



**MANGALORE UNIVERSITY**  
**DEPARTMENT OF MARINE GEOLOGY**  
**MSc GEOINFORMATICS**

**GIH 451: DATA BASE MANGEMENT SYSTEM AND SPATIAL STATISTICS**

**Course Outcome:**

- CO1: Develop Geodatabases to store spatial data and implement these in a range of application areas.
- CO2: Address the real world problems related to geosciences using programming.
- CO3: Apply knowledge of computing, mathematics and Geoinformatics appropriate to the application area.
- CO4: Analysis of geospatial data using statistical procedures and SPSS software.
- CO5: An ability to acquire and apply new knowledge as needed, using appropriate learning strategies

**DATA BASE MANAGEMENT SYSTEM**

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| <b>Unit 1</b> | <b>Data and database:</b> Organization of database Components of Database Management Systems Files: key, file directories and file storage. Data retrieval and Data Security Basics of Database models: Entity-relationship model, Flat File system, Network Data model. Concept of Data Mining and Data Warehousing.  | 06 hrs |
| <b>Unit 2</b> | <b>Structured Query Language (SQL).</b><br><br>Structured Query Language (SQL), Query by Example (QBE) Relational Model Concepts, Relational Algebra, Record Storage & Primary File Organization, Buffering of Blocks, Hashing Techniques, Index Structures for Files. Transaction Processing Concepts, Database Recovery Techniques, Data base Security Authorizations, Functional Dependencies and Normalization for Relation Databases, Normal Forms Based on Primary Keys, Boyce – Codd Normal form. | 06 hrs |
| <b>Unit 3</b> | <b>Relational and Hierarchical Data Models:</b> Basic definition & terminology, Projection operators, Selection operators (Arithmetic &  | 06 hrs |

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|                | Logical operators), Set unions, Set differences, Cartesian product, Brief description of ASP,NET, JAVA and ORACLE.  |        |
| <b>Unit 4</b>  | <b>SPATIAL STATISTICS</b><br><br><b>Measures of Central Tendency:</b> Mean, Median and Mode and their application to GIS and Remotely Sensed Data.  | 06 hrs |
| <b>Unit 5</b>  | <b>Correlation Co-efficient</b> and its application to GIS and Remotely Sensed Data.<br><br><b>Linear Regression and Prediction:</b> Concepts and application to GIS and Remotely Sensed Data.  | 06 hrs |
| <b>Unit 6</b>  | <b>Cluster Analysis:</b> Introduction to Cluster Analysis. Interpretation of Q-mode and R-mode Clusters with reference to Spatial Data. Application of Cluster Analysis to Spatial Data.  | 06 hrs |
| <b>Unit 7</b>  | <b>Factor Analysis:</b> Outlines of Factor Analysis. Interpretation of Factors for Spatial data   | 06 hrs |
| <b>Unit 08</b> | <b>Statistical Package: SPSS</b> Introduction to Statistical Packages. Introduction to SPSS package. Functions of SPSS. Graphic out-put of processed data using SPSS. Application of SPSS to Geoinformatics. Case studies using SPSS. Use of SPSS in spatial data analysis. Designing of Cluster Analysis and Dendrograms related to Geoinformatics data. | 06 hrs |

## References

1. K. Majumdar & Bhattacharya. P, 1999, *Database management Systems*. Tata McGraw-Hill Publications.
  2. Korth H. F &Silberschatz, A. 1986, *Database Systems Concept* , McGraw-Hill, New York
  3. Widerhold G, 1984, *Database Design* ,McGraw-Hill, New York
  4. Martin. J, 1977, *Computer Database Organization*, Prentice-Hall, New Jersey.
  5. Sir Maurice Kendall., Alan Stuart and J. Keith., *The Advanced theory of Statistics*, Vol 3, 4<sup>th</sup> Edition (1943-1960)
  6. Daniel and S. Wilks, 1995, *Statistical Methods in the Atmospheric Sciences*.
  7. Gupta, S. C., 1977.*Fundamentals of Applied Statistics*. Vol 62, No. 3,
  8. Elhance Veena Elhance D. N. and Aggarwal B. M. 1956-1996, *Fundamental of Statistics*.
  9. Davis, J. C. 1973.*Statistics and Data Analysis in Geology*.
- Krumbein, W. C and Graybill, F. A. 1965.*An Introduction to Statistical Models in Geology*.