Syllabus for Comprehensive Exams: TOPOLOGY

M.S. - MATH

(1) **Topological Spaces:** Open sets, closed sets, limit points, boundary points, closure, neighborhoods, bases, sub-bases, subspace topology, metric spaces, product spaces, order topology on a linearly ordered set

(2) **Connectedness, Compactness, Continuity:** Continuous functions, homeomorphisms, embeddings, connected spaces, arcwise connectivity, local connectivity, components, path components, compact spaces, local compactness, sequential compactness, examples in $\mathbb{R}, \mathbb{R}^2, \mathbb{R}^3$

(3) **Countability, separation axioms:** Hausdorff spaces, regularity, normality, Urysohn Lemma, Tietze's extension theorem (statement only), complete regularity, first and second axioms of countability, separable spaces, Lindelöf spaces

MAIN REFERENCES:

[1] Munkres, *Topology: A First Course*, Second Edition

Ch. 2 [omit §2.21, §2.22], 3, 4 [omit §4.36], 5 [omit §5.38]

[2] Dugundji, *Topology*

Ch. 3, 4 [§4.1–4.3], 5, 7, 8 [§8.6, 8.7], 9 [§9.1–9.5, 9.7], 11 [§11.1–11.4, 11.6]

OTHER REFERENCES:

[3] Gemignani, *Elementary Topology*, Second Edition

Ch. 2, 3, 4 [omit §4.5], 5, 7, 8 [omit §8.3], 9

[4] Hocking/Young, *Topology*

[5] Kelley, *General Topology*

[6] Simmons, *Introduction to Topology and Modern Analysis*