EASTERN ARIZONA COLLEGE

Calculus II

Course Design

2019-2020

Course Information

Division	Mathematics
Course Number	MAT 230 (SUN# MAT 2230)
Title	Calculus II
Credits	4
Developed by	Pedro Dabalsa
Lecture/Lab Ratio	3 Lecture/2 Lab

Transfer Status

ASU	NAU	UA
MAT 271, MAT 266, Mathematics (MA) *Note: Will fulfill MAT 266 requirement for Engineering Majors.*	MAT 137	MATH 129

Activity Course	No
CIP Code	27.0101
Assessment Mode	Final Exam (14 Questions/100 Points)
Semester Taught	Fall and Spring
GE Category	Mathematics
Separate Lab	No
Awareness Course	No
Intensive Writing Course	No
Diversity and Inclusion Course	No

Prerequisites

MAT 220 with a grade of "C" or higher

Educational Value

Students majoring in Mathematics, Physics, Chemistry, and Engineering.

Description

Continuation of MAT 220. Transcendental functions, techniques of integration, parametric equations, improper integrals, numerical methods, infinite series, conics, and polar coordinates.

Supplies

Scientific calculator; TI-83 or TI-84 recommended

Competencies and Performance Standards

1. Define the basic hyperbolic functions.

Learning objectives

What you will learn as you master the competency:

a. Write out the definitions of the fundamental Hyperbolic functions.

b. Differentiate Hyperbolic functions.

c. Integrate Hyperbolic functions.

d. Prove Hyperbolic function identities.

Performance Standards

Competence will be demonstrated:

- on assigned activities
- on written exams
- on a comprehensive final exam

Criteria - Performance will be satisfactory when:

- learner can write out the definitions of the fundamental transcendental functions and operate with them
- learner can differentiate hyperbolic functions
- learner can integrate hyperbolic functions
- learner can prove hyperbolic function identities

2. Apply integration to different real world applications.

Learning objectives

What you will learn as you master the competency:

a. Solve problems of velocity and net change.

b. Calculate the region between two curves.

c. Compute the volume of an object by slicing.

d. Compute the volume of an object by cylindrical shells.

e. Calculate the length of a plane curve.

f. Determine the surface area of an object of rotation.

g. Redefined logarithms in integral form.

Performance Standards

Competence will be demonstrated:

- on assigned activities
- on written exams
- on a comprehensive final exam

Criteria - Performance will be satisfactory when:

- learner can correctly solve problems dealing with velocity and net change, regions between curves, volumes of revolution, surface area, etc.

3. Apply various techniques for the evaluation of nontrivial integrals.

Learning objectives

What you will learn as you master the competency:

a. Evaluate a given integral using integration by parts.

b. Evaluate trigonometric integrals.

c. Evaluate integrals by the use of a trigonometric substitution.

d. Use the method of partial fractions to integrate a rational function.

e. Use numerical integration to evaluate an integral that cannot be expressed in terms of elementary functions.

f. Evaluate improper integrals.

g. Use Weierstrass substitution to evaluate integrals.

Performance Standards

Competence will be demonstrated:

o on assigned activities

o on written exams

o on a comprehensive final exam

Criteria - Performance will be satisfactory when:

o learner can successfully evaluate selected types of nontrivial integral

4. Apply theorems and other techniques to evaluate infinite series and to determine the convergence or divergence status of sequences and infinite series.

Learning objectives

What you will learn as you master the competency:

a. Determine the properties of sequences.

b. Evaluate infinite series.

c. Determine convergence/divergence status of infinite series.

d. Expand a telescoping series and determine its converging pattern.

e. Apply theorems of alternating series.

Performance Standards

Competence will be demonstrated:

o on assigned activities

o on written exams

o on a comprehensive final exam

Criteria - Performance will be satisfactory when:

o learner can evaluate an infinite series and determine the converging pattern

5. Apply properties of series to the study of power series and their applications.

Learning objectives

What you will learn as you master the competency:

a. Approximate functions with a polynomial.

b. Determine interval and radius of convergence of a power series.

c. Decompose a function into a Taylor and a Maclaurin series.

Performance Standards

Competence will be demonstrated:

o on assigned activities

o on written exams

o on a comprehensive final exam

Criteria - Performance will be satisfactory when:

- o learner can write a given function as a Taylor or Maclaurin series

6. Apply differentiation and integration to parametric functions.

Learning objectives

What you will learn as you master the competency:

a. Write a given function in parametric form.
b. Graph a parametric function.
c. Differentiate and integrate parametric functions.
d. Redefine conic sections in parametric form.

Performance Standards

Competence will be demonstrated:

- o on assigned activities
- o on written exams
- o on a comprehensive final exam

Criteria - Performance will be satisfactory when:

- o learner can write a given function in parametric form and operate with it

7. Apply polar coordinates to function differentiation and integration.

Learning objectives

What you will learn as you master the competency:

a. Convert points in Cartesian Coordinates to Polar Coordinates and vice versa.
b. Write Cartesian equation in Polar equations and vice versa.
c. Graph, differentiate, and integrate polar curves.
d. Study conic sections in Polar form.

Performance Standards

Competence will be demonstrated:

- o on assigned activities
- o on written exams
- o on a comprehensive final exam

Criteria - Performance will be satisfactory when:

- o learner can write a given function in polar form and operate with it

Types of Instruction

Classroom presentation

Grading Information

Grading Rationale

Each instructor has the flexibility to develop evaluative procedures within the following parameters.

1. Written Exams must represent at least 60% of the final course grade.
2. Final Exam must represent at least 20% of the final course grade.
3. Other Activities may represent at most 20% of the final course grade.

Grading Scale

A	90% - 100%
B	80% - 89%
C	70% - 79%
D	60% - 69%
F	Below 60 %