SIR PADAMPAT SINGHANIA UNIVERSITY
Department of Computer Science & Engineering

Programme: B.Tech **Session:** 2011-15

Semester – III

HU201	L T P C
Business & Technical Communication-I	**1 1 0 2**

Objective: *The course trains the students to acquire excellent writing skills and equips them for their professional pursuits and social life*

Course outline:

Internal Business Communication

- Memorandum
  - Introduction, Functions of memo
  - Types of memo
  - Characteristics of an effective memo
  - Structure and layout of memo
  - Writing strategies of memo
- Proposals
  - Proposal and its types (Non formal and Formal, Internal and external, Solicited and Unsolicited Proposals)
  - Structure of a Formal Proposal

Interpersonal Communication

- Negotiation –
  - Approaches to Negotiation – Distributive, Integrative, Lose-lose and Compromise approach
  - Negotiation Process, factors affecting negotiation
  - Types of negotiation
  - Third party negotiation
- Conflict and Conflict Resolution
  - Role of conflict in an organization
  - Types of conflict
  - Conflict management styles – Competing, Collaborating, Avoiding and Accommodating style

Literature

- Critical Appreciation of various genres of literature – prose, poetry, drama

Texts / Reference Books-

1. Duan. P, Gu. W, & Ma. Y. 2001. English for Technical Communication [M]. Beijing: Science Press.
2. Pickett, N. A., & Laster, A. A. (1980). Technical English [M]. New York: Harper & Row Publishers.
3. McMurrey. Power Tools for Technical Communication. current edition. Heinle.
4. Meenakshi Raman and Sangeeta Raman. Technical Communication. Oxford University Press.

CS201	L T P C
Database Management System	3 0 2 5

Objective: This course will enable students develop basic knowledge as well as expertise in using Database Management Systems. The students will learn database concepts, data organization, data models, various approaches to database design, strengths of relational model, normalization etc. At the end of the course the student will be able to understand database design and normalization techniques, use standard Query language and its various versions, understand importance of backup and recovery techniques.

Course outline:
Introduction: Purpose of DBMS, View of data, Database Languages, Relational Databases, Database Design, Database Architecture, Database users and administrators.

Relational Databases & SQL: Structure, Relational Algebra Operation, Null Values, Modification of the database, Data Definition, Basic structure of SQL queries, Set operations, aggregate functions, Nested sub-queries, Complex queries, Views, Joins, PL/SQL - cursor, stored function, stored procedure, triggers, error handling, package.

Database Design: Overview, The E-R model, Constraints, E-R Diagram, E-R Design Issues, Entity set, Features of Relational Designs, Atomic domains and 1NF, Functional Dependencies, Multi valued dependencies, More Normal forms, Database design process.

Database Storage and Querying: Overview, Magnetic disks, RAID, Tertiary storage, Storage access, File Organization, Organization of records in file, Data Dictionary storage, Indexing and Hashing concepts.

Transaction & Concurrency Control: Transaction concept & state, Implementation of Atomicity and Durability, Concurrent executions, Serializability, Recoverability, Isolation, Lock based, Time-stamp based and Validation based protocols, Multiple granularity, Deadlock handling.

Texts / Reference Books

1 Date C J, “An Introduction To Database System”, Addision Wesley
2 Korth, Silbertz, Sudarshan, “Database Concepts”, McGraw Hill
3 Elmasri, Navathe, “Fundamentals Of Database Systems”, Addision Wesley
4 Leon & Leon, “Database Management System”, Vikas Publishing House.
5 Bipin C. Desai, “An introduction to Database Systems”, Galgotia Publication
6 Ramakrishnan, Gehrke, “Database Management System”, McGraw Hill
7 Kroenke, “Database Processing: Fundamentals, Design and Implementation”, Pearson Education.

CS202	L T P C
Software Engineering	3 0 1 4

Objective: *Software Engineering is a systematic and disciplined approach to developing software. It applies both computer science and engineering principles and practices for the creation, operation, and maintenance of software systems. It demands an understanding of the systematic design processes, non-functional system properties, and large integrated systems. This course is designed to help students develop high-quality software systems. It emphasizes basic techniques including requirement analysis, specification, which helps to reveal errors early in the development process, and ensures that the end product satisfies its requirements.*

Course outline:

Introduction: The Evolving role of software, Changing nature of software, legacy software, Software Myths, Software Crisis.

Software Process: SE – a layered technology, Process framework, CMMI, Process pattern and assessment, Process technology, Product and process, Process Models – Waterfall, Incremental, RAD, Prototype, Spiral, Concurrent Development, Component based, Formal methods models.

Requirement Engineering: Tasks, Process, Eliciting requirement, Developing use cases, Building the analysis model, Negotiating and Validating requirements.

Analysis Model: Requirement analysis, Modeling approaches, Data modeling concepts, O-O analysis, Scenario based, Flow oriented, Class based modeling, Creating a behavioral model.

Design and Architecture: Design process and quality, Design concepts and model, Software architecture, Data design, Architectural design, Mapping data flow into a software architecture.

Testing Strategy and Tactics: Approaches, Test strategies, Validation and System testing, Debugging, Black Box and White Box Testing - Basis path, Control structure testing.

Project Management: Management spectrum, Metrics in the process and project domains, Software measurement, Metrics for software quality, Software project estimation, Decomposition techniques, Empirical estimation model, Project scheduling, Risk Management, RMMM plan, Quality Management, SQA, FTR, Statistical SQA, ISO 9000 quality standards, Software Configuration Management.

Texts / Reference Books

1 R. S. Pressman, Software Engineering: A Practitioners Approach, McGraw Hill.
2 Rajib Mall, Fundamentals of Software Engineering, PHI Publication.

3 K. K. Aggarwal and Yogesh Singh, Software Engineering, New Age International Publishers.
4 Carlo Ghezzi, M. Jarayeri, D. Manodrioli, Fundamentals of Software Engineering, PHI Publication.
5 Ian Sommerville, Software Engineering, Addison Wesley.
6 Pankaj Jalote, Software Engineering, Narosa Publication
7 Pfleeger, Software Engineering, Macmillan Publication.
8 A. Leon and M. Leon, Fundamentals of Software Engineering, Vikas Publication.

EC204	L T P C
Digital Electronics	**3 0 1 4**

Objective: *This course develops the skills and knowledge required for designing digital circuits that are used in low cost, high speed, innovative and programmable devices for real time embedded applications.*

Course outline:

Boolean Algebra And Logic Gates: Introduction to Boolean algebra, Binary connectives, Basic Logic Gates, Evaluation of truth functions, Function calculus as Boolean algebra, Duality, Fundamental theorems of Boolean algebra and simplification of Boolean expressions, Standard forms of Boolean Functions, Minterm and Maxterm.

Minimization Techniques: The K Map Method, Three, Four and Five-Variable Map, Product-of-Sums Simplification, Don't-Care Conditions, Quine Mc cluskey Method NAND and NOR Implementation, Other Two-Level Implementations.

Combinational Logic Circuits: Combinational Circuits, Analysis Procedure, Design Procedure, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers and Demultiplexers.

Sequential Logic Circuits: Classifications & model of sequential circuits, latches, Flip-Flops, Level & edge triggering, Master-slave configuration , Analysis of Clocked Sequential Circuits, State Reduction and Assignment, Design Procedure, Registers and Counters, Registers-Shift Registers, Ripple Counters, Synchronous Counters, Other Counters.

Analysis & Designing Of Synchronous & Asynchronous Machines: Basic models of sequential machines - Concept of state - state diagram - state reduction through partitioning and implementation of synchronous sequential circuits, Asynchronous Sequential Logic Design.

Digital Logic Families & Programmable Logic: Characteristics of Digital ICS -TTL,ECL,MOS and CMOS digital IC families Characteristics - Comparison of Performances – Interfacing TTL and CMOS ICs - Display Drivers. Basic Concepts of Programmable Logic – PROM, EPROM, PAL, PLA

Texts / Reference Books

1. Malvino, Leach -Digital principle and applications (PHI)
2. R.P.Jain-Modern digital electronics (TMH)
3. Tocci.R.J : "Digital systems-Principles & Applications"-(PHI)
4. Morris Mano : "Digital Design" – (PHI)

MA202	L T P C
Discrete Mathematical Structures	4 1 0 5

Objective: *In this course concepts and techniques from discrete mathematics that are applied in Computer Science and Engineering are discussed.*

Course outline:

Propositional Logic: Propositions, Basic Logical operations, Truth tables, Tautologies and Contradictions, Algebra of propositions, logical implication, logical equivalence, Arguments, Validity of Arguments, Predicates, Universal and existential quantifiers.

Set Theory: Definition of sets, Sub-set, Operations on sets, Laws of Algebra of sets, Counting and Venn-Diagram, Inclusion and Exclusion Principle, Finite and Infinite Sets. Principle of Mathematical Induction.

Fuzzy sets: Union, intersection and complement.

Mapping and Relation: Injunctive, Surjective, Bijective Mappings (Definition and Simple Examples); Relation, types of relation, composition of relations, Pictorial representation of relations, Equivalence relation, Equivalence Class & Partition, Poset, Lattice, Finite State Automata.

Combinatorics: Principle of Counting, Permutation and Combination, Pigeon Hole Principle. Generating Functions, Recurrence Relation.

Algebraic Structures: Semigroup and Monoid; Group; Subgroup and Coset; Normal Subgroup; Quotient Group; Cyclic Group, Permutation Group; Dihedral Group (upto D_4); Symmetric Group S_3, Homomorphism and Isomorphism; Modulo Group; Elementary Applications in Coding.

Boolean algebra: Basic definitions, Boolean Functions; Simplification of Boolean Functions; Karnaugh Map; Application to Switching Circuits and Logic Gates.

Graphs: Simple graph, multi graph, basic terminology, representation of graphs, Bipartite, Regular, Planar and connected graphs, connected components in a graph, Euler graphs, Hamiltonian path and circuits. Matrix Representation of Graphs (Adjacency and Incidence Matrices); Tree; Properties of Tree; Binary Tree and Fundamental Circuit; Minimal Spanning Tree: Kruskal's Algorithm; Prim's Algorithm; DFS; BFS. Cut Set; Fundamental Cut Set and Cut Vertices. Network; Flow Augmenting Path; Ford-Fulkerson Algorithm for Maximum Flow; Floyd Algorithm; Max-Flow and Min-Cut Theorem (statement only).

Texts / Reference Books

1	Trembly, J.P.,& Manohar R	Discrete Mathematical Structures
2	Rosen K H	Discrete Mathematics and its Application
3	Biggs N L	Discrete Mathematics, Oxford University Press
4	Deo N.	Graph Theory with Applications to Engineering and Computer Science
5	Lipschutz S and Lipson M	Discrete Mathematics
6	Koloman, Busby & Ross,	Discrete Mathematical Structures, PHI.

CS204	L T P C
Computer Graphics	**3 0 1 4**

Objective: *This course provides an introduction to the area of computer graphics. Over the past decades, computer graphics has revolutionized many areas such as printing, human-computer interfaces, digital video and photography, games, simulations, computerized training, medical visualization, virtual reality, mechanical design. This course gives a basic understanding of the internal workings of what goes on under the hood in these areas. This class also acts as a connection between the fields of programming and CG.*

Course outline:

Foundation of Computer Graphics

- The display device and technology
- The GPU
- Computer Display Units
    - CRT
    - LCD
    - OLED
    - 3D Displays

Introduction to OpenGL

- OpenGL Command Syntax
- OpenGL as a State Machine
- OpenGL Rendering Pipeline
    - Display Lists
    - Evaluators
    - Per-Vertex Operations
    - Primitive Assembly
    - Pixel Operations
    - Texture Assembly
    - Fragment Operations

Introduction to DirectX

- 2D Rendering
- 2D Geometry
- Texture Mapping
- 3D Primer
- Vectors and 3D space
- The Matrix

Graphics Pipeline Mathematics

- Sets

- Intervals
- Angles
- Trigonometry
- Coordinate systems
- Vectors
- Points
- Normals
- Mathematical Surfaces
- Solid Angle
- Random Numbers
- Orthonormal Bases and Frames
- Geometric Series
- The Dirac Delta Function

Rendering Algorithms

- Ray tracing
- Ray casting
- Scanline rendering and rasterisation

Shaders

- Shader types
    - Geometry shaders
    - Pixel shaders
    - Vertex shaders
    - The Unified Shader Model
- GLSL (OpenGL Shading Language)
- HLSL (High Level Shader Language for DirectX)

Texture mapping

- Mapping techniques
- Antialiasing
- Triangle Meshes
- Textures and Transformations
- Procedureal textures
- Noice based textures

OpenGL ES for embedded devices such as smart phones

- Consideration for using 3D graphics on mobile devices

Texts / Reference Books

1. OpenGL Programming Guide: The Official Guide to Learning OpenGL Version 3.0, Seventh Edition. Dave ShreinerAddison-Weseley, 2009
2. Beginning DirectX 11 Game Programming by Allen Sherrod and Wendy Jones DELMAR PUBLISHING, 2011
3. Interactive Computer Graphics: A Top-Down Approach Using OpenGL, Fifth Edition by Edward Angel ,Addison-Wesley, 2003