

ST. ALOYSIUS' COLLEGE (AUTONOMOUS)
JABALPUR , M. P., INDIA
Reaccredited 'A+' by NAAC with CGPA (3.68/4.0)
College with Potential for Excellence by UGC
DST-FIST supported
BACHELOR IN SCIENCE (B.Sc.)
Session 2019-20

Max .Marks	:	40
Class	:	BSc/B.A
Year	:	Second
Subject	:	Mathematics
Paper	:	I
Title	:	Abstract Algebra

Unit I: Definition and basic properties of groups, subgroups, subgroups generated by a subset, Cyclic groups and simple properties.

Unit II: Coset decomposition, Lagrange's theorem and its corollaries including Fermat's theorem, Normal subgroups, Quotient groups.

Unit III: Homomorphism and Isomorphism of groups, Fundamental theorem of homomorphism, Transformation and Permutation group, S_n (Various subgroups of $S_n, n < 5$ to be studied), Cayley's Theorem.

Unit IV: Group Automorphism, Inner Automorphism, group of Automorphisms, Conjugacy relation and centralizer, Normaliser, Counting principle and class equation of a finite group, Cauchy's theorem for finite group, Cauchy's theorem for finite abelian groups and non abelian groups.

Unit V: Definition and basic properties of rings, Ring homomorphism subrings, Ideals and quotient rings, Polynomial rings & its properties, Integral domain and Field.

Test Books:

1. I. N. Herstein –Topics in Algebra, Wiley Eastern Ltd. New Delhi 1977.
2. PB Bhattacharya. S.K Jain and S.R Nagpaul-Basic Abstract Algebra, Wiley Eastern, New Delhi, 1997.
3. मध्यप्रदेश हिंदी ग्रंथ अकादमी की पुस्तके ।

Vandana
27.7.19

Pratibha
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Reference Books :

1. Shantinayyan – A text Book of Modern Abstract Algebra, S.Chand and Company New Delhi.
2. Surjeet Singh – A Text Book of Modern Algebra.
3. N. Jacobson – Basic Algebra Vol.I and II W.H. Freeman
4. I.S. Luther and I.B.S Passi – Algebra Vol I and II Narosa Publishing House

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Max . Marks	:	40
Class	:	BSc/B.A
Year	:	Second
Subject	:	Mathematics
Paper	:	II
Title	:	Advanced calculus

Unit I: Definition of a sequence, Theorems on limits of sequences. Bounded and monotonic sequences. Cauchy's convergence criterion, series of non- negative terms, comparison test, Cauchy's intergral test, Cauchy's root test, ratio tests, Raabe's tests, logarithmic tests, Alternating series. Leibnitz's test, Absolute and conditional convergence.

Unit II:Continuity of functions of single variable, sequential continuity. Properties of continuous functions. Uniform continuity, chain rule of differentiability, Mean value theorems and their geometrical interpretations. Darboux's intermediate value theorem for derivatives.

Unit III: Limit and continuity of functions of two variables, Partial differentiation, Change of variables, Euler's theorem on homogeneous functions, Taylor's theorem for function of two variables. Jacobians.

Unit IV: Envelopes, Evolutes, Maxima and Minima of functions of two variables, Lagrange's multiplier method, Beta and Gamma Functions.

Unit V: Double and triple integrals, volumes and surfaces of solids of revolution Dirichlet's integrals, change of order of integration in double integrals.

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Test Books:

1. R. R. Goldbeg -Real Analysis, Oxford& I.B.H. Publishing co., New Delhi
2. Gorakh Prasad- Differential Calculus, Pothishala Pvt. Ltd. Allahabad.
3. Gorakh Prasad- Integral Calculus, Pothishala Pvt. Ltd. Allahabad
4. मध्यप्रदेश हिंदी ग्रंथ अकादमी की पुस्तके ।

Reference Books :

1. Gabriel Klaumber- Mathematical Analysis, Marcel Dekkar, Inc. New York, 1975
2. T. M. Apostol- Mathematical Analysis, Narosa Publishing House, New Delhi, 1985
3. D. Soma Sundaram and B. Choudhary- A first Course in mathematical Analysis, Narosa Publishing, House, New Delhi, 1997.
4. Murray R. Spiegel- Theory and problems of advance Calculus, Schauma Publishing Co., New York
5. O.E. Stanaitis – An Introduction to Sequence, Series and improper Integrals.

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Max .Marks : 40
Class : BSc/B.A
Year : Second
Subject : Mathematics
Paper : III
Title : **Differential Equations**

Unit – I: Series solutions of differential equations, Power series method, Bessel and Legendre equations, Bessel's and Legendre's functions and their properties-recurrence and generating function. Orthogonality of functions.

Unit – II: Laplace Transformation, Linearity of the Laplace transformation, existence theorem for Laplace Transforms, Laplace Transforms of derivative and integrals, Shifting theorems, Differentiation and integration of transformations.

Unit – III: Inverse Laplace Transforms, Convolution theorem, Application of Laplace Transformations in solving linear differential equations with constant coefficients.

Unit – IV: Partial differential equations of the first order, Lagrange's solution. Some special types of equations which can be solved easily by methods other than general method, Charpit's general method.

Unit – V: Partial differential equations of second and higher orders, Classification of partial differential equations of second order, Homogeneous and non-homogeneous equations with constant coefficients, Partial differential equations reducible to equation with constant coefficients.

Text Book:

1. Sharma and Gupta-Integral Transform, Pragati Prakashan Meerut.
2. Sharma and Gupta-Differential Equation, Pragati Prakashan Meerut.
3. Raysinghania-Differential Equation, S. Chand & Company, New Delhi.
4. मध्यप्रदेश हिंदी ग्रंथ अकादमी की पुस्तके ।

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Reference Books :

1. D.A. Murray – Introductory course in differential equation. Orient Longman. India. 1967
2. G.F. Simmons- Differential Equations, Tata McGraw Hill, 1972.
3. E.A. Codington- An Introduction to ordinary differential Equation, Prentice Hall of India, 1961.
4. H.T.H. Piaggio- Elementary Treatise on Differential Equations and their Application, C.B.S. Publisher & Distributors, Delhi, 1985
5. E.D. Rainville – Special Function. The Macmillan Company. New York.

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