2nd SEMESTER
DISCIPLINE SPECIFIC COUSRE FOR BA / BSc
(& GENERIC ELECTIVE COURSE FOR BCA)

MM220C: MATHEMATICS / APPLED MATHEMATICS: DIFFERENTIAL EQUATIONS AND THEORY OF EQUATIONS

CREDITS:THEORY:4, TUTORIAL: 2

MAXIMUM MARKS: 60,
MINIMUM MARKS: 24

THEORY (4 CREDITS: 60 HOURS)

Objectives: The aim of this course is:
i)   To learn the techniques of solving differential equations.
ii)   To apply these techniques in the problems of other subjects.
iii).   To study the properties of polynomial equations and their solutions upto degree 4.
         At the end a student should be able to translate the real life problems into mathematical language and give the solutions.

UNIT-1 (15 HOURS)

Differential equations, integrating factors, Bernoulli's equation, exact differential equations, necessary and sufficient conditions for exactness, symbolic operators, homogeneous and non-homogeneous linear differential equations with constant and variable coefficeints.

UNIT-2 (15 HOURS)

Miscellaneous forms of differential equations, first order higher degree equations solvable for X, Y, Z, P equations from which one variable is explicitly absent, Clairut's form, equations reducible to Clairut's form.

UNIT-3 (15 HOURS)

General properties of polynomials, Synthetic division, relation between the roots and the coefficients of an equation, transformation of equations, diminishing of roots of an equation by a given number, removal of terms of an equation, formation of equations whose roots are functions of the roots of a given equation, equation of squired difference.

UNIT-4 (15 HOURS)

Symmetric functions, Newton's method for finding the sum of the powers of the roots of an equation, Cardan's solution of the cubic, nature of the roost of a cubic, Descartes solution of a biquadratic, Descartes rule of signs, rational roots of an integral polynomial, location of roots of an equation (simple cases).

TUTORIALS (2 CREDITS: 30 HOURS)   Maximum Marks: 30 Minimum Marks: 12
3. Tutorials based on Unit I & II - **1 credit**
4. Tutorials based on Unit III & IV – **1 credit**.

Books recommended

1. S. D. Chopra and M.L.Kochar, *Integral Calculus*, Kapoor Publications
2. M. D. Raisinghania, *Ordinary Differential Equations.*
3.Shepley L. Ross, *Differential Equations*, 3rd Ed., John Willey and Sons, 1984.
5. Schaum Series, *Differential Equations*.
6. A.Aziz, Nissar A.Rather and B.A.Zargar, Theory of Equations, Kapoor Publications.
7. W.S.Burnside and A.W.Panton, The Theory of Equations, Dublin University Press, 1954.
8. C.C.MacDuffee, Theory of Equations, John Wiley and Sons Inc., 1954.