UMA006: Introductory Mathematics - II

L	**T**	**P**	**Cr**
3	**1**	**0**	**3.5**

Course objective: The objective is to develop the basics skills in calculus and differential equations and application of quantitative required for biological studies.

Differentiation: Functions, Domain and range, Properties of standard functions (trigonometric, exponential and logarithmic) and their graphs, Limit, Continuity and Differentiability. Differentiation of standard functions (polynomials, trigonometric, inverse trigonometric exponentials and logarithmic), Product rule, Quotient rule, Chain rule, Applications of derivatives in graphing, Maximum and minimum of single variable function, Functions of several variables, Partial derivatives, Homogeneous functions, Maximum and minimum of several variable functions.

Integration: Integral as anti-derivative, Integration: by substitution, by parts and partial fractions, Definite integral and its properties, Double integrals, Areas of bounded regions and rectification.

Differential Equations: Order and degree, General and particular solution of differential equation, Techniques for solving first order ordinary differential equation and its applications to biological problems (population growth, radioactive decay).

Course learning outcome: Upon completion of this course, the students will be able to:

1) find the domain and range of various functions.
2) solve problems on limit, continuity, differentiation, partial differentiation, maxima and minima.
3) integrate functions and will be able to find the area of bounded regions.
4) find the general and particular solutions of first order ordinary differential equations and will be able to solve simple biological problems like population growth, radioactive decay etc.

Text Books:

1) Mathematics, A Text book (Parts I & II), NCERT, New Delhi, 2011.
2) Thomas, G.B. and Finney, R.L. Calculus and Analytical Geometry, Pearson Education, 10th ed., 2007.

Reference Books:

1) Kreyszig, Erwin, Advanced Engineering Mathematics, 8th Edition, John Wiley, 1999.
2) Shanti Narayan, Differential and Integral Calculus, S. Chand, 2005.

Evaluation Scheme:

Sr.No.	Evaluation Elements	Weight age (%)
1.	MST	30
2.	EST	45
3.	Sessionals (May include assignments/quizzes)	25