Course Code	Course Num.	Course Name	Credit Hours	Lec.	Lab.	Tut.	Private study	Pre-requisites	Course Level
MAT	1207	Calculus 3	5	4	0	2	10	MAT 1116	4

Topics Outline

1. **Vectors and Geometry of Space:** Vectors in Space, Dot and Cross Products, Lines and Planes in Space, Surfaces in Space.

2. **Vector-Valued Functions:** Vector-Valued Functions, Calculus of Vector Functions, Motion in Space, Curvature, Tangent and Normal Vectors.

3. **Functions of Several Variables and Partial Differentiation**: Limits and Continuity, Partial Derivatives, Directional Derivatives, The Total Derivative, The Gradient of a Scalar Function, Tangent Plane and Linear Approximation, Chain Rule, Implicit Differentiation, Maxima and Minima and their Tests, Constraints and Lagrange's Multipliers.

4. **Multiple Integrals:** Double Integrals in Cartesian Coordinates, Double Integrals in Polar Coordinates, Triple Integrals in Cartesian Coordinates, Triple Integrals in Cylindrical and Spherical Coordinates, Areas and Volumes, Change of Variables in Multiple Integrals.

5. **Vector Calculus:** Vector Field, Line and Surface Integrals, Curl and Divergence, Green's Theorem, Divergence Theorem, and Stokes Theorem, Applications.

References:

1. **Calculus, Early Transcendental Functions**, Robert Smith, Roland Minton, McGraw-Hill Science Engineering, 2007.

2. **Essential Calculus with Application**; Richard A. Silverman, Dover Publications, 1989.

3. **Calculus**, O. Swokowski, et al, PWS Pub. Co.; 6th edition (1994).

4. **Calculus Early Transcendentals**, C. Henry Edwards, David E. Penney, Prentice Hall, 2008.