

ANALYSIS-IV (METRIC SPACES)

Total marks: 100(Theory: 75, Internal Assessment: 25)

5 Periods (4 lectures +1 students' presentation),

1 Tutorial (per week per student)

(1st Week)

Metric spaces: definition and examples.

[1] Chapter1, Section 1.2 (1.2.1 to 1.2.6).

(2nd Week)

Sequences in metric spaces, Cauchy sequences.

[1] Chapter1, Section 1.3, Section 1.4 (1.4.1 to 1.4.4)

(3rd Week)

Complete Metric Spaces.

[1] Chapter1, Section 1.4 (1.4.5 to 1.4.14 (ii)).

(4th Week)

Open and closed balls, neighbourhood, open set, interior of a set

[1] Chapter2, Section 2.1 (2.1.1 to 2.1.16)

(5th & 6th Weeks)

Limit point of a set, closed set, diameter of a set, Cantor's Theorem.

[1] Chapter2, Section 2.1 (2.1.17 to 2.1.44)

(7th Week)

Subspaces, dense sets, separable spaces.

[1] Chapter2, Section 2.2, Section 2.3 (2.3.12 to 2.3.16)

(8th Week)

Continuous mappings, sequential criterion and other characterizations of continuity.

[1] Chapter3, Section 3.1

(9th Week)

Uniform continuity

[1] Chapter3, Section3.4 (3.4.1 to 3.4.8)

(10th Week)

Homeomorphism, Contraction mappings, Banach Fixed point Theorem.

[1] Chapter3, Section 3.5 (3.5.1 to 3.5.7(iv)), Section 3.7 (3.7.1 to 3.7.5)

(11th Week)

Connectedness, connected subsets of \mathbf{R} , connectedness and continuous mappings.

[1]Chapter4, Section 4.1 (4.1.1 to 4.1.12)

(12th Week)

Compactness, compactness and boundedness, continuous functions on compact spaces.

[1] Chapter5, Section 5.1 (5.1.1 to 5.1.6), Section 5.3 (5.3.1 to 5.3.11)

REFERENCES:

[1] SatishShirali&Harikishan L. Vasudeva, Metric Spaces, Springer Verlag London(2006)
(First Indian Reprint 2009)

SUGGESTED READINGS:

[1] S. Kumaresan, Topology of Metric Spaces, Narosa Publishing House, Second Edition
2011.

[2] G. F. Simmons, Introduction to Topology and Modern Analysis, Mcgraw-Hill, Edition
2004.