ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ

ವಿಶ್ವವಿದ್ಯಾನಿಲಯ ಕಾರ್ಯಸೌಧ
ಕ್ರಾಫರ್ಡ್‌ಭವನ, ಮೈಸೂರು-5

ಸಂಖ್ಯೆ:ಯುಎ.2/379(39)/2016-2017 ದಿನಾಂಕ 10-12-2020

ಗೆ:

ಗಣಿತಶಾಸ್ತ್ರ ಅಧ್ಯಯನ ಮಂಡಳಿ(ಸ್ನಾತಕೋತ್ತರ)ಯ
ಅಧ್ಯಕ್ಷರು ಮತ್ತು ಸದಸ್ಯರುಗಳಿಗೆ.

ಮಾನ್ಯರೇ,

ವಿಷಯ: ದಿನಾಂಕ 26-11-2020ರಂದು ನಡೆದ ಗಣಿತಶಾಸ್ತ್ರ ಅಧ್ಯಯನ ಮಂಡಳಿ(ಸ್ನಾತಕೋತ್ತರ)ಯ ವಾರ್ಷಿಕ ಸಭೆಯ ನಡಾವಳಿಯನ್ನು ಕಳುಹಿಸುತ್ತಿರುವ ಬಗ್ಗೆ.

* * * * *

ದಿನಾಂಕ 26-11-2020ರಂದು ನಡೆದ ಗಣಿತಶಾಸ್ತ್ರ ಅಧ್ಯಯನ ಮಂಡಳಿ (ಸ್ನಾತಕೋತ್ತರ)ಯ ವಾರ್ಷಿಕ ಸಭೆಯ ನಡಾವಳಿಯನ್ನು ಈ ಪತ್ರದ ಜೊತೆ ಲಗತ್ತಿಸಿ ಕಳುಹಿಸಲಾಗಿದೆ.

Lingaraj 10/12/2020
ಉಪ ಕುಲಸಚಿವ (ಪ್ರಾಧಿಕಾರ)

ಪ್ರತಿ:

1. ಅಧ್ಯಕ್ಷರು, ಗಣಿತಶಾಸ್ತ್ರ ಅಧ್ಯಯನ ವಿಭಾಗ, ಮಾನಸಗಂಗೋತ್ರಿ, ಮೈಸೂರು
2. ಪ್ರೊ. ಜಿ.ವೆಂಕಟೇಶ್ ಕುಮಾರ್, ಡೀನರು, ವಿಜ್ಞಾನ ಮತ್ತು ತಂತ್ರಜ್ಞಾನ ನಿಕಾಯ, ಮನೋವಿಜ್ಞಾನ ಅಧ್ಯಯನ ವಿಭಾಗ, ಮಾನಸಗಂಗೋತ್ರಿ, ಮೈಸೂರು
3. ಕುಲಸಚಿವ(ಪರೀಕ್ಷಾಂಗ), ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಮೈಸೂರು.
4. **ಉಪಕುಲಸಚಿವರು (ಶೈಕ್ಷಣಿಕ), ಆಡಳಿತ ವಿಭಾಗ, ಮೈವಿವಿ ನಿಲಯ, ಮೈಸೂರು-ಅಧ್ಯಯನ ಮಂಡಳಿಯು ಶಿಫಾರಸ್ಸು ಮಾಡಿರುವಂತೆ ಸೂಕ್ತ ಕ್ರಮಕೈಗೊಳ್ಳಬೇಕಾಗಿ ಕೋರಿದೆ.**
5. ಸಹಾಯಕ ಕುಲಸಚಿವರು/ಅಧೀಕ್ಷಕರು (ಶೈಕ್ಷಣಿಕ), ಆಡಳಿತವಿಭಾಗ, ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಮೈಸೂರು
6. ಕುಲಪತಿ/ಕುಲಸಚಿವ/ಕುಲಸಚಿವ(ಪರೀಕ್ಷಾಂಗ) ಅವರ ಆಪ್ತ ಸಹಾಯಕರು, ಮೈವಿವಿ ನಿಲಯ, ಮೈಸೂರು.
7. ಕಾರ್ಯನಿರ್ವಾಹಕರು, ಎಸಿ2(ಎಸ್), ಆಡಳಿತ ವಿಭಾಗ, ಮೈವಿವಿ ನಿಲಯ, ಮೈಸೂರು.

Board of studies 172

ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ

ಗಣಿತಶಾಸ್ತ್ರ ಅಧ್ಯಯನ ವಿಭಾಗ,
ಮಾನಸಗಂಗೋತ್ರಿ, ಮೈಸೂರು–570 006

ದಿನಾಂಕ: 26–11–2020 ರಂದು ಬೆಳಿಗ್ಗೆ 11–30ಘಂಟೆಗೆ ಗಣಿತಶಾಸ್ತ್ರ ಅಧ್ಯಯನ ವಿಭಾಗ, ಮಾನಸಗಂಗೋತ್ರಿ, ಮೈಸೂರು ಇಲ್ಲಿ ಜರುಗಿದ ಗಣಿತಶಾಸ್ತ್ರ ಅಧ್ಯಯನ ಮಂಡಳಿ(PG)ಯ ನಡಾವಳಿ.

ಸಭೆಯಲ್ಲಿ ಹಾಜರಿದ್ದ ಸದಸ್ಯರುಗಳು:

1. ಪ್ರೊ. ರಂಗರಾಜನ್. ಆರ್, ಗಣಿತಶಾಸ್ತ್ರ ಅಧ್ಯಯನ ಮಂಡಳಿ, ಗಣಿತಶಾಸ್ತ್ರ ಅಧ್ಯಯನ ವಿಭಾಗ, ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಮಾನಸಗಂಗೋತ್ರಿ, ಮೈಸೂರು – ಅಧ್ಯಕ್ಷರು R. Rangarajan
2. ಪ್ರೊ. ಡಿ. ಸೊನಾರ್ ನಂದಪ್ಪ, ಗಣಿತಶಾಸ್ತ್ರ ಅಧ್ಯಯನ ವಿಭಾಗ, ಮೈ ವಿ ವಿ, ಮಾನಸಗಂಗೋತ್ರಿ, ಮೈಸೂರು. – ಸದಸ್ಯರು
3. ಪ್ರೊ .ಡಿ.ಡಿ.ಸೋಮಶೇಖರ, ಗಣಿತಶಾಸ್ತ್ರ ಅಧ್ಯಯನ ವಿಭಾಗ, ಮೈ ವಿ ವಿ, ಮಾನಸಗಂಗೋತ್ರಿ, ಮೈಸೂರು. – ಸದಸ್ಯರು
4. ಪ್ರೊ ಕೆ.ಆರ್. ವಾಸುಕಿ, ಗಣಿತಶಾಸ್ತ್ರ ಅಧ್ಯಯನ ವಿಭಾಗ, ಮೈ ವಿ ವಿ, ಮಾನಸಗಂಗೋತ್ರಿ, ಮೈಸೂರು. – ಸದಸ್ಯರು
5. ಡಾ. ವೀಣಾ ಮಠದ್, ಗಣಿತಶಾಸ್ತ್ರ ಅಧ್ಯಯನ ವಿಭಾಗ, ಮೈ ವಿ ವಿ, ಮಾನಸಗಂಗೋತ್ರಿ, ಮೈಸೂರು. – ಸದಸ್ಯೆರು VHMathad
6. ಪ್ರೊ. ಬಿರಾದರ ಬಿ ಎಸ್ , ಸಂಖ್ಯಾಶಾಸ್ತ್ರ ಅಧ್ಯಯನ ವಿಭಾಗ, ಮೈ ವಿ ವಿ, ಮಾನಸಗಂಗೋತ್ರಿ, ಮೈಸೂರು. – ಸದಸ್ಯರು
7. ಪ್ರೊ. ಸುರೇಶ, ಗಣಕಶಾಸ್ತ್ರ ಅಧ್ಯಯನ ವಿಭಾಗ, ಮೈ ವಿ ವಿ, ಮಾನಸಗಂಗೋತ್ರಿ, ಮೈಸೂರು. – ಸದಸ್ಯರು
8. ಪ್ರೊ. ಎಚ್.ಎಸ್ ನಾಗೇಂದ್ರಸ್ವಾಮಿ, ಗಣಕಶಾಸ್ತ್ರ ಅಧ್ಯಯನ ವಿಭಾಗ, ಮೈ ವಿ ವಿ, ಮಾನಸಗಂಗೋತ್ರಿ, ಮೈಸೂರು.– ಸದಸ್ಯರು

ಸಭೆಯಲ್ಲಿ ಹಾಜರಾಗಲಾಗದ ಸದಸ್ಯರುಗಳು:

9. ಪ್ರೊ. ಎನ್ ಬಿ ನಡುವಿನಮನಿ, ಗಣಿತಶಾಸ್ತ್ರ ವಿಭಾಗ, ಗುಲ್ಬರ್ಗ ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಕಲಬುರ್ಗಿ – ಸದಸ್ಯರು

ಮೊದಲಿಗೆ ಅಧ್ಯಯನ ಮಂಡಳಿ ಅಧ್ಯಕ್ಷರು ಸದಸ್ಯರುಗಳನ್ನು ಸ್ವಾಗತಿಸಿದರು.

ಕಾರ್ಯಸೂಚಿ 1 : ಎಂ.ಎಸ್ಸಿ ಪ್ರವೇಶ ಪರೀಕ್ಷೆಯ ಪಠ್ಯಕ್ರಮವನ್ನು ಹೊಸ ಬಿ.ಎಸ್ಸಿ(ಸಿಬಿಸಿಎಸ್) ಪಠ್ಯಕ್ರಮದ ಪ್ರಕಾರ ಮಾರ್ಪಡಿಸಲಾವುದು.

ತೀರ್ಮಾನ: 2021–22 ನೇ ಸಾಲಿನಿಂದ ಜಾರಿಗೆ ಬರುವಂತೆ ಎಂ.ಎಸ್ಸಿ ಪ್ರವೇಶ ಪರೀಕ್ಷೆಯ ಪಠ್ಯಕ್ರಮವನ್ನು ಸಿದ್ದಪಡಿಸಿ, ಒಪ್ಪಿಗೆ ನೀಡಿ, ಕುಲಸಚಿವರಿಗೆ ಕಳುಹಿಸಲು ಅಧ್ಯಯನದ ಮಂಡಳಿಯ ಅಧ್ಯಕ್ಷರಿಗೆ ಅಧಿಕಾರ ನೀಡಲಾಯಿತು.

ಕಾರ್ಯಸೂಚಿ 2 : ಸ್ನಾತಕೋತ್ತರ ಕೋರ್ಸ್‌ಗಳಲ್ಲಿನ/ಪರಿನಿಯಮಾವಳಿ/ಪಠ್ಯಕ್ರಮ, ಪರೀಕ್ಷಾ ಯೋಜನೆ ಇತ್ಯಾದಿಗಳಲ್ಲಿ ಅಗತ್ಯ ಬದಲಾವಣೆಗಳೇನಾದರು ಮಾಡಬೇಕಾದಲ್ಲಿ ಅದರ ಬಗ್ಗೆ ಹಾಗೂ 2021–2022ನೇ ಸಾಲಿನಲ್ಲಿ ನಡೆಯುವ ಪರೀಕ್ಷೆಗಳಿಗೆ ಸಂಬಂಧಿಸಿದಂತೆ ಪರೀಕ್ಷಕರ ಪಟ್ಟಿಯನ್ನು ಸಿದ್ಧಪಡಿಸುವ ಬಗ್ಗೆ.

ತೀರ್ಮಾನ: 2021–22 ಸಾಲಿನಲ್ಲಿ ನಡೆಯುವ ಪರೀಕ್ಷೆಗಳಿಗೆ ಸಂಬಂಧಿಸಿದಂತೆ ಅಧ್ಯಯನ ಮಂಡಳಿಯು ಪರೀಕ್ಷಕರ ಪಟ್ಟಿಯನ್ನು ಪರಿಷ್ಕರಿಸಿದ್ದು ಅದನ್ನು ಪರೀಕ್ಷಾಂಗ ಕುಲಸಚಿವರಿಗೆ ಕಳುಹಿಸಲು ಅಧ್ಯಯನ ಮಂಡಳಿಯ ಅಧ್ಯಕ್ಷರಿಗೆ ಅಧಿಕಾರ ನೀಡಲಾಯಿತು.

ಕಾರ್ಯಸೂಚಿ 3 : ಇತರೆ ಯಾವುದಾದರೂ ವಿಷಯಗಳು ಇದ್ದಲ್ಲಿ ಅದರ ಬಗ್ಗೆ (ಅಧ್ಯಕ್ಷರ ಅನುಮತಿಯೊಂದಿಗೆ).

ತೀರ್ಮಾನ: ಯಾವುದು ಇಲ್ಲ

ಅಧ್ಯಯನ ಮಂಡಳಿ ಅಧ್ಯಕ್ಷರು ಎಲ್ಲಾ ಸದಸ್ಯರುಗಳಿಗೆ ಅವರ ಅಮೂಲ್ಯ ಸಲಹೆ ಮತ್ತು ಸಹಕಾರಗಳಿಗೆ ವಂದನೆಗಳನ್ನು ಸಲ್ಲಿಸಿದರು

R. Rangaraj

ಅಧ್ಯಕ್ಷರು,
ಗಣಿತಶಾಸ್ತ್ರ ಅಧ್ಯಯನ ಮಂಡಳಿ(ಪಿಜಿ),
ಮಾನಸಗಂಗೋತ್ರಿ, ಮೈಸೂರು

Chairman (BOS)
DOS in Mathematics
University of Mysore
Manasagangotri
Mysore 570 006

UNIVERSITY OF MYSORE

ENTRANCE TEST FOR M.Sc. COURCE IN MATHEMATICS

(With effect from the academic year 2021-22)

Eligibility criteria for writing the Entrance Test : Those candidates who are appearing or have appeared for Final semester/Year of B.Sc./B.Sc. Ed. (RIE) course with Mathematics as Major/Optional subject are eligible to write the entrance test.

Eligibility criteria for Admission: The eligibility for admission is 45% of marks (40% for SC, ST and Cat. I candidates) after deducting 3% for each extra year over normal duration of the course, if any in Mathematics of B.Sc./B.Sc. Ed. (RIE) Examination.

ENTRANCE TEST SYLLABUS FOR M.Sc. COURSE IN MATHEMATICS

Unit	Existing	Modified
1	**Analytical Geometry:** Cartesian coordinates in three dimensional space – Relation between cartesian coordinates and position vector – Distance formula (cartesian and vector form) – Division formula (cartesian and vector form) – Direction cosines – Direction ratios – Projection on a straight line – Angle between two lines – Area of triangle – volume of a tetrahedron. Straight line – Equations of straight lines (cartesian and vector form) - Planes – Equations of planes (cartesian and vector form) - Normal form – Angle between planes – Coaxial planes – Parallel and perpendicular planes – length of a perpendicular form a point to a plane – Bisectors of angles between two planes – Mutual position of a lines and planes – Shortest distances between two skew lines. **Quadric Curves:** Translation and rotation of cartesian axes in a plane – Curves of second degree – Discriminant and trace - theorem on discriminant and trace – removing the mixed term – removing linear terms – proof of the theorem. The set of points (x, y) satisfying equation $Ax^2 + 2Bxy + Cy^2 + Dx + Ey + F = 0$	**Analytical Geometry:** Cartesian coordinates in three dimensional space – Relation between cartesian coordinates and position vector – Distance formula (cartesian and vector form) – Division formula (cartesian and vector form) – Direction cosines – Direction ratios – Projection on a straight line – Angle between two lines – Area of triangle – volume of a tetrahedron. Straight line – Equations of straight lines (cartesian and vector form) - Planes – Equations of planes (cartesian and vector form) - Normal form – Angle between planes – Coaxial planes – Parallel and perpendicular planes – length of a perpendicular form a point to a plane – Bisectors of angles between two planes – Mutual position of a lines and planes – Shortest distances between two skew lines. **Theory of Equations:** Theory of Equations – Euclid's algorithm - Polynomials with integral coefficients – Remainder theorem – Factor theorem – Fundamental theorem of algebra (statement only) – Irrational and complex roots occur in conjugate pairs – Relation between roots and coefficients of a polynomial equation – symmetric functions – Transformations – Reciprocal equations – Descartes rule of signs – Multiple roots - Solving cubic equations by Cardon's method – solving quartic equations by Descarte's Method.

	is either empty or a point consists of one or two lines or is a parabola, an ellipse or a hyperbola – problems there on – Polar equations of a conic – problems there on – Quadratic Surfaces – Sphere – Cylinder – Cone - Ellipsoid – Hyperboloids – Paraboloids - Ruled Surfaces.	
2	**Differential Calculus:** Real Numbers – Inequalities – Absolute Value – Intervals – Functions – Graphs – definition ofδ– εLimit of a function – Left hand and right hand limits – continuity of a function - problems. Differentiation – Linear approximation theorem – derivatives of higher order – Leibnitz's theorem – Monotone functions - Maxima and Minima – Concavity, Convexity and points of inflection. Polar coordinates- angel between the radius vector and the tangent at a point on a curve – angle of intersection between two cnurves – Pedal equations – Derivative of arc length in cartesian, parametric and polar coordinates, curvature – radius of curvature – circle of curvature – evolutes. **Differentiability and its applications:** Differentiability- Theorems – Rolle's theorem – Lagranges's Mean valve theorem – Cauchy's mean value theorem – Taylor's theorem – Maclaurin's theorem – Generalized mean value theorem – Taylor's infinite series and power series expansion – Maclaurin's infinite series – Indeterminate forms. Asymptotes – Envelopes – Singular points – Multiple points – cusp, nodes and conjugate points – Tracing of standard curves with Cartesian and polar equations. **Partial Derivatives:** Functions of two or more variables – Explicit and implicit functions – The neighborhood of a point – The limit of a function – Continuity – Partial	**Differential Calculus:** Real Numbers – Inequalities – Absolute Value – Intervals – Functions – Graphs – definition ofδ– εLimit of a function – Left hand and right hand limits – continuity of a function - problems. Differentiation – Linear approximation theorem – derivatives of higher order – Leibnitz's theorem – Monotone functions - Maxima and Minima – Concavity, Convexity and points of inflection. Polar coordinates- angel between the radius vector and the tangent at a point on a curve – angle of intersection between two cnurves – Pedal equations – Derivative of arc length in cartesian, parametric and polar coordinates, curvature – radius of curvature – circle of curvature – evolutes. **Differentiability and its applications:** Differentiability- Theorems – Rolle's theorem – Lagranges's Mean valve theorem – Cauchy's mean value theorem – Taylor's theorem – Maclaurin's theorem – Generalized mean value theorem – Taylor's infinite series and power series expansion – Maclaurin's infinite series – Indeterminate forms. **Partial Derivatives:** Functions of two or more variables – Explicit and implicit functions – The neighborhood of a point – The limit of a function – Continuity – Partial derivatives – Differentiable functions – Linear approximation theorem – Homogeneous functions – Euler's theorem – Chain rule – Change of variables – Directional derivatives – Partial derivatives of

	derivatives – Differentiable functions – Linear approximation theorem – Homogeneous functions – Euler's theorem – Chain rule – Change of variables – Directional derivatives – Partial derivatives of higher order – Taylor's theorem – Derivatives of implicit functions – Jacobian – Some illustrative examples.	higher order – Taylor's theorem – Derivatives of implicit functions – Jacobian – Some illustrative examples.
3	**Theory of Numbers:** Division Algorithm - Divisibility - Prime and composite numbers - Proving the existence and uniqueness of GCD and the Euclidean Algorithm - Fundamental theorem of Arithmetic - The least common multiple – congruences - linear congruences - Wilson's theorem - Simultaneous congruences - Theorem of Euler, Fermat and Lagrange. **Theory of Equations:** Theory of Equations – Euclid's algorithm - Polynomials with integral coefficients – Remainder theorem – Factor theorem – Fundamental theorem of algebra (statement only) – Irrational and complex roots occur in conjugate pairs – Relation between roots and coefficients of a polynomial equation – symmetric functions – Transformations – Reciprocal equations – Descartes rule of signs – Multiple roots - Solving cubic equations by Cardon's method – solving quartic equations by Descarte's and Ferrari's Method. **Group Theory:** Definition and examples of groups – Some general properties of Groups Permutations - group of permutations, cyclic permutations, Even and odd permutations. Powers of an element of a group – Subgroups – Cyclic groups, Zn and Z . Cosets, Index of a group, Lagrange's theorem – consequences. Normal subgroups. Quotient groups – Homomorphism, Isomorphism, Automorphism. Fundamental theorem of	**Theory of Numbers:** Division Algorithm - Divisibility - Prime and composite numbers - Proving the existence and uniqueness of GCD and the Euclidean Algorithm - Fundamental theorem of Arithmetic - The least common multiple – congruences - linear congruences - Wilson's theorem - Simultaneous congruences - Theorem of Euler, Fermat and Lagrange. **Group Theory:** Definition and examples of groups – Some general properties of Groups Permutations - group of permutations, cyclic permutations, Even and odd permutations. Powers of an element of a group – Subgroups – Cyclic groups, Zn and Z . Cosets, Index of a group, Lagrange's theorem – consequences. Normal subgroups, Quotient groups – Homomorphism, Isomorphism, Automorphism. Fundamental theorem of homomorphism – Isomomorphism – Direct product of groups – Cayley's theorem.

	homomorphism – Isomomorphism – Direct product of groups – Cayley's theorem.	
4	**Real Numbers:** Introduction – Field structure – Order structure - Bounded and unbounded sets – Supremum and infimum – Completeness - Some important subsets of R – Archimedean Property of real numbers – countable and uncountable sets. **Limits and continuity:** Limits - Continuous functions - discontinuous functions - theorems on continuity - Functions continuous on closed interval - Uniform continuity (explaining the idea). **Real sequences:** Sequences of real numbers – Bounded and unbounded sequences – Infimum and supremum of a sequence – Limit of a sequence – Sum, product and quotients of limits – Standard theorems on limits – Convergent, divergent and oscillatory sequences – Standard properties – Subsequences – monotonic sequences and their properties – Limit point of a sequences – Cauchy's general principle of convergence **Infinite Series:** Infinite series of real numbers – Convergence – divergence and oscillation of series – properties of convergence – Positive term series – Geometric series – Comparison tests – Cauchy's root test – D'Alembert's ratio test, Raabe's test, Integral test – Absolute and conditional convergence - D'Alembert's test for absolute convergence – Leibnitz's test for alternating series. Summation of Binomial, Exponential and logarithmic series. **Fourier series:** Introduction – Periodic functions – Fourier series and Euler formulae – Even and odd functions – Half range series – Change of interval.	No Change

5	**Riemann Integration:** The Riemann integral – Upper and lower sums – Criterion for integrability – Integrability of continuous functions and monotonic functions – Fundamental theorem of Calculus – Change of variables – integration by parts –First and Second mean value theorems of integral calculus. **Integral Calculus:** Techniques of integrations – Integrals of Algebraic and transcendental functions – Reduction formulae - Definite integrals – properties. **Improper Integrals:** Improper integrals of the first and second kinds – Convergence – Gamma and Beta functions and results – Connection between Beta and gamma functions – Applications to evaluation of integrals – Duplication formula – Sterling formula. **Laplace Transforms:** Definition and basic properties – Laplace transforms of $e^{kt}, cos kt, sin kt, t^n, cosh kt, sinh kt$ - Laplace transform of $e^{at}F(t)t^{\frac{1}{2}}$- problems - Theorems on the derivative of Laplace transform and the transform of derivatives - Inverse Laplace transforms – problems – alpha function – theorem on the Laplace transform of integrals – Laplace transform of $\frac{F(t)}{t}$. Convolution theorem – Simple initial value problems – Special integral equations – Solution of first and second order differential equations with constant coefficients by Laplace transform method – Systems of equations – Laplace transforms of Periodic functions.	No Change
6	**Rings and Fields:** Rings – Examples – Integral domains – Division rings – Fields – Subrings – subfields - Characteristic of a ring – Ordered integral domain – Imbedding of a ring into another ring – The field of	No Change

	quotients – Ideals – Algebra of Ideals – Principle ideal ring – Divisibility in an integral domain – Units and Associates – Prime Elements – Polynomial rings – Divisibility - Irreducible polynomials – Division Algorithm – Greatest Common Divisors – Euclidean Algorithm – Unique factorization theorem – Prime fields – Quotient rings – Homomorphism of rings – Kernel of a ring homomorphism – Fundamental theorem of homomorphism – Maximal ideals – Prime Ideals – Properties - Unique Factorization domain – Eisenstein's Criterion of irreducibility.	
7	**Differential Equations:** Definition and examples of differential equations. The elimination of arbitrary constants - Families of curves - Differential equations of first order, separation of variables - equations with homogeneous coefficients – Exact equations - Linear equations of order one. The general solution of a linear equation – Integrating factors found by inspection. The determination of Integrating factors. Substitution suggested by the equation. Bernoulli's equation. Coefficients linear in two variables . Equations of first order and higher degree Equations - solvable for x , solvable for y , solvable for P , Clairaut's equation – Singular solutions and geometrical meaning. Ordinary Linear differential equations with constant coefficients – complementary function – particular integral – Inverse differential operators. **Linear Differential Equations:** Cauchy – Euler differential equations – Simultaneous differential equations (two variables with constant coefficients) - Solution of ordinary second order linear differential equations by the following methods i. Reduction of order method and variation of parameters. ii. Changing the independent variable.iii. Changing the dependent variable. iv. Exact equations.	**Differential Equations:** Definition and examples of differential equations. The elimination of arbitrary constants - Families of curves - Differential equations of first order, separation of variables - equations with homogeneous coefficients – Exact equations - Linear equations of order one. The general solution of a linear equation – Integrating factors found by inspection. The determination of Integrating factors. Substitution suggested by the equation. Bernoulli's equation. Coefficients linear in two variables . Ordinary Linear differential equations with constant coefficients – complementary function – particular integral – Inverse differential operators. **Linear Differential Equations:** Cauchy – Euler differential equations – Simultaneous differential equations (two variables with constant coefficients) - Solution of ordinary second order linear differential equations by the following methods i. Reduction of order method and variation of parameters. ii. Changing the independent variable.iii. Changing the dependent variable. iv. Exact equations. Total differential equations – Necessary and sufficient condition for the equation $Pdx + Qdy + Rdz = 0$ to be exact (proof only for the necessary part) – Simultaneous equations of the form $\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$.

	Total differential equations – Necessary and sufficient condition for the equation $Pdx + Qdy + Rdz = 0$ to be exact (proof only for the necessary part) – Simultaneous equations of the form $\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$. **Partial Differential Equations:** Basic concepts – Formation by elimination of arbitrary constants – Formation by eliminations of arbitrary functions – Solutions of partial differential equations – Solutions by direct integration – Lagranges's linear equations $-Pp + Qq = R$ Standard types of first order non-linear partial differential equations – Charpit's method - Homogeneous linear equations with constant coefficients – Rules for finding the complimentary function – Rules for finding the particular integral method of separation of variables (product method).	**Partial Differential Equations:** Basic concepts – Formation by elimination of arbitrary constants – Formation by eliminations of arbitrary functions – Solutions of partial differential equations – Solutions by direct integration – Lagranges's linear equations $-Pp + Qq = R$ Standard types of first order non-linear partial differential equations – Charpit's method - Homogeneous linear equations with constant coefficients – Rules for finding the complimentary function – Rules for finding the particular integral method of separation of variables (product method).
8	**Line and Multiple Integrals:** Definition of a line integral and basic properties – Examples on evaluation of line integrals – Definitions of double integral – Conversion to iterated integrals - Evaluation of double integrals i. Under given limits ii. In regions bounded by given curves – change of variables – surface areas. Definition of a triple integral – Evaluation – Change of variables - Volume as a triple integral. **Vector Calculus:** Vectors – Scalars – Vector field – Scalar field – Vector differentiation – The vector differential operator - del – Gradient – Divergence – Curl – standard derivations – Vector integrations – The divergence theorem of Gauss – Stoke's theorem. Green's theorem in the plane. **Numerical Analysis:** Numerical solutions of Algebraic and transcendental equation – Bisection method – The method of false position - Iteration method – Newton – Raphson	No Change

	method – Secant method. Numerical solutions of a first order linear differential equations – Euler – Cauchy method – Euler's modified method – Runge –Kutta fourth order method – Picard's method. Finite differences – Forward and backward differences – Shift operator – Derivatives operator - Weirstrass theorem (statement) – Interpolations – Newton – Gregory – forward and backward difference formulae – Lagrange's interpolations formula – Finding first and second derivatives using interpolation formulae – Difference equations. Numerical integrations – General quadrature formula – Trapezoidal Rule – Simpson's 1/ 3 rule – Simpson's 3/8 th rule – Weddle's rule.	
9	**Matrices:** Matrices of order m x n - Algebra of Matrices – Symmetric and skew symmetric - Hermitian and skew Hermitian matrices, symmetric matrices and their standard properties – Determinants – Adjoint of a square matrix – Singular and non-singular matrices – Rank of a matrix – Elementary row/column operations – Invariance of rank under elementary operations – Inverse of a non-singular matrix by elementary operations. System of m linear equations in n unknowns – matrices associated with linear equations – trivial and non-trivial solutions – Criterion for existence of non-trivial solution of homogeneous and non-homogeneous systems – Criterion for uniqueness of solutions – Problems. Eigen values and Eigen vectors of a square matrix – Characteristic equation of a square matrix – Eigen values and eigen vectors of a real symmetric matrix - Properties – Diagonalization of a real symmetric matrix – Caley – Hamilton theorem – Applications to determine the	No Change

	power of square matrices and inverses of non-singular matrices. **Vector Spaces:** Vector spaces – Introduction – Examples – Vector subspaces – Criterion for a subset to be a subspace – Algebra of subspace – Linear combinations – Linear spans – Linear dependence and linear independence of vectors – Theorems on linear dependence and linear independence – Basis of a vector space – Dimension of a vector space - Finite dimensional vector spaces – Some properties – Coordinates system – Quotient space – Homomorphism of vector spaces or linear transformations – Isomorphism of vector spaces – Direct sums – Inner product spaces – Euclidean vector spaces – Distance – length- Properties – Normal orthogonal vectors – Gram-Schmidt othogonalization process – Orthogonal complement. **Linear Transformations:** Linear transformations – Linear maps as matrices – Change of basis and effect of associated matrices – Kernel and image of a linear transformation – Rank and nullity theorem – Singular and non-singular linear transformations – Elementary matrices and transformations – Similarity – Eigen values and eigen vectors - Diagonalisation - Charateristic polynomial – Cayley –Hamilton theorems – Minimal polynomial. Automorphism.	
10	**Complex Analysis:** The complex number system – Absolute value and conjugate of a complex number – Geometrical representation – Polar form of complex numbers – De Moiver's theorem – Euler's formula – Dot and cross product. Neighbourhoods – Limit point – Interior, Exterior, Isolated and boundary points – Open sets – Closed sets - Bounded sets – Compact sets – Connected sets – Domain – Simply	**Complex Analysis:** The complex number system – Absolute value and conjugate of a complex number – Geometrical representation – Polar form of complex numbers – De Moiver's theorem – Euler's formula – Dot and cross product. Neighbourhoods – Limit point – Interior, Exterior, Isolated and boundary points – Open sets – Closed sets - Bounded sets – Compact sets – Connected sets – Domain – Simply Connected regions. Equation to a

	Connected regions. Equation to a circle and a straight lines in complex form – Jordan arc – Closed Contour – The extended complex plane. **Functions of a Complex Variable:** Functions of a complex variable – Limit of a function – Continuity and differentiability – Analytic functions – Singular points – Cauchy-Riemann equations in cartesian and polar forms – Necessary and sufficient condition for f to be analytic – Harmonic functions – Real and Imaginary parts of an analytic functions are harmonic – Construction of analytic functions i. Milne Thomson Method. ii. Using the concept of Harmonic function. **Complex Integration:** The Complex Line integral – Examples and Properties – Proof of Cauchy's Integral theorem using Green's theorem – Direct consequences of Cauchy's theorem – The Cauchy's Integral formula for the function and the derivatives – Applications to the evaluations of simple line integrals – Cauchy's inequality – Liouville's theorem – Fundamental theorem of Algebra. **Transformations:** Definitions – Jacobian of a transformation - Identity transformation – Reflections – Translation – Rotation – stretching - Inversion - Linear Transformations – Definitions - The Bilinear transformation – Cross Ratio of four points – Cross Ratio Preserving property – Preservation of the family of straight lines and circles – Conformal mappings – Discussion of the transformations$w = z^2, w = sinz, w = e^z, w = \frac{1}{2}\left(z + \frac{1}{z}\right)$. **Calculus of Residues:** Zeros and Singularities, Residues – The residue theorem – Evaluation of definite integrals.	circle and a straight lines in complex form – Jordan arc – Closed Contour – The extended complex plane. **Functions of a Complex Variable:** Functions of a complex variable – Limit of a function – Continuity and differentiability – Analytic functions – Singular points – Cauchy-Riemann equations in cartesian and polar forms – Necessary and sufficient condition for f to be analytic – Harmonic functions – Real and Imaginary parts of an analytic functions are harmonic – Construction of analytic functions i. Milne Thomson Method. ii. Using the concept of Harmonic function. **Complex Integration:** The Complex Line integral – Examples and Properties – Cauchy's Integral theorem Liouville's theorem – Fundamental theorem of Algebra. **Transformations:** Definitions – Jacobian of a transformation - Identity transformation – Reflections – Translation – Rotation – stretching - Inversion - Linear Transformations – Definitions - The Bilinear transformation – Cross Ratio of four points – Cross Ratio Preserving property – Preservation of the family of straight lines and circles – Conformal mappings – Discussion of the transformations$w = z^2, w = sinz, w = e^z, w = \frac{1}{2}\left(z + \frac{1}{z}\right)$.

Books for Reference

1. Natarajan - Manicavachogam Pillay and Ganapathy – Algebra
2. Lipman Bers – Calculus, Volumes 1 and 2
3. Courant and John – Introduction to Calculus and Analytical Geometry
4. Grosswald – Topics from the Theory of Numbers
5. N. Piskunov – Differential and integral Calculus
6. F. Ayers – Matrices, Schaum Series
7. Ranville and Bedient – A Short course in Differential equations
8. I. N. Herstein – Topics in Algebra
9. B. S. Grewal – Higher Engineering Mathematics
10. S. C. Mailk – Real Analysis
11. E. Kreyszig – Advanced Engineering Mathematics
12. Murray R Spiegel – Theory and Problems of Vector Analysis
13. S. S. Shastry – Introductory Methods of Numerical Analysis
14. Stewart – Introduction to Linear Algebra
15. Gopalakrishna – University Algebra
16. S. Ponnuswamy – Foundations of Complex Analysis