Syllabus:
Poinacre's Recurrence Theorem, Hopf's Maximal Ergodic Theorem, Birkoff's Individual ergodic Theorem, von Neumann's Mean Ergodic Theorem. Ergodicity, Mixing, Eigenvalues. Discrete Spectrum Theorem. Ergodic automorphisms of Compact Groups. Conjugacy. Entropy.

Text books:
1. Peter Walters, An Introduction to Ergodic Theory, Springer, 2005.

References:
1. Halmos P. R., Intordoctory Lectures in Ergodic Theory,
2. Nadakarni M. G., Ergodic Theory, Hindustan Book Agency, 3rd Edition, 2013.

Code:MAT5008: Fixed Point Theory Prerequisites: Topology and functional analysis	L	T	P	Credit
	3	2	0	4

Course Category	Elective
Course Type	Theory
Course Objective	The objective of the course is to motivate and equip the students with the basics in topological as well as metric fixed point theory. It also intends to expose the students to some of the interesting applications in fixed point theory and make them understand how this important tool is used in the study of nonlinear phenomena.
Course Outcome(s)	Upon completion of this course : Students will be familiar with some of the classical results in Metric fixed point theory such as Banach Contraction Principal and several other contraction theorems such as Kannan’s fixed point theorem, Chatterjea’s fixed point theorem etc.; able to understand the concept of measure of noncompactness; able to understand Brower fixed point theorem and its generalizations such as Schauder fixed point theorem and its applications

	students will be able to recognize various iteration schemes for approximating fixed points

Syllabus:

The Background of Metrical Fixed Point Theory, Fixed Point Formulation of Typical Functional Equations, Fixed Point Iteration Procedures, The Principle of Contraction mapping in complete metric spaces, Some generalizations of Contraction mapping, A converse of Contraction Principle, some applications of Contraction Principle.

Convexity, Smoothness, and Duality Mappings, Geometric Coefficients of Banach Spaces, Existence Theorems in Metric Spaces, Existence Theorems in Banach Spaces, Approximation of Fixed Points, Strong Convergence Theorems.

Compactness in metric spaces. Measure of noncompactness, Measure of noncompactness in Banach spaces, Classes of special operators on Banach spaces. The Fixed point property, Brower's Fixed point theorem, equivalent formulations, some examples and applications, The computation of fixed points, Schauder's fixed point theorem and its generalizations,

Applications of Fixed Point Theorems.

Text books:

1. V. Berinde, Iterative approximation of fixed points, Springer-Verlag, Berlin, Heidelberg, 2007.
2. R. P. Agarwal, Maria Meehan and D.O' Regan, Fixed point theory and applications, Cambridge University Press, 2001.

References:

1. V. I. Istratescu, Fixed Point Theory - An Introduction, D. Reidel Publishing Company, Dordrecht, Holland, 1981.
2. K. Goebel and W. A. Kirk, Topics in Metric _xed point theory, Cambridge University Press, 1990.
3. A. Granas and J. Dugundji, Fixed point theory, Springer Monographs in Mathe matics, 2003. 4. M. A. Khamsi and W. A. Kirk, An Introduction to Metric Spaces and Fixed Point Theory, A Wiley- Interscience Publication, 2001.
5. W. A .Kirk and B. Sims, Handbook of Metric Fixed Point Theory, Kluwer Academic Publishers, 2001.
6. Sankatha Singh, Bruce Watson and Pramila Srivastava, Fixed point theory and best approximation:
The KKM-Map principle, Kluwer Academic Publishers, 1997.
7. E.Zeidler, Nonlinear Functional Analysis and its Applications I: Fixed Point Theorems, Springer-Verlag, New York, 1986.