Wharton County Junior College

Administrative Master Syllabus

Course Information

Course Title	Calculus III
Course Prefix, Num. and Title	MATH 2415
Division	Math and Physical Science
Department	Mathematics
Course Type	Academic General Education Course (from ACGM, but not WCJC Core)
Course Catalog Description	Advanced topics in calculus, including vectors and vector-valued functions, partial differentiation, Lagrange multipliers, multiple integrals, and Jacobians; application of the line integral, including Green's Theorem, the Divergence Theorem, and Stokes' Theorem.
Pre-Requisites	MATH 2414 Calculus II; or Division Chair approval
Co-Requisites	None

Semester Credit Hours

Total Semester Credit Hours (SCH): Lecture Hours: Lab/Other Hours	4:4:0
Equated Pay Hours	4
Lab/Other Hours Breakdown: Lab Hours	0
Lab/Other Hours Breakdown: Clinical Hours	0
Lab/Other Hours Breakdown: Practicum Hours	0
Other Hours Breakdown	0

Approval Signatures

Title	Signature	Date
Department Head:	Yvonne Smith Digitally signed by Yvonne Smith DN: cn=Yvonne Smith, o=WCJC, ou=Math and Physical Science, email=smithy@wcjc.edu, c=US Date: 2023.08.08 10:27:43 -05'00'	
Division Chair:	Jennifer Mauch Digitally signed by Jennifer Mauch DN: cn=Jennifer Mauch, o, ou=Wharton County Junior College, email=mauchj@wcjc.edu, c=US Date: 2023.08.07 09:59:08 -05'00'	
VPI:	Leigh Ann Collins Digitally signed by Leigh Ann Collins Date: 2023.08.14 12:35:24 -05'00'	

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Additional Course Information

Topical Outline: Each offering of this course must include the following topics (be sure to include information regarding lab, practicum, and clinical or other non-lecture instruction).

Chapter 9 – Differential Equations
9.1 Modeling with Differential Equations
9.2 Direction Fields and Euler's Method
9.3 Separable Equations
9.4 Models for Population Growth
9.5 Linear Equations
9.5 Predator-Prey Systems

Chapter 12 – Vectors and the Geometry of Space
12.1 Three Dimensional Coordinate Systems
12.2 Vectors
12.3 The Dot Product
12.4 The Cross Product
12.5 Equations of Lines and Planes
12.6 Cylinders and Quadric Surfaces

Chapter 13 – Vector Functions
13.1 Vector Functions and Space Curves
13.2 Derivatives and Integrals of Vector Functions
13.3 Arc Length and Curvature
13.4 Motion in Space: Velocity and Acceleration

Chapter 14 – Partial Derivatives
14.1 Functions of Several Variables
14.2 Limits and Continuity
14.3 Partial Derivatives
14.4 Tangent Planes and Linear Approximations
14.5 The Chain Rule
14.6 Directional Derivatives and the Gradient Vector
14.7 Maximum and Minimum Values
14.8 Lagrange Multipliers

Chapter 15 – Multiple Integrals
15.1 Double Integrals over Rectangles
15.2 Double Integrals over General Regions
15.3 Double Integrals in Polar Coordinates
15.4 Applications of Double Integrals
15.5 Surface Area
15.6 Triple Integrals
15.7 Triple Integrals in Cylindrical Coordinates
15.8 Triple Integrals in Spherical Coordinates
15.9 Change of Variables in Multiple Integrals

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Chapter 16 – Vector Calculus
16.1 Vector Fields
16.2 Line Integrals
16.3 The Fundamental Theorem for Line Integrals
16.4 Green's Theorem
16.5 Curl and Divergence
16.6 Parametric Surfaces and Their Areas
16.7 Surface Integrals
16.8 Stokes' Theorem

Course Learning Outcomes:

Learning Outcomes – Upon successful completion of this course, students will:

1. Perform calculus operations on vector-valued functions, including derivative, integrals, curvature, displacement, velocity, acceleration, and torsion.
2. Perform calculus operations on functions of several variables, including partial derivatives, directional derivatives, and multiple integrals.
3. Find extrema and tangent planes.
4. Solve problems using the Fundamental Theorem of Line Integrals, Green's Theorem, the Divergence Theorem, and Stokes' Theorem.
5. Apply the computational and conceptual principles of calculus to the solutions of real-world problems.
6. sections.

Methods of Assessment:

Final Exam (Required)

Other Methods of Assessment:
- Hour Exams
- Homework
- Quizzes
- Short Answer
- Discussion Board
- Participation
- Projects

Required text(s), optional text(s) and/or materials to be supplied by the student:

"Calculus" by Stewart, Cengage, 9th Edition

Students must have computer access to the WCJC website, their WCJC student email and online accounts. WCJC has open computer labs, with internet access, on all campuses for students to use.

Suggested Course Maximum:

35

List any specific or physical requirements beyond a typical classroom required to teach the course.

None

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Course Requirements/Grading System: Describe any course specific requirements such as research papers or reading assignments and the generalized grading format for the course.

A. Final Exam 15-30%
B. Other Course Requirements 70-85%

A = 90-100
B = 80-89
C = 70-79
D = 60-69
F = 59 or below

Curriculum Checklist:

☒**Administrative General Education Course** (from ACGM, but not in WCJC Core) – No additional documents needed.

☐**Administrative WCJC Core Course** – Attach the Core Curriculum Review Forms

- ☐Critical Thinking
- ☐Communication
- ☐Empirical & Quantitative Skills
- ☐Teamwork
- ☐Social Responsibility
- ☐Personal Responsibility

☐**WECM Course** – If needed, revise the Program SCANS Matrix and Competencies Checklist