COURSE NUMBER: Vv256	**COURSE TITLE:** Applied Calculus IV
Credits: 4	**PREREQUISITES:** Vv255 or Vv285 or instructors permission
TEXTBOOKS/REQUIRED MATERIAL: William E. Boyce, Richard C. DiPrima, *Elementary Differential Equations and Boundary Value Problems* (8th edition)	**INSTRUCTOR:** Mateusz Krzyzosiak **DATE OF PREPARATION:** Sep 27, 2012 **DATE OF UC APPROVAL:** Oct. 30, 2013
INSTRUCTOR(S):	**SCIENCE/DESIGN:** n/a
CATALOG DESCRIPTION: The sequence Applied Calculus Vv156-255-256 is an introduction to basic calculus. It differs from the Honors Math sequence in that new concepts are often introduced and extended from concrete examples, remaining closely aligned to applications. Most theorems are stated rigorously and motivated from examples, but complicated proofs and abstract generalizations are often omitted. The emphasis is on applying mathematical results to concrete problems. The present course focuses on ordinary differential equations and their applications.	**COURSE TOPICS:** • elements of linear algebra: matrices and eigenvalue problems; diagonalization and the Jordan normal form • ordinary differential equations (ODEs) of first order • linear systems of first-order equations • linear second-order and higher order equations • power series solutions of ODEs by the Frobenius method; Bessel's and Legendre's differential equations • Laplace transform and its applications to ODEs • introduction to the classical partial differential equations of physics and some basic solutions by separation of variables
COURSE STRUCTURE/SCHEDULE: lecture (twice per week, 90 minutes each)	

COURSE OBJECTIVES [Course Outcomes in brackets]	• Present analytic techniques to compute solutions to various differential equations and analytic and qualitative techniques to understand the behavior of solutions to various differential equations [1-9]. • Present the mathematical foundations of the techniques and the range of their applicability [1-8]. • Develop an increased ability to reason abstractly about mathematical concepts related to differential equations [1-9]. • Develop effective problem-solving skills [1-9].
COURSE OUTCOMES [Program Outcomes in brackets]	After completing this course, students should be able to: 1. read, write, and speak accurately about mathematical ideas and use correct mathematical notation [a, g]. 2. identify and classify ordinary differential equations ODEs and systems of ODEs, and apply appropriate solution strategies to selected classes of ODEs and systems of ODEs [a, e, k]. 3. model real world phenomena with ODEs and systems of ODEs [a, e, g, k]. 4. use power series techniques to solve ODEs [a, e, k]. 5. use the Laplace transform to solve problems with differential equations [a, e, k]. 6. find and discuss solutions of selected classes of partial differential equations [a, e, k]. 7. use graphing technology to explore mathematical concepts, and verify their work [a, e, g, k]. 8. use numerical, graphical, symbolic, and verbal representations to solve problems and communicate with others [a, e, g, k]. 9. incorporate the use of computer-based technology (CAS, graphing software) in problem-solving and results presentation [a, e, g, k].
ASSESSMENT TOOLS [Course Outcomes in brackets]	homework [1-9] project [1-9] midterm and final exams [1-9]