LIST OF OPEN ELECTIVES OFFERED BY ALL DEPARTMENTS
OPEN ELECTIVE-I

S.No.	Open Elective-I Subject Title	Department Offering the Subject	Sub Code	No.of periods per week			No.of Credits
				L	T	P	C
1	Disaster Management	CE	R20CC1OE01	3	0	0	3
2	Green Technology	CE	R20CC1OE02	3	0	0	3
3	Micro Electro Mechanical System	EEE	R20CC1OE03	3	0	0	3
4	Fundamentals of Electrical Engineering	EEE	R20CC1OE04	3	0	0	3
5	Rapid Prototyping & 3D Printing (Other than ME)	ME	R20CC2OE05	3	0	0	3
6	Operations Research	ME	R20CC2OE06	3	0	0	3
7	Principles of Signals, Systems & Communications (Other than ECE)	ECE	R20CC1OE08	3	0	0	3
8	Medical Electronics	ECE	R20CC1OE08	3	0	0	3
9	DBMS (Other Than CSE)	CSE	R20CC1OE09	3	0	0	3
10	Web Development Using Mean Stack Tech	CSE	R20CC1OE11	3	0	0	3
11	Front End UI and Frame Work	IT	R20CC1OE10	3	0	0	3
12	Web Development Using Mean Stack Tech	IT	R20CC1OE12	3	0	0	3
13	Financial Institutions, Markets and Services	MBA	R20CC1OE13	3	0	0	3
14	Human Resource Practices	MBA	R20CC1OE14	3	0	0	3
15	OOP Through JAVA	AI	R20CC1OE15	3	0	0	3
16	Computer Organization	AI	R20CC1OE16	3	0	0	3

OPEN ELECTIVE-II

S.No.	Open Elective-II Subject Title	Department Offering the Subject	Sub Code	No.of periods per week			No.of Credits
				L	T	P	C
1	Remote Sensing And GIS	CE	R20CC2OE01	3	0	0	3
2	Traffic Safety	CE	R20CC2OE02	3	0	0	3
3	Hybrid Electric Vehicle	EEE	R20CC2OE03	3	0	0	3
4	Energy Audit and Conservation	EEE	R20CC2OE04	3	0	0	3
5	Industrial Engineering & Management (Other than ME)	ME	R20CC2OE05	3	0	0	3
6	Industrial Robotics (Other than ME)	ME	R20CC2OE06	3	0	0	3
7	Fundamentals of Image Processing (Other than ECE)	ECE	R20CC2OE07	3	0	0	3
8	Global Positioning System(GPS)	ECE	R20CC2OE08	3	0	0	3
9	Artificial Intelligence	CSE	R20CC2OE09	3	0	0	3
10	OOPS through JAVA	CSE	R20CC2OE10	3	0	0	3
11	Introduction to AI	IT	R20CC2OE11	3	0	0	3
12	OOP Through JAVA	IT	R20CC2OE12	3	0	0	3
13	Digital Marketing	MBA	R20CC2OE13	3	0	0	3
14	Personal Finance Planning	MBA	R20CC2OE14	3	0	0	3
15	Database Management Systems	AI	R20CC2OE15	3	0	0	3
16	Cloud Computing	AI	R20CC2OE16	3	0	0	3

OPEN ELECTIVE-III

S.No.	Open Elective-III Subject Title	Department Offering the Subject	Sub Code	No.of periods per week			No.of Credits
				L	T	P	C
1	Railway, Airport & Harbour Engineering	CE	R20CC3OE01	3	0	0	3
2	Low Cost Housing	CE	R20CC3OE02	3	0	0	3
3	Concept of Smart Grid Technology	EEE	R20CC3OE03	3	0	0	3
4	Industrial Automation	EEE	R20CC3OE04	3	0	0	3
5	Automotive Vehicles	ME	R20CC3OE05	3	0	0	3
6	Nano Technology	ME	R20CC3OE06	3	0	0	3
7	Introduction to Micro Processors & Micro Controllers(Other than ECE)	ECE	R20CC3OE07	3	0	0	3
8	Nano Electronics	ECE	R20CC3OE08	3	0	0	3
9	Cloud Computing	CSE	R20CC3OE09	3	0	0	3
10	Block Chain Technologies	CSE	R20CC3OE10	3	0	0	3
11	Digital Marketing	IT	R20CC3OE11	3	0	0	3
12	Augmented Reality	IT	R20CC3OE12	3	0	0	3
13	Performance Management	MBA	R20CC3OE13	3	0	0	3
14	Services Marketing	MBA	R20CC3OE14	3	0	0	3
15	Block Chain Technologies	AI	R20CC3OE15	3	0	0	3
16	Human Computer Interaction	AI	R20CC3OE16	3	0	0	3

OPEN ELECTIVE-IV

S.No.	Open Elective-IV Subject Title	Department Offering the Subject	Sub Code	No.of periods per week			No.of Credits
				L	T	P	C
1	Environmental Pollution & Control	CE	R20CC4OE01	3	0	0	3
2	Construction Technology and Management	CE	R20CC4OE02	3	0	0	3
3	Non-Conventional Energy Resources	EEE	R20CC4OE03	3	0	0	3
4	Electrical Safety	EEE	R20CC4OE04	3	0	0	3
5	Pneumatics & Hydraulic Automation	ME	R20CC4OE05	3	0	0	3
6	Mechatronics	ME	R20CC4OE06	3	0	0	3
7	Introduction to Embedded Systems (Other than ECE	ECE	R20CC4OE07	3	0	0	3
8	Embedded and Real time Operating System	ECE	R20CC4OE08	3	0	0	3
9	Cyber Security	CSE	R20CC4OE09	3	0	0	3
10	Ethical Hacking	CSE	R20CC4OE010	3	0	0	3
11	Ethical Hacking	IT	R20CC4OE011	3	0	0	3
12	E-Commerce	IT	R20CC4OE012	3	0	0	3
13	Quality Management	MBA	R20CC4OE013	3	0	0	3
14	Logistics and Supply Chain Management	MBA	R20CC4OE014	3	0	0	3
15	DevOps	AI	R20CC4OE015	3	0	0	3
16	E-Commerce	AI	R20CC4OE016	3	0	0	3

LIST OF OPEN ELECTIVES OFFERED BY DEPARTMENT

OPEN ELECTIVE-I

S.No.	Open Elective-I Subject Title	Department Offering the Subject	Sub Code	No.of periods per week			No.of Credits
				L	T	P	C
1	OOP Through JAVA	AI	R20CC1OE15	3	0	0	3
2	Computer Organization	AI	R20CC1OE16	3	0	0	3

OPEN ELECTIVE-II

S.No.	Open Elective-II Subject Title	Department Offering the Subject	Sub Code	No.of periods per week			No.of Credits
				L	T	P	C
1	Database Management Systems	AI	R20CC2OE15	3	0	0	3
2	Cloud Computing	AI	R20CC2OE16	3	0	0	3

OPEN ELECTIVE-III

S.No.	Open Elective-III Subject Title	Department Offering the Subject	Sub Code	No.of periods per week			No.of Credits
				L	T	P	C
1	Block Chain Technologies	AI	R20CC3OE15	3	0	0	3
2	Human Computer Interaction	AI	R20CC3OE16	3	0	0	3

OPEN ELECTIVE-IV

S.No.	Open Elective-IV Subject Title	Department Offering the Subject	Sub Code	No.of periods per week			No.of Credits
				L	T	P	C
1	DevOps	AI	R20CC4OE015	3	0	0	3
2	E-Commerce	AI	R20CC4OE016	3	0	0	3

O E- I	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	-	-	30	70	100	3
SUBCODE: R20CC1OE15	— **OOPS Through JAVA**						

COURSE OBJECTIVE:
The course provides fundamentals of object-oriented programming in Java and development of user interface.

COURSE OUTCOMES:
After successful completion of this course, the student will be able to:
CO1: Summarize the basic concepts of Object Oriented Programming.
CO2: Illustrate various programming paradigms of Object Oriented Programing.
CO3: Analyze inheritance, packages and Exception handling concepts.
CO4: Apply multi-threading concepts and Applets.
CO5: Apply Event Handling and AWT concepts in various UI Applications.

SYLLABUS:

UNIT - I
Introduction to OOP: Introduction, Need of Object Oriented Programming, Principles of Object-Oriented Languages(Classes, Objects, Abstraction, Encapsulation, Inheritance, Polymorphism), Procedural languages Vs. OOP, Applications of OOP, History of JAVA, Java Virtual Machine, Java Features(Platform Independence, Object-Oriented, Both Java compiled and interpreted, Robust, Security, Multithreaded, other features), and Program structures, Installation of JDK1.8(Getting started with JDK, JDK Installation notes, Exploring the JDK).

UNIT - II
Programming Constructs: Variables, Primitive Data types, Identifiers (Naming Conventions, Keywords), Literals, Operators (Binary, Unary and ternary), Expressions, Precedence rules and Associativity, Primitive Type Conversion and Casting, Flow of control (Branching, Conditional, loops).
Classes and Objects: classes, Objects, Creating Objects, Methods (method types, method overloading), constructors (Parameterized Constructors, Constructor overloading), Cleaning up unused objects (Garbage collector, Finalization), Static keyword (static variables, methods, blocks), this keyword, Arrays, Recursion, Command line arguments and String handling.

UNIT - III
Inheritance: Types of Inheritance, Deriving classes using extends keyword, Method overriding, super keyword, final keyword, Abstract class.
Interfaces, Packages and Enumeration: Interface (Variables in interface, Extending interface), Interface vs. Abstract classes, Packages (Creating packages, using Packages, Access protection), Understanding CLASSPATH, java.lang package (Object class, String class), enumeration.
Exceptions: Introduction, Exception handling techniques (try...catch, throw, throws, finally block), user defined exception.

UNIT - IV

Multi-Threading: java.lang.Thread, Thread life cycle, main Thread, Creation of new threads (by inheriting Thread class, Implementing the Runnable interface), Thread priority, Multithreading using isAlive () and join (), Synchronization (Synchronizing Methods, Statements), Suspending and Resuming threads, Communication between Threads.

Applets: Applet class, Applet structure, An Example Applet Program, Applet Life Cycle (init (), start (), stop (), destroy ()), paint (), update () and repaint (), passing parameters to the Applet.

UNIT - V

Event Handling: Introduction, Event Delegation Model, java.awt.event Description, Sources of Events, Event Listeners, Adapter classes, Inner classes.

Abstract Window Toolkit: Why AWT?, java.awt package, Components and Containers, Button, Label, Checkbox, Radio buttons, List boxes, Choice boxes, Text field and Text area, container classes, Layouts, Menu, Scroll bar.

TEXT BOOK:

1. The Complete Reference Java, 8ed, Herbert Schildt, TMH.

REFERENCE BOOKS:

1. JAVA Programming, K. Rajkumar, Pearson.
2. Core JAVA, Black Book, Nageswara Rao, Wiley, Dream Tech.

ONLINE REFERENCES:

1. https://www.coursera.org/learn/object-oriented-java
2. https://www.youtube.com/watch?v=3u1fu6f8Hto
3. https://www.edx.org/course/object-oriented-programming-in-java

O E- I	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	-	-	30	70	100	3
SUBCODE: R20CC1OE16	COMPUTER ORGANIZATION						

COURSE OBJECTIVES:

- Comprehensive knowledge of computer system including the analysis and design of components of the system.
- Describes different parameters of a memory system, organization and mapping of various types of memories.
- Illustrates algorithms for basic arithmetic operations using binary representation.
- Describes the means of interaction of devices with CPU, their characteristics and operating modes.

COURSE OUTCOMES:

After completion of this course, the students would be able to

CO 1: Interpret the computer system from user's perspective and can explain how Arithmetic Logic Unit works. [K2]

CO 2: Explain of basic components of the system and illustrate data paths and control flow for sequencing in CPUs. [K2]

CO 3: Interpret the Micro operations and Microprogramming for design of control unit of CPU.   [K2]

CO 4: Develop Main Memory Interfacing Circuit and can apply various cache memory mapping techniques. [K3]

CO 5: Apply algorithms to perform arithmetic operations on binary representation of fixed point data. [K3]

CO 6: Interpret various I/O interface devices. [K2]

SYLLABUS:

UNIT - I

Introduction: Types of Computers, Functional units of Basic Computer (Block diagram of Micro Computer).

Register Transfer and Micro-operations: Register Transfer language, Register Transfer, Bus and memory transfers - Three-State Bus Buffers, Memory Transfer; Arithmetic micro operations, Binary Adder, Binary Adder _Subtractor, Binary Incrementer, Arithmetic Circuit; Logical micro operations- List of Logic Microoperations, Hardware Implementation, Some Applications; Shift micro operations-Hardware Implementation, Arithmetic logic shift unit.

UNIT - II

Basic Computer Organization and Design: Instruction codes – Stored Program Organization, Indirect Address, Computer Registers – Common Bus Systems, Computer instructions – Instruction Set Completeness, Timing and control, Instruction cycle – Fetch and Decode, Determine the Type of Instruction, Register Reference Instructions, Memory – Reference Instructions – AND to AC, ADD to AC, LDA :Load to AC,STA: Store AC, BUN: Branch Unconditionally, BSA: Branch and Save Return Address, ISZ: Increment and Skip if Zero, Control Flow Chart, Input – Output Instructions and Interrupt – Input – Output Configuration, Input-Output Instructions.

UNIT - III

Central Processing Unit: Instruction formats – Three Address Instructions, Two Address Instructions, One Address Instructions, Zero Address Instructions, RISC Instructions, Addressing modes – Numerical Example, Data Transfer and manipulation – Data Transfer Instructions, Data Manipulation Instructions, Arithmetic Instructions, Logical and Bit Manipulation Instructions, Shift Instructions, Program control – Status Bit Conditions, Conditional Branch Instructions, Subroutine Call and Return, Program Interrupt, Types of Interrupts, Reduced Instruction Set Computer – CISC Characteristics, RISC Characteristics. Micro Programmed Control Unit: Control memory, Address sequencing – Conditional Branching, Mapping of Instructions, Subroutines, Micro program example – Computer Configuration, Microinstruction Format, Symbolic Microinstructions, The Fetch Routine, Symbolic Microprogram, Design of control unit – Microprogram Sequencer.

UNIT - IV

The Memory System: Memory Hierarchy, Main memory - RAM and ROM Chips, Memory Address Maps, Memory Connection to CPU, Auxiliary memory – Magnetic Disks, Magnetic Tape, Associative Memory – Hardware Organization, Match Logic, Cache Memory – Associative Mapping, Direct Mapping, Set- Associative Mapping, Writing into Cache. Computer Arithmetic: Addition and subtraction – Addition and Subtraction with Signed Magnitude Data, Hardware Implementation, Hardware Algorithm, Addition and Subtraction with Signed 2's Complement Data, Multiplication Algorithms –Booth Multiplication Algorithm.

UNIT – V

Input-Output Organization: Peripheral Devices – ASCII Alphanumeric Characters, Input Output Interface – I/O Bus and Interface Modules, I/O vs Memory Bus, Isolated vs Memory Mapped I/O, Example of I/O Interface, Asynchronous data transfer – Strobe Control, Handshaking, Asynchronous Serial Transfer, Modes of Transfer – Example of Programmed I/O, Interrupt Initiated I/O, Priority Interrupts – Daisy Chaining Priority, Parallel Priority Interrupt, Priority Encoder, Interrupt Cycle, Direct memory Access – DMA Controller, DMA Transfer.

TEXT BOOKS:

1. M. Morris Mano, "Computer System Architecture", Third Edition, Pearson.2008

REFERENCE BOOKS:

1. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, "Computer Organization", McGraw Hill, 5/e, 2002.
2. William Stallings, "Computer Organization and Architecture", Pearson 6/e, 2006.
3. Structured Computer Organization, Andrew S. Tanenbaum, Pearson, 4/e, 2005.
4. Sivarama P. Dandamudi, "Fundamentals of Computer Organization and Design", Springer, 2006.

WEB REFERENCES:

1. nptel.ac.in/courses/106106092
2. nptel.ac.in/courses/106103068

O E- II	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	-	-	30	70	100	3
SUBCODE: R20CC2OE15	**DATABASE MANAGEMENT SYSTEMS**						

COURSE OBJECTIVE:
- Provides students with theoretical knowledge and practical skills in the design, use of databases and database management systems in information technology applications.

COURSE OUTCOMES:

After completion of this course, the students would be able to
CO1 : Interpret the fundamentals of DBMS. [K2]
CO2 : Analyze DB design methodology and normalization process. [K4]
CO3 : Develop Queries in RDBMS. [K3]
CO4 : Compare and Contrast various transaction and concurrency management techniques. [K2]
CO5 : Analyze various file organizations and indexing techniques. [K4]

SYLLABUS:
UNIT I:
Introduction: History of Data base Systems, Data base System Applications, purpose of database systems, View of Data, Database Languages, Database Access from applications Programs, data base System Structure, data base Users and Administrators, Transaction Management, Storage Manager, the Query Processor.

UNIT-II:
Introduction to Database Design: Data base design and ER diagrams, Entities, Attributes and Entity sets, Relationships and Relationship sets, Additional features of ER Model, Conceptual Design with the ER Model, Case Study .
The Relational Model: Introduction to the Relational Model, Integrity Constraint Over relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design ER to Relational, Introduction to Views, Destroying /altering Tables and Views.

UNIT III:
Relational Algebra: Relational Algebra.
SQL: Queries, Constraints, Triggers:- Form of Basic SQL Query, Union, Intersect and Except, Nested Queries, Aggregative Operators, NULL values, Complex Integrity Constraints in SQL, Triggers and Active Data bases.

UNIT IV:
Schema Refinement and Normal Forms: Introduction to Schema Refinement, Functional Dependencies, reasoning about FDS, FIRST, SECOND and THIRD Normal forms, BCNF, Properties of Decomposition, Multi valued Dependencies, FOURTH Normal Form.

UNIT V:
Transactions: Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation.
Concurrency Control: Lock-based protocols, Timestamp-based protocols.
Overview of Storage and Indexing:
Data on External Storage, File Organization and Indexing, Index data Structures
Tree Structured Indexing: Indexed Sequential Access Methods (ISAM), B+ Trees: A Dynamic index Structure.

TEXT BOOKS:

1. Raghuram Krishnan, Johannes Gehrke, "Database Management Systems", TMH, 3/e, 2008.
2. Silberschatz, Korth, "Database System Concepts", TMH, 6/e, 2010.

REFERENCE BOOKS:

1. Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", PEA, 6/e, 2011.
2. C J Date, "Introduction to Database Systems", PEA, 8/e, 2006.
3. Database System Concepts, Peter ROB, Coronel, Ceneage, 6/2, 2011.

WEB REFERENCES:

1. nptel.ac.in/courses/106106093
2. nptel.ac.in/courses/106104135

O E- II	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	-	-	30	70	100	3
SUBCODE: R20CC2OE16	**CLOUD COMPUTING**						

COURSE OBJECTIVES:

- To gain knowledge about virtualization and Virtual Machines
- To familiarize Cloud Computing and its services

COURSE OUTCOMES:

After successful completion of this course, the students will be able to:

CO1: Interpret various types of Virtualization.[K2]

CO2: Outline the Cloud Computing Architectures and Models.[K2]

CO3: Analyze the Cloud Infrastructure Management and Migration and

Disaster Management in Cloud.[K4]

CO4: Analyze AWS and MS Azure services.[K4]

SYLLABUS:
UNIT-I:

Overview of Cloud Computing: Essentials of Cloud Computing, History of Cloud Computing, Business and Information, Benefits of Cloud Computing, Limitations of Cloud Computing, Characteristics of Cloud Computing, How to Develop Cloud Infrastructure, Vendors of Cloud Computing.

UNIT-II:

Introduction to virtualization and virtual machine: Types of virtualization: Server virtualization, Application/ desktop virtualization, client virtualization, storage virtualization, Network virtualization service / application infrastructure virtualization, virtual machines & virtualization middleware.

Cloud Computing Architecture: Grid Framework Overview, Grid Architecture, Cloud Computing Architecture, Key Design Aspects of Cloud Architecture, Cloud Services, and Cloud Applications, Similarities and Differences Between Grid and Cloud Computing, Cloud and Dynamic Infrastructure.

UNIT-III:

Models of Cloud Computing: Cloud Service Models, Cloud Computing Sub Service Models, Cloud Deployment Models, Alternative Deployment Models, Cloud Stack, Cloud Storage.

UNIT-IV:

Cloud Infrastructure Management and Migration: Administrating Clouds, Cloud Management Products, Processes in Cloud Service Management, Cloud Providers and Traditional IT Service Providers, How to Access the Cloud, Migrating to Clouds.

Disaster Recovery: Disaster Recovery Planning, Disasters in the Cloud, Disaster Management

UNIT-V:

What is Microsoft Azure?, Types of Azure Clouds, Azure key Concepts, Azure Domains (Components), Traditional vs. Azure Cloud Model, Applications of Azure, Advantages of Azure, Disadvantages of Azure. What is AWS?, History of AWS,Important AWS Services , Amazon Web Services Cloud Platform: Compute & Networking , Storage & Content Delivery Network, Database, Analytics, Application Services, Deployment and Management ,Applications of AWS ,services, Companies using AWS, Advantages of AWS, Disadvantages of AWS, Comparison between Azure and AWS.

TEXT BOOKS:

1. Cloud Computing –Shailendra Singh Oxford University Press.

REFERENCE BOOKS:

1. Cloud Computing and SOA Convergence in Your Enterprise: A Step-by-Step Guide David S. Linthicum Addison-Wesley Professional.

2. Distributed & Cloud Computing From Parallel Processing to the Internet of Things by Kai Hwang. Geoffrey C. Fox. Jack J. Dongarra

WEB REFERENCES:

1. http://nptel.ac.in/courses/106106129/21

2. https://freevideolectures.com/course/3649/cloud-computing

3. https://www.youtube.com/watch?v=Eg4AAGCE7X4&list=PL2UlrhJ_JwyA5IlOC dEWlNArFke4jgtlg

O E- III	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	-	-	30	70	100	3
SUBCODE: R20CC3OE15	**BLOCK CHAIN TECHNOLOGIES**						

COURSE OBJECTIVES:
- Introduces the fundamental concepts and functionalities of Blockchain.
- Provide conceptual understanding of methods in securing distributed ledgers, how consensus on their contents is achieved, and the new applications that they enable.

COURSE OUTCOMES:
Upon the completion of the course, the students will be able to:

CO 1 : Summarize the fundamentals of Blockchain.[K2]

CO 2 : Analyze the working of Blockchain.[K4]

CO 3 : Interpret how business can be easily made with Blockchain.[K4]

CO 4 : Summarize how Block Chain can be integrated with various current technologies.[K2]

CO 5 : Get familiarity about the Blockchain strength in providing solutions.[K3]

CO 6 : Investigate and understand the Problems with Blockchain.[K4]

SYLLABUS:

UNIT- I:

Grasping Blockchain Fundamentals:
Tracing Blockchain's Origin, The shortcomings of current transaction systems, The emergence of bitcoin, The birth of blockchain, Revolutionizing the Traditional Business Network, Exploring a blockchain application, Recognizing the key business benefits, Building trust with blockchain.

UNIT- II:
Taking a Look at How Blockchain Works:
Why It's Called "Blockchain", What Makes a Blockchain Suitable for Business?, Shared ledger, Permissions, Consensus, Smart contracts ,Identifying Participants and Their Roles.

UNIT- III: .
Propelling Business with Blockchains:
Recognizing Types of Market Friction, Information frictions, Interaction frictions, Innovation frictions, Moving Closer to Friction-Free Business Networks, Reducing information friction, Easing interaction friction, Easing innovation friction, Transforming Ecosystems through Increased Visibility.

UNIT- IV:
Block chain in Action: Use Cases:
Financial Services, Commercial financing, Trade finance, Cross-border transactions, Insurance, Government, Supply Chain Management, Healthcare, Electronic medical records Healthcare payments preauthorization.

UNIT- V

Hyperledger, a Linux Foundation Project:

Hyperledger Vision, Hyperledger Fabric, How Can IBM Help Developers Innovate With Blockchain? Offering an easily accessible cloud and development platform, Individualized attention and industry Expertise. **Problems with Blockchain**: Security and Safeguards, Protection from attackers, Hacks on exchanges, What is stopping adoption?, Scalability problems , Network attacks to destroy bitcoin , Case Study: Failed currencies & blockchain

TEXT BOOK:

1. Blockchain For Dummies®, IBM Limited Edition, Manav Gupta, John
      Wiley & Sons, Inc.111 River St, Hoboken, NJ 07030-5774

REFERENCES:

1. Swan, Melanie. Blockchain: Blueprint for a new economy. "O'Reilly Media, Inc.", 2015.
2. Gupta, M. "Blockchain For Dummies." (2017).

O E- III	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	-	-	30	70	100	3
SUBCODE: R20CC3OE16	**HUMAN COMPUTER INTERACTION**						

COURSE OBJECTIVES:
- The main objective is to get student to think constructively and analytically about how to design and evaluate interactive technologies.

COURSE OUTCOMES:
CO 1: Outline knowledge about user interface design. [K2]
CO 2: Summarize the importance of Graphical User Interface. [K2]
CO 3: Apply the strategies used in design process. [K3]
CO 4: Summarize the importance of screen designing. [K2]
CO 5: Apply the various operations of Windows. [K3]

SYLLABUS
UNIT – I
Introduction: Importance of user Interface – definition, importance of good design. Benefits of good design. A brief history of Screen design.

UNIT – II
The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

UNIT – III
Design process – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds.

UNIT – IV
Screen Designing : Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics.

UNIT – V
Windows – New and Navigation schemes selection of window, selection of devices based and screen based controls.
Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.

TEXT BOOKS:
1. Alan Dix, Janet Finlay, Goryd, Abowd, Russell Beal, "Human Computer Interaction", PEA, 3/e, 2004.
2. Wilbert O Galitz, "The Essential guide to user interface design", Wiley Dream tech, 2/e.

REFERENCE BOOKS:
1. Dan R.Olsan, "Human Computer", Interaction Cengage ,2010.
2. Ben Shneidermann , "Designing the user interface", 4/e, PEA.
3. Soren Lauesen, "User Interface Design", PEA.
4. Prece, Rogers, Sharps, "Interaction Design", Wiley.

WEB REFERENCES:
1. https://scholar.google.co.in/scholar?q=human+computer+interaction&hl=en&as_sdt=0&as_vis=1&oi=scholar

2. https://www.interaction-design.org/literature/topics/human-computer-interaction

3. https://en.wikipedia.org/wiki/Human%E2%80%93computer_interaction

4. https://www.tutorialspoint.com/human_computer_interface/human_computer_interface_introduction.htm

O E- IV	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	-	-	30	70	100	3
SUBCODE: R20CC4OE15	**DEVOPS**						

COURSE OBJECTIVES:

• DevOps improves collaboration and productivity by automating infrastructure and workflows and continuously measuring applications performance

COURSE OUTCOMES:

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

CO 1: Demonstrate the phases of software development life cycle. [K2]
CO 2: Outline the basic Fundamentals of DevOps. [K2]
CO 3: Adopt the DevOps technology into the project. [K6]
CO 4: Evaluate the CI/CD concepts and metrics to track CI/CD practices. [K5]
CO 5: Summarize the importance of DevOps maturity models. [K2]

SYLLABUS:
UNIT- I

Phases of Software Development life cycle. Values and principles of agile software development.

UNIT- II

Fundamentals of DevOps: Architecture, Deployments, Orchestration, Need, Instance of Applications, DevOps delivery pipeline, DevOps eco system.

UNIT- III

DevOps adoption in projects: Technology aspects, Agiling capabilities, Tool stack Implementation, People aspect, processes

UNIT- IV

CI/CD: Introduction to Continuous Integration, Continuous Delivery and Deployment, Benefits of CI/CD, Metrics to track CICD practices

UNIT- V

Devops Maturity Model: Key factors of DevOps maturity model, stages of Devops maturity Model, DevOps maturity Assessment.

TEXT BOOKS:

1. Gene Kim , John Willis , Patrick Debois, "The DevOPS Handbook: How to Create World-Class Agility, Reliability, and Security in Technology Organizations" Jez Humb,O'Reilly Publications
2. Mike Loukides, "What is Devops? Infrastructure as code" O'Reilly publications.
3. Jez Humble and David Farley, "Continuous Delivery: Reliable Software Releases Through Build, Test, and Deployment Automation",
4. Dave Harrison, Knox Lively, "Achieving DevOps: A Novel About Delivering the Best of Agile, DevOps, and Microservices.
5.   Joakim Verona , Packt, "Practical Devops"

REFERENCE BOOKS:

1. Mandi Walls, "Building a DevOps Culture", O'Reilly publications
2. Viktor Farcic, "The DevOps 2.0 Toolkit: Automating the Continuous Deployment Pipeline With Containerized Micro services"

WEB REFERENCES:

1.   https://www.youtube.com/watch?v=hQcFE0RD0cQ
2.   https://www.youtube.com/watch?v=YSkDtQ2RA_c
3.   https://www.svrtechnologies.video/courses/devops-training-free/lectures/10955807
4.   https://www.youtube.com/watch?v=MOZMw5_fBFA

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	3	-	-	30	70	100	3
SUBCODE: R20CC4OE16	E-COMMERCE						

COURSE OBJECTIVE:

- To introduce the fundamental principles of e-business, e-commerce, and the role of management.
- To introduce the application of tools and services to the development of small-scale e-commerce applications

COURSE OUTCOMES:

After successful completion of this course, the students will be able to:

CO 1: Interpret the E-commerce applications and Process Model. [K2]
CO 2: Compare and contrast various electronic Payment Systems. [K3]
CO 3: Interpret the Intra Organizational Commerce. [K2]
CO 4: Outline the corporate digital library and marketing research. [K2]
CO 5: Analyze resource discovery and information filtering. [K4]

SYLLABUS:
UNIT – I
Electronic Commerce-Framework, anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications.

UNIT – II
Consumer Oriented Electronic commerce - Mercantile Process models.
Electronic payment systems - Digital Token-Based, Smart Cards, Credit Cards, Risks in Electronic Payment systems.

UNIT – III
Intra Organizational Commerce - work Flow, Automation Customization and internal Commerce, Supply chain Management.

UNIT – IV
Corporate Digital Library - Document Library, digital Document types, corporate Data Warehouses.
Advertising and Marketing - Information based marketing, Advertising on Internet, on-line marketing process, market research.

UNIT – V
Consumer Search and Resource Discovery - Information search and Retrieval, Commerce Catalogues, Information Filtering. Digital Video and electronic Commerce

TEXT BOOKS:
1. Kalakata, Whinston, "Frontiers of electronic commerce", Pearson.

REFERENCE BOOKS:

1. Hendry Chan, Raymond Lee, Tharam Dillon, Ellizabeth Chang, John Wiley, "E-Commerce fundamentals and applications"
2. S.Jaiswal – Galgotia, "E-Commerce".
3. Efrain Turbon, Jae Lee, David King, H.Michael Chang, "E-Commerce".
4. Gary P.Schneider, "Electronic Commerce", Thomson.
5. E-Commerce – Business, Technology, Society, Kenneth C.Taudon, Carol Guyerico Traver.

WEB REFERENCES:

1.https://www.slideshare.net/kamalgulati7/full-notes-on-ecommerce-study-material-for-ecommerce
2.http://www.vssut.ac.in/lecture_notes/lecture1428551057.pdf
3.https://www.geektonight.com/e-commerce-notes/