

Hong Kong Baptist University
Faculty of Science
Department of Mathematics

Title (Units): MATH 3650 TOPOLOGY (3,3,0)

Approved by Science Faculty at April 26, 2011

Course Aims: This course covers the essential concepts of topological spaces. Important topological properties are also taught to lay the ground work for further studies.

Prerequisite: MATH1111-2 Mathematical Analysis I & II

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Learning Outcomes (LOs):

Upon successful completion of this course, students should be able to:

No.	Learning Outcomes (LOs)
1	recognize the basic concepts of topological spaces, such as subspace, product spaces, connectedness and compactness, homeomorphism
2	develop the concept of metric spaces
3	construct quotient space
4	derive the properties of connectedness and compactness
5	prove elementary theorems involving the concepts of topological space, homeomorphism, compactness and connectedness
6	prove elementary theorems involving the concepts of topological space, homeomorphism, compactness, and connectedness

Assessment:

No.	Assessment Methods	Weighting	Remarks
1	Continuous Assessment (assignments and test)	20%	Continuous assessments are designed to measure how well the students have learned the basic concepts and fundamental theory of topology.
2	Final Examination	80%	Final Examination questions are designed to see how far students have achieved their intended learning outcomes. Questions will primarily be understanding and skills based to assess the student's versatility in topology.

Learning Outcomes and Weighting:

Content	LO No.	Teaching (in hours)
I. Topological Spaces	1, 2, 3, 5	14
II. Connectedness	1, 4, 5	8
III. Compactness	1, 4, 5	6
IV. Metric Spaces	2, 5	11

Textbook: B. Mendelson, Introduction to Topology, Dover Publications, 1990.

References: C. Adams and R. Franzosa, Introduction to topology: pure and applied, Prentice Hall, 2007.
C.W. Patty, Foundations of Topology, PWS-KENT Publishing Co. Boston, 1993.
J. Munkres, Topology: A first course, Prentice-Hall, 1975.
J. Dugundji, Topology, Allyn and Bacon, 1966.
D. Christie, Basic Topology, MacMillan, 1976.
S. Willard, General Topology, Addison-Wesley, 1970.

Course Content in Outline:

	<u>Topic</u>	<u>Hours</u>
I.	Topological Spaces	14
	A. Definitions and examples of topological spaces	
	B. Basis and subbasis	
	C. Subspaces	
	D. Closed sets, limit points, closure	
	E. Continuous mappings, homeomorphism	
	F. Cartesian product and product topology	
	G. Quotient spaces	
	H. T_1 , T_2 spaces	
II.	Connectedness	8
	A. Connected spaces	
	B. Properties and connected sets in the real line	
	C. Components	
	D. Path connectedness	
	E. Applications	
III.	Compactness	6
	A. Compact space	
	B. Examples and properties	
	C. Local compactness	
IV.	Metric Spaces	11
	A. Definitions and examples of metric spaces	
	B. Convergence in metric spaces	
	C. Complete metric space	
	D. Compactness in metric spaces	
	E. Bolzano property, total boundedness, sequential compactness	