SEVA SADAN MAHAVIDYALAYA, BURHANPUR (M.P.)

Subject Topology - I **PROFESSOR'S DAILY DIARY** Class M.Sc (Prev) Sem I

Date	Unit	Period	Matter + Teaching Method	Assignment
15.07.2022		2nd	Introduction to the subject	
16.07.2022			Basic Topology-	
18.07.2022	I		Basic Topology Continues	
19.07.2022			finite sets - Definition Explanations	
20.07.2022			Lemma 6.1 f	Theo & Lemm
21.07.2022			Countable sets. Infinite sets The 7.1	
22.07.2022			Theorems on Countable, uncountable.	
25.07.2022			Shroedr - Bersten Theorem	
26.07.2022			Proof - Axiom of choice	
27.07.2022			Lemma. 9.2. Existence of Choice function	
28.07.2022			Zorn's Lemma.	
29.07.2022			Well ordering Theorem	
30.07.2022			Proof Continues - Zermelo's Postulates	
01.08.2022	II		Topological Space - Definition & Example	
02.08.2022			Basis of a topology - Definition.	
03.08.2022			Lemma 13.1. Lemma 13.2 Proof	
04.08.2022			Proof of Lemma 13.3, Subbasis - Definition	
05.08.2022			Order topology and Product topology. Defn.	
06.08.2022			Theorem 15.1 Proof	
08.08.2022			Subspace topology - Lemma 16.1, 16.2	
10.08.2022			Theorem 16.3, Theorem 16.4.	
12.08.2022	III		Closed sets and Limit points. - Definition	
16.08.2022			Theorem 17.1 Proof	
17.08.2022			Theorem 17.2 Proof	
18.08.2022			Closure and Interior of set	
22.08.2022			Theorem 17.4. Proof	
23.08.2022			Theorem 17.5 Proof, Limit points.	
24.08.2022			Theorem 17.6 Proof	
25.08.2022			Continuous functions	

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PROFESSOR'S DAILY DIARY

Subject Topology-5 Class M.Sc (Prev) - I Sem

Date	Unit	Period	Matter + Teaching Method	Assignment
29.08.2022			Continuity of a function	
30.08.2022			Theorem 18.1 Proof	
01.09.2022			Homomorphisms -	
02.09.2022			Theorem 18.2 &	
03.09.2022			Pasting Lemma (Theorem 18.3)	
06.09.2022			Theorem 18.4	
07.09.2022	IV		Connectedness - Definition	
09.09.2022			Lemma 23.1	
12.09.2022			lemma 23.2	
13.09.2022			Theorem 23.3, Theorem 23.4	Theo 23.5, 23.6
14.09.2022			Connected Subspace of the real line	
15.09.2022			Definition on Theorem 24.1	
16.09.2022			Theo 24.3 - Intermediate Value Theorem	
17.09.2022			Path, Path Connectedness	
19.09.2022			Components - Theo. 25.1	
20.09.2022			Path Components Theo. 25.2 (Samen)	
21.09.2022			Theorem 25.3 (Locally connected	
22.09.2022			Locally path connected	
23.09.2022			Theorem 25.3, 25.4	
24.09.2022			Theorem 25.5	
27.09.2022	V		The Countability Axioms - Definition The 30.1	
02.11.2022			Theorem 30.2 & Theorem 30.3	
03.11.2022			Theorem 17.8 Proof	
04.11.2022			Theorem 17.9 Proof	
05.11.2022			Theorem 17.10 Proof	
07.11.2022			Theorem 17.11 Proof	
09.11.2022			Hausdorff Space.	

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SEVA SADAN MAHAVIDYALAYA, BURHANPUR (M.P.)

PROFESSOR'S DAILY DIARY

Subject Real Analysis Class M.Sc (Prev) I Sem

Date	Unit	Period	Matter + Teaching Method	Assignment
15.07.2022	I	4th	Introduction to Subject	
18.07.2022			Recall of Riemann Integral Concepts	
19.07.2022			——" Definitions	
20.07.2022			Riemann - Stieltjes Integral - Introduction	
21.07.2022			Upper and Lower RS Sum	
22.07.2022			Riemann-Stieltjes Integral.	
25.07.2022			Boundedness	
26.07.2022			Theorem 6.4, Theorem 6.7	
27.07.2022			Theorem 6.9, 6.10, 6.11.	
28.07.2022			Theorem 6.17	
29.07.2022			Differentiation and Integration	
30.07.2022			Fundamental Theorem of Calculus.	
01.08.2022	II		Integration of vector valued function	
02.08.2022			Theorem 6.25 proof	
03.08.2022			Rectifiable Curves - Definition	
04.08.2022			Theorem 6.27 Proof	
05.08.2022			Sequence & Series of functions - Definitions	
06.08.2022			Uniform Convergence - Definition	
08.08.2022			Theorem 7.8 Proof	
10.08.2022			Theorem 7.9, 7.10.	
16.08.2022			Theorem 7.11 Proof	Th. 7.12.
17.08.2022			Theorem 7.13	
19.08.2022			Theorem 7.15 Proof	
22.08.2022	III		Uniform Convergence & Integration Th. 7.16	
23.08.2022			Pointwise Bounded. Uniform Converse	
24.08.2022			and Differentiation - Theo 7.17	
25.08.2022			Equicontinuous families of functions - Def	
29.08.2022			Theorem 7.23, 7.24	
30.08.2022			Theo 7.24	

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Subject Real Analysis — **PROFESSOR'S DAILY DIARY** — Class M.Sc (Prev) I Sem

Date	Unit	Period	Matter + Teaching Method	Assignment
01.09.2022			Theorem 7.25. Proof	
02.09.2022			STONE - WEIERSTRASS Theo. 7.26.	
03.09.2022			Theorem Corolla 7.27	
06.09.2022			Theo. 7.29, 7.31	
07.09.2022			Theo. 7.32	
08.09.2022			Theo. 7.33	
12.09.2022	IV		Special functions. Th. 8.1, Corollary	
13.09.2022			Th. 8.2, 8.3, 8.4	8.4, Hw
14.09.2022			Theo 8.5	
15.09.2022			Exponential & Logarithmic functions	
16.09.22			Th 8.6	
17.09.22			Trigonometric functions - Th. 8.7	
19.09.22			Algebraic Completeness of the Complex	Field
20.09.22			Chap 9. Linear Transformation	
21.09.22			Theo 9.2	
22.09.22			Theo 9.3	
23.09.22			Theo 9.5	
24.09.22			Theo 9.7	
27.09.22			Theo 9.8	
28.09.22			9.9 Matrices	
02.11.22	V		9.10 Differentiation	
03.11.22			Theorem 9.15, 9.16	
04.11.22			Theorem 9.17	
05.11.2022			Example 9.18, 9.19 Theorem	9.20
07.11.2022			Theo 9.21, Inverse function Theorem	
09.11.2022			Contraction principal	

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Subject ~~Linear Algebra & Numerical Analysis~~ — **PROFESSOR'S DAILY DIARY** — Class B.Sc. (Cs+IT)

Date	Unit	Period	Matter + Teaching Method	Assignment
15.07.2022			Studuts Remain Absent	
16.07.2022			~	
18.07.2022			~	
19.07.2022	1	1st	Vector Space - Introduction - Chapt 1	
20.07.2022			Definition & Examples	
22.07.2022			Subspace - Ond Criterion	
25.07.2022			Revision - for other students	
26.07.2022			University Examination. - NO Class	
27.07.2022			University Exam. - No - Class	
28.07.2022			Revision of Criteria of Subspace, Direct Sum	
29.07.2022			Linear Span of a set, Linear Combination	
30.07.2022			Linear Dependence & L.Indep. of Vectors -	
01.08.2022			Chapter 2 - Bases & Dimension. - Definition	
02.08.2022			Theorem - Existence & Invariance & No of elements	
03.08.2022			Dimension of V.S. finite dimension V.S	
04.08.2022			Dimension & Sum of Subspaces -	
05.08.2022			Theorems - Quotient Space & Dimen	
06.08.2022			Quotient Space Continue.	
07.08.2022			University Exams -	
08.08.2022			University Exams. -	
10.08.2022			Students Remain Absent -	
11.08.2022			Raksha - Bandhan Holiday	
12.08.2022			Students Remain Absent	
13.08.2022			Har Ghar Tiranga Rally.	
16.08.2022	II		Linear Transformation - Vector Space	
17.08.2022			Homomorphism.	
18.08.2022			Kernel of Homomorphisms. Examples	
20.08.2022			Matrix representation - Example.	
22.08.2022			Algebra of Linear Transformation	

SEVA SADAN MAHAVIDYALAYA, BURHANPUR (M.P.)

Subject Linear Algebra & Numerical Analysis — **PROFESSOR'S DAILY DIARY** — Class B.Sc. III (CS + PL)

Date	Unit	Period	Matter + Teaching Method	Assignment
23.08.2022			Rank-Nullity - Definition & Theorem 17.	
24.08.2022			Linear functional,	
25.08.2022			Dual Base, Bidual Base	
27.08.2022			Hyperspace, Annihilator.	
29.08.2022			Eigen Values & Eigen Vectors	
30.08.2022			Diagonalization of Matrices	
01.09.2022			Canonical form of Quadratic form.	
02.09.2022			Matrix Method.	
03.09.2022			Lagrange's Method.	
06.09.2022	IV		Solution of Equations - Errors & Method	
07.09.2022			Bisection Method. & Example	
08.09.2022			Regula falsi Method & Example	
12 09.2022			Secant Method & Example	
13.09.2022			N-R Method & Example	
14.09.2022			Graffee's Root Squaring Method - Example	
15.09.2022			Interpolation - Operators.	
16.09.2022			Relation b/w the operators	
17.09.22			Interpolation - Operators and relations	
19.09.22			Lagrange's interpolation, Divided diff	
20.09.22			Forward Diff & Backward diff	
21.09.22			Newton's Divided difference	
22.09.22			Numerical Quadrature - Derivation & Example	
23.09.22			Trapezoidal Rule, Simpson's 1/3 rule	
24.09.22			Simpson's 3/8 Rule	
26.09.22			Gaussian Quadrature formula	
27.09.22	V	.	Linear Equation Chapt - 12 Direct M. & Iterative Meth	
			Direct Method.	
28.09.22			Example Gauss Elimination method.	
29.09.2022			LU Decomposition Method / Cholesky's Decomposition.	

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Subject Real & Complex Analysis — **PROFESSOR'S DAILY DIARY** — Class B.Sc. III

Date	Unit	Period	Matter + Teaching Method	Assignment
30.09.2022			Cholesky's Decomposition.	
01.10.2022			Iterative Methods - Gauss-Seidel / Gauss-Jacobi	
06.10.2022			Relaxation Method.	
07.10.2022			Ordinary D.E. Eulers Method Single step.	
10.10.2022			Euler Modified.	
11.10.2022			Runge Kutta Osdos II, III & IV	
12.10.2022			Multistep Method, - Milne Simpson.	
20.10.2022			Method based of Numerical Integeal.	
31.10.2022		Paper - II	U-I Riemann Integeal - Introducte.	
01.11.22	I		U(P,f), L(P,f),	
02.11.22			Necessary and Sufficient Condition.	
03.11.22			Properties of R.I.	
04.11.22			Fundamental Theorem of Integeal Calculus	
05.11.22			Mean Value theorem	
07.11.22			Partial Derivatives	
.		09.11.2022	To 12.11.2022 CCE (Internal Exam)	
14.11.22			Differentiability - Some theorems	
16.11.2022			f_{xy} and f_{yx}	
17.11.22			Schwarz Theorem	
18.11.22			Young's Theorem.	
19.11.22			Implicit function	
21.11.22	II		Improper integeal & Convergence	
25.11.22			Kinds of Improper Integeal - Kind - I	
26.11.22			Necessary Conditions of Test of Convergence	
28.11.2022			Comparision Test, M-Test	
29.11.2022			Abel's Test, Disichlet's Test	
30.11.2022			Kind - II - Comparision Test, M-Test	
01.12.2022			Abel's Test, Disichlet's Test	
02.12.22			Frullani's Integeal	

SEVA SADAN MAHAVIDYALAYA, BURHANPUR (M.P.)

Subject _____ **PROFESSOR'S DAILY DIARY** Class B.Sc. III

Date	Unit	Period	Matter + Teaching Method	Assignment
03.12.22			Integral as a function of Parameter	
05.12.22			Uniform Convergence of integrals	
06.12.22			Continuity, destivability and integrability	
07.12.22			Fourier Series - Periodic functions	
08.12.22			Full Range - F.series - Dirichlet's condition	
09.12.22			F-series with period 2π	
10.12.22			F-series with period $2l$ $(-l, l)$	
12.12.22			F series with even and odd function	
13.12.22	III		Metric-spaces - Definitions.	
14.12.22			Open Sphere, ~~Nbhd~~ Nbd; Limit point	
15.12.22			Theorems based on above Concepts.	
16.12.22			Open set - Theorems	
17.12.22			Closed Sphere, closed set - Theorem	
19.12.22			Closure of a set, Subspace	
20.12.22			Cauchy Sequence, Convergence of Seq.	
21.12.22			Theorems based on Convergence.	
22.12.22			Complete Metric Space	
23.12.22			Cantor's Intersection theorem	
02.01.23			Fixed point - Theorem, Banach Cot. Princ.	
03.01.23			Real Numbers, Irrational numbers	
04.01.23			Lub, glb.	
05.01.23			Dense Subsets, Nowhere dense set	
06.01.23			Bair's Category Theorem, First countable	
07.01.23	IV		Continuous functions	
09.01.23			Extension theorem	
10.01.23			Uniform Continuity	
11.01.23			Compact-spaces	
12.01.23			Continuous functions and Compact Spaces	
13.01.23			Theorems based concept	

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SEVA SADAN MAHAVIDYALAYA, BURHANPUR (M.P.)

Subject Adv. Num. Analysis **PROFESSOR'S DAILY DIARY** Class M.Sc. Final III Sem

Date	Unit	Period	Matter + Teaching Method	Assignment
17.08.2022	I	III	Interpolation, Linear interpolation	
18.08.2022			Quadratic Interpolation,	
22.08.2022			Higher Interpolation	
23.08.2022			Errors in Interpolation	
24.08.2022			Lagrange's Interpolation	
25.08.2022			Newton's - Gregory interpolation	
29.08.2022			Hermite Interpolation	
30.08.2022			Examples on Hermite interpolation	
01.09.2022			Piecewise interpolation	
02.09.2022			Linear Piecewise interpolation	
03.09.2022			Quadratic Piecewise interpolation	
06.09.2022			Cubic Piecewise interpolation	
07.09.2022			Hermite-type data for Piecewise cubic. Int	
08.09.2022			Examples on P.C.I. using Hermite type	
12.09.2022	~~IV~~		Spline interpolation - Linear	
14.09.22			Quadratic Spline Interpolation	
15.09.2022			Cubic Spline Interpolation	
16.09.2022	II		Bivariate interpolation - Lagrange's	Ex 4.28
17.09.22			Newton's Bivariate interpolation	Ex 4.29.
19.09.22			Weierstrass Approximation - Least Square Approximation	
20.09.22			Example 4.32, 4.33	
21.09.22	III		Gram-Schmidt Orthogonalizing Process	Ex 4.38
22.09.22			Legendre Polynomials	
23.09.22			Chybeshev Polynomial.	
26.09.22		—	Students Remain Absent - -	
27.09.22			Examples based - 4.39, 4.40, 4.41	
28.09.22			Ex 4.41	
10.10.2022	IV		Uniform Approximation	
11.10.2022			Uniform (Minimax) Poly. Appro. (Chybeshev Approximation)	

SEVA SADAN MAHAVIDYALAYA, BURHANPUR (M.P.)

Subject Adv. Num. Analysis — PROFESSOR'S DAILY DIARY — Class M.Sc. III- Sem.

Date	Unit	Period	Matter + Teaching Method	Assignment
12.10.2022	V		Numerical Diff - Method based on interpolation	
31.10.2022			Example 5.2	Ex 5.1
01.11.2022			Method based on finite differences	Ex 5.3
02.11.2022			Method based on Undetermined coeff.	
03.11.2022			Ex 5.4	
04.11.2022			Optimum choice of step length.	
05.11.2022			Ex 5.6	
07.11.2022			Ex 5.7	

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Subject Real & Complex Anly — PROFESSOR'S DAILY DIARY — Class B.Sc. III

Date	Unit	Period	Matter + Teaching Method	Assignment
16.01.23			Continuity of Complex function.	
17.01.23			Differentiability of Complex function	
18.01.23			Analytic function - C-R Equations. proof	
19.01.23			Harmonic function	
20.01.23			Method of constructing analytic function	
21.01.23			Examples	
23.01.23	IV		Cauchy Theorem and - Rectifiable curve	
24.01.23			Cauchy Integral formula	
25.01.23			Higher order derivatives.	
27.01.23			Power series - representation of analytic function	
28.01.23			Taylor series and Laurent Series	
30.01.23			Singularities, poles, - types of singularities	
31.01.23			Meromorphic functions	
01.02.23			Limit point of poles, Point at infinity	
02.02.23			Residues at infinity	
03.02.23			Cauchy's residue theorem	
04.02.23			Contour integration	
06.02.23			Jordan's inequality	

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Subject Adv. Num Ana. **PROFESSOR'S DAILY DIARY** Class M.Sc. IV

Date	Unit	Period	Matter + Teaching Method	Assignment
31.01.2023	I	III 5.4	Enkapolation/Richardson's extrapolation	Ex 5.8
01.02.2023			Partial Diff - Ex 5.9, 5.10	
13.02.23			6.1. O.D.E. IVP Reduction of HOE to FOE	Examples
15.02.23			Th. 6.2. Ex 6.3, Ex 6.4	Ex 6.5
16.02.23			Singlestep Methods - Revision.	
17.02.23			Multistep methods - Explicit Method	
20.02.23			Adams-Bashforth Methods (i=0	
21.02.23			Nystrom Methods (i=1)	Ex 6.24
22.02.23			Implicit method - Adams Moulton (i=0)	
03.02.23			Milne-Simpson method (i=1)	Ex 6.26
24.02.23			General multistep method	
27.02.23	II		Maximum order of K-step method.	Ex 6.28
28.02.23			Convergence of multistep method	Ex 6.31
01.03.23			Second order eq without u'	
02.03.23			Cowell's method - Numerov's Method	Ex 6.32
13.03.23			Ex 6.33	
20.03.23			P(EC)^{m}E method - Theorem 6.6.	
21.03.23			PMPCMC method	Ex 6.34
27.03.23			6.8 Stability Analysis of Multi Metho	
28.03.23			Nystrom, Milne-Simpson	Ex 6.35
29.03.23	III		Boundary Value Problems (ODE)	
05.04.23			IVP Method (Shooting method)	Ex 7.1.
19.04.23				
20.04.23				
24.04.23				

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Subject Topology II **PROFESSOR'S DAILY DIARY** Class M.Sc. II Sem

Date	Unit	Period	Matter + Teaching Method	Assignment
04.04.2023	I	II	26. Compact Spaces. Definition.	Examples.
05.04.2023			Lemma 26.1. & Theor 26.2	Theorem 26.3
06.04.2023			Theorem 26.5	
07.04.2023			Theorem 26.9	
08.04.2023			27. Compact Subspaces of the real line	Th. 27.1, 27.3
11.04.2023			Theo. 27.4, Lemma 27.5 (The Leb. Nulemma)	
12.04.2023			Th. 27.6, 27.7.	
13.04.2023			Limit Point Compactness Theo. 28.1.	
18.04.23			Def -- Sequentially compact	
19.04.23			Local compactness	
20.04.23	II		Separation Axioms - Theo. 31.1(a)	
21.04.23			Theor 32.1 Normal Space	Th 32.3.
24.04.23			~~Every~~ Urysohn Lemma	
25.04.23			Urysohn Lemma Continue Theor 33.1	
26.04.23			Urysohn Lemma Continue	
27.04.23			Urysohn Lemma Continue.	
28.04.23			Definition - Completely Regular	
01.05.23			Theor 33.2 Proof	
02.05.23			Theor 33.2 Continues	
03.05.23			The Tietze Extension Theorem Th 35.1	
04.05.23			Proof Continue Theo 35.1.	
08.05.23	IV		Nets & Filters. Definition of Convergence of Nets	Directed set
09.05.23			Theorem (1.4) Proposition (1.6)	1.10, 1.12
10.05.23			Topo. & Convergence Net Theorem 2.1	2.3. Corollary
11.05.23			Theorem 2.5 PIP.	2.9
12.05.22			Filters definition Propo. (3.3)	3.6
13.05.23			Proposition 3.8	3.9
15.05.22			Theorem 3.10.	3.11
16.05.23			Ultrafilters & Compactness Theorem 4.2	4.3

SEVA SADAN MAHAVIDYALAYA, BURHANPUR (M.P.)

Subject _____ **PROFESSOR'S DAILY DIARY** Class _____

Date	Unit	Period	Matter + Teaching Method	Assignment
17.05.23			Propo. 4.4.	
18.05.23			Theorem 4.5	
19.05.23			Theorem 4.6	
	V		Homotopy of Paths - Definition	
			Lemma 5.1	

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Month Wise / Unit wise Distribution of Syllabus 2022 - 2023

Name of the Professor H.P. Dixit

Subject Topology-I / M.Sc.(Prev) / Sem-I

Month Unit/ Class	Portion to be taught tentatively	No. of Periods/ Lectures	Remarks/ Signature
U-I	Finite and infinite sets. Countable and Uncountable sets. Schroeder-Bernstein theorem. Axiom of choice. Well ordered sets. Cardinal numbers and its arithmetic Cantor's theorem. The continuum hypothesis. Zorn's Lemma	15	Completed
U-II	Definition and examples of topological space, Bases and subbases, order topology, Product topology. Subspace and relative topology.	20	Completed.
U-III	closed sets and limit points, closure of a set. Dense subset. Interior, exterior and boundary of sets. Neighbourhoods and Neighbourhood System. Continuous functions and homoeomorphisms. Examples.	20	
U-IV	Connected spaces. Connected subspaces of real line. Path connectedness. Components and local connectedness		

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Month Unit/ Class	Portion to be taught tentatively	No. of Periods/ Lectures	Remarks/ Signature
U-II	The countability axions. First and Second Countable space. Lindelöff's theorem. Separable space. Second countability and separability. Hausdorff space.	20	

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Seva Sadan Mahavidyalaya, Burhanpur

Month Wise / Unit wise Distribution of Syllabus 20___ - 20___

Name of the Professor H. P. Dixit

Subject Real Analysis / M.Sc. (Prev) / Sem-I

Month Unit/ Class	Portion to be taught tentatively	No. of Periods/ Lectures	Remarks/ Signature
U-1	Definition and Existence of Riemann Stildjes integral and its properties. Integration and differentiation. The fundamental theorem of calculus. Integration by parts.	15	Completed
U-2	Integration of Vector valued functions. Rectifiable curves. Sequence and series of functions. Uniform Convergence. Uniform Convergence and Continuity.	20	
U-3	Uniform Convergence and integration Uniform Convergence and differentiation Equicontinuous families of functions. Stone-Weierstrass theorem.		
U-4	Some Spection functions: Power series. The exponential and logarithmic functions. The algebraic completeness of the complex field. Functions of several variables: Linear Transformation	20	

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Month Unit/ Class	Portion to be taught tentatively	No. of Periods/ Lectures	Remarks/ Signature
U-5	Differentiation, Chain rule, pastial derivatives. The contsaction principle. The inverse function theorem. The implicit function theorem. Derivatives of higher order, Differentiation of integrals	20	

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Name of the Professor H.P. Dixit

Subject Advanced Numerical Analysis / M.Sc. (Final) / III - Sem.

Month Unit/ Class	Portion to be taught tentatively	No. of Periods/ Lectures	Remarks/ Signature
U-1	Introduction: Interpolation, Linear Interpolation and higher order interpolation Hermite interpolation. Piecewise and Spline interpolation. Piecewise quadratic interpolation. Piecewise Cubic interpolation using Hermite type data. Quadratic Spline interpolation. Cubic spline interpolation and its derivation. Problems	15	
U-2	Bivariate interpolation: Lagrange's and Newton's Bivariate interpolation. Polynomials and their derivation. Approximation: Discreate and Continuous data. Least square approximation.	20	
U-3	Orthogonal process.		
U-3	Gram-Schmidt Orthogonalising process. Legendre and Chebyshev polynomials.		
U-4	Uniform Approximation, Uniform polynomials approximation (Chebyshev). Chebyshev polynomial approximation and Lanczo's Economization, Rational approximation. Choice of Method.	20	

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Month Unit/ Class	Portion to be taught tentatively	No. of Periods/ Lectures	Remarks/ Signature
U-5	Numerical Differentiation: Method based on interpolation, Non-uniform and uniform nodal points, Quadratic interpolation. Method based on finite differences, operators. Method based on undetermind coefficients. Optimum choice of length.	20	

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Name of the Professor H. P. Dixit

Subject Mathematics/B.Sc.(C.S+P)/III Year/P-1/Lin. Alg. & Num. Anal.

Month Unit/ Class	Portion to be taught tentatively	No. of Periods/ Lectures	Remarks/ Signature
U-1	Definition and examples of Vector Spaces, Subspaces, Sum and direct sum of subspaces Linear span, Linear dependence, independence and their basis properties. Basis, Existence theorem for basis, Extension theorem, Invariance of the number of elements of a basis, Dimension, finite dimensional Vector spaces, Existence of complementary subspaces of a subspace of a finite dimensional vector space, Dimension of sum of subspaces, Quotient space and its dimension	20	Completed
U-2	Linear transformations and their representation as Matrices, Algebra of L.T. Rank-Nullity Theorem, Change of Basis, Dual Space, bidual Space, and natural isomorphism. Adjoint of L.T. Eigen values and eigen vectors of L.T. Diagonalisation, Bilinear, Quadratic and Hermitian form.	20	
U-3	Inner product space: Cauchy-Schwartz inequility, Orthogonal vectors, Orthogonal Complements, Orthogonal sets and bases. Bessel's inequility for finite dimensional spaces, Gram-Schmidt orthogonalization Process.	20	

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Month Unit/ Class	Portion to be taught tentatively	No. of Periods/ Lectures	Remarks/ Signature
U-4	Solution of equations: Bisection, Secant, Regula falsi, Newton's Method, Roots of second degree polynomials. Interpolation: Lagrange interpolation, Divided differences, Interpolation formulas using differences, Numerical Quadrature, Newton-Cote's formula, Gauss-Quadrature formula	15	
U-5	Linear equations: (Lagrange interpolation Divided difference, interpolation formula) Direct Methods for solving systems of Linear equations (Gauss elimination, LU decomposition, Cholesky decomposition) Iterative methods (Jacobi, Gauss-Seidel, reduction Method) Ordinary differential equations: Euler Method, Single step method, Runge-Kutta method, Multistep method, Milne Simpson method, Methods based on Numerical integration, Methods based on numerical differention.	20	

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Month Wise / Unit wise Distribution of Syllabus 2022 - 2023

Name of the Professor H.P. Dixit

Subject Mathematics/B.Sc.(C.S+PL) III Year/Paper-II/Real & Complex Analysis.

Month Unit/ Class	Portion to be taught tentatively	No. of Periods/ Lectures	Remarks/ Signature
U-1	Riemann Integral, Integrability of continuous and Monotonic functions. The fundamental theorem of integral calculus. Mean Value theorem of integral calculus. Partial derivatives and differentiability of real valued functions of two variables. Schwartz's and Young's theorem, Implicit function Theo.		
U-2	Improper integral and their convergence. Comparision test, μ-test, Abel's test, Dirichlet's test. Frullani's integral as a function of parameter. Continuity, Derivability and integrability, of an integral of a function of parameter. Fourier Series of half and full intervals.		
U-3	Definition and examples of metric spaces. Neighbourhoods, limit points, Subspace of metric space. Open and Closed sets. Closure and interior. Boundary points. Subspace of a metric space, Cauchy Sequences, Completeness Cantor's intersection theorem. Contraction Principles. Real number as a complete order field. Dense subset. Bair category theorem. Separable, Second Countable.		

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Month Unit/ Class	Portion to be taught tentatively	No. of Periods/ Lectures	Remarks/ Signature
	and first- countable spaces. Continuous functions, Uniform Continuity, Properties of continuous functions on compact sets		
U-4	Continuity and differentiability of Complex functions, Analytic functions. Cauchy- Riemann equations. Harmonic functions, Cauchy theorem, Cauchy integral formula		
U-5	Power series representation of an analytic function Taylor series, Laurent's series, Singularities, Cauchy Residue theorem, Contor integration.		

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