



AN INTRODUCTION TO POINT-SET- TOPOLOGY PART-II

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PRE-REQUISITES : Attended the part-I of this course from NPTEL or acquired the basic knowledge the content offers from elsewhere.

INTENDED AUDIENCE : Students from various streams which include some modern mathematics such as B. Sc., M. Sc., Students, Ph. D. , B. Tech. and M. Tech. who had not attended any topology courses seriously, before this, will be able to benefit from this course.

COURSE OUTLINE :

This course begins with the assumption that the audience has attended the part-I. We cover all important advanced topics such as various notions of compactness in metric spaces, Ascoli's theorem, paracompactness, compactifications, Urysohn's Metrization theorem, Stone-Weierstrass theorem, total disconnectedness, etc. Checking whether any of these topological properties in product invariant occupies a considerable amount of our time. A brief introduction to Topological Dimension Theory, discussion of function-space topologies and finally the Ordinal topology as a rich source of counter examples are the added features. The content of this course will be useful for anybody who wishes to study deeper aspects of Analysis or topology or apply topological tools anywhere else in Mathematics or Physics, etc. It is certainly useful in the two courses that I have offered on Algebraic Topology on NPTEL portal.

ABOUT INSTRUCTOR :

Prof. Anant R Shastri is a retired Emeritus Fellow of Department of Mathematics I.I. T. Bombay. After serving in School of Mathematics T.I.F.R. for 16 years he joined I.I.T. Bombay as a full professor in 1988. Apart from several research papers, he has published three books. Since 2004, he has constantly involved in the activities of ATM schools, the chief activity of these schools is to impart advanced training in Mathematics to Ph. D. students in various universities and research institutions in the country. These activities were initially funded by NBHM and currently adapted by National Centre for Mathematics, I.I.T. Bombay. Over the years, he has taught roughly the contents of the proposed course more than 20 times to M.Sc/ BTech / MTech and Ph. D. students. CDEEP has recorded my course on Complex Analysis MA205 for B. Tech students. He has offered a course in Algebraic Topology in two parts on NPTEL portal. He strongly believes that especially in these troubled times NPTEL mode of Knowledge-dissemination is the best.

COURSE PLAN :

Week 1: Compactness and separation axioms.

Week 2: Paracompactness and partition of unity.

Week 3: Various notions of Compactness in metric spaces, Ascoli's theorem.

Week 4: Productive properties.

Week 5: Productive properties continued.

Week 6: Urysohn's Metrization theorem.

Week 7: Compactifications 1-pt compactification, Stone-Cech Compactification.

Week 8: Total disconnectedness.

Week 9: A brief introduction to dimension theory.

Week 10: Function spaces, Compact open topology, exponential correspondence.

Week 11: Stone-Weierstrass Theorem.

Week 12: Ordinal Topology- a source for many counter examples.