



Indra Ganesan

COLLEGE OF ENGINEERING

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai
Accredited by NAAC with 'B+' Grade, 2(f) & 12B Status Institution by UGC

IG Valley, Madurai Main Road, Manikandam, Tiruchirappalli - 620012

NAAC DOCUMENTS

QUALITY INDICATOR FRAME WORK

CRITERION – 1

CURRICULAR ASPECTS

SUBMITTED BY

IQAC

INTERNAL QUALITY ASSURANCE CELL

INDRA GANESAN COLLEGE OF ENGINEERING





Indra Ganesan

COLLEGE OF ENGINEERING

Madurai Main Road (NH-45B), Manikandam, Tiruchirappalli - 620 012

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai
NAAC Accredited, 2(F) Status Institution by UGC



Criteria 1	Curricular Aspects	100
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1.1 Curricular Planning and Implementation (20)

1.1.1 The Institution ensures effective curriculum planning and delivery through a well-planned and documented process including Academic calendar and conduct of continuous internal Assessment

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INDRA GANESAN COLLEGE OF ENGINEERING

IG Valley, Manikandam, Tiruchirappalli, Tamil Nadu – 620 012, India
(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

PREFACE OF THE COURSE FILE

Batch : 2021-2025

Academic Year : 2022-2023 / ODD

Program : ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

Year & Semester : 2nd Year / 3th Semester / 'A' Section

Course Code : AD3391 NBA Course Code: C204

Name of the Course : Database Design and Management

Faculty in-charge : Mrs.A.Suganya Asst.Prof / AI&DS

Signature of the Faculty in-charge



HoD / AI&DS



Dr. G. Balakrishnan, M.E., Ph.D.,
Principal
Indra Ganesan College of Engineering
IG Valley, Madurai Main Road
Manikandam, Trichy-620 012.

INDRA GANESAN COLLEGE OF ENGINEERING

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

REVIEW OF COURSE FILE

(to be pasted on the inner side of the file-backside).(#-State Yes/No.)

S.N	Details	Date:	R-I-*	R-II-*&	R-III-*&	R-IV-*&\$	R-V-*&\$@
1.	Preface of the course file		Y				
2.	Vision, Mission, PEOs, POs, PSOs, Blooms taxonomy		Y				
3.	Subject handlers of yesteryears		Y				
4.	Timetable/Workload of the staff – Distribution of teaching load – Roles and Responsibilities		Y				
5.	Syllabus signed by staff & HoD		Y				
6.	Lecture Schedule signed by staff & HoD		Y				
7.	Course Committee meeting circular and minutes		Y				
8.	Identification of Curricular gap and Content Beyond the syllabus		Y				
9.	Self-study topics		Y				
10.	Previous AU Question papers		Y				
11.	Unit wise Q&A and Objective type questions		Y				
12.	Unit wise course material			Y	Y	Y	
13.	Assignment question paper with sample answer sheets and mark entry			Y	Y	Y	
14.	Tutorial question paper with key and mark entry			Y	Y	Y	
15.	Class test/IA test Q Paper with Key, sample answer papers and mark entry			Y	Y	Y	
16.	IA Test- result analysis-CAP-evidence-root cause analysis.			Y	Y	Y	
17.	Retest –Q paper-Attendance-marks			Y	Y	Y	
18.	AU Web portal entry sheet			Y	Y	Y	
19.	Very poor performance in first two tests-action taken.-communication to parents-evidence				Y	Y	
20.	Absence for two tests-action taken-communication to parents-evidence.				Y	Y	
21.	Indiscipline of student reported, if any						
22.	Special class/coaching class/remedial class/attendance-CAP			Y	Y	Y	
23.	Conduct of Seminar, Quizzes - proof						
24.	Content beyond the syllabus - proof						Y
25.	Student feedback on faculty						Y
26.	Course end survey						Y
27.	Internal Assessment sheet						Y
28.	AU question paper with students feedback						Y
29.	Discrepancy of the question paper and correspondence, if any						Y
30.	AU result analysis-Details of arrear students.						Y
31.	AU grade sheet						Y
32.	CO – PO & PSO attainment sheet						Y
	Signature of Course handling faculty		<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>
	Signature of HoD		<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

Faculty Time Table

Mr.A.Suganya AP/AI&DS								
Day Order	1	2	3	4	5	6	7	8
I				AD3391 DDM				
II				AD3391 DDM				
III			AD3391 DDM					
IV								
V		AD3391 DDM						
S.Code	Title			Year / Branch		Hours		
AD3391	Database Design and Management			II/AI&DS		4		
TOTAL - 4 hours								


Signature of the Faculty


Dr. G. Balakrishnan, M.E., Ph.D.,
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HoD/CSE

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

AD3391	DATABASE DESIGN AND MANAGEMENT	L T P C
		3 0 0 3

COURSE OBJECTIVES:

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

UNIT I CONCEPTUAL DATA MODELING	8
Database environment – Database system development lifecycle – Requirements collection – Database design -- Entity-Relationship model – Enhanced-ER model – UML class diagrams.	
UNIT II RELATIONAL MODEL AND SQL	10
Relational model concepts -- Integrity constraints -- SQL Data manipulation – SQL Data definition – Views -- SQL programming.	
UNIT III RELATIONAL DATABASE DESIGN AND NORMALIZATION	10
ER and EER-to-Relational mapping – Update anomalies – Functional dependencies – Inference rules – Minimal cover – Properties of relational decomposition – Normalization (upto BCNF).	
UNIT IV TRANSACTION MANAGEMENT	8
Transaction concepts – properties – Schedules – Serializability – Concurrency Control – Twophase locking techniques.	
UNIT V OBJECT RELATIONAL AND NO-SQL DATABASES	9
Mapping EER to ODB schema – Object identifier – reference types – rowtypes – UDTs – Subtypes and supertypes – user-defined routines – Collection types – Object Query Language; No-SQL: CAP theorem – Document-based: MongoDB data model and CRUD operations; Column-based: Hbase data model and CRUD operations.	

TOTAL : 45 PERIODS

COURSE OUTCOMES

After the completion of this course, students will be able to:

- CO1: Understand the database development life cycle and apply conceptual modeling
- 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.

Dr. G. D. ...
(Signature)

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TEXT BOOKS:

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.

REFERENCES:

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.



Name and Signature of the Faculty Incharge



HoD/AI&DS



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Principal

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

Lecture Schedule

Degree/Program: **B.Tech. /AI&DS**
Duration: **2022-2023 ODD**

Course code & Name: **AD3391 & Database Design and Management**
Semester: **III** Section: **A** Faculty : **Mrs.A.Suganya**

AIM:

To learn data model and querying in object-relational and No-SQL

OBJECTIVES:

To impart knowledge on

- (i) To learn the fundamentals of data models and to represent a database system using ER diagrams.
- (ii) To study SQL and relational database design
- (iii) To understand the internal storage structures using different file and indexing techniques which will help in physical DB design.
- (iv) To understand the fundamental concepts of transaction processing- concurrency control techniques and recovery procedures
- (v) To have an introductory knowledge about the Storage and Query processing Techniques

PREREQUISITES: Data Structure, Operating System

COURSE OUTCOMES:

After the course, the student should be able to:

CO	Course Outcomes	POs	PSOs
C203.1	Describe the fundamental elements of relational database management systems	1,2,3,4	1,2
C203.2	Explain the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL	1,2,3,4	1,2
C203.3	Apply ER-models to represent simple database application scenarios.	1,2,3,4	1,2
C203.4	Explain transaction concepts and serializability of schedules	1,2,3,4	1,2
C203.5	Describe data model and querying in object-relational and No-SQL databases	1,2,3,4	1,2
C203.6	Explain database design using conceptual modeling, Normalization	1,2,3,4	1,2

S.No	Date	Period	Topics to be Covered	Book & Page. No.
UNIT I CONCEPTUAL DATA MODELING				Target periods :08
1	20/8/22	4	Database environment	T1
2	22/8/22	4	Database system development lifecycle	T1
3	24/8/22	3	Requirements collection	
4	25/8/22	2	Database design	T1
5	26/8/22	4	Entity-Relationship model	R1
6	0.1/09/22	4	Enhanced-ER model	R1
7	0.2/09/22	3	Enhanced-ER model	R1

8	05/9/22	2	UML class diagrams	R1
UNIT II RELATIONAL MODEL AND SQL				Target periods :10
9	08/9/22	4	ER and EER-to-Relational mapping	
10	09/9/22	4	Update anomalies	R2
11	12/9/22	3	Functional dependencies	R2
12	14/9/22	2	Inference rules	R2
13	16/9/22	4	Minimal cover	R1
14	16/9/22	4	Properties of relational decomposition	T2
15	19/9/22	3	Properties of relational decomposition	T2
16	21/9/22	2	Normalization (upto BCNF)	T2
17	23/9/22	4	SQL programming	T2
UNIT III RELATIONAL DATABASE DESIGN AND NORMALIZATION				Target Periods :10
18	26/9/22	4	ER and EER-to-Relational mapping	R1
19	28/9/22	4	Update anomalies	
20	29/9/22	3	Functional dependencies	T2
21	30/9/22	2	Inference rules	T2
22	3/10/22	4	Minimal cover	R2
23	6/10/22	4	Properties of relational decomposition	R1
24	7/10/22	3	Properties of relational decomposition	T2
25	12/10/22	2	Normalization (upto BCNF)	T2
26	13/10/22	4	Tutorial 1	T2
UNIT IV TRANSACTION MANAGEMENT				Target Periods :08
27	14/10/22	4	Transaction concepts	R2
28	17/10/22	4	Transaction concepts	R1
29	19/10/22	3	Transaction properties	T2
30	20/10/22	2	Schedules	T2
31	21/10/22	4	Serializability	T2
32	26/10/22	4	Concurrency Control	T2
33	27/10/22	3	Concurrency Control	T2
34	28/10/22	2	Two-phase locking techniques.	T2
35	3/11/22	4	Transaction concepts	T2
36	10/11/22	4	Transaction concepts	Material
UNIT V ADVANCEMENTS OBJECT RELATIONAL AND NO-SQL DATABASES				Target Periods:09
37	10/11/22	4	Mapping EER to ODB schema	R2
38	11/11/22	4	Object identifier	R2
39	14/11/22	3	Reference types – rowtypes	R2
40	16/11/22	2	UDTs – Subtypes and supertypes	R1
41	17/11/22	4	User-defined routines – Collection types	T2
42	18/11/22	4	Object Query Language; No-SQL: CAP theorem	T2
43	23/11/22	3	Document-based: MongoDB data model	T2
44	24/11/22	2	CRUD operations	T2
45	26/11/22	4	Column-based: Hbase data model	T1

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46	25/11/22	2	CRUD operations	Material
Content Beyond the Syllabus				
47	26/11/22	2	JDBC connectivity using databases.	Material

Book Reference - Reference Books

Sl.	Title of the Book	Author	Publisher	Year
1.	Databas Modeling and Design	Toby Teorey Sam Lightstone	Ninth Edition, Cengage learning	2011
2.	Database Systems: Design, Implementation, and Management	Carlos Coronel Steven Morris Peter Rob	Fifth Edition Morgan Kaufmann Publishers	2012

Book Reference - Text Books

Sl.	Title of the Book	Author	Publisher	Year
1.	A Practical Approach to Design	Thomas M Connolly Carolyn E. Begg	Global Edition, Fourth Edition	2015.
2.	Fundamentals of Database Systems	Ramez Elmasri Shamkant B Navathe	Pearson 7th Edition	2017.


Website Reference


W1:<http://nptel.ac.in/>.

W2:https://www2.cs.siu.edu/~mengxia/Courses%20PT/435/Chapter_03.pdf

W3:

<http://www.cs.tau.ac.il/~nachumd/models/Nets.pdf>


Signature of the Faculty in-charge


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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

Identification of Curricular Gap & Content Beyond Syllabus(CBS)

Name of the Faculty :A.Suganya

Course Code & Name:AD3391 & Database and Design and Management

Degree & Program:B.Tech. /AI&DS

Semester & Section: III / A

Academic Year: 2021 -2022 /ODD

I.Mapping of Course Outcomes with POs & PSOs.(before CBS)

Table.1 Mapping of COs, C, PSOs with POs - before CBS.

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C224.1	3	3	3	2	-	-	-	-	-	2	1	1	2	1
C224.2	3	3	3	2	1	-	-	-	-	2	1	1	2	1
C224.3	3	3	3	2	1	-	-	-	-	2	1	1	2	1
C224.4	3	3	3	2	-	-	-	-	-	2	1	1	2	1
C224.5	3	3	3	2	-	-	-	-	-	2	1	1	2	1
C224.6	3	3	3	2	-	-	-	-	-	2	1	1	2	1
C224	3	3	3	2	1	-	-	-	-	2	1	1	2	

II. Identification of content beyond syllabus.

Table.2 Identification of content beyond syllabus

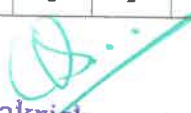
Details of Content Beyond Syllabus(CBS) added	POs strengthened/ vacant filled	CO/Unit
JDBC connectivity using database	PO5(2) Vacant filled	C224.5 & C224.6/ IV & V

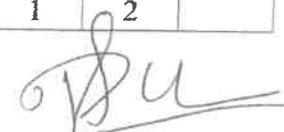
III. Mapping of Course Outcomes with POs & PSOs. (After CBS)

Table.3 Mapping of COs, C, PSOs with POs- after CBS.

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C224.1	3	3	3	2	-	-	-	-	-	2	1	1	2	1
C224.2	3	3	3	2	1	-	-	-	-	2	1	1	2	1
C224.3	3	3	3	2	1	-	-	-	-	2	1	1	2	1
C224.4	3	3	3	2	-	-	-	-	-	2	1	1	2	1
C224.5	3	3	3	2	1	-	-	-	-	2	1	1	2	1
C224.6	3	3	3	2	1	-	-	-	-	2	1	1	2	1
C224	3	3	3	2	1	-	-	-	-	2	1	1	2	


Signature of the Faculty


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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

Proof of Conduct of Content Beyond Syllabus(CBS)

Name of the Faculty : Mrs.A.Suganya
Degree & Program: B.TECH & AI&DS

Course Code & Name: AD3391&DDM
Semester: III Academic Year: 2022 -2023 /ODD

TOPIC: JDBC connectivity using databases.

- **Import JDBC Packages** – Add **import** statements to your Java program to import required classes in your Java code.
- **Register JDBC Driver** – This step causes the JVM to load the desired driver implementation into memory so it can fulfill your JDBC requests.
- **Database URL Formulation** – This is to create a properly formatted address that points to the database to which you wish to connect.
- **Create Connection Object** – Finally, code a call to the *DriverManager* object's *getConnection()* method to establish actual database connection.

Import JDBC Packages

```
import java.sql.* ; // for standard JDBC programs
import java.math.* ; // for BigDecimal and BigInteger support
```

Approach I - Class.forName()

The most common approach to register a driver is to use Java's **Class.forName()** method, to dynamically load the driver's class file into memory, which automatically registers it. This method is preferable because it allows you to make the driver registration configurable and portable.

The following example uses **Class.forName()** to register the Oracle driver

```
try {
    Class.forName("oracle.jdbc.driver.OracleDriver");
}
catch(ClassNotFoundException ex) {
    System.out.println("Error: unable to load driver class!");
    System.exit(1);
}
```


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getInstance()

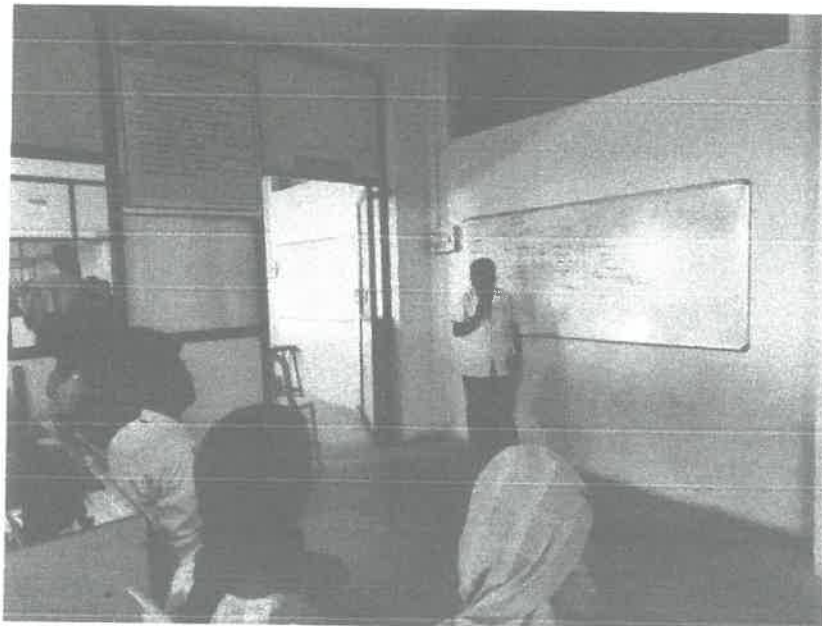
```
try {
```



```
Class.forName("oracle.jdbc.driver.OracleDriver").newInstance();
}
catch(ClassNotFoundException ex) {
    System.out.println("Error: unable to load driver class!");
    System.exit(1);
catch(IllegalAccessException ex) {
    System.out.println("Error: access problem while loading!");
    System.exit(2);
catch(InstantiationException ex) {
    System.out.println("Error: unable to instantiate driver!");
    System.exit(3);
}
```

Database URL Formulation

- getConnection(String url)
- getConnection(String url, Properties prop)
- getConnection(String url, String user, String password)



JDBC connectivity using databases.


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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

Assignment Answer Sheet

Name of the Student : DHARANI . R

AU Register Number: 81122124009

Assignment – 01		Date of Issue:	11.10.2022	Marks	10
Course code	AD3391	Course Title	DATABASE DESIGN & MANAGEMENT		
Year	2022	Semester/Section	III	Date of Submission:	15.10.22

Q.No	Questions	CO
1	Explain in detail – Database system development lifecycle .	C201.1
2	Explain in detail - Entity-Relationship mode	C201.1

Mark Allocation

Rubrics	Marks Allocated	Marks obtained
Content Quality	6	4
Presentation Quality	2	2
Timely submission	2	2
Total marks	10	8

Name and Signature of the Faculty Incharge

HoD/AI&DS

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IQAC Academic Audit Form

ACADEMIC YEAR: 2022-2023 / ODD SEMESTER

Name of Department : _____ Year / Sem / Sec : _____ No. of Students Registered : _____

Details of Examination : IA Test -1 / IA Test -2 / IA Test -3 / Model Test

S.No.	Course Code	List of Reg.No Verified	Course Log Book Verified (Y/N)	Course File Verified (Y/N)	No of students Attended	No of Absentees	No of Failures	Pass %	Remarks
1	MA3354	811221243002	yes	yes	01	-	-	100	Presented well
2	CS3351	811221243004	yes	yes	01	-	-	100	Well Answered.
3	AD3301	811221243006	yes	yes	06	01	1	85	good.
4	AD3391	811221243009	yes	yes	07	-	-	100	good presented
5	AD3351	811221243025	yes	yes	06	-	01	85	Neatly Presented.
6	AL3391	811221243032	yes	yes	07	-	-	100	good

Verified by

External Member Name and Signature:

S. Padmarajuli SRA

Internal Member Name and Signature:

K. Uli

Overall Remarks:

HoD/ AI&DS

IQAC Co-ordinator

Dr. G. Balakrishnan, M.E., Ph.D.,

Principal

Principal

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STUDENT FEEDBACK ON FACULTY THEORY COURSE

ACADEMIC YEAR: 2022-23 SEMESTER 3

Name of Department : #12DS Year / Sem: II / III Faculty Name A. Suganya.
Subject Code & Name AD-3391 - Database Design & Management.

S.No.	QUESTIONS	Excellent	Very Good	good	Satisfactory	Somewhat Satisfactory	Not Satisfactory
		5	4	3	2	1	0
1.	Delivery of Lectures by Interactive Communication	✓					
2.	Use of Teaching Aids and ICT		✓				
3.	Level of Preparedness & Knowledge Level	✓					
4.	Involvement in mentoring and guiding		✓				
5.	Effective Time management		✓				
6.	Is the teacher completing syllabus as per lecture schedule?	✓					
7.	Is the teacher distributing answer scripts of students as per schedule?		✓				
8.	Is the teacher addressing grievances on answer scripts of IA while distributing?		✓				
9.	Is the teacher covering content beyond syllabus (CBS)?	✓					
10.	Is the teacher punctual to class?		✓				


HoD/CSE


IQAC Coordinator


Principal



Indra Ganesan

COLLEGE OF ENGINEERING

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IGCE/EXAMCELL/IA/2022-23/ODD/UT/001

INTERNAL ASSESSMENT TEST - I

Test Time: (FN) 11.30 am to 1.00 pm

BRANCH	SESSION	10/10/2022	11/10/2022	12/10/2022	13/10/2022	14/10/2022	15/10/2022
BRANCH	SESSION	FN	FN	FN	FN	FN	FN
AI	II	MA3301	AI3301	AI3302	AI3303	ME3391	CE3351
AIDS	II	MA3354	CS3351	AD3301	AD3391	AD3351	AI3391
CSE	II	MA3354	CS3351	CS3352	CS3301	CS3391	
ECE	II	MA3303	EE3301	EE3302	EC3301	EE3303	CS3351
ECE	II	MA3355	EC3351	EC3352	EC3353	EC3354	CS3354
MECH	II	MA3351	ME3351	ME3351	CE3391	ME3392	ME3391
IT	II	MA3354	CS3351	CS3352	CS3391	CS3391	

EXAM CELL CO ORDINATOR

PRINCIPAL

COPY TO

1. The Director for favour of kind information
2. The Principal (file copy)
3. All HODs request to circulate among their faculty members
4. Exam cell file
5. Notice Board (Lath Block)

Mission of the Institution: To evolve as a centre of excellence in Engineering, Technology and Management with distinctive research reputation, and to transform the masses into knowledgeable, skilled professionals with high ethical values to cater the needs of the society.

Dr. G. Balakrishnan, M.E., Ph.D.,
Principal
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IG Valley, Madurai Main Road
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Register Number:

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(Approved by AICTE, New Delhi and affiliated to Anna University, Chennai)

Internal Assessment Exam - I		Date/Session	12.10.2022/FN	Marks	60
Course code	AD3391	Course Title	Database Design and Management		
Regulation	2022	Duration	90 minutes	Academic Year	2022-2023
Year	II	Semester	III	Department	AI&DS

COURSE OUTCOMES

CO1:	Understand the database development life cycle and apply conceptual modeling.
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:	Familiar with the basic issues of transaction processing and concurrency control.

Q.No.	Question	CO	BTS
PART A (Answer all the Questions 9 x 2 = 18 Marks)			
1	Define the tuple?	1	2
2	Define Primary key? Give example	1	3
3	Define Foreign key?	2	1
4	Why key is essential? Write the different types of keys	1	2
5	What is referential integrity?	2	1
6	Define Anomalies?	1	2
7	Define normalization?	1	3
8	Define functional Dependency?	1	1
9	Why it is necessary to decompose a relation?	2	2
PART B (Answer all the Questions 2 x 14 = 28 Marks)			
11a	List the properties of decomposition. Explain lossless join with example	1	2
OR			
11b	Explain the various types of Normalization?	1	3
12a	Consider the following relation R(A,B,C,D) AND FDs A->BC, IS the decomposition of R into R1(A,B,C), R2(A,D). Check if the decomposition is lossless join or not	1	1
OR			
12b	Consider the relation R-{A,B,C,D,E,F,G,H,I,J} and the set of functional dependencies F={A,B->C, A->D,E, B->F, F->G,H, D->I,J} 1. What is the key for R? Demonstrate it using the inference rules. 2. Decompose R into 2NF then 3NF relation.	1	1
PART C (Answer all the Questions 1 x 14 = 14 Marks)			
13a	Explain DDL and DML	1	3
OR			
13b	Explain join and its types	1	3

[Signature]
Course Faculty
(Name / Sign / Date) : 10/10/22

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HoD
(Name / Sign / Date)

Internal Assessment Exam-1

Answer Key

Part-1

1. A tuple, pronounced TUH-pul, is an ordered and finite list of elements in various fields of interest, including computing. The exact nature of that list depends on the context in which it is used, although the meaning is conceptually similar across disciplines
2. A primary key, also called a primary keyword, is a column in a relational database table that's distinctive for each record. It's a unique identifier, such as a driver's license number, telephone number with area code or vehicle identification number
3. A foreign key is a column or columns in a database that (e.g. table_1.column_a) that are linked to a column in a different table (table_2.column_b)
4. database management systems, keys play a crucial role in maintaining data integrity and facilitating efficient data retrieval
5. Data quality is any company's most valuable asset. The purpose of this article is to provide best data quality management practices for creating database with referential integrity.
6. Anomalies are irregularities or inconsistencies that occur in a database, disrupting the normal functioning and data integrity
7. Normalization is the process of reorganizing data in a database so that it meets two basic requirements
8. functional dependency is a relationship that exists between two attributes. It typically exists between the primary key and non-key attribute within a table.
9. Decomposition is used to eliminate some of the problems of bad design like anomalies, inconsistencies, and redundancy

Part-B



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11 a. What is Lossless Decomposition?

Lossless join decomposition is a decomposition of a relation R into relations R1, and R2 such that if we perform a natural join of relation R1 and R2, it will return the original relation R. This is effective in removing redundancy from databases while preserving the original data. In other words by lossless decomposition, it becomes feasible to reconstruct the relation R from decomposed tables R1 and R2 by using Joins.

Advantages of Lossless Decomposition

1. **Reduced Data Redundancy:** Lossless decomposition helps in reducing the data redundancy that exists in the original relation. This helps in improving the efficiency of the database system by reducing storage requirements and improving query performance.
2. **Maintenance and Updates:** Lossless decomposition makes it easier to maintain and update the database since it allows for more granular control over the data.
3. **Improved Data Integrity:** Decomposing a relation into smaller relations can help to improve data integrity by ensuring that each relation contains only data that is relevant to that relation. This can help to reduce data inconsistencies and errors.

11 b. **First Normal Form (1NF):** All data must be atomic, meaning that each cell in a table should contain only a single value and not a list of values.

Second Normal Form (2NF): In addition to meeting the rules of 1NF, a table must not contain any partial dependencies. A partial dependency exists when a non-primary key column depends on only part of a composite primary key.

Third Normal Form (3NF): In addition to meeting the rules of 2NF, a table must not contain any transitive dependencies. A transitive dependency exists when a non-primary key column depends on another non-primary key column.

Boyce-Codd Normal Form (BCNF): A relation is in BCNF if and only if for every one of its non-trivial functional dependencies $X \rightarrow Y$, X is a superkey.

Fourth Normal Form (4NF): A table is in 4NF if it is in BCNF and it has no multi-valued dependencies.

Fifth Normal Form (5NF): A relation is in 5NF if every non-trivial join dependency in R is implied by the candidate keys of R .

12a.. $R(A,B,C,D)$ AND FDs $A \rightarrow BC$, IS the decomposition of R into $R_1(A,B,C), R_2(A,D)$.

12b. $R(A, B, C, D, E, F, G)$

Closure of $(BC)^* = BCEDAFG$

$\{BC\}$ is a key of R

Minimal cover of F is F'

$F' = \{BC \rightarrow A, BC \rightarrow E, A \rightarrow F, F \rightarrow G, C \rightarrow D\}$

Now decompose into BCNF,

$R_1(B, C, A, E), R_2(A, F), R_3(F, G), R_4(C, D)$

13a. Data Definition Language

- DDL is used to specify a database's structure, which includes its tables, views, indexes, and constraints.
- DDL commands come in the following types: CREATE, ALTER, DROP, RENAME, and TRUNCATE.
- DDL statements only modify the database's schema; they have no direct effect on the data within the database.
- DDL declarations are irreversible and difficult to undo

Data Manipulation Language

- Inserting, updating, removing, and retrieving data from a database are all possible with DML.
- DML commands come in the following types: SELECT, INSERT, UPDATE, DELETE, and MERGE.

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- DML statements have a direct impact on the database's data.
- In the event of an error, data can be recovered thanks to the reversibility of DML statements.

14Join

In DBMS, a join statement is mainly used to combine two tables based on a specified common field between them. If we talk in terms of Relational algebra, it is the cartesian product of two tables followed by the selection operation. Thus, we can execute the product and selection process on two tables using a single join statement. We can use either 'on' or 'using' clause in MySQL to apply predicates to the join queries.

A Join can be broadly divided into two types:

1. **Inner Join**
2. **Outer Join**

For all the examples, we will consider the below-mentioned employee and department table

Inner Join

Inner Join is a join that can be used to return all the values that have matching values in both the tables

1. Equi Join

Equi Join is an inner join that uses the equivalence condition for fetching the values of two tables.

2. Natural Join

Natural Join is an inner join that returns the values of the two tables on the basis of a common attribute that has the same name and domain. It does not use any comparison operator. It also removes the duplicate attribute from the results.

Outer Join

Outer Join is a join that can be used to return the records in both the tables whether it has matching records in both the tables or not.


The outer join can be further divided into three types:

1. **Left-Outer Join**
2. **Right-Outer Join**
3. **Full-Outer Join**

we'll learn about these outer joins one-by-one.


Staff Incharge



Hod/AI&DS



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Internal Assessment Test Answer Book

Name	DHARANI R	Year/ Semester/Section	2022/10
Batch No.	81122124009	Date/Session	B.10.22/FN
Course code	AD3391	Department	AI&DS
Course Title	Database Design and management		
Internal Assessment Test	IAT 1 <input checked="" type="checkbox"/>	IAT 2 <input type="checkbox"/>	IAT 3 <input type="checkbox"/> Model <input type="checkbox"/>
Name and Signature of the Invigilator with date	 13/10/22 A. RAMYA		

Instruction to the Student: Put tick mark to the question attended in the column against question.							
Part A			Part B / Part C				Total Marks
Q. No.	✓	Marks	Q. NO.	✓	a	b	
					Marks		
1	✓	2	11	✓	13		13
2	✓	2	12	✓	12		12
3		1	13				
4		2	14	✓	13		13
5		2	15				
6		2	16				
7	✓	2	38			Total	38
8	✓	1	56			 Name and Signature of the Examiner with date	
9	✓	2					
10	✓	2					
Total		18	Grand Total				

To be filled by the examiner							
Course Outcomes	1	2	3	4	5	6	Total
Marks allotted	25	35					
Marks Obtained	23	33					
IQAC Audit - Remarks							 Name and Signature of the IQAC member
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INDRA GANESAN COLLEGE OF ENGINEERING
IG VALLEY, MANIDANDAM, TIRUCHIRAPPALLI – 620012
DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE
ACADEMIC YEAR 2021 – 2022 (EVEN SEMESTER)
STUDENTS MARK STATEMENT- CO BASED
INTERNAL ASSESSMENT I

SUBJECT CODE & TITLE: AD3391 & DATABASE DESIGN AND MANAGEMENT

YEAR/SEM: II/III

MONTH & YEAR: OCTOBER/2022

S.NO	REG NO	STUDENT NAME	C224.1 (25)	C224.2 (35)	TOTAL (60)	TOTAL (100)
1.	811221243002	ABDUR RAHMAN J	20	32	52	86
2.	811221243004	ARUN KUMAR M	19	29	48	80
3.	811221243006	BHARATH KUMAR R	20	30	50	83
4.	811221243009	DHARANI R	24	32	56	93
5.	811221243013	JAVAHAR NISHA B	23	31	54	90
6.	811221243025	MOHAMED FAHADHU A	21	30	51	85
7.	811221243032	RAKESH S	19	29	48	80

MARKS RANGE:

<20	20-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
0	0	0	0	0	0	2	3	2

Total No.of Candidates Present	7
Total No.of Candidates Absent	0
Total No.of Students Pass	7
Total No. of Students Fail	0
Percentage of Pass	100%

STAFF INCHARGE

HoD/AI&DS

PRINCIPAL

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