of change, area, arc length, and surface of revolution of polar and parametric curves.

SLO #5 Identify convergence or divergence of infinite series; use infinite series to represent transcendental functions, their derivatives, and/or antiderivatives and identify the interval of convergence

SUNY SLO: Students will demonstrate mathematical skills and quantitative reasoning, including the ability to

- represent mathematical information symbolically, visually, numerically, or verbally as appropriate; and

Course SLO(s):

SLO #1 Solve simple differential equations graphically, algebraically; and in applications.

SLO #3 Set up and use definite integrals to solve application problems including volume of solids, surface area, arc length, and work.

SLO #4 Work with polar and parametric equations and graphs; identify rates of change, area, arc length, and surface of revolution of polar and parametric curves.

SUNY SLO: Students will demonstrate mathematical skills and quantitative reasoning, including the ability to

- employ quantitative methods such as arithmetic, algebra, geometry, or statistics to solve problems.

Course SLO(s):

SLO #1 Solve simple differential equations graphically, algebraically; and in applications.

SLO #2 Identify and use appropriate integration techniques to calculate antiderivatives; apply L'Hopital's Rule to calculate the limit of an indeterminate form.

SLO #3 Set up and use definite integrals to solve application problems including volume of solids, surface area, arc length, and work.

SLO #4 Work with polar and parametric equations and graphs; identify rates of change, area, arc length, and surface of revolution of polar and parametric curves.

SLO #5 Identify convergence or divergence of infinite series; use infinite series to represent transcendental functions, their derivatives, and/or antiderivatives and identify the interval of convergence

This course does not address any of the above Tompkins Cortland ILOs, PLOs, or SUNY General Education Competencies or Knowledge and Skills Areas.

V. Essential Topics/Themes

1. Differential Equations and Integral applications
2. L'Hopital's Rule, Improper Integrals, and Advanced Integration Techniques (Integration by Parts, by Trigonometric Substitution, by Partial Fractions; Trigonometric Integration Using Identities and Substitution)
3. Applications of Definite Integrals: Volume of Solids, Volume of Revolution, Arc's Length, Surface Area of Revolution, Work, Center of Mass, Other Applications
4. Conic Sections, Polar and Parametric Calculus
5. Sequences and Infinite Series: Tests for Convergence, Sum of Infinite Series, Error Bounds, Power Series to Represent Functions, Mclaurin and Taylor Series to Represent and/or Approximate Transcendental Functions

VI. Methods of Assessment/Evaluation

Method	% Course Grade
1. Unit Tests	20-60%
2. Homework	10-30%
3. Final Exam (Cumulative)	20-30%

VII. Texts – Required Recommended Used for more than one course (list courses)

High school instructors may consult with staff in the CollegeNow office for additional information and guidance.

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1. <i>Calculus</i> . Larson, Ron et.al. 10th Edition, © 2014 Houghton Mifflin, Inc.	<input type="checkbox"/>
2. <i>Contemporary Calculus</i> . Dale Hoffman. Washington State College, CC-BY	<input checked="" type="checkbox"/>

Editions listed are current as of date of syllabus. More recent editions may be used.

VIII. Bibliography of Supplemental Materials – None specified

IX. Other Learning Resources

Audiovisual: None specified

Electronic:

<https://ohm.lumenlearning.com>

Other:

DYNAMIC Calculus web page: www.monroecc.edu/wusers/pseeburger

Attendance Policy: *To maintain good grades, regular attendance in class is necessary. Absence from class is considered a serious matter and absence never excuses a student from class work. It is the responsibility of all instructors to distribute reasonable attendance policies in writing during the first week of class. Students are required to comply with the attendance policy set by each of their instructors. Students are not penalized if they are unable to attend classes or participate in exams on particular days because of religious beliefs, in accordance with Chapter 161, Section 224-a of the Education Law of the State of New York. Students who plan to be absent from classroom activity for religious reasons should discuss the absence in advance with their instructors. See college catalog for more information.*

Services for Students with Disabilities: *It is the College's policy to provide, on an individual basis, appropriate academic adjustments for students with disabilities, which may affect their ability to fully participate in program or course activities or to meet course requirements. Students with disabilities should contact the Coordinator of Access and Equity Services, to discuss their particular need for academic adjustments. All course materials are available in alternate formats upon request.*

Academic Integrity: *Every student at Tompkins Cortland Community College is expected to act in an academically honest fashion in all aspects of his or her academic work: in writing papers and reports, in taking examinations, in performing laboratory experiments and reporting the results, in clinical and cooperative learning experiences, and in attending to paperwork such as registration forms.*

Any written work submitted by a student must be his or her own. If the student uses the words or ideas of someone else, he or she must cite the source by such means as a footnote. Our guiding principle is that any honest evaluation of a student's performance must be based on that student's work. Any action taken by a student that would result in misrepresentation of someone else's work or actions as the student's own — such as cheating on a test, submitting for credit a paper written by another person, or forging an advisor's signature — is intellectually dishonest and deserving of censure.

Several degree programs offer student learning opportunities (such as internships, field work, and clinical experiences) outside the standard classroom setting. As part of the learning process, students must understand and engage in conduct that adheres to principles guiding employment within the professional workplace. These behaviors include, but are not limited to, academic integrity, accountability, reliability, respect, use of appropriate language and dress, civility, professional ethics, honesty, and trustworthiness. Disciplinary action may be initiated for inappropriate conduct occurring while participating in any course-related project or event.