COURSE NUMBER: Vv255	**COURSE TITLE:** Applied Calculus III
Credit: 4	**PREREQUISITES:** Vv156 or Vv186 or permission of instructor
TEXTBOOKS/REQUIRED MATERIAL: James Stewart, *Calculus* (5th 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: This course covers linear systems of equations and the Gauss-Jordan algorithm; finite-dimensional vector spaces (with an emphasis on euclidean space), linear independence and bases; scalar products and Gram-Schmidt orthonormalization; linear maps and matrices; determinants; analytic geometry of lines and planes; parametric representation of curves and surfaces; partial derivatives and applications; line, surface and volume integrals; vector fields the classical theorems of vector analysis in three dimensions (Green, Gauss and Stokes) and applications.	**COURSE TOPICS:** • Vectors, linear system, matrix algebra, inverse and determinant • Dot product and Orthogonality, orthogonal sets and orthogonal projections • Gram-Schmdit, cross product, lines and planes in R3 • Vector-valued functions, • Arc length and curvature, motion in space • Functions of several variables, limits and continuity, partial derivatives • Linear approximations, the chain rule • Directional derivatives and gradient, • Optimization, Lagrange multiplier • Double integral, iterated integrals • Surface area, triple integral I, Triple integrals II, Jacobian • Vector fields, line integrals, green's theorem, curl and divergence • Surface integrals, Stokes's theorem, divergence theorem
COURSE STRUCTURE/SCHEDULE: lecture (twice per week, 90 minutes each)	

COURSE OBJECTIVES [Course Outcomes in brackets]	• Provide knowledge about concepts in multivariate calculus [1-7]. • Present analytic techniques of the multivariate calculus and develop students' ability to apply them effectively in modeling of real-world problems [1-7]. • Develop student's ability to interpret the concepts of calculus algebraically, graphically, and verbally [1-7]. • Improve students' ability to think critically, to analyze a problem and solve it using a wide array of tools [1-7].
COURSE OUTCOMES [Program Outcomes in brackets]	After completing this course, students should be able to: 1. Find patterns, generalize, and ask/answer relevant questions with mathematical thinking and reasoning. 2. Develope a mathematical vocabulary by expressing mathematical ideas orally and in writing. 3. Perform numeric and symbolic computations in multivariate calculus. 4. State and apply mathematical definitions and theorems in multivariate calculus. 5. Prove fundamental theorems in multivariate calculus. 6. Model real-life problems mathematically using multivariate calculus. 7. Use MATLAB to analyze and solve geometric, computational, and symbolic problems.
ASSESSMENT TOOLS [Course Outcomes in brackets]	homework[1-7] midterm and final exams [1-7]