ACADEMIC CALENDAR

Session: 2017-2018

part I		
Topic	Assigned Faculty	**Month**
Unit I		
Introduction to Computer and Problem Solving: Information and Data. Hardware: CPU, Primary and Secondary storage, I/O devices, Bus structure Software: Systems and Application.	DG	**July- August**
Generation of Computers: Super, Mainframe, Mini and Personal Computer. Introduction to Programming Languages: Machine Language, Assembly Language, High Level Language. Problem Solving: Flow Charts, Decision Tables and Pseudocodes.	DG	**July- August**
Number Systems and Codes: Number representation: Weighted Codes, Non-weighted codes, Positional, Binary, Octal, Hexadecimal, Binary Coded Decimal(BCD), Conversion of bases. Complement notions. Binary Arithmetic, Binary Codes: Gray, Alphanumeric, ASCII, EBCDIC; Single Error-Detecting and Correcting Codes, Hamming Codes	DG	**August- September**
Unit II		

Elementarycircuit theory: Kirchoff's Laws with simple applications, Statement and illustration of Thevenin's & Norton's theorems(without proof) in resistive network only& its simple applicatons. Elementary Physics of semi-conductors: Intrinsic and Extrinsic semiconductors, P & N type, Diode & its applications: P-N Junction diodes, Biasing of a junction diode, Depletion region & its effect, Zener diodes & its applications, Diode as a rectifier, Types of diodes, LED, LCD. Principle of junction transistor, Current components of transistor, Modes of a transistor (CB, CE and CC) and their properties, I/O characteristics of a transistor in CE mode. Relation between & -parameters of Transistor, Biasing of a transistor : Q point, load line, Self-bias, fixed bias & collector to base bias. Amplifiers: Concepts, Class A & B. Inverters using Transistors–transfer characteristics and threshold voltages. Switching characteristics of diodes and transistors-SCR & UJT. Principle of FET and MOSFET, Depletion and Enhanced modes of operations, Characteristics and definition of different parameters, Symbols and Application for switching functions. Concept of NMOS, PMOS and CMOS switch. Principle of Multivibrators, Applications of Multi-vibrators – Monostable and Astable Multivibrators Principle of differential amplifiers, CMRR of differential amplifiers, Properties of Ideal OP-AMP, Concept of virtual ground, Offset parameters and its uses as an inverting, non-inverting amplifiers, adder/subtractor/multiplier/divider, differentiator, integrator and scale changer, Schmitt trigger.	**DG**	**August- September**

| | Data Converter: D/A Conversion principle using basic circuit, R-2R Ladder circuit, Counter based A/D converter, Successive approximation method for A/D conversion.
DTL and TTL NAND gate circuits and its operations, Fan in & Fan out. SSI, MSI, LSI, and VLSI classifications.
Group – D : Computer Organization – I (45 Periods)
Basic Computer Organization – IAS Computer, Von Neumann Computer, System Bus. Instruction Cycle, Data Representation, Machine instruction and Assembly Language, CPU Organization, Arithmetic and Logic Unit, Control Unit, CPU Registers, Instruction Registers, Program Counter, Stack Pointer. CISC & RISC processors.
Instruction: Operation Code and Operand. Zero, One, Two and Three address instruction. Instruction types. Addressing modes. Stack organization.
Memory: Types of Memory, RAM, ROM, EPROM, DRAM, SRAM, SAM, PLA, Associative memory. Different storage technology. I/O system organization and interfacing, Bus: SCSI, PCI, USB; Tri State Devices, Bus Arbitration. | **S.K** | **December- January** | |
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Digital System Design (35 Periods) Combinational Circuits: Realization of AND and OR Gates using diodes and NOT Gate using transistors, Standard Gate Assemblies, IC chips packaging nomenclature, Half and Full Adder(3 & bit), Multi-bit adders – Ripple carry and Carry Look Ahead Adder, Adder/subtractor, BCD-Adder, Data selectors/multiplexers – expansions, reductions, function realization, universal function realization, multi-function realization, Decoders: function realization, Demultiplexer and function realization, Encoder, Priority Encoder, Parity bit Generator/checker, Gray Code Generator, Code Converters, Keyboard encoder, Seven segment display unit, Comparators. Sequential Circuits: Model of Sequential computing, Difference between Combinational and Sequential circuit, RSLatch: using NAND and NOR Gates, RS Latch as a Static RAM Cell, Problems of Basic Latch circuits, Digital Clock – Duty Cycle, Rising time, Falling time, Clocked Flip Flops - SR, JK, D, T, Level Trigger and Edge Trigger, Excitation Functions of each flip-flops, Flip-flops with Preset and Clear, Application of Flip-flops: Asynchronous Counter(UP/DOWN) upto 4 bit counter, Decade Counter, Mod – n Counter, Finite State machine Model – State Transition Diagram and Table, Synchronous Counters – different mod counters, Ring counter, Johnson's Counter, Registers, Registers with parallel load, Shift Registers.	**DG& DG**	**JAN TO FEB**	
Boolean Algebra: Fundamentals of Boolean Algebra, Switches and Inverters, Functionally Complete Gates (AND, OR, NOT), NAND. NOR, Switching function and Boolean Function. De Morgan's Theorem, Minterm, Truthtable and minimization of switching function upto four variables, Algebraic and K-map method of Logic circuit synthesis: Two level and Multi level.	**DG& DG**	**MAR-APRIL**	

Part-II Paper – III (Theoretical) : 100 MARKS		
Group A1 : System Analysis and Design (20 Periods) Introduction : System definition, characteristics; real-time and distributed systems. System Life Cycle : Waterfall model, description of different phases. Planning : Data gathering techniques; feasibility study. Cost-benefit analysis	**DG**	**July-August**
Design and Modelling : Logical and physical design; flowcharts and structured charts; DFD and ERD. Form design, User interface design Modularity : Module specification concepts; coupling and cohesion Maintenance : Evaluation, testing and validation. Maintenance issues Case Study : Accounting and Finance System, Personnel system	**DG**	**August- September**
Group A2 : Database Management (40 Periods) Overview : Files and database. Data independence. 3-level DBMS architecture, Data Dictionary, Database Languages Traditional Models : Network, Hierarchical and Relational. Comparison Relational Model : Definition and properties, Keys of different types Relational Algebra : Operations – select, project, cross product, join, set. Relational Calculus : Concept of tuple and Domain Calculus. Query Language : SQL – basic concepts, Transaction Processing Design : ER diagram to relational scheme; Normalization (upto 3NF) File Organizations : Hashed, Sequential, heap, indexed sequential B-Tree. Related topics : Concurrency and recovery; security and integrity. Current trends in databases : Distributed, Client-Server, Object oriented	**DG**	**September- October**
Group B (Practical) : Full Marks 50 Groups B1 & B2 together constitute Group B		

Database Design : Data types, creating databases, adding records, edit, browse, delete, save. Application Design : Menu and screen design; data validation; report design and generation; use of GUI facilities. SQL : Constructs; insert, delete, update, view, temporary tables; nested queries, API types of call, native API, ODBC. Trouble shooting : Validation , correctness, integrity, Performance tuning and documentation.			**July-August**
Students should get appropriate ideas reg the following : assembling a PC, upgradation of a PC, installation of different softwares, running diagnostic software for performance tuning and related topics.			**August- September**
Part – III Paper IV			**September- October**
		DG	**November- December**

Group A : Communication and Computer Networks (60 Periods) Communication Concepts : Analog and Digital communication – basic concept and comparison. Signal types frequency spectrum, strength, bandwidth, data rate, channel capacity. S/N ratio, modulation and demodulation FSK, ASK. Transmission media (brief idea, characteristics, comparison) : Guided (twisted pair, co-axial, optical fiber) and unguided (microwave, satellite-geo synchronous and low-orbit, VSAT). Audio and Video communication systems : Analog and digital telephone, AM & FM radio, cable TV network, IDGN, paging, cordless and cellular phones, ATM. Computer Networks : Distributed processing and resource sharing concepts. Classes – LAN, MAN, WAN Architecture – OSI , TCP/IP and http protocol – brief study. Basic idea of protocols, routing, congestion control. LAN : Ethernet and Token Ring topology (principle of operation, characteristics, comparison). High speed LANs Internetworking Modems, bridges and routers, connectivity concepts. Network security. The Internet : basic idea, DNS and URL, IP address, browsers E-mail : Architecture and services	**DG**	**November- December**

Group B1 : Shell Programming (Minimum Laboratory Work 50 periods) Files & Directories : Copy, delete, rename, compare files, create, navigate, remove directories, access vi editor, status of users, background jobs; Pipes & filters; cutting, pastings and sorting of files, pattern searching in a string. Shell Programming : Concept and simple programming problems. Unix/Linux system administration-creation and maintenance of accounts, super user, disk management, backups, X-windows. Group B2 : Programming in GUI environment (Theoretical – 10 periods, minimum Lab. Work – 40 periods) Students should learn about programming on the following topics using one of the two languages, primarily through practical sessions, along with theoretical classes in between. Basic Features; building objects with classes, operations with objects, class libraries. Multitasking and multithreading applications; software design involving forms, objects, events, functions, procedure and methods (32 bit programming). ODBC driver; Front and development for database. Multimedia applications. Department of	**DG**	**December - MARCH**