Introduction to Topology Preps

August-25-10
9:43 AM

MAT327H1
Introduction to Topology [36L]
Metric spaces, topological spaces and continuous mappings; separation, compactness, connectedness. Topology of function spaces. Fundamental group and covering spaces. Cell complexes, topological and smooth manifolds, Brouwer fixed-point theorem. Students in the math specialist program wishing to take additional topology courses are advised to obtain permission to take MAT1300Y. Students must meet minimum GPA requirements as set by SGS and petition with their college.
Prerequisite: MAT257Y1/(MAT224H1, MAT237Y1, MAT246H1 and permission of the instructor)

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Course	& Section	Ssn	Day	& Times..	Bld/Room	Bgn Date	End Date
MAT327H	LEC 0101	20109	M	14:00 15:00	SS 1070	2010/09/13	2010/12/06
MAT327H	LEC 0101	20109	R	14:00 16:00	SS 1070	2010/09/16	2010/12/02

By the week plan (a priori, rough, optimistic) -

1. Topologies, bases, continuous functions, the product topology and the subset topology, closed sets.
2. Closure and limit points, T2 spaces, equivalent conditions for continuity, the box and the product topologies.
3. Topologies on products, metrics and metrizability, metrizability of countable products, non-metrizability of products in the box topology, non-metrizability of uncountable products, sequences and sequential closure, clopens and connectedness.
4. Connected sets, intervals are connected, finite and infinite products are connected, connectedness in the box topology, connectedness and path-connectedness, compactness, the unit interval is compact, compactness and closedness, compactness of finite products.
5. The finite intersection property, Zorn's lemma, the axiom of choice and Tychonoff's theorem, a word on Lims, normal spaces, compacts and metrizable are normal.
6. Urysohn's lemma and Tietze's theorem, compactness in metric spaces, completing a metric space
7. Hilbert 13th problem, term test.
8. Baire spaces, nowhere-differentiable functions, metric is Baire, compact is Baire, local compactness and the one-point compactification.
9. Homotopy of paths and the fundamental group, the fundamental group of a circle and path lifting.
10. Homotopies between maps, homotopy equivalence and retracts, Brouwer's theorem, the fundamental theorem of algebra, the fundamental group of spheres.
11. Van-Kampen: statement and many examples.
12. The classification of surfaces.

Reality at (end − 4 weeks): Done to the "Finite Intersection property".

The last 4 weeks: Continue as planned, just w/o the fundamental group and without surfaces. } Hilbert 13 optional.

If lack, a very quick intro to π_1 and Brouwer at the very end.

Do roaches on the side.