West Valley College

MATH004A - Intermediate Calculus

General Information

Author(s):	Doonu Barife
Proposal Start:	2017SU
Distance Education Approved:	No
TOP Code:	1701.00
TOP Name:	Mathematics, General
CIP Code:	27.0101
CIP Name:	Mathematics, General
SAM code:	E = Non-occupational
Course Control Number:	CCC000534425
Curriculum Committee Approval Date:	03/23/2015
Board of Trustees Approval Date:	04/21/2015
External Review Approval Date:	07/01/2015
Course Description:	This course covers vector-valued functions, calculus of functions of more than one variable, partial derivatives, differentials, gradients, Lagrange Multipliers, multiple integration, line integrals, surface integrals, Green's Theorem, Stokes' Theorem, and the Divergence theorem.
Submission Rationale:	

Faculty Minimum Qualification Requirements

Master Discipline Preferred:	Mathematics
Alternate Master Discipline Preferred:	No value

Bachelors or Associates Discipline Preferred:	No value
Additional Bachelors or Associates Discipline:	No value

Course Development Options

Course Basic Skill Status	Allowed Number of Retakes	Grade Options
Course is not a basic skills course.	0	Letter Grade methods

Allow Students to Gain Credit by Exam/Challenge

Rationale For Credit By Exam/Challenge	Retake Policy Description	Allow Students To Audit Course
No value	No value	

Transferability & Gen. Ed. Options

Request for Transferability	Transferability Status
Transferable to both UC and CSU	Approved

Units and Hours

Summary

Minimum Credit Units	5	**Total Course In-Class (Contact) Hours**	90
Maximum Credit Units	5	**Total Course Out-of-Class Hours**	180
		Total Student Learning Hours	270
		Faculty Load	-

Detail

Weekly Student Hours

	In Class	Out of Class
Lecture Hours	5	10
Lab Hours	-	-
Activity Hours	-	-

Course Student Hours

Course Duration (Weeks)	18
Hours per unit divisor	-

Course In-Class (Contact) Hours

Lecture	-
Lab	-
Activity	-
Total	90

Course Out-of-Class Hours

Lecture	-
Lab	-
Activity	-
Total	180

Units and Hours - Weekly Specialty Hours

Requisites

Entrance Skills

Skill	Content Review
No value	No value

Limitations on Enrollment

Limitation	Provide Rationale
Prerequisite: MATH 003B or qualifying score on Placement Test and proof of Calculus II	

Specifications

Methods of Instruction	Methods of Instruction Rationale
Instructor Demonstration	Lecture concepts are enhanced through the use of tables, charts, graphs and/or technology such graphing calculators or

Maple
software.

	C. Critical Thinking
	Express a triple integral over T as an iterated integral six different ways using different orders of integration.

Methods of Evaluation	Methods of Evaluation Rationale
Other	A. Homework assignments
	B. Problem solving using technology
	C. Quizzes
	D. Tests

Equipment

No value

Textbooks

Author	Title	Publisher	Date	ISBN
Smith Robert T. & Minton Roland B..	Calculus Early Transcendental Function. 4th.	McGraw Hill.	2012.	9780073532325
Stewart, James.	Calculus. 7th.	Brooks Cole.	2012.	9780538497817
Tan, Soo T..	Calculus: Early Transcendentals.	Brooks Cole.	2011.	9780534465544

Learning Outcomes and Objectives

Course Objectives

Determine equations of lines and planes.
Demonstrate ability to perform vector operations.
Demonstrate ability to perform analytic geomtry in 3-space.
Find the limit of a function at a point and determine where it is continuous.
Graph surfaces in space (including planes, cylinders and quadratic surfaces).
Solve physical problems involving position, velocity, and acceleration including finding and interpreting the normal and tangential components of acceleration.
Compute evaluate and interpret partial derivative both geometrical and physically.
Write the equation of a tangent plane and a normal line at a point.
Determine differentiability and compute differentials.
Find local extrema and test for saddle points.
Solve constraint problems using Lagrange multipliers.
Compute arc length and curvature.
Evaluate double integrals using rectangular and polar coordinates where appropriate.
Evaluate triple integrals using rectangular, cylindrical and spherical coordinates.
Find and interpret the divergence and curl of a vector field.
Determine whether a vector field is conservative and find its potential function if it is conservative.
Apply a change of variables to integrate functions of multiple variables.
Compute line and surface integrals.
Apply Green’s, Stokes’, and the Divergence Theorem where appropriate.

CSLOs

Find limits of, differentiate, and integrate vector-valued functions.	Expected SLO Performance: 80
Find limits of, differentiate, and integrate functions of several variables.	Expected SLO Performance: 80

Course Outline

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A.Vectors and Geometry of Space

A.Vectors in two and three dimensions

1. Geometric and algebraic interpretations

H. Position, velocity, and acceleration vectors
I. Normal and tangential components of acceleration

C. Functions of Several Variables
A. Domain of functions of several variables
B. Graphs of functions of two variables
C. Level curves and surfaces
D. Limits and continuity of functions of several variables
E. Partial derivatives and higher-order derivatives of functions of several variables
F. Linear approximations, differentials and applications
G. Chain rules for functions of several variables
H. Implicit differentiation for functions of several variables
I. Directional derivatives, gradient vectors and properties

I. Surface and flux integrals for parametric surfaces and surfaces that are graphs of functions
J. Stokes' theorem
K. Divergence theorem
