B.Tech. CS&IT Semester - VIII											
Sr. No.	**Subject**	**Code**	**Hours**				**Credits**				**Total Credits**
			CL	**S**	**T**	**P**	**CL**	**S**	**T**	**P**	
8.1	Final Project & Dissertation	BTCS08CCA1	0	2	0	12	0	2	0	6	8
8.2	Advanced Database Management System	BTCS08CCA2	1	1	1	4	1	1	1	2	5
8.3	Advanced Cloud Computing	BTCS08CCA3	1	1	1	4	1	1	1	2	5
		TOTAL	**2**	**4**	**2**	**20**	**2**	**4**	**2**	**10**	**18**

Advanced Database Management System

This course is aimed at imparting candidates for the Advance Database Management System and aims at building the following key competencies amongst the Students

Program Name	**Degree in B.Tech. (CSIT)**								
Course Name	**Advance Database Management System**			**Course Code**					
Version No	**1.0**			**Version Update date**					
Pre-requisite	• Introductory knowledge of Database Systems.								
Course Outcome	• To understand the basic concepts and terminology related to DBMS • To the design and implement Distributed Databases. • To understand advanced DBMS techniques to construct tables and write effective queries, forms, and reports								
Total Credits / L:T:P:S	4/1:1:1:1								
Teaching & Examination Scheme	**Teaching Scheme**				**Examination Scheme**				
	L 15	P 15	T 15	S 15	CAT 50	CAP 40	TEE 50	TEP 40	SA 20

The Course Encompasses

Sr. No	Module/Units	Key Learning Outcomes	Instructional Objectives
1	**Data Base Analysis and Design Techniques** Theory Duration (hh.mm): 03.00 Practical Duration (hh.mm): 08.00	The **Students** should be able to: • LO1: Understand basic database design methodology and ER diagram • LO2: Understand and learn the concept of Functional Dependency, closure and keys • LO3: Understand Normal Forms and decomposition of tables	Students will get the basic knowledge of table, functional dependency, keys and various normal forms and they will decompose a table in various normal forms

2	**Advanced Transaction Processing and Concurrency Control** Theory Duration (hh.mm): 03.00 Practical Duration (hh.mm): 10.00	The **Students** should be able to: • LO1: Understand the transaction concept in DBMS • LO2:Understand serializability concept and concurrency control • LO3: Understand concurrency control technique, Timestamping and locking mechanism.	Students get to know the concept of transaction, serializability and concurrency control mechanism
3	**Query Processing & Optimization** Theory Duration (hh.mm): 03.00 Practical Duration (hh.mm): 14.00	The **Students** should be able to: • LO1: Understand the basics of Relational Algebra • LO2:Understand Operations like join select and project • LO3: Understand Query Optimization process and Estimating cost.	Students get to know the concept of Relational Algebra, Query optimization and cost estimation
4	**Data Storage and Querying** Theory Duration (hh.mm): 03.00 Practical Duration (hh.mm): 16.00	The **Students** should be able to: • LO1: Understand the concept of File organization. • LO2: Students learn basic concept of indexing and hashing. • LO3: Students learn the comparison of indexing and hashing	Students would be able to understand the basic concept of indexing and hashing.
5	**Distributed Databases** Theory Duration (hh.mm): 03.00 Practical Duration (hh.mm): 12.00	The **Students** should be able to: • LO1: Understand the concept of centralize and distributed DBMS • LO2: Students learn basic technique of distributed database design. • LO3: Students learn query processing in distributed database	Students get to know the concept of distributed DBMS and its design.

Module/Unit wise Syllabus Details

Sr. No	Module/Units	Detailed Topic wise Syllabus	References
1	**Data Base Analysis and Design Techniques** Theory Duration (hh.mm): 06.00	Review of basic Database Concepts, Database Design Methodologies. ER Modeling, Functional Dependencies Implication, Closures, its correctness, Normalization Theory, 1st,2nd,3rd Normal Form and BCNF, Decomposition.	Chapter 1, 2, T1 **N/A**
2	**Advanced Transaction Processing and Concurrency Control** Theory Duration (hh.mm): 06.00	Transaction Concepts, Concurrency Control: Introduction to Transaction Processing, Transaction Properties, Transaction recoverability and serializability, Introduction to Concurrency Control, Concurrency control Techniques, Two-phase locking, Timestamping Methods, Graph based Protocol.	Chapter 6 T1 **QP: SSC/Q3001 NOS: SSC/N2101**
3	**Query Processing & Optimization** Theory Duration (hh.mm): 06.00	Introduction, Translating SQL queries, Relational Algebra, Operations – Sorting, Selection, Join and Project etc. Aggregate and Outer Joins, Query Evaluation, Transformation of relational expressions in Query optimization, Heuristics for Query optimization, estimating cost in query optimization.	Chapter 7,8 &10 T1 **N/A**
4	**Data Storage and Querying** Theory Duration (hh.mm): 06.00	File organization, Organization of records, Indexing and Hashing – Basic concepts, B+-tree index files, Static and dynamic hashing, comparison of indexing and hashing.	Chapter 6 & 11 T1 Study Material **QP: SSC/Q2101 NOS: SSC/N2101**

5	**Distributed Databases** <u>Theory Duration</u> (hh.mm): 06.00	Concepts, Centralized DBMS and Distributed DBMS, Techniques for Distributed database design – Data fragmentation, replication, and allocation techniques; Types of Distributed Systems, Query processing in Distributed Databases, Concurrency control & Recovery in Distributed Databases.	Chapter 12 T1 **N/A**

Text Books/Reference Books

Sr. No	Title of the Book	Author	Edition / volume	Text (T)
1.	**Advanced database management system**	RiniChkrabarti and ShibhadraDasgupta,		
2.	**Distributed Databases**	Ozsu and Valduriez ,Pearson Education.		
3	**Fundamentals of Database Systems**	RamezElmasri, ShamkantNavathe, Pearson Education		
4	**Database System Concepts**	Abraham Silberschatz, Henry F. Korth, S. Sudarshan, Tata McGraw-Hill.		
5	**Fundamentals of Database Systems**	R. Elmasri and S. Navathe, 6th Ed. Pearson Education	**2010**	
6	**Database Management Systems**	R. Ramkrishnan and J. Gehrke, 3rd Edition, McGraw Hill Education,	**2014**	

Internal Theory Assessment –

- Unit Tests – 15 Marks each, 3 number, Best 2
- Assignments – 10 Marks each, 2 number

Internal Practical Assessment –

- Journal Completion – 10 Marks
- Completion of Experiment / Activities – 10 Marks each, 5 number, Best three

Term end Practical –

- Viva Voce on internal practical submission – 10 Marks
- Performance in practical experiment / Activity – 20 Marks
- Presentation in viva/experiment – 10 Marks

Skill Assessment –

- Completion of Skill Journal – 5 Marks
- Completion of Activities / Projects during Skill Sessions – 10 Marks
- Viva-voce – 5 Marks

Weightage of Units for Examination

Unit	% weightage
1. Data Base Analysis and Design Techniques	**20%**
2. Advanced Transaction Processing and Concurrency Control	**20%**
3. Query Processing & Optimization	**20%**
4. Data Storage and Querying	**20%**
5. Distributed Databases	**20%**

Evaluation System

Description	Allotted marks
Internal Theory	50
Internal Practical	40
Term end Theory	50
Term end Practical	40
Skill Assessment	20
TOTAL	200

Weekly Practical

Date	Module/Unit	Description of Experiments	Session
Week 1	**Data Base Analysis and Design Techniques**	• Creating Tables and adding integrity constrains. • Creating relations between tables using entity integrity and referential Integrity	1
Week 2	**Data Base Analysis and Design Techniques**	• Apply Join operations to fetch records from multiple tables • Firing queries and Using Joins, nested queries and correlated queries to extract the required data	2
Week 3	**Data Base Analysis and Design Techniques**	• Design Normalize (1NF, 2NF) database and implementation • Design Normalize (3NF, BCNF) database and implementation	3
Week 4	**Advanced Transaction Processing and Concurrency Control**	• Transaction Handling in SQL	4
Week 5	**Advanced Transaction Processing and Concurrency Control**	• Using Transaction Recovery in SQL	5
Week 6	**Advanced Transaction Processing and Concurrency Control**	• Transaction Recovery in Oracle	6
Week 7	**Query Processing & Optimization**	• Operations- Join, selection, sorting etc. implementation in Oracle	7
Week 8	**Query Processing & Optimization**	• Aggregate and Outer Join in SQL	8
Week 9	**Query Processing & Optimization**	• Query Optimization and cost estimation	9

Week 10	**Data Storage and Querying**	• Indexing and Hashing implementation	10
Week 11	**Data Storage and Querying**	• B+ Tree indexing implementation	11
Week 12	**Data Storage and Querying**	• Static and Dynamic Hashing Implementation	12
Week 13	**Distributed Databases**	• To understand database design- Fragmentation, Replication and Allocation	13
Week 14	**Distributed Databases**	• Query Processing	14
Week 15	**Distributed Databases**	• Concurrency control and recovery Analysis	15

Advanced Cloud Computing

Program Name	**B.Tech. in Computer Science & Information Technology**		
Course Name	Advanced Cloud Computing	**Course Code**	BTCS08CCA3
Version No	**1.0**	**Version Update date**	**06/01/2021**
Pre-requisite	• Cloud Infrastructure • Programming Skills		
Course Outcome	On completion of this course, the Students should be able to To provide an overview of concepts of Cloud Computing. To understand the security features, user management of Cloud. To understand the concepts of Virtualization.		

Sr. No	Module/Units	Detailed Topic wise Syllabus (In bullet points)	Total Hours (L + T + S +P)
1	**Cloud Computing Overview**	Cloud Computing Overview Origins of Cloud computing – Cloud components - Essential characteristics – On-demand selfservice, Broad network access, Location independent resource pooling ,Rapid elasticity , Measured service, Comparing cloud providers with traditional IT service providers, Roots of cloud computing.	6 + 3 + 3 + 3
2	**Cloud Insights**	Architectural influences – High-performance computing, Utility and Enterprise grid computing, Cloud scenarios – Benefits: scalability ,simplicity ,vendors ,security, Limitations – Sensitive information - Application development- security level of third party - security benefits, Regularity issues: Government policies.	6 + 3 + 3 + 3
3	**Cloud Architecture- Layers and Models**	Layers in cloud architecture, Software as a Service (SaaS), features of SaaS and benefits, Platform as a Service (PaaS), features of PaaS and benefits, Infrastructure as a Service (IaaS), features of IaaS and benefits, Service providers, challenges and risks in cloud adoption. Cloud deployment model: Public clouds – Private clouds – Community clouds - Hybrid clouds - Advantages of Cloud computing.	6 + 3 + 3 + 3

4	**Cloud Simulators- CloudSim and GreenCloud**	Introduction to Simulator, understanding CloudSim simulator, CloudSim Architecture(User code, CloudSim, GridSim, SimJava) Understanding Working platform for CloudSim, Introduction to GreenCloud	6 + 3 + 3 + 3
5	**Introduction to VMWare Simulator**	Basics of VMWare, advantages of VMware virtualization, using Vmware workstation, creating virtual machines-understanding virtual machines, create a new virtual machine on local host, cloning virtual machines, virtualize a physical machine, starting and stopping a virtual machine	6 + 3 + 3 + 3

Learning Resources

Sr. No.	Module/Unit	Text Books
1	**UNIT 1 ,UNIT 2**	Cloud computing a practical approach - Anthony T.Velte , Toby J. Velte Robert Elsenpeter, TATA McGraw- Hill , New Delhi – 2010
2	**UNIT 3 , UNIT 4**	Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online - Michael Miller - Que 2008
3	**UNIT 5**	Cloud Computing (Principles and Paradigms), Edited by Rajkumar Buyya, James Broberg, Andrzej Goscinski, John Wiley & Sons, Inc. 2011

Evaluation System

Description	Allotted marks
Internal Theory	50
Internal Practical	40
Term end Theory	50
Term end Practical	40
Skill Assessment	20
TOTAL	200

Internal Theory Assessment –

- Unit Tests – 15 Marks each, 3 number, Best 2
- Assignm

ents – 10 Marks each, 2 number

Internal Practical Assessment –

- Journal Completion – 10 Marks
- Completion of Experiment / Activities – 10

Marks each, 5 number, Best three Term end Practical –

- Viva Voce on internal practical submission – 10 Marks
- Performance in practical experiment / Activity – 20 Marks
- Presentatio

n in viva/experiment – 10 Marks Skill Assessment –

- Completion of Skill Journal – 5 Marks
- Completion of Activities / Projects during Skill Sessions – 10 Marks
- Viva-voce – 5 Marks

Weightage of Units for Examination

Unit	% weightage
Unit-1	**20**
Unit-2	**20**
Unit-3	**20**
Unit-4	**20**
Unit-5	**20**

Practical Plan

Session Number	Module/Unit	Description of Experiments	Week Number
1	1	To study cloud architecture and cloud computing model	Week 1

2	2	Installation and Configuration of virtualization using KVM	Week 2
3	2	To study and implementation of Infrastructure as a Service	Week 3
4	3	To study and implementation of Storage as a Service	Week 4
5	4	To Study Cloud security management	Week 5

Skill Plan

Session Number	Module/Unit	Description of Experiments	Week Number
1	1	Secure Text Transfer Based on Cloud Computing .	Week 1
2	2	Platform as a service on cloud application deployment	Week 2
3	2	Towards Differential Query Services in Cost-Efficient Clouds	Week 3