20BSM106E					Theory of Equations					
Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs. / Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
3	0	0	3	3	25	50	25	--	--	100

COURSE OBJECTIVES

- To introduce the students with the fundamental theorem of algebra and it's uses.
- To study the relations between the roots and coefficients of general polynomial equations.
- To study the properties of symmetric functions and derived functions.
- To introduce various methods to solve non-linear equations.

UNIT 1 POLYNOMIAL EQUATIONS **10 Hrs.**

Numerical and algebraic equations, polynomials and their graphical representation, maximum and minimum values of polynomials, fundamental theorem of algebra, theorem on complex roots, theorem on reciprocal roots, theorem on multiple roots.

UNIT 2 RELATION BETWEEN THE ROOTS AND COEFFICIENTS OF A POLYNOMIAL EQUATION **10 Hrs.**

Relation between roots and coefficients of equations, Symmetric functions, Applications symmetric function of the roots, Newton's Theorem on the Sum of the Powers of the Roots, Descarte's rule of signs positive and negative rule.

UNIT 3 ALGEBRAIC SOLUTIONS OF EQUATIONS **10 Hrs.**

Transformation of equations. Solutions of reciprocal and binomial equations. Algebraic solutions of the cubic and biquadratic. Properties of the derived functions.

UNIT 4 NUMERICAL SOLUTIONS OF EQUATIONS **10 Hrs.**

Properties of the derived functions, theorem for multiple roots, symmetric functions of the roots.

40 Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to
CO1 – Understand and prove fundamental theorems of the subject.
CO2 – Use the relation between roots and coefficients of equations to establish various identities.
CO3 – Solve polynomial equations having conditions on roots.
CO4 – Apply various methods to solve cubic equations (Cardon's method) and biquadratic equations analytically.
CO5 – Solve algebraic and transcendental equations by various numerical methods.
CO6 – Analyze nature of the roots of an equation without explicitly solving the equation.

TEXT/REFERENCE BOOKS

1. Chandrika Prasad : Text Book on Algebra and Theory of Equations. Pothishala Private Ltd., Allahabad
2. W.S. Burnstine and A.W. Panton, Theory of equations, 2007
3. C. C. Mac Duffee, *Theory of Equations*, John Wiley & Sons Inc., 1954.
4. M.K. Jain, S.R.K. Iyenger and R.K. Jain, Numerical Methods for Scientific and Engineering Computation, 5thEd., New Age International (2007).

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks: 100	**Exam Duration: 3 Hrs.**
Part A: 6 questions of 4 marks each	24 Marks
Part B: 6 questions of 8 marks each	48 Marks
Part C: 2 questions of 14 marks each	28 Marks