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). • Classification of Computers ➢ Super, Mainframe, Mini, PC.	**4 hours**
	• 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**	**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**
	• Cyber Crime: Definition, hacking, eavesdropping, phishing and fraud emails, ransomware, cyber trolls, cyber bullying.	**3 Hours**
	• Cyber safety: Safely browsing the web, identity protection, confidentiality.	**2 Hours**
	• Malware: Viruses, trojans, adware.	**1 Hour**
	• E-waste management: Proper disposal of used electronic gadgets.	**2 Hours**
	• Information Technology Act: (IT Act).	**1 Hour**