COURSE SYLLABUS

Tunxis Community College

Education That Works For a Lifetime

Course Title:	Differential Equations	**Date submitted:**	1/27/2020 (AAC: 20-03)
Department:	STEAM		
Curriculum:	Mathematics		

Course Descriptors:

Course Code: (eg. ACC 101) **MAT*285**

Course Type: **L**

A: Clinical   B: Lab   D: Distance Learning
I: Individual/Independent   L: Lecture   N: Internship
M: Seminar P: Practicum   U: Studio
X: Combined Lecture/Lab   Y: Combined Lecture/Clinical/Lab   Z: Combined Lecture/Studio

Elective Type: **G/LAS/M**

AH: Art History   E: English   FA: Fine Arts   FL: Foreign Language   G: General   HI: History   HU: Humanities LAS: Liberal Arts & Sciences   M: Math S: Science   SS: Social Science

Contact Hours:		
Credit Hours:	3	
Developmental: (yes/no)	N	
Lecture:	3	
Clinical:	0	
Lab:	0	
Studio:	0	
Other:	0	
TOTAL:	3	
Class Maximum:	30	
Semesters Offered:	F/Sp	

Prerequisites:

C- or better in Calculus II (MAT*256)

Corequisites:

Other Requirements:

Catalog Course Description:	An introductory course in differential equations. Solution methods for differential equations including select first-order equations, n-th order equations, and systems of linear equations with applications. Laplace transforms, and numerical methods and series solutions for linear differential equations are included. This class is intended for Math and Engineering students.

Topical Outline:	1. Families of curves and their differential equations
	2. Solution of first order differential equations
	   a. Separation of variables
	   b. Homogeneous coefficient equations
	   c. Exact equations
	   d. Linear equations

3. Elementary applications in geometry (orthogonal trajectories), physics and chemistry
4. Integrating factors
5. Linear differential equations of the nth order
    a. Linear independence
    b. Differential operators
    c. Homogeneous with constant coefficients
    d. Nonhomogeneous: undetermined coefficients and variation of parameters method
6. Inverse differential operators
7. The LaPlace Transform and its inverse

Outcomes:

COURSE: Upon successful completion of this course, the student will be able to do the following:

1. Draw direction fields
2. Use Euler's approximation method to numerically solve first-order differential equations.
3. Solve the following type of first-order differential equations using analytic techniques: separable, linear, exact
4. Solve application problems involving heating and cooling, Newtonian mechanics, and electrical circuits
5. Determine the general solution to a homogeneous linear differential equation
6. Solve auxiliary equations with complex roots
7. Use the method of undetermined coefficients to solve a non-homogenous differential equation
8. Solve second-order differential equations using variation of parameters
9. Describe free and forced mechanical vibrations using a second-order differential equation
10. Determine the general solution to a second-order differential equation about an ordinary point
11. Determine the general solution to a second-order differential equation about a single point
12. Determine the Laplace transform of a function
13. Determine conditions for the existence of the Laplace transform of a function
14. Use the properties of the Laplace transform to derive new transforms
15. Determine the inverse Laplace transform of a function including the use of the method of partial fractions
16. Solve initial -value problems using the Laplace transform of a function

PROGRAM: N/A

GENERAL EDUCATION:
 Quantitative Reasoning -Students will learn to recognize, understand, and use the quantitative elements they encounter in various aspects of their lives. Students will develop a habit of mind that uses quantitative skills to solve problems and make informed decisions. Demonstrates: Interprets numerical information and applies sufficient laws of logic and mathematics to solve problems using numbers, symbols, graphs and/or descriptions. Does Not Demonstrate: Misinterprets numerical information or insufficiently applies laws of logic and mathematics to solve problems using numbers, symbols, graphs and/or descriptions.

Evaluation:	**Assessment will be based on the following criteria:** Quizzes Exams Projects as assigned
Instructional Resources:	**Required:** No special resources required **Desired: None**
Textbook(s)	Refer to current academic year printout.