MATHEMATICS-I
BEG101SH

Year: I   **Semester: I**

Teaching Schedule Hours/week			Examination Scheme						Total Marks
			Final				Internal Assessment		
			Theory		Practical		Theory Marks	Practical Marks	
L	P	T	Duration	Marks	Duration	Marks			
3	-	3	3	80	-	-	20	-	100

Objectives: - The basic objective of the course is to provide a sound knowledge of calculus and other related topics.

Course Content:

1.0 Limits and continuity of a function   (3 hrs)
Limit of a function with examples, infinity as a limit, continuity of a function with their Properties

2. 0 Derivatives: (5 hrs)
Derivatives of explicit, implicit, parametric equation, hyperbolic and inverse hyperbolic Functions, higher order derivatives and Leibnitz theorem, Partial derivatives of functions of two and three variables, and total differential coefficients.

3.0 Applications of derivatives: (10 hrs)
Extrema of function of two or three variables, mean value theorems, Taylor's and Maclaurin's infinite series, indeterminate forms and L'Hospital's rule, tangent and normal, Curvature, asymptotes and curve tracing (cartesian, parametric and polar)

4.0 Integration: (8 hrs)
Basic integration formulas, integration method, standard integrals, definite Integral and its Properties Definite integral as the limit of a sum, fundamental theorem of integral calculus, improper integrals, reduction formula for integrals, Beta and Gamma function

5.0 Applications of Integral Calculus: (7 hrs)
Determination of area, length, Volumes and surface areas of solid of revolution, double integration of Cartesian curves only

6.0 Plane Analytical Geometry: (6hrs)
Translation and rotation of axes, circles, conic section (parabola, ellipse and hyperbola)

7.0 Vector Algebra: (6 hrs)
Vector components, type of vector addition and subtraction, direction cosines, space Coordinates (Cartesian, Cylindrical and Spherical), equation relating these coordinates Scalar and vector product of two vectors, product of three and four vectors, vectors Equation of lines and planes

References:

- Differential Calculus- M.B.Singh and B.C.Bajracharya, Sukunda pustak Bhawan Kathmandu.
- Basic Mathematics (Vol-I & Vol-II)- D.R.Bajracharya,
- A Text Book of Vector Analysis- MB. Singh and B.C. Bajrachrya, National Book Kathmandu.
- Our Engineering Mathematics (Vol.I), S.P. Pradhananga & N.B. Khatakho.
- A textbook of Engineering Mathematics (Vol.I)P.R. Pokhrel
- Calculus and Analytical Geometry, Thomas & Finney, Narosa Publishing House, India.