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UNIVERSITY OF MYSORE

Estd. 1916

VishwavidyanilayaKaryasoudha
Crawford Hall, Mysuru- 570 005

No.AC2(S)/55/2024-25

Dated: 20.07.2024

Notification

Sub:- Modification **of** Syllabus and Scheme of Examinations of Mathematics (PG) Programme from the Academic year 2024-25.

Ref:-1. Decision of Board of Studies in Mathematics (CB) meeting held on 06-06-2024.
2. Decision of the Faculty of Science & Technology meeting held on 19-06-2024.
3. Decision of the Academic Council meeting held on 29-06-2024.

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The Board of Studies in Mathematics (CB) which met on 06-06-2024 has resolved to recommend & approved the Modified Syllabus and Scheme of examinations of Mathematics (PG) programme with effect from the Academic year 2024-25.

The Faculty of Science & Technology and Academic Council at their meetings held on 19-06-2024 and 29-06-2024 respectively has also approved the above said modified Syllabus and Scheme of examinations hence it is hereby notified.

The Syllabus and Scheme of Examinations content may be downloaded from the University Website i.e., www.uni-mysore.ac.in.

Registrar

Registrar
University of Mysore
Mysore

To;

1. The Registrar (Evaluation), University of Mysore, Mysuru.
2. The Chairman, BOS/DOS in Mathematics, Manasagangothri, Mysore.
3. The Dean, Faculty of Science & Technology, DOS in Mathematics, MGM.
4. The Director, Distance Education Programme, Moulya Bhavan, Manasagangotri, Mysuru.
5. The Director, PMEB, Manasagangothri, Mysore.
6. Director, College Development Council, Manasagangothri, Mysore.
7. The Deputy Registrar/Assistant Registrar/Superintendent, Administrative Branch and Examination Branch, University of Mysore, Mysuru.
8. The PA to Vice-Chancellor/ Registrar/ Registrar (Evaluation), University of Mysore, Mysuru.
9. Office Copy.

M.Sc. Mathematics Syllabus

Semester I
Complex Analysis-I
Q.P.Code: 18104 and HC104

Unit-I
Algebra of complex numbers. geometric representation of complex numbers. Riemann sphere and Stereographic projection, Lines, Circles. Topology of complex plane, Limits and Continuity.

Unit-II
Analytic functions. Cauchy-Riemann equations. Harmonic functions. Polynomials and Rational functions. Exponential and Logarithmic Functions.

Unit-III
Complex integration – Line integrals, Rectifiable arcs. Cauchy's theorem for a rectangle. Cauchy's theorem in a Circular disk, Cauchy's integral formula. Local properties of analytic functions, Morera's theorem. Cauchy's Inequalities. Liouville's theorem, Fundamental theorem of algebra. Maximum and minimum modulus principle.

Unit-IV
Elementary theory of power series - sequences, series, uniform convergence of power series, Abel's limit theorem, Weierstrass theorem for uniform convergence, Weierstrass M-test, Taylor's theorem, Singularities(definition with example), Laurent's theorem.

References:

1. L. V. Ahlfors – Complex Analysis, McGraw-Hill, Kogakusha, 1979.

2. J. B. Conway – Functions of one complex variable, Narosa, New Delhi.

3. R. P. Boas – Invitation to Complex Analysis, The Random House, 1987

4. B. C. Palka – An Introduction to Complex Function Theory, Springer, 1991.

5. S. Ponnusamy – Foundations of Complex Analysis. Narosa. 1995.

6. Ravi P. Agarwal, Kanishka Perera. Sandra Pinelas- An Introduction to Complex Analysis, Springer, 2011.

M.Sc. Mathematics Syllabus

Semester II
Complex Analysis-II
Q. P. Code: 18123 and HC203

UNIT-I

Zero's of an Analytic function, Identity theorem, Isolated singularities-Removable singularity, Poles and Essential singularity, Cauchy Residue theorem, summation of series as an application of Cauchy Residue theorem, Argument principles, Rouche's theorem, Fundamental theorem of Algebra as a consequence of Rouche's theorem, Problems related to roots of a polynomial using Rouche's theorem. Evaluation of real integral using Contour - integration.

UNIT-II

Infinite products, Weierstrass factorization theorem, partial fractions, Mittag-Leffer theorem, gamma function, Stirling's Formula, Analytic continuation.

UNIT-III

Harmonic functions, its basic properties, Mean value property, Poisson's Formula, Schwarz's theorem, reflection principle. Entire functions, Jensen's Formula.

UNIT-IV

Riemann Zeta Functions, Linear fractional transformations, Cross-ratio, Conformal mappings, Double periodic function, Elliptic functions.

References:

1. 'An introduction to Complex Analysis' by Ravi P. Agarwal, Kanishka Perera and Sandra Pinelas. Springer International Edition.
2. 'Complex analysis' (Third edition) by Lars V. Ahlfors. McGraw-Hill International Editions.
3. Functions of One complex variable(Second edition) by John B. Conway. Springer International Edition.
4. 'An Introduction to Complex Function Theory' by Bruce P. Palka.

M.Sc. Mathematics Syllabus

Semester III
Theory of Numbers
Q. P. Code: 18144 and SC304

Unit-I

Prime numbers, The Fundamental theorem of Arithmetic, The series of Reciprocals of primes, The Euclidean Algorithm. Fermat and Mersenne numbers, Perfect numbers, Farey series, Farey dissection of the continuum, Irrational numbers-Irrationality of mth root of N, e and π.

Unit-II

Arithmetical Functions – The Mobius function, The Euler' function and Sigma function, The Dirichlet product of Arithmetical functions, Multiplicative functions. Averages of Arithmetical functions – Euler summation formula, Some elementary asymptotic formulas, The average orders of $d(n)$, $\sigma(n)$, $\phi(n)$, and $\mu(n)$. An application to the distribution of lattice points visible from the origin.

Unit-III

Approximation Irrational numbers. Hurwitz's Theorem, The functions $\zeta(s)$ and $L(s,\chi)$ - Introduction, Properties of the gamma function. Hurwitz zeta function-Integral representation , a contour integral representation , analytic continuation. Analytic continuation of the $\zeta(s)$ and $L(s,\chi)$, Hurwitz formula for $\zeta(s,a)$, The functional equation for the Riemann zeta function , Hurwitz zeta function and L-function, Evaluation of $\zeta(-n,a)$, properties of Bernoulli's numbers and Bernoulli polynomial, Formulas for $L(0,\chi)$, Approximation of $\zeta(s,a)$ by finite sums, Inequalities for $\zeta(s,a)$, Inequalities for $\zeta(s)$ and $L(s,\chi)$.

Unit-IV

Continued fractions - Finite continued fractions, Convergent of a continued fraction, Continued fractions with positive quotients. Simple continued fractions, The representation of an irreducible rational fraction by a simple continued fraction. The continued fraction algorithm and Euclid's algorithm. The difference between the fraction and its convergents, Infinite simple continued fractions, the representation of an irrational number by an infinite continued fraction, Equivalent numbers and periodic continued fractions, some special quadratic surds, The series of Fibonacci and Lucas.

References:

(1) G. H. Hardy and E. M. Wright – An Introduction to Theory of Numbers, Oxford University Press, 1979, 5th Ed.

(2) T. M. Apostol – Introduction to Analytic Number Theory, Narosa Publishing House, New Delhi.

(3) I. Niven, H. S. Zuckerman and H. L. Montgomery – An Introduction to the Theory of Numbers, New York, John Wiley and Sons, Inc., 2004, 5th Ed.

(4) Bruce C. Berndt – Ramanujan's Note Books Volume-1 to 5, Springer.

(5) G. E. Andrews – Number Theory, Dover Books, 1995.

M.Sc. Mathematics Syllabus

Semester IV
Differential Geometry
Q. P. Code: 18163 and SC403

Unit-I

Plane curves and Space curves - Frenet-Serret Formulae,Global properties of curves - Simple closed curves, The isoperimetric inequality, The Four Vertex theorem.

Unit-II

Surfaces in three dimensions - Smooth surfaces, Tangents, Normals and Orientability, Quadric surfaces. The First Fundamental form - The lengths of curves on surfaces, Isometries of surfaces, Conformal mappings of surfaces, Surface area, Equiareal Maps and a theorem of Archimedes.

Unit-III

Curvature of surfaces The Second Fundamental form, The Curvature of curves on a surface, Normal and Principal Curvatures.

Unit-IV

Gaussian Curvature and The Gauss' Map - The Gaussian and The mean Curvatures, The Pseudo sphere, Flat surfaces, Surfaces of Constant Mean Curvature, Gaussian Curvature of Compact surfaces, The Gauss' Map.

References:

(1) A. Pressley - Elementary Differential Geometry, Under-graduate Mathematics Series, Springer.

(2) T. J. Willmore - An Introduction to Differential Geometry, Oxford University Press.

(3) D. Somasundaram - Differential Geometry: A First Course, Narosa, 2005.