INT 306
DATABASE MANAGEMENT SYSTEMS

Lecture #0

The kick start session

Course details

- LTP – 3 0 2 [Three lectures and 2 practicals/week]
- Credit – 4

Marks Breakup

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- Marks Breakup:

Activity	Marks
Attendance	5
Continuous Assessment	25
Mid-Term (MTT)	20
End-Term (ETT)	50
Total	**100**

- 1 Best CA out of 2 CA and 1 CA compulsory , each of 30 marks

Course Evaluation criteria

- CA1: 30 marks- Quiz based

A)10 marks based on the architecture and data modelling

B)20 marks MCQ based on the SQL

- CA2: 30 marks- Case study based

A) 20 marks based on topic database design and normalization

B) 10 Marks based on topic transactions in the database

- CA3: 30 marks- Project-based evaluation

A) 10 marks for design and modelling of real-life scenario problem

B) 10 marks for coding the application

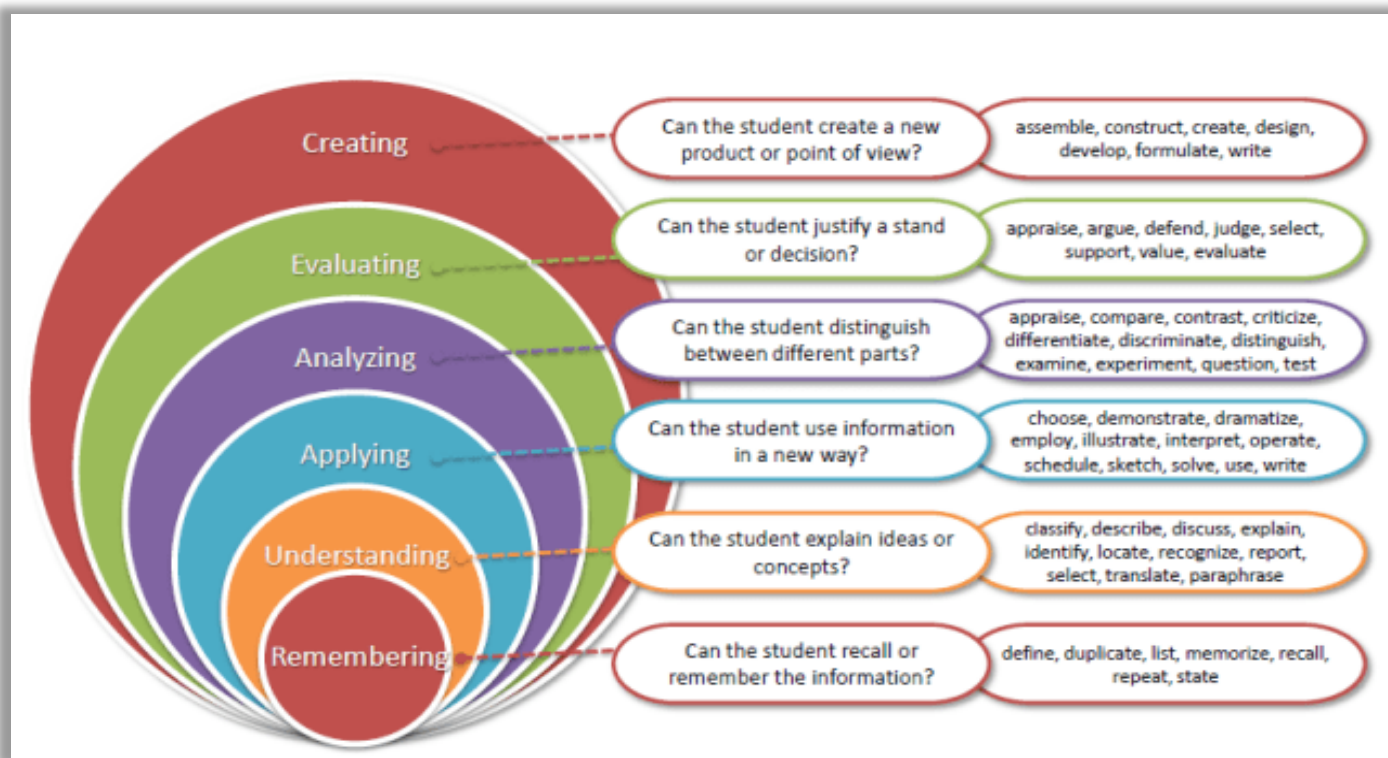C) 10 marks for the written report

Text book and reference book

Text Books:

1. DATABASE SYSTEM CONCEPTS by HENRY F. Korth, Abraham Silberschatz, S. Sudarshan, Mcgraw Hill Education

References:

1. THE PROGRAMMING LANGUAGE OF ORACLE by Ivan   Byross, BPB Publications
2. DATABASE SYSTEMS: MODELS, LANGUAGES, DESIGN AND APPLICATION PROGRAMMING by Ramez Elmasri, Shamkant B. Navathe, Pearson
3. AN INTRODUCTION TO DATABASE SYSTEMS by C. J.Date, S. Swamynathan, A. Kannan, Pearson

Revised Bloom's Taxonomy

	Can the student create a new product or point of view?	assemble, construct, create, design, develop, formulate, write
Creating		
Evaluating	Can the student justify a stand or decision?	appraise, argue, defend, judge, select, support, value, evaluate
Analyzing	Can the student distinguish between different parts?	appraise, compare, contrast, criticize, differentiate, discriminate, distinguish, examine, experiment, question, test
Applying	Can the student use information in a new way?	choose, demonstrate, dramatize, employ, illustrate, interpret, operate, schedule, sketch, solve, use, write
Understanding	Can the student explain ideas or concepts?	classify, describe, discuss, explain, identify, locate, recognize, report, select, translate, paraphrase
Remembering	Can the student recall or remember the information?	define, duplicate, list, memorize, recall, repeat, state

Course Outcome

CO1: Explain the Database components and logical design of database

CO2: Practice relational constructs like algebra, constraints and SQL

CO3: Possess knowledge on the different issues involved in the design and implementation of relational database system

CO4: Learn the transaction management systems in single and concurrent environment

CO5: Practice programming constructs such as functions, stored procedures and triggers that can be shared by multiple forms

CO6: Discuss file organization techniques, reports and data management application

Program Outcomes

- **PO1**
  Engineering Knowledge:: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

- **PO2**
  Problem Analysis:: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

- **PO3**
  Design/development of solutions:: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

- **PO4**
  Conduct investigations of complex problems:: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

Program Outcomes

- **PO5**
  Modern tool usage:: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

- **PO6**
  The engineer and society:: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

- **PO7**
  Environment and sustainability:: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

- **PO8**
  Ethics:: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

- **PO9**
  Individual and team work:: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

Program Outcomes

- **PO10**
  Communication:: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

- **PO11**
  Project management and finance:: Demonstrate knowledge and understanding of the engineering, management principles and apply the same to one's own work, as a member or a leader in a team, manage projects efficiently in respective disciplines and multidisciplinary environments after consideration of economic and financial factors.

- **PO12**
  Life-long learning:: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

- **PO13**
  Competitive Skills:: Ability to compete in national and international technical events and building the competitive spirit along with having a good digital footprint.

Course Contents

- **Unit I- Introduction to Databases:**
  - purpose of database systems, components of dbms, applications of dbms, three tier dbms architecture, data independence, database schema, instance, data modeling, entity relationship model, relational model

- **Unit II- Relational query language:**
  - relational algebra, introduction to data definition language, data manipulation, data control and transaction control language, integrity constraints, database keys, SQL basic operations, Aggregate functions, Sql joins, set operators, views, subqueries

Course Contents

- **Unit III-Relational Database Design:**
  - Data integrity rules, functional dependency, need of normalization, first normal form, second normal form, third normal form, boyce codd normal form, multivalued dependencies, fourth normal form, join dependencies, fifth normal form and pitfalls in relational database design

- **Unit IV- Database Transaction Processing:**
  - Transaction system concepts, desirable properties of transactions, schedules, serializability of schedules, concurrency control, recoverability

Course contents

- **Unit V- Programming constructs in Database:**
  - Flow control statements, functions, stored procedures, cursors, triggers, exception handling

- **Unit VI- File Organization and Trends in Databases :**
  - File organizations and its types, indexing, types of indexing, hashing, hashing techniques, introduction to big data, nosql systems

Course contents

- **Unit VII-**
  - **SQL,PL/SQL :** Set Operations, Basic Structure, Aggregate functions, DDL, DML, DCL, Views, Nested Queries, Joins, Complex Queries, Language elements, Subprograms, Packages, Cursors, Triggers.
  - **Data Manipulation :** Add New Rows to a Table, Change the Data in a Table, Use the DELETE and TRUNCATE Statements, How to save and discard changes with the COMMIT and ROLLBACK statements, Implement Read Consistency, Describe the FOR UPDATE Clause.
  - **Retrieve Data using the SQL SELECT Statement :** List the capabilities of SQL SELECT statements, Generate a report of data from the output of a basic SELECT statement, Use arithmetic expressions and NULL values in the SELECT statement, Invoke Column aliases, Concatenation operator, literal character strings, alternative quote operator, and the DISTINCT keyword, Display the table structure using the DESCRIBE command

Course contents

- **Unit VII (Contd.)-**
  - **Aggregated Data Using the Group Functions :** Usage of the aggregation functions in SELECT statements to produce meaningful reports, Describe the AVG, SUM, MIN, and MAX function, How to handle Null Values in a group function?, Divide the data in groups by using the GROUP BY clause, Exclude groups of date by using the HAVING clause.
  - **Usage of Subqueries to Solve Queries :** Use a Subquery to Solve a Problem, Single-Row Subqueries, Group Functions in a Subquery, Multiple-Row Subqueries, Use the ANY and ALL Operator in Multiple-Row Subqueries, Use the EXISTS Operator.
  - **SET Operators :** Describe the SET operators, Use a SET operator to combine multiple queries into a single query, Describe the UNION, UNION ALL, INTERSECT, and MINUS Operators, Matching the SELECT statements, Use the ORDER BY Clause in Set Operations.

Course contents

- **Unit VII (Contd.)-**
  - **Creating Views :** Create, modify, and retrieve data from a view, Perform Data manipulation language (DML) operations on a view, How to drop a view?
  - **Manipulating Data by Using Subqueries :** Using Subqueries to Manipulate Data, Inserting by Using a Subquery as a Target, Using the WITH CHECK OPTION Keyword on DML Statements, Using Correlated Subqueries to Update and Delete rows.
  - **Introduction to PL/SQL :** PL/SQL Overview, List the benefits of PL/SQL Subprograms, Overview of the Types of PL/SQL blocks, Create a Simple Anonymous Block, Generate the Output from a PL/SQL.
  - **Block PL/SQL Identifiers :** List the different Types of Identifiers in a PL/SQL subprogram, Usage of the Declarative Section to Define Identifiers, Use of variables to store data, Scalar Data Types, %TYPE Attribute, Bind Variables, Sequences in PL/SQL Expressions

Course contents

- **Unit VII (Contd.)-**
  - **Write Executable Statements :** Basic PL/SQL Block Syntax Guidelines, How to comment code?, SQL Functions in PL/SQL, Data Type Conversion, Nested Blocks, Operators in PL/SQL
  - **Explicit Cursors :** Understand Explicit Cursors, Declare the Cursor, How to open the Cursor?, Fetching data from the Cursor, How to close the Cursor?, Cursor FOR loop, Explicit Cursor Attributes, FOR UPDATE Clause and WHERE CURRENT Clause
  - **Exception Handling :** What are Exceptions?, Handle Exceptions with PL/SQL, Trap Predefined Oracle Server Errors, Trap Non-Predefined Oracle Server Errors, Trap User-Defined Exceptions, Propagate Exceptions, RAISE_APPLICATION_ERROR Procedure
  - **Stored Procedures and Functions :** What are Stored Procedures and Functions?, Differentiate between anonymous blocks and subprograms, Create a Simple Procedure, Create a Simple Procedure with IN parameter, Create a Simple Function, Execute a Simple Procedure, Execute a Simple Function

MOOCs or Industry certification

Details of MOOC Provider	MOOC Name	Online Link for MooC
Swayam	Database Management System	https://onlinecourses.swayam2.ac.in/cec19_cs05/preview

Next Class: Introduction to Databases