COURSE SYLLABUS STEM Ed Abroad Program

Course Title: Calculus III

Course Semester: Fall

University and Country: Adam Mickiewicz University; Poznan, Poland

Number of ECTS: 8 (lecture)

Course Designations for Transfer Credit: MA242 (NCSU), MATH166 (ISU)

Content: This is the third of three semesters in a calculus sequence for science and engineering majors. Vectors, vector algebra, vector functions, functions of several variables, partial derivatives, gradients, directional derivatives, maxima and minima, multiple integration, line and surface integrals, Green's Theorem, Divergence Theorem, Stokes Theorem, and numerous applications will be covered.

Pre-requisites: Calculus II with a grade of C- or better.

Aims: A student after the Calculus III course should be able to:

1. Analyze and visualize curves, surfaces, and regions in 2 and 3 dimensions.

2. Perform calculus operations on vector-valued functions and functions of several variables including limits, derivatives, and integrals.

3. Find and classify extrema and tangent planes of functions of two variables.

4. Use the Fundamental Theorem of Line Integrals, Green's Theorem, the Divergence Theorem, and Stokes' Theorem, to simplify integration problems.

5. Solve various real life problems using Calculus III methods.

Lecture component: The Learning Objectives for each exam will be posted on each section's web site prior to the first lecture of the sequence leading up to that exam and will serve as both a study outline and a summary of items to review. The Learning Objectives also includes the topics listed below in **Course Lecture Topics**. A student must know and apply to demonstrate mastery of the material listed in these topics as presented in this course.

Recommended Books and Media : Calculus III for Engineers and Scientists (Franke, Griggs, Norris). This ebook is accessible via WebAssign.

Useful Web Page: https://kurtz.wordpress.ncsu.edu/teaching/ma-242/ This is the place to find old tests, helpful worksheets, complete test solutions.

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Instructors: Dr. Adam Przestacki (lecture) with consultation by Dr. Leslie Kurtz (NC State University). Email: adamp@amu.edu.pl

Grading System and Percentage Contribution

WebAssign Homework	20%
Exams	50%
Final Exam, Cumulative	30%
Total	100%

AMU Grading system and scale: The grading system used at Adam Mickiewicz University, whose name is abbreviated as AMU or UAM, is as follows:

Tests, exams, homework assignments grading scale

5 100%-91%
4+ 90%-86%
4 85%-76%
3+ 75%-71%
3 70%-60%
2 59% and less

This translates into the following ECTS (European internationally recognized system) grading scale:

ECTS Grade	AMU grade	Definition
A	5.0	EXCELLENT – outstanding performance with only minor errors
B	4+ / 4.5	VERY GOOD – above the average standard but with some errors
C	4.0	GOOD – generally sound work with a number of notable errors
D	3+ / 3.5	SATISFACTORY – fair but with significant shortcomings
E	3.0	SUFFICIENT – performance meets the minimum criteria
FX	2.0	FAIL – some more work required before the credit can be awarded
F	2.0	FAIL – considerable further work is required

Hours: 4 Lecture hours per week.

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Course Lecture Topics:

Dates	Sections/Topics
Week 1	1.1 3D Coordinate System 1.2 Vectors 1.3 Dot Product
Week 2	1.3 Dot Product 1.4 Cross Product 1.5 Equations of Lines and Planes
Week 3	2.1The Calculus of Vector Functions 2.2 Parameterized Curves in Space 2.3 Tangent Vectors, Arc Length, Curvature
Week 4	2.3 Tangent Vectors, Arc Length, Curvature 2.4 Curvature, Torsion, & the Osculating Plane
Week 5	TEST 1 3.1 Multivariable Functions 3.2 Limits and Continuity 3.3 Directional Derivatives: Partial Derivatives
Week 6	3.3 Geometrical Interpretation of Partial Derivatives 3.3 Tangent Plane 3.4 Differentiability of multivariable functions
Week 7	3.5 Directional Derivative & the Gradient Vector 3.5 Chain Rule 3.6 Optimization
Week 8	TEST 2 4.1 Double Integrals
Week 9	4.2 Applications of Double Integrals 4.3 Triple Integrals
Week 10	5.1 Double Integrals in Polar Coordinates 5.2 Triple integrals in Cylindrical Coordinates 5.3 Triple integrals in Spherical Coordinates
Week 11	TEST 3 6.1 Vector Fields 6.2 Line Integrals
Week 12	6.3 Fundamental thm for Line Integrals 6.4 Parametric Surfaces 6.5 Surface Integrals
Week 13	6.5 Surface Integrals 7.2 Divergence & Curl of the Vector Field
Week 14	TEST 4 7.3 Green's Theorem
Week 15	7.4. Stokes Theorem 7.5 Divergence Theorem
Last week	Final Exam