DON BOSCO ARTS & SCIENCE COLLEGE
ANGADIKADAVU
(Affiliated to Kannur University Approved by Government of Kerala)
ANGADIKADAVU P.O., IRITTY, KANNUR – 670706

COURSE PLAN

B Sc mathematics

(2020 – 23)

SEMESTER - V

ACADEMIC YEAR - (2022-23)

V Semester B Sc Mathematics (2020 - 23)			
SL. No.	**Name of Subjects with Code**	**Name of the Teacher**	**Duty Hours per week**
1.	5B05 MAT SET THEORY, THEORY OF EQUATIONS AND COMPLEX NUMBERS	AJEENA JOSEPH	4
2.	5B06 MAT REAL ANALYSIS I	ANIL M V	**5**
3.	5B07 MAT ABSTRACT ALGEBRA	PRIJA V	**5**
4.	5B08 MAT DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS	RIYA BABY	4
5.	5B09 MAT VECTOR CALCULUS	ATHULYA P	**5**
	Name of Class Incharge	ATHULYA P	

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	DIFFERENTIAL EQUATIONS	OPEN COURSE	VECTOR CALCULUS	ABSTRACT ALGEBRA
2	ABSTRACT ALGEBRA	REAL ANALYSIS	OPEN COURSE	SET THEORY	VECTOR CALCULUS
3	VECTOR CALCULUS	SET THEORY	ABSTRACT ALGEBRA	DIFFERENTIAL EQUATIONS	REAL ANALYSIS
4	DIFFERENTIAL EQUATIONS	VECTOR CALCULUS	REAL ANALYSIS	ABSTRACT ALGEBRA	SET THEORY
5	SET THEORY	ABSTRACT ALGEBRA	VECTOR CALCULUS	REAL ANALYSIS	DIFFERENTIA LEQUATIONS

Subject Code:	**5B05MAT**
Subject Name:	**Set Theory, Theory of Equations and Complex Numbers**
No. of Credits:	**4**
No. of Contact Hours:	**72**
Hours per Week:	**4**
Name of the Teacher:	**Ajeena Joseph**

Syllabus:

Unit I : Finite and Infinite sets (14 hours)

Finite and Infinite sets, Countable sets, Uncountable sets , Cantor's theorem
(Section 1.3 of text I)

Unit II: Theory of equations I (20 hours)

Roots of equations, Relation connecting roots and coefficient of an equation, Transformation of equations, Special cases, The cubic equation, Character and position of roots of an equation, Some general theorems, Descartes rule of signs, Corollaries, De Gua' s rule, Limits to the roots of an equation, To find rational roots of an equation,
Newton's method of divisors, Symmetric function of roots of an equation, symmetric function involving only the difference of roots of f(x)= 0, Equation whose roots are symmetric functions
(Sections 1 to 17 in chapter VI of text 2)

Unit II: Theory of equations II (20 hours)

Reciprocal equation (proof omitted) (section 1 in chapter XI of text 2)
The cubic equation, Equation whose roots are the squares of the difference of the roots, Character of roots, Cardan' s solutions
(Section 5 of chapter VI and sections 1 to 4 of chapter XII in text 2)

Unit III: Complex numbers (18 hours)

Quick review of complex numbers, Roots of complex numbers, General form of De Moivre's theorem, the nth root of unity, factors, imaginary cube root of unity
(Sections 15 to 20 of chapter V of text 2)
Polar form of complex numbers, powers and roots (section 13.2 of text 3)

Texts:

(1) R.G. Bartle and D.R.Sherbert, Introduction to real analysis, 4th edition, Wiley
(2) Bernard and Child, Higher algebra, A.I.T.B.S publishers
(3) E.Kreyzig, Advanced Engineering Mathematics, 10th edition, Wiley.

TEACHING SCHEDULE

No of Weeks	Dates	Session	Topic
1	06-06-2022 To 10-06-2022	1	Introduction to set theory
		2	Finite set
		3	Finite set
		4	Theorem
2	13-06-2022 To 17-06-2022	5	Theorem
		6	Infinite set
		7	Theorem
		8	Countable set
3	20-06-2022 To 24-06-2022	9	Uncountable set
		10	Theorem
		11	Theorem
		12	Cantor's theorem
4	27-06-2022 To 01-07-2022	13	Class test
		14	Roots of Equations
		15	Problems
		16	Relation connecting roots and coefficients of an equation
5	04-07-2022 To 08-07-2022	17	Problems
		18	Transformation of equations
		19	Problems
		20	Problems
6	11-07-2022 To 15-07-2022	21	**I Internal Examination**
		22	**I Internal Examination**
		23	**I Internal Examination**
		24	**I Internal Examination**
		25	**I Internal Examination**
7	18-07-2022 To 22-07-2022	26	The cubic equation
		27	Character and position of equation
		28	Theorems
		29	Theorems
8	25-07-2022 To 29-07-2022	30	Class test
		31	Seminar
		28 July	Karkidaka Vav
		32	Seminar
9	01-08-2022	33	Descarte's rule of sign

No of Weeks	Dates	Session	Topic
	To 05-08-2022	34	Problems
		35	Corollaries
		36	De Gua's rule
10	08-08-2022 To 12-08-2022	08 August	Muharam
		37	Rational roots of an equation
		38	Problems
		39	Problems
		40	Newton's method of divisors
11	15-08-2022 To 19-08-2022	15 August	Independance Day
		41	Symmetric functions of roots of an equation
		42	Symmetric functions of roots of an equation
		18 August	Sree Krishna Jayanthi
		43	Symmetric functions of roots of an equation
12	22-08-2022 To 26-08-2022	44	Symmetric functions of roots of an equation
		45	Class test
		46	Reciprocal equation
		47	Reciprocal equation
13	29-08-2022 To 02-09-2022	48	Reciprocal equation
		49	Reciprocal equation
		50	Character of roots
		51	Character of roots
14	05-06-2022 To 09-09-2022	05 September	ONAM VACATION
		06 September	ONAM VACATION
		07 September	ONAM VACATION
		08 September	ONAM VACATION
		09 September	ONAM VACATION
15	12-09-2022 To 16-09-2022	52	Carden's solution
		53	Carden's solution
		54	Carden's solution
		55	Introduction to complex numbers
16	19-09-2022 To 23-09-2022	56	Introduction to complex numbers
		21September	Sree Narayana Guru Samadhi
		57	Introduction to complex numbers
		58	nth root of complex numbers
17	26-09-2022 To 30-09-2022	59	**II Internal Examination**
		60	**II Internal Examination**
		61	**II Internal Examination**
		62	**II Internal Examination**

No of Weeks	Dates	Session	Topic
		63	**II Internal Examination**
		64	**II Internal Examination**
18	03-10-2022 To 07-10-2022	04 October	Maha Navami
		05 October	Vijaya Dashami
		65	nth root of complex numbers
		66	The imaginary cube root of unity
19	10-10-2022 To 14-10-2022	67	Polar form of complex numbers
		68	Revision
		69	**V Semester University Examination**
		70	**V Semester University Examination**
20	17-10-2022 To 21-10-2022	71	**V Semester University Examination**
		72	**V Semester University Examination**

Subject Code:	**5B06 MAT**
Subject Name:	**Real Analysis I**
No. of Credits:	**4**
No. of Contact Hours:	**90**
Hours per Week:	**5**
Name of the Teacher:	**Anil M V**

5B06 MAT: Real Analysis I

Unit I - The Real Numbers (20 hours)
Algebraic and Order Properties of $\mathbb{R}$, Absolute Value and Real Line, The Completeness Property of $\mathbb{R}$, Applications of the Supremum Property, Intervals
(Sections 2.1, 2.2, 2.3, 2.4, 2.5 of the Text).

Unit II – Sequences (30 hours)

Sequences and their Limits, Limit Theorems, Monotone Sequences, Subsequences and the Bolzano-Weierstrass Theorem, The Cauchy Criterion (Sections 3.1, 3.2, 3.3, 3.4, 3.5 of the Text).

Unit III - Series (20 hours)

Introduction to Infinite Series, Absolute Convergence, Tests for Absolute Convergence, Tests for Non Absolute Convergence (Sections 3.7, 9.1, 9.2, 9.3 of the Text).

Unit IV - Continuous Functions (20 hours)

Continuous Functions, Combination of Continuous Functions, Continuous Functions on Intervals (Sections 5.1, 5.2, 5.3 of the Text).

Text
R.G. Bartle and D.R. Sherbert, Introduction to Real Analysis (4th edition), Wiley.

TEACHING SCHEDULE

No of Weeks	Dates	Session	Topic
1	06-06-2022 To 10-06-2022	1	Algebraic properties of real numbers
		2	Examples
		3	Examples
		4	Examples
		5	Rational and Irrational numbers
2	13-06-2022 To 17-06-2022	6	The order properties of real numbers
		7	Theorem
		8	Theorem
		9	Theorem
		10	Inequalities
3	20-06-2022 To 24-06-2022	11	AM-GM inequality
		12	Bernoullis inequality
		13	Absolute value and the real line
		14	Triangle inequality
		15	The completeness property of real number
4	27-06-2022 To 01-07-2022	16	Applications of supremum property
		17	Archimedian property & Corollary
		18	Intervals
		19	Nested interval property
		20	Class test
5	04-07-2022 To 08-07-2022	21	Sequences- Definition
		22	The limit of a sequence
		23	Theorem
		24	Tails of sequences
		25	Theorem
6	11-07-2022 To 15-07-2022	26	**I Internal Examination**
		27	**I Internal Examination**
		28	**I Internal Examination**
		29	**I Internal Examination**
		30	**I Internal Examination**
7	18-07-2022 To 22-07-2022	31	Limit theorems
		32	Theorem
		33	Theorem
		34	Monotone Sequences
		35	Monotone convergence theorem

No of Weeks	Dates	Session	Topic
8	25-07-2022 To 29-07-2022	36	Subsequences
		37	Divergence criteria
		38	Theorem
		39	Example
		28 July	Karkidaka Vav
9	01-08-2022 To 05-08-2022	40	Monotone subsequence theorem
		41	Cauchy Criterion
		42	Cauchy convergence criterion
		43	Contractive sequences
		44	Theorem
10	08-08-2022 To 12-08-2022	08 August	Muharam
		45	Example
		46	Example
		47	Exercise questions
		48	Theorem
11	15-08-2022 To 19-08-2022	15 August	Independance Day
		49	Theorem
		18 August	Sree Krishna Jayanthi
		50	Class Test
		51	Series
12	22-08-2022 To 26-08-2022	52	Definitions
		53	Cauchy Criterion for series
		54	Integral test
		55	Comparison test
		56	Limit comparison test
13	29-08-2022 To 02-09-2022	57	Examples
		58	Absolute Convergence
		59	Grouping of series
		60	Rearrangement of series
		61	Test for absolute convergence
14	05-06-2022 To 09-09-2022	05 September	ONAM VACATION
		06 September	ONAM VACATION
		07 September	ONAM VACATION
		08 September	ONAM VACATION
		09 September	ONAM VACATION
15	12-09-2022 To	62	Test for Non absolute convergence
		63	Examples
		64	Raabes test , Integral Test

No of Weeks	Dates	Session	Topic
	16-09-2022	65	Examples
		66	Theorem
		67	Theorem
16	19-09-2022 To 23-09-2022	68	Class Test
		69	Continuous functions
		21September	Sree Narayana Guru Samadhi
		70	Theorem
		71	Theorem
		72	Examples
17	26-09-2022 To 30-09-2022	73	**II Internal Examination**
		74	**II Internal Examination**
		75	**II Internal Examination**
		76	**II Internal Examination**
		77	**II Internal Examination**
		78	**II Internal Examination**
18	03-10-2022 To 07-10-2022	79	Combinations of continuous functions
		04 October	Maha Navami
		05 October	Vijaya Dashami
		80	Theorem
		81	Theorem
		82	Continuous functions on intervals
19	**10-10-2022 To 14-10-2022**	83	Continuous functions on intervals
		84	Example
		85	Revision
		86	Revision
		87	**V Semester University Examination**
		88	**V Semester University Examination**
20	17-10-2022 To 21-10-2022	89	**V Semester University Examination**
		90	**V Semester University Examination**

Subject Code:	**5B07 MAT**
Subject Name:	**Abstract Algebra**
No. of Credits:	**4**
No. of Contact Hours:	**90**
Hours per Week:	**5**
Name of the Teacher:	**Prija V**

5B07 MAT: Abstract Algebra

Unit I (27 hours)

Groups and Subgroups - Binary Operations, Groups, Subgroups, Cyclic Groups (Sections 2, 4, 5, 6 of the Text).

Unit II (28 hours)

Groups of Permutations, Orbits, Cycles and the Alternating Groups, Cosets and Theorem of Lagrange (Sections 8, 9, 10 of the Text).(Proof of Theorem 9.15 omitted).

Unit III (20 hours)

Homomorphisms, Factor Groups (Sections 13, 14 of the Text).

Unit IV (15 hours)

Rings and Fields, Integral Domains (Sections 18, 19 of the Text).

(*Problems involving direct products are omitted from all sections*)

Text

J.B. Fraleigh, A First Course in Abstract Algebra (7th edition), Pearson.

TEACHING SCHEDULE

No of Weeks	Dates	Session	Topic
1	06-06-2022 To 10-06-2022	1	Unit-I Introduction
		2	Binary Operations–Definition,Examples.
		3	Some elementary properties.
		4	Groups –Definition,Examples.
		5	Theorems.
2	13-06-2022 To 17-06-2022	6	Exercise questions.
		7	Exercise questions.
		8	Subgroups- Definition,Examples
		9	Exercise questions.

No of Weeks	Dates	Session	Topic
		10	Theorems.
3	20-06-2022 To 24-06-2022	11	Class test.
		12	Theorems.
		13	Theorems.
		14	Cyclic Groups- Definition,Examples.
		15	Exercise questions.
4	27-06-2022 To 01-07-2022	16	Exercise questions.
		17	Theorems.
		18	Class test.
		19	Assignment.
		20	Unit II-Introduction.
5	04-07-2022 To 08-07-2022	21	Groups of Permutations- Definition,Examples.
		22	Theorems.
		23	Exercise questions.
		24	Theorems.
		25	Theorems.
6	11-07-2022 To 15-07-2022	26	**I Internal Examination**
		27	**I Internal Examination**
		28	**I Internal Examination**
		29	**I Internal Examination**
		30	**I Internal Examination**
7	18-07-2022 To 22-07-2022	31	Orbits- Definition, - Definition,Examples.
		32	Examples.
		33	Class test.
		34	Theorems.
		35	Theorems.
8	25-07-2022 To 29-07-2022	36	Exercise questions.
		37	Exercise questions.
		38	Theorems.
		39	Theorems.
		28 July	Karkidaka Vav
9	01-08-2022 To 05-08-2022	40	Class test.
		41	Assignment.
		42	Seminar.
		43	Cycles and the Alternating Groups
		44	Definition,Examples.
10	08-08-2022	08 August	Muharam

No of Weeks	Dates	Session	Topic
	To 12-08-2022	45	Theorems.
		46	Theorems.
		47	Exercise questions.
		48	Exercise questions.
11	15-08-2022 To 19-08-2022	15 August	Independance Day
		49	Theorems.
		18 August	Sree Krishna Jayanthi
		50	Class test.
		51	Cosets and Theorem of Lagrange.
12	22-08-2022 To 26-08-2022	52	Definition,Examples.
		53	Theorems.
		54	Theorems.
		55	Exercise questions.
		56	Exercise questions.
13	29-08-2022 To 02-09-2022	57	Class test.
		58	Unit III-Introduction.
		59	Homomorphisms.
		60	Definition,Examples.
		61	Seminar.
14	05-06-2022 To 09-09-2022	05 September	ONAM VACATION
		06 September	ONAM VACATION
		07 September	ONAM VACATION
		08 September	ONAM VACATION
		09 September	ONAM VACATION
15	12-09-2022 To 16-09-2022	62	Definition,Examples.
		63	Theorems.
		64	Theorems.
		65	Exercise questions.
		66	Exercise questions.
		67	Definition,Examples.
16	19-09-2022 To 23-09-2022	68	Theorems.
		69	Class test.
		21September	Sree Narayana Guru Samadhi
		70	Factor Groups.
		71	Definition,Examples.
		72	Theorems.
17	26-09-2022	73	**II Internal Examination**
		74	**II Internal Examination**

No of Weeks	Dates	Session	Topic
	To 30-09-2022	75	**II Internal Examination**
		76	**II Internal Examination**
		77	**II Internal Examination**
		78	**II Internal Examination**
18	03-10-2022 To 07-10-2022	79	Theorems.
		04 October	Maha Navami
		05 October	Vijaya Dashami
		80	Unit IV-Introduction.
		81	Rings -Definition,Examples.
		82	Fields- Definition,Examples.
19	**10-10-2022 To 14-10-2022**	83	Theorems.
		84	Integral Domains -Definition,Examples.
		85	Class test.
		86	Revision.
		87	**V Semester University Examination**
		88	**V Semester University Examination**
20	17-10-2022 To 21-10-2022	89	**V Semester University Examination**
		90	**V Semester University Examination**

Subject Code:	5B07 MAT
Subject Name:	Differential Equations, Laplace Transform and Fourier Series
No. of Credits:	4
No. of Contact Hours:	90
Hours per Week:	4
Name of the Teacher:	RIYA BABY

Module I: First Order Differential Equations (20 Hours)

Basic concepts and ideas, Separable differential equations, Exact differential Equations,Integrating factors, Linear differential equations. Bernoulli equation, Orthogonal trajectories of curves, Existence and uniqueness of solutions. (Sections 1.1, 1.3, 1.5,1.6, 1.8 and 1.9 of Text 1).
Systems of Differential Equations - Introductory examples, Basic concepts and theory. (Sections 3.1, 3.2)

Module II: Second Order Linear Differential Equations (25 Hours)

Homogeneous linear equations of second order, second order homogeneous Equation with constant coefficients, Case of complex roots, Complex exponential function, Differential operators, Euler-Cauchy equation, Existence and uniqueness theory (proof omitted), Wronskian, Non homogeneous equations, Solution by undetermined coefficients, Solution by variation of parameters.
(Sections 2.1 to 2.10 except 2.5)

Module III: Laplace Transform (22 Hours)

Laplace transform, Inverse transform, Linearity, Transforms of derivatives and Integrals, Unit step function, second shifting theorem, Dirac's Delta function, Differentiation of integration of transforms, Convolution, Partial Fractions. Differential equations.
(Sections 5.1 to 5.6)

Module IV: Fourier Series (23 Hours)

Periodic functions. Trigonometric series, Fourier series, Functions of any period p=2L, Even and odd functions, Half range expansion, Fourier integrals (Sections 10.1 to 10.4 and10.8).

Text : E. Kreyzig, Advanced Engineering Mathematics, 8th Edition, John Wiley, 2006.

References:

1. S.L. Ross, Differential Equations, 3rd Edition, Wiley.
2. 2. G. Birkhoff and G.C. Rota, Ordinary Differential Equations, Wiley and Sons, 3rd Edition
3. 3. E.A. Coddington, An Introduction to Ordinary Differential Equtions, Printice Hall
4. 4. W.E. Boyce and R.C.Diprima, Elementary Differential Equations and Boundary Value Problems, 9th Edition, Wiley.

TEACHING SCHEDULE

No of Weeks	Dates	Session	Topic
1	06-06-2022 To 10-06-2022	1	Basic concepts and ideas.
		2	Separable differential equations.
		3	Example problems, Exercise Questions.
		4	Exact differential equations.
		5	Example problems, Exercise Questions.
2	13-06-2022 To 17-06-2022	6	Exercise Questions, Homework.
		7	Integrating factors
		8	Example problems, Exercise Questions.
		9	Class Test
		10	Linear differential equations
3	20-06-2022 To 24-06-2022	11	Example problems, Exercise Questions.
		12	Assignment.
		13	Bernoulli equation.
		14	Example problems, Exercise Questions.
		15	Example problems, Exercise Questions
4	27-06-2022 To	16	Example problems, Exercise Questions.
		17	Existence and uniqueness of solutions- Theorems and Proofs

No of Weeks	Dates	Session	Topic
	01-07-2022	18	Existence and uniqueness of solutions- Theorems and Proofs
		19	Systems of Differential Equations - Introductory examples, Basic concepts
		20	Example problems, Exercise Questions.
5	04-07-2022 To 08-07-2022	21	Class Test.
		22	Laplace transform- Basic Concepts
		23	Inverse transform. Linearity
		24	Inverse transform. Linearity
		25	Linearity
6	11-07-2022 To 15-07-2022	26	**I Internal Examination**
		27	**I Internal Examination**
		28	**I Internal Examination**
		29	**I Internal Examination**
		30	**I Internal Examination**
7	18-07-2022 To 22-07-2022	31	Transforms of derivatives and integrals
		32	Example problems, Exercise Questions.
		33	Unit step function
		34	Example problems
		35	second shifting theorem
8	25-07-2022 To 29-07-2022	36	Example problems, Exercise Questions.
		37	Dirac's Delta function
		38	Homework
		39	Differentiation of integration of transforms
		28 July	Karkidaka Vav
9	01-08-2022 To 05-08-2022	40	Class test.
		41	Convolution- Example problems, Exercise Question
		42	Partial Fractions, Differential equations. Example problems, Exercise Questions.
		43	Homogeneous linear equations of second order Examples, Definition.
		44	Second order homogeneous equation with constant coefficients- Example problems, Exercise Questions.
10	08-08-2022 To 12-08-2022	08 August	Muharam
		45	Euler-Cauchy equation- Example problems, Exercise Questions, Homework.
		46	Existence and uniqueness theory
		47	Differential operators- Example problems, Exercise Questions, Homework
		48	Non homogeneous equations
11	15-08-2022	15 August	Independance Day

No of Weeks	Dates	Session	Topic
	To 19-08-2022	49	Assignment
		18 August	Sree Krishna Jayanthi
		50	Solution by undetermined coefficients
		51	Solution by variation of parameters
12	22-08-2022 To 26-08-2022	52	Solution by variation of parameters- Solution by variation of parameters
		53	Class test
		54	Periodic functions- definitions, examples
		55	Trigonometric series-definitions
		56	Fourier series- definitions
13	29-08-2022 To 02-09-2022	57	Example problems, Exercise Questions. Homework
		58	Functions of period p=2
		59	Even and odd functions
		60	Example problems
		61	Example problems
14	05-06-2022 To 09-09-2022	05 September	ONAM VACATION
		06 September	ONAM VACATION
		07 September	ONAM VACATION
		08 September	ONAM VACATION
		09 September	ONAM VACATION
15	12-09-2022 To 16-09-2022	62	Example problems, Exercise Questions
		63	Half range Fourier cosine series.
		64	Assignment
		65	Assignment
		66	Half range expansion-basic concepts
		67	Half range Fourier cosine series
16	19-09-2022 To 23-09-2022	68	Half range Fourier sine series
		69	Fourier integrals
		21September	Sree Narayana Guru Samadhi
		70	Example problems
		71	Example problems
		72	Example problems
17	26-09-2022 To 30-09-2022	73	**II Internal Examination**
		74	**II Internal Examination**
		75	**II Internal Examination**
		76	**II Internal Examination**
		77	**II Internal Examination**
		78	**II Internal Examination**

No of Weeks	Dates	Session	Topic
18	03-10-2022 To 07-10-2022	79	Class Test
		04 October	Maha Navami
		05 October	Vijaya Dashami
		80	Seminar- Exercise Questions.
		81	viva
		82	viva
19	**10-10-2022 To 14-10-2022**	83	Revision
		84	Revision
		85	Revision
		86	Revision
		87	**V Semester University Examination**
		88	**V Semester University Examination**
20	17-10-2022 To 21-10-2022	89	**V Semester University Examination**
		90	**V Semester University Examination**

Subject Code:	5B09 MAT
Subject Name:	VECTOR CALCULUS
No. of Credits:	**4**
No. of Contact Hours:	**90**
Hours per Week:	**5**
Name of the Teacher:	ATHULYA P

5B09 MAT: Vector Calculus

Unit I – Geometry of space and motion in space (25 Hours) Lines and planes in space, curves in space and their tangents, arc length in space, curvature and **normal vector of a curve, tangential and normal components of acceleration (Sections 12.5, 13.1, 13.3, 13.4, 13.5 of the Text).**

Unit II - Partial derivatives (25 Hours) Directional derivatives and gradient vectors, Tangent planes and differentials, Extreme values and saddle points, Lagrange multipliers, Partial derivatives with constrained variables, Taylor's formula for two variables (Sections 14.5, 14.6, 14.7, 14.8, 14.10 of the Text).

Unit III – Integration in vector fields I (20 Hours) Line integrals, Vector fields and line integrals: work, circulation, flux, Path independence, conservative fields and potential functions, Green's theorem in the plane (Sections 16.1, 16.2, 16.3, 16.4 of the Text).

Unit IV - Integration in vector fields II (20 Hours) Surfaces and area, surface integrals, Stokes' theorem (theorem without proof) (paddle wheel interpretation of $\nabla \times F$ is excluded), the Divergence Theorem (theorem without proof) (Gauss' law: one of the four great laws of Electromagnetic Theory, continuity equation of hydrodynamics, unifying the integral theorems are excluded) (Sections 16.5, 16.6, 16.7, 16.8 of the Text).

Text G.B, Thomas Jr., M.D. Weir and J.R. Hass, Thomas' Calculus (12th edition), Pearson Education

TEACHING SCHEDULE

No of Weeks	Dates	Session	Topic
1	06-06-2022 To 10-06-2022	1	Introduction to vector calculus
		2	A quick review of vectors and operations
		3	A quick review of vectors and operations
		4	Line and its equation
		5	Parametric equation of line
2	13-06-2022 To 17-06-2022	6	Distance to a line
		7	Equation of plane
		8	Planes in space
		9	Planes in space
		10	Vector functions
3	20-06-2022 To 24-06-2022	11	Vector functions
		12	Arc length and unit tangent vector T
		13	Arc length and unit tangent vector T
		14	Class test
		15	Curvature and unit normal vector N
4	27-06-2022 To 01-07-2022	16	Torsion and unit Binormal vector B
		17	Torsion and unit Binormal vector B
		18	Calculation of T,N,B etc.
		19	Directional derivatives and gradient vectors
		20	Directional derivatives and gradient vectors
5	04-07-2022 To 08-07-2022	21	Directional derivatives and gradient vectors
		22	Tangent planes and differentials
		23	Tangent planes and differentials
		24	Tangent planes and differentials
		25	Extreme values and saddle points
6	11-07-2022 To 15-07-2022	26	**I Internal Examination**
		27	**I Internal Examination**
		28	**I Internal Examination**
		29	**I Internal Examination**
		30	**I Internal Examination**
7	18-07-2022 To 22-07-2022	31	Extreme values and saddle points
		32	Extreme values and saddle points
		33	Lagrange multipliers
		34	Lagrange multipliers

No of Weeks	Dates	Session	Topic
		35	Partial derivatives with constrained variables
8	25-07-2022 To 29-07-2022	36	Partial derivatives with constrained variables
		37	Partial derivatives with constrained variables
		38	Taylor's formula for two variables
		39	Taylor's formula for two variables
		28 July	Karkidaka Vav
9	01-08-2022 To 05-08-2022	40	Integration in vector fields
		41	Line integrals
		42	Problems
		43	Problems
		44	Vector fields and line integrals
10	08-08-2022 To 12-08-2022	08 August	Muharam
		45	Vector fields and line integrals
		46	work
		47	circulation
		48	**flux**
11	15-08-2022 To 19-08-2022	15 August	Independance Day
		49	Path indepedence
		18 August	Sree Krishna Jayanthi
		50	Problems
		51	Problems
12	22-08-2022 To 26-08-2022	52	Problems
		53	Conservative fields
		54	Green's theorem in the plane
		55	Green's theorem in the plane
		56	Class test
13	29-08-2022 To 02-09-2022	57	Surface area and surface integrals
		58	Surface area and surface integrals
		59	Surface area and surface integrals
		60	Surface area and surface integrals
		61	Parameterized surfaces
14	05-06-2022 To 09-09-2022	05 September	ONAM VACATION
		06 September	ONAM VACATION
		07 September	ONAM VACATION
		08 September	ONAM VACATION
		09 September	ONAM VACATION
15	12-09-2022	62	Parameterized surfaces

No of Weeks	Dates	Session	Topic
	To 16-09-2022	63	Parameterized surfaces
		64	Parameterized surfaces
		65	Parameterized surfaces
		66	Stokes' theorem (theorem without proof)
		67	Stokes' theorem (theorem without proof)
16	19-09-2022 To 23-09-2022	68	Problems
		69	Problems
		21September	Sree Narayana Guru Samadhi
		70	Class Test
		71	Problems
		72	Problems
17	26-09-2022 To 30-09-2022	73	**II Internal Examination**
		74	**II Internal Examination**
		75	**II Internal Examination**
		76	**II Internal Examination**
		77	**II Internal Examination**
		78	**II Internal Examination**
18	03-10-2022 To 07-10-2022	79	Stokes' theorem (theorem without proof)
		04 October	Maha Navami
		05 October	Vijaya Dashami
		80	Divergence theorem and unified theory
		81	Divergence theorem and unified theory
		82	Divergence theorem and unified theory
19	**10-10-2022 To 14-10-2022**	83	Review of stokes' theorem and divergence theorem and problems
		84	Review of stokes' theorem and divergence theorem and problems
		85	Revision
		86	Revision
		87	**V Semester University Examination**
		88	**V Semester University Examination**
20	17-10-2022 To 21-10-2022	89	**V Semester University Examination**
		90	**V Semester University Examination**