Course Handout

Institute/School Name	Chitkara University Institute of Engineering and Technology		
Department Name	Department of Computer Science & Engineering		
Programme Name	Bachelor of Engineering (B.E.), Computer Science & Engineering		
Course Name	Database Management System	Session	July – Dec 2025
Course Code	24CSE0209	Semester/Batch	3rd /2024
L-T-P (Per Week)	2-0-2	Course Credits	03
Pre-requisite	Basic knowledge of computer storage	NHEQF Level[1]	05
Course Coordinator	Dr. Shikha	SDG Number[4]	4, 9[4]

1. Objectives of the Course

The course provides a wide scope of learning & understanding of the subject and the main objectives of the course are:

- To provide a comprehensive foundation for designing and implementing database environment by using relational database management systems and analyze its need for real life applications.
- To enable the students to participate in the development process by implementing SQL commands and be able to describe relational algebraic expression from queries.
- To recognize and identify the use of normalization and functional dependency used in database design.
- To apply and relate the concept of transaction, concurrency control, security, and recovery in database.
- To provide knowledge about the concepts of sequence, triggers, cursor, function, and procedure.

2. Course Learning Outcomes (CLOs)

Students should be able to:

	CLOs	Program Outcomes (PO)	NHEQF Level Descriptor[2]	No. of Lectures
CLO01	Understand the fundamentals of database systems including data models, database architecture and ER features.	PO2, PO4, PO11, PSO1	Q1, Q2	**7**
CLO02	Analyze and apply the different normalization techniques.	PO2, PO4, PO8, PSO1	Q3	**5**
CLO03	Enable the students to participate in the development process by implementing SQL commands and be able to describe relational algebraic expressions from queries.	PO1, PO2, PO5, PSO2	Q2, Q3, Q6	**5**
CLO04	Access the basic concept of transaction, concurrency control, security and recovery in database.	PO6, PO7, PSO1	Q4	**6**
CLO05	Understand and apply the concepts of sequence, triggers, cursor, function, procedure.	PO4, PO11, PSO1	Q1, Q3	**7**
CLO06 (Only for lab components)	Get practical knowledge on designing, creating relational database systems and applying various queries relational constraints, join, set operations, aggregate functions, trigger, view and embedded SQL.	PO1, PO5, PO11, PSO2	Q2, Q3, Q4	**30**
Total Contact Hours				**60**

CLO-PO Mapping

CLO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	Type of Assessment's[3]
CLO01		M		H							M	L		Summative assessments
CLO02		M		M				M				L		Summative assessments
CLO03	M	M			H								L	Summative assessments
CLO04						M	H					M		Summative assessments
CLO05				M							M	M		Summative assessments
CLO06	M				H						M		M	Summative assessments

H=High, M=Medium, L=Low

3. Recommended Books:

[1] National Higher Education Qualification Framework Level, Refer to annexure

[2] NHEQF Level Descriptor, Refer to Annexure & Learning outcomes descriptors for qualification for all levels on the NHEQF

[3] Types of Assessments can be referred from Type of Assessments. Refer to Annexure.

[4] For SDG Mapping with Courses, Pl refer SDG Mapping policy for Courses

B01: Database System Concepts, Abraham Silberschatz, Henry F. Korth, Sudharsan, McGraw- Hill, Seventh Edition.
B02: An Introduction to Database Systems, C.J.Date , O'Reilly Media, Eighth Edition.
B03: Database Systems', Ramez.Z.Elmasri, Shamkant B.Navathe, Pearson Education, Seventh Edition.
B04: DBMS: A Simplified Approach by Parteek Bhatia
B05: Efficient MySQL Performance: Best Practices and Techniques 1st Edition by Daniel Nichter
B06: Querying MySQL: Make your MySQL database analytics accessible with SQL operations, data extraction, and custom queries Paperback – 29 July 2022 by Adam Aspin (Author)

4. Other readings and relevant websites:

Serial No	Link of Journals, Magazines, websites and Research Papers
1.	https://www.geeksforgeeks.org/dbms/dbms/
2.	https://link.springer.com/chapter/10.1007/978-1-349-11552-5_1
3.	https://onlinecourses.nptel.ac.in/noc22_cs91/preview
4.	https://www.w3schools.com/MySQL/default.asp
5.	https://dl.acm.org/doi/pdf/10.5555/77708

5. Recommended Tools and Platforms

MySQL Installer 8.0.38
Testpad

6. Course Plan: Theory+ Lab Plan

Theory Plan

Lect. No.	Topic(s)
1	Overview of Database, Database Management System (DBMS), DBMS Architecture
2	Data Independence, Integrity Constraints
3	Data Models, ER (Entity Relationship) Diagram, Attributes, Relationships
4	Relational Constraints, Referential Integrity
5	Conversion of ER to Relational model
6	Relational Algebra – Operations, Queries
7	Relational Calculus - Tuple Relational Calculus
8	Relational Calculus - Domain Relational Calculus
9	Functional Dependencies, Usage of Functional Dependencies, Inference Rules, Closure Set of Attributes
10	Equivalence of Functional Dependencies, Minimization of Functional dependencies
11	Functional Decomposition - Lossless and Lossy
12	Normalization - 1NF, 2NF,3NF, BCNF
ST1 (Demonstration)	
13	DDL statements Create, Alter, Drop, DML statements Insert, Update, Delete
14	Simple queries WHERE Clause, Compound WHERE Clause with multiple AND & OR Conditions
15	Referential Integrity Constraints, DCL statement Grant, Revoke
16	Join queries
17	Sub-queries - Simple & Correlated Using IN, EXISTS, NOT EXISTS
18	Database Security: Introduction, Threats, Counter Measures, SQL injections
ST2 (ST1 syllabus also included)	
19	Control Structures: Introduction To Conditional statement, Iterative Control
20	Sequential Control Statements
21	Cursors, Views
22	Procedures, Parts of Procedures
23	Parameter Modes, Advantages of Procedures
24	Triggers: Syntax For Creating Triggers, Types of Triggers
25	Introduction To Transaction, Properties of Transactions
26	Serializability - Conflict and Non-Conflict
27	View Serializability, Recoverability, Need for Concurrency Control
28	Locking Techniques
29	Database Recovery of Database: Introduction, Need for Recovery
30	Types Of Errors, Recovery Techniques
ST3- Project Based Evaluation	
End Term Exam	

Lab Plan

Lab No.	Topic(s)
1-2	Lab 1 (Introduction and Installation of the software)
3-4	Lab 2 (Create Database in MySQL)
5-6	Lab 3 (Creating Tables, Alter the table and drop tables)
7-8	Lab 4 (Appy constraints on the new or existing table)

9-10	Lab 5 (Perform DML operations on tables, select query to fetch records from tables)
11-12	Lab 6 (Write queries using referential integrity)
13-14	Lab 7 (Implement Aggregate Function, Nested & Correlated Queries)
15-16	Lab 8 (Write queries to create views and perform various operations on views)
17-18	Lab 9 (Write queries using different types of joins)
19-20	Lab 10 (Write a simple Stored program using if-else statement)
21-22	Lab 11 (Write a Stored program using for and while loop)
23-24	Lab 12 (Create a procedure using cursor)
25-26	Lab 13 (Perform operations using triggers)
27-28	Lab 14 (Learn Locking Techniques)
29-30	Lab 15 (Learn to recover database)

7. Delivery/Instructional Resources

Theory Plan:

Lect. No.	Topics	CLO	Book No, CH No, Page No	TLM[3]	ALM[4]	Web References	Audio-Video
1	Overview of Database, Database Management System (DBMS), DBMS Architecture	CLO1	B01 Chpater-1	Lecture Discussion	Quiz/Test Questions	https://www.geeksforgeeks.org/introduction-of-dbms-database-management-system-set-1/	https://www.youtube.com/watch?v=DTN78zxMs-I&list=PLVCEF4zOWjkhPA1jIOk1PcC_DejxQFTcL&index=1&pp=iAQB
2	Data Independence, Integrity Constraints	CLO1	B01-Chpater-1	Lecture Discussion	Quiz/Test Questions	https://www.geeksforgeeks.org/dbms-architecture-2-level-3-level/	
3	Data Models, ER (Entity Relationship) Diagram, Attributes, Relationships	CLO1	B01-Chapter-6	Lecture Discussion	Quiz/Test Questions	https://www.geeksforgeeks.org/introduction-of-er-model/	https://www.youtube.com/watch?v=LIKeqPQNCjo&list=PLVCEF4zOWjkhPA1jIOk1PcC_DejxQFTcL&index=19&pp=iAQB
4	Relational Constraints, Referential Integrity	CLO1	B01-Chapter-6	Lecture Discussion	Quiz/Test Questions	https://www.geeksforgeeks.org/constraints-on-relational-database-model/	https://www.youtube.com/watch?v=vAvt1LJY9uE
5	Conversion of ER to Relational model	CLO1	B01-Chapter-6	Lecture Discussion	Quiz/Test Questions	https://www.geeksforgeeks.org/mapping-from-er-model-to-relational-model/	https://www.youtube.com/watch?v=_xHl2gpoXqI
6	Relational Algebra – Operations, Queries	CLO3	B02-Chapter-7	Lecture Discussion	Quiz/Test Questions	https://www.geeksforgeeks.org/introduction-of-relational-algebra-in-dbms/	https://www.youtube.com/watch?v=4YilEjkNPrQ
7	Relational Calculus - Tuple Relational Calculus	CLO3	B02-Chapter-8	Lecture and Discussion	Quiz/Test Questions	https://www.geeksforgeeks.org/tuple-relational-calculus-trc-in-dbms/	https://www.youtube.com/watch?v=lnZ23qi-588
8	Relational Calculus - Domain Relational Calculus	CLO3	B02-Chapter-8	Lecture Discussion	Quiz/Test Questions	https://www.geeksforgeeks.org/domain-relational-calculus-in-dbms/	https://www.youtube.com/watch?v=d37Ct1gHmsU
9	Functional Dependencies, Usage of Functional Dependencies, Inference Rules, Closure Set of Attributes	CLO2	B01-Chapter-7 B02-Chapter-11	Lecture Discussion	Quiz/Test Questions	https://www.geeksforgeeks.org/inference-rules-in-dbms/ https://www.geeksforgeeks.org/functional-dependency-and-attribute-closure/	https://www.youtube.com/watch?v=y8XuGhEdslM
10	Equivalence of Functional Dependencies, Minimization of Functional dependencies	CLO2	B02-Chapter-11	Lecture Discussion	Quiz/Test Questions	https://www.geeksforgeeks.org/canonical-cover-of-functional-dependencies-in-dbms/	https://www.youtube.com/watch?v=eIXC6NfKno4 https://www.youtube.com/watch?v=sS-LJMTVVj8
11	Functional Decomposition - Lossless and Lossy	CLO2	B02-Chapter-12	Lecture Discussion	Quiz/Test Questions	https://www.geeksforgeeks.org/lossless-decomposition-in-dbms/	https://www.youtube.com/watch?v=YnressrELUg
12	Normalization - 1NF, 2NF,3NF, BCNF	CLO2	B01-Chapter-7 B02-Chapter-12	Lecture Discussion	Brain-storming session	https://www.geeksforgeeks.org/normal-forms-in-dbms/	https://www.youtube.com/watch?v=EGEwkad_llA
13	DDL statements Create, Alter, Drop, DML statements Insert, Update, Delete	CLO3	B01-Chapter-3 B04-Chapter-8	Lecture Discussion	Quiz/ Test Questions	https://www.geeksforgeeks.org/sql-tutorial/	https://www.youtube.com/watch?v=rf3cduPAkVc
14	Simple queries WHERE Clause, Compound WHERE Clause with multiple AND & OR	CLO3	B05-Chapter-5 B04-Chapter-8	Lecture Discussion	Quiz/Test Questions	https://www.javatpoint.com/mysql-where	https://www.youtube.com/watch?v=eiLqDeDp7Oc

[3] Teaching Learning Methods
[4] Active Learning Methods

15	Referential Integrity Constraints, DCL statement Grant, Revoke	CLO3	B04-Chapter-8	Lecture Discussion	Quiz/Test Questions	Referential Integrity Constraints	https://www.youtube.com/watch?v=YTJdBA9wZro
16	Different types of joins	CLO3	B04-Chapter-8	Lecture Discussion	Quiz/Test Questions	https://www.javatpoint.com/mysql-join	https://www.youtube.com/watch?v=H6988OpZKTU
17	Sub-queries - Simple & Correlated Using IN, EXISTS, NOT EXISTS	CLO3	B05-Chapter-6 B04-Chapter-8	Lecture Discussion	Quiz/Test Questions	https://www.javatpoint.com/mysql-subquery	https://www.youtube.com/watch?v=wA9GJZcB618
18	Database Security: Introduction, Threats, Counter Measures, SQL Injection	CLO4	B02-Chapter-17	Lecture	Quiz/Test Questions	https://www.tutorialspoint.com/database-security	https://www.youtube.com/watch?v=uakTCU5Z_pg
19	Control Structures: Introduction To Conditional statement, Iterative Control	CLO5	B06-Chapter-4	Lecture Discussion	Quiz/Test Questions	https://www.geeksforgeeks.org/loops-in-mysql/	https://www.youtube.com/watch?v=yFA_ZzMynv0
20	Sequential Control Statements	CLO5	B06-Chapter-5	Lecture Discussion	Quiz/Test Questions	https://www.geeksforgeeks.org/mysql-if-if-then-if-then-else-and-if-then-elseif-else-statement/	https://www.youtube.com/watch?v=6C-m1Eqw0PU
21	Cursors, Views	CLO5	B04-Chapter-32	Lecture Discussion	Quiz/Test Questions	https://www.geeksforgeeks.org/difference-between-view-and-cursor-in-sql/	https://www.youtube.com/watch?v=2ege5FiH6Go
22	Procedures, Parts of Procedures	CLO5	B06-Chapter-5	Lecture Discussion	Quiz/Test Questions	https://dev.mysql.com/doc/dev/mysql-server/latest/stored_programs.html	https://www.youtube.com/watch?v=oagHZwY9JJY
23	Parameter Modes, Advantages of Procedures	CLO5	B06-Chapter-19	Lecture Discussion	Quiz/Test Questions	https://www.tutorialspoint.com/mysql/mysql-stored-procedure.htm	https://www.youtube.com/watch?v=oagHZwY9JJY
24	Triggers: Syntax For Creating Triggers, Types of Triggers	CLO4	B04-Chapter-34	Lecture Discussion	Quiz/Test Questions	https://www.geeksforgeeks.org/different-types-of-mysql-triggers-with-examples/	https://www.youtube.com/watch?v=qr8QIZRHDaY
25	Introduction To Transaction, Properties of Transactions	CLO4	B01-Chapter-17	Lecture Discussion	Quiz/Test Questions	https://www.geeksforgeeks.org/transaction-in-dbms/	https://www.youtube.com/watch?v=-GS0OxFJsYQ&pp=ygURdHJhbnNhY3Rpb24gQUNJRCA%3D
26	Serializability - Conflict and Non-Conflict	CLO4	B01-Chapter-17	Lecture Discussion	Quiz/Test Questions	https://www.geeksforgeeks.org/conflict-serializability-in-dbms/	https://www.youtube.com/watch?v=-GS0OxFJsYQ https://www.youtube.com/watch?v=zv0ba0Iok1Y
27	View Serializability, Recoverability, Need for Concurrency Control	CLO4	B01-Chapter-17	Lecture Discussion	Quiz/Test Questions	https://www.geeksforgeeks.org/dbms/polygraph-to-check-view-serializabilty-in-dbms/	https://www.youtube.com/watch?v=s8QlJoL1G6w
28	Locking Techniques	CLO4	B01-Chapter-18	Lecture Discussion	Quiz/Test Questions	https://www.geeksforgeeks.org/lock-based-concurrency-control-protocol-in-dbms/	https://www.youtube.com/watch?v=94C0V7f2zm4
29	Database Recovery of Database: Introduction, Need for Recovery	CLO4	B01-Chapter-19	Lecture Discussion	Quiz/Test Questions	https://www.geeksforgeeks.org/database-recovery-techniques-in-dbms/	https://www.youtube.com/watch?v=HnVo3_iH76w
30	Types Of Errors, Recovery Techniques	CLO4	B01-Chapter-19	Lecture Discussion	Quiz/Test Questions	https://www.geeksforgeeks.org/database-recovery-techniques-in-dbms/	https://www.youtube.com/watch?v=eq2EMu1Mh-w

Lab Plan:

Lab No.	Experiment	CLO	TLM	ALM	Web References	Audio-Video
1-2	Lab 1 (Introduction and Installation of the software)	CLO6	Demonstration method using a simulation or a tool	Lab Challenge	https://www.geeksforgeeks.org/php-mysql-database-introduction/ https://www.mysql.com/downloads/	NA
3-4	Lab 2 (Create Database in MySQL)	CLO6	Demonstration method using a simulation or a tool	Lab Challenge	https://www.w3schools.com/mysql/mysql_create_db.asp	NA
5-6	Lab 3 (Creating Tables, Alter the table and drop tables)	CLO6	Demonstration method using a simulation or a tool	Lab Challenge	https://www.w3schools.com/mysql/mysql_create_table.asp	NA
7-8	Lab 4 (Appy constraints on the new or existing table)	CLO6	Demonstration method using a simulation or a tool	Lab Challenge	https://www.w3schools.com/mysql/mysql_constraints.asp	NA
9-10	Lab 5 (Perform DML operations on tables, select	CLO6	Demonstration method using a	Lab Challenge	https://www.w3schools.com/mysql/mysql_select.asp	NA

	query to fetch records from tables)		simulation or a tool			
11-12	Lab 6 (Write queries using referential integrity)	CLO6	Demonstration method using a simulation or a tool	Lab Challenge	https://www.w3schools.com/mysql/mysql_constraints.asp	NA
13-14	Lab 7 (Implement Aggregate Function, Nested & Correlated Queries)	CLO6	Demonstration method using a simulation or a tool	Lab Challenge	https://www.w3schools.com/mysql/mysql_min_max.asp	NA
15-16	Lab 8 (Write queries to create views and perform various operations on views)	CLO6	Demonstration method using a simulation or a tool	Lab Challenge	https://www.w3schools.com/mysql/mysql_view.asp	NA
17-18	Lab 9 (Write queries using different types of joins)	CLO6	Demonstration method using a simulation or a tool	Lab Challenge	https://www.w3schools.com/mysql/mysql_join.asp	NA
19-20	Lab 10 (Write a simple Stored procedure using if-else statement)	CLO6	Demonstration method using a simulation or a tool	Lab Challenge	https://dev.mysql.com/doc/refman/8.4/en/flow-control-statements.html	NA
21-22	Lab 11 (Write a Stored procedure using for and while loop)	CLO6	Demonstration method using a simulation or a tool	Lab Challenge	https://www.geeksforgeeks.org/loops-in-mysql/	NA
23-24	Lab 12 (Create a procedure using cursor)	CLO6	Demonstration method using a simulation or a tool	Lab Challenge	https://dev.mysql.com/doc/refman/8.4/en/cursors.html	NA
25-26	Lab 13 (Perform operations using triggers)	CLO6	Demonstration method using a simulation or a tool	Lab Challenge	https://www.geeksforgeeks.org/different-types-of-mysql-triggers-with-examples/	NA
27-28	Lab 14 (Learn Locking Techniques)	CLO6	Demonstration method using a simulation or a tool	Lab Challenge	https://www.javatpoint.com/dbms-lock-based-protocol	NA
29-30	Lab 15 (Learn to recover database)	CLO6	Demonstration method using a simulation or a tool	Lab Challenge	https://www.studytonight.com/dbms/tcl-command.php	NA

8. Remedial Classes[5]

After Every Sessional Test, weak learners will be identified, and supplement course handout will be provided. Student list and Impact Observed report will be submitted to Dean through proper channel.

9. Self-Learning[6]

Assignments to promote self-learning, survey of contents from multiple sources.

S.No	Topics	CLO	ALM	References/MOOCS
1	Task 1.1 Individual Assignment (Design ER Diagram)	CLO1	Assignment	Reference Books
2	Task 1.2 Individual Assignment (Normalize the Database)	CLO2	Assignment	Reference Books
3	Task 1.3 Individual Assignment Create (Database and tables in MySQL)	CLO3, CLO6	Assignment	Testpad
4	Task 1.4 Individual Assignment (Apply different DML operations)	CLO3, CLO6	Assignment	Testpad
5	Task 1.5 Individual Assignment (Execute different join queries)	CLO3, CLO6	Assignment	Testpad
6	Task 1.6 Individual Assignment (Create Stored Programs)	CLO4, CLO6	Assignment	Testpad

10. Delivery Details of Content Beyond Syllabus[7]

Content beyond the syllabus covered (if any) should be delivered to all students that would be planned, and schedule notified accordingly.

S.No	Advanced Topics, Additional Reading,	CLO	POs	ALM	References/MOOCS

[5] Refer to Annexure
[6] Refer to Annexure
[7] Refer to Annexure

	Research papers and any				

11. Evaluation Scheme & Components:

Assessment Type[8]	Evaluation Component[9]	Type of Component[10]	No. of Assessments[11]	% Weightage of Component	Max. Marks	Mode of Assessment	CLO
Formative	Component 1	Testpad module progress and completion#	--	10%	**10**	Online	CLO01, CLO02, CLO03, CLO04, CLO05
Formative	Component 2	ST-1 (Demonstration)	01**	10%	**10**	Offline	CLO01, CLO02, CLO03, CLO04, CLO05
Formative	Component 3	ST-2 (MCQ-Based Evaluation)	01**	10%	**10**	Online	CLO01, CLO02, CLO03, CLO04, CLO05
Summative	Component 4	ST-3 (Project-Based Evaluation)	01**	20%	**20**	Offline	CLO01, CLO02, CLO03, CLO04, CLO05
Summative	Component 5	End Term Examination	01***	50%	**50**	Online	CLO01, CLO02, CLO03, CLO04, CLO05
	Total		**100%**				

No attempt and progress will be considered after the scheduled deadline.
** Students will have to appear in all Sessional Tests.
** Makeup Examination will compensate for either ST-1 or ST-2 (Only for genuine cases, based on the Dean's approval).
** Makeup Examination will be in the form of ST-1 (Demonstration) only after Dean's approval
** ST-3 will be a project-based evaluation (No makeup exam will be taken for ST-3)
*** As per Academic Guidelines, a minimum of 75% attendance is required to become eligible for appearing in the End Semester Examination.

12. Syllabus of the Course:

Subject: Database Management System			
S. No.	**Topic(s)**	**No. of Lectures**	**Weightage %**
1	Overview of Database, Database Management System (DBMS), DBMS Architecture, Data Independence, Integrity Constraints, Data Models, ER (Entity Relationship) Diagram, Attributes, Relationships, Relational Constraints, Referential Integrity, Conversion of ER to Relational model	**5**	**17**
2	Relational Algebra – Operations and Queries, Relational Calculus - Tuple Relational Calculus, Relational Calculus - Domain Relational Calculus	**3**	**10**
3	Functional Dependencies, Usage of Functional Dependencies, Inference Rules, Closure Set of Attributes, Equivalence of Functional Dependencies, Minimization of Functional dependencies, Functional Decomposition - Lossless and Lossy, Normalization - 1NF, 2NF,3NF, BCNF	**4**	**13**
ST1 (Demonstration)			
4	DDL statements Create, Alter, Drop, DML statements Insert, Update, Delete, Simple queries WHERE Clause, Compound WHERE Clause with multiple AND & OR Conditions, Referential Integrity Constraints	**3**	**10**
5	DCL statement Grant, Revoke, join queries, Sub-queries - Simple & Correlated Using IN, EXISTS, NOT EXISTS, Database Security: Introduction, Threats, Counter Measures, SQL injections	**3**	**10**
ST2 (ST1 syllabus also included)			
6	Control Structures: Introduction To Conditional statement, Iterative Control, Sequential Control Statements, Cursors, Views, Procedures, Parts of Procedures, Parameter Modes, Advantages of Procedures, Triggers: Syntax for Creating Triggers, Types of Triggers	**7**	**23**
7	Introduction To Transaction, Properties of Transactions, Serializability - Conflict and Non-Conflict, View Serializability, Recoverability, Need for Concurrency Control, Locking Techniques, Database Recovery of Database: Introduction, Need for Recovery, Types of Errors, Recovery Techniques	**5**	**17**
ST3- Project Based Evaluation			
End Term Exam			

13. Academic Integrity Policy:

[8] Refer to Annexure 2 of NCrF
[9] Refer to Annexure
[10] Refer to Annexure
[11] Refer to Annexure

Education at Chitkara University builds on the principle that excellence requires freedom where Honesty and integrity are its prerequisites. Academic honesty in the advancement of knowledge requires that all students and Faculty respect the integrity of one another's work and recognize the importance of acknowledging and safeguarding intellectual property. Any breach of the same will be tantamount to severe academic penalties.

This Document is approved by:

Designation	Name	Signature
Course Coordinator	Dr. Shikha	
Head-Academic Delivery	Dr. Mrinal Paliwal	
Dean	Dr. Rishu Chhabra	
Date (DD/MM/YYYY)	26.06.2025	

Annexure

1. **Pre- requisite**
   Mention The Pre-requisite skill set or course/s if it is expected to be studies before this course, otherwise write "not applicable".

2. **NHEQF levels**

The NHEQF levels represent a series of sequential stages expressed in terms of a range of learning outcomes against which typical qualifications are positioned/located. NHEQF level 4.5 represents learning outcomes appropriate to the first year (first two semesters) of the undergraduate programme of study, while Level 8 represents learning outcomes appropriate to the doctoral-level programme of study.

Table 1: Higher education qualifications at different levels on the NHEQF

NHEQF level	Examples of higher education qualifications located within each level
Level 4.5	Undergraduate Certificate. Programme duration: First year (first two semesters) of theundergraduate programme, followed by an exit 4-credit skills-enhancement course(s).
Level 5	Undergraduate Diploma. Programme duration: First two years (first four semesters) of the undergraduate programme, followed by an exit 4-credit skills-enhancement course(s) lasting two months.
Level 5.5	Bachelor's Degree. Programme duration: First three years (Six semesters) of the four-yearundergraduate programme.
Level 6	Bachelor's Degree (Honours/ Honours with Research). Programme duration: Four years(eight semesters).
Level 6	Post-Graduate Diploma. Programme duration: One year (two semesters) for those whoexit after successful completion of the first year (two semesters) of the 2-year master's programme.
Level 6.5	Master's degree. (e.g. M.A., M.Com., M.Sc., etc.) Programme duration: Two years (four semesters) after obtaining a 3- year Bachelor's degree (e.g. B.A., B.Sc., B.Com.etc.).
Level 6.5	Master's degree. (e.g. M.A., M.Com., M.Sc., etc.) Programme duration: One year (two semesters) after obtaining a 4 - year Bachelor's degree (Honours/ Honours with Research) (e.g. B.A., B.Sc., B.Com. etc.).
Level 7	Master's degree.(e.g. M.E./M.Tech. etc.) Programme duration: Two years (four semesters) after obtaining a 4-year Bachelor's degree. (e.g. B.E./B.Tech. etc.)
Level 8	Doctoral Degree

3. NHEQF level descriptors

Each NHEQF level is structured based on the defined learning outcomes which lead to the expected graduate attributes/profile. The level descriptors reflect the expected outcomes of learning that should be achieved and demonstrated by graduates of a specific programme of study leading to a qualification at a specific NHEQF level.

Click Learning outcomes descriptors for qualification for all levels on the NHEQF

4. Course Outcomes

The number of Course Outcomes is recommended to be 4-5 for courses that do not contain practical component and 6 for those courses with a practical component. Flexibility can be sought by the post-graduate courses in this regard.

5. Theory/lab Plan

The following are the guidelines to be followed while creating plans

- Each session may be planned for a duration of 45/50mins (irrespective of the double hour or single hour scheduled in timetable).
- Every session must incorporate at least one active learning method which may or may not be part of the assessments.
- Put BoS Approved Syllabus in the topics. Deviations (if any) from BoS approved syllabus must be brought to the notice of BoS chairman & Dean Academics, After approval, revised handout should be submitted.
- The Topics elaborated in the Theory/Lab plan must match those in the course execution plan.

6. Teaching Learning Methods

The following are some of the Teaching & Learning methods that can be incorporated in session wise teaching learning plan.

- **Teacher-centered Learning Methods:**
  i. Lecture
  ii. Discussion
  iii. Demonstration method using a simulation or a tool
  iv. Reviewing
  v. Questioning

- **Learner-centered teaching & Learning methods:**
  i. **Active learning**, in which students solve problems, answer questions, formulate questions of their own, discuss, explain, debate, or brainstorm during class;
  ii. **Cooperative learning**, in which students work in teams on problems and projects under conditions that assure both positive interdependence and individual accountability; and
  iii. **Inductive teaching and learning**, in which students are first presented with challenges (questions or problems) and learn the course material in the context of addressing the challenges.
  iv. **Inductive methods** include inquiry-based learning, case based instruction, problem-based learning, project-based learning, discovery learning, and just-in-time teaching. It is important to integrate authentic, reflective and collaborative learning experiences when designing for student-centered learning.

7. **Active Learning Methods**

The following are some of the Active Learning Methods that can be incorporated in session wise teaching learning plan.

- One Minute Paper

- Group Discussion
- Student-Created PPT, Charts, Matrices, Flowcharts, Models
- The Fish Bowl
- Debate
- Video Synthesis
- Quiz/Test Questions
- Brain Storming Sessions
- Case Study
- Shadowing
- Leading Question
- Puzzle, Enigma, Contradiction
- Statement-Opinion-Summary
- Think / Pair / Share
- Peer Review
- Just in Time Teaching
- Statement-Opinion-Summary
- Peer Survey
- Focused Listing
- Role-Playing
- Student Field Work with Reflection
- Infusing Humor into Class Sessions
- Inviting Effective Guest Speakers

8. Remedial Classes

After every Sessional Test, identify weak learners, provide supplement course handout. Student list and Impact Observed report should be submitted to Dean through proper channel.

9. Self Learning

Plan 10% of topics in self-learning mode with discussions, ALM's and Assessment happing in the class.

10. Content Beyond Syllabus

Plan Advanced Topics, Experiments, Additional Reading, Research papers in self-learning mode with ALM's and Assessment happing in the regular class or lab. Usually caters advanced learners. Identify Advanced learners. For Extra classes, schedule should be notified accordingly.

11. Assessment Type

1. Assessment broadly can be classified into the following types:

a. **Diagnostic assessments**: Diagnostic assessments are intended to help teachers identify what students know and can do in different domains to support their students' learning. These help teachers determine strengths of students in various areas to
better address their specific needs.
b. **Formative assessments**: Formative assessment refers to a wide variety of methods that teachers use to conduct in-process evaluations of student comprehension, learning needs, and academic progress during a lesson, unit, or a course. Formative assessments help teachers identify concepts that students are struggling to understand, skills they are having difficulty acquiring, or learning standards they have not yet achieved so that adjustments can be made to lessons, instructional techniques, and academic support.
c. **Summative assessments**: Summative assessment is an assessment administered at the end of an instructional unit in a course. These assessments are intended to evaluate student learning by comparing performance to a standard or benchmark.
d. **Ipsative assessments**: Ipsative assessment involves comparisons between past and current work to identify a learner's growth over time, rather than progress toward an external set of criteria. Therefore, Ipsative assessment is an internal or self-referenced assessment.
e. **Norm-referenced assessments**: Norm-referenced tests report whether test takers performed better or worse than a hypothetical average student, which is determined by comparing scores against the performance results of a statistically selected group of test takers, typically of the same age or grade level, who have already taken the exam.
f. **Criterion-referenced assessments**: Criterion-Reference tests measure the performance of test takers against the criteria covered in the curriculum.
g. **Peer-to-Peer randomised Assessments**: Peers will be able to provide assessment in this case
h. **Industry Validation of Effectiveness**: In the Vocation Education, Industry validation of effectiveness of training is particularly important.
i. **Self-assessments**: To evaluate how much the learner has grasped by self-learning.

2. Other Assessment Methods: Conducting an assessment takes time, thought, attention, planning, and often collaboration. Each assessment tool, whether a short survey or detailed rubric, will be useful only insofar as it both addresses the outcomes well and is feasible to use.

a**. Rubrics**: For assessing qualitative student work such as essays, projects, reports, or presentations. Rubrics serve well to clearly denote the specific expectations for an assignment, for collecting data for assessment of student learning outcomes. and for student performance. Rubrics can be used for grading, for providing feedback to students, and for informing and encouraging students to think about their own learning.
b. **Portfolios and E-Portfolio**: Portfolios can provide a window into the process of student learning across a semester-long project that can be assessed (usually by using a rubric).
c. **Curriculum Mapping**: A good curriculum map can serve to focus assessment, and the improvements that follow, where it will be most useful, informative, or effective.
d. **Structured Interviews**: While time-consuming, structured interviews are useful when specific questions need to be asked. It also leaves room for unplanned topics or ideas to emerge.
e. **Student Experience Surveys**: Student experience in research universities (SERU), including administration of on-line census SERU Undergraduate and Graduate Surveys, can yield important information about student perceptions and experiences.

12. Evaluation Component & Types

As per LMs we need to figure it out whether it is component 1, 2 or 3. In Types of Evaluation Component, we need to specify what type of

evaluation we are performing like Continuous Evaluation or Sessional Test or End Term Examination.

13. **No. of Assessments and Weightage of Components**
Department will give guideline for number of assessments, mandatory or optional and weightage.