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:	Brent Hamilton
Date Approved by CAAC:	January 27, 2020
Course Title:	Calculus I
Course Number:	MAT-210
Equivalent Prior Course Numbers:	40-251; MATH-251
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-128 Precalculus with a grade of C or higher; or MAT-121 College Algebra and MAT-134 Trigonometry and Analytic Geometry with grades of C or higher; or an ALEKS score of at least 70.

Corequisite(s):

None.

Course Description:

Topics include analysis of functions, limits, derivatives and integrals of algebraic, logarithmic, exponential, and trigonometric functions, and applications of differentiation.

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 only 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. Analyze functions using numeric, graphic, and symbolic representations.
2. Construct the sum, difference, product, quotient, and composition of functions.
3. Apply linear concepts such as slope, intercepts, and various algebraic forms of a line to construct and interpret linear mathematical models.
4. Determine the value (if it exists) of limits of algebraic functions and certain trigonometric functions, including one-sided limits.
5. Define the concept of continuity and determine intervals of continuity for functions.
6. Derive algebraic, trigonometric, inverse trigonometric, exponential, and logarithmic functions.
7. Derive implicitly defined equations.
8. Apply differential notation for local linear approximations in applied problems.
9. Choose and apply the power, product, quotient and chain rules to find derivatives of functions.
10. Apply both the first and the second derivatives in the curve sketching of the graphs of functions.
11. Solve application problems involving related rates of change and optimization.
12. Determine the points of inflection and concavity of the graph of a function.
13. Use the derivative to find the extreme values of a function.
14. Relate and apply the Mean Value Theorem and Rolle's Theorem for derivatives.
15. Determine, derive and integrate all inverse functions.
16. Define and determine the antiderivative of various functions.
17. Evaluate elementary integral problems.
18. Construct an expression using sigma notation to approximate the area beneath a curve.
19. Determine the area beneath a curve by use of the limit of a sum.
20. Define the definite integral and discuss the statement $\int_a^b f(x)\,dx = \lim_{\max \Delta x_k \to 0} \sum_{k=1}^{n} f(x_k^*)\Delta x$
21. Explain the Fundamental Theorem of Calculus and apply it to evaluate definite integrals.
22. Relate and apply the Mean Value Theorem for Integrals.