DON BOSCO ARTS & SCIENCE COLLEGE

ANGADIKADAVU

(Affiliated to Kannur University Approved by Government of Kerala)

ANGADIKADAVU P.O., IRITTY, KANNUR – 670706

COURSE PLAN

M Sc Mathematics

(2020 – 22)

SEMESTER - I

ACADEMIC YEAR - (2020-21)

I Semester M Sc Marhematics (2020 - 22)			
SL. No.	Name of Subjects with Code	Name of the Teacher	Duty Hours per week
1.	MAT1C01: Basic Abstract Algebra	Athulya P , Prija V	5
2.	MAT1C02: Linear Algebra	Remya Raj	5
3.	MAT 1C03: REAL ANALYSIS	Riya Baby	5
4.	MAT 1C04: BASIC TOPOLOGY	Sneha P Sebastian	5
5.	MAT1C05: DIFFERENTIAL EQUATIONS	Anil M V	5
	Name of Class Incharge	Prija V	

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	Real analysis	Basic Topology	DE (Noble philip)	Linear algebra	Abstract Algebra (Athulya P)
2	Basic Topology	Abstract Algebra (Athulya P)	Real analysis	DE (Noble philip)	Linear algebra
3	Linear algebra	Basic Topology	Abstract Algebra (Athulya P)	Real analysis	DE (Noble philip)
4	Abstract Algebra (Prija V)	Real analysis	Basic Topology	DE (Anil M V)	Linear algebra
5	DE (Anil M V)	Basic Topology	Real analysis	Linear algebra	Abstract Algebra (Prija v)

Subject Code:	**MAT1C01**
Subject Name:	**Basic Abstract Algebra**
No. of Credits:	**4**
No. of Contact Hours:	**90**
Hours per Week:	**5**
Name of the Teacher:	**Athulya P & Prija V**

MAT1C01: BASIC ABSTRACT ALGEBRA
Text Book: John. B. Fraleigh – A First Course in Abstract Algebra (7th Edition), Narosa
(2003)
Unit I
Direct Products and finitely generated Abelian Groups, Group Action on a Set, Applications of
Sylow Theorems.
(Chapter-2: Section 11; Chapter-3: Section 16; Chapter-7: Sections 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, Homomorphisms and Factor
Rings, Prime and Maximal Ideals
(Chapter-4: Section 22, 23; Chapter-5: Section 26, 27).

TEACHING SCHEDULE

No of Weeks	Dates	Session	Topic
1	02-11-2020 To 06-11-2020	1	**Unit 1- introduction**
		2	**Direct products**
		3	**Theorem**
		4	**Theorem**
		5	**Example**

No of Weeks	Dates	Session	Topic
2	09-11-2020 To 13-11-2020	6	**Class Test**
		7	**Definition**
		8	**Examples**
		9	**Fundamental theorem of Finitely generated Abelian groups**
		10	**Applications**
3	16-11-2020 To 20-11-2020	11	**Thorem**
		12	**Thorem**
		13	**Group action on a set**
		14	**Class Test**
		15	**Examples**
4	23-11-2020 To 27-11-2020	16	**Isotropy subgroups**
		17	**Theorem**
		18	**Orbits**
		19	**Theorem**
		20	**Sylow theorems- introduction.**
5	30-11-2020 To 04-12-2020	21	**Cauchys theorem**
		22	**Definition , Lemma**
		23	**First sylow theorem**
		24	**Sylow p subgroup**
		25	**Second sylow theorem**
6	07-12-2020 To 11-12-2020	26	**Third sylow theorem**
		27	**Class Test**
		28	**Examples**
		29	**Applications of sylow theory**
		30	**Class equation**
7	14-12-2020 To 18-12-2020	31	Theorem
		32	**Lemma**
		33	**Examples**
		34	**Unit 2- introduction.**
		35	**The construction**
8	21-12-2020 To 25-12-2020		Christmas Vacation
			Christmas Vacation
			Christmas Vacation
			Christmas
			Christmas Vacation
9	28-12-2020	36	**Class Test**

No of Weeks	Dates	Session	Topic
	To 01-01-2021	37	**Seminar**
		38	**Field of quotients of an integral domain**
		39	**Theorem**
		40	**Isomorphism theorems- introduction**
10	04-01-2021 To 08-01-2021	41	**First isomorphism theorem**
		42	**Lemma**
		43	**Second isomorphism theorem**
		44	**Third isomorphism theorem**
		45	**Class Test**
11	11-01-2021 To 15-01-2021	46	**Subnormal and normal series**
		47	**Examples**
		48	**Examples**
		49	**Definitions**
		50	**Lemma**
12	18-01-2021 To 22-01-2021	51	**Example**
		52	**Zassenhaus lemma**
		53	**Schreier theorem**
		54	**Definition & Examples**
		55	**Jordan Holder theorem**
13	25-01-2021 To 29-01-2021	56	**Seminar**
			Republic day
		57	**Seminar**
		58	**Seminar**
		59	**Class Test**
14	01-02-2021 To 05-02-2021	60	**Seminar**
		61	**Seminar**
		62	**Seminar**
		63	**Seminar**
		64	**Seminar**
15	08-02-2021 To 12-02-2021	65	**Seminar**
		66	**Unit 3 -Rings of polynomials**
		67	**Class Test**
		68	**Polynomial in an indeterminate**
		69	**Definition**
16	15-02-2021 To 19-02-2021	70	**Example**
		71	**The Evaluation Homomorphisms**
		72	**Examples**
		73	**Examples**

No of Weeks	Dates	Session	Topic
		74	**Theorem**
17	22-02-2021 To 26-02-2021		I Semester PG Internal Exam
			I Semester PG Internal Exam
			I Semester PG Internal Exam
		75	**Factorization of polynomial over a field**
		76	**Factor theorem**
18	01-03-2021 To 05-03-2021	77	**Example**
		78	**Corollary**
		79	**Irreducible polynomials**
		80	**Definition and examples**
		81	**Theorem**
19	08-03-2021 To 12-03-2021		English Proficiency
			English Proficiency
			English Proficiency
			English Proficiency
		11 March	**Maha Shivarathri**
			English Proficiency
20	15-03-2021 To 19-03-2021		English Proficiency(Exam)
		82	**Homomorphisms**
		83	**Theorem**
		84	**Factor rings**
		85	**Exam**
21	22-03-2021 To 26-03-2021	86	**Prime and maximal ideals**
		87	**Examples**
		88	**Theorem & Definition**
		89	**Theorem**
		90	**Question paper discussion**
22	29-03-2021 To 02-04-2021	29 March	Talent Hunt
		30 March	Easter Vacation
		31 March	Easter Vacation
		1 April	Easter Vacation
		2 April	Easter Vacation

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**

Unit 1 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,)

Unit 2 Linear Functionals, The Double Dual, The Transpose of a Linear Transformation. Elementary Canonical Forms: Introductions, Characteristic Values (Chapter 3, sections 3.5, 3.6, 3.7 Chapter-6: Section 6.1, 6.2,)

Unit 3 Annihilating Polynomials ,Invariant Subspace, Simultaneous Triangulations& Simultaneous Diagonalisation. Elementary Canonical Forms: Invariant Direct Sums, (Chapter-6: Sections 6.3, 6.4, 6.5, 6.6 6.7)

Unit 4 The Primary Decomposition Theorem. The Rational and Jordan Forms: Cyclic Subspaces and Annihilators, Cyclic Decomposition and the Rational Forms Inner Product Spaces: Inner Products, Inner Product Spaces, (Chapter 6 section 6.8; Chapter7: Sections: 7.1, 7.2, 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 2003.

TEACHING SCHEDULE

No of Weeks	Dates	Session	Topic
1	02-11-2020 To 06-11-2020	1	Linear Transformation-Definition, examples
		2	Theorem 1
		3	Examples
		4	Null space, Range space- examples
		5	Rank Nullity theorem
2	09-11-2020 To 13-11-2020	6	Examples
		7	Theorem 4,6
		8	Linear operator- Definition, examples
		9	Theorem 5
		10	Inverible linear transformation- definition, theorem 7
3	16-11-2020 To 20-11-2020	11	Non singular LT., theorem 8
		12	Examples, Problems
		13	Problems
		14	Theorem 9
		15	Isomorphism- definition, theorem 10
4	23-11-2020 To 27-11-2020	16	Problems
		17	Representation of transformations by matrix- theorem 11
		18	The matrix of T relating to B- definition, theorem 12
		19	Problems
		20	Problems
5	30-11-2020 To 04-12-2020	21	Theorem 13
		22	Theorem 14
		23	Problems
		24	Linear functionals- definition, examples
		25	Problem
6	07-12-2020 To 11-12-2020	26	Dual space - definition, theorem 15
		27	Example
		28	Annihilator of a set- definition, Remarks
		29	Theorem 16
		30	Corollary
7	14-12-2020 To	31	Problems
		32	Problems
		33	Problems

No of Weeks	Dates	Session	Topic
	18-12-2020	34	Class test
		35	Double dual - definition, theorem 17
8	21-12-2020 To 25-12-2020		Christmas Vacation
			Christmas Vacation
			Christmas Vacation
			Christmas
			Christmas Vacation
9	28-12-2020 To 01-01-2021	36	Corollary, theorem 18
		37	Maximal proper subspace of V- definition, hyper space - definition, theorem 19
		38	Lemma
		39	Theorem 20
		40	The transpose of a LT - definition, example
10	04-01-2021 To 08-01-2021	41	Theorem 22
		42	Problems
		43	Revision
		44	Class test
		45	Unit 2: Elementary canonical forms- characteristic values - definition, remarks
11	11-01-2021 To 15-01-2021	46	Theorem 1,characteristic polynomial - definition, similar marices - definition
		47	Lemma, remarks
		48	Problems
		49	Diagonalizable LO - definition, remarks, examples
		50	Lemma, remark
12	18-01-2021 To 22-01-2021	51	Lemma
		52	Theorem 2
		53	Problems
		54	Problems
		55	Problems
13	25-01-2021 To 29-01-2021	56	Annihilating polynomial: ideal , principal ideal - definition, remarks
		26Januay	Republic day
		57	Remarks
		58	Minimal polynomial- definition, theorem 3
		59	Problems
14	01-02-2021	60	Problems
		61	Problems

No of Weeks	Dates	Session	Topic
	To 05-02-2021	62	Theorem 4: Cayley Hamilton theorem
		63	Problems
		64	Problems
15	08-02-2021 To 12-02-2021	65	Invariant subspace - definition, examples
		66	Examples
		67	Problems
		68	Problems
		69	Lemma
16	15-02-2021 To 19-02-2021	70	T- conductor- definition, lemma
		71	Remark, triangulable- definition
		72	Lemma - definition
		73	Theorem 5
		74	Theorem 6
17	22-02-2021 To 26-02-2021		I Semester PG Internal Exam
			I Semester PG Internal Exam
			I Semester PG Internal Exam
		75	Simultaneous triangulation, diagonalization, definition, lemma
		76	Theorem 7,8
18	01-03-2021 To 05-03-2021	77	Direct sum decomposition- definition remarks, lemma
		78	Theorem 9,examples
		79	Unit 3: inner product space - definition, examples, normed space- definition
		80	Polarization identities
		81	Theorem 1 , examples
19	08-03-2021 To 12-03-2021		English Proficiency
			English Proficiency
			English Proficiency
			English Proficiency
		11 March	**Maha Shivarathri**
			English Proficiency
20	15-03-2021 To 19-03-2021		English Proficiency(Exam)
		82	Orthogonal victors definition, examples, Theorem 2
		83	Theorem 3,examples
		84	Best approximation- definition, theorem 4
		85	Orthogonal Projection- definition, theorem 5,examples, Bessels inequality
21	22-03-2021	86	Invariant direct sums- definition, theorem 10,11
		87	Theorem 12: primary decomposition theorem, rational

No of Weeks	Dates	Session	Topic
	To 26-03-2021		and Jordan form of a matrix, examples
		88	Cyclic subspaces- definition, remarks, results, theorem
		89	Revision, university Question paper discussion
		90	Class test
22	29-03-2021 To 02-04-2021	29 March	Talent Hunt
		30 March	Easter Vacation
		31 March	Easter Vacation
		1 April	Easter Vacation
		2 April	Easter Vacation

Subject Code:	**MAT1C03**
Subject Name:	**REAL ANALYSIS**
No. of Credits:	**4**
No. of Contact Hours:	**90**
Hours per Week:	**5**
Name of the Teacher:	**Riya Baby**

Text Book I: Walter Rudin: Principles ofMathematical Analysis; 3rd EditionMcGraw-Hill
International
Text Book 2: T.M Apostol: Mathematical Analysis 2nd Edition; Narosa Publications (1973)

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)

Reference:

1. R.G Bartle and D.R Sherbert; Introduction to Real Analysis; John Wiley Bros. 1982
2. L.M Graves; The Theory of functions of real variable; Tata McGraw-Hill Book Co.
3. M.H Porter and C.B Moraray;A first Course in Real Analysis; Springer Verlag UTM 1977.
4. S.C Sexena and S.M Shah: Introduction to Real Variable Theory, Intext Educational 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	02-11-2020 To 06-11-2020	1	Basic Topology.
		2	Finite sets-definitions.
		3	Examples,theorem.
		4	Countable and Uncountable Sets- definitions.
		5	Examples,theorem.
2	09-11-2020	6	Theorems
		7	Compact Sets- Theorem

No of Weeks	Dates	Session	Topic
	To 13-11-2020	8	Class test.
		9	Perfect Sets-definitions.
		10	Theorems
3	16-11-2020 To 20-11-2020	11	Connected Sets-definitions.
		12	Exercise questions.
		13	Continuity: Limits of Functions-definitions.
		14	Theorems
		15	Class test.
4	23-11-2020 To 27-11-2020	16	Continuous Functions ,Theorems
		17	Continuity and Compactness-definitions.
		18	Theorems
		19	Continuity and Connectedness-definitions.
		20	Theorems
5	30-11-2020 To 04-12-2020	21	Discontinuities-definitions,
		22	Monotonic Functions-definitions,Theorem
		23	Class test.
		24	Infinite limits and Limits at Infinity- Theorem.
		25	Exercise questions.
6	07-12-2020 To 11-12-2020	26	Assignment.
		27	Seminar.
		28	Seminar.
		29	Seminar.
		30	Differentiation.
7	14-12-2020 To 18-12-2020	31	The derivative of Real Function , Theorems.
		32	Mean Value Theorems
		33	Theorems.
		34	The Continuity of Derivatives
		35	Assignment .
8	21-12-2020 To 25-12-2020		Christmas Vacation
			Christmas Vacation
			Christmas Vacation
			Christmas
			Christmas Vacation
9	28-12-2020 To 01-01-2021	36	Exercise questions.
		37	Class test.
		38	L ‘Hospital’ s Rule
		39	Theorems.

No of Weeks	Dates	Session	Topic
		40	Corollary.
10	04-01-2021 To 08-01-2021	41	Derivatives of Higher Order Taylor's Theorem
		42	Theorems.
		43	Corollary.
		44	Differentiation of Vector-Valued Functions
		45	Class test.
11	11-01-2021 To 15-01-2021	46	The Riemann-Stieltjes Integral
		47	Theorems.
		48	Corollary.
		49	Exercise questions.
		50	Definition and Existence of the Integral
12	18-01-2021 To 22-01-2021	51	Corollary.
		52	Assignment
		53	Properties of the Integral
		54	Theorems.
		55	Corollary.
13	25-01-2021 To 29-01-2021	56	Seminar.
			Republic day
		57	Seminar.
		58	Seminar.
		59	Seminar.
14	01-02-2021 To 05-02-2021	60	Seminar.
		61	The Riemann-Stieltjes Integral (Continued); Theorems.
		62	Theorems.
		63	Integration of Vector-Valued Functions.
		64	Corollary.
15	08-02-2021 To 12-02-2021	65	Class test.
		66	Functions of Bounded Variations and Rectifiable Curves.
		67	Exercise questions.
		68	Corollary.
		69	Integration and Differentiation,
16	15-02-2021 To 19-02-2021	70	Theorems.
		71	Corollary.
		72	Exercise questions.
		73	Class test.
		74	Theorems.
17	22-02-2021		I Semester PG Internal Exam

No of Weeks	Dates	Session	Topic
	To 26-02-2021		I Semester PG Internal Exam
			I Semester PG Internal Exam
		75	Exercise questions.
		76	Exercise questions.
18	01-03-2021 To 05-03-2021	77	Corollary.
		78	Functions of Bounded Variations and Rectifiable Curves.
		79	Corollary.
		80	Theorem.
		81	Theorem.
19	08-03-2021 To 12-03-2021		English Proficiency
			English Proficiency
			English Proficiency
			English Proficiency
		11 March	**Maha Shivarathri**
			English Proficiency
20	15-03-2021 To 19-03-2021		English Proficiency(Exam)
		82	Seminar.
		83	Seminar.
		84	Seminar.
		85	Viva.
21	22-03-2021 To 26-03-2021	86	Class test.
		87	Revision.
		88	Revision.
		89	Revision.
		90	Revision.
22	29-03-2021 To 02-04-2021	29 March	Talent Hunt
		30 March	Easter Vacation
		31 March	Easter Vacation
		1 April	Easter Vacation
		2 April	Easter Vacation

Subject Code:	**MAT 1C04**	
Subject Name:	**BASIC TOPOLOGY**	
No. of Credits:	**4**	
No. of Contact Hours:	**90**	
Hours per Week:	**5**	
Name of the Teacher:	**Sneha P Sebastian**	

MAT 1C04 BASIC TOPOLOGY

Text:
C. Wayne Patty, Foundations of Topology, Second Edition – Jones & Bartlett India Pvt. Ltd., New Delhi, 2012.

Unit – I

Topological Spaces: The Definition and Examples, Basis for a Topology, Closed Sets, Closures and Interiors 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 ones: Subspaces, The Product Topology on X x 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 space,

[Chapter 3: Sections 3.1 to 3.3 excluding Theorem 3. 29 and Theorem 3.30]

References:

1. K. D. Joshi, Introduction to General Topology, New Age International (P) Ltd., Publishers.
2. Dugundji, Topology, Prentice Hall of India.
3. G. F. Simmons, Introduction to Topology and Modern Analysis, Mc Graw Hill.
4. S. Willard, General Topology , Addison Wesley Publishing Company.5.
5. J.R.Munkers,Topology: A First Course, Prentice Hall of India.
6. Murdeshwar M. G., General Topology, second edition, Wiley Eastern.
7. Kelley, General Topology, van Nostrand, Eastern Economy Edition.

TEACHING SCHEDULE

No of Weeks	Dates	Session	Topic
1	02-11-2020 To 06-11-2020	1	**Unit 1 : Topological Spaces**
		2	Definitions
		3	Examples
		4	Theorem
		5	Examples
2	09-11-2020 To 13-11-2020	6	Theorem
		7	Basis for a topology
		8	Example
		9	Theorem
		10	Example
3	16-11-2020 To 20-11-2020	11	Sub basis
		12	Theorem
		13	Example
		14	First countable and second countable spaces
		15	Theorem
4	23-11-2020 To 27-11-2020	16	Example
		17	Closed Sets
		18	Theorem
		19	Example

No of Weeks	Dates	Session	Topic
		20	Closure of a set
5	30-11-2020 To 04-12-2020	21	Example and theorem
		22	Interior of a set
		23	Theorem
		24	Metric spaces
		25	Example
6	07-12-2020 To 11-12-2020	26	Convergence
		27	Theorem
		28	Example
		29	Continuous functions and homeomorphisms
		30	Theorem
7	14-12-2020 To 18-12-2020	31	Theorem
		32	Example
		33	Theorem
		34	Revision – Unit 1
		35	Class test – Unit 1
8	21-12-2020 To 25-12-2020		Christmas Vacation
			Christmas Vacation
			Christmas Vacation
			Christmas
			Christmas Vacation
9	28-12-2020 To 01-01-2021	36	**Unit 2 : New spaces from old ones**
		37	Subspaces
		38	Example
		39	Theorem
		40	Theorem
10	04-01-2021 To 08-01-2021	41	Example
		42	Theorem
		43	Hereditary property
		44	Theorem
		45	The Product topology on X x Y
11	11-01-2021 To 15-01-2021	46	Example
		47	Theorem
		48	Theorem
		49	Product Topology
		50	Product space
12	18-01-2021 To	51	Theorem
		52	Example

No of Weeks	Dates	Session	Topic
	22-01-2021	53	Theorem
		54	Theorem
		55	The weak topology and the product topology
13	25-01-2021 To 29-01-2021	56	Theorem
			Republic day
		57	Example
		58	Theorem
		59	Theorem
14	01-02-2021 To 05-02-2021	60	Example
		61	Revision – Unit 2
		62	Class Test – Unit 2
		63	**Unit 3 : Connectedness**
		64	Connectedness in metric spaces
15	08-02-2021 To 12-02-2021	65	Theorem
		66	Example
		67	Connected space
		68	Theorem
		69	Example
16		70	Path wise Connectedness
		71	Example
		72	Theorem
		73	Theorem
		74	Theorem
17	22-02-2021 To 26-02-2021		I Semester PG Internal Exam
			I Semester PG Internal Exam
			I Semester PG Internal Exam
		75	Local Connectedness
		76	Theorem
18	01-03-2021 To 05-03-2021	77	Example
		78	Theorem
		79	Totally disconnected spaces
		80	Theorem
		81	Example
19	08-03-2021 To 12-03-2021		English Proficiency
			English Proficiency
			English Proficiency
			English Proficiency
			Maha Shivarathri

No of Weeks	Dates	Session	Topic
			English Proficiency
20	15-03-2021 To 19-03-2021		English Proficiency(Exam)
		82	Example
		83	Theorem
		84	Revision – Unit 3
		85	Class Test – Unit 3
21	22-03-2021 To 26-03-2021	86	Revision – Unit 1
		87	Revision – Unit 2
		88	Previous year Question paper discussion
		89	Previous year Question paper discussion
		90	Previous year Question paper discussion
22	29-03-2021 To 02-04-2021	29 March	Talent Hunt
		30 March	Easter Vacation
		31 March	Easter Vacation
		1 April	Easter Vacation
		2 April	Easter Vacation

Subject Code:	**MAT1C05**
Subject Name:	**DIFFERENTIAL EQUATIONS**
No. of Credits:	**4**
No. of Contact Hours:	**90**
Hours per Week:	**5**
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, SecondOrder 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 GammaFunction, 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 Methodof Successive Approximations, Picard's Theorem, Systems. The Second Order Linear Equation
(Chapter-4; Sections 24 and 25; Chapter-13; Sections 68 to 70)

TEACHING SCHEDULE

No of Weeks	Dates	Session	Topic
1	02-11-2020 To 06-11-2020	1	**Introduction to power series**
		2	**Convergence of power series**
		3	**Radius of curvature of power series**
		4	**Examples**
		5	**Examples**
2	09-11-2020 To 13-11-2020	6	**Series solution of first order equations**
		7	**Problems**
		8	**Problems**
		9	**Second order linear equations**
		10	**Ordinary points, singular points**
3	16-11-2020 To 20-11-2020	11	**Regular singular points, examples**
		12	**Theorem**
		13	**Problems**
		14	**Power series solution of Legendre's equation**
		15	**Power series solution of Bessel's equation**
4	23-11-2020 To 27-11-2020	16	**Theorem**
		17	**Problems**
		18	**Problems**
		19	**Problems**
		20	**Assignment**
5	30-11-2020 To 04-12-2020	21	**Gauss's Hypergeometric equation**
		22	**Hypergeometric series**
		23	**General solution of Gauss's Hypergeometric equation**
		24	**Examples**
		25	**Examples**
6	07-12-2020 To 11-12-2020	26	**The point at infinity**
		27	**Confluent Hypergeometric equation**
		28	**Problems**
		29	**Problems**
		30	**Assignment**
7	14-12-2020 To 18-12-2020	31	**Legendre Polynomials**
		32	**Rodrigues' formula**
		33	**Problems**
		34	**Generating function of the Legendre Polynomials**
		35	**Problems**
8	21-12-2020		Christmas Vacation

No of Weeks	Dates	Session	Topic
	To 25-12-2020		Christmas Vacation
			Christmas Vacation
			Christmas
			Christmas Vacation
9	28-12-2020 To 01-01-2021	36	**Orthogonality Property of Legendre Polynomials**
		37	**Legendre series, Bessel Function**
		38	**General solution of the Bessel equation**
		39	**Bessel function of the first kind**
		40	**Class test**
10	04-01-2021 To 08-01-2021	41	**The Gamma function**
		42	**Properties of Gamma function**
		43	**Problems**
		44	**Problems**
		45	**Orthogonality Property of Bessel functions**
11	11-01-2021 To 15-01-2021	46	**Zeros and the Bessel series**
		47	**Bessel expansion Theorem**
		48	**Problems**
		49	**Assignment**
		50	**Discussions**
12	18-01-2021 To 22-01-2021	51	**Linear systems**
		52	**Homogeneous Linear systems**
		53	**Theorem**
		54	**Theorem**
		55	**Theorem**
13	25-01-2021 To 29-01-2021	56	**Seminar**
			Republic day
		57	**Problems**
		58	**Homogeneous systems with constant coefficients**
		59	**Classifications**
14	01-02-2021 To 05-02-2021	60	**Seminar**
		61	**Seminar**
		62	**Seminar**
		63	**Seminar**
		64	**Seminar**
15	08-02-2021 To 12-02-2021	65	**Seminar**
		66	**Seminar**
		67	**Seminar**
		68	**Oscillations**

No of Weeks	Dates	Session	Topic
		69	**Sturm separation Theorem**
16	15-02-2021 To 19-02-2021	70	**Normal and standard form**
		71	**Theorem**
		72	**Problems**
		73	**Theorem**
		74	**Discussions**
17	22-02-2021 To 26-02-2021		I Semester PG Internal Exam
			I Semester PG Internal Exam
			I Semester PG Internal Exam
		75	**The Sturm comparison theorem**
		76	**Theorem**
18	01-03-2021 To 05-03-2021	77	**Successive approximations**
		78	**Problems**
		79	**Picard's iteration method**
		80	**Problems**
		81	**Class test**
19	08-03-2021 To 12-03-2021		English Proficiency
			English Proficiency
			English Proficiency
			English Proficiency
			Maha Shivarathri
			English Proficiency
20	15-03-2021 To 19-03-2021		English Proficiency(Exam)
		82	**The Picard's theorem**
		83	**The Picard's theorem(contd.)**
		84	**Lipschitz condition**
		85	**Examples**
21	22-03-2021 To 26-03-2021	86	**Theorem**
		87	**Problems**
		88	**Problems**
		89	**Systems of initial value problems**
		90	**Examples**
22	29-03-2021 To 02-04-2021	29 March	Talent Hunt
		30 March	Easter Vacation
		31 March	Easter Vacation
		1 April	Easter Vacation
		2 April	Easter Vacation