

Introduction to Spatial Databases: Requirements, Principles, and Concepts for Spatial Database Management Systems (SDBMS) - Spatial Databases and Geographic Information Systems - SDBMS and GIS Applications. Models for Spatial Data: Geographic Space Modeling - Representation Models - Geometry of Collection of Objects - Vector Data - Raster Data - Modeling Spatial Data. Spatial Access Methods (SAM): Issues in SAM Design - Space Driven Structures versus Data Driven Structures - The Grid File - Quadtree and Variants - R-Tree and Variants - k-d-B Tree - Other common and useful SAM - Cost Models. Query Processing: Algebras and Query Languages for Spatial Data - Spatial Join Queries - Nearest Neighbor Queries - Queries over Raster Data (Map Algebra) - Cost Models. Spatio-Temporal Databases: Introduction to Temporal Databases - Specialized Index Structures - Query Processing. Spatio-temporal Data Streams – Data Stream Management Systems – Spatio-temporal Continuous Queries – Spatio-temporal Data Stream Clustering

TEXT BOOKS/ REFERENCES

1. Philippe Rigaux, Michel Scholl, Agnes Voisard, “*Spatial Databases with Applications to GIS*”, Morgan Kaufmann, 2002
2. Shashi Shekhar, Sanjay Chawla, “*Spatial Databases: A Tour*”, Prentice Hall, 2003
3. H. Samet, “*Foundations of Multidimensional and Metric Data Structures*”, Morgan-Kaufmann, San Francisco, 2006
4. Zdravko Galic, “*Spatio-temporal Data Streams*”, Springer, 2016, ISBN 978-1-4939-6575-5