DHANALAKSHMI SRINIVASAN ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE & Affiliated to Anna University, Chennai)
Re-Accredited by NAAC with 'A' Grade
Accredited by NBA for AERO, BME, CSE, ECE, EEE, IT & MECH.
PERAMBALUR-621212, TAMILNADU, INDIA.
Website: www.dsengg.ac.in

COURSE PLAN

Course Code/Name	**U23AIT31 DATABASE MANAGEMENT SYSTEMS**			
Year/Semester/Department	**II/III/AI&DS**			
Credits Details	**L:3**	**T: 0**	**P:0**	**C:3**
Total Contact Hours Required	**45**			

Syllabus:

UNIT I CONCEPTUAL DATA MODELING	**No.of Periods 09**
Database environment – Database system development lifecycle – Requirement's collection – Database design -- Entity-Relationship model – Enhanced-ER model – UML class diagrams	
UNIT II RELATIONAL MODEL AND SQL	**No.of Periods09**
Relational model concepts -- Integrity constraints -- SQL Data manipulation – SQL Data definition –Views -- SQL programming	
UNIT III RELATIONAL DATABASE DESIGN AND NORMALIZATION	**No.of Periods 09**
ER and EER-to-Relational mapping – Update anomalies – Functional dependencies – Inference rules –Minimal cover – Properties of relational decomposition – Normalization (up to BCNF).	
UNIT IV TRANSACTION MANAGEMENT	**No.of Periods 09**
Transaction concepts – properties – Schedules – Serializability – Concurrency Control – Two- phase locking techniques.	
UNIT V OBJECT RELATIONAL AND NO-SQL DATABASES	**No.of Periods 09**
Mapping EER to ODB schema – Object identifier – reference types – row types – UDTs – Subtypes and super types – user-defined routines – Collection types – Object Query Language; No-SQL: CAP theorem – Document-based: MongoDB data model and CRUD operations; Column-based: H base data model and CRUD operations	

Objective:

The main learning objective of this course is to prepare the students

1. To introduce database development life cycle and conceptual modeling
2. To learn SQL for data definition, manipulation and querying a database
3. To learn relational database design using conceptual mapping and normalization
4. To learn transaction concepts and serializability of schedules
5. To learn data model and querying in object-relational and No-SQL databases

Text Book:

1. Thomas M. Connolly, Carolyn E. Begg, Database Systems – A Practical Approach to Design, Implementation, and Management, Sixth Edition, Global Edition, Pearson Education, 2015.
2. Ramez Elmasri, Shamkant B. Navathe, Fundamentals of Database Systems, 7th Edition, Pearson, 2017.

Reference Book:

1. Toby Teorey, Sam Lightstone, Tom Nadeau, H. V. Jagadish, "DATABASE MODELING AND DESIGN - Logical Design", Fifth Edition, Morgan Kaufmann Publishers, 2011
2. Carlos Coronel, Steven Morris, and Peter Rob, Database Systems: Design, Implementation, and Management, Ninth Edition, Cengage learning, 2012
3. Abraham Silberschatz, Henry F Korth, S Sudharshan, "Database System Concepts", 6th Edition, Tata Mc Graw Hill, 2011.
4. Hector Garcia-Molina, Jeffrey D Ullman, Jennifer Widom, "Database Systems: The Complete Book", 2nd edition, Pearson.
5. Raghu Ramakrishnan, "Database Management Systems", 4th Edition, Tata Mc Graw Hill, 2010.

Website:

W1.https://www.ibm.com/topics/Database management /
W2.https://www.mckinsey.com/featured-insights/mckinsey-explainers/what-are- relational database

Online Mode of Study(if Any):

NPTEL details can be listed.

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- https://nptel.ac.in/courses/106/105/106105077/
- https://nptel.ac.in/courses/106/105/106105077/
- https://nptel.ac.in/courses/106/105/106105077/
- https://nptel.ac.in/courses/106/102/106102220/

Course Plan:

Topic Number	Topic	Reference Detail	Page Number	Mode of teaching	Number of Periods Required	Cumulative Period
UNIT I CONCEPTUAL DATA MODELING						
1	INTRODUCTION	R1	23	BB	1	1
2	Database environment	R1	29	PPT	1	2
3	Database Management System	R1	35	BB	1	3
4	Database system development lifecycle	R1	38	BB	1	4
5	Requirement's collection	R1	42	BB	1	5
6	Database design	R1	48	PPT	1	6
7	Entity-Relationship model	R1	51	BB	1	7
8	Enhanced-ER model	R1	55	BB	1	8
9	UML class diagrams	R1	57	BB	1	9
Outcome of Unit I: **CO1:**. Understand the database development life cycle and apply conceptual modelling						
UNIT II RELATIONAL MODEL AND SQL						
10	RELATIONAL MODEL AND SQL	W1	1	BB	1	10
11	Relational model	W2	6	BB	1	11
12	Relational model concepts	W3	8	BB	1	12
13	Integrity constraints	W4	17	BB	1	13
14	SQL	W5	25	BB	1	14
15	SQL Data manipulation	W6	36	BB	1	15
16	SQL Data definition	W7	40	BB	1	16
17	Views	W8	56	BB	1	17

18	SQL programming	W9	62	BB	1	18
Outcome of Unit II: **CO2**. Apply SQL and programming in SQL to create, manipulate and query the database **CO3:** Apply the conceptual-to-relational mapping and normalization to design relational database						
UNIT III RELATIONAL DATABASE DESIGN AND NORMALIZATION						
19	RELATIONAL DATABASE DESIGN	R3	172	BB	1	19
20	ER and EER	R3	182	BB	1	20
21	ER and EER-to-Relational mapping	R3	187	PPT	1	21
22	Update anomalies	R3	191	BB	1	22
23	Functional dependencies	R3	193	BB	1	23
24	Inference rules	R3	197	BB	1	24
25	Minimal cover	R3	202	BB	1	25
26	Properties of relational decomposition	R3	207	PPT	1	26
27	Normalization (up to BCNF	R3	210	BB	1	27
Outcome of Unit III: **CO4:**. Determine the serializability of any non-serial schedule using concurrency techniques						
UNIT IV TRANSACTION MANAGEMENT						
28	TRANSACTION MANAGEMENT	R1	121	BB	1	28
29	Transaction concepts	R1	153	BB	1	29
30	properties	R1	154	BB	1	30
31	Schedules	R1	155	BB	1	31
32	Serializability	R1	159	BB	1	32
33	Concurrency Control	R1	163	BB	1	33
34	Two- phase locking techniques	R1	167	BB	1	34
Outcome of Unit IV: **CO5:** Apply the data model and querying in Object-relational and No-SQL databases						
UNIT V OBJECT RELATIONAL AND NO-SQL DATABASES						
35	Mapping EER to ODB schema	R1	170	BB	1	35
36	Object identifier – reference types	R1	172	BB	1	36

37	row types	R1	217	BB	1	37
38	UDTs	R3	45	BB	1	38
39	Subtypes and super types	R3	53	BB	1	39
40	user-defined routines	R2	75	BB	1	40
41	Collection types	R2	79	BB	1	41
42	Object Query Language; No-SQL	R2	82	BB	1	42
43	CAP theorem	R2	85	BB	1	43
44	Document-based: MongoDB data model and CRUD operations;	R2	89	BB	1	44
45	Column-based: H base data model and CRUD operations	R2	90	BB	1	45

Outcome of Unit V:

CO6: Apply the H base data model and CRUD Operations in NO SQL

At the end of the course the students would be able to:

CO1: Understand the database development life cycle and apply conceptual modelling

CO2: Apply SQL and programming in SQL to create, manipulate and query the database

CO3: Apply the conceptual-to-relational mapping and normalization to design relational database

CO4: Determine the serializability of any non-serial schedule using concurrency techniques

CO5: Apply the data model and querying in Object-relational and No-SQL databases

CO6: Apply the H base data model and CRUD Operations in NO SQL

Course Outcome Vs Program Outcome Mapping:

CO	PO1	PO 2	PO 3	PO4	PO5	PO 6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2
CO 1	*	*	*	*	*	*	-	-	*	-	*	-
CO 2	-	*	*	*	*	-	-	-	*	-	*	-
CO 3	-	*	*	*	*	-	-	-	*	-	*	-
CO 4	-	*	*	*	*	*	-	-	*	-	*	-
CO 5	-	*	*	*	*	*	-	*	*	*	*	*

Assignment:1

Batch Details	Register Number	Total Number	Mode of Assignment	Topics
Batch 1			Assignment	Database system development lifecycle
Batch 2			Assignment	Entity-Relationship model
Batch 3			PPT	SQL Data manipulation

Assignment:2

Batch Details	Register Number	Total Number	Mode of Assignment	Topics
Batch 1			Assignment	ER and EER
Batch 2			Assignment	Transaction concepts
Batch 3			PPT	Properties of relational decomposition

Assignment:3

Batch Details	Register Number	Total Number	Mode of Assignment	Topics
Batch 1			PPT	CAP theorem
Batch 2			MCQ	Document-based: MongoDB data model and CRUD operations;
Batch 3			Seminar	Column-based: H base data model and CRUD operations

SUBMISSION DETAILS:

Phase 1 (Before AT 1)	Phase 2 (Before AT 2)	Phase 3 (Before MODEL)
Assignment 1, 2	**Assignment 3, 4**	**Assignment 5**

Prepared by
P. VARSHINI/AP, MCA

Verified by
HOD/MCA

Approved By
PRINCIPAL