## 2CSE401 Probability & Statistics [3 0 2 4]

**Learning outcomes:**

Upon completion of this course, students will be able to:

- Understand all basic fundamentals of Statistics and its application on collected information.
- Prepare him/her self for making a proper interpretation of system based on parameters of distribution.
- Apply knowledge of statistics and Probability to form a mathematical model to ensure conclusive hypothesis for problem.

## Syllabus:

| Unit No | Topics |
|---|---|
| 1 | **Frequency Distribution:** Collection of data, Classification of data, Class interval, Types of Classes, Class frequency, Class mark, Class Boundaries, Width of a class, Frequency density, Relative frequency, Percentage frequency, Cumulative frequency. |
| 2 | **Measures Of Central Tendency:** Introduction, Arithmetic Mean, Simple and weighted for raw data, Discrete frequency distribution, Continuous frequency distribution, Properties of A.M., Merits & De merits of A.M., Median for raw data, Discrete frequency distribution, Continuous frequency distribution, Merits and demerits of Median, Mode for raw data, Merits & demerits of mode. |
| 3 | **Measures Of Dispersion:** Introduction, Range, coefficient of range, Quartiles, Quartiles deviations, coefficient of quartile deviations, Mean deviation and coefficient of mean deviation, S.D and variance for all types of frequency distribution, Coefficient of Dispersion, Coefficient of variation. |
| 4 | **Correlation:** Definition of Correlation, Types of Correlation, Scatter Diagram Method, Karl Person's Correlation Coefficients, Correlation Coefficients for Bivariate frequency distribution, Probable error for Correlation Coefficients, Rank Correlation Co-efficient. |
| 5 | **Regression:** Definition of Regression, Regression lines, Regression Coefficients, Properties of regression Coefficients, and Fitting of regression lines and estimation for Bivariate frequency distribution, Multiple Linear Regression. |
| 6 | **Probability Theory:** Introduction, Random Experiment, Sample Space, Events, Complementary Events, Union and Intersection of Two Events, Difference Events, Exhaustive Events, Mutually Exclusive Events, Equally Likely Events, Independent Events, Mathematical & Statistical definition of Probability, Axiomatic definition of probability, Addition Theorem, Multiplication Theorem, Theorems of Probability, Conditional Probability, Inverse Probability. |

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| **7** | **Probability Distributions:**<br>**Binomial Distribution:**<br>Introduction, Probability mass function of Binomial distribution, Mean and Variance of Binomial distribution, Properties of Binomial Distribution, Uses of Binomial Distribution.<br>**Poisson Distribution:**<br>Introduction, Probability mass function of Poisson distribution, Mean and Variance of Poisson distribution, Properties of Poisson Distribution, Applications of Poisson Distribution. |
| **8** | **Normal Distribution:**<br>Introduction, Probability density function of Normal distribution, Properties of Normal distribution, Importance of Normal Distribution. |

**Text Book:**

1) Probability, Statistics and Random Process, 3rd Edition by T Veerarajan, TMH.

**Reference Books:**

1) Fundamental of Applied Statistic by S.C. Gupta & V.K. Kapoor , Sultan Chand Publication.
2) Statistical Methods by S. P. Gupta, Sultan Chand Publication.
3) Business Statistics by Prof. H.R. Vyas & Others, B.S. Shah Prakashan.

## 2CSE402: Operating System [3 0 4 5]

**Learning Outcomes:**

- A student passing this course will have acquired the following abilities:
- Explain the objective, functions and resource management of modern operating systems.
- Analyze the tradeoffs inherent in operating system design.
- Describe how computing resources are used by application software and managed by system software.
- Summarize techniques for achieving concurrency and synchronization in an operation system.
- Compare and contrast the common algorithms used for both preemptive and non-preemptive scheduling of tasks in operating systems.
- Explain memory hierarchy and cost-performance tradeoffs.
- Summarize the range of considerations in the design of file systems.

**Syllabus**

| Unit No | Topics |
|---|---|
| **1** | Operating system objectives and functions, evolution, building blocks: Process, Memory, File and IO |
| **2** | Process Management, Control and Scheduling: Process, Process States, description, control. Threads, Symmetric Multiprocessing, ,micro kernels, process scheduling types, scheduling algorithms, multi-processor scheduling, real time scheduling. |
| **3** | Principles of concurrency, mutual exclusion, semaphore, monitors, message passing, reader's writers' problem, deadlock, prevention, avoidance, detection, dining philosopher's problem. |
| **4** | Memory management, partitioning, paging, segmentation, virtual memory, hardware and control structure, shared memory. |
| **5** | I/O Devices, Functions, Buffering, disk scheduling, RAID, disk cache. |
| **6** | File Organization and access, directories, file sharing, record blocking, secondary storage management. |
| **7** | Mobile operating system basics |
| **8** | **Normal Distribution:** Introduction, Probability density function of Normal distribution, Properties of Normal distribution, Importance of Normal Distribution. |

**Textbook:**

Operating System Internals and Design Principles by William Stallings - 9th Edition, Pearson Publication

**Reference books:**

Operating System Concepts by Abraham Silberschatz, Peter Baer Galvin, Addison-Wesley publication

Modern Operating Systems by Andrew S. Tanenbaum, Prentice Hall of India

## 2CSE403: Database Management System [3 0 4 5]

### Learning Outcomes:

On successful completion of the course the students will be able to:

- Understand database concepts and structures and query language
- Understand the E R model and relational model
- To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.
- Understand Functional Dependency and Functional Decomposition.
- Apply various Normalization techniques.
- Perform PL/SQL programming using concept of Cursor Management, Error Handling, Package and Triggers.
- Execute various advance SQL queries related to Transaction Processing & Locking using concept of Concurrency control.
- Understand query processing and techniques involved in query optimization.
- Understand the principles of storage structure and recovery management.

**Syllabus:**

| Unit No | Topics |
|---|---|
| **1** | **Introduction**<br>Introduction and applications of DBMS, Purpose of data base, Data, Independence, Database System architecture- levels, Mappings, Database, users and DBA |
| **2** | **Entity Relationship Model**<br>Basic Concepts , Constraints, Keys , Design Issues , Entity Relationship Diagram, Weak Entity Sets, Extended E-R Features , Design of an E-R Database Schema Reduction of an E-R Schema to Tables. |
| **3** | **Relational Model**<br>Structure of Relational Databases, the Relational Algebra, Extended Relational Algebra Operations, Modifications of the Database Views, the Tuple Relational Calculus, The Domain Relational Calculus |
| **4** | **SQL**<br>Basics of SQL, DDL,DML,DCL, structure – creation, alteration, defining constraints – Primary key, foreign key, unique, not null, check, IN operator, Functions - aggregate functions, Built-in functions – numeric, date, string functions, set operations, sub-queries, correlated sub-queries, Use of group by, having, order by, join and its types, Exist, Any, All , view and its types. Transaction control commands – Commit, Rollback, Save point |
| **5** | **Relational Database Design**<br>First Normal Form, Pitfall of Relational-Database Condition, Functional Dependencies, Decomposition, Desirable Properties of Decomposition, Boyce-Cod Normal Form Third Normal Form |
| **6** | **PL/SQL Concepts**<br>Introduction, Cursors, Stored Procedures, Stored Functions, database Triggers |
| **7** | **Overview of Storage and Indexing**<br>Data on External Storage – File Organization and Indexing – Cluster Indexes, Primary and Secondary Indexes – Index data Structures – Hash Based Indexing – Tree base Indexing |

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|---|---|
| **8** | **Transaction Management**<br>Transaction concepts, properties of transactions, serializability of transactions, testing for serializability, System recovery, Two- Phase Commit protocol, Recovery and Atomicity, Log-based recovery, concurrent executions of transactions and related problems, Locking mechanism, solution to concurrency related problems, deadlock, , two-phase locking protocol, Isolation, Intent locking |
| **9** | **Security**<br>Introduction, Discretionary access control, Mandatory Access Control, Data Encryption |
| **10** | **Query Processing and Query Optimization**<br>Overview, Measures of Query Cost |
| **11** | **Database System Architecture**<br>Centralized and Client-Server Architectures, Server System Architectures, Parallel Systems,<br>Distributed Systems |

**Case Study of DB2 Vs Oracle**

**Reference Books:**

1. Database System Concepts : Fourth Edition By Silberschatz, Korth, Sudarshan.

2. An Introduction to Database Systems : Seventh Edition By C. J. Date

3. SQI, PI/SQL The Programing Language of ORACLE : 2nd Edition By Ivan Bayross.

4. Basics of Information Management with DB2 by IBM

5. Database Management Systems by Raghu Ramakrishnan and Johannes Gehrke McGraw-Hill

## 2CSE404 : Microprocessor & Interfacing [3 0 2 4]

**Learning Outcomes:**

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

- Understand the working of a microprocessor.
- Apply the knowledge of combinational and sequential logical circuits to design different parts of microprocessor and memory interface as well other hardware interface.
- Understand the input / output and Memory related flow of signals.
- Understand concept of Interrupts.
- Write, debug and simulate assembly language programs.
- Understand the concept of interfacing using various interfacing chips with 8085.

**Syllabus:**

| Unit No | Topics |
|---|---|
| **1** | **Introduction to Microprocessor:** 8085 Microprocessor architecture, buses, 8085 programming model, flags, 8085 pin configuration and function of each pin. Fetch-decode-and execute operations. T-states, Machine cycle, Instruction cycle, Op-code Fetch cycle, Memory and I/O read and write cycles, Wait state, Interrupt timing diagram and timing diagram in general for any instruction. |
| **2** | **8085 Instruction set and Programming** Instruction classification depending on size and operations. Addressing modes. Instruction groups viz. Data transfer, Arithmetic, Logical, Branch and Machine control instructions and related programs. Time delays, concept of Stack and related instructions. 8085 interrupts, RST, RIM, SIM instructions. Conditional and un conditional CALL and RET and subroutines |
| **3** | **Interfacing of Memory Chips & Input / Output Chips :** Address decoding, interfacing of memory chips with 8085. Memory mapped I/O and I/O mapped I/O. Interfacing input / output chips with 8085. |
| **4** | **Peripheral ICs and Applications :** Interfacing Concepts, Ports, Interfacing of I/O Devices, Interfacing of Data Converters (D-To-A And A-To-D). Programmable Interfacing Devices Like 8279 Keyboard/Display Interface, 8255A PPI, 8253/8254 Timer, 8259A PIT, 8237 DMA Controller, Serial I/O Concepts, SID And SOD, 8251A USART. Block diagrams, pin description, control words, and Interfacing of above chips With 8085, Programming them in Different Modes and practical applications. |

**Reference Books:**


1. Microprocessor Architecture, Programming, and Applications with the 8085 –Ramesh S. Gaonkar Pub: Penram International.
2. Microprocessor 8085 and its Interfacing, By Sunil Mathur, PHI Learning Pvt. Ltd.
3. 8085 Microprocessor And its Applications, By A. Nagoor Kani, TMH Education Pvt. Ltd

## 2CSE405: Application Development - II [0 0 2 1]

Application Development -II is in continuation of the work carried out in Application Development – I and courses learnt till semester.

**Learning Outcomes:**

1. Apply knowledge of computer science principles and engineering principles to design, develop, and verify system on the proposed idea.
2. Design and conduct testing in selected areas of computing, as well as to analyze and interpret the resulted data.

**Syllabus:**

| Unit No | Topics |
|---|---|
| **1** | **Work Plan:**<br>1. Revise/ Modify the scope of selected problem during Application Development -I.<br>2. Perform analysis and design.<br>3. Apply data structures concepts and programming principles to build software solution.<br>4. Do developer and user level Testing.<br>5. Write technical report and present the work |
| **2** | **Assessment:**<br>Content/discipline knowledge and skills are assessed at the practical level through continuous evaluation |

## 2CSE406: Technical Writing [0 0 2 1]

**Course Objectives**

This course is designed to develop skills that will enable to produce clear and effective scientific and technical documents. While the emphasis will be on writing, oral communication of scientific and technical information will form an important component of the course, as well.

**Learning Outcomes:**

- Act ethically in their role in the communication situation.
- Apply concepts of information design. These concepts include effective ways to design documents for print, web, and other electronic means of communication in order to construct documents meaningful to the audience.
- Use visual items in effectively constructing meaning in communication situations.
- Create clear, concise technical documents that effectively use style and grammar and information structure in ways that create meaning with the reader.
- Collaborate effectively in various writing situations, including planning, creating, and managing, evaluating, editing and revising document production.

**Syllabus:**

| Unit No | Topics |
|---|---|
| 1 | **Lab Work:**<br>Foundation of Reading & Writing, Introduction to Technical Writing, Introduction to research papers, articles, technical notes, Document Development Life Cycle, Software Tools ( Latex, etc.), concept of technical publication<br><br>Students create a variety of projects, drawn from the genres listed below, and engage in numerous discussions and group activities to facilitate their ability to create effective documents. |
| 2 | **Case Study:**<br>Design Specification, User Manual / Guides, Hardware Manuals, Installation Manuals, Online Help, Web sites, Analytical/Feasibility Reports, Proposals (Business Development Perspective), Lab/Science Reports, Project proposal writing, Abstracts, Progress reports |

**Reference Books**

Markel, Mike. Technical Communication. 7th ed. New York, NY: Bedford/St. Martin's, 2003. ISBN: 9780312403386.

Buy at Amazon Hacker, Diana. A Pocket Style Manual. 4th Ed. New York, NY: Bedford/St. Martin's, 1999. ISBN: 9780312406844.

Perelman, Leslie C., James Paradis, and Edward Barrett. The Mayfield Handbook of Technical and Scientific Writing. New York, NY: McGraw-Hill, 1997. ISBN: 9781559346474.