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Revision

Department of Mathematics,
Udai Pratap (Autonomous) College, Varanasi
w.e.f. Session: 2022-23
Minor Elective course: Year-I
Course Title: MathematicsMinor-I
Minor Elective Course name: Mathematics Minor-I

Programme/Class: **Certificate Course**	Year: **First**	Semester: **I/II**
Subject: **Mathematics**		
Course Code: **ME030101M**	Course Title: **Mathematics Minor-I**	

Course outcomes :

CO 1: The main objective of this course is to introduce students to basic concepts of sets, relations, functions, arithmetic and geometric progressions and number systems.

CO 2: Students will be able to find the domain, co-domain and range of a function.

CO 3: Students will able to identify and sum an A.P. & G.P.

CO 4: After completion of the course, students will be able to know about number system.

Credits: **4**	**MinorElective**
Max. Marks: **25+75**	Min. Passing Marks:

Total No. of Lectures-Tutorials-Practical (in hours per week): **4-0-0**

Unit	Topic	No. of Lectures
I	Arithmetic Progression (A. P.), general term of an A.P., sum of n terms of an A.P. Arithmetic Mean (A.M.) , Geometric Progression (G.P.), general term of a G.P., sum of n terms of a G.P., infinite G.P. and its sum, geometric mean (G.M.), relation between A.M. and G.M. , Formulae for the special sums (without proof) of the kind $\sum_{k=1}^{n} k$, $\sum_{k=1}^{n} k^2$ and $\sum_{k=1}^{n} k^3$.	16
II	Sets and their representations, Empty set, Finite and Infinite sets, Equal sets, Subsets. Power set. Universal set. Union and Intersection of sets. Difference of sets. Complement of a set. de Morgan's Law. Venn diagrams and its simple applications. Cartesian product of sets. Number of elements in the Cartesian product of two finite sets.	16
III	Definition of relation, domain, co-domain and range of a relation. Types of relations: reflexive, symmetric, transitive and equivalence relations. Function as a special type of relation. Pictorial representation of a function, domain, co-domain and range of a function.	14
IV	An overview of number theory : Natural number, whole number, integers, rational number, irrational number, real number, complex number, addition and multiplication of complex numbers, prime and composite numbers, relatively prime numbers, problems based on greatest common divisor (gcd) and least common multiples (lcm).	14

Suggested Readings: 1. Mathematics Textbook for Class XI, NCERT Publications 2. Mathematics Part I - Textbook for Class XII, NCERT Publication 3. Mathematics Part II - Textbook for Class XII, NCERT Publication 4. Senior Secondary School Mathematics, R.S.Agrwal, Bharati Bhawan,1995 5. Higher Algebra by Hall and Knight
This course can be opted as an elective by the students of following subjects:
Suggested Continuous Evaluation Methods: **Max. Marks: 25** **Internal evaluation in this paper will based on Class test, Presentation/ class interaction, assignments, and attendance or the rules framed by central examination committee of the college.**
Course prerequisites: ***To study this course, a student must have the subject Mathematics in class10th.***
Suggested equivalent online courses: • National Programme on Technology Enhanced Learning (NPTEL) • SWAYAM • Massachusetts Institute of Technology (MIT) Open Learning • Uttar Pradesh Higher Education Digital Library (UPHEDL) • National Digital Library of India (NDLI)
Further Suggestions: None

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Revision

Department of Mathematics,
Udai Pratap (Autonomous) College, Varanasi
w.e.f. Session: 2022-23
MinorElective course: Year-II
Course Title: Mathematics Minor-II
MinorElective Course name: Mathematics Minor-II

Programme/Class: **Diploma Course**	Year: **Second**	Semester: **III/IV**
Subject: **Mathematics**		
Course Code: **ME030201M**	Course Title: **Mathematics Minor-II**	

Course outcomes :

CO1: The main objective of this course is to introduce students to the basics of real valued functions, counting techniques and probability.

CO2: To familiarize students with the polynomials and roots of quadratic equations.

CO3: Students will be able to know simple linear programming problems in two variable and their graphical solution.

CO4: After the completion of the course, students will be able to solve problems of permutations, combinations and basic probability.

Credits: **4**	**Minor Elective**
Max. Marks: **25+75**	Min. Passing Marks:

Total No. of Lectures-Tutorials-Practical (in hours per week): **4-0-0**

Unit	Topic	No. of Lectures
I	Real valued functions, domain and range of these functions, constant, identity, polynomial, rational, modulus, signum, exponential, logarithmic and greatest integer functions, with their graphs. One to one and onto functions, composite functions, inverse of a function.	15
II	Polynomials, Linear polynomial, quadratic polynomial, cubic polynomial, biquadratic polynomial, roots of polynomial, Linear Equations in two variables, Quadratic equations, Relation between its roots and coefficient, Factor theorem (Without Proof) Factorization,	15
III	Rectangular coordinate axes, Cartesian coordinates of point, quadrants, Linear Programming Problem (LPP), Mathematical Model of Linear Programming Problem in two variables, Objective function, Constraint, Non-negative Restrictions, Feasible solution and Optimal solution, Graphical method for Linear Programming Problem in two variables.	12
IV	Fundamental principle of counting. Factorial n. (n!) Permutations and combinations, derivation of Formulae for nP_r and nC_r and their connections, simple applications. Random experiments; outcomes, sample spaces (set representation). Events; occurrence of events, 'not', 'and' and 'or' events, exhaustive events, mutually exclusive events, Axiomatic (set theoretic) probability. Probability of an event, probability of 'not', 'and' and 'or' events	18

Suggested Readings: 1. Mathematics Textbook for Class XI, NCERT Publications 2. Mathematics Part I - Textbook for Class XII, NCERT Publication 3. Mathematics Part II - Textbook for Class XII, NCERT Publication 4. Higher Algebra by Hall and Knight
This course can be opted as an elective by the students of following subjects:
Suggested Continuous Evaluation Methods: **Max. Marks: 25** **Internal evaluation in this paper will based on Class test, Presentation/ class interaction, assignments, and attendance or the rules framed by central examination committee of the college.**
Course prerequisites:None
Suggested equivalent online courses: : ***To study this course, a student must have the subject Mathematics in class10th.***
Further Suggestions: None