2. B.Sc. CS Semester - III Syllabus

B.Sc. CS Semester – III (Second Year)

Subject Title : CSM205-2C
Subject Code : Database Management System
Subject Type : Major

Rationale:

The aim of this subject is to get broad understanding of the basic concepts of database management system in particular relational database system. The students will also develop the skills to design database system and develop application programs to manage & retrieve data from different perspective using Structured Query Language (SQL) in ORACLE.

Learning Outcomes:

The students will be able to:

- Understand the concept of Database.
- Recognize the elements of Database for Real Life Applications.
- Identify the key relationship between Database components.
- Comprehend Database concept, Data Models, various approaches to Database Design, strength of Relational Model.

Teaching and Evaluation Scheme:

Credit	Duration in Hours		Maximum Marks		
	Theory	Practical	CCE (Formative)	SEE (Summative)	Total
4	30	60	50	50	100

Course Content

Unit I **[Weightage=25% approx., Lectures=7, Practicals= 16]**

Introduction to DBMS and difference between files and DBMS

Introduction to SQL: Data type, Basics of SQL,

Types of SQL Statements: DDL, DML, DCL, TCL. structure – creation, alteration, defining constraints – Primary key, foreign key, unique, not null, check, IN operator,

Logical operators: BETWEEN, IN, AND, OR and NOT

Aggregate functions: Count, Sum, Min, Max, Avg, SQL Scaler Functions

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Unit II **[Weightage=25% approx., Lectures=7, Practicals= 14]**

Date and Time related function, Numeric, String, Conversion, functions, handling Null values, Order By, Group By, Having Clause.

Entity Relationship (ER) Modeling: Concept of ERD: Entities (Strong , Weak), Attribute s(Atomic, Composite, Multivalued, Derived), Types (Chen's, Crow's Foot), Relationship (Unary, Binary, n-ary), Cardinality (one to one, one to many, Many to many), Generalization, Specialization and Aggregation.

Unit III **[Weightage=25% approx., Lectures=8, Practicals= 16]**

Functional Dependency – definition, trivial and non-trivial FD, closure of FD set, closure of attributes, irreducible set of FD,

Normalization – 1Nf, 2NF, 3NF, BCNF.

Database Integrity Constraints: Domain Integrity constraints: Not null, Check, Entity Integrity constraints: Unique, Primary key, Referential integrity constraints: Foreign key, referenced key, on delete cascade

Unit-IV **[Weightage=25% approx., Lectures=8, Practicals= 14]**

Advanced SQL: Relational Set Operators-Union, Intersect, Difference, Divide, Product, Joins (Self Join, Inner & Outer joins)

Sub-Queries: Single-row, Multiple-row, correlated – Sub-queries, Inline View–EXISTS, NOT EXISTS, IN, ANY, ALL operators.

Transaction control commands – Commit, Rollback, Savepoint

Reference Books:

- Database system concepts', 6th Edition –Abraham Silberschatz, Henry Korth, S, Sudarshan, (McGraw Hill International)
- Database systems: "Design implementation and management"- Rob Coronel, 4thEdition, (Thomson Learning Press)
- Database Management Systems - Raghu Ramkrishnan, Johannes Gehrke Second Edition, (McGraw Hill International)
- Database Systems – a Practical approach to design, implementation & Management Thomes M. Colnnolly, Carolyn E. Begg, Pearson 4th Ed.

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Practical List:

- Implement SQL queries to perform various DDL Commands.
- Implement SQL queries to perform various DML Commands.
- Implement SQL queries using Date functions
- Retrieve data using SELECT command and various SQL operators.
- Implement SQL queries using Numeric functions
- Implement SQL queries using Character Functions
- Implement SQL queries using Conversion Functions
- SQL queries using Comparison Operators, Logical Operators in WHERE clause
- Sorting data using ORDER BY clause
- Implement SQL queries using Aggregate functions and group by clause
- Implement SQL queries using Set operators
- SQL queries-based Joins
- Sub-Queries - Single-row, Multiple-row, correlated – Sub-queries, Inline View, EXISTS, NOT EXISTS, IN, ANY, ALL operators .
- Transaction based queries using COMMIT, ROLLBACK, SAVEPOINT

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B.Sc. CS Semester – III (Second Year)

Subject Title : Web Technologies
Subject Code : CSM206-2C
Subject Type : Major

Rationale:

Students would learn about web-based application development using PHP & MySQL. Students to acquire knowledge in areas like PHP Programming Fundamentals, OOP Concepts and database application with MySQL. We will introduce students to PHP application development using AJAX and JQuery.

Learning Outcomes:
After successful completion of the course students should be able to:

- Importance of Web development
- Learn about PHP Syntax, Arrays, Loops
- PHP and MySQL connectivity
- PHP form validation
- Learn OOP concept in PHP programming.
- Able to work with file handling, cookie and session handling.
- Learn to send mail in PHP.
- Learn to create a PHP application using AJAX and JQuery

Teaching and Evaluation Scheme:

Credit	Duration in Hours		Maximum Marks		
	Theory	Practical	CCE (Formative)	SEE (Summative)	Total
4	30	60	50	50	100

Course Content

Unit I **[Weightage=25% approx., Lectures=7, Practicals= 14]**

Introduction to Web Development: Overview of Web Technologies, Client-side vs. Server-Side Development, Setting up a Local Development Environment (XAMPP, WAMP, etc.)

Introduction to PHP: Evaluation of PHP, Basic Syntax, Defining variable and constant, PHP Data type Operator and Expression

Handling Html Form with PHP: Capturing Form Data, Dealing with Multi-value filed, Generating File uploaded form, Redirecting a form after submission.

Decisions and Loop: Making Decisions Doing Repetitive task with looping Mixing Decisions and looping with Html

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Function: What is a function Define a function Call by value and Call by reference Recursive function

Unit II **[Weightage=25% approx., Lectures=8, Practicals= 16]**

String: Creating and accessing String Searching & Replacing String Formatting String String Related Library function.

Array: Anatomy of an Array Creating index based and Associative array Accessing array Element, Looping with Index based array, Looping with associative array using each() and foreach() Some useful Library function.

Working with file and Directories: Understanding file& directory Opening and closing a file Coping, renaming and deleting a file Working with directories, File Uploading & Downloading,

State management: Using query string (URL rewriting), Using Hidden field Using cookies, Using session.

String matching with regular expression: What is regular expression Pattern matching in PHP Replacing text Splitting a string with a Regular Expression

Unit III **[Weightage=25% approx., Lectures=8, Practicals= 16]**

Introduction to OOPS: Introduction Objects Declaring a class, the new keyword and constructor Destructor, Access method and properties using $this, Variable Public, Private, Protected properties and methods Static properties and method, Class constant Inheritance & code reusability Polymorphism, Parent:: & self:: keyword Instanceof operator Abstract method and class.

Exception Handling: Understanding Exception and error Try, catch, throw

Unit IV **[Weightage=25% approx., Lectures=7, Practicals= 14]**

PHP-MYSQL: Database Connectivity with MySQL: Introduction to RDBMS Connection with MySQL, Database Performing basic database operation (DML) (Insert, Delete, Update, Select) Setting query parameter Executing query Join (Cross joins, Inner joins, Outer Joins, Self joins.) PHP MySQL Connect to a Database

jQuery and AJAX: Basics, loading and using jQuery, describing call back functions, exploring jQuery Selectors, methods, manipulators, events and effects, exploring jQuery and AJAX

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Text Books:

- PHP 6 and MySQL Bible – Steve Suehring, Tim Conserve & Joyce Park - Willey India
- Professional PHP - WROX
- Making use of PHP - Ashok Appu
- Practical PHP & MYSQL - Jono Bacon

References:

- Julie C Meloni, "Sams Teach Yourself PHP, MySQL and Apache All in One" 4th edition, Pearson Education
- Tim Converse and Joyce Park, PHP6 and MySQL Bible –Steve Suehring, Wiley India Latest Edition.
- Luke Welling, Laura Thomson , PHP and MySQL Web Development — Pearson
- Beginning Ajax with PHP From Novice to Professional, By Lee BabinApress
- Head First AJAX by Rebecca Riordan , O'Reilly Media

Practical List:

- Practical based on Control Structures.
- Practical based on Arrays.
- Practical based on String Handling
- Practical based on Passing Information to Form using Get and Post.
- Practical based Mysql functions and executing different type of queries.
- Practical based on programming with basic OOP Concept. Learning use of Inheritance, function Overloading, access modifier etc.
- Practical based on Cookie (creating cookie, store and fetch data into/from cookie)
- Practical based on session (Store/Fetch value into/from Session)
- Practical based on File handling.
- Mini Project: PHP Working with database
- Create a Webpage which will create CD album (read data from JSON file) and convert data into HTML table.
- Create a Webpage which will read data from JSON file display data into HTML table (use AJAX).
- Create a registration form with validation using AJAX.

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B.Sc. CS Semester – III (Second Year)

Subject Title : Software Engineering
Subject Code : CSM207-2C
Subject Type : Major

Rationale:

Analysis and Design of Information System provides the core foundation necessary to analyze and design business information systems. To cover the concepts and principles to analyze, design, implement, and document the system development cycle. The course covers the ability to perform analysis and design the current systems and apply critical thinking skills such as, work within tight schedules, manage resources across the organization and deliver results on time and within budget during the development of a Software Project to the ever-changing Information Technology industry.

Learning Outcomes:

Student will able to.

- To understand the systems analyst's activities, and apply current tools and techniques.
- To develop an awareness of the different approaches that may be taken to systems analysis.
- To understand the role of systems analysis within various systems development life cycles.
- Will be able to implement SDLC by small case studies.
- Use appropriate methods and techniques to produce a systems analysis for a given scenario.
- Evaluate the tools and techniques that may be used by a systems analyst in a given context.
- Discuss various systems analysis approaches and explain their strengths and weaknesses.
- Gain brief knowledge of Software Project Management and Build a project plan, enter tasks and calculate project budgets.

Teaching and Evaluation Scheme:

Credit	Duration in Hours		Maximum Marks		
	Theory	Practical	CCE (Formative)	SEE (Summative)	Total
4	60	-	50	50	100

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Course Content

Unit I **[Weightage=25% approx., Lectures=15]**

Information, Information System, Information Gathering

- Types of Information,
- Need of Computer Based Information System,
- Management Structure
- Management and Information Requirement,
- Quality of Information
- Variety and Example of Information system,
- Overview and design of Information system,
- The Role and Task of System Analyst,
- Attribute of System Analyst,
- Tool used by system Analyst

Unit II **[Weightage=25% approx., Lectures=15]**

Software Development Methodologies

- Software Development Life Cycle
- Different Development Methodologies
    - Sequential Development Model
    - Iterative Development Model
    - Spiral Model
    - Rapid Prototype Model
    - Agile Method

Information Gathering
Requirement Modeling / Fact-finding techniques/ Methods for searching Information

- Interview
- Document review
- Observation
- Questionnaires and surveys

Software Requirement Specification

- Introduction with example
- Data Requirement (Types of Requirements- Operational, Tactical, Strategic Requirement)

Overview Feasibility Study

- Operational ,
- Technical ,
- Economic ,
- Schedule Feasibility

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Unit III **[Weightage=25% approx., Lectures=15]**

System Designing

- Structural Designing
  - Data Flow Diagram: Concepts, Symbols, Rules, Leveling of DFD
  - Process Specification: Structural English, Decision Table, Decision Tree
- Object Oriented Designing
  - Introduction of Object-Oriented Concept
  - Use Case
  - Class Diagram
  - Sequence Diagram
  - Activity Diagram
- ER Model, Relationship and cardinality, Normalization

Unit IV **[Weightage=25% approx., Lectures=15]**

Software Project Management

- Introduction of Project Management
- Risk Identification, Analysis and Management
- Managing People
- Team Work
  - Selecting Group Members
  - Group Organization and Communication
- Project Planning
  - Project Pricing and Cost Estimation
  - Project Scheduling

Reference Books:

- Software Engineering, Ian Sommerville, Pearson Publication, 9th Edition,
- Software Project Management, Joel Henry, Pearson Education Publication
- Analysis and Design of Information System, V. Rajaraman, PHI Publication, Third Edition.
- System Analysis and Design Methods; 4thedition; by Shelly, Cashman, Rosenblatt; Cengage Learning India Edition.

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B.Sc. CS Semester – III (Second Year)

Subject Title : Probability Theory and Statistics
Subject Code : MDC243-2C
Subject Type : MDC

Learning Outcomes:
After completing this course student will be able to

- Analyze data using statistical measures of central tendency such as mean, median and mode.
- Understand the concept of probability and various theorems related to probability.
- Understand the definition of mathematical expectation.
- Understand the meaning of probability distribution and to get in depth knowledge on Binomial distribution
- Solve problem based on Poisson distribution.
- Know applications of normal distribution.
- Develop knowledge of hypothesis testing.
- Understand t-distribution
- Perform Chi-square test and F-test

Teaching and Evaluation Scheme:

Credit	Duration in Hours		Maximum Marks		
	Theory	Practical	CCE (Formative)	SEE (Summative)	Total
4	60	-	50	50	100

Course Content

Unit I **[Weightage=25% approx., Lectures=15]**

Introduction to statistics, population and sample, collection of data, census and sampling, methods of sampling-Random and non-random sampling methods, frequency distributions, measures of central tendency, measures of dispersion, moments, skewness and kurtosis, correlation and regression analysis.

Unit II **[Weightage=25% approx., Lectures=15]**

Different approaches to probability, conditional probability, independence of events, addition and multiplication theorems, Baye's theorem (Only Statement), simple problems based on Baye's theorem, random variables, expectation and its properties, mean variance and moments in terms of expectation

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Unit III **[Weightage=25% approx., Lectures=15]**

Probability distributions, types of probability distributions, Binomial distribution, characteristics of Binomial distribution, expected frequencies of Binomial distribution, Poisson distribution, characteristics of Poisson distribution, applications of Poisson distribution, Normal distribution, Characteristics of normal distribution, relation between Binomial, Poisson and Normal Distributions, area under the normal curve, Central limit theorem (without proof)

Unit IV **[Weightage=25% approx., Lectures=15]**

Meaning and types of hypothesis, Test of significance, Type I and Type II errors, Degree of freedom, Test of significance of large samples, Test of specified mean, Meaning of t-distribution, Condition for the use of t-Test, Properties of t-distribution, Characteristic of t-distribution, Application of t-distribution, Chi-square distribution, characteristics of Chi-square distribution, F-test and its properties

Reference Books:

- Statistical analysis: Graphs and diagrams, Spectrum books (P) Ltd, New Delhi.
- Introduction to the Practice of Statistics, Moore, S. David; McCabe, P. George W. H. Freeman and Company, New York.
- Basic Statistics, Agarwal, B. L., New Age International (P) Ltd.
- Introduction to the theory of Statistics, Mood, A. M., Greybill, F.A., Boes, D.C., McGraw Hill.
- Fundamentals of Mathematical Statistics, S. C. Gupta and V. K. Kapoor, Sultan Chand and Sons, New Delhi

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B.Sc. CS Semester – III (Second Year)

Subject Title : Business Communication
Subject Code : AEC211-2C
Subject Type : AEC

Course objectives:

1. To help develop expressional skills in professional contexts.
2. To facilitate the understanding of effective professional communication and skillsrequired for the same.

Learning Outcomes:

1. Efficient use of both the expressional skills as per the requirement of the world ofwork.
2. Basic process of professional writing.
3. ability to produce well crafted basic structures of routine business communication.
4. Skills and techniques for effective oral and written business communication.
5. Use of web and how it can enhance work communication.

TEACHING AND EVALUATION SCHEME:

Subject Code	Subject Title	Teaching Scheme	Credits	Examination Scheme			Total Marks
		Theory Per Week		Hrs.	Max Marks CCE	Max Marks SEE	
AEC 211-2C	Business Communication	2	2	2	25	25	50

Course content

Unit no.	content	Total hours	Weightage
1	**Written Communication**		57% = 15 Marks
1.1	The writing process: How business communication is different from generalcommunication, pre writing, writing and rewriting	2	
1.2	SOPs – importance, components, usability check and sample	1	
1.3	Process descriptions and instructions	2	
1.4	writing for Business Structure, layout and style Acknowledgement letter, acceptance letter Inquiry letter and order letter Complaint letter and apology letter Sales letter	1 1 1 1 2	

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1.5	Report Writing: formal and Informal reportsDefinition, features, significance and types Informal reports- layouts Formal report Structure of a formal report	1 2 1 2	
2.	**Persuasive communication**		
2.1	Importance of argumentation and persuasion in communication Ethical, emotional and Logical argumentation Organize your persuasion	1 1 1	
2.2	Communicating for positive influence- need and Importance in Business Using conversational style and YOU attitude Using positive words, being courteous, avoid blaming refrain from preaching, be sincere, don't overdo,	1 1 1	33%= 7 Marks
2.3	Public Speaking: The PRPSA test Developing confidence, preparing the speech, and delivering the same Practical purview	3 1	
3	**Use of Web and digital tools for business**		
3.1	Why the web is important for Business Communication, Characteristics of online communication, Considerations for Handheld mobile device	1	10% = 3Marks
3.2	Smartphones and communication	1	
3.3	Using collaborative writing tools and tips to use them effectively	1	

Reference Book:

- Technical Communication: Process and Product By: Gearson and Gearson, Person Publication.
- Technical Communication: A Practical approach, By: TVS Padmaja, Pearson Publication
- Communication Skills, By Sanjay Kumar and Pushpa Lata, Oxford University Press Publication
- Business Communication: Connecting in a digital world BY: Raymond Lesikar, McGraw Hill Edu.

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B.Sc. CS Semester – III (Second Year)

Subject Title : Project- III
Subject Code : SEC243-2C
Subject Type : SEC

Rationale:

By studying the different theoretical and fundamental concept, students must ensure their learning by developing real time or scenario-based applications on the fundamental concept. The project development as a subject will help them to learn and understand the applications of the concept which they are learning from different subjects in the semester.

- Primarily, student must gain the knowledge about the applications of the fundamentals.
- Importantly, they need to also learn the technology trends and develop their skills on those technologies during project development.

Learning Outcomes:

Students will be able develop their skills in analysis, design, development, testing and implementation through the development of small application.

Teaching and Evaluation Scheme:

Credit	Duration in Hours		Maximum Marks		
	Theory	Practical	CCE (Formative)	SEE (Summative)	Total
2	-	60	25	25	50

Content:

Students will do project in groups using technology/tools of their choice with the approval of Project coordinator/HOD. Guidelines for the technology/tools/tasks are listed below:

Projects developing Web Applications based on PHP and MySQL:

This type of learning allows students to learn not only the theory, but also how to apply that theoretical knowledge to real-world scenarios. By building a PHP project, students will practice the high-level logic of code and project, and see how each individual line can impact on application. They will also gain problem-solving skills and how to fix it.

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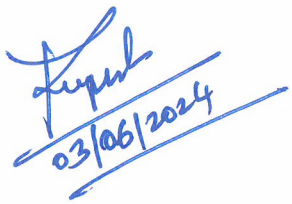
Project report shall be submitted including following details:

- Project Title
- Group Details
- Project Domain
- Project Definition
- Project Overview
- Detail Explanation
- Future Enhancement
- References

Note: Project will be evaluated based on Presentation / Live Project Demonstration.



B.Sc. CS Semester – III (Second Year)

Subject Title : Indian Astronomy-II
Subject Code : IKS207-2C
Subject Type : IKS

Rationale:

- Understanding the universe explained in the Upanishads by ancient scholars like Aryabhata and Brahmagupta.
- Be acquainted with the Indian knowledge system about the Yuga System, Solar Year and Lunar Year.
- Inspiring to know and understand the Gregorian Calendar, Hindu Calendar, Islamic Calendar, IndianCalendar and Pancanga as well as Direction/Place/Time, Eclipses of Sun/Moon/Star planetsof the Indian Astronomy systems for the potential applications in our daily lives.

Teaching and Evaluation Scheme:

Credit	Duration in Hours		Maximum Marks		
	Theory	Practical	CCE (Formative)	SEE (Summative)	Total
2	30	-	25	25	50

Course Content

Unit I **[Weightage=50% approx., Lectures=15]**

Calendars and Pancanga

Introduction, Gregorian Calendar, Hindu Calendar, Islamic Calendar, Indian Calendar and Pancanga.

True Positions of Sun, Moon and Star-Planets

Introduction Epicyclic theory, equation of Centre for the Sun and the Moon, True daily motions of the Sun, the Moon and star-planets.

Unit II **[Weightage=50% approx., Lectures=15]**

Triprasna-Direction, Place and Time

Introduction, determination of North-South Line, Finding Latitude & co-latitude of a place, Rising and Setting Points of the Sun, Times of Sunrise and Sunset, Rising of Signs of the Zodiac, Determination of Lagna at a given Time and Place,

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Eclipse

Lunar Eclipse, Solar Eclipse

• *Continuous Evaluation: It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests

Reference Books:

- Indian astronomy: An introduction by S. Balachandra Rao, Universities Press (India) Ltd, Hyderabad
- THE ARYABHATI of ARYABHATA: An Ancient Indian Work on Mathematics and Astronomy, Walter Eugene Clark, The Univeristy of Chicago Press, Illinois
- Indian Astronomy- A source book (Based primarily on Sanskrit Texts), Compiled by B V Subbarayappa& K V Sharma, Nehru Center, Bombay

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