



**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**Syllabus for Bachelor of Vocation (B.Voc.), 6<sup>th</sup> Semester**  
**Branch: Information Technology**  
**Subject Name: Introduction to NoSQL**  
**Subject Code: 1160502**

**Type of Course:** Core.

**Prerequisites:** DBMS.

**Rationale:** This course aims to introduce students to fundamental concepts and practical applications of various NoSQL databases, essential for modern data management within computer engineering.

**Teaching and Examination Scheme:**

Teaching Scheme			Credit	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA(M)	ESE(V)	PA(I)	
3	0	0	3	50	0	0	0	50

**SUGGESTED PRACTICAL EXERCISES**

The following practical outcomes (PrOs) (are the subcomponents of the COs). These PrOs need to be attained to achieve the COs.

Sr. No.	Contents	Hrs.	Weightage (%)
1	<b>Unit 1: Introduction to Big Data</b> Types of Digital Data: Classification of Data (Structured, Semi-structured and Unstructured), Characteristics of Data, Evolution of Big Data, Definition of Big Data, Challenges of Big Data, Characteristics of Big Data (Volume, Velocity, Variety), Other characteristics of Big Data which are not Definitional Traits of Big Data, Why Big Data? Are we Information Consumer or Producer? Traditional BI vs Big Data, Typical Data Warehouse Environment, Typical Hadoop Environment, what is Changing in Realms of Big Data? Terminologies used in Big Data Environments	10	20 %
2	<b>Unit 2: Introduction to NoSQL</b> NoSQL: Introduction: Where is it used? What is it? Types of NoSQL databases, Why NoSQL?, Advantages of NoSQL, Use of NoSQL in Industry, SQL vs NoSQL, NewSQL	10	25 %
3	<b>Unit 3: Introduction to MongoDB and Map Reduce</b> MongoDB: Introduction: What is MongoDB? Why Mongo DB? (using JSON, Creating or generating a unique key, Support for Dynamic Queries, Storing Binary Data, Replication, Sharding, Updating information in -place), Terms used in RDBMS and Mongo DB, Data types in Mongo DB, MongoDB Query Language Map Reduce: Data Flow, Map, Shuffle, Sort, Reduce, Hadoop Streaming, mrjob, Installation, word count in mrjob, Executing mrjob	10	20 %



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<b>4</b>	<p><b>Unit 4: Introduction to HIVE and Pig</b></p> <p><b>HIVE:</b> Introduction: What is HIVE? HIVE Architecture, HIVE data Types, HIVE File Formats, HIVE Query Language, RCFile Implementation, SerDe, User-Defined Functions (UDF).</p> <p><b>Pig:</b> Introduction: What is Pig? The anatomy of Pig, Pig on Hadoop, Pig philosophy, Use Case for Pig- ETL Processing, Pig Latin overview, Data types in Pig, Running Pig, Execution modes of Pig, HDFS commands, Relational operators, Eval function, Complex Data Types, Piggy Bank, User-defined Functions, Parameter substitution, Diagnostic Operator, Word Count Example using Pig, when to use and not use Pig? ,Pig at Yahoo, Pig vs HIVE.</p>	12	35 %
<b>Total</b>		<b>42</b>	<b>100</b>

**Suggested Specification table with Marks (Theory):**

<b>Distribution of Theory Marks</b>					
R Level	U Level	A Level	N Level	E Level	C Level
5	10	5	15	5	10

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

**Note:**

1. More Practical Exercises can be designed and offered by the respective course teacher to develop the industry relevant skills/outcomes to match the Co. The above table is only a suggestive list.
2. The following are some sample 'Process' and 'Product' related skills (more may be added/deleted depending on the course) that occur in the above listed Practical Exercises of this course required which are embedded in the COs and ultimately the competency.

**Course Outcomes:**

Sr.No.	Sample Performance Indicators for the PrOs	%Weightage
CO-1	Analyse given problem and find possible solution methods	15
CO-2	Select appropriate concept/method to solve the problem	30
CO-3	Implement proper concept to solve the problem	25
CO-4	Test the solutions by different inputs	30