

CURRICULUM

(Scheme of Studies and Examinations and Syllabus for 03rd-08th sem.)
('C' Scheme)

for

UNDERGRADUATE DEGREE

(B. Tech.) COURSE

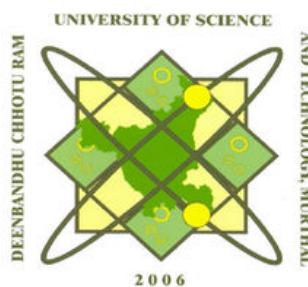
IN

COMPUTER SCIENCE

&

ENGINEERING

[w.e.f. 2019-20]



FACULTY OF INFORMATION TECHNOLOGY AND COMPUTER SCIENCE
DEENBANDHU CHHOTU RAM UNIVERSITY OF SCIENCE AND TECHNOLOGY

(Established Under Haryana Legislature Act No. 29 of 2006)
Murthal-131039, Sonipat (Haryana)

www.dcrust.ac.in

Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonepat)
SCHEME OF STUDIES & EXAMINATIONS
B.Tech. 3rd YEAR (SEMESTER –VI) COMPUTER SCIENCE AND ENGINEERING
Choice Based Credit System Scheme of Studies & Examinations w.e.f. 2020-21

Sl. No.	Course Code	Course Title	Teaching Schedule			Marks of Class work	Examination Marks		Total	Credits	Duration of Exam
			L	T	P		Theory	Practical			
1.	CSE302C	Compiler Design	3	0	0	25	75	0	100	3	3
2.	PEC-II	Program Elective-II	3	0	0	25	75	0	100	3	3
3.	PEC-III	Program Elective-III	3	0	0	25	75	0	100	3	3
4.	OEC-I	Open Elective-I	3	0	0	25	75	0	100	3	3
5.	OEC-II	Open Elective-II (Humanities)	3	0	0	25	75	0	100	3	3
6.	CSE382C	Compiler Design Lab	0	0	4	25	0	75	100	2	3
7.	PEC-II Lab	Program Elective-II Lab	0	0	4	25	0	75	100	2	3
Total			15	0	8	175	375	150	700	19	21

For B.Tech (Hons) degree the students will study the following subjects in addition to the subjects mentioned above.

SEMESTER-VI											
Sl. No.	Course Code	Course Title	Teaching Schedule			Marks of Class work	Examination Marks		Total	Credits	Duration of Exam
			L	T	P		Theory	Practical			
B.Tech. (Hons.) in CSE with specialization in Blockchain (H1)											
1.	CSEH302C	Cryptocurrency with Ethereum	3	0	0	25	75	0	100	3	3
2.	CSEH382C	Cryptocurrency with Ethereum Lab	0	0	4	25	0	75	100	2	3
3.	CSEH304C	Foundations of Blockchain Technology	3	0	0	25	75	0	100	3	3
B.Tech. (Hons.) in CSE with specialization in Cyber Security (H2)											
1.	CSEH306C	Information Security and Data Hiding	3	0	0	25	75	0	100	3	3
2.	CSEH386C	Information Security and Data Hiding Lab	0	0	4	25	0	75	100	2	3
3.	CSEH308C	Mobile and Smart Forensics	3	0	0	25	75	0	100	3	3
B.Tech. (Hons.) in CSE with specialization in Data Science (H3)											
1.	CSEH310C	Data Analytics with Python	3	0	0	25	75	0	100	3	3
2.	CSEH390C	Data Analytics with Python Lab	0	0	4	25	0	75	100	2	3
3.	CSEH312C	Data Mining	3	0	0	25	75	0	100	3	3
Total(H1/H2/H3)			6	0	4	75	150	75	300	8	9

*B. Tech. 3rd semester to 8th semester CSE: Approved in 15th meeting of Academic Council held on 14.08.2020.
applicable to all students admitted in 2018-19 & onwards and trailing students.*

Program Elective-II

Course Code	Course Title	Course Code	Course Title
CSE324C	Mobile Applications Development	CSE330C	IoT Architecture & Protocols ⁴
CSE326C	Digital Image Processing	CSEH306C	Information Security and Data Hiding ²
CSE328C	Advanced Java	CSEH310C	Data Analytics with Python ³

Program Elective-II Lab

Course Code	Course Title	Course Code	Course Title
CSE384C	Mobile Applications Development Lab	CSE390C	IoT Architecture & Protocols Lab
CSE386C	Digital Image Processing Lab	CSEH386C	Information Security and Data Hiding Lab ²
CSE388C	Advanced Java Lab	CSEH390C	Data Analytics with Python Lab ³

Program Elective-III

Course Code	Course Title	Course Code	Course Title
CSE340C	Artificial Intelligence and Expert System	CSEH304C	Foundations of Blockchain Technology ¹
CSE342C	Advanced Computer Networks	CSEH312C	Data Mining ³
CSE344C	Software Testing		

¹Not to be opted by B.Tech (Hons) students opting specialization in Blockchain.

²Not to be opted by B.Tech(Hons) students opting specialization in Cyber Security

³Not to be opted by B.Tech(Hons) students opting specialization in Data Sciences

⁴Not to be opted by B.Tech(Hons) students opting specialization in IoT

NOTE:

1. Students will be permitted to opt for any one elective each from the list of Program Elective-II and Program Elective-III. The minimum strength of the students should be 20 to run an elective course.
2. The student pursuing B.Tech (Hons.) will choose subjects as per the specialization opted in the V semester.
3. The students pursuing B.Tech (Hons.) can choose one subject each from the list of Program Elective –II and Program Elective –III except already opted as per the specialization (Blockchain (H1), Cyber security (H2) and Data Science (H3)). The students should choose different subjects.
4. Each student has to undergo Professional Training (Level-3) of at least 4 weeks from the industry, institute, research lab, training centre etc. during summer vacation and its evaluation shall be carried out in the VII semester.
5. Students will be permitted to opt for one elective each from the list of Open Elective-I and Open Elective-II that are run by other departments. The minimum strength of the students should be 20 to run an elective course.
6. Students will be allowed to use non-programmable scientific calculator. However, sharing of calculators will not be permitted in the examinations.

OPEN ELECTIVES

Open Elective-I			Open Elective-II		
S.No	Course No.	Course Title	S.No	Course No.	Course Title
1.	HUM350C	Communication Skills for Professionals (Except BME & BTE)	1.	CSE305C	Computer Networks
2.	HUM352C	Soft Skills And Interpersonal Communication	2.	CSE431C	Cyber Security
3.	MGT402C	Human Values, Ethics And IPR	3.	CHE457C	Industrial Safety
4.	MGT404C	Human Resource Management	4.	CE406C	Disaster Management
5.	HUM354C	Introduction To French Language	5.	ECE327C	Consumer Electronics
6.	HUM356C	Introduction To German Language			

CSE328C ADVANCED JAVA						
B. Tech. Semester – VI (Computer Science and Engg.)						
L	T	P	Credits	Class Work	:	25 Marks
3	0	--	3	Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To study the fundamental concepts of programming in Java including the designing of interactive applications.
2. To learn the concepts of connecting with databases.
3. To gain the insights of servlet concept.
4. To understand the fundamental concepts of JSP.

UNIT-I

Introduction: Concepts of Classes and Objects, Constructors, Inheritance, Function Overloading, Polymorphism, Packages and Interfaces, exception handling, file streams and their manipulation. AWT & Applet Programming Design of User Interfaces: Swing, Japplet, Icons and Labels, Text Fields, Buttons, JButton Class, Check Box, Radio Buttons, The Container, Panel, Windows, and Frame Classes, Combo Box, Tabbed Panes, Scroll Panes, Trees, Tables, Custom Rendering of Jlist Cells.

UNIT-II

JDBC: JDBC Fundamentals, Establishing Connectivity and working with connection interface, working with statements, Creating and Executing SQL statements, working with Result Set Object & Result Set Meta Data. **Java Beans:** Java Bean, Installing, Starting Bean Development Kit, Use of JAR files and the use of Java Beans API.

UNIT-III

Servlets: Introduction to Servlets, Life cycle of Servlets, Creating, Compiling and running servlet, Reading the servlet Parameters, Reading Initialization parameter, Packages- javax.servletPackage, Handling HTTP Request and Response (GET / POST Request), Cookies and Session Tracking.

UNIT-IV

JSP: JSP Architecture, JSP Access Mode, JSP Syntax Basic (Directions, Declarations, Expression, Scriptlets and Comments, JSP Implicit Object, Object Scope, Synchronization Issue, Session Management).

Text/Reference Books:

1. Gary Cornell and Horstmann Cay S., **Core Java, Vol I and Vol II**, Sun Microsystems Press.
2. Herbert Schildt, **Java: The Complete Reference**, McGraw-Hill.
3. Philip Hanna, **JSP: The Complete Reference**, McGraw-Hill.
4. Deitel and Deitel, **Java How to Program**, Prentice Hall (2007).

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:

Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

1. Have an ability to apply the core Java concepts for designing applications.
2. Have an ability to use the Java concepts for accessing a database.
3. Have an ability to understand the utility of server side technologies.
4. Have basic understanding and knowledge of JSP.

CSE330C IoT ARCHITECTURE & PROTOCOLS
B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits	Class Work	:	25 Marks
3	0	--	3	Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To understand the basics of IoT.
2. To learn IoT Architecture and enabling technologies
3. To know about IoT protocols at different layers
4. To know about the application areas of IoT

UNIT- I

Introduction to IoT:-

Introduction to IoT, Market Trends, Opportunities in IoT, Characteristics of IoT, Physical design of IoT, Logical design of IoT: Functional blocks of IoT, Difference between IoT and M2M, Software defined Network(SDN) for IoT, Network Function Virtualization(NFV) for IoT, Data Handling and Analytics, Challenges in IoT(Design, Development, Security). An IoT Security Framework,SDN and NFV over IoT Deployment , IoT entities---Sensors,actuators,gateway,cloud,Mobile/web apps.

UNIT- II

IOT Architecture And enabling technologies-

IoT Architecture:- IoT-An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations, IoT communication Architecture, IoT Communication models & APIs, Reference Model- IoT reference Model, IoT Reference Architecture- Introduction, Functional View, Information View, Deployment and Operational View, SOA based Architecture, API-based Architecture, OPENIoT Architecture for IoT/Cloud Convergence..

IOT Enabling Technologies:-

Introduction to Big Data Analytic, Embedded Systems, Cloud Computing-Cloud Service Management and IOT - Connecting IOT to cloud – Cloud Storage for Iot ,Wireless Sensor Networks- Industrial sensors, Integrated IoT Sensors, Sensors' Swarm

UNIT- III

IoT protocols:-Wireless communication protocols: Wifi, IPV4/IPV6, 6LOWPAN, ZigBee(IEEE802.15.4), Bluetooth, Bluetooth Low Energy(BLE)

Application layer protocols: MQTT/MQTTTS, CoAP, REST/HTTP,XMPP,SCADA Authentication Protocols; IEEE 802.15.4., comparison of the different IoT protocols, advantages and disadvantages (limitations) of these IoT protocols.

UNIT- IV

Applications of IoT And Research Perspective:- IoT Strategic Research and Innovation Directions , Domain specific applications of IoT, Home automation, Surveillance applications, Industrial IoT,IoT in Energy, IoT in Healthcare, Internet of Robotic Things, Green IoT, home, infrastructures, buildings, security, Industries, Home appliances,Internet of Nano Things,IoT application in Drones, Internet of Vehicles(IoV),Internet of Everything(IoE)

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TEXT/REFERENCES:

1. Vijay Madisetti, Arshdeep Bahga, "Internet of Things: A Hands-On Approach"
2. Waltenegus Dargie, Christian Poellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice"
3. Cuno Pfister, Getting Started with the Internet of Things, O'Reilly Media, 2011, ISBN: 978-1-4493- 9357-1.
4. David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry, "IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things", CISCO Press, 2017
5. Hersent, Olivier, David Boswarthick, and Omar Elloumi. The internet of things: Key applications and protocols. John Wiley & Sons, 2011.
6. Buyya, Rajkumar, and Amir Vahid Dastjerdi, eds. Internet of Things: Principles and paradigms. Elsevier, 2016.
7. Dr. Guillaume Girardin , Antoine Bonnabel, Dr. Eric Mounier, 'Technologies & Sensors for the Internet of Things Businesses & Market Trends 2014 - 2024',Yole Développement Copyrights ,2014
8. Editors OvidiuVermesan Peter Friess,'Internet of Things – From Research and Innovation to Market 4. 4.Deployment', River Publishers, 2014

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Course Outcomes:

On successful completion of the course, the student will:

1. Comprehend the essentials of IoT
2. Understand IoT Architecture & enabling technologies
3. Understand various IoT protocols
4. Understand IoT applications in different domain and be able to analyze their performance.

CSEH306C INFORMATION SECURITY AND DATA HIDING

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits	Class Work	:	25 Marks
3	0	--	3	Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To learn about data hiding applications and their techniques.
2. To learn about hacking.
3. To learn security based protocols, attacks and intrusions.
4. To work with advance data hiding techniques.

UNIT- I

Introduction: - The need for security, security approach, principles of security, types of attack, denial of service, IP spoofing, Phishing. Digital signature, Firewall.

UNIT- II

Hacking:- Basics, Email hacking, computer hacking, types of hacking, practice against hacking, Access Authorization, Compression, LZW Compression and Decompression Method.

UNIT- III

Data hiding:- Terms related to data hiding, Differences between cryptography, stenography & watermarking, history of stenography. Applications of data hiding.

UNIT- IV

Advance data hiding techniques :- Transform domain, difference between special domains and transform domain, wavelets, advantages of wavelet, and wavelet based techniques for data hidings.

TEXT REFERENCE BOOKS:

1. **Cryptography and Network Security by Atul Khat e, Mc Graw Hill Publisher**
2. **E-mail Hacking by Ankit Fadia, Vikash Publishers**
3. **Data communication and Networking , Behrouz A. Forouzan .**

Note:

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Course Outcomes:

After completing the course the student will be able to:

1. Explain information security.
2. Give an overview of access control of relational databases.

3. State the basic concept in information systems security, including security technology and principles, software security and trusted systems and IT security management.
4. Learn advance data hiding techniques.

CSE340C ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEM

B. Tech. Semester – VI (Computer Science and Engg.)

L 3	T 0	P --	Credits 3	Class Work	: 25 Marks
				Examination	: 75 Marks
				Total	: 100 Marks
				Duration of Examination	: 3 Hours

Course Objectives:

1. To understand the basic concepts of AI and problem solving
2. To analyze and formalize the problem as a state space, graph, design heuristics and select amongst different search techniques to solve them
3. To represent knowledge and draw inferences
4. To explore learning techniques and existing expert systems

UNIT- I

Introduction: The AI problems; what is an AI technique; Characteristics of AI applications Problem Solving, Search and Control Strategies General Problem solving; Production systems; Control strategies: forward and backward chaining Exhaustive searches: Depth first Breadth first search.

UNIT- II

Heuristic Search Techniques: Hill climbing; Branch and Bound technique; Best first search and A* algorithm; AND/OR Graphs; Problem reduction and AO* algorithm; Constraint Satisfaction problems Game Playing Minmax search procedure; Alpha-Beta cutoffs; Additional Refinements

UNIT- III

Knowledge Representation & Reasoning:- Propositional logic, First order predicate logic, Inference in FOPL, Skolemisation; Resolution Principle and Unification; Forward & Backward chaining, Inference Mechanisms Horn's Clauses; Semantic Networks; Frame Systems and Value Inheritance; Conceptual Dependency

UNIT- IV

Learning Techniques: - Supervised and unsupervised learning, Decision trees, Statistical learning models, Reinforcement learning.

Expert Systems: Introduction to Expert Systems, Architecture of Expert Systems; Expert System Shells; Knowledge Acquisition; Case Studies: MYCIN, Learning, Rote Learning; Learning by Induction; Explanation based learning.

TEXT/REFERENCES BOOKS:

1. Elaine Rich and Kevin Knight: Artificial Intelligence- Tata McGraw Hill.
2. Dan W.Patterson, Introduction to Artificial Intelligence and Expert Systems- Prentice Hall of India.
3. Nils J.Nilsson: Principles of Artificial Intelligence- Narosa Publishing house.
4. Artificial Intelligence : A Modern Approach, Stuart Rusell, Peter Norvig, Pearson Education
5. Artificial Intelligence, Winston, Patrick, Henry, Pearson Education

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Course Outcomes:

After completion of course, students would be able to:

- 1.Analyze and formalize problem and solve them using AI techniques
- 2.Use Heuristic search techniques for game playing and other problems
- 3.Represent diverse knowledge using AI and analyze
- 4.Understand and design an expert system

CSE342C ADVANCED COMPUTER NETWORKS
B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits	Class Work	:	25 Marks
3	0	--	3	Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To educate concepts, vocabulary and techniques currently used in the area of computer networks.
2. To master the terminology and concepts of socket programming.
3. To be familiar with wireless networking concepts
4. To be familiar with contemporary security issues in networking technologies.

UNIT-I

Binding Protocol Address: Address Resolution Protocol & RARP, ARP & RARP, packet format, Encapsulation. Internet protocol: Introduction, Ipv4 header, Ipv4Datagrams, Encapsulation, Fragmentation and Reassembly, IP routing, Subnet addressing, Subnet mask, Supernetting-special case of IP addresses IPv6-Motivation, frame format and addressing, comparison of IPv4 and IPv6.

UNIT-II

Socket Programming: Creating sockets, Posix data type, Socket addresses, Assigning address to a socket, Java socket programming, Thread programming, Berkeley Sockets: Overview, socket address structures, byte manipulation & address conversion functions, elementary socket system calls –socket, connect, bind, listen, accept, fork, exec, close, TCP ports (ephemeral, reserved), Berkeley Sockets: I/O asynchronous & multiplexing models, select & poll functions, signal & fcntl functions, socket implementation (client & server programs), UNIX domain protocols.

UNIT-III

GSM Overview, GSM Network signaling, GSM Mobility Management, GSM Short Message Service, Mobile Number portability General Packet Radio Service: Functional Groups, Architecture, GPRS Network nodes and Interfaces, Introductory ideas about WAP.

UNIT-IV

Network Security Practice: Authentication Applications- Kerberos, X.509 Authentication Service; Electronic Mail Security-Pretty Good Privacy, S/MIME; IP Security- IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations; Web Security- Web Security Considerations, Secure Sockets Layer and Transport Layer Security, Secure Electronic Transaction.

TEXT/REFERENCE BOOKS

1. Jawin, “Networks Protocols Handbook”, Jawin Technologies Inc., 2005.
2. Bruce Potter and Bob Fleck, “802.11 Security”, O’Reilly Publications, 2002.
3. Ralph Oppliger “SSL and TSL: Theory and Practice”, Arttech House, 2009.
4. Forouzen, Data Communication and Networking, TMH
5. Behrouz A. Forouzan, TCP/IP Protocol Suite
6. William Stalling, Network Security Essentials, 2nd Edition. PHI New Delhi

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Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

After completing the course the student will be able to:

1. Have an understanding of the concepts, vocabulary and techniques currently used in the area of computer networks.
2. Have an ability of terminologies and concepts of socket programming.
3. Have knowledge of wireless networking concepts.
4. Have the understanding of contemporary security issues in networking technologies.

CSE344C SOFTWARE TESTING

B. Tech. Semester – VI (Computer Science and Engg.)

L 3	T 0	P --	Credits 3	Class Work : Examination : Total : Duration of Examination :	25 Marks 75Marks 100 Marks 3 Hours
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Course Objectives:

1. To study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods.
2. To learn how to planning a test project, design test cases and data, conduct testing operations, manage software problems and defects, generate a testing report.
3. To expose the advanced software testing topics, such as object-oriented software testing methods, and component-based software testing issues, challenges, and solutions.
4. To gain the techniques and skills on how to use modern software testing tools to support software testing projects.

UNIT- I

Introduction:- What is software testing and why it is so hard?, Error, Fault, Failure, Incident, Test Cases, Testing Process, Limitations of Testing, No absolute proof of correctness, Overview of Graph Theory.

Functional Testing:- Boundary Value Analysis, Equivalence Class Testing, Decision Table Based Testing, Cause Effect Graphing Technique.

UNIT- II

Structural Testing:- Path testing, DD-Paths, Cyclomatic Complexity, Graph Metrics, Data Flow Testing, Mutation testing.

Testing Activities:- Unit Testing, Levels of Testing, Integration Testing, System Testing, Debugging, DomainTesting.

UNIT- III

Reducing the number of test cases:- Prioritization guidelines, Priority category, Scheme, Risk Analysis, Regression Testing, and Slice based testing.

Object Oriented Testing:- Issues in Object Oriented Testing, Class Testing, GUI Testing, Object Oriented Integration and System Testing.

UNIT- IV

Testing Tools: Static Testing Tools, Dynamic Testing Tools, and Characteristics of Modern Tools and Implementation with example. Advanced topics in software testing: web based testing, Client server testing, Automated test cases generation, Regular expression and FSM based testing.

TEXT/ REFERENCE BOOKS:

1. William Perry, **Effective Methods for Software Testing**, John Wiley & Sons, New York, 1995.
2. Cem Kaner, Jack Falk, Nguyen Quoc, **Testing Computer Software**, Second Edition, Van Nostrand Reinhold, New York, 1993.

3. Boris Beizer, **Software Testing Techniques**, Second Volume, Second Edition, Van Nostrand Reinhold, New York, 1990.
4. Louise Tamres, **Software Testing**, Pearson Education Asia, 2002
5. Roger S. Pressman, **Software Engineering – A Practitioner’s Approach**, Fifth Edition, McGraw-Hill International Edition, New Delhi, 2001.
6. Boris Beizer, **Black-Box Testing – Techniques for Functional Testing of Software and Systems**, John Wiley & Sons Inc., New York, 1995.
7. K.K. Aggarwal & Yogesh Singh, **Software Engineering**, New Age International Publishers, New Delhi, 2003.
8. Marc Roper, **Software Testing**, McGraw-Hill Book Co., London, 1994.
9. Gordon Schulmeyer, **Zero Defect Software**, McGraw-Hill, New York, 1990.
10. Watts Humphrey, **Managing the Software Process**, Addison Wesley Pub. Co. Inc., Massachusetts, 1989.

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Course Outcomes:

After completing the course the student will be able to:

1. Have an ability to apply software testing knowledge and engineering methods and design and conduct a software test process for a software testing project.
2. Have an ability to identify the needs of software test automation, and define and develop a test tool to support test automation.
3. Have an ability to use various communication methods and skills to communicate with their teammates to conduct their practice-oriented software testing projects.
4. Have basic understanding and knowledge of contemporary issues in software testing, such as component-based software testing problems

CSEH304C FOUNDATIONS OF BLOCKCHAIN TECHNOLOGY

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits	Class Work	:	25 Marks
3	0	--	3	Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To introduce basic concepts of Blockchain.
2. To understand abstract models for Blockchain technology
3. To learn about usage of Blockchain technology in financial services.
4. To visualize the scope of blockchain & its role in futuristic development.

Introduction to Blockchain:- Overview of blockchain, need for blockchain, history of centralized services, trusted third party, Distributed consensus in open environments, Distributed Vs Decentralized Network, 51 % attack theory, Public blockchains, Private blockchains, Blockchain Architecture and working, Mining, Limitations of blockchain, Applications of blockchain

UNIT- II

Models for blockchain:- GARAY model, RLA Model, Proof of Work (PoW), HashcashPoW, PoW Attacks and the monopoly problem, Proof of Stake(PoS), hybrid models(PoW+PoS), Proof of Burn and Proof of Elapsed Time.

UNIT- III

Permissioned Blockchain:- Permissioned model and use cases, Design issues for Permissioned blockchains, State machine replication, Consensus models for permissioned blockchain, Distributed consensus in closed environment, Paxos, RAFT Consensus, Byzantine general problem, Byzantine fault tolerant system, Lamport-Shostak-Pease BFT Algorithm, BFT over Asynchronous systems.

UNIT- IV

Blockchain in Financial Service:- Digital Currency, Cross border payments, Stellar and Ripple protocols, Project Ubin, Know Your Customer (KYC), Privacy Consents, Mortgage over Blockchain, Blockchain enabled Trade, We Trade – Trade Finance Network, Supply Chain Financing, Insurance.

Blockchain Security: Security properties, Security considerations for Blockchain, Intel SGX, Identities and Policies, Membership and Access Control, Blockchain Crypto Service Providers, Privacy in a Blockchain System, Privacy through Fabric Channels, Smart Contract Confidentiality.

TEXT/REFERENCES BOOKS:

1. **Blockchain: Blueprint for a New Economy, by Melanie Swan.**
2. **Blockchain: The blockchain for beginners guide to blockchain technology and leveraging blockchain programming, by Josh Thompsons**
3. **Blockchain Basics by Daniel Drescher, Apress**

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Course Outcomes:

At the end of the course, students will develop understanding for:

1. Recognizing goals of Blockchain.
2. Smart Contracts, transactions in Blockchain and Permissioned Blockchain.
3. Analyzing usage of Blockchain in finance.
4. Security issues in Blockchain.

CSEH302C CRYPTOCURRENCY WITH ETHEREUM
B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits	Class Work	:	25 Marks
3	0	--	3	Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To introduce the concepts of cryptocurrency.
2. To understand working of Bitcoin and Ethereum
3. To study the security issues and safeguards related to bitcoin trading
4. To study governing cryptocurrency regulations and its impact on economy.

UNIT- I

Cryptocurrency:- History, Distributed Ledger Technology (DLT), cryptocurrency in blockchain, Cryptographic basics for cryptocurrency: overview of Hashing, signature schemes, encryption schemes and elliptic curve cryptography

UNIT- II

Bitcoin:- Creation of coins, Wallet, Genesis Block, Merkel Tree, Bitcoin Scripts, Bitcoin P2P Network, hardness of mining, Transaction in Bitcoin Network, transaction verifiability, anonymity, forks, payments and double spending, Consensus in a Bitcoin network, mathematical analysis of properties of Bitcoin, Bitcoin protocols – Bitcoin Mining strategy and rewards, life of a Bitcoin Miner, Mining Difficulty, Mining Pool.

UNIT- III

Ethereum:- Ethereum Virtual Machine (EVM), Wallets for Ethereum, Ethereum Programming Language: Solidity, Smart Contracts, The turing completeness of smart contract languages, attacks on smart contracts, Ethereum Construction, DAO, GHOST, Vulnerability, Attacks, Sidechain: another type of blockchain, Namecoin

UNIT- IV

Cryptocurrency Regulation:- Stakeholders, Roots of Bitcoin, Bitcoin scripting vs Ethereum smart contracts, Legal Aspects - Cryptocurrency Exchange, Black Market and Global Economy, Global Acceptability perspective

TEXT/REFERENCES BOOKS/ARTICLES

1. **Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction by Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, Princeton University Press (July 19, 2016).**
2. **Mastering Bitcoin: Unlocking Digital Cryptocurrencies by Antonopoulos**
3. **Bitcoin: A Peer-to-Peer Electronic Cash System by Satoshi Nakamoto**
4. **ETHEREUM: A Secure Decentralized Transaction Ledger by Gavin Wood, Yellow paper.2014.**
5. **A survey of attacks on Ethereum smart contracts by Nicola Atzei, Massimo Bartoletti, and Tiziana Cimoli**

Note:

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For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:

Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

At the end of the course, students will develop understanding for:

1. Cryptocurrency : Bitcoin and Ethereum
2. Building efficient blockchain models to carry out tasks with the practical approach.
3. Evaluating the use and risks involved with cryptocurrency
4. Smart contracts and their implications.

CSEH308C MOBILE AND SMART PHONE FORENSICS

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits	Class Work	:	25 Marks
3	0	--	3	Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To understand mobile device forensics.
2. To learn different types of digital evidence.
3. To gain knowledge of different system like android and ios.
4. To understand mobile file system & data structures.

UNIT- I

Mobile Forensic:- Cell phone and mobile device forensics, Understanding Mobile device forensics, Understanding acquisition procedure ,Cell phone Crimes, SIM Architecture, Data Storage, Data Extraction, Files Stored on SIM, Mobile Operating System.

UNIT- II

Digital Evidence:- Mobile Device Forensics, Types of Evidence on Mobile Devices, Handling Mobile Devices as Sources of Evidence, Forensic Preservation of Mobile Devices, Forensic Examination and Analysis of Mobile Devices, Forensic Acquisition and Examination of SIM Cards, Investigative Reconstruction Using Mobile Devices Future Trends.

UNIT- III

Android and IOS Systems:- Architecture, Differentiation, Technological Composition, Introduction to Android Platform, Introduction to IOS Platform.

UNIT- IV

Mobile File Systems and Data Structures:- Introduction, What and How of Data, Types of Memory, File Systems, Rootfs, devpts, sysfs, cgroup, yaffs2, Procedure for handling an Android Devices, Logical Techniques VS Digital Techniques, Introduction to Mobile Malware.

TEXT/REFERENCES BOOKS:

4. **Guide to Computer Forensics and Investigations By Bill Nelson, Amelia Phillips, Christopher Stuart.**
5. **Digital Evidence on Mobile Devices.**
6. **Digital Evidence and Computer Crime, Third Edition Eoghan Casey. Published by Elsevier Inc. All rights reserved.**
7. **Android Forensic, Investigation, and Security by Andrew Hogg, Publisher Synergy Security in Mobile Communication by Professor Noureddine Boudriga. Mobile Malware Attacks and Defense By Ken Dunham.**

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

B. Tech. 3rd semester to 8th semester CSE: Approved in 15th meeting of Academic Council held on 14.08.2020. applicable to all students admitted in 2018-19 & onwards and trailing students.

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Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

At the end of the course, students will develop understanding for:

1. Mobile device forensics.
2. Different type of mobile file system & digital forensic.
3. Technological composition of android & ios systems.
4. Mobile file system & data structures.

CSEH312C DATA MINING

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits	Class Work	:	25 Marks
3	0	--	3	Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To learn data mining and Data preprocessing concepts.
2. To know about the association rules in data mining.
3. To perform various Classification and clustering algorithms.
4. To understand the strengths and limitations of various data mining models.

UNIT - I

Introduction to Data Mining:- Introduction, What is Data Mining, Definition, KDD, Challenges, Data Mining Tasks, Data Preprocessing, Data Cleaning, Missing data, Dimensionality Reduction, Feature Subset Selection, Discretization and Binaryzation, Data Transformation; Measures of Similarity and Dissimilarity- Basics.

UNIT - II

Association Rules:- Problem Definition, Frequent Item Set Generation, Frequent Itemsets, Closed Itemsets, and Association Rules. Apriori Algorithm: Finding Frequent Itemsets by Confined Candidate Generation, Generating Association Rules from Frequent Itemsets , Improving the Efficiency of Apriori, A Pattern-Growth Approach for Mining Frequent Itemsets ,Mining Frequent Itemsets Using Vertical Data Format, Mining Closed and Max Patterns.

UNIT - III

Classification:- Problem Definition, General Approaches to solving a classification problem , Evaluation of Classifiers , Classification techniques, Decision Trees-Decision tree Construction ,Naive-Bayes Classifier, Bayesian Belief Networks; K- Nearest neighbor classification-Algorithm and Characteristics.

Clustering:- Problem Definition, Clustering Overview, Evaluation of Clustering Algorithms, Partitioning Clustering-K-Means Algorithm, PAM Algorithm, Hierarchical Clustering - Agglomerative Methods and divisive methods, Strengths and Weakness; Outlier Detection.

UNIT - IV

Web and Text Mining:- Introduction, web mining, web content mining, web structure mining, Text mining –unstructured text, episode rule discovery for texts, hierarchy of categories, text clustering.

TEXT/ REFERENCE BOOKS:

1. **Data Mining- Concepts and Techniques-** Jiawei Han, Micheline Kamber, Morgan Kaufmann Publishers, Elsevier, 2 Edition,2006.
2. **Introduction to Data Mining,** Pang-Ning Tan, Vipin Kumar, Michael Steinbanch, PearsonEducation.
3. **Data mining Techniques and Applications,** Hongbo Du Cengage IndiaPublishing
4. **Data Mining Techniques,** Arun K Pujari, 3rd Edition, UniversitiesPress
5. **Data Mining Principles & Applications –** T.V Sveresh Kumar, B. Esware Reddy,Jagadish S Kalimani,Elsevier.
6. **Data Mining,** Vikaram Pudi, P Radha Krishna, Oxford UniversityPress

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Note:

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Course Outcomes:

After completing the course the student will be able to:

1. Perform the preprocessing of data and apply mining techniques on it.
2. Identify the association rule applied on datasets.
3. Perform Classification and clustering algorithms
4. Classify web pages, extract knowledge from the Web.

Open Elective-I

(Common for All Branches except Bio Technology and Bio-Medical Engg for all Semesters)

HUM 350 C Communication Skills for Professionals

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits	Class Work	:	25 Marks
3	0	0	3	Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To hone verbal and written communication
2. To acquaint students with multiple forms and formats of various technical and business reports
3. To develop competence for report writing with a focus on its techniques
4. To develop English Language Proficiency

UNIT I

(Contact hours 8)

Mechanics of Report Writing: Objectives of Report Writing; Types of Reports on the basis of forms and content. Introduction to Formats of Reports; Structure of Reports: Front Matter, Main Body, Back Matter

UNIT II

(Contact hours 10)

Writing Business and Technical Report: Preliminary Strategies for Report Writing: Data Collection, Report Planning, Use of Illustrations, Point Formation, Preparing Notes/Drafts Using Appropriate Formats: Memo Format, Letter Format, Manuscript Format, Printed Forms

UNIT III

(Contact hours 10)

Oral Communication and Soft Skills: Group Discussions; Interviews for jobs: preparation and facing them Professional Presentations: Power Point Presentation, Oral Presentation, Role of Kinesics (Body Language) in Communication, General Etiquettes in Office areas, corporate lunch and dinner Handling, Telephone calls

UNIT IV

(Contact hours 8)

Resumes and Job application: Writing of Resume--Chronological Resume and Functional Resume, Request for Reference/Recommendation, Writing Application Letters for Job; Writing Covering letter

RECOMMENDED READING

1. **Sharma,Sangeeta, and Binod Mishra.** *Communication Skills for Engineers and Scientists.* PHI,2009.
2. **Tyagi,Kavita, and Padma Mishra.** *Advanced Technical Communication.* PHI, 2011.
3. **Rizvi, M. Ashraf.** *Effective Technical Communication.* McGraw Hill Education, 2014.

B. Tech. 3rd semester to 8th semester CSE: Approved in 15th meeting of Academic Council held on 14.08.2020. applicable to all students admitted in 2018-19 & onwards and trailing students.

4. Kumar, Sanjay, and PushpLata. **Communication Skills.** OUP, 2011.
5. Raman, Meenakshi and SangeetaSharma. **Communication Skills.** OUP,2011.
6. *Bhatnagar, Nitin, and MamtaBhatnagar. **Communicative English for Engineers and Professionals.** Pearson Education, 2013.
(The soft copy of the book is available in the university library)
7. Mitra,Barun K. **Personality Development and Soft Skills.** OUP,2011.
8. Kaul, Asha. **Business Communication.** PHI, 2nd Edition.
9. Namee, Patrick Mc. **Success in Interviews: How to Succeed in any Job Interview,** Ist Edition.
10. Argenti, Paul. **Corporate Communication.**6th Edition. McGraw Hill Education, 2012.

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For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:

Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Learning Outcomes:

At the end of the course, students will be able to:

1. Get acquainted with multiple forms and formats of various technical and business reports
2. Develop competence for report writing with a focus on its complex writing techniques and procedures.
3. Develop their speaking skills with professional proficiency.
4. Equip themselves for Letter Writing Skills.

Open Elective-I
(Common for All Branches)

HUM 352 C Soft Skills and Interpersonal Communication

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits		
3	0	0	3	Class Work	: 25 Marks
				Examination	: 75 Marks
				Total	: 100 Marks
				Duration of Examination	: 3 Hours

Course Objective:

- To train students to learn Soft Skills and engage in a successful and fruitful Interpersonal Communication

UNIT I

(Contact hrs 08)

Soft Skills: Introduction to Soft Skills & their classification, Importance of Soft Skills: Writing Resume/CV, Engaging in Group discussion, Appearing for Job interviews

UNIT II

(Contact hrs 10)

Interpersonal Skills, Behaviour, Relationships and Communication: Development and Role of Effective Interpersonal Skills, Development of Effective Speaking and Listening Skills

UNIT III

(Contact hrs 10)

Non-Verbal Elements in Interpersonal Communication: Role of Body Language, Paralinguistic Features, Proxemics/Space Distance and Haptics in Interpersonal Communication

UNIT IV

(Contact hrs 08)

Personality Development for Personal and Professional Growth: Desirable Personality, Personality Types, Analysis of Personality Development (Freudian and Swami Vivekananda's Concept), Grooming Personality for Personal and Professional Life

RECOMMENDED READING:

1. Mitra, Barun K. **Personality Development and Soft Skills.** Delhi: OUP, 2nd Edition, 2016.
2. Butterfield, Jeff. **Soft Skills for Everyone.** Cengage Learning, 2017.
3. Raman, Meenakshi and Sangeeta Sharma. **Communication Skills.** OUP, 2011.
4. Ramesh, Gopalaswamy and Mahadevan Ramesh. **The ACE of Soft Skills,** Pearson India, 2010.
5. Ribbons, Geoff and Richard Thompson. **Body Language.** Hodder & Stoughton, 2007.
6. Sharma, Sangeeta and Binod Mishra. **Communication Skills for Engineers and Scientists.** PHI, 2017.

Note:

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For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:

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Course Learning Outcomes:

At the end of the course, students will be able to:

1. Know now how soft skills complement hard skills for career growth
2. Enhance communicative competence for professional enhancement
3. Learn desirable body language and other non-verbal elements in interpersonal communication
4. Groom personality for handling effectively various situations of personal and professional life

Open Elective-I

(Common for All Branches for all Semesters)

HUM 354 C Introduction to French Language

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits	Class Work	:	25 Marks
3	0	0	3	Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To enable students to understand the elementary communication structures of French language
2. To enable students to know and learn elementary vocabulary and grammar of French language
3. To enable students to engage in simple dialogues in French language

UNIT I

(Contact hours 10)

VOCABULAIRE: Les Salutations, Les jours de la semaine, Les moins de l'année, Les couleurs, Les professions, Les nombres cardinaux, Les lieux de la ville, Les nationalités, Personnes et objets caractéristiques d'un pays, Civilisation: France, de la société française, les monuments, les fêtes

UNIT II

(Contact hours 10)

GRAMMAIRE: Conjugation des verbes être, avoir, aller; Conjugation des verbes -er, -ir, -re Masculin/feminine, Singulier/ pluriel, Accord des noms et des adjectifs, Articles indéfinis et définis, Négation simple, Interrogation, Futur proche, On= Nous, Articles partitifs et contractés, La date et l'heure

UNIT III

(Contact hours 8)

ECRITURE (comprehension des écrits, Production écrite), Presentez-vous, Mon meilleur ami, Ma famille, Cartes et messages d'invitation, d'acceptation ou de refus, Ecrivez des scènes

UNIT IV

(Contact hours 8)

COMPREHENSION (écouter, production orale): Se présenter à un groupe, Parlez/écoutez devotre ville, Parlez/écoutez des activités de loisirs, Parlez /écoutez de vos goûts, Demander/donner une explication, Identifier une personne ou un objet, Demander/dire ce qu'on a fait

RECOMMENDED READING

1. Echo – A1 Méthode de Français, CLE International (Distributed in India by W. R. Goyal Publishers & Distributors, Delhi)
2. Connexions, niveau 1, Yves Loiseau and Régine M. Rieux (Goyal Publishers)
3. Alter Ego-1, Hachette (Distributed in India by W. R. Goyal Publishers & Distributors, Delhi)
4. Forum- Méthode de Français 1, Hachette (Distributed in India by W. R. Goyal Publishers & Distributors, Delhi)
5. 450 Exercices de Grammaire, CLE International (Distributed in India by W. R. Goyal Publishers & Distributors, Delhi)
6. Audio- Video study material

B. Tech. 3rd semester to 8th semester CSE: Approved in 15th meeting of Academic Council held on 14.08.2020. applicable to all students admitted in 2018-19 & onwards and trailing students.

7. Supplementary handouts

Note:

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Course Learning Outcomes:

At the end of the course, students will be able to:

1. Familiarize with the basics of French language
2. Understand and express vocabulary and grammar through writing
3. Demonstrate understanding through simple dialogues in French

Open Elective-I

(Common for All Branches for all Semesters)

HUM 356 C Introduction to German Language

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits	Class Work	:	25 Marks
3	0	0	3	Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To enable students to understand the elementary communication structures of German language
2. To enable students to know and learn elementary vocabulary and grammar
3. To enable students to engage in simple dialogues in German

UNIT I

(Contact hours 10)

Introduction to German alphabets, Numbers 0- 100 (basic algebraic expressions), Vocabulary of days and months, Adverbs of time, Ordinal numbers in German, Phonetics and pronunciation

UNIT II

(Contact hours 10)

Introduction to the simple possessive pronouns, Sentence: statement, question, (question for completion and decision) command, Coordination of clauses, Placing of the verb in the sentence: first, second and last place, Word order in main clause, Details of time, manner and place (casual)

UNIT III

(Contact hours 8)

Verb: infinitive, imperative, indicative – Präsens, Perfekt, Präteritum of auxiliary and modal verbs, modal verbs (meaning, indicative Präsens&Präteritum, möchten), Verbs with prefixes – separable and inseparable, Nouns: Gender, plural, Nominative, Accusative, Dative Articles: Definite and Indefinite, Adjectives: predicative use

UNIT IV

(Contact hours 8)

Day-to-day conversation in German: Introducing oneself and other, greeting and taking leave, Meeting people, Time and date, months and weekdays, Inquire and name the country of origin, languages, Introduce family members and friends

RECOMMENDED READING

1. **Tangram AktuellNiveau A1, Max HeuberVerlag, Ismaning, 2005** (Published and distributed in India by German Book Depot, Delhi)
2. **Netzwerk A1, KlettVerlag, Muenchen, 2013** (Published and distributed in India by German Book Centre, Delhi, 2015).
3. **Sprachkurs Deutsch I &2. Diesterweg (Moritz) Verlag, Frankfurt am Main, 1989,** (Published and distributed in India by Goyal Saab Publishers & Distributors, New Delhi)
4. **Schuelerduden Grammatik, BibliographischesInstitutand F.ABrockhaus, 2000.**
5. **ThemenAktuell 1, Kursbuch, Max HeuberVerlag, Ismaning, Deutschland, 2003** (Published and distributed in India by German Book Centre, Delhi,2010).
6. **Audio-video Study Material**
7. **Supplementary Handouts**

B. Tech. 3rd semester to 8th semester CSE: Approved in 15th meeting of Academic Council held on 14.08.2020. applicable to all students admitted in 2018-19 & onwards and trailing students.

Note:

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Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Learning Outcomes:

At the end of the course, students will be able to:

1. Familiarize with the basics of German language
2. Understand and express vocabulary and grammar through writing
3. Demonstrate understanding through simple dialogues in German

Open Elective-I

MGT402C HUMAN VALUES, ETHICS AND IPR **B. Tech. Semester – VI (Computer Science and Engg.)**

L	T	P	Credits	Class Work	:	25 Marks
3	0	0	3	Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

To help the students appreciate the essential complementarities between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behaviour and mutually enriching interaction with Nature.

Unit-I

Human Values: Understanding the need, basic guidelines, Self Exploration - its content and process; 'Natural Acceptance' and Experiential Validation, Continuous Happiness and Prosperity-Human Aspirations, Right understanding, Relationship and Physical Facilities, Understanding Happiness and Prosperity correctly.

Unit-II

Different kinds of value: Understanding human being as a co-existence of the sentient 'I' and the material 'Body' Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha. Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail, Programs to ensure Sanyam and Swasthya.

Unit-III

Modern approach to the study of values: Understanding Harmony in the Family and Society-Harmony in Human-Human Relationship Understanding harmony in the Family, Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman).

Unit-IV

Professional Ethics & IPR: Values in Work-life, Professional Ethics and Ethos, Code of conduct, Whistle Blowing, Corporate Social Responsibility.IPR: meaning, nature, scope and relevance of IPR. Kinds of IPR: Copyright, Patents, Trademark, Geographical Indication, Industrial design, Plant Variety. Benefits, Emerging dimensions and Rational for protection of IPR.

Suggested Readings:

1. R. R. Gaur, R Sangal, G P Bagaria, 2009, **A Foundation Course in Human Values and Professional Ethics**, Excel Books, New Delhi
2. A.N. Tripathy, 2003, **Human Values**, New Age International Publishers.
3. E G Seebauer& Robert L.Berry, 2000, **Fundamentals of Ethics for Scientists & Engineers**, Oxford University Press.
4. M Govindrajan, S Natrajan& V. S Senthil Kumar, **Engineering Ethics (including Human Values)**, Eastern Economy Edition, Prentice Hall of India Ltd.
5. S. B. Gogate, **Human Values & Professional Ethics**, Vikas Publishing House Pvt. Ltd., Noida.

Reference Books

1. A Nagraj, 1998 JeevanVidyaekParichay, Divya Path Sansthan, Amarkantak.
2. P. L. Dhar, R. R. Gaur, 1990, Science and Humanism, Commonwealth Publishers.
3. Prof. A.R.Aryasri, DharanikotaSuyodhana, Professional Ethics and Moral, Maruthi Publications.
4. A. Alavudeen, R.Kalil Rahman and M. Jayakumaran, Professional Ethics and Human Values, University Science Press.
5. Prof.D.R.Kiran, 2013, Professional Ethics and Human Values, Tata McGraw-Hill
6. Jayshree Suresh and B. S. Raghavan, Human Values And Professional Ethics, S.Chand Publications

Note:

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Course Outcomes:

At the end of the course:

1. Students will be able to understand the significance of value inputs in a classroom and start applying them in their life and profession
2. Understand and can distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, etc.
3. Understand the role of a human being in ensuring harmony in society and nature.
4. Students will be aware of the significance of Intellectual Property as a very important driver of growth and development in today's world and to be able to statutorily acquire and use different types of intellectual property in their professional life.

Open Elective-I

MGT404C HUMAN RESOURCE MANAGEMENT

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits	Class Work	:	25 Marks
3	0	0	3	Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

To help the students develop an understanding of the management of human resources and develop abilities and skills required to manage them.

Unit-I

Introduction – nature and scope of human resource management, HRM objectives and functions, HRM policies, HRM in globally competitive environment; strategic human resource management.

Unit-II

Acquiring human resources – Man power planning, Job evaluation, job analysis and job design. Recruitment: Sources, Methods, constraints & challenges, selection: objectives and process, placement and induction.

Unit-III

Developing human resources: Training: types, methods, training vs. development and evaluation of a training programme and training need assessment, career planning and development.

Unit-IV

Performance appraisal: methods, process and challenges of performance appraisal, performance appraisal vs. potential appraisal, Compensation: wages & salaries administration and factors influencing compensation levels.

Suggested Readings:

1. Jyothi, **Human Resource Management**, Oxford University Press
2. Bohlander George and Scott Snell, **Management Human Resources**, Cengage, Mumbai
3. Bhattacharyya, Dipak Kumar, **Human Resource Management**, Excel Books, New Delhi
4. Cascio Wayne F., **Managing Human Resources**, TMH, New Delhi
5. DeCenzo, David A, and Stephan P. Robbins, **Fundamentals of Human Resource Management**, Wiley India, New Delhi
6. Denisi, Angelo S, and Ricky W Griffin, **Human Resource Management**, Biztantra, New Delhi

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Course Outcomes:

At the end of the course:

1. To have an understanding of the basic concepts, functions and processes of human resource management
2. To be aware of the role, functions and functioning of human resource department of the organizations.
3. To Design and formulate various HRM processes such as Recruitment, Selection, Training, Development, Performance appraisals and Reward Systems, Compensation Plans and Ethical Behavior.
4. Develop ways in which human resources management might diagnose a business strategy and then facilitate the internal change necessary to accomplish the strategy.

CSE431C CYBER SECURITY

B. Tech. Semester - VI (Computer Science and Engg.)

L	T	P	Credits	Class Work	:	25 Marks
3	0	--	3	Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To understand cyber crime and its laws.
2. To work with tools and methods used in cyber crime.
3. To understand the life cycle of digital forensics.
4. To learn and understand web threats, challenges and protection policies.

UNIT- I

Introduction To Cybercrime:- Cybercrime and Information Security, Classifications of Cybercrimes, The need for Cyber laws, The Indian IT Act Challenges to Indian Law and Cybercrime Scenario in India, Weakness in Information Technology Act and its consequences, Digital Signatures and the Indian IT Act, Cybercrime and Punishment; Technology, Students and Cyber law; Survival tactics for the Netizens, Cyber-offenses: Cybers talking, Cyber cafe and Cyber crimes, Botnets, Attack Vector, Cloud Computing;

UNIT- II

Tools And Methods Used In Cybercrime:- Proxy Servers and Anonymizers, Phishing and identity theft, Password Cracking, Keyloggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Stenography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow; Cybercrime: Mobile and Wireless Devices: Trends in Mobility, Attacks on Wireless Networks, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges, Registry Settings for Mobile Devices, Authentication Service Security Attacks on Mobile/Cell Phones

UNIT- III

Understanding Computer Forensics:- The Need for Computer Forensics, Cyber forensics and Digital Evidence, Forensics Analysis of E-Mail, Digital Forensics Life Cycle, Chain of Custody Concept, Network Forensics, Computer Forensics and Stenography, Relevance of the OSI 7 Layer Model to Computer Forensics, Forensics and Social Networking Sites: The Security/Privacy Threats, Challenges in Computer Forensics, Forensics Auditing, Anti forensics.

UNIT- IV

Cyber security Organizational Implications:- Cost of Cybercrimes and IPR Issues, Web Threats for Organizations, Security and Privacy Implications from Cloud Computing, Social Media Marketing, Social Computing and the Associated Challenges for Organizations, Protecting People's Privacy in the Organization, Organizational Guidelines for Internet Usage, Safe Computing Guidelines and Computer Usage Policy, Incident Handling, Forensics Best Practices, Media and Asset Protection, Importance of Endpoint Security in Organizations.

TEXT/ REFERENCE BOOKS:

1. "Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives", Nina Godbole, Sunit Belapur, Wiley India Publications, April, 2011.

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:

Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

1. Able to demonstrate cyber crime its laws and related terms.
2. Work with SQL injection, DOS attacks etc.
3. Explain computer forensic, Network forensic cyber forensic.
4. Understand safe computing guidelines, usage policies and incident handling.

Open Elective-II

CHE457C : INDUSTRIAL SAFETY

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits	Class Work	:	25 Marks
3	0	0	3	Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

The purpose of this course is

1. To teach the students the concept of industrial safety and provide useful practical knowledge for workplace safety.
2. To identify, evaluate control the hazards to prevent or mitigate harm or damage to people, property and the environment.
3. To understand about fire and explosion, preventive methods, relief and its sizing methods
4. To analyze industrial hazards and its risk assessment

UNIT-I

Introduction: Concept of loss prevention, origin of process hazards, types of process hazards, acceptable risks, accident and loss statics, nature of accident process, concepts of inherent safety in plants or Factories, dose Vs response curve, toxicants entry route, thresh limit values, safety regulations.

UNIT-II

Hazards: Fire, Chemical (industrial and laboratory scale), electrical, mechanical, biohazards (natural and anthropogenic), toxic materials, their types and preventive measures, Liquid and vapor phase hazardous methods, storage and handling, containment, precautions, Personal safety precautions.

UNIT-III

Risk management principles, risk analysis techniques, risk control, hazards operability studies, hazard analysis, Fault tree analysis, Consequences analysis, human error analysis, accidental error analysis, economics of risk management, check list, reliability theory, event tree, HAZOP, safety reviews, what if analysis.

UNIT-IV

Safety audit, procedure for safety auditing, audit report, safety training, emergency planning and disaster management, introduction to security risk factors tables.

TEXT BOOKS:

1. **Chemical Hazards and safety, 2nd Edition, DawandeDenet & Co., 2012**
2. **Loss preventions in process industries, Lees Butterworth-Heinemann, 1980.**
3. **Industrial safety Handbook, William and Handley, McGraw Hill.**

REFERENCE BOOKS:

1. Safety and Hazard management in Chemical Industries, Vyas, Atlantic 2013.
2. Industrial safety, health environment & Security, Basudev Panda, Laxmi publication ISBN-97893-81159-43-9
3. Industrial Safety and Health Management, 4th Edition, C. Ray Asfahl, Prentice Hall International Series, 1984

B. Tech. 3rd semester to 8th semester CSE: Approved in 15th meeting of Academic Council held on 14.08.2020. applicable to all students admitted in 2018-19 & onwards and trailing students.

4. Industrial Accident Prevention : A Safety Management Approach, Herbert William Heinrich

NOTES:

1. **Part A: Till academic session 2020-2021:** In Semester Examinations, the paper setter will set two questions from each unit (total 8 questions in all), covering the entire syllabus. Students will be required to attempt only five questions, selecting at least one question from each unit.
Part B: From Academic Session 2021-2022 onwards: For the semester examination, nine questions are to be set by the examiner. Question no. 1, containing 6-7 short answer type questions, will be compulsory & based on the entire syllabus. Rests of the eight questions are to be set by setting two questions from each of the four units of the syllabus. The candidates will be required to attempt five questions in all, selecting one from each unit. All questions will carry equal marks.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator, mobile phones or other electrical/ electronic items will not be allowed in the examination.
3. For students admitted in B.Tech. 1st Year (C-Scheme) in 2019 & onwards and all trailing students:
Examinations and evaluations of students shall be conducted, covering the entire syllabus, as per guidelines “AICTE Examination Reforms”. Students shall be informed about these reforms.

Course Outcomes:

Students will be able to:

1. Analyze the effect of release of toxic substances.
2. Understand the industrial laws, regulations and source models.
3. Understand the methods of hazard identification and preventive measures and develop safety programs to prevent the damage or loss.
4. Conduct safety audits and improve safety practices.

Open Elective-II

CE406C : DISASTER MANAGEMENT

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits	Class Work	:	25 Marks
3	0	0	3	Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Unit-I

Introduction to Disaster Management: Disaster, Emergency, Hazard, Mitigation, Disaster Prevention, Preparedness and Rehabilitation, Risk and Vulnerability, Classification of Disaster, Natural and Man-made Disasters, International day and Decade of Disaster Reduction.

Risk and Vulnerability to disaster mitigation and management options: Warning and Forecasting.

Unit-II

Hydro-meteorological based disasters I: Disaster Management Act 2005, Role of NDMA, NDRF, NIDM, Tropical Cyclones, Floods, droughts, mechanism, causes, role of Indian Metrological Department, Central Water Commission, structure and their impacts, classifications, vulnerability, Early Warning System, Forecasting, Flood Warning System, Drought Indicators, recurrence and declaration, Structural and Non-structural Measures.

Hydro-meteorological based disasters II: Desertification Zones, causes and impacts of desertification, Characteristics, Vulnerability to India and Steps taken to combat desertification, Forest Fires; Causes of Forest Fires; Impact of Forest Fires, Prevention.

Unit-III

Geological based disasters: Earthquake, Reasons, Compression, Shear, Rayleigh and Love Waves; Magnitude and Intensity Scales, Direct and Indirect Impact of Earthquake; Seismic Zones in India, Factors, Indian Standards Guidelines for RCC and Masonry Structures, Prevention and Preparedness for Earthquake, Tsunamis, Landslides and avalanches: Definition, causes and structure; past lesson learnt and measures taken; their Characteristic features, Impact and prevention, Atlas (BMTRPC); structural and non-structural measures.

Unit-IV

Manmade Disasters I: Chemical Industrial hazards; causes and factors, pre- and post-disaster measures; control; Indian Standard Guidelines and Compliance; Traffic accidents; classification and impact, Fire hazards; Classification as per Indian Standards; Fire risk assessment; Escape routes; fire-fighting equipment; classification of buildings, fire zones, occupancy loads; capacity and arrangements of exits,

Use of remote sensing and GIS in disaster mitigation and management.

Text Books:

1. Thomas D. Schneid., **Disaster Management and Preparedness**, CRC Publication, USA, 2001
2. Patrick Leon Abbott, **Natural Disasters**, Amazon Publications, 2002
3. Ben Wisner., **At Risk: Natural Hazards, People vulnerability and Disaster**, Amazon Publications, 2001
4. Oosterom, Petervan, Zlatanova, Siyka, Fendel, Elfriede M., “Geo-information for Disaster Management”, Springer Publications, 2005

5. Savindra Singh and Jeetendra Singh, Disaster Management, Pravalika Publications, Allahabad
6. NidhiGaubaDhawan and AmbrinaSardar Khan, Disaster Management and Preparedness, CBS Publishers & Distribution

Reference Books:

1. Selected Resources Published by the National Disaster Management Institute of Home Affairs, Govt. of India, New Delhi.

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

The use of scientific calculator will be allowed in the examination. However, programmable calculator, mobile phones or other electrical/ electronic items will not be allowed in the examination.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:

Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course Outcomes:

At the end of the course, the student will be able to:

1. Knowledge of the significance of disaster management,
2. Analyze the occurrences, reasons and mechanism of various types of disaster
3. Understand the preventive measures as Civil Engineer with latest codal provisions
4. Apply the latest technology in mitigation of disasters

Open Elective-II

ECE327C Consumer Electronics

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits	Class Work	:	25 Marks
3	0	0	3	Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Unit I

(12 Lectures)

Monochrome TV (Introduction): Elements of a TV System, Picture transmission, Sound transmission, Picture reception, Sound reception, Synchronization, Receiver control, Image continuity, Scanning Process, Aspect Ratio, Flicker, Composite Video Signal, Picture Elements, Kell factor, Vertical Resolution, Horizontal Resolution, Video bandwidth, Interlacing, 625 Line System, Bandwidths for TV Transmission, Vertical and horizontal synch detail, Vestigial Side Band transmission(Advantages and Disadvantages)

Monochrome TV (Picture and Camera Tubes): Monochrome picture tube, beam reflection, Beam focusing, Screen Phosphor, Faceplate, Picture tube characteristics, picture tube circuit controls, Monochrome Camera Tubes: Basic principle, Image Orthicon, Vidicon, Plumbicon

Unit II

(12 Lectures)

Colour TV Essentials: Compatibility , Colour perception, Three Colour theory, Luminance, Hue and Saturation, Dispersion and Recombination of light, Primary and secondary colours, luminance signal, Chrominance Signal, Colour picture tube, colour TV Camera, Colour TV display Tubes, colour Signal Transmission, Bandwidth for colour signal transmission, Colour TV controls. Cable TV, Block Diagram and principle of working of cable TV.

Plasma and LCD: Introduction, liquidcrystals, types of LCD's,TN, STN, TFT, Power requirements, LCD working, Principle of operation of TN display, Construction of TN display, Behaviour of TN liquid crystals, Viewing angle, colour balance, colour TN display, limitatons, advantages, disadvantages, applications.

Unit III

(10 Lectures)

LED and DMD :Introduction to LED Television , comparison with LCD and Plasma TV's, schematic of DMD, introduction to Digital Micro Mirror device, Diagram of DMD, principle of working, emerging applications of DMD.

Microwave Ovens and Air Conditioners: Microwaves, Transit Time, Magnetron, Waveguides, Microwave Oven, Microwave Cooking. Air conditioning, Components of air conditioning systems, all water Air conditioning systems, all air conditioning Systems, Split air conditioner.

Unit IV

(11 Lectures)

Microphones: Introduction, characteristics of microphones, types of microphone: carbon, movingcoil, wireless, crystal, introduction to tape recorder.

Loudspeaker: Introduction to ideal and basic loudspeaker, loudspeaker construction types of loudspeaker: Dynamic and permanent magnet, woofers, tweeters, brief introduction to baffles, equalisers.

Text Books :

B. Tech. 3rd semester to 8th semester CSE: Approved in 15th meeting of Academic Council held on 14.08.2020. applicable to all students admitted in 2018-19 & onwards and trailing students.

1. Consumer Electronics by S. P. Bali, Pearson Education.
2. Complete Satellite and Cable T.V by R.R Gulati, New Age International Publishers

Reference Books:

1. Monochrome and Colour Television by R. R. Gulati, New Age International Publishers

Note:

In semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attempt only five questions selecting at least one question from each unit.

The use of scientific calculator will be allowed in the examination. However, programmable calculator, mobile phones or other electrical/ electronic items will not be allowed in the examination.

For students admitted in B Tech 1st year (C-Scheme) in 2019 and all training students:

Examination and evaluations of students shall be conducted as per guidelines *AICTE Examinations reforms* covering the entire syllabus. The students shall be made aware about the reforms.

Course outcomes: At the end of the course, students will demonstrate the ability to:

1. Identify and explain basic working of electronics products like TV, Microphone, loudspeaker, AC, Microwave ovens.
2. Learn various components of composite video signal and differentiate between line, brightness, saturation and to design the lower power consumption device, the primary challenge is how to minimize overall cost.
3. Acquire ability to design different display screen so that effect of radiations on eyes will be reduced.
4. Understand the general importance of product safety to consumers & producers will reduce the various adverse impacts of these devices on common man.

CSE382C COMPILER DESIGN LAB

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits	Class Work	:	25 Marks
0	0	4	2	Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To acquire knowledge in different phases and passes of Compiler.
2. To use the Compiler tools like LEX, YACC, etc.
3. To design different types of compiler tools to meet the requirements of the realistic constraints of compilers.
4. To use Top-down and Bottom-up parsers. Construction of LL, SLR, CLR and LALR parse table.

List of Practicass:

1. Practice of LEX/YACC of compiler writing.
2. Write a program to check whether a string belong to the grammar or not.
3. Write a program to generate a parse tree.
4. Write a program to find leading terminals.
5. Write a program to find trailing terminals.
6. Write a program to compute FIRST of non-terminal.
7. Write a program to compute FOLLOW of non-terminal.
8. Write a program to check whether a grammar is left Recursion and remove left Recursion.
9. Write a program to remove left factoring.
10. Write a program to check whether a grammar is operator precedent.
11. To show all the operations of a stack.
12. To show various operations i.e. read, write and modify in a text file.

Course Outcomes:

After completing the course the students will be able to:

1. Understand the concepts of Compilers
2. Understand the concepts of The actual roles of the lexical analyzer
3. Understand the concepts of different Parsing techniques and Construction of syntax trees
4. Understand the concepts of Type checking

CSE384C MOBILE APPLICATIONS DEVELOPMENT LAB

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits	Class Work	:	25 Marks
0	0	4	2	Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To describe and compare different mobile application models/architectures and patterns.
2. To apply mobile application models/architectures and patterns to the development of a mobile software application.
3. To describe the components and architecture of a mobile development framework (Google's Android Studio).
4. To apply a mobile development framework to the development of a mobile application.

List of Practicals:

1. Getting Started with Android Development.
2. Activities and Views: Android Manifest.xml, Activity Class, Basic View Components: Layouts and Buttons.
3. Navigation with Data: Working with Intent, Sharing Data Between Activities, Application Class.
4. Android Resources: String Resources, Loading Strings in XML, Loading Strings in Code, The Resource Values Folder.
5. Drawables - Image Basics, Drawable Folders and Qualifiers, Dimensions, Image Padding, The ImageButton Widget.
6. Lists: Implementing an Android List, ListView, ListActivity, Empty Lists,ListAdapter, Sorting the Adapter, Overriding ArrayAdapter, List Interaction.
7. Dialogs, New and Old: AlertDialog, Custom Dialog, Support Library, Fragments, DialogFragment
8. Menus: Options Menu, Modifying an Options Menu, Context Menu.
9. Saving Data with Shared Preferences: Shared Preferences, Getting Started with SharedPreferences, PreferenceActivity.
10. Saving Data with a Database: Setting Up SQLite, Creating a Helper, using the Helper, Cursor and CursorAdapter.
11. Threading with AsyncTasks: Threading in Android, AsyncTask, Tracking Progress.
12. Styles and Themes: Introduction to Styling: Defining Styles, Defining Themes, Style Inheritance, Direct Theme References.

Course Outcomes:

After completing the course the student will be able to:

1. Understand the concepts of mobile application models/architectures and patterns.
2. Apply mobile application models/architectures and patterns to the development of a mobile software application.
3. Understand the components and architecture of a mobile development framework (Google's Android Studio).
4. Apply a mobile development framework to the development of a mobile application.

CSE386C DIGITAL IMAGE PROCESSING LAB			
B. Tech. Semester – VI (Computer Science and Engg.)			
L	T	P	Credits
0	0	4	2
			Class Work : 25 Marks
			Examination : 75Marks
			Total : 100 Marks
			Duration of Examination : 3 Hours

Course Objectives:

1. To review the fundamental concepts of a digital image processing system.
2. To analyze the images in the frequency domain using various transforms.
3. To evaluate the techniques for image enhancement and image restoration.
4. To categorize various compression techniques.

The students will be required to carry out 10 or 12 Lab exercises covering the theory course **CSE326C: Digital Image Processing** as assigned by concerned faculty.

Course Outcomes:

After completing the course the student will be able to:

1. Review the fundamental concepts of a digital image processing system.
2. Analyze the images in the frequency domain using various transforms.
3. Evaluate the techniques for image enhancement and image restoration.
4. Categorize various compression techniques.

CSE388C ADVANCED JAVA LAB

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits	Class Work	:	25 Marks
0	0	4	2	Examination	:	75Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To use graphics, Animations and Multithreading for designing Simulation and Game based applications.
2. To design and develop GUI applications using Abstract Windowing Toolkit (AWT), Swing and Event Handling.
3. To design and develop Web applications
4. To design Enterprise based applications by encapsulating an application's business logic.

The students will be required to carry out 10 or 12 experiments covering the theory course **CSE328C: Advanced Java** as assigned by the concerned faculty.

Course Outcomes:

After completing the course the student will be able to:

1. Use graphics, Animations and Multithreading for designing Simulation and Game based applications.
2. Design and develop GUI applications using Abstract Windowing Toolkit (AWT), Swing and Event Handling.
3. Design and develop Web applications.
4. To design Enterprise based applications by encapsulating an application's business logic.

CSE390C IoT ARCHITECTURE & PROTOCOLS LAB**B. Tech. Semester – VI (Computer Science and Engg.)**

L	T	P	Credits	Class Work	:	25 Marks
0	0	4	2	Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

Students should be able to work with

1. Python
2. Raspberry Pie
3. Arduino

List of Practicals

1. To study and configure raspberry pie and arduino
2. Write a Program for data types in python.
3. Write a Program for arithmetic operation in Python.
4. Write a Program for looping statement in Python
5. Write program for Blink LED using arduino/raspberry pie.
6. Write Program for RGB LED using Arduino/ raspberry pie.
7. Study the Temperature sensor and write a program for monitoring temperature using Arduino/ raspberry pie.
8. Write a Program to upload temperature and humidity data on cloud

Course outcomes:

On successful completion of the course, the student will be able to

1. Write programs in Phyton
2. Work with Raspberry Pie
3. Work with Arduino
4. Device small projects using all hardware and software

B. Tech. 3rd semester to 8th semester CSE: Approved in 15th meeting of Academic Council held on 14.08.2020. applicable to all students admitted in 2018-19 & onwards and trailing students.

CSEH382C CRYPTOCURRENCY WITH ETHEREUM LAB

B. Tech. Semester – VI (Computer Science and Engg.)

L	T	P	Credits		
--	--	4	2	Class Work	: 50 Marks
				Examination	: 50Marks
				Total	: 100 Marks
				Duration of Examination	: 3 Hours

Course Objectives:

1. To understand working of Ethereum platform.
2. To study the security issues and safeguards related to trading.
3. To create smartcontracts using Remix.
4. To create a blockchain application.

Learn the basics of Ethereum platform with Ethereum Studio, a web-based IDE to create and test smart contracts and build a frontend.

The student should do the following using the learned concepts:

- i. Naive Blockchain construction
- ii. Implement Memory Hard algorithm - Hashcash implementation
- iii. Implement Direct Acyclic Graph
- iv. Play with Go-ethereum
- v. Smart Contract Construction using Remix - an Ethereum IDE and tools for the web. Remix is an open source tool written in JavaScript with support for writing of Solidity contracts, testing, debugging and deploying of smart contracts.
- vi. Develop Toy application using Blockchain
- vii. Implement Mining puzzles

Course Outcomes:

After completing the course the student will be able to:

1. Understand Ethereum platform.
2. Implement the security issues and safeguards related to trading.
3. Create smartcontracts using Remix.
4. Develop a blockchain application.

CSEH386C INFORMATION SECURITY AND DATA HIDING LAB**B. Tech. Semester – VI (Computer Science and Engg.)**

L	T	P	Credits	Class Work	:	25 Marks
0	0	4	2	Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To learn the concept of information hiding.
2. To provide an insight to steganography techniques.
3. To learn Watermarking techniques
4. To understand the attacks on data hiding and how integrity of data is maintained.

The students will be required to carry out 10 or 12 experiments covering the theory course **CSEH306C** Information Security and Data Hiding as assigned by the concerned faculty.

Course Outcomes:

After completing the course the student will be able to:

1. Learn the concept of information hiding.
2. Understand the steganography techniques.
3. Learn Watermarking techniques
4. Understand the attacks on data hiding and how integrity of data is maintained.

CSEH390C DATA ANALYTICS WITH PYTHON LAB**B. Tech. Semester – VI (Computer Science and Engg.)**

L	T	P	Credits	Class Work	:	25 Marks
0	0	4	2	Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To learn the basic process of data science.
2. To learn Python notebooks.
3. To have an applied understanding of how to manipulate and analyze uncurated datasets, basic statistical analysis and machine learning methods.
4. To have an understanding on how to effectively visualize results.

The students will be required to carry out 10 or 12 experiments covering the theory course **CSE310C: Data Analytics with Python** as assigned by the concerned faculty.

Course Outcomes:

After completing the course the student will be able to:

1. Find a dataset, formulate a research question, use the tools and techniques of this course to explore the answer to that question.
2. Learn Python notebooks.
3. Understand the manipulation and analysis of uncurated datasets, basic statistical analysis and machine learning methods.
4. Understand to effectively visualize results.