BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE-PILANI, HYDERABAD CAMPUS
INSTRUCTION DIVISION
FIRST SEMESTER 2016-2017
Course Handout (Part II)

Date:01-08-2016

In addition to part-I (General Handout for all courses appended to the timetable) this portion gives further specific details regarding the course.

Course No. **:** MATH F311
Course Title : INTRODUCTION TO TOPOLOGY
Instructor-in-charge : SHARAN GOPAL

1 . **Course Description:** Metric Spaces; Topological Spaces – subspaces; Continuity and homeomorphism; Quotient spaces and Product spaces; separation axioms; Urysohn's lemma and Tietze extension theorem; Connectedness; Compactness; Tychonoff's Theorem; Locally Compact Spaces; Homotopy and the fundamental group.

2. **Scope and Objective of the Course:** To introduce the students to concepts of logical thinking in abstract terms using formal and axiomatic methods and to lay the foundations for further studies in abstract mathematics.

3. **Text Book:** Munkres, J.R.: Topology, PHI (Second Edition), 2000

4. **Reference Books:**
   1. John L. Kelley, General topology., van Nostrand. Reprinted (1976) by Springer Verlag
   2. L. A. Steen and J. A. Seebach, Counterexamples in topology, Springer, 1978.

5. Course Plan:

Lecture No.	Learning Objectives	Topics to be covered	Sec. No. of Text Book
1	To give the overview of the course and give the broad perspective of the course	Overview of the course	-
2 - 3	To make the students understand the definition of topological spaces and the how it generalizes the concept of metric spaces	Topological Spaces; Examples	12
4	To study the concept of basis and understand how it generates a topology	Basis and subbasis	13
5	To study the topology which is defined using an order relation on a set	The order Topology	14
6	To study the subspace topology	Subspaces & Subspace Topology	16

7	To study the product topology for product of finitely many topological spaces	Finite Products	15
8 – 10	To study the topological properties of subsets of a topological space	Closed sets, closure and Interior of a set, limit points, Hausdorff spaces	17
11 – 13	To study the continuous functions and homeomorphisms on a topological space	Continuous functions; homeomorphisms	18
14 – 15	To study the two different concepts of product topology on arbitrary product of topological spaces and understand why do we prefer product topology to box topology	Product Topology and Box Topology	19
16 – 19	To study the metrizable topological spaces and their properties	Metric topology	20-21
20 – 22	To study the quotient topology and understand how this concept is connected with geometry	Quotient topology	22
23 – 25	To study the concept of connectedness for a topological spaces and understand how a topological space can be broken into pieces that are connected	Connected Spaces, Components and Local connectedness	23-25
26 – 28	To study the various notions of compactness in a topological spaces	Compact Spaces	26-28
29 – 30	To study the notion of local compactness	Locally Compact spaces	29
31 – 33	To study the countability axioms and understand how hw countability axioms are well behaved with respect to the operations of taking subspaces or countable products	Countability axioms	30
34 – 36	To study the separations axioms and their properties	Separation axioms	31
37 – 38	To study the normal topological spaces	Normal spaces; Urysohn's lemma	32-33
39 – 40	To study a theorem that gives us conditions under which a topological space is metrizable	Urysohn Metrization Theorem	34
41 – 42	To study the arbitrary product of compact spaces	Tychonoff's Theorem	37

6. **Evaluation Scheme:**

EC No.	Evaluation Component	Duration	Weightage	Date, Time	Nature of Component
1.	Test I	1 Hr	20%	10/9, 10.00--11 AM	Closed Book
2.	Test II	1 Hr	20%	22/10, 10.00--11 AM	Closed Book
3.	Assignment		20%		Open Book
4.	Comprehensive Examination	3 hrs	40%	09/12 AN	Closed Book

7. **Make-up Policy**: Make-up will be given only for very genuine cases and prior permission has to be obtained from I/C.

8. **Chamber consultation hours:** To be announced in the class.

9. **Notices:** The notices concerning this course will be displayed on the CMS site only.

Instructor-in-charge
MATH F311