

**DON BOSCO ARTS & SCIENCE COLLEGE
ANGADIKADAVU**

(Affiliated to Kannur University Approved by Government of Kerala)

ANGADIKADAVU P.O., IRITTY, KANNUR – 670706



COURSE PLAN

Mathematics

(2022 – 24)

SEMESTER -I

ACADEMIC YEAR- (2022-23)

I Semester M Sc Mathematics (2022 - 24)

SL. No.	Name of Subjects with Code	Name of the Teacher	Duty Hours per week
1.	MAT1C01: Basic Abstract Algebra	Najumunnisa K	6
2.	MAT1C02: Linear Algebra	Remya Raj	6
3.	MAT1C03: Real analysis	Riya Baby	6
4.	MAT1C04: Basic Topology	Ajeena Joseph	6
5.	MAT1C05: Differential Equations	Anil M V	6
	Name of Class Incharge:	Ajeena Joseph	

TIME TABLE

Day	09.50 Am - 10.45 Am	10.45 Am -11.40 Am	11.55 Am -12.50 Pm	01.40 Pm - 02.35 Pm	02.35 Pm - 03.30 Pm
1	MAT1C04: Basic Topology	MAT1C01: Basic Abstract Algebra	MAT1C03: Real analysis	MAT1C05: Differential Equations	MAT1C02: Linear Algebra
2	MAT1C05: Differential Equations	MAT1C03: Real analysis	MAT1C04: Basic Topology	MAT1C01: Basic Abstract Algebra	MAT1C02: Linear Algebra
3	MAT1C02: Linear Algebra	MAT1C03: Real analysis	MAT1C04: Basic Topology	MAT1C05: Differential Equations	MAT1C01: Basic Abstract Algebra
4	MAT1C05: Differential Equations	MAT1C03: Real analysis	MAT1C04: Basic Topology	MAT1C01: Basic Abstract Algebra	MAT1C02: Linear Algebra
5	MAT1C01: Basic Abstract Algebra	MAT1C05: Differential Equations	MAT1C02: Linear Algebra	MAT1C03: Real analysis	MAT1C04: Basic Topology
6	MAT1C02: Linear Algebra	MAT1C04: Basic Topology	MAT1C01: Basic Abstract Algebra	MAT1C05: Differential Equations	MAT1C03: Real analysis

Subject Code:	MAT1C01
Subject Name:	BASIC ABSTRACT ALGEBRA
No. of Credits:	4
No. of Contact Hours:	90
Hours per Week:	6
Name of the Teacher:	NAJUMUNNISA.K

SYLLABUS

Text Book: John .B . Fraleigh – A first course in Abstract Algebra (7th Edition)

Unit-I

Direct products and finitely generated Abelian Groups, Group action on set, Applications of Sylow Theorems

(Chapter 2: Section 11, Chapter 3: Section 16, Chapter 7: Section 36,37)

Unit II

Field of quotients of the integral Domain, Isomorphism Theorems, Series of Groups, Free abelian Groups, Field of quotients of the integral domain

(Chapter 4:- Section 21, Chapter 7:- Section 34,35,38)

Unit-III

Ring of polynomials, Factorization of polynomials over a field, homomorphism and Factor Rings, Prime and Maximal ideals

(Chapter 4: Section 23,22, Chapter 5: section 26,27)

TEACHING SCHEDULE

No of Weeks	Dates	Session	Topic
1	15-08-2022 To 20-08-2022	15 August	Independence Day
		1	Direct products and finitely generated Abelian Groups introduction
		2	Theorems
		18 August	Sree Krishna Jayanthi
		3	Theorems
2	22-08-2022 To 27-08-2022	4	Theorems
		5	Theorems
		6	Theorems
		7	Problems
		8	Problems
		9	Problems
3	29-08-2022 To 03-09-2022	10	Group action on a set
		11	Theorems
		12	Theorems
		13	Theorems
		14	Applications of Sylow Theorems.
		15	Theorems
4	05-09-2022 To 10-09-2022	16	Theorems
		05 September	Onam Vacation
		06 September	Onam Vacation
		07 September	Onam Vacation
		08 September	Onam Vacation
		09 September	Onam Vacation
5	12-09-2022 To 17-09-2022	10 September	Onam Vacation
		17	Theorems
		18	Theorems
		19	Theorems
		20	Theorems
		21	Problems
6	19-09-2022 To 24-09-2022	22	Problems
		23	Problems
		24	Problems
		21 September	Sree Narayana Guru Samadhi
		25	Discussion

No of Weeks	Dates	Session	Topic
		26	Class Test
		27	Field of quotients of the integral Domain
7	26-09-2022 To 01-10-2022	28	Theorems
		29	Theorems
		30	Theorems
		31	problems
		32	problems
		33	Isomorphism Theorems
8	03-10-2022 To 08-10-2022	34	problems
		04 October	Mahanavami
		05 October	Vijayadashami
		35	problems
		36	Theorems
9	10-10-2022 To 15-10-2022	08 October	Milad-i-Sherif
		37	Series of Groups
		38	Theorems
		39	Theorems
		40	Theorems
		41	Theorems
10	17-10-2022 To 22-10-2022	42	Problems
		43	I Internal Examination
		44	I Internal Examination
		45	I Internal Examination
		46	I Internal Examination
11	24-10-2022 To 29-10-2022	47	I Internal Examination
		48	I Internal Examination
		24 October	Divali
		49	Free abelian Groups
		50	Theorems
		51	Theorems
12	31-10-2022 To 05-11-2022	52	Theorems
		53	Theorems
		54	Theorems
		55	Theorems
		56	Field of quotients of the integral domain
		57	Examples
		58	Discussion
		59	Theorems

No of Weeks	Dates	Session	Topic
13	07-11-2022 To 12-11-2022	60	Theorems
		61	Theorems
		62	Theorems
		63	Theorems
		64	Class Test
		12 November	Second Saturday
14	14-11-2022 To 19-11-2022	65	Ring of polynomials
		66	Theorems
		67	Theorems
		68	Theorems
		69	Factorization of polynomials over a field
		70	Theorems
15	21-11-2022 To 26-11-2022	71	Theorems
		72	Theorems
		73	Homomorphism and Factor Rings,
		74	Examples
		75	Examples
		76	Theorems
16	28-11-2022 To 03-12-2022	77	Theorems
		78	Theorems
		79	Prime and Maximal ideals
		80	Theorems
		81	Theorems
		82	Examples
17	28-11-2022 To 03-12-2022	83	II Internal Examinations
		84	II Internal Examinations
		85	II Internal Examinations
		86	II Internal Examinations
		87	II Internal Examinations
		88	Discussion
18		89	Discussion
		90	Discussion

Subject Code:	MAT1C02
Subject Name:	Linear Algebra
No. of Credits:	4
No. of Contact Hours:	90
Hours per Week:	5
Name of the Teacher:	Remya Raj

SYLLABUS

Unit1: Linear Transformations: Linear Transformations, The Algebra of Linear Transformations, Isomorphism, Representation of Transformation by Matrices, (Chapter-3; Sections 3.1, 3.2,3.3, 3.4,3.5,3.6, 3.7,) Linear Functionals, The Double Dual, The Transpose of a Linear Transformation.Chapter-6: Section)

Unit 2:Elementary Canonical Forms: Introduction, characteristic values, Annihilating Polynomials, Invariant Subspace, Simultaneous Triangulations& Simultaneous Diagonalisation. , (Chapter-6: Sections 6.1, 6.2,6.3, 6.4, 6.5, 6.6)

Unit 3: Elementary Canonical Forms: Invariant Direct Sums, The Primary Decomposition Theorem.

The Rational and Jordan Forms: Cyclic Subspaces and Annihilators, Cyclic Decomposition and the Rational Forms, The Jordan forms.

Inner Product Spaces: Inner Products, Inner Product Spaces, (Chapter 6 section 6.7,6.8; Chapter7: Sections: 7.1, 7.2,7.3, Chapter-8: Sections 8.1, 8.2,)

Text Book:

Kenneth Hoffman & Ray Kunze; Linear Algebra; Second Edition, Prentice-Hall of India Pvt. Ltd

Reference:

1. Stephen H. Friedberg, Arnold J Insel and Lawrence E. Spence: Linear Algebra: 4th Edition 2002: Prentice Hall.
2. Serge A Land: Linear Algebra; Springer
3. Paul R Halmos Finite-Dimensional Vector Space; Springer 1974.
4. McLane & Garrell Birkhoff; Algebra; American Mathematical Society 1999.
5. Thomas W. Hungerford: Algebra; Springer 1980
6. Neal H.McCoy& Thomas R.Berger: Algebra-Groups, Rings & Other Topics: Allyn& Bacon.
7. S Kumaresan; Linear Algebra A Geometric Approach; Prentice-Hall of India

TEACHING SCHEDULE

No of Weeks	Dates	Session	Topic
1	15-08-2022 To 20-08-2022	15 August	Independence Day
		1	Linear Transformation-Definition, examples
		2	Theorem 1
		18 August	Sree Krishna Jayanthi
		3	Examples
		4	Null space, Range space- examples
2	22-08-2022 To 27-08-2022	5	Rank Nullity theorem
		6	Examples
		7	Theorem 4,6
		8	Linear operator- Definition, examples
		9	Theorem 5
		10	Inverible linear transformation- definition, theorem 7
3	29-08-2022 To 03-09-2022	11	Nonsingular LT., theorem 8
		12	Examples, Problems
		13	Problems
		14	Theorem 9
		15	Isomorphism- definition, theorem 10
		16	Problems
4	05-09-2022 To 10-09-2022	05 September	Onam Vacation
		06 September	Onam Vacation
		07 September	Onam Vacation
		08 September	Onam Vacation
		09 September	Onam Vacation
		10 September	Onam Vacation
5	12-09-2022 To 17-09-2022	17	Representation of transformations by matrix- theorem 11
		18	The matrix of T relating to B- definition, theorem 12
		19	Problems
		20	Problems
		21	Theorem 13
		22	Theorem 14
6	19-09-2022 To 24-09-2022	23	Problems
		24	Linear functionals- definition, examples
		21 September	Sree Narayana Guru Samadhi
		25	Problem

No of Weeks	Dates	Session	Topic
		26	Dual space - definition, theorem 15
		27	Example
7	26-09-2022 To 01-10-2022	28	Annihilator of a set- definition, Remarks
		29	Theorem 16
		30	Corollary
		31	Problems
		32	Problems
		33	Problems
8	03-10-2022 To 08-10-2022	34	Class test
		04 October	Mahanavami
		05 October	Vijayadashami
		35	Double dual - definition, theorem 17
		36	Corollary, theorem 18
		08 October	Milad-i-Sherif
9	10-10-2022 To 15-10-2022	37	Maximal proper subspace of V- definition, hyperspace - definition, theorem 19
		38	Lemma
		39	Theorem 20
		40	The transpose of a LT - definition, example
		41	Theorem 22
		42	Problems
10	17-10-2022 To 22-10-2022	43	I Internal Examination
		44	I Internal Examination
		45	I Internal Examination
		46	I Internal Examination
		47	I Internal Examination
		48	I Internal Examination
11	24-10-2022 To 29-10-2022	24 October	Diwali
		49	Unit 2: Elementary canonical forms- characteristic values - definition, remarks
		50	Theorem 1, characteristic polynomial - definition, similar matrices - definition
		51	Lemma, remarks
		52	Problems
		53	Diagonalizable LO - definition, remarks, examples
12	31-10-2022 To	54	Lemma, remark
		55	Lemma
		56	Theorem 2

No of Weeks	Dates	Session	Topic
	05-11-2022	57	Problems
		58	Problems
		59	Problems
13	07-11-2022 To 12-11-2022	60	Annihilating polynomial ideal, principal ideal - definition, remarks
		61	Remarks
		62	Minimal polynomial- definition, theorem 3
		63	Problems
		64	Problems
		12 November	Second Saturday
14	14-11-2022 To 19-11-2022	65	Problems
		66	Theorem 4: Cayley Hamilton theorem, problems
		67	Class test
		68	Invariant subspace - definition, examples, T- conductor- definition, lemma
		69	Remark, triangulable- definition, Lemma - definition
		70	Lemma – definition, Theorem 5
15	21-11-2022 To 26-11-2022	71	Theorem 6
		72	Simultaneous triangulation, diagonalization, definition, lemma
		73	Theorem 7,8
		74	Direct sum decomposition- definition remarks, lemma
		75	Theorem 9, examples, Unit 3: inner product space - definition, examples, normed space- definition
		76	Polarization identities, Theorem 1, examples, Orthogonal vectors definition, examples,
16	28-11-2022 To 03-12-2022	77	Theorem 2, Theorem 3, examples
		78	Best approximation- definition, theorem 4, Orthogonal Projection- definition, theorem 5
		79	Examples, Bessel's inequality, Invariant direct sums- definition, theorem 10
		80	Theorem 11, 12: primary decomposition theorem, Rational and Jordan form of a matrix, examples.
		81	Cyclic subspaces- definition, remarks, results, theorem
		82	Revision
17	28-11-2022 To 03-12-2022	83	II Internal Examinations
		84	II Internal Examinations
		85	II Internal Examinations
		86	II Internal Examinations

No of Weeks	Dates	Session	Topic
		87	II Internal Examinations
		88	University Question paper discussion
18		89	University Question paper discussion
		90	University Question paper discussion

Subject Code:	MAT 1C 03
Subject Name:	Real Analysis
No. of Credits:	4
No. of Contact Hours:	90
Hours per Week:	6
Name of the Teacher:	Riya Baby

Unit-I

Basic Topology: Finite, Countable and Uncountable Sets, Metric Spaces, Compact Sets, Perfect Sets, Connected Sets, Continuity: Limits of Functions, Continuous Functions, Continuity and Compactness, Continuity and Connectedness, Discontinuities, Monotonic Functions, Infinite limits and Limits at Infinity.
(Text Book1; Chapter-2, All sections: Chapter-4, All sections)

Unit-II

Differentiation: The derivative of Real Function, Mean Value Theorems, The Continuity of Derivatives, L'Hospital's Rule, Derivatives of Higher Order Taylor's Theorem, Differentiation of Vector-Valued Functions. The Riemann-Stieltjes Integral: Definition and Existence of the Integral, Properties of the Integral.
(Text Book 1: Chapter-5; all sections; Chapter-6; sections 6.1 to 6.19)

Unit-III

The Riemann-Stieltjes Integral (Continued); Integration and Differentiation, Integration of Vector-Valued Functions,(Text Book 1: Chapter-6; Sections 6.20 to 6.25;)Functions of Bounded Variations and Rectifiable Curves.(Text Book2; Chapter-6; Sections 6.1 to 6.12)

Text Book

1: Walter Rudin: Principles of Mathematical Analysis; 3rd Edition McGraw-Hill International

2: T.M Apostol: Mathematical Analysis 2nd Edition; Narosa Publications (1973)

Reference:

1. R.G Bartle and D.R Sherbert; Introduction to Real Analysis; John WileyBros. 1982
2. L.M Graves; The Theory of functions of real variable; Tata McGraw-HillBook Co.
3. M.H Porter and C.B Moraray; A first Course in Real Analysis; SpringerVerlag UTM 1977.
4. S.C Sexena and S.M Shah: Introduction to Real Variable Theory, IntextEducational Publishers, San Francisco
5. S.R Ghopade and B.V Limaye; A Course in Calculus and Real Analysis, Springer.
6. N.L Carothers- Real Analysis Cambridge University Press

TEACHING SCHEDULE

No of Weeks	Dates	Session	Topic
1	15-08-2022 To 20-08-2022	15 August	Independence Day
		1	Basic Topology
		2	Basic Topology
		18 August	Sree Krishna Jayanthi
		3	Finite, Countable and Uncountable Sets
		4	Finite, Countable and Uncountable Sets
2	22-08-2022 To 27-08-2022	5	Finite, Countable and Uncountable Sets
		6	Metric Spaces
		7	Metric Spaces
		8	Metric Spaces
		9	Compact Sets
		10	Compact Sets
3	29-08-2022 To 03-09-2022	11	Compact Sets
		12	Compact Sets
		13	Perfect Sets
		14	Perfect Sets
		15	Perfect Sets
		16	Connected Sets
4	05-09-2022 To 10-09-2022	05 September	Onam Vacation
		06 September	Onam Vacation
		07 September	Onam Vacation
		08 September	Onam Vacation
		09 September	Onam Vacation
		10 September	Onam Vacation

No of Weeks	Dates	Session	Topic
5	12-09-2022 To 17-09-2022	17	Connected Sets
		18	Connected Sets
		19	Continuity: Limits of Functions
		20	Continuity: Limits of Functions
		21	Continuity: Limits of Functions
		22	Continuous Functions
6	19-09-2022 To 24-09-2022	23	Continuous Functions
		24	Continuous Functions
		21 September	Sree Narayana Guru Samadhi
		25	Continuity and Compactness
		26	Continuity and Compactness
		27	Continuity and Compactness
7	26-09-2022 To 01-10-2022	28	Continuity and Compactness
		29	Continuity and Compactness
		30	Continuity and Compactness
		31	Continuity and Connectedness
		32	Continuity and Connectedness
		33	Continuity and Connectedness
8	03-10-2022 To 08-10-2022	34	Continuity and Connectedness
		04 October	Mahanavami
		05 October	Vijayadashami
		35	Discontinuities, Monotonic Functions
		36	Discontinuities, Monotonic Functions
		08 October	Milad-i-Sherif
9	10-10-2022 To 15-10-2022	37	Infinite limits and Limits at Infinity
		38	Infinite limits and Limits at Infinity
		39	Test Paper
		40	Seminar
		41	Differentiation: The derivative of Real Function
		42	Differentiation: The derivative of Real Function
10	17-10-2022 To 22-10-2022	43	I Internal Examination
		44	I Internal Examination
		45	I Internal Examination
		46	I Internal Examination

No of Weeks	Dates	Session	Topic
		47	I Internal Examination
		48	I Internal Examination
11	24-10-2022 To 29-10-2022	24 October	Divali
		49	Mean Value Theorems
		50	Mean Value Theorems
		51	Mean Value Theorems
		52	The Continuity of Derivatives
		53	The Continuity of Derivatives
12	31-10-2022 To 05-11-2022	54	The Continuity of Derivatives
		55	L 'Hospital's Rule
		56	L 'Hospital's Rule
		57	L 'Hospital's Rule
		58	Derivatives of Higher Order Taylor's Theorem
13	07-11-2022 To 12-11-2022	59	Derivatives of Higher Order Taylor's Theorem
		60	Derivatives of Higher Order Taylor's Theorem
		61	Differentiation of Vector-Valued Functions
		62	Differentiation of Vector
		63	Differentiation of Vector
		64	Test Paper
14	14-11-2022 To 19-11-2022	12 November	Second Saturday
		65	The Riemann-Stieltjes Integral
		66	The Riemann-Stieltjes Integral
		67	The Riemann-Stieltjes Integral
		68	Definition and Existence of the Integral
		69	Definition and Existence of the Integral
15	21-11-2022 To 26-11-2022	70	Definition and Existence of the Integral
		71	Definition and Existence of the Integral
		72	Definition and Existence of the Integral
		73	Properties of the Integral
		74	Properties of the Integral
		75	Properties of the Integral
16	28-11-2022	76	Assignment
		77	Seminar
		78	Seminar

No of Weeks	Dates	Session	Topic
	To 03-12-2022	79	Seminar
		80	Properties of the Integral
		81	Properties of the Integral
		82	Properties of the Integral
17	28-11-2022 To 03-12-2022	83	II Internal Examinations
		84	II Internal Examinations
		85	II Internal Examinations
		86	II Internal Examinations
		87	II Internal Examinations
		88	Functions of Bounded Variations and Rectifiable Curves
18		89	Functions of Bounded Variations and Rectifiable Curves
		90	Functions of Bounded Variations and Rectifiable Curves

Subject Code:	MAT1C04
Subject Name:	Basic Topology
No. of Credits:	4
No. of Contact Hours:	90
Hours per Week:	6
Name of the Teacher:	Ajeena Joseph

Syllabus

Unit I: Topological spaces: The definition and examples, Basis for a topology, Closed sets, Closures and interior of sets, Metric spaces, Convergence, continuous functions and homeomorphisms.

(Chapter 1: sections 1.2 to 1.7 excluding theorem 1.46 and theorem 1.51)

Unit II

New Spaces from old spaces: Subspaces, The product topology on $X \times Y$, The Product topology, The weak topology and the product topology.

(Chapter 2: sections 2.1 to 2.4)

Unit III

Connectedness in metric spaces: Connected spaces, Pathwise and local connectedness, Totally disconnected spaces.

(Chapter 3: sections 3.1 to 3.3 excluding theorem 3.29 and theorem 3.30)

Text: Wayne C Patty, Foundations of Topology.

TEACHING SCHEDULE

No of Weeks	Dates	Session	Topic
1	15-08-2022 To 20-08-2022	15 August	Independence Day
		1	Topological spaces
		2	Examples
		18 August	Sree Krishna Jayanthi
		3	Examples
2	22-08-2022 To 27-08-2022	4	Examples
		5	Basis for a topology
		6	Theorem
		7	Theorem
		8	Sub basis for a topology
		9	Examples
3	29-08-2022 To 03-09-2022	10	First countable spaces
		11	First countable spaces
		12	Second countable spaces
		13	Examples
		14	Theorem
		15	Closure of a set
4	05-09-2022 To 10-09-2022	16	Assignment
		05 September	Onam Vacation
		06 September	Onam Vacation
		07 September	Onam Vacation
		08 September	Onam Vacation
		09 September	Onam Vacation
5	12-09-2022 To 17-09-2022	10 September	Onam Vacation
		17	Interior of a set
		18	Theorem
		19	Theorem
		20	Metric spaces
		21	Metric spaces
6	19-09-2022	22	Theorem
		23	Theorem
		24	Examples

No of Weeks	Dates	Session	Topic
	To 24-09-2022	21 September	Sree Narayana Guru Samadhi
		25	Convergence of sequence
		26	Theorem
		27	Theorem
7	26-09-2022 To 01-10-2022	28	Continuous functions
		29	Theorem
		30	Class Test
		31	Homeomorphism
		32	Theorem
		33	Subspaces
8	03-10-2022 To 08-10-2022	34	Theorem
		04 October	Mahanavami
		05 October	Vijayadashami
		35	Theorem
		36	Theorem
9	10-10-2022 To 15-10-2022	08 October	Milad-i-Sherif
		37	Theorem
		38	Product topology on $X \times Y$
		39	Product topology on $X \times Y$
		40	The Product topology
		41	Theorem
10	17-10-2022 To 22-10-2022	42	Theorem
		43	I Internal Examination
		44	I Internal Examination
		45	I Internal Examination
		46	I Internal Examination
		47	I Internal Examination
11	24-10-2022 To 29-10-2022	48	I Internal Examination
		24 October	Divali
		49	Theorem
		50	Examples
		51	Examples
		52	Examples
12	31-10-2022 To 05-11-2022	53	Theorem
		54	Theorem
		55	Theorem
		56	The weak topology and the product topology
		57	The weak topology and the product topology

No of Weeks	Dates	Session	Topic
		58	The weak topology and the product topology
		59	Theorem
13	07-11-2022 To 12-11-2022	60	Theorem
		61	Connected spaces
		62	Theorem
		63	Assignment
		64	Class Test
		12 November	Second Saturday
		14	14-11-2022 To 19-11-2022
66	Theorem		
67	Examples		
68	Examples		
69	Theorem		
70	Pathwise connectedness		
15	21-11-2022 To 26-11-2022	71	Theorem
		72	Theorem
		73	Local connectedness
		74	Theorem
		75	Theorem
		76	Seminar
16	28-11-2022 To 03-12-2022	77	Seminar
		78	Seminar
		79	Disconnectedness
		80	Theorem
		81	Theorem
		82	Theorem
17	28-11-2022 To 03-12-2022	83	II Internal Examinations
		84	II Internal Examinations
		85	II Internal Examinations
		86	II Internal Examinations
		87	II Internal Examinations
		88	Revision
18		89	Revision
		90	Revision

Subject Code:	MAT 1C05
Subject Name:	Differential Equations
No. of Credits:	4
No. of Contact Hours:	90
Hours per Week:	6
Name of the Teacher:	Anil M V

SYLLABUS

MAT1C05 Differential Equations

Text Book: G.F Simmons - Differential Equations with Historical Notes; Third Edition-CRC Press, Taylor and Francis Group.

Unit I

Introduction. A Review of Power Series, Series Solutions of First Order Equations, Second Order Linear Equations. Ordinary Points, Regular Singular Points, Regular Singular Points (Continued), Gauss's Hyper Geometric Equation, The Point at Infinity.

(Chapter-5; Sections 26 to 32)

Unit II

Legendre Polynomials, Properties of Legendre Polynomials, Bessel Functions. The Gamma Function, Properties of Bessel functions, General Remarks on Systems, Linear Systems Homogeneous Linear Systems with Constant Coefficients.

(Chapter-8; Sections 44 to 47; Chapter-10; Sections 54 to 56)

Unit III

Oscillations and the Sturm Separation Theorem, The Sturm Comparison Theorem, The Method of Successive Approximations, Picard's Theorem, Systems. The Second Order Linear Equation

(Chapter-4; Sections 24 and 25; Chapter-13; Sections 68 to 70)

Reference:

1. G.Birkoff and G.C Rota: Ordinary Differential Equations; Wiley and Sons; (1978)
2. E.A Coddington; An Introduction to Ordinary Differential Equations; Prentice Hall of India, New Delhi (1974)
3. P.Hartmon; Ordinary Differential Equations; John Wiley and Sons
4. Chakraborti; Elements of Ordinary Differential Equations and Special Functions; Wiley Eastern Ltd New Delhi (1990)
5. L.S Poutrigardian: A Course in Ordinary Differential Equations; Hindustan Publishing Corporation Delhi (1967)
6. S.G Deo & V.Raghavendra; Ordinary Differential Equations and Stability Theory; Tata McGraw Hill New Delhi (1967)
7. V.I Arnold; Ordinary Differential Equations; MIT Press, Cambridge.

TEACHING SCHEDULE

No of Weeks	Dates	Session	Topic
1	15-08-2022 To 20-08-2022	15 August	Independence Day
		1	Introduction to power series
		2	Convergence of power series
		18 August	Sree Krishna Jayanthi
		3	Radius of curvature of power series
2	22-08-2022 To 27-08-2022	4	Examples
		5	Examples
		6	Series solution of first order equations
		7	Second order linear equations
		8	Ordinary points, singular points
3	29-08-2022 To 03-09-2022	9	Regular singular points, examples
		10	Theorem
		11	Problems
		12	Power series solution of Legendre's equation
		13	Power series solution of Bessel's equation
4	05-09-2022	14	Theorem
		15	Problems
		16	Problems
4	05-09-2022	05 September	Onam Vacation

No of Weeks	Dates	Session	Topic
	To 10-09-2022	06 September	Onam Vacation
		07 September	Onam Vacation
		08 September	Onam Vacation
		09 September	Onam Vacation
		10 September	Onam Vacation
5	12-09-2022 To 17-09-2022	17	Problems
		18	Problems
		19	Gauss's Hypergeometric equation
		20	Hypergeometric series
		21	General solution of Gauss's Hypergeometric equation
		22	Examples
6	19-09-2022 To 24-09-2022	23	Examples
		24	The point at infinity
		21 September	Sree Narayana Guru Samadhi
		25	Confluent Hypergeometric equation
		26	Problems
		27	Problems
7	26-09-2022 To 01-10-2022	28	Assignment
		29	Legendre Polynomials
		30	Rodrigues' formula
		31	Problems
		32	Generating function of the Legendre Polynomials
		33	Problems
8	03-10-2022 To 08-10-2022	34	Orthogonality Property of Legendre Polynomials
		04 October	Mahanavami
		05 October	Vijayadashami
		35	Legendre series, Bessel Function
		36	General solution of the Bessel equation
9	10-10-2022 To 15-10-2022	08 October	Milad-i-Sherif
		37	Bessel function of the first kind
		38	The Gamma function
		39	Properties of Gamma function
		40	Problems
		41	Problems
10	17-10-2022 To	42	Class Test
		43	I Internal Examination
		44	I Internal Examination
		45	I Internal Examination

No of Weeks	Dates	Session	Topic
	22-10-2022	46	I Internal Examination
		47	I Internal Examination
		48	I Internal Examination
11	24-10-2022 To 29-10-2022	24 October	Divali
		49	Orthogonality Property of Bessel functions
		50	Zeros and the Bessel series
		51	Bessel expansion Theorem
		52	Problems
		53	Assignment
12	31-10-2022 To 05-11-2022	54	Linear systems
		55	Homogeneous Linear systems
		56	Theorem
		57	Theorem
		58	Theorem
		59	Theorem
13	07-11-2022 To 12-11-2022	60	Problems
		61	Homogeneous systems with constant coefficients
		62	Classifications
		63	Examples
		64	Examples
		12 November	Second Saturday
14	14-11-2022 To 19-11-2022	65	Examples
		66	Class Test
		67	Oscillations
		68	Sturm separation Theorem
		69	Normal and standard form
		70	Theorem
15	21-11-2022 To 26-11-2022	71	Problems
		72	Theorem
		73	The Sturm comparison theorem
		74	Theorem
		75	Successive approximations
		76	Picard's iteration method
16	28-11-2022 To 03-12-2022	77	Problems
		78	The Picard's theorem
		79	The Picard's theorem(contd.)
		80	Lipschitz condition
		81	Examples

No of Weeks	Dates	Session	Topic
		82	Systems of initial value problems
17	28-11-2022 To 03-12-2022	83	II Internal Examinations
		84	II Internal Examinations
		85	II Internal Examinations
		86	II Internal Examinations
		87	II Internal Examinations
		88	Class Test
18		89	Revision
		90	Revision