DU M.Sc MATHEMATICS SYLLABUS

1. Group Theory	2014	2015	2016	2017	2018
• Divisibility in Z congruences, Chinese remainder theorem, Euler's ϕ-function. • Groups, Subgroups, Normal subgroups, Quotient groups, Homomorphisms, Cyclic groups, Cayley's theorem, Class equations, Sylow theorems.	**10**	**6**	**2**	**5**	**8**
2. Ring/Field Theory	2014	2015	2016	2017	2018
• Rings, fields, Ideals, Prime and Maximal ideals, Quotient rings, Unique factorization domain, Principal ideal domain, Euclidean domain, Polynomial rings and irreducibility criteria.	**6**	**9**	**4**	**4**	**4**
3. Linear Algebra	2014	2015	2016	2017	2018
• Eigenvalues and eigenvectors of matrices, Cayley Hamilton theorem. • Vector spaces, Subspaces, Linear dependence, Basis, Dimension, Algebra of linear transformations, ,Matrix representation of linear transformations, Changes of basis, Inner product spaces, Orthonormal basis.	**8**	**10**	**9**	**6**	**4**
4.Real Analysis	2014	2015	2016	2017	2018
• Elementary set theory, Finite, countable and uncountable sets, Real number system as a complete ordered field, Archimedean property, supremum, infimum. Sequence and series, Convergence limsup, liminf. Bolzano Weierstrass theorem, Heine Borel theorem. • Sequences and series of functions, Uniform convergence. Riemann sums and Riemann integral, Improper integrals	**15**	**15**	**13**	**12**	**9**
5. Function of one Variable	2014	2015	2016	2017	2018
• Continuity, Uniform continuity, Intermediate value theorem, Differentiability, Mean value theorem, Maclaurin's theorem and series, Taylor's series. • Monotonic functions, Types of discontinuity.	**8**	**7**	**2**	**3**	**6**
6. Function of Two Variable	2014	2015	2016	2017	2018
• Functions of several variables, Directional derivative, Partial derivative.	**1**	**2**	**2**	**1**	**2**

7. Matrics Space	2014	2015	2016	2017	2018
• Metric spaces, Completeness, Total boundedness, Separability, Compactness, Connectedness.	**4**	**6**	**3**	**4**	**2**
8.Ordernary Differential Equation	2014	2015	2016	2017	2018
• Existence and Uniqueness of solutions of initial value problems for first order ordinary differential equations, singular solutions of first order ordinary differential equations, System of first order ordinary differential equations, General theory of homogeneous and non-homogeneous linear ordinary differential equations, Variation of parameters, Sturm Liouville boundary value problem, Green's function.	**7**	**8**	**8**	**7**	**4**
9. Partial Differential Equation	2014	2015	2016	2017	2018
• Lagrange and Charpit methods for solving first order PDEs, Cauchy problem for first order PDEs, Classification of second order PDEs, General solution of higher order PDEs with constant coefficients, Method of separation of variables for laplace. Heat and Wave equation.	**8**	**7**	**4**	**2**	**4**
10.Numerical Analysis	2014	2015	2016	2017	2018
• Numerical solutions of algebraic equation, Method of iteration and Newton-Raphson method, Rate of convergence, Solution of systems of linear algebraic equations using Guass elimination and Guass-Seidel method, Finite differences, Lagrange, Hermite and Spline interpolation, Numerical integration, Numerical solutions of ODEs using Picard, Euler, modified Euler and second order Runge-Kutta methods.	**3**	**5**	**3**	**6**	**7**
Total Number	**70**	**75**	**50**	**50**	**50**

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