



**Course Number and Name:** MAT 172 Section Name - *Unified Calc II*

**Term Dates:** Section Start Date - Section End Date

**Meeting Location:** Section Meeting Building Section Meeting Room

**Meeting Days & Times:** Section Meeting Days; Section Start Time - Section End Time

**Lecture/Lab Hours:** 4.00 Lecture Hours

**Credits:** 4.00

**Prerequisite(s):** MAT-171; ENG-097

**Corequisite(s):** Course Coreqs

**Course Description:** This course is a continuation of MAT 171 particularly appropriate for students continuing onto Calculus III or studying Engineering. Topics include algebraic and transcendental functions, techniques of integration, area, volume, applications to the physical, biological, and managerial sciences, infinite series, conic sections, and parametric equations.

## Course Learning Outcomes

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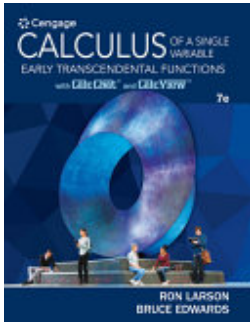
**Upon successful completion of this course, students will be able to:**

1. Determine the derivative and integral of exponential and logarithmic functions with bases other than  $e$ , inverse trigonometric functions, and hyperbolic functions.
2. Use separation of variables to solve differential equations, with specific application to models of growth and decay.
3. Formulate and compute definite integrals to determine the area between curves, volumes of revolution, work and centroids of planar lamina.
4. Determine the appropriate method (substitution, integration by parts, trigonometric integration, trigonometric substitution, partial fractions) for integrating a function and perform indefinite and definite integrations using these methods.

5. Recognize limits that produce indeterminate forms and apply L'Hopital's Rule to evaluate such limits.
6. Determine the convergence or divergence of infinite series using a variety of tests.
7. Use Taylor and Maclaurin series to represent transcendental functions, determine the intervals on which they converge, as well as the number of terms required to achieve a specified accuracy of approximation.
8. Graph conic sections and provide equations for given conic section graphs in rectangular form.

## Course Materials

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**Calculus of a Single Variable + Webassign Printed Access Card for Larson/Edwards Calculus, Multi-term - Included in Cengage Unlimited**

**Publication Date:** 2018-01-01

## Grading

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Letter Grade	Percentage
A	90-100
B+	87-89
B	80-86
C+	77-79
C	70-76
D+	67-69
D	60-66
F	< 60

## Class Schedule

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Units	Class Weeks	Chapter	Pages	Topics
I	3	5.5	pg 352-357	Bases OtherThan e and Applications
		5.6	pg 362-368	Indeterminantforms and L'Hopital's Rule
		5.7	pg 373-378	Inverse TrigFunctions Differentiation
		5.8	Pg 382-386	Inverse TrigFunctions- Integration
		5.9	pg 390-396	HyperbolicFunctions (light on inverse hyperbolicfunctions)
		6.2	pg 415-419	Differential Equations Growth and Decay
				Review and Test 1
II	3	7.1	pg 444-449	Area of a regionbetweentwocurves
		7.2	pg 454-460	Volume:The Disk Method
		7.3	pg 465-469	Volume: The Shell Method
		7.4	pg 474-480	Arc Length and Surface of Revolution (optional)
		7.5	pg 485-490	Work
		7.6	pg 494-500	Moments, Centers of Mass and Centroids (omit Theorem of Pappus)
				Review and Test 2

Units	Class Weeks	Chapter	Pages	Topics
III	4	8.1	pg 516-519	Basic Integration Rules
		8.2	pg 523-528	Integration by Parts
		8.3	pg 532-536	Trigonometric Integrals
		8.4	pg 541-546	Trigonometric Substitution
		8.5	pg 550-556	Partial Fractions
		8.8	pg 572-578	Improper Integrals
				Review and Test 3
IV	2.5	9.1	pg 588-595	Sequences
		9.2	pg 599-604	Series and Convergence
		9.3	pg 609-612	The Integral Test and $p$ -Series
		9.4	pg 616-619	Comparison of Series
		9.5	pg 623-628	Alternating Series

Units	Class Weeks	Chapter	Pages	Topics
		9.6	pg 631-636	The Ratio and Root Tests (root test if time permits)
		9.7	pg 640-647	Taylor Polynomials and Approximations
		9.8	pg 651-657	Power Series
		9.9	pg 661-665	Representation of Functions by Power Series
		9.10	pg 668-676	Taylor and MacLaurin Series
				Review and Test 4
V	1.5	10.1	pg 686-694	Conics and Calculus (time permitting)
		10.2	pg 700-706	Plane Curves and Parametric Equations
		10.3	pg 710-714	Parametric Equations and Calculus
				Review for Final Exam

## Experiential Learning

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Students must complete an experiential learning activity that connects course content to career applications. This activity may be a content specific assignment or practical skill that is applied within a course assignment. This assignment supports the general education learning outcomes of scientific/critical thinking and quantitative reasoning; oral and written communication; and information literacy/technological competency.

## **Academic Policies**

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See College Catalog for more information: <http://onlinecatalog.ucc.edu/content.php?catoid=10&navoid=2858>

## **Americans with Disabilities Act (ADA)**

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Union College offers reasonable accommodations and/or services to persons with disabilities. Any student who has a documented disability and wishes to self-identify should contact the Coordinator of Disability Support Services at (908) 709-7164, or email [disabilitysvc@ucc.edu](mailto:disabilitysvc@ucc.edu). Accommodations are individualized and in accordance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1992. In order to receive accommodations, students must be registered with Disability Support Services. Students should register with the office as soon as possible. Accommodations are not official until the Faculty Accommodations Alert Form(s) are issued from the student to his/her instructor(s).

## **Family Educational Rights and Privacy Act (FERPA)**

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The FERPA Statement can be found at <https://www.ucc.edu/admissions/the-family-education-rights-and-privacy-act/>.

## **Equal Opportunity Statement**

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Union College does not discriminate and prohibits discrimination, as required by state and/or federal law, in all programs and activities, including employment and access to its career and technical programs.

## **Union College Mission Statement**

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*Transforming Our Community. . . One Student at a Time*

## **Suggested Teaching Methodologies**

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1. Lecture
2. Active learning/problem-solving activities

3. Independent practice
4. Discussion
5. Technology (WebAssign, Mathematica) supports course objectives to be determined at the discretion of the instructor

## Mapping Course Learning Outcomes to Learning Activities and Evaluation Methods

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<b>Course Learning Outcomes (CLO's)</b>	<b>Learning Activities</b>	<b>Evaluation Methods</b>
Determine the derivative and integral of exponential and logarithmic functions with bases other than e, inverse trigonometric functions, and hyperbolic functions.	Mix of the following as appropriate: <ul style="list-style-type: none"> <li>• Lecture</li> <li>• Class Discussion</li> <li>• Student Practice</li> <li>• Group Work</li> <li>• Homework – textbook/software</li> </ul>	Written assignments  Quizzes & Tests  Classroom discussion
Use separation of variables to solve differential equations, with specific application to models of growth and decay.	Mix of the following as appropriate: <ul style="list-style-type: none"> <li>• Lecture</li> <li>• Class Discussion</li> <li>• Student Practice</li> <li>• Group Work</li> <li>• Homework – textbook/software</li> </ul>	Written assignments  Quizzes & Tests  Classroom discussion
Formulate and compute definite integrals to determine the area between curves, volumes of revolution, work and centroids of planar lamina.	Mix of the following as appropriate: <ul style="list-style-type: none"> <li>• Lecture</li> <li>• Class Discussion</li> <li>• Student Practice</li> <li>• Group Work</li> <li>• Homework – textbook/software</li> </ul>	Written assignments  Quizzes & Tests  Classroom discussion
Determine the appropriate	Mix of the following as appropriate:	Written assignments

method (substitution, integration by parts, trigonometric integration, trigonometric substitution, partial fractions) for integrating a function and perform indefinite and definite integrations using these methods.	<ul style="list-style-type: none"> <li>• Lecture</li> <li>• Class Discussion</li> <li>• Student Practice</li> <li>• Group Work</li> <li>• Homework – textbook/software</li> </ul>	<p>Quizzes &amp; Tests</p> <p>Classroom discussion</p>
Recognize limits that produce indeterminate forms and apply L'Hopital's Rule to evaluate such limits.	<p>Mix of the following as appropriate:</p> <ul style="list-style-type: none"> <li>• Lecture</li> <li>• Class Discussion</li> <li>• Student Practice</li> <li>• Group Work</li> <li>• Homework – textbook/software</li> </ul>	<p>Written assignments</p> <p>Quizzes &amp; Tests</p> <p>Classroom discussion</p>
Determine the convergence or divergence of infinite series using a variety of tests.	<p>Mix of the following as appropriate:</p> <ul style="list-style-type: none"> <li>• Lecture</li> <li>• Class Discussion</li> <li>• Student Practice</li> <li>• Group Work</li> <li>• Homework – textbook/software</li> </ul>	<p>Written assignments</p> <p>Quizzes &amp; Tests</p> <p>Classroom discussion</p>
Use Taylor and Maclaurin series to represent transcendental functions, determine the intervals on which they converge, as well as the number of terms required to achieve a specified accuracy of approximation.	<p>Mix of the following as appropriate:</p> <ul style="list-style-type: none"> <li>• Lecture</li> <li>• Class Discussion</li> <li>• Student Practice</li> <li>• Group Work</li> <li>• Homework – textbook/software</li> </ul>	<p>Written assignments</p> <p>Quizzes &amp; Tests</p> <p>Classroom discussion</p>
Graph conic sections and provide equations for	<p>Mix of the following as appropriate:</p> <ul style="list-style-type: none"> <li>• Lecture</li> </ul>	<p>Written assignments</p> <p>Quizzes &amp; Tests</p>



given conic section graphs in rectangular form.	<ul style="list-style-type: none"> <li>• Class Discussion</li> <li>• Student Practice</li> <li>• Group Work</li> <li>• Homework – textbook/software</li> </ul>	Classroom discussion
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**Please note:** all programs must integrate in one or more courses, discipline-specific course learning outcomes that reflect the College learning outcomes of scientific/critical thinking and quantitative reasoning, oral/written communication, and information literacy.