

GAU, Faculty of Engineering

Course Unit Title	Engineering Mathematics	
Course Unit Code	MT212	
Type of Course Unit	Compulsory, All engineering students	
Level of Course Unit	2nd Year BSc	
National Credits	3	
Number of ECTS Credits Allocated	4 ECTS	
Theoretical (hour/week)	2	
Practice (hour/week)	1	
Laboratory (hour/week)	-	
Year of Study	2	
Semester when the course unit is delivered	2	
Mode of Delivery	Face to Face,	
Language of Instruction	English	
Prerequisites and co-requisites	-	
Recommended Optional Programme Components	Basic background for high school algebra and trigonometry.	
Objectives of the Course:		
<ul style="list-style-type: none"> ➤ Designed for students working on a degree in science, mathematics, computer science, and those planning on certain types of graduate work. ➤ Students should also be able to solve inequalities and equations involving exponential, logarithmic and trigonometric functions ➤ Improve their ability to think critically, to analyze a problem and solve it using a wide array of tools 		
Learning Outcomes		
When this course has been completed the student should be able to		Assesment.
1	Understand and apply two and three dimensional Cartesian coordinate system;	1,2
2	Recognize and classify the equations and shapes of quadratic surfaces;	1,2
3	recognize and construct the equations of lines and planes;	1,2
4	Evaluate double and triple integrals in Cartesian and polar coordinates and triple integrals in Cartesian and cylindrical coordinates;	1,2
5	find line integrals and flux using Green's Theorem and find circulation of a vector field using Stoke's theorem; use Divergence Theorem to find the flux of a vector field.	1,2
Assesment Methods: 1. Written Exam, 2. Assignment 3. Project/Report, 4. Presentation, 5 Lab. Work		

Course's Contribution to Program		
		CL
1	Ability to understand and apply knowledge of mathematics, science, and engineering	4
2	Ability to design and conduct experiments as well as to analyze and interpret	3
3	Ability to work in multidisciplinary teams while exhibiting professional responsibility and ethical conduct	1
4	Ability to apply systems thinking in problem solving	4
5	Knowledge of contemporary issues while continuing to engage in lifelong learning	3
6	Ability to use the techniques, skills and modern engineering tools necessary for engineering practice	3
7	Ability to express their ideas and findings, in written and oral form	4
8	Ability to design and integrate systems, components or processes to meet desired needs within realistic constraints	2
9	Ability to approach engineering problems and effects of their possible solutions within a well structured, ethically responsible and professional manner	3
CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate 4: High, 5: Very High)		

Course Contents			
Week			Exams
1	Chapter 10	Analytic Geometry In 3-space, Vectors	
2		Dot And Cross Product	
3		Planes and Lines	
4	Chapter 12	Functions Of Several Variables, Limit and Continuity	
5		Partial Derivatives, Higher Order Derivatives	Quiz
6		Chain Rule, Gradient and Directional Derivatives	
7	Chapter 14	Double Integrals, Triple Integrals	
8			Midterm
9		Application of Multiple Integration	
10	Chapter 15	Vector and Scalar Fields	
11		Conservative Fields	
12		Line integrals of vector fields	
13	Chapter 16	Gradient, Divergence and Curl	
14		Green's Theorem in the plane, Stoke's Theorem	
15			Final

Recommended Sources

Textbook: "Calculus a Complete Course", Robert A. Adams, Pearson 6th Edn 2006

Supplementary Material (s):

- 1) "Calculus Early Transcendental Functions", Robert T. Smith & Roland B. Minton 4th Edition, 2012
- 2) "Calculus Early Transcendental" Briggs Cochran, William Briggs, Lyle Cochran, Bernard Gillett

Assessment

Attendance & Assignment	15%	
Midterm Exam (Written)	35%	
Quiz (Written)	5%	
Final Exam (Written)	45%	
Total	100%	

ECTS Allocated Based on the Student Workload

Activities	Number	Duration (hour)	Total Workload (hour)
Course duration in class (including the Exam week)	15	2	30
Tutorials	13	1	13
Assignments	5	1	5
Project/Presentation/Report Writing	-	-	-
E-learning Activities	-	-	-
Quizzes	1	6	6
Midterm Examination	1	15	15
Final Examination	1	20	20
Self Study	14	2	28
Total Workload			117
Total Workload/30 (h)			3.9
ECTS Credit of the Course			4