Class XI

Total Contact Hours: 200 (Theory & Practical: 180 ; Remedial & Home Assignment:20)

SEMESTER – I

Course Code: COMS (Theory)

Full Marks: 35

Contact Hours: 100

Unit – 1	Computer System and Organisation 15 Marks	Total 30 Hours
	 Basic Computer Organisation CPU, Primary Memory (RAM, ROM, Cache), Secondary storage device, I/O devices, units of memory (bit, byte, KB, MB, GB, TB, PB). 	4 hours
	 Classification of Computers Super, Mainframe, Mini, PC. 	
	 Concepts of Software Definition of software, types of software – System Software (Translator: assembler, interpreter, compiler, Loader, Linker, Operating System: Definition and functions, types of OS- Single use, Multiuse, Multiprogramming, Multiprocessing, Time sharing), Application Software (Definition and example), Utility Software, concept of GUI and CUI with examples using LINUX (Basic Commands). 	9 hours
	 Number System Binary, Octal, Decimal, Hexadecimal number system, conversion between number system, Weighted Code (BCD, Binary, 84-2-1 code), non-weighted code (GREY, Excess-3), encoding schemes (ASCII, ISCII, unicode), 1's complement, 2's complement. 	7 Hours
	 Boolean Algebra Postulates, logic gates: NOT, AND, OR, NAND, XOR, XNOR, truth tables, De Morgan theorem, SOP, POS, Simplifications using K-Map and Boolean algebra, logic circuits. 	10 Hours
Unit – 2	Programming Fundamentals 10 Marks	Total 25 Hours
	 Concept of Programming Instruction (Definition, Example), Program (definition, example), Programming Language (concept of high level, low level and assembly language), Procedural and Non-procedural programming, Concept of Structured Programming, Object Oriented Programming 	2 Hours
	 Algorithm fundamentals Definition, characteristic of algorithm, recursive and non-recursive algorithms, representation of algorithm using flowchart, pseudo code, efficiency of algorithm, space complexity, time complexity, asymptotic notation- big O, big Omega, big Theta. 	18 Hours
	 Introduction to Problem Solving Steps for Problem Solving (analysing the problem, developing an algorithm, coding, testing, debugging). 	5 Hours

Unit – 3	Introduction to C 10 Marks T	Total 45 Hours
	 Basic Structure Character set, keywords, identifiers, constants, variables and type declaration, Sample programs, pre-processor. 	2 Hours
	 Operators Arithmetic, Relational, Logical, Assignment, Increment and Decrement, Conditional, comma; operator precedence and associatively; arithmetic expression-evaluation and type conversion. Character I/O, Escape sequence and formatted I/O. 	3 Hours
	 Branching and Looping ➤ if, if-else, while, do-while, for. 	3 Hours
	 Arrays and Structure One-dimensional and Two-dimensional, Different types of uses. String handling with arrays – read and write, concatenation, comparison, string functions. Structures: Initialization; arrays of a structure, arrays within structures, structure within structure. 	12 Hours
	 User defined functions Need, Call by Reference, call by value, return value and types, nesting of functions, recursion. 	10 Hours
	 Pointers Declaration and initialization, operators, pointer arithmetic's, accessing variables, pointer & arrays, strings, functions. 	15 Hours

SEMESTER – II

Course Code: COMS (Theory)

Full Marks: 35

Contact Hours: 80

Unit – 1	Data Structure 15 Marks	Total 45 Hours
	Definition, types of data structure-linear and non-linear.	1 Hour
	Abstract Data types.	1 Hour
	• Arrays: 1D, 2D and their applications.	7 Hours
	Linked List: Single, circular and double link list.	10 Hours
	 Stack Stack operations (push and pop), implementation using array and list, application of Stack. 	6 Hours
	 Queue Queue operation implementation using array and list, circular queue, de-queue, priority queue. 	6 Hours
	 Recursion Definition. Advantages and limitations of recursion. Understanding what goes behind recursion (internal stack implementation), tail recursion. 	4 Hours
	 Searching and Sorting Linear Search, Binary Search and their comparison. Bubble Sort and its implementation. 	10 Hours
Unit – 2	Computer Networks 10 Marks	Total 20 Hours
	 Introduction to Networking Analogue and digital Communication. Mode of Communication- Simplex, half duplex and full duplex. Network Architecture- Client server, Peer to Peer. Serial and Parallel Communication. Measuring Capacity of Communication Media (bandwidth, channel capacity, baud). Synchronous and asynchronous Transmission Mode. Baseband and Broadband network. 	6 Hours

	•	 Transmission Media Wired Communication Media (Twisted Pair, Co-axial cable, Fiber Optic). Wireless Communication Media (Radio wave, Microwave, Infrared, Satellite). 	3 Hours
	•	 Network Connecting Devices Modem, Ethernet Card, RJ45, Repeater, Hub, Switch, Router, Gateway, Wifi card. 	2 Hours
	•	 Network Type and Topologies Types of Network-LAN, MAN, WAN. Network Topologies- Bus, Star, Ring, Tree. 	3 Hours
	•	Network Protocols -HTTP, FTP, PPP, SMTP, TCP/IP, POP3, TELNET, HTTPS, VoIP.	2 Hours
	•	Referential Model- OSI Model (Basic Concept, use of devices and protocols at different layers).	1 Hour
	•	Introduction to Web Services: WWW, HTML, XML, IP Addresses, Domain names, URL, ISP, Website, Web browser, Web Server, Web Hosting.	3 Hours
Unit – 3	Ethics	10 Marks	Total 15 Hours
	•	Digital Footprints.	1 Hour
	•	Data Protection: Intellectual property rights (copyright, patent, trademark).	
		violation of IPR (plagiarism, copyright infringement, trademark infringement), open-source software and licensing (Creative Commons, GPL and Apache).	5 Hours
	•	violation of IPR (plagiarism, copyright infringement, trademark infringement), open-source software and licensing (Creative Commons, GPL and Apache). Cyber Crime: Definition, hacking, eavesdropping, phishing and fraud emails, ransomware, cyber trolls, cyber bullying.	5 Hours 3 Hours
	•	 violation of IPR (plagiarism, copyright infringement, trademark infringement), open-source software and licensing (Creative Commons, GPL and Apache). Cyber Crime: Definition, hacking, eavesdropping, phishing and fraud emails, ransomware, cyber trolls, cyber bullying. Cyber safety: Safely browsing the web, identity protection, confidentiality. 	5 Hours 3 Hours 2 Hours
	•	 violation of IPR (plagiarism, copyright infringement, trademark infringement), open-source software and licensing (Creative Commons, GPL and Apache). Cyber Crime: Definition, hacking, eavesdropping, phishing and fraud emails, ransomware, cyber trolls, cyber bullying. Cyber safety: Safely browsing the web, identity protection, confidentiality. Malware: Viruses, trojans, adware. 	5 Hours 3 Hours 2 Hours 1 Hour
	•	 violation of IPR (plagiarism, copyright infringement, trademark infringement), open-source software and licensing (Creative Commons, GPL and Apache). Cyber Crime: Definition, hacking, eavesdropping, phishing and fraud emails, ransomware, cyber trolls, cyber bullying. Cyber safety: Safely browsing the web, identity protection, confidentiality. Malware: Viruses, trojans, adware. E-waste management: Proper disposal of used electronic gadgets. 	5 Hours 3 Hours 2 Hours 1 Hour 2 Hours