East West University
Course Outline

Department of Mathematical and Physical Sciences

Semester: **Fall 2023**

Course Title: Coordinate Geometry and Vector Analysis **Course Code:** MAT104
Pre-Requisite: MAT101 **Credit Hour:** 3

Course Instructor: Dr. Anup Kumer Datta, Associate Professor.
Office Room: **Phone Number:**
E-mail Address: anup.datta@ewubd.edu

Class Schedule and Office Hour:

Day	Course Code	Class Time & Room No.	Office Hour
Sunday	MAT104(Sec-8)	8:30 am – 10:00 am FUB-802	10.10 am -11.40 am
	MAT104(Sec-9)	11:50 am – 1:20 pm FUB-603	
Tuesday	MAT104(Sec-8)	8:30 am – 10:00 am FUB-802	
	MAT104(Sec-9)	11:50 am – 1:20 pm FUB-603	

Course Goal
This course is designed to develop the basic concept of students in the area of geometry and vector analysis. A student has to study this course because the contents of the course are very much applicable in all branches of Science and Engineering. The methods of vector analysis provide a natural aid to the understanding of geometry and some physical concepts. They are also a fundamental tool in many theories of Applied Mathematics.

Course Contents : 1. Two-dimensional geometry
2. Three-Dimensional geometry
3. Vector Analysis

Description : The following topics will be covered throughout the semester.

Course Learning Outcomes

The specific course outcomes supporting the programs outcomes are:

Outcome 1

- At the end of Two-dimensional geometry students will be able to do transformations of axes. They will also be able to determine different properties of straight lines, circles and conics with identification of curves.

Outcome 2

- At the end of Three-Dimensional geometry students will be able to do transformations of curvilinear co-ordinate systems. They will be able to determine directional cosines and directional ratios of straight lines manually with geometric interpretations, and different properties of conics and straight lines in three dimensions.

Outcome 3

- At the end of vector analysis students will be able to do vector integrations and differentiations. They will able to do gradient of scalar functions, divergence and curl of vector functions. They will be able to solve problems of Green's theorem, divergence theorem and Stoke's theorem.

Tentative Course Contents and Teaching Methods

Topics	Teaching
Two-Dimensional Geometry Change of axes. Transformation of co-ordinates. Pair of straight lines. Circles: Tangents and Normals, Chord of contact, System of circles, Orthogonal circles. Conic Section: Parabola, Ellipse and Hyperbola. The general equation of second degree, Identification of curves.	Lecturing, multimedia presentation, concept test and questioning.
Three-Dimensional Geometry Co-ordinate system. Direction cosines and direction ratios. Plane, Straight line. The shortest distance. Sphere: Tangent plane. Cylinder and Cone.	Lecturing, multimedia presentation, concept test and questioning.
Vector Analysis Vectors and Scalars. Algebra of vectors, Vector differentiation and vector integration. Gradient. Divergence and Curl. Cartesian, Spherical, Polar and Cylindrical system. Physical significance of Gradient, Divergence and Curl. Green's Theorem, Divergence Theorem. Stoke's Theorem and their applications.	Lecturing, multimedia presentation, concept test and questioning.

Text Book : A Text Book on Co-ordinate Geometry with Vector Analysis: Md. Abdur Rahman, 1st Edition, Ideal Library.

Reference Books : Vector Analysis: Schaum's Series.

Term Examinations:

Examinations	
Mid	14 November 2023 (Tuesday)
Final	31 December 2023 (Sunday)

Score Distribution:

Mid Examination	: 30%	Presentation	: 5%
Final Examination	: 30%	Class Performance	: 5%
Class Test/Quizzes	: 20%		
Assignment	: 10%		

Grading Policy:

80% and above- : A+	60% to less than 65%: B	40% to less than 45%: D
75% to less than 80%: A	55% to less than 60%: B-	less than 40% : F
70% to less than 75%: A-	50% to less than 55%: C+	
65% to less than 70%: B+	45% to less than 50%: C	

Special Instruction:

- ♣ Students are not allowed to enter into the classroom after 10 minutes of starting time.
- ♣ Students should wear proper dress inside the university campus.
- ♣ Students are requested to **switch off their mobile telephone** during the class hour.
- ♣ **No make-up quizzes and assignment** will be held.
- ♣ Students are requested to go to the Teaching Assistant (GTA) regularly.
- ♣ **There is zero tolerance for cheating at EWU. Students caught with cheat sheets in their possession, whether used or not used, &/or copying from cheat sheets, writings on the palm of hand, back of calculators, chairs or nearby walls, etc. would be treated as cheating in the exam hall. The only penalty for cheating is expulsion from EWU.**

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(**Dr. Anup Kumer Datta**)
Date: 01.10.2023