



DEPARTMENT OF MATHEMATICS

Semester : VII

Integrated M.Sc. Mathematics
Subject : 060090701 Topology

Academic Year : 2019-20

Teaching Schedule

Objectives of the course: To provide knowledge of fundamentals of point-set topology, algebraic topology. To establish the topological scenario for general problem and perform the mathematical analysis.

Course Outcomes: Upon completion of the course, students shall be able to

CO1: identify the concepts of distance between two sets, connectedness, denseness, compactness and separation axioms.

CO2: know the two fundamental topologies: discrete and indiscrete topologies.

CO3: provide the awareness of tools for students to carrying out advanced research work in pure mathematics.

CO4: ability to establish the denseness of a given subset of a space.

CO5: formulate topology of a problem and resolve it using acquired knowledge of the topology.

CO6: use embeddings to understand the digital topology and image processing applications.

Unit	Sub Unit	No. of Lect.(s)	Topics	Reference Chapter/ Additional Reading	Teaching Methodology to be used	Active Learning Activities	Evaluation Parameter
Unit 1: Topological Spaces							
[20]	1.1	4	Topological space and examples, Relative topology and examples, continuity & convergence	Ch#3 George F. Simmons, Introduction to Topology and Modern Analysis	Chalk & Talk	For Slow Learner: Students must write answer of question(s) given by teacher after completion of each method and verified by teacher to resolve any query of students.	Unit Test -1 Assignment-1
	1.2	4	Open and closed sets with examples, Closure of a set, Neighborhood of a point, Interior point, limit point				





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	1.3	4	Derived set with theorems and examples , Definition and examples of open base and open sub base			For Active Learner: Student will solve exercise given in book after completion of Unit.	
	1.4	4	First and second countable spaces with theorems and examples				
	1.5	4	Separable spaces with theorems and examples				
Unit 2: Compactness							
[18]	2.1	5	Cover, Sub-cover, open cover, Basic and sub-basic open cover, sub cover, Countable open cover	Ch#4 George F. Simmons, Introduction to Topology and Modern Analysis	Chalk & Talk	For Slow Learner: Students must write answer of question(s) given by teacher after completion of each method and verified by teacher to resolve any query of students. For Active Learner: Student will solve exercise given in book after completion of Unit.	Unit Test -1 and 2 Assignment-1
	2.2	5	Continuity and compactness with theorems and examples				
	2.3	4	Finite intersection property				
	2.4	4	Heine Borel property with theorems				
Unit 3: Product Spaces							
[12]	3.1	4	Definition and examples, Projection mappings and its continuity	Ch#4 George F. Simmons, Introduction to Topology and Modern Analysis	Chalk & Talk	For Slow Learner: Students must write answer of question(s) given by teacher after completion of each method and verified by teacher to resolve any query of students.	Unit Test -2 Assignment-2
	3.2	4	Open and closed sub-base for product space				
	3.3	2	Tychonoff's theorem				





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	3.4	2	Generalized Heine Borel theorem			For Active Learner: Student will solve exercise given in book after completion of Unit.	
Unit 4: Compactness for Metric Space							
[10]	4.1	3	Sequentially compact metric space	Ch#4 George F. Simmons, Introduction to Topology and Modern Analysis	Chalk & Talk	For Slow Learner: Students must write answer of question(s) given by teacher after completion of each method and verified by teacher to resolve any query of students.	Internal Examination Assignment-2
	4.2	2	Bolzano-Weierstrass property (BWP)				
	4.3	3	Totally bounded Space				
	4.4	2	Ascoli's theorem				
						For Active Learner: Student will solve exercise given in book after completion of Unit.	

Text book:

1. George F. Simmons, Introduction to Topology and Modern Analysis, McGraw - Hill Book Co., 1963.

Reference books:

1. James R. Munkres, Topology, A First Course, Prentice Hall of India Pvt. Ltd., New Delhi, 2000.
2. J. Dugundji, Topology, Allyn and Bacon, 1966 (Reprinted in India by Prentice Hall of India Pvt. Ltd.)
3. K. D. Joshi, Introduction to General Topology, Wiley Eastern Ltd., 1983.
4. J. Hocking and G. Young, Topology, Addison-Wesley, Reading, 1961





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Course Objectives and Course Outcomes Mapping:

- To provide knowledge of fundamentals of point-set topology and algebraic topology: CO1, CO2, CO3, CO4
- To establish the topological scenario for general problem and perform the mathematical analysis: CO5, CO6

Course Units and Course Outcomes Mapping:

Unit No.	Unit	Course Outcomes					
		CO1	CO2	CO3	CO4	CO5	CO6
1	Topological Spaces	✓	✓	✓		✓	✓
2	Compactness	✓		✓	✓	✓	✓
3	Product Spaces			✓		✓	✓
4	Compactness for Metric Space			✓	✓	✓	✓

Programme Outcomes (PO)

PO1: Knowledge

Provides knowledge about the fundamentals of pure, applied and computing mathematics and its applications to students that creates the opportunities in industries and research centers.

PO2: Core Competence

Creates competency in science and mathematics to formulate, analyses and solve problem and/or also to pursue advanced study or research.

PO3: Breadth

Trains students having good knowledge in unearth core of academia and industry by the roots of mathematics.

PO4: Evaluation

Imparts in students to raise trial and error-based curiosity and problem-solving functionality with research based advanced tutorial for higher level decision makings tools.





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Programme Outcomes and Course Outcomes Mapping:

Programme Outcomes	Course Outcomes					
	C01	C02	C03	C04	C05	C06
P01		✓	✓			✓
P02	✓		✓			
P03				✓	✓	
P04			✓			✓

