

### **NoSQL Databases**

#### 1.Description:

Introduction to non-relational (NoSQL) data models, such as Key-Value, Document, Column, Graph and Object-Oriented database models. Advantages and disadvantages of the different data architecture patterns will be discussed. Hands-on experience with a representative sample of open-source NoSOL databases will be provided. The rapid and efficient processing of data sets with a focus on performance, reliability, and agility will be covered. Big Data, distributed and cloud computing concepts will be introduced. Intended for students with previous programming experience.

#### 2.STUDENT LEARNING OUTCOME(S) (SLO'S):

Upon successful completion of this course, a student will meet the following outcomes:

- 1.Define NoSQL, its characteristics and history, and the primary benefits for using NoSQL databases
- 2.Define the major types of NoSQL databases including a primary use case and advantages/disadvantages of
- 3. Create wide-column, document, key-value, graph and object-oriented databases, add content, and run queries
- 4. Describe the NoSOL data architecture patterns
- 5.Use NoSQL to manage Big Data.
- 6.Develop NoSQL desktop and cloud database solutions.

#### 3.SPECIFIC INSTRUCTIONAL OBJECTIVES:

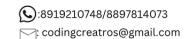
Upon successful completion of this course, a student will be able to:

- 1.Define NoSQL, its characteristics and history, and the primary benefits for using NoSQL data
- 2.Define the major types of NoSQL databases including a primary use case and advantages/disadvantages of each type
- 3. Create wide-column, document, key-value, graph and object-oriented databases, add content, and run queries
- 4. Describe the NoSOL data architecture patterns
- 5. Perform basic database administration tasks.
- 6. Develop NoSQL desktop and cloud database solutions.

#### 4. COURSE CONTENT:

#### Lecture Content:

- 1. Introduction to NoSQL
- · What is NoSQL
- NoSQL Overview
- NoSQL Database Environment
- NoSQL Options
- 2. When to Use NoSQL
- Benefits to using NoSQL DBBackend Management
- Deployment
- · Front-End Development
- Open Source
- Drawbacks to Using NoSQL DB
- Open Source
- NoSQL vs. SQL
- 3. Introduction to NoSQL Development
- · Schemaless Development



- Data Models
- Distribution Models
- Consistency
  Categories of NoSQL
  Key-Value Stores
- Wide-Column Family StoresDocument Databases
- · Graph Databases
- Object-Oriented Databases
- Others
- NoSQL Scalability
- Searching

#### 4. Wide-Column Databases - NoSQL

- Column Family
- Key and Keyspace
- Categories of NoSQL
- Examples
- Cassandra
- MapR
- Others

# 5. Key-Value Databases - NoSQLMajor KeysMinor Keys

- Values
- ExamplesOracle NoSQL Database
- Redis
- Others

#### 6. Document Databases - NoSQL

- Attributes
- Metadata
- Formats
- XML
- JSON and BSON
- Examples
- ElasticSearch CouchDB
- MongoDB
- Others

## 7. Graph Databases - NoSQL • Edges

- Nodes
- Relationships
- Examples
- Neo4J
- InfoGrid
- GraphBase
- Others

### 8. Object-Oriented Databases - NoSQLObject-Oriented Concepts

- Object Stores
  Examples
- ZODB
- ObjectDB
- Others

#### 9. Cloud Computing with NoSQL Databases

- Big DataRemote Searches
- Hadoop
- MapReduce
- REST
- AWS

