MAT 671 – Topology

Course Code & Number	Course Name	Credit Hours	Lec.	Lab.	Tut.	Prerequisites
MAT 671	Topology	4	3	0	1	MAT 613

Syllabus:

Basics: Review of set theory, Definition and examples of topological spaces, equivalent topologies, Basis and Sub-basis, Subspaces, Order topology, Closed sets and the closure of a set, Hausdorff spaces, Continuous functions, Homeomorphisms and topological properties, Product and box topologies.

Metric Spaces: Definition and important examples, Metrics on $\mathbb{R}^{\omega}$, The Induced metric topology, Metrizable topological spaces, Sequences and the sequence lemma, Cauchy sequences and complete metric Spaces, Uniform convergence.

Connectedness & Compactness: Separation and connected topological spaces, Basic properties, products of connected spaces, Path connectedness, Connectedness in $\mathbb{R}$.Open covering and compact spaces, Basic properties, Hausdorff compact spaces, Compactness in $\mathbb{R}$, Lebesgue number lemma and the uniform convergence theorem, Compactness in $\mathbb{R}^n$, Tychonoff theorem, Limit and sequentially compactness, Local compactness and the one-point compactification.

Countability and Separation Axioms: Countability Axioms, Separation Axioms, Normal Spaces Urysohn Lemma and Urysohn Metrization Theorem.

References

1. J. R. Munkres; ***Topology***; 2nd Edition, Pearson, 2000. **(Main Reference)**
2. B. Mendelson; ***Introduction to Topology***; 3rd Edition, Dover Publications, 1990.
3. S. Willard; ***General Topology***; Dover Publications, 2004.