

# **ADVANCED TOPICS IN TOPOLOGY AND MODERN ANALYSIS**

Course Code: **MM24409DCE**

Semester: **MA/M.Sc. 4<sup>th</sup> Semester**

Continuous Assessment: **Marks 20**, Theory: **Marks 80**

Total Credits: **04**

Total Marks: **100**

Time Duration: **2½ hrs**

**Course Objectives:** To provide the students an integrated development of modern analysis and topology through the integrating vehicle of uniform spaces.

**Course Outcome:** After the successful completion of the course, the students shall be able to apply topological and other concepts from analysis, Uniform spaces in measure and other related problems.

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## **Unit -I**

Uniform spaces, definition and examples, uniform topology, metrizable complete regularity of uniform spaces, pre-compactness and compactness in uniform spaces, uniform continuity.

## **Unit -II**

Uniform continuity, uniform continuous maps on compact spaces Cauchy convergence and completeness in uniform spaces, initial uniformity, simple applications to function spaces, Arzela-Ascoli theorem.

## **Unit -III**

Abstract harmonic analysis, definition of a topological group and its basic properties. subgroups and quotient groups, product groups and projective limits, properties of topological groups involving connectedness, invariant metrics and Kakutani theorem, structure theory for compact and locally compact, Abelian groups.

## **Unit -IV**

Some special theory for compact and locally compact Abelian groups, Haar integral and Haar measure, invariant means defined for all bounded functions, convolution of functions and measures, elements of representation theory, unitary representations of locally compact groups.

## **Recommended Books:**

1. I. M. James, Uniform Spaces, Springer Verlag, 1987th Edition, 1987.
2. K. D. Joshi, Introduction to General Topology, New Age International Pvt Ltd, 2017.
3. S. K. Berberian, Lectures on Operator Theory and Functional Analysis, Springer Verlag, 1974th Edition, 2014.
4. G. B. Folland, Real Analysis, John Wiley, 2<sup>nd</sup> Edition, 1999.
5. G. Murdeshwar, General Topology, New Age International Pvt. Ltd, 3rd Edition, 2020.
6. E. Hewitt & K.A Ross, Abstract Harmonic Analysis-I, Springer Verlag, 1979.