

Zarqa University

Faculty of Engineering  
Department: Electrical Engineering  
Course title: Engineering Mathematics  
(0904201)



Prerequisite: (0904102)

Instructor: TBD

Lecture's time: TBD

Office Hours: TBD

### Course description:

Vectors and the geometry of space: dot product, cross product. Lines and planes in space. Vector functions: derivatives and integrals. Function of two or more variables: partial derivatives, gradient, divergence, curl. Lagrange's multipliers. Multiple integral. Double Integral in polar coordinates: areas, moments and centers of mass.

### Aims of the course:

1. Students will learn the basics of the calculus of functions of two and three variables.
2. Students will study vectors and Euclidean geometry in three-dimensional space, vector valued functions.
3. Students will learn partial derivatives.
4. Students will learn double, triple integrals and line integrals.

### Intended Learning Outcomes (ILOs):

Upon successful completion of this course, a student should be able to:

1. Use the dot and cross products to find projection vectors, area of parallelogram, volume of parallelepiped, to derive out line and plane equations in the 3-space.
2. Use vectors to study about curves in the 2-space and 3-space; compute a tangent vector, the arc length parameterization, unit tangent and normal vectors and curvatures.
3. Compute partial derivatives, maxima and minima of functions of two variable, maxima and minima of functions of two or three variables under a constraint using Lagrange multipliers.



4. Set up and compute double integrals in the rectangular and polar coordinates, triple integrals in the rectangular, cylindrical and spherical coordinates, know how to do some applications of double and triple integrals.
5. Set and compute line and surface integrals, know how to do some applications of line and surface integrals, understand and know how to use Green's Theorem, the Divergence Theorem, and Stokes' Theorem.

**Course structures:**

Week	C. Hrs	ILOs	Topics	Teaching Procedure	Assessment methods
1-4		1+2	Vectors and the Geometry of Space	Whiteboard + Lecture notes	Quizzes
4-7		1+2	Vector Functions	Whiteboard + Lecture notes	Quizzes 1 <sup>st</sup> Exam TBD
7-12		3	Partial Derivatives	Whiteboard + Lecture notes	Quizzes 2 <sup>nd</sup> Exam TBD
12-15		4+5	Multiple Integrals	Whiteboard + Lecture notes	Quizzes Final Exam TBD

**References:**

"Early Transcendental" 7<sup>th</sup> edition by James Steward

**Assessment Methods:**

Methods	Grade	Date
Quizzes	10	TBD
1 <sup>st</sup> Exam	20	TBD
2 <sup>nd</sup> Exam	20	TBD
Final Exam	50	TBD

