STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI
COURSE PLAN June - November 2024

Department : **Mathematics**
Name of the Faculty : **Dr. S. Teresa Arockiamary**
Course Title : **Functional Analysis**
Course Code : **23MT/PC/FA34**
Shift : **1**

COURSE OUTCOMES (COs)

COs	Description	CL
CO1	understand the basic definitions of normed spaces	K1
CO2	explain and illustrate the concept of normed spaces, Banach spaces, bounded linear maps, linear functionals through simple problems and related theorems	K2
CO3	investigate the properties of normed spaces, Banach spaces, bounded linear maps, linear functionals	K3
CO4	analyse the properties learnt and use it to develop the theory of Hilbert spaces	K4
CO5	evaluate the concepts learnt and find its applications in numerical analysis and approximation theory	K5

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Jun 19 – 26, 2024 (Day Order 1 - 6)	1	**Fundamentals of Normed Spaces** 1.1 Normed Spaces 1.2 Continuity of Linear Maps	K1-K5	5	CO1-5	Lecture Group Discussions	Questioning and interaction
Jun 27 – July 4, 2024 (Day Order 1 - 6)	1	1.3 Hahn-Banach Theorems 1.4 Banach Spaces	K1-K5	5	CO1-5	Lecture Group Discussions	Questioning and interaction
July 5 – 12, 2024 (Day Order 1 - 6)	1 & 2	1.4 Banach Spaces **Bounded Linear Maps on Banach Spaces** 2.1 Uniform Boundedness Principle	K1-K5	5	CO1-5	Lecture Group Discussions	Questioning and interaction Slip test
July 15 – 23, 2024 (Day Order 1 - 6)	2	2.1 Uniform Boundedness Principle 2.2 Closed Graph and Open Mapping Theorems	K1-K5	5	CO1-5	Lecture Group Discussions Problem solving	Questioning and interaction Third Component I: Test (Unit 1 Few Theorems) Marks: 20
July 24 – 31, 2024 (Day Order 1 - 6)	2	2.2 Closed Graph and Open Mapping Theorems 2.3 Bounded Inverse Theorem	K1-K5	5	CO1-5	Lecture Presentations	Third Component II: Seminar (Units 3,4 & 5.1) Marks:15 Group Work
Aug 1 – 5, 2024 (Day Order 1 - 3)	2	2.4 Spectrum of a Bounded Operator	K1-K5	2	CO1-5	Lecture Presentations	Questioning and interaction
Aug 6 – 10, 2024	**C.A. Test – I (Units 1 & 2)**						

Aug 12 – 14, 2024 (Day Order 4-6)	2 & 3	2.4 Spectrum of a Bounded Operator **Spaces of Bounded Linear Functionals** 3.1 Duals and Transposes	K1-K5	3	CO1-5	Lecture Presentations	Seminar Group Work
Aug 16 – 23, 2024 (Day Order 1-6)	3	3.1 Duals and Transposes 3.2 Weak and Weak * Convergence	K1-K5	5	CO1-5	Presentations Group Discussions	Questioning and interaction Seminar
Aug 27 – Sep 3, 2024 (Day Order 1-6)	3 & 4	3.2 Weak and Weak * Convergence **Geometry of Hilbert Spaces** 4.1 Inner Product Spaces	K1-K5	5	CO1-5	Presentations Group Discussions Problem solving	Questioning and interaction Seminar Slip test
Sep 4 – 11, 2024 (Day Order 1-6)	4	4.1 Inner Product Spaces 4.2 Orthonormal Sets	K1-K5	5	CO1-5	Presentations Group Discussions Problem solving	Questioning and interaction Seminar
Sep 12 - 20, 2024 (Day Order 1-6)	4	4.2 Orthonormal Sets 4.3 Projection and Riesz Representation Theorems	K1-K5	5	CO1-5	Presentations Group Discussions	Questioning and interaction Seminar
Sep 23 - 26, 2024 (Day Order 1-4)	4	4.3 Projection and Riesz Representation Theorems	K1-K5	3	CO1-5	Presentations Group Discussions	Questioning and interaction
Sep 27 – Oct 3, 2024	**C.A. Test – II (Units 3 & 4)**						
Oct 4 – 5, 2024 (Day 5 & 6)	5	**Bounded Operators on Hilbert Spaces** 5.1 Bounded Operators and Adjoints	K1-K5	2	CO1-5	Presentations Group discussions	Questioning and interaction Seminar
Oct 7 - 15, 2024 (Day Order 1 to 6)	5	5.1 Bounded Operators and Adjoints 5.2 Normal, Unitary and Self- Adjoint Operators	K1-K5	5	CO1-5	Presentations Group discussions	Third Component III: Problem Test (Unit 5) Marks:15
Oct 16 - 22, 2024 (Day Order 1 to 6)	5	5.2 Normal, Unitary and Self- Adjoint Operators	K1-K5	5	CO1-5	Lecture Group discussions	Questioning and interaction

Oct 23 - 24, 2024	**REVISION**
(Day Order 1 to 2)	