Bachelors with Mathematics as Minor
2nd Semester
MMT222N: Mathematics/Applied Mathematics: Calculus – II

Credits: 4 THEORY + 2 TUTORIAL　　　　**Theory: 60 Hours & Tutorial: 30 Hours**

Course Objectives: (i) To study and understand the notions of integral calculus and to imbibe the acquaintance for using the techniques in other sciences and engineering. (ii) To prepare the students for taking up advanced courses of mathematics.

Course outcome: The techniques involved in the course shall be used to estimate area and to solve complex problems.

Theory: 4 Credits

Unit –I

Standard cases of partial fractions, Integration of rational functions when the denominator consists of repeated and un-repeated linear factors and also with quadratic factors. Integration of Irrational functions. Integration of functions like $\frac{1}{a+b\cos x}$ etc.

Unit –II

Reduction Formulae of the functions: $\int \sin^n x\, dx$, $\int \cos^n x\, dx$, $\int \tan^n x\, dx$, $\int \cot^n x\, dx$, $\int \sec^n x\, dx$, $\int \cosec^n x\, dx$, $\int \sin^m x\, \cos^n x\, dx$, $\int x^m \cos nx\, dx,$ $\int \sin^m x \sin nx\, dx,$ $\int \cos^m x \cos nx\, dx$.

Unit –III

Definite Integrals with properties, definite integral as limit of sum, differentiation under an integral sign, fundamental theorem of calculus. Rectification: Rules for curve tracing, formula for rectification and examples.

Unit –IV

Quadrature. Area of a region bounded by a curve, x-axis (y-axis) and two ordinates (abscissa), sectorial areas bounded by a closed curve. Lengths of plane curves. volumes and areas of surfaces of revolution.

Tutorial: 2 Credits

Unit –V

Linear differential equations, integrating factor, exact differential equation, necessary and sufficient condition for exactness, linear differential equations with constant coefficients. Elementary problems on second and higher order differential equations.

Unit –VI

Definitions of Beta and Gamma functions; their properties and applications, various relations between beta and gamma function.

Recommended Books:
1. Integral Calculus , S. D. Chopra and M. L. Kochar, Kapoor Sons.
2. Integral Calculus, Shanti Narayan and P.K. Mittal, S. Chand, 2005
3. Schaums outline of Theory and problems of Differential and Integral Calculus, 1964.

Reference Books:
1. Calculus , H. Anton, I. Birens and S. Davis, John Wiley and Sons, Inc. 2002.
2. Calculus Vol. I, T.M. Apostal, John Wiley & Sons Inc, 1975.
3. Differential Calculus, S. Balachandra Rao and C. K. Shantha, New Age Publication.
4. A First Course in Calculus, S. Lang, Springer-Verlag, 1998.
5. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & Sons, 2008.
6. Calculus, G.B. Thomas and R.L. Finney, Pearson Education, 2007.