Post Graduate Programm

M.A. / M .Sc. (Math)

MSc Math 01 **Credit- 08**

TOPOLOGY

Unit –I

Elements of set Theory -
Sets, Functions and relations. Real Numbers, Products and Co-Products, Finite and infinite sets, Countable and Uncountable, Well – Ordered sets, Partially Ordered sets, The maximum Principal and Zorn's, Lemma, **Metric Spaces-** The real line R, Metric, Euclidean spaces, Some important in equalities, Bounded and Unbounded spaces, Some important metric spaces, Spares (or Balls), Open sets, Closed sets, Neighborhood, Accumulation Points, adherent Points, Closure, interior, exterior and boundary of a set, Dense and Non-dense sets, Sequences and-sequences in a metric space, Cauchy's sequences, Complete metric spaces, Completeness and contracting mappings, Some complete metric spaces, Completion of a metric sp.

Unit-II

Topological spaces- Order topologies, The Product topology,The subspace topology, Closed sets and limit points, Continues function, The quotient Topology, Metric Topology, Connected spaces, Compact spaces, Locally compact spaces and Alexandra, Compactification, Normal, Spaces and manifolds, Count ability Axioms, Separation Axioms,
Normal spaces and manifolds – countabiliti Axioms, Normal Spaces Second countable regular spaces and the Kristin, Metrication theorem, Completely regular spaces and The stones-c echo compactification,
Manifolds,
Segebraic topology- ,What is algebraic topology ?
The fundamental group, Dependence on the base point,Homogony invariance
Calculation (R) and (S) Z The Brower fixed point theorem,The fundamental theorem of algebra,
Categories Natural transformation and Fundamental groupoid Function,Natural transformations, Homogony categories and homogony equivalence, The fundamental grouped, Limit and CO-limits, The Van dampen theorem, Examples the van dampen theorem.

Unit –III

Classification of covering of spaces Covering of grouped- The definition of covering spaces, The unique path lifting property, covering of groupies, Group actions and orbit categories, The classification of covering of groupids , The construction of covering of groupids, The classification of covering of spaces, The construction of coverings of spaces,

Graphs Paths and Trees- the definition of graphs, Edge paths and trees, The homogony types of graphs, covers of graphs and Euler characteristics, Applications to groups,

Weak Hausdroff and compactly generated spaces- The Definition of compactly generated spaces, The category of compactly generated spaces,

Calibration and Rapper Cylinders The definition of calibrations,Mapping cylinders and calibrations, Replacing maps by calibrations,A criterion for a map to be a co fib ration, Co fiber homogony equivalence,

Fib rations and path lifting functions- The definition of fib rations, path lifting functions and fib rations, Replacing maps by fib rations

A criterion for a map to be a fib ration, Fiber homogony equivalence, Change of fiber.

Unit – IV

Based Monopoly and connection between co fiber and fiber sequences 19-205- based homogony classes of maps, cones, suspensions, paths, loops, Based fib rations, Co fiber sequences, Based fib rations, Fiber sequences, Connection between co fiber and fiber sequences,

Homogony groups and change of base point- The definition of homogony groups, Long exact sequences associated to pairs, Long exact sequences associated fib rations, A few calculation s, Chance of base point, n-Equivalence, weak equivalences and a technical lemma,

CW Complexes and cellular approximation- The definition and some examples of CW complexes, Tome constructions on CW complexes, HELP and the White head theorem, the cellular approximation theorem,Approximation of spaces by CW complexes, Approximation of pairs of CW pairs, Approximation of excusive triads by CW triads,

The homogony excision and Credential theory- Statement of the homogony excision theorem The fredential suspension theorem, proof of the homogony excision theorem.

Post Graduate Programm

M.A. / M .Sc. (Math)

MSc Math 02 **Credit- 08**

Operations Research

Unit –I

1, Introduction,
2, Mathemroblems

Unit –II

1, Allocation (General Laical Preliminaries
2, Inventory Theory,
3,Replacement Pear Programming Problems.

Unit- III

1, Convex Sets and Their Properties,
2, Simplex Method

Unit –IV

1, Transportation Problem,
2, Network Analysis (PERT-CPM)

Post Graduate Programm

M.A. / M .Sc. (Math)

MSc Math 03 **Credit-08**

Real Analysis

Unit – 1

Real Number System & Real Line- Real Number System , Mathematical induction, The Real line, **Limit, Continuity and Differentiability-** Functions and Limits, Continuity, Differentiability Functions of one variable , L' Hospital's Rule, Taylor's theorem

Unit – II

Riemann Integral and Improper Integrals- Definition of the Integral, Existence of the Integrals, Properties of the Integrals, Improper Integrals, A more advanced look at the Existenceof the proper Riemann Integral, **Sequence and Series-** Sequence of real numbers, Real Topics Revisited with sequence, Infinite series of,constants, Sequence and series of Functions, Power series

Unit – III

Structure of R" and Functions of Several Variable- Structure of R", Continuous Real- Valued functions of n variables, Partial Derivatives and theDifferential,The chain Rule and Taylor' stheorem, **Linear- ransformations and, Matrices,** LinearTransformations and Matrices, Continuity and differentiability of transformations ,The Inverse function Theorem, The Implicit function theorem.

Unit – IV

Multiple Integrals- Definition and Existence of the Multiple Integral , Iterated Integrals and Multiple Integra, Change of variables in Multiple Integrals.

Post Graduate Programm

M.A. / M .Sc. (Math)

MSc Math 04 **Credit- 08**

Complex Analysis

Unit –I

Complex Numbers, Properties Of The Addition Of Complex Numbers, Properties Of the Multiplication Of Complex Numbers, Difference of Two Complex numbers, Division In C, Modulus Of A Complex Number, Conjugate Of A Complex Number, Modulus- rgument Form Or Polar Standard Form Or Trigonometric, Form Of A Complex Number, The Geometrical Representation of Complex Numbers, The Points on The Argent Plane Representing The sum ,Difference, Product And Division Of Two Complex Numbers, More Properties of Module And Arguments, heorem The order Relations Greater Than or Less Than Do Not Apply, To Complex Numbers, Some Important Results About Complex Numbers, Integral And Rational Powers Of AComplex Number, Geometrical, Applications Of Complex Numbers, Complex Equation Of A Straight Line In The, Complex Plane Projection, Equation of A Circle In The complex Plane, The Spherical Representation of Complex Numbers And Stereo graphic Projection, Curves In The Argent Plane, Functions Of a complex Variable, Neighborhoods Of A Point, Limits And Continuity, Differentiability, Analytic, Homomorphism And Regular Functions , The Necessary And Sufficient Conditions For f (z) To Be Analytic, Polar Form Of Cauchy- riemann Equations, Derivative Of w = f (z) In Polar Form, Orthogonal System, Harmonic Function, Methods Of Constructing A Regular Function (Milne- Thomson's Method)
Multiple Valued Functions.

Unit –II

Mappings or Transformations, Jacobin of A Transformations, Conformal Mapping, Necessary Conditions For w = (z) To Represent a Conformal Mapping, Sufficient Conditions For w= f (z) To Represent a Conformal Mapping ,Superficial Magnification, The Circle, Inverse Points With Respect To A Circle, Some Elementary Transformations, Linear, ransformations , Bilinear or Linear Fractional Transformation, Critical Ports, Resultant or Product of Two Bilinear Transformations, Bilinear Transformation as the Resultant of Elementary Bilinear, Transformations with Simple Geometric Properties, Bilinear Transformation as the Resultant Of An Even Number Of Inversions, The Linear Group, Equation Of A Circle Through Three Given Points, Cross Ratio, Perseverance Of Cross –Ratio under Bilinear Transformation, To Find the Bilinear Transformation Which Transforms Three Distinct points, Z1, z2, z3, of z-Plane Respectively Into Three, pecified Points, W1 w2, w3 of w-Plane, Two Important Families of Circles, Perseverance of the Families of Circles And Straight Lines Under Bilinear Transformations, Fixed Point

or Invariant Points of A Bilinear Transformation, ormal Form of A Bilinear Transformations, Elliptic, Hyperbolic And Parabolic, ransformations, Some Special Bilinear,, ansformations. Taylor's Series, Equines, Infinite Series, Sequences And Seriesof, Functions, Principal of Uniform Convergence of a Sequence, Cauchy's Criterion For Series, Power Series, Elementary Transcendental Functions, Exponential Function, Addition Theorem For Exponential Function zee , Trigonometrically Functions sin z and coos z, Addition Theorem For sin z and coos z, Hyperbolic Functions sin z and cosh z, Relation Bettor en Trigonometric and Hyperbolic Function, Periodicity, Periodicity of sin z and coos z, Periodicity of e, Logarithmic Function (Inverse of Exponential Function), Branches of log w, Addition Theorem For log w, Analytic log w, Eerier l v Cir z, Cnverse Trigonometric Functions.

Unit –III

Introduction, Definitions, Rectifiable Arcs, Function of Bounded Variation, Complex Integrals, Evaluation of Some Integrals, abs –into (By definition), Reduction of complex Integrals To Real Integrals, Some Elementary Properties of Com complex Integrals, An Upper Bound for A complex Integral, Line Integrals as Functions of Arcs, Cauchy's, undamental Theorem, Cauchy Gorse Theorem (Second Proof), Cauchy Gorse Theorem (Third Proof), Cauchy's Integral Formula , Derivative of an Analytic Function, Higher Order Derivatives of an Analytic Function, Poisson's Integral Formula for a Circle , Moonwort Theorem, Catchy Inequality, Integral Function, Expansion of Analytic Function As Power Series, , he Z Pros of An Analytic Function,Singularities of An Analytic Function,Polynomials, Characterization o Polynomials, Rational Function Characterization of Rational Functions,Theorems on Poles and other Singularities, Maximum Modulus Principal, Maximum Modulus Principal, The Excess of The Number of Zeros Over The Number of Poles of A, Geomorphic Function (The Argument Principal Maximum Modulus Principal Theorem), Touched Lemma, Schwarz Function Theorem, Fundamental Theorem of Algebra, Analytic Continuation, Power Series Method of Analytic Continuation, Schwarz's Ruction Principal.

Unit –IV

Uniform Convergence of A Sequence, General principal of Uniform Convergence, Uniform Convergence of Series, Weierstrass's M-test , Herd's Test for Uniform Convergence, Counterweight of The Sum Function of A Series, Term By Term Integration, Analyticity of the Sum Function of A Series, Term By Term, Differentiation.(Weierstrass's Theorem), Hurwitz Theorem , Uniform Convergence of Power Series, Infinite Products, General Principle of Convergence of An Infinite Product Important Theorems, The Absolute Convergence of Infinite Products, Perform, onvergence of An Infinite Product.

Post Graduate Programm

M.A. / M .Sc. (Math)

MSc Math 05 **Credit – 08**

Partial Differential Equations

Unit – I

The Foundations: A brief Introduction, An Introduction to partial Differential Equations.

Unit – II

Partial Differential Equations of Second Order, Elliptic Differential Equations.

Unit – III

Parabolic Differential Equations, Hyperbolic Differential Equations.

Unit – IV

Green, Direct and Harmonic Function.

Post Graduate Programm

M.A. / M .Sc. (Math)

MSc Math 06 **Credit- 08**

Mathematical Statistics

Unit –I

Meaning and Purpose of Statistics, Frequency Distributions and Measures of Central tendency , Measures of Dispersion and Skew ness.

Unit –II

Probability, Random Variable Distribution Function, Continuous Frequency Distributions, Method of least Square and Curve Fitting .

Unit –III

Bavaria Distribution, Regression and Correlation , Multiple and Partial Correlation, Consistence of Data and Association of Attributes, Preliminary Concepts Sampling.

Unit –IV

Finite Differences and Interpolation, The Sampling of Variables – Large Samples, Index Numbers, Analysis of Time Series.

Post Graduate Programm

M.A. / M .Sc. (Math

MSc Math 07 **Credit – 08**

Discrete Mathematics

Unit – I

Essentials of Discrete Mathematics, Introduction, Conditional Statement / Bi-conditional Statements.

Unit – II

Boolean Algebra, Predicate Calculus and Quantifier, Set Theory.

Unit – III

Relation and Functions, Algebraic Structure, Subgroups & Normal Subgroups.

Unit – IV

Ring, Field and Integral domain, Linear Spaces (Vector Spaces), Linear Transformations.

Post Graduate Programm

M.A. / M .Sc. (Math)

MSc Math 08 **Credit- 08**

C + +

Unit –I

प्रोग्राम डै , डवलपमेंट एनवायरमेंटए, प्रोग्रामिंग –भाषाएँ तथा C+ + भाषा के मानक, विभिन्न C+ + कम्पाइलर्स का परिचयए C+ + स्टैन्डर्ड लाइब्रेरीज, main () फंक्शन का प्रोटोटाइप, डाटा टाइप्स, C+ + का परिचय, सॉफ्टवेयर क्राइसिस, प्रोसिजरल (स्ट्रक्चर्ड) ओरिएन्टेड बनाम ऑब्जेक्ट – ओरिएन्टेड, प्रोग्रामिंग पैराडिग्म, oop की मूल अवधारणाएँ, oop के लाभ, oop के अनुप्रयोग, टर्बो C+ + इंटीग्रेटिड डैवलपमेंट एनवायरमेंट, प्रोंग्राम को ऐडिट, कम्पाइल व रन करना, C+ + भाषा के तत्व, C+ + प्रोग्राम की संरचना, C+ + टोकन्स,की वर्ड्स, आइडेन्टिफायर्स, कांस्टेंट्स, ऑपरेटर्स, ऐक्सप्रेशन्स में टाइप – परिचय।

Unit – II

ऐरेज, ऐरे का अर्थ, एक आयामी ऐरे, द्वि–आयामी ऐरे (बहु – आयामी ऐरे), यूजर द्वारा परिभाषित फंक्शन, यूजर डिफाइन्ड फंक्शन के तत्व, Return वैल्यूज व उनके प्रकार, फंक्शन कॉल्स, फंक्शन का वर्ग्रीकरण, फंक्शन्स का वर्ग्रीकरण, फंक्शन्स को पैरामीटर्स पास करना, रिकर्सन, कमांड – लाइन, कारग्यूमेंट्स, स्टोरेज क्लास स्पेसीफायर्स, लूपिंग तथा ब्राचिंग, परिचय, सीक्वेन्शियल स्टेटमेंन्ट्स, गणितीय फंक्शन, ब्रान्चिंग स्टेटमेंन्टस, लूपिंग, स्टेटमेंन्ट्स, नैस्टेड लूप, प्रोग्रामिंग के उदाहरण, ऑब्जेक्ट्स का ऐरे, ऑब्जेक्ट्स के लिए पॉइन्टस, C+ + में टाइप चेकिंग, this पॉइन्टर, डिराइव्ड टाइप्स के लिए पॉइन्टर, क्लास मेम्बरर्स के लिए पॉइन्टर, रेफरेन्स, C+ + के डायनैमिक ऐलोकेशन ऑपरेटर्स।

Unit –III

क्लासेज, स्ट्रक्चर्स और क्लासेज, यूनियन्स और क्लासेज, फ्रेन्ड फंक्शन, फ्रेन्ड क्लासेज, इनलाइन फंक्शन, स्कोप रिजोल्यूशन ऑपरेटर, स्टैटिक क्लास मेम्बरर्स, स्टैटिक डाटा मेम्बरर्स, स्टैटिक मेम्बर फंक्शन्स, फंक्शन को ऑब्जेक्ट पास करना, ऑब्जेक्ट्स को रिटर्न करना, ऑब्जेक्ट असाइनमेंन्ट, फंक्शन ओवरलोडिंग, कन्सट्रक्टर फंक्शन को ओवरलोड करना, एक ओवरलोडेड फंक्शन क`पते को खोजना, ऑपरेटर ओवरलोडिंग, एक मेम्बर ऑपरेटर फंक्शन बनाना, इन्क्रीमेन्ट (++) और डिक्रीमेन्ट (– –) ऑपरेटर्स के प्रीफिक्स तथा, पोस्टफिक्स रूपो को बनाना (यूनेरी ऑपरेटर को ओवरलोड करना), इन्क्रीमेंन्ट ऑपरेटर (+ +) का प्रीफिक्स रूप बनाना, इन्क्रीमेंन्ट ऑपरेटर (+ +) का पोस्टफिक्स रूप बनाना, डिक्रीमन्ट ऑपरेटर (– –) के पोस्टफिक्स रूप को बनाना, डिक्रीमेंन्ट ऑपरेटर (–) के पोस्टफिक्स रूप को बनाना, शॉर्टहैण्ड ऑपरेटर को ओवरलोड करना, ऑपरेटर ओवरलोडिंग की सीमाएँ, परिचय, कन्स्ट्रक्टर्स, डिफॉल्ट कन्स्ट्रक्टर, पैरामीटराइज्ड कन्स्ट्रक्टर्स, कॉपी कन्स्ट्रक्टर, एक क्लास में अनेक कन्स्ट्रक्टर्स, डिफाल्ट।

आर्ग्यूमेंट्स के साथ कन्स्ट्रक्टर्स, डिफॉल्ट आर्ग्यूमेंन्ट, कन्स्ट्रक्टर, –फंक्शन की प्रमुख विशेषताएँ, डिस्ट्रक्टर्स।

Unit – IV

पॉलीमॉर्फिज्म, पॉलीमार्फिज्म के प्रकार, वर्चुअल फंक्शन और पॉलीमॉर्फिज्म, शुद्ध वर्चुअल फंक्शन, अर्ली बनाम लेट बाइडिंग, परिचय इन्हेरिटेंस के लाभ या विशेषताए, इन्हेरिटेन्स के प्रकार, बेस क्लासेज और डिराइव्ड क्लासेज, बेस क्लास ऐक्सेस कंट्रोल, प्रोटेक्टेड मेम्बरर्स, प्रोटेक्टेड बेस क्लास इन्हेरिटेन्स, सिंगल इन्हेरिटैन्स में सेंदगधता, कंस्ट्रक्टर्स, डिस्ट्रक्टर्स और इन्हेरिटेन्स, पैरामीटर्स को बेस क्लास कंस्ट्रक्टर्स के लिए भेजना, ऐक्सेस की अनुमति देना, वर्चुअल बेस क्लासेस, C+ + C+ + स्ट्रीम्स, C+ + प्रीडिफाइम्ड स्ट्रीम्स, IOS मेम्बरर्स का उपयोग करके फॉर्मेटिंग, फॉर्मैट फ्लैगस को साफ करना, Setf ( ) का एक ओवरलोडेड रूप, फार्मेट किए गए फ्लैगस का निरिक्षण करना, Width ( ) का उपयोग करना, Precision ( ) का उपयोग करना, Fill ( ) का उपयोग करना, I/O को फॉर्मैट करने हेतु मेनीपुलेटर्स का उपयोग करना, अपने स्वयं के मैनिपुलेटर्स बनाना।