

# North South University



Department of Mathematics & Physics (DMP)

## MAT250: Calculus and Analytical Geometry III

Instructor	: Dr. Mamun Molla (Mla)
Office	: SAC1035
E-mail	: mamun.molla@northsouth.edu
Office time	: See my office door
<b>Course Objectives</b>	<ol style="list-style-type: none"><li>1. To demonstrate the function of several variables and plotting 3D figures.</li><li>2. To teach the concept of partial derivatives and their applications.</li><li>3. To develop the ability of multiple integration in different coordinate systems.</li><li>4. To analyze the vector calculus and their physical significance.</li></ol>
<b>Course Learning Outcomes:</b>	<p>Upon the successful completion of this course, a student will be able to:</p> <ul style="list-style-type: none"><li><b>(CO-1)</b> Classify the difference between single and several variables functions and limits as well as plotting 3D figures.</li><li><b>(CO-2)</b> Evaluate the partial derivatives for several variables functions and distinguish ordinary and partial derivatives.</li><li><b>(CO-3)</b> Apply multiple integration techniques to find area and volume of the different model geometries.</li><li><b>(CO-4)</b> Demonstrate their understanding of vector calculus and vector algebra.</li><li><b>(CO-5)</b> Apply line and surface integrals to evaluate the work done and the corresponding flux.</li></ul>

## Mapping of Course Outcomes

#	Course Outcomes (CO)	Bloom's taxonomy domain/level (C: Cognitive P: Psychomotor A: Affective)	Delivery methods and activities	Assessment tools
CO-1	Classify the difference between single and several variables functions and limits as well as plotting 3D figures.	C1, C2, C3	Lecture Discussion	Quiz, Assignment
CO-2	Evaluate the partial derivatives for several variables functions and distinguish ordinary and partial derivatives	C3, C4, P2	Lecture, in-class group discussion,	Concept clarification, Midterm exam, Assignment
CO-3	Apply multiple integration techniques to find area and volume of the different model geometries.	C2, C3, P2	Lecture, Discussion	Class work, Quiz, Assignment, Final Exam
CO-4	Demonstrate their understanding of vector calculus and vector algebra.	C2, P2	Lecture, Discussion	Concept, Demonstration, Quiz, Assignment, Final Exam
CO-5	Apply line and surface integrals to evaluate the work done and the corresponding flux.	C3, C4, P2	Lecture  Demonstration	Assignment, Final Exam

**Text book : 1. Calculus: Early Transcendental; Anton, Bivens and Davis, 10th Edition.**

### Marks

<b>Distribution</b>	:	Attendance-	5%
		Regular Quizzes (minimum 3 quizzes)	15%
		Mid-Term-	20%
		Mid-term 2	20%
		Final Exam-	35%
		Assignment	5%
<b>Total</b>			<b>100%</b>

**Lecture Plan/Course Schedule:**

<b>Lesson</b>	<b>Topics</b>	<b>Learning Activities</b>	<b>Assessment tools</b>	<b>Learning Outcome</b>
<b>I</b>	Functions of two variables	Lecture	Discussions Mid term-I	CO-1
<b>II</b>	Limits and Continuity	Lecture Assignment	Quiz 1	CO-1
<b>III</b>	Partial Derivatives	Lecture Group Discussion	Discussions Quiz 1 Mid term-I	CO-1
<b>IV</b>	Partial Derivatives and its application	Lecture Discussion	Quiz 1 Mid term-I	CO-1
<b>V</b>	Differentiability and Chain Rule	Lecture	Mid term-I	CO-1
<b>VI</b>	Directional Derivatives	Lecture Assignment	Quiz 2 Mid term-I	CO-1
<b>VII</b>	Tangent planes and normal line	Lecture	Quiz 2 Mid term-I	CO-1
<b>VIII</b>	maxima and minima	Discussion Lecture Assignment	Mid term-I	CO-2
<b>IX</b>	Double Integrals over rectangular regions	Lecture Assignment	Mid term-II	CO-2
<b>X</b>	<b>Mid Term Exam-I</b>			
<b>XI</b>	Double Integrals over non-rectangular regions	Lecture	Quiz 3 Mid term-II	CO-1

<b>XII</b>	Double Integrals over non-rectangular regions	Lecture assignment	Quiz 3 Mid term -II	CO-4
<b>XIII</b>	Double Integrals in Polar Coordinates	Lecture assignment	Quiz 3 Mid term -II	CO-4
<b>XIV</b>	Triple Integrals: in Cartesian coordinates	Lecture assignment	Quiz 3 Mid term -II	CO-4
<b>XV</b>	Change of variables in Multiple Integrals; Jacobean	Lecture assignment	Mid term -II	CO-3
<b>XVI</b>	Cylindrical and Spherical Coordinates	Lecture assignment	Mid term -II	CO-3
<b>XVII</b>	Triple Integrals: Cylindrical and spherical coordinates	Lecture Assignment Prepare for Mid II	Mid term -II	CO-3 CO-2
<b>XVIII</b>	<b>Mid Term II</b>			
<b>XIX</b>	Vector fields	Lecture assignment	Quiz 4 Final Exam	CO-5
<b>XX</b>	Line integrals	Lecture assignment	Quiz 4 Final Exam	CO-5
<b>XXI</b>	Green's Theorem	Lecture assignment	Quiz 3 Final Exam	CO-5
<b>XXII</b>	Surface Integrals	Lecture assignment	Final exam	CO-3
<b>XXIII</b>	Divergence theorem	Lecture assignment	Final exam	CO-3
<b>XXIV</b>	Stokes theorem and discussion for final exam	Lecture, Presenting, Explaining, De monstrating	Final exam	
<b>Final Exam</b>				

**Note:** Final Exam is comprehensive. In that case the course teacher will select at least one topic from the Mid-I and Mid-II syllabus. The course teacher will select these two topic based on the necessity and importance of the topics.

### **Rules and regulations:**

- (a) There is **no scope to retake a quiz**. In case of Mid-term- or Final exam, exceptional cases\*(unfortunate physical inability, accidents, serious illness) may be considered conditionally (with a **penalty of 20% reduced marks**) with proper justification.
- (b) Three consecutive absents need an official clarification.
- (c) Student having attendance **less than 60% of total classes will be not allowed to sit for Final Exam**.

**Note:** Full attendance will carry the bonus marks. Three to four quizzes will be taken.

**\*\*\*\*\* No Make Up Exam \*\*\*\*\***