Department of Mathematics and Physics

Course Title	**Calculus and Analytical Geometry II**
Course Code	MAT-130
Section No	Section 7 and 8
Semester	Fall 2022
Course Coordinator	Hasina Akter (hasina.akter@northsouth.edu)
Instructor & Department Information	
Instructor's Name	Mahboob Shaheen (MS1)
Office Room	SAC 1034
Office Hours	By appointments and **8:00 AM – 9:30 AM (SMTW)**
Office Phone	6214
Email Address	mahboob.shaheen@northsouth.edu
Links	North South University Website: http://www.northsouth.edu Department Website: http://www.northsouth.edu/academic/seps/mp.html

Course & Section Information	
Prerequisites	MAT 120
Class Time & Location	**Section 7: 9:40 AM – 11:10 AM (MW), SAC 316** **Section 8: 11:20 AM – 12:50 PM (MW), SAC 316**
Course Credit Hours	3:0
Text Book	Calculus, Early Transcendentals, Howard Anton, Irl Bivens, Stephen Davis, 10th edition, John Wiley & Sons, Inc., 2013, ISBN NO. 978-1-11809240-8
Reference Book	Calculus, James Stewart, 7th edition, Cengage learning, 2012, ISBN NO. 978-0-538-49781-7

Marks Distribution:

Attendance	10%
Assignments	10%
Quizzes	15%
Mid-Term	30%
Final Exam	35%

Grading Policy:

Numerical Scores	Letter Grade	Grade Points
93 & above	A	4.0
90 - 92	A-	3.7
87 – 89	B+	3.3
83 – 86	B	3.0
80 – 82	B-	2.7
77 – 79	C+	2.3
73- 76	C	2.0
70 – 72	C-	1.7
67 - 69	D+	1.3
60 - 66	D	1.0

Course Short Description

This course provides students an overview of the basic principle of integral, methodology of finding area between curves, length of a plane curve, surface area and volume by revolving plane curves using integration.

Course Objectives

1. To classify different types of proper and improper integrals and find the appropriate techniques for finding values of integrals, and to analyse the area of bounded and unbounded regions.
2. To analyse the basic geometric properties of conic sections parabolas, ellipses, and hyperbolas.
3. To demonstrate student' understanding of the relationship between the exponential and hyperbolic functions, their graphs and the application of hyperbolic functions in the real life problems.
4. To develop the ability to apply the basic principles of integration to find the length of a curve, surface area of revolution, area between two curves and the volume of solids generated by revolution of curves.

Course Learning Outcomes

Upon successful completion of this course, students will be able to:

- **(CO-1)** Classify the type of a given integral and apply the appropriate technique for finding the value of the integral.
- **(CO-2)** Formulate and evaluate integrals to find the length of curves, the area between curves, the area of unbounded regions, and the area of surfaces of revolution.
- **(CO-3)** Analyze the structure of solids generated by revolution of a region bounded by curves to evaluate volume.
- **(CO-4)** Illustrate parametric curves and conic sections, and analyze their various properties.
- **(CO-5)** Develop the ability to apply polar coordinates to find the area of regions bounded by polar curves.

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 type of a given integral and apply the appropriate technique for finding the value of the integral.	**C2, C3**	Lecture Group work	Quiz Midterm exam Class performance
CO-2	Formulate and evaluate integrals to find the length of curves, the area between curves, the area of unbounded regions, and the area of surfaces of revolution.	**C3, C4, P2**	Lecture Group work	Midterm exam Assignment
CO-3	Analyze the structure of solids generated by revolution of a region bounded by curves to evaluate volume.	**C3, C4, P2**	Lecture Discussion	Group work in class Quiz Assignment
CO-4	Illustrate parametric curves and conic sections, and analyze their various properties.	**C4, P2**	Lecture Discussion	Assignment Final Exam
CO-5	Develop the ability to apply polar coordinates to find the area of regions bounded by polar curves.	**C2, C3, P2**	Lecture	Quiz Assignment Final Exam

Course Contents & Lecture Schedule:

Lesson	*Topics*	*Section*	Learning activities	Assessment tools	Learning Outcome
1	Integration by parts	7.2	Lecture	Mid	CO-1
2	Trigonometric integrals	7.3	Lecture	Quiz, Mid Assignment	CO-1
3	Trigonometric integrals	7.3	Lecture	Quiz, Mid Assignment	CO-1
4	Trigonometric substitution	7.4	Lecture	Quiz, Mid	CO-1
5	Integrating rational functions by partial fractions	7.5	Lecture	Quiz, Mid	CO-1
6	Integrating rational functions by partial fractions	7.5	Lecture	Mid Assignment	CO-1
7	Hyperbolic functions and hanging cables	6.9	Lecture	Mid	CO-1
8	Hyperbolic functions and hanging cables	6.9	Lecture	Mid	CO-1
9	Area between two curves	6.1	Lecture	Quiz, Mid	CO-2
10	Volumes by slicing disks	6.2	Lecture	Quiz, Mid	CO-3
11	Volumes by slicing washers	6.2	Lecture	Quiz, Mid Assignment	CO-3
12	Volumes by Cylindrical shells	6.3	Lecture	Quiz, Mid	CO-3
13	***Midterm***				
14	Length of a plane curves	6.4	Lecture	Final	CO-2
15	Area of a surface of revolution	6.5	Lecture	Final	CO-2
16	Improper Integrals	7.8	Lecture	Final, Quiz	CO-1, CO-2
17	Improper Integrals	7.8	Lecture	Final, Assignment	CO-1, CO-2
18	Tangent lines and arc length for parametric curves	10.1	Lecture	Final	CO-4
19	Polar coordinates, Area in polar coordinates	10.2	Lecture	Final, Quiz Assignment	CO-5
20	Area in polar coordinates	10.3	Lecture	Final, Quiz	CO-5
21	Conic sections, parabola, ellipse	10.4	Lecture	Final	CO-4
22	Conic sections ellipse, hyperbola	10.4	Lecture	Final	CO-4
23	Conic sections in polar coordinates	10.6	Lecture	Final, Assignment	CO-4
24	***Review***				
	Mid-Term Exam (Syllabus and Date: TBA) **Final Exam (Declared by the Controller of Examinations) is comprehensive.**				

Note: The instructor reserves the right to make changes to the syllabus if necessary.

Students Complaints Policy

Students at North South University have the right to pursue complaints relate
d to faculty, staff, and other students. The nature of the complaints may be either academic or non-academic. For more information about the policy and processes related to this policy, you may refer to the students' handbook.

Classroom Rules of Conduct

1. Electronic devices e.g**. cell phone**, **laptop, notepad, iPad, iPod, mp3, etc,** are strictly prohibited in the class.
2. It is imperative that the students maintain absolute discipline in class. Students are also expected to arrive on time for the class, as frequent late attendance will not be accepted.
3. **Academic Integrity Policy:** Department of Mathematics and Physics does not tolerate academic dishonesty by its students. At minimum, students must not be involved in cheating, copyright infringement, submitting the same work in multiple courses, significant collaboration with other individuals outside of sanctioned group activities, and fabrications.

Students are advised that violations of the Student Integrity Code will be treated seriously, with special attention given to repeated offences.
Please Refer to NSU Student Handbook, Sections: "Disciplinary Actions" and "Procedures and Guidelines".

Exams & Make Up Policy

Four quizzes will be taken (best **Three** out of **Four** will be considered). **NO makeup for quizzes under any circumstances.** If a student misses any of the Midterm exams due to the circumstances beyond their control (official valid documents are required) and informed beforehand (if possible), reasonable arrangement may be considered. There will be **no extra question** in the Midterm and Final exams, so that students should have to answer all the questions given in the exam script.
Cell phones are **prohibited** in exam sessions.

Attendance Policy

Students are required and expected to attend all classes regularly and on time and participate in class discussions. North South University mandates to fail students who are absent 25% or more from their classes, even if such absences are excusable. It is the responsibility of the student to become aware of other course-related announcements missed during an absence.
Please Refer to NSU Student Handbook, Section: "Study Principles and Policies"

Marks distribution for attendance:

Number of class	0-12	13	14	15	16	17	18	19	20	21	22	23	24
Marks	0	According to RDS attendance percentage											

Communication Policy

All communications should take place using the instructor's **email**. Announcements in class will override any statement made here or in any other handouts. It is the student's responsibility to be aware of any announcements made in classes.

Appropriate Use Policy

All members of the North South University community must use electronic communications in a responsible manner. The University may restrict the use of its computers and network systems for electronic communications subject to violations of university policies/codes or local laws or national laws. Also, the university reserves the right to limit access to its networks through university-owned or other computers, and to remove or limit access to material posted on university-owned computers.

Students with Special Needs

North South University will provide educational opportunities that ensure fair, appropriate and reasonable accommodation to students who have disabilities/special needs that may affect their ability to participate in course activities or meet course requirements. Students with disabilities are encouraged to contact their instructors to ensure that their needs are met. The University through its Special Need section will exert all efforts to accommodate special needs.

Special Needs Section

Telephones: +88-02-**5566 8200 ext-1220**
Location: **Room # 413/A, Admin Building (**4th floor).
Please Refer to NSU Student Handbook, Section: "Special Needs Services"