

Columbus State Community College Mathematics Department Syllabus

Course and Number: MATH 2255 – Elementary Differential Equations

Credits: 4 **Class Hours Per Week:** 4

Prerequisites: Grade of 'C' or higher in MATH 2153

COURSE DESCRIPTION: This course is a study of the basic concepts and methods of solving ordinary differential equations. Topics include slope fields; separable, linear, exact, Bernoulli, and homogeneous first order equations; homogeneous and nonhomogeneous second and higher order linear equations; Laplace transforms; series solutions; numerical methods; applications to physical sciences and engineering.

COURSE GOALS: To acquaint the students with the basic methods of solving of elementary ordinary differential equations with an emphasis on applications. To further promote and develop students' abilities to think and reason mathematically and prepare them for further study in mathematics, science, and engineering.

INSTITUTIONAL LEARNING GOALS: Critical Thinking and Quantitative Skills

EQUIPMENT AND TEXTBOOK REQUIRED

- *Elementary Differential Equations and Boundary-Value Problems*, 10th ed., Boyce/DiPrima, Wiley, 2012.
- A graphing calculator is recommended. The TI-89, TI-92, TI-Nspire CAS, and other Computer Algebra Systems (CAS) are never allowed during proctored assessments.

UNITS OF INSTRUCTION:

- Introduction to ODEs (Sections 1.1, 1.3)
- First Order ODEs (Sections 2.1, 2.2, 2.4, 2.6, 2.7)
- Modeling with First Order ODEs (Sections 2.3, 2.5)
- Higher Order ODEs (Sections 3.1-3.6, 4.1-4.4)
- Modeling with Higher Order ODEs (Section 3.7-3.8)
- Series Solutions of Linear ODEs (Sections 5.1-5.6)
- Laplace Transforms (Sections 6.1-6.4, 6.6)

GENERAL INSTRUCTIONAL METHODS: Instructional methods may include face-to-face or video lectures or demonstration, face-to-face or virtual discussion, individual or group activities including the use of visual aids, computers and/or other technologies. Students may be expected to participate in these activities during class and/or outside of class. Instructors may require class participation, collaborative learning, and peer review.

STANDARDS AND METHODS FOR EVALUATION: The final examination will be weighted between 25% and 33% (inclusive) of the course grade. The remainder of the course grade will be determined by the instructor.

GRADING SCALE: Letter grades for the course will be awarded using a 90%-80%-70%-60% scale. Grades will NOT be curved, skewed, or otherwise inflated.