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

COURSE PLAN

MSC MATHEMATICS

(2020 – 22)

SEMESTER – IV

ACADEMIC YEAR - (2021-22)

IV Semester MSC MATHEMATICS (2020 - 22)			
SL. No.	Name of Subjects with Code	Name of the Teacher	Duty Hours per week
1.	MAT4C15 Operator Theory	Anil M V + Athulya P	6
2.	MAT4C16 Differential Geometry	Ajeena Joseph	6
3.	MAT4E06 Operations Research	Riya Baby	6
4.	Project Work		6
5.	Viva-Voce		6
	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	MAT4C16 Differential Geometry	MAT4C15 Operator Theory	MAT4E06 Operations Research	Project Work	Viva-Voce
2	MAT4C15 Operator Theory	MAT4E06 Operations Research	Project Work	Viva-Voce	MAT4C16 Differential Geometry
3	MAT4E06 Operations Research	MAT4C16 Differential Geometry	Project Work	MAT4C15 Operator Theory	Viva-Voce
4	MAT4C15 Operator Theory	MAT4E06 Operations Research	MAT4C16 Differential Geometry	Project Work	Viva-Voce
5	MAT4C16 Differential Geometry	Project Work	MAT4E06 Operations Research	Viva-Voce	MAT4C15 Operator Theory
6	MAT4C15 Operator Theory	MAT4C16 Differential Geometry	MAT4E06 Operations Research	Project Work	Viva-Voce

Subject Code:	**MAT4C15**
Subject Name:	**Operator Theory**
No. of Credits:	**4**
No. of Contact Hours:	**90**
Hours per Week:	**6**
Name of the Teacher:	**Anil M V & Athulya P**

MAT4C15: OPERATOR THEORY

Text Book: Balmohan V Limaye; Functional Analysis (Third Edition); New Age International Publishers

Unit I

Spectrum of a Bounded Operator-Spaces of Bounded Linear Functionals; Duals and Transposes Weak and Weak* Convergence
(Chapter-3 Section-12; Chapter-4 Sections 13; 13.1 to 13.6 and Sections 15; 15.1 to 15.4)

Unit II

Spaces of Bounded Linear Functionals; Reflexivity, Compact Operators on Normed Spaces: Compact Linear Maps, Spectrum of a Compact Operator.
(Chapter-4, Section 16.1 to 16.7 [Omitting Theorem 16.3]; Chapter-5, Sections 17,18)

Unit III

Bounded Operators on Hilbert Spaces; Bounded Operators and Adjoints, Normal, Unitary and Self Adjoint Operators, Spectrum and Numerical Range, Compact Self Adjoint Operators. (Chapter-7; Section 25, 26(omitting Fourier Plancherel Transform) and 27; Section 28: 28.1 to 28.5 (Proof of 28.5 is omitted

TEACHING SCHEDULE

No of Weeks	Dates	Session	Topic
1	03-01-2022 To 08-01-2022	1	Spectrum of a bounded operator
		2	Theorem
		3	Definitions
		4	Theorem
		5	Examples
		08 January	Second Saturday
2	10-01-2022 To 15-01-2022	6	Theorem
		7	Theorem
		8	Theorem
		9	Examples
		10	Theorem
		11	Theorem
3	17-01-2022 To 22-01-2022	12	Duals and transpose
		13	Theorem
		14	Theorem
		15	Corollary
		16	Examples
		17	Theorem
4	24-01-2022 To 29-01-2022	18	Theorem
		19	Theorem
		26 January	Republic Day
		20	Class test
		21	Assignment
		22	Weak convergence
5	31-01-2022 To 05-02-2022	31 January	Don Bosco
		23	Theorem
		24	Theorem
		25	Theorem
		26	Examples
		27	Weak* convergence
6	07-02-2022 To 12-02-2022	28	Theorem
		29	Bolzano Weierstrass property
		30	Theorem
		31	Reflexivity
		32	Theorem

No of Weeks	Dates	Session	Topic
		12 February	Second Saturday
7	14-02-2022 To 19-02-2022	33	Lemma
		34	Lemma
		35	Examples
		36	Uniform convexity
		37	Theorem
		38	Class test
8	21-02-2022 To 26-02-2022	39	I Internal Examination
		40	I Internal Examination
		41	I Internal Examination
		42	I Internal Examination
		43	I Internal Examination
		44	I Internal Examination
9	28-02-2022 To 05-03-2022	45	Compact linear maps
		01 March	Maha Sivarathri
		46	Theorem
		47	Theorem
		48	Examples
		49	Theorem
10	07-03-2022 To 12-03-2022	50	Spectrum of a Compact operator
		51	Lemma
		52	Lemma
		53	Theorem
		54	Theorem
		12 March	**Second Saturday**
11	14-03-2022 To 19-03-2022	55	Theorem
		56	Theorem
		57	Examples
		58	Bounded operators
		59	Continuity of Bounded operators
		60	Theorem
12	21-03-2022 To 26-03-2022	61	Theorem
		62	Adjoint operators
		63	Theorem
		64	Theorem
		65	Normal operators
		66	Unitary operators
13	28-03-2022	67	Self adjoint operators

No of Weeks	Dates	Session	Topic
	To 02-04-2022	68	Examples
		69	Theorem
		70	Positive operators
		71	Generalized Schwarz inequality
		72	Examples
14	04-04-2022 To 09-04-2022	73	Eigen Spectrum
		74	Approximate eigen spectrum
		75	Spectrum of a bounded operators
		76	Theorem
		77	Numerical range, properties
		09 April	Second Saturday
15	11-04-2022 To 16-04-2022	78	Theorem
		79	Finite dimemsional spectral theorem
		13 April	Easter Holidays
		14 April	Easter Holidays
		15 April	Easter Holidays
		16 April	Easter Holidays
16	18-04-2022 To 23-04-2022	18 April	Easter Holidays
		80	Compact operators
		81	Hilbert Schmidt operator
		82	Theorem
		83	Revision
		84	Revision
17	25-04-2022 To 30-04-2022	85	II Internal Examination
		86	II Internal Examination
		87	II Internal Examination
		88	II Internal Examination
		89	II Internal Examination
		90	II Internal Examination

Subject Code:	**MAT4C16**
Subject Name:	**Differential Geometry**
No. of Credits:	**4**
No. of Contact Hours:	**90**
Hours per Week:	**6**
Name of the Teacher:	**Ajeena Joseph**

SYLLABUS

Text: John A Thorpe, Elementary Topics in Differential Geometry.

UNIT 1

Graph sets and level sets; Vector field;The tangent space, Surfaces, Vector fields and surfaces; Orientation.
(Chapter 1,2,3,4,5).

UNIT II

The Gauss map, Geodesics, Parallel transport, the Weiengarten map, Curvature of plane curves.
(Chapter 6,7, 8, 9, 10).

UNIT III

Arc length and line integrals, Curvature of surfaces, Parametrized surfaces, Local equivalence of surfaces and parametrized surfaces.
(Chapter 11, 12, 14, 15)

Reference:

1. W I Burko: Applied Differential Geometry, Cambridge University Press (1985)
2. M.De Carmo: Differential Geometry of Curves, Surfaces (Prentice Hall Inc. Englewood cliffs N.J (1976)
3. V. Grilleman and Pollack: Differential Topology, Prentice Hall, Inc Englewood cliffs N.J (1974)
4. Singer and J.A Thorp: Lecture notes on elementary Topology and Geometry CUTM Springer Verlag, New York (1967)
5. R. Millmen and Parker: Elements of Differential Geometry (Prenice Hall Inc. Englewood cliffs N.J (1977)
6. M Spivak: A Comprehensive Introduction to Differential Geometry, Vol 1 to 5, Perish Boston (1970-75)

TEACHING SCHEDULE

No of Weeks	Dates	Session	Topic
1	03-01-2022 To 08-01-2022	1	Level sets
		2	Examples
		3	Examples
		4	Examples
		5	Graph of a function
		08 January	Second Saturday
2	10-01-2022 To 15-01-2022	6	Vector field
		7	Examples
		8	Parametrized curve
		9	Theorem
		10	Examples
		11	Smooth function
3	17-01-2022 To 22-01-2022	12	Class test
		13	Theorem
		14	Examples
		15	Theorem
		16	Examples
		17	Theorem
4	24-01-2022 To 29-01-2022	18	Examples
		19	Theorem
		26 January	Republic Day
		20	Theorem
		21	Definition
		22	Examples
5	31-01-2022 To 05-02-2022	31 January	Don Bosco
		23	Parametrized surfaces
		24	Velocity vector
		25	Examples
		26	Tangent spaces
		27	Orientation of surfaces
6	07-02-2022 To 12-02-2022	28	Theorem
		29	Examples
		30	Class test
		31	Theorem
		32	Theorem

No of Weeks	Dates	Session	Topic
		12 February	Second Saturday
7	14-02-2022 To 19-02-2022	33	Gauss map
		34	Theorem
		35	Theorem
		36	Examples
		37	Theorem
		38	Theorem
8	21-02-2022 To 26-02-2022	39	I Internal Examination
		40	I Internal Examination
		41	I Internal Examination
		42	I Internal Examination
		43	I Internal Examination
		44	I Internal Examination
9	28-02-2022 To 05-03-2022	45	Examples
		01 March	Maha Sivarathri
		46	Examples
		47	Geodesics
		48	Theorem
		49	Theorem
10	07-03-2022 To 12-03-2022	50	Examples
		51	Theorem
		52	Co- Variant derivative
		53	Theorem
		54	Levi- Civita parallel
		12 March	**Second Saturday**
11	14-03-2022 To 19-03-2022	55	Theorem
		56	Weiengarten map
		57	Examples
		58	Class test
		59	Examples
		60	Curvature of plane curve
12	21-03-2022 To 26-03-2022	61	Theorem
		62	Theorem
		63	Examples
		64	Seminar
		65	Seminar
		66	Seminar
13	28-03-2022	67	Examples

No of Weeks	Dates	Session	Topic
	To 02-04-2022	68	Arc Length
		69	Theorem
		70	Line Integrals
		71	Examples
		72	Class test
14	04-04-2022 To 09-04-2022	73	Theorem
		74	Theorem
		75	Curvature of surfaces
		76	Theorem
		77	Theorem
		09 April	Second Saturday
15	11-04-2022 To 16-04-2022	78	Theorem
		79	Theorem
		13 April	Easter Holidays
		14 April	Easter Holidays
		15 April	Easter Holidays
		16 April	Easter Holidays
16	18-04-2022 To 23-04-2022	18 April	Easter Holidays
		80	Examples
		81	Examples
		82	Revision
		83	Revision
		84	Revision
17	25-04-2022 To 30-04-2022	85	II Internal Examination
		86	II Internal Examination
		87	II Internal Examination
		88	II Internal Examination
		89	II Internal Examination
		90	II Internal Examination

Subject Code:	**MAT4E06**
Subject Name:	**OPERATIONS RESEARCH**
No. of Credits:	**4**
No. of Contact Hours:	**5**
Hours per Week:	**75**
Name of the Teacher:	**RIYA BABY**

MAT4E06 OPERATIONS RESEARCH

Text Book; Kanti Swarup, P.K Gupta, Man Mohan; Operations Research; Sultan Chand & Sons. New Delhi (2007)

Unit I
Markov Analysis, Decision Analysis, Simulation
(Chapter-15; All Sections; Chapter-16; All Sections; Chapter-22; Section 22.1 to 22.9)

Unit II
Reliability and System failure rates, Inventory Control
(Chapter-18; Section 18.6, Chpater-19; All Sections, expect 19.8 and 19.9)

Unit III
Information Theory (Chpater-30; Section 30.1 to 30.10)

References:

1. K.V Mittal; Optimization methods on Operations Research and System: Analysis, New Age International (P) Ltd. New Delhi
2. J.K Sharma; Operations Research-Theory and Applications, Macmillan, New Delhi
3. R.K Gupta; Operations Research, Krishna Prakashan Mandir II, Shivaji Road, Meerat-2,
4. L.R Potti; Operations Research, Yamuna Publications, Sreekanteswaram, Thiruvananthapuram
5. Premkumar Gupta and D.S Hira; Operations Research, S.Chand & Company Ltd. Ram Nagar New Delhi 1995.
6. B.S Goel and S.K Mittal; Operations Research, Pragti Prakashan Meerat-2

TEACHING SCHEDULE

No of Weeks	Dates	Session	Topic
1	03-01-2022 To 08-01-2022	1	Introduction
		2	Basic definitions
		3	Basic theorems on markov analysis
		4	Theorems
		5	Definitions
		08 January	Second Saturday
2	10-01-2022 To 15-01-2022	6	Markov analysis
		7	Advantages
		8	Disadvantages
		9	Limitations
		10	Procedure
		11	Algorithm
3	17-01-2022 To 22-01-2022	12	Basic steps
		13	Problems
		14	Problems
		15	Problems
		16	Problems
		17	Problems
4	24-01-2022 To 29-01-2022	18	Decision analysis
		19	Definitions
		26 January	Republic day
		20	Theory
		21	Theory
		22	Different methods
5	31-01-2022 To 05-02-2022	31 January	Don Bosco
		23	Different methods
		24	Different methods
		25	Different methods
		26	Different methods
		27	Different methods

No of Weeks	Dates	Session	Topic
6	07-02-2022 To 12-02-2022	28	Different methods
		29	Different methods
		30	Different methods
		31	Different methods
		32	Test paper
		12 February	Second Saturday
7	14-02-2022 To 19-02-2022	33	Problems
		34	Problems
		35	Problems
		36	Simulation
		37	Definitions
		38	Problems
8	21-02-2022 To 26-02-2022	39	I internal examination
		40	I internal examination
		41	I internal examination
		42	I internal examination
		43	I internal examination
		44	I internal examination
9	28-02-2022 To 05-03-2022	45	Problems
		01 March	Maha sivarathri
		46	Reliability and System failure rates
		47	Reliability and System failure rates
		48	Reliability and System failure rates
		49	Reliability and System failure rates
10	07-03-2022 To 12-03-2022	50	Advantages
		51	Disadvantages
		52	Limitations
		53	Procedure
		54	Algorithm
		12 March	Second Saturday
11	14-03-2022 To	55	Problems
		56	Problems

No of Weeks	Dates	Session	Topic
	19-03-2022	57	Inventory control
		58	Inventory control
		59	Inventory control
		60	Inventory control
12	21-03-2022 To 26-03-2022	61	Inventory control
		62	Introduction
		63	Basic definitions
		64	Basic theorems
		65	Theorems
		66	Definitions
13	28-03-2022 To 02-04-2022	67	Advantages
		68	Disadvantages
		69	Limitations
		70	Procedure
		71	Algorithm
		72	Problems
14	04-04-2022 To 09-04-2022	73	Problems
		74	Problems
		75	Problems
		76	Problems
		77	Test paper
		09 April	Second Saturday
15	11-04-2022 To 16-04-2022	78	Information theory
		79	Information theory
		13 April	Easter holidays
		14 April	Easter holidays
		15 April	Easter holidays
		16 April	Easter holidays
16	18-04-2022 To 23-04-2022	18 April	Easter holidays
		80	Elements of IT
		81	Procedures
		82	Theory
		83	Definitions

No of Weeks	Dates	Session	Topic
		84	Revision
17	25-04-2022 To 30-04-2022	85	II internal examination
		86	II internal examination
		87	II internal examination
		88	II internal examination
		89	II internal examination
		90	II internal examination