COURSE NUMBER: Vv216	**COURSE TITLE:** Calculus IV
Credit: 4	**PREREQUISITES:** Vv215 or instructor's permission
TEXTBOOKS/REQUIRED MATERIAL: James R. Brannan and William E. Boyce, *Differential Equations: An introduction to modern methods and applications*, 3rd Edition	**INSTRUCTOR:** Zachiri McKenzie **DATE OF PREPARATION:** Spring 2018 **DATE OF UC APPROVAL:**
INSTRUCTOR(S):	**SCIENCE/DESIGN:** n/a
CATALOG DESCRIPTION: The sequence Calculus Vv115-116-215-216 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. This sequence has an additional course compared to the Applied Calculus sequence. This allows room for more examples and the discussion of more applications. The present course covers differential equations.	**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 (as time permits) • Laplace transform and its applications to ODEs • introduction to the classical partial differential equations of physics (as time permits)
COURSE STRUCTURE/SCHEDULE: lecture (five times per fortnight, 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 behaviour of solutions to various differential equations [1-7]. • Present the mathematical foundations of the techniques and the range of their applicability [1-6]. • Develop an increased ability to reason abstractly about mathematical concepts related to differential equations [1-7]. • Develop effective problem-solving skills [1-7].
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. 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. 3. model real world phenomena with ODEs and systems of ODEs. 4. use the Laplace transform to solve problems with differential equations. 5. use graphing technology to explore mathematical concepts, and verify their work. 6. use numerical, graphical, symbolic, and verbal representations to solve problems and communicate with others. 7. incorporate the use of computer-based technology (CAS, graphing software) in problem-solving and results presentation.
ASSESSMENT TOOLS [Course Outcomes in brackets]	homework [1-7] midterm and final exams [1-6]