Title	NoSQL Databases
Code	18MCA301
Hrs / Week	03
Credits	03

Course Objectives:

- Understand detailed technical concepts of NoSQL databases
- Understand about basic principles and design criteria of NoSQL databases
- Understand concept and implementation of document oriented database
- Understand technical concepts of Key-Value database
- Know about data storage and processing techniques using graph based NoSQL database

Course Outcomes:

On successful completion of the module students will be able to:

- To analyze internal architecture of NoSQL databases and can be implemented on semi structured and unstructured data
- Apply the NoSQL Business Driver and understand NoSQL Case Studies
- Apply the Document Structure and Common Features by Understanding the concept of Document Database.
- Analyze the various techniques/types of Key-Value Stores and Understand the concept of Managing User Information.
- Analyze the various techniques/types of Triple queries and apply the Data Integrity and Triple Store Structure.

Module -1 **7 Hrs.**

Introduction to NoSQL

NoSQL – History – Features – Problem with Conventional Approach – NoSQL Business Driver – NoSQL Case Studies – LiveJournal Memcache – Google's MapReduce – Amazon's Dynamo – Mark Logic – Enterprise NoSQL – Different Data Types – Columnar – Key-Value Stores – Triple & Graph Stores – Document – Search Engines – Hybrid NoSQL Products – NoSQL Products – Describing NoSQL – ACID and BASE for Reliable Data Transactions – Comparing NoSQL & RDBMS – Pros & Cons NoSQL Databases

Text 1: Ch1
Text 2: Ch1, Ch2

Module -2 **9 Hrs.**

Scaling & Visualizing NoSQL

Consistency – Availability – Partition – Consistency Methods – ACID – BASE – Availability approaches – Deploying applications – Polyglot – Search Engine Techniques – Business Intelligence, Dashboarding, reporting – Technical Evaluation – Search features of NoSQL – Scaling NoSQL – Keeping Data Safe – Visualizing NoSQL – Extending Data Layer – Business Evaluation – Deciding commercials – Preparing Failure – Scaling up – Acceptance Testing – Monitoring – Data Architecture Pattern

Text 1: Ch2, Ch3
Text 2: Ch3

Module – 3 **9 Hrs.**

Document Oriented Databases

Document Database – Common Features – Tree Based Model – Managing Trades in Financial Services – Document Structure – Key-Values Store – Patching Documents – Sharding – Key based Sharding – Automatic Sharding – Managing Consistency – Managing Changing Data Structures – Providing Familiar Developer Experience – Providing End to End Document Platform – Securing Documents – Web Applications

Text 1: Ch15,Ch16,Ch17
Text 2: Ch4

Module-4 **9 Hrs.**

Key-Value Based Databases

Key-Value Stores – Benefits – Managing Availability – Managing Key – Managing Data – Scaling – Reducing Time to Value – Managing User Information – High Speed Data Caching – High Speed Key Access – Taking Advantages of Flash – Pluggable Storage – Separating Data Storage and Distribution – Handling Partitions

Text 1: Ch4,Ch5,Ch6,Ch7
Text 2: Ch4

Module-5 **11 Hrs.**

Graph Based Databases

Graph and Triple Store – Triple queries – Graph queries – Deciding Factors – Storing RDF – Querying SPARQL – Triple Store Structure – Data Integrity – Storing Document using Triple – Semantic Facts – Web Facts – Social Graphs

Text 1: Ch19, Ch20, Ch21

Content beyond the Syllabus:

1. Installation and configuration of different types of NoSQL databases
2. Applications of Graph based NoSQL Databases

Text Books:

1. NoSQL for Dummies – Adam Fowler, Published by John Wiley & Sons, Inc, ISBN: 978-1-118-90574-6
2. Making sense of NoSQL, DAN McCREARY & Ann Kelly, Manning Shelter Island, ISBN: 9781617291074

Reference Books:

1. Next Generation Databases – Guy Harrison, Published by APRESS, ISBN-13 (pbk): 978-1-4842-1330-8

Website:

1. http://nosql-database.org/
2. https://hbase.apache.org/2.0/book.html