North Iowa Area Community College
Course Outline

Please follow the included instructions when completing this form. Direct questions to Division Chair. After Course Outline is completed, please submit to Division Chair for review, who then submits to Administrative Assistant to the Vice President for Academic Affairs for review by the Curriculum and Academic Affairs Council (CAAC).

Prepared by:	Kathy Rogotzke
Date Approved by CAAC:	January 27, 2020
Course Title:	Calculus II
Course Number:	MAT-216
Equivalent Prior Course Numbers:	40-252; MATH-252
Academic Division/Department:	Math

Credits – Semester Hours (s.h.): 4

Contact Hours As defined by the Iowa Department of Education in consultation with Division Chair/Registrar (see attached instructions).

Lecture:	60	1 s.h. = 15 contact hours
Lab:	0	1 s.h. = 30 contact hours
Clinical Practice:	0	1 s.h. = 45 contact hours
Work Experience:	0	1 s.h. = 60, 75, 90, or 105 contact hours
Total:	**60**	

Prerequisite(s):

MAT-210 Calculus I with a grade of C or higher.

Corequisite(s):

None.

Course Description:

This course is a continuation of MAT-210 Calculus I. Topics include applications of the definite integral; principles of integration evaluation; improper integrals; modeling with differential equations; and infinite sequences and series.

Required Textbook(s) and Other Required Materials:

Calculus Early Transcendental Functions, 6th edition, Larson, ISBN # 1-285-77477-9

Purpose of Course Check one [X] in consultation with Division Chair.

X	Arts and Sciences (General Education)
	Arts and Sciences
	Career and Technical (General Education)
	Career and Technical
	Developmental

If course is offered <u>only</u> in specific semesters, please explain below:

Maximum number of weeks for which the course is offered:

16

[Do not edit the following section. Managed by Academic Affairs]

Is this a Core Competency Anchor Course? YES ☐ NO ☐

If "Yes," list Core Competency Student Learning Outcome Numbers being taught and assessed in this course (2.2, 3.1, etc.)

(Example) 2.2 [Press Tab to create new rows for each SLO]

Student Learning Outcomes (SLOs):

Upon successful completion of this course the student will be able to:

1. State and explain the Fundamental Theorem of Calculus.
2. Use definite integrals to find average values of functions and areas under functional curves.
3. Be aware of the relationship between algebraic and transcendental functions relative to differentiation and integration of certain functions.
4. Define and work with the hyperbolic functions.
5. Use integrals to find volumes of solids bounded by functions, arc lengths of functional curves, surfaces of rotated functions, work done by a variable force, and moments and centroids.
6. Use a table of integrals.
7. Integrate by parts, by trigonometric substitution and by partial fraction decomposition.
8. Integrate powers of sine, cosine, secant and tangent.
9. Study and use numerical methods to find definite integrals.
10. Use L'Hopital's Rule when it applies.
11. Recognize and evaluate integrals which are improper.
12. Determine the convergence or divergence of integrals.
13. Interpret and sketch directional fields, and solve first-order differential equations.
14. Evaluate terms of a sequence to understand the pattern, and determine the limit of a convergent sequence.
15. Determine whether or not a sequence is monotonic and/or bounded.
16. Define an infinite series and contrast a sequence to a series.
17. Recognize a geometric series and the conditions under which it converges.
18. Recognize the harmonic series, telescoping series, p-series, alternating series be able to show why they converge or diverge.

19. Use the integral test, the comparison tests, the ratio test, the root test, and the alternating series test correctly.

20. Construct a Taylor Polynomial and use the Remainder Theorem to check its accuracy.

21. Define a power series in x, and find its interval of convergence.

22. State the Taylor and MacLaurin series for the standard transcendental functions and use them to construct the series for more complex functions.

23. Use the Taylor representation of a function to perform differentiation and integration.