GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Diploma in Engineering
Level: Diploma
Branch: Information Technology
Course / Subject Code : DI01016021
Course / Subject Name : Introduction to I.T. Systems

w. e. f. Academic Year:	2024-2025
Semester:	1st
Category of the Course:	ESC

Prerequisite: Basic knowledge of Computer, demonstrated through the school's Test Learning Center.

Rationale:	Information technology is a relatively new comprehensive term that describes the entire range of information generation, storage, transmission, retrieval, and processing. Most organizations in the industry, business, non-profit organizations, and government departments now rely heavily on their information systems (IS) and information technology (IT). The information system collects, stores, and disseminates information from the organization's environment and internal operations to support organizational functions and decision-making, communication, coordination, control, analysis and visualization. Therefore, the knowledge about the various applications areas of Information Technology including practical skills acquired through the laboratory will help students when he/she will be working with information systems.
	At the end of the course, students will be able to comfortably work on computers, install and configure OS, connect it to external devices, protect information and computers from basic abuses/attacks. This course is therefore so designed that the students will be able to apply the concepts of IT systems as and when required.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	Apply the basic concepts of Information technology systems for various educational, business, and industrial applications.	A
02	Discuss basic logic gates for designing digital logic circuits.	U
03	Describe features of different Operating Systems for various applications.	R
04	Analyze different parameters of the computer network- its communication cable/devices, topology, and addressing system.	N
05	Appraise information security for data protection and cyber-attacks in network communication.	N

*Revised Bloom's Taxonomy (RBT)

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Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
				Theory		Tutorial / Practical		
L	**T**	**PR**	**C**	**ESE (E)**	**PA/CA (M)**	**PA/CA (I)**	**ESE (V)**	
2	**0**	**2**	**3**	**70**	**30**	**20**	**30**	**150**

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	**Basics of Information System** 1.1 Importance of information technology in the modern era. - Information Concepts - Information v/s knowledge - Components Of Information System 1.2 Hardware Components of computer system - Memory (Primary and secondary) - Motherboard - Peripherals (Names and application) 1.3 Applications of various Internet Digital Platforms - - BHIM, Digi-Locker, Digital Gujarat	**4**	**10**
2.	**Digital Logic** 2.1 Introduction to digital computers and number system - Binary numbers - Base conversions (Binary, Decimal, Hexadecimal, Octal) 2.2 Working of Logic gates - AND, OR, INVERTER, XOR, XNOR 2.3 Working of Universal Gates - NAND and NOR Gate	**4**	**10**

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3.	**Operating System** 3.1 General features of OS - Introduction - Need, Functions, Services 3.2 Types of OS (Introduction and Classification) - Batch, Multitasking/Time-Sharing, Multiprocessing, Real-Time, Distributed, Network, Mobile 3.3 Proprietary & Open-source software - Windows OS -Introduction Only - Linux OS-Architecture, Components of Linux System, Kernel Mode vs User Mode, Basic Features	5	20
4.	**Information Communication & Networking** 4.1 Basic terminology of information communication - Basic Structure of communication system - Transmission modes (Simplex, half-duplex, Full-duplex) - Synchronous and Asynchronous transmission - Serial and Parallel communication 4.2 Transmission media and Connectors - Twisted -pair (STP-UTP), Coaxial, Fiber Optic, - RJ-45 connectors 4.4 OSI Model - Working & Functioning of each layer - Name of Protocols & Hardware supported at each layer 4.5 Network Topologies - Bus, Mesh, Star, Ring, Hybrid 4.6 Types of Computer Networks - LAN, MAN, WAN 4.7 Internet & Intranet - URL, Internet, Intranet, - Comparison between Intranet & Internet 4.8 Networking Devices (Types & use) - Switch, Router, Repeater, Wireless Access Point	7	25

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5.	**IP Addressing Scheme & DNS** 5.1 Network Addressing (IPv4) & Frame Format (IPv4) - Internet Protocol (need, types) - Classful addressing scheme, Address space, notations, netid, hostid - Need of IPv6 - IPv6 Notations & examples 5.3 Comparison between IPv4 & IPv6 5.4 DNS - Introduction, Need - Domain Names & its types	**5**	**15**
6.	**Information Security** 6.1 Need for Information Security - Definition of various terms of Information Security like Cryptography, Vulnerability, Threat, Attack, Encryption, Decryption 6.2 The Principles of Security (CIA Triad) 6.3 Cyber attacks - Introduction of common types of attacks - Malware, Virus, Worm, Trojan Horse, Denial-of-service, Phishing, Password cracking 6.4 Cyber Law - IT Amendment Act 2008 (Section 66 & 67-Introduction Only)	**5**	**20**
		30	**100**

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
20	**30**	**10**	**40**	**0**	**0**

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:
(a) Books:

Sr No.	Title of Book	Author	Publication, year and ISBN
1.	Digital Design (4th Edition)	M. Morris Mano; Michael D. Ciletti	Pearson publication, Latest Edition, ISBN: 81-203-0417-9

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2.	Operating systems	Dhamdhere	Tata McGraw Hill, ISBN: 1282187244, 9781282187245
3.	Operating systems	Silberschatz, Galvin, Gagne	Wiley & Sons publication ISBN: 978-0-470-12872-5
4.	Data Communications and Networking	Behrouz Forouzan	Tata McGraw Hill ISBN: 978-0-07-296775-3
5.	Cryptography and network security	William Stallings	Prentice Hall ISBN: 978-0130914293

(b) Open-source software and website:

Open-source software:
1. https://fedoraproject.org/
2. https://www.libreoffice.org/discover/libreoffice/

Website:
1. https://www.digitalindiaportal.co.in/
2. https://getintopc.com/
3. https://nptel.ac.in/
4. https://www.cert-in.org.in/
5. https://www.netacad.com

Suggested Course Practical List:

Sr. No	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs.
1	Identify specifications of various types of computer systems available in your institute.	1	02
2	Demonstrate participation in any three Digital India Platforms from the following to survey Digital literacy. Digital India Platforms: BHIM/Dig-Locker/Digital Gujarat	1	02
3	Convert given decimal number into another (HEXADECIMAL, OCTAL, DECIMAL, BINARY)	2	02
4	Install anyone from the given freeware application software/tool on your PC (Adobe PDF, notepad++, VLC media player)	3	02
5	Update the Operating System by using the recommended Setting from the Control Panel.	3	02

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6	Identify different aspects of the network in your department lab by following Parameter's consideration. (1) Types of Cables (Twisted -pair, Coaxial, Fiber Optics) (2) Topology (Bus, Mesh, Star, Ring, Hybrid) (3) Network Type (LAN, MAN, WAN)	4	04
7	Demonstrate following Networking Commands for troubleshooting. Commands: ping, traceroute, hostname, netstat, nslookup, route	4	02
8	Install any three peripheral devices from the following in your Desktop/Laptop. List of Peripheral Devices: -Computer Mouse (Wired/Wireless), -Microphone, -Digital Camera, -Scanner, -Printer, -USB Flash Drive	4	04
9	Identify specifications of the various network connecting devices at your Institute's Lab.	4	02
10	Identify your Desktop/Laptop IP Address (IPv4 & IPv6) by the following. (1) Ipconfig command (2) Default/Manual Network & Internet setting	5	04
11	Compile various cyber incidents by visiting the site https://cert-in.org.in/.5	5	02
12	Prepare a document by using various digital platforms, newspapers or any social media platform to identify cyber-crimes that have been done in your city.	6	02
	Total Hrs.		**30**

List of Laboratory/Learning Resources Required:

Sr. No	Learning Resources Specifications	Practical No.
1	Computer System (Desktop/Laptop) with minimum configuration: Operating System: Windows 7 or later version, Linux (Red Hat, Fedora, Ubuntu) RAM:8 GB, HDD: As per preferable, MS-Office :2016 or Open Office	**All**

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Suggested Project List: Suggestive list of projects is given here. This has to match the competency and the COs. Similar projects could be added by the concerned course teacher:

a) **Digital India Platform**: Demonstrate the various Digital India initiatives to create awareness about Digital literacy.
b) **Operating System**: Install any flavor of the Linux Operating System by using the virtualization Software (VMware/virtual box).
c) **Networking**: Prepare a report of various Network connecting devices existing at your home/ Institute Lab.
d) **Information Security:** Prepare a case study of various cyber-attacks in the current marketplace.

Suggested Activities for Students:

a) Prepare a portfolio for the Digital India platform and identify digital services for Indian citizens.

b) Give a seminar on the latest technologies & applications in demand.

c) Identify the existing network structure of your home.

d) Prepare a case-study on cyber-crime.

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