B.Sc(IT) SEMESTER-III

Code	Subject	L	Pr./ Tu	Cr	Ext. Exam.	Int. Exam.	Total Marks
3101	Database Management Systems	4	-	4	75	25	100
3102	JAVA Programming	4	-	4	75	25	100
3103	Computer Networks	4	-	4	75	25	100
3104	Computer Organisation & Architecture	4	-	4	75	25	100
3201	Database Management Systems Lab	-	2	2	25	25	50
3202	JAVA Programming Lab	-	2	2	25	25	50
	Total			20			500

SEMESTER-III	1 Credit=25 Marks Total Credits = 20 Total Marks = 20*25=500

B.Sc.(IT) SEMESTER-IV

Code	Subject	L	Pr./ Tu	Cr	Ext. Exam.	Int. Exam.	Total Marks
4101	Advance Java	4	-	4	75	25	100
4102	Python Programming	4	-	4	75	25	100
4103	Data Warehousing and Data Mining	4	-	4	75	25	100
4104	Software Engineering	4	-	4	75	25	100
4201	Advance Java Lab	-	2	2	25	25	50
4202	Python Programming Lab	-	2	2	25	25	50
	Total			20			500

SEMESTER-IV	1 Credit=25 Marks Total Credits = 20 Total Marks = 20*25=500

B.Sc(IT) SEMESTER-V

Code	Subject	L	Pr./ Tu	Cr	Ext. Exam.	Int. Exam.	Total Marks
5101	Mobile Application Development	4	-	4	75	25	100
5102	Internet of Things	4	-	4	75	25	100
5103	Internet Security	4	-	4	75	25	100
5104	Green Computing	2		2	25	25	50
5105	Elective 1 - Software Testing	4	-	4	75	25	100
5106	Elective 2 – Digital Marketing	4	-	4	75	25	100
5107	Elective 3 – Network Programming	4	-	4	75	25	100
5201	Mobile Application Development Using Android- Lab	-	2	2	25	25	50
	Total			20			500

SEMESTER-V	1 Credit=25 Marks Total Credits = 20 Total Marks = 20*25=500

B.Sc.(IT) SEMESTER-VI

Code	Subject	L	Pr./ Tu	Cr	Ext. Exam.	Int. Exam.	Total Marks
6101	Intelligent Property Rights and Cyber Laws	4	-	4	75	25	100
6102	Enterprise Resource Planning	4	-	4	75	25	100
6103	Ethical Hacking	4	-	4	75	25	100
6104	Elective 1 - Machine Learning	4	-	4	75	25	100
6105	Elective 2 - Block Chain Technology	4	-	4	75	25	100
6106	Elective 3 - Cloud Computing	4	-	4	75	25	100
6201	Project	-	4	4	50	50	100
	Total			20			500

SEMESTER-VI	1 Credit=25 Marks Total Credits = 20 Total Marks = 20*25=500

SEMESTER III

Branch: B.Sc.(IT)	Semester-III
Subject Code: 3101	Lecture: 04 Credit: 04
Course Opted	Core Course – 7
Subject Title	DATABASE MANAGEMENT SYSTEMS

Course Objectives:
- To introduce the concept of database management systems
- Learn to organize, maintain and retrieve information efficiently and effectively from a database management system
- To present the concepts and techniques relating to query processing by SQL
- To introduce the concepts of transactions and transaction processing
- To present the issues and techniques relating to concurrency and recovery in multiuser database environments

Course Outcomes:
  The student would be able to
- Understand the Concept of database approach.
- Understand database architecture and data modeling, data Normalization.
- Design and draw ER and EER diagram for real life problem.
- Understand the commands of SQL.
- Understand the concept of transaction, concurrency and recovery.

Modules	Sr. No.	Topic and Details	No. of Lectures Assigned	Marks Weightage %
UNIT - I	1	**Database Management System Concepts:** Basic concept and definition, Traditional file system, File processing system vs DBMS, Significance and objectives of database, Abstraction and data integration, Applications of DBMS.	3	6
	2	**Database Systems and Architecture:** Three Tier Architecture, Centralized and Client-Server Architecture, Mapping: MySQL Architecture, SQL Server 2000 Architecture, Oracle Architecture	3	6
UNIT -II	3	**Data Models**: Object Based Logical Model: Object Oriented Data Model; Entity Relationship Data Model, Record Base Logical Model: Network data model; Hierarchical data model; Relational data model,	4	8
	4	**Database Design**: ER Diagram Concepts, EER Diagram, Relational Database Design by ER and EER to Relational Mapping, Extended E-R Features: Specialization, Generalization, Aggregation, Problems on Reduction of an E-R Schema to Tables, Tabular representation of Strong, Weak entity Sets and Relationship Sets.	6	12
	5	**Introduction to RDBMS:** Relational Algebra operations, Object-oriented database, Distributed Database, No SQL, Graph Database, Keys, Functional Dependencies, 1NF, 2NF, 3NF, BCNF, 4NF, 5NF	5	10

UNIT -III	6	**Introduction to SQL:** About SQL and use of developer tool, data types and operators in oracle.	2	4
	7	**Data Retrieval Techniques:** Use select statement in different ways, data filtering and sorting, types of oracle clauses.	4	8
	8	**Working with DDL and DML commands:** DDL commands: create, drop, alter, modify, rename, delete and truncate. DML commands for copying data, inserting row, update any row and merge command.	6	12
UNIT -IV	9	**Integrity constraints and Functions:** Types of Integrity constraints, Built-in-functions. **Data Aggregation:** Working with aggregate function: count(), sum(), max(), min(), avg(), Group by, Where and Having clause, understanding join and its uses, Types of Join.	9	18
	10	**Transaction Processing System and Concurrency Control Techniques:** Need of concurrency control, ACID Properties, Schedule & serializability, 2PL, Timestamp Ordering, Optimistic Concurrency Control technique, Deadlock **Database Backup & Recovery:** Remote backup, Recovery concepts, Caching, Checkpoints, Transaction Rollback	8	16
		TOTAL	**50**	**100**

Text Book:

1. Korth, Silberschatz, "Database System Concepts",McGraw-Hill,27-Jan-2010

Reference Books:

1. Elmasri and Navathe, "Fundamentals of Database Systems",McGraw-Hill,2010

2. Ivan Bayross, "Oracle-the complete reference": BPB Publications

3. Dr. P.S.Deshpande SQL & PL/SQL for Oracle 10g Black Book

4. Gio Wiederhold, "Database Design", McGraw-Hill 1995.

Branch: B.Sc.(IT)	Semester-III
Subject Code: 3201	Lecture: 02 Credit: 02
Course Opted	Core Course Practical – 7
Subject Title	DATABASE MANAGEMENT SYSTEMS – LAB

Course Objectives:
- Understand, appreciate and effectively explain the underlying concepts of database technologies

Course Outcomes:
- Design and implement a database schema for a given problem-domain
- Normalize a database
- Populate and query a database using SQL DML/DDL commands.
- Programming SQL including stored procedures, stored functions, cursors, packages.

Modules	Sr. No.	Topic and Details	No. of Lectures Assigned	Marks Weightage %
UNIT - I	1	Fundamentals of Database Management System	1	2
	2	Introduction to Oracle with SQL	1	2
UNIT - II	3	Relational Data Model	2	4
	4	E-R and EER diagrams	3	6
	5	Relational algebra operations	3	6
UNIT - III	6	Database Creation, Table Creation using SQL	2	4
	7	Data filtering, sorting and Oracle clauses	2	4
	8	DDL commands and DML commands	3	6
	9	Built-in Functions of SQL and working with integrity constraints	3	6
UNIT -IV	10	Data Aggregation Functions	2	4
	11	Extra programs	2	4
	12	Backup and Recovery Techniques	1	2
		TOTAL	**25**	**50**

Text Book:

1. Korth, Silberschatz, "Database System Concepts",McGraw-Hill,27-Jan-2010

Reference Books:

1. Elmasri and Navathe, "Fundamentals of Database Systems",McGraw-Hill,2010

2. Ivan Bayross, "Oracle-the complete reference": BPB Publications

3. Dr. P.S.Deshpande SQL & PL/SQL for Oracle 10g Black Book

4. Gio Wiederhold, "Database Design", McGraw-Hill 1995

Branch: B.Sc.(IT)	Semester-III
Subject Code: 3102	Lecture: 04 Credit: 04
Course Opted	Core Course – 8
Subject Title	JAVA PROGRAMMING

Course Objectives:
- To make students aware of various OOP concepts and their implementations.
- To enable students to install and use various versions of JAVA & some of its editors.
- To enable students to write, compile, run & debug java programs using core java language.
- Implementation of various OOP entities like classes, objects, inheritance etc. using java.
- To learn JAVA dealing with GUI & IO devices.
- Learning advanced Java features like Generics, Multi-Threading, Autoboxing etc.

Course Outcomes:
- Basic knowledge of programming in JAVA.
- Experience with developing and debugging software in Java.
- Developing software skills for developing real world applications using Java Programming language.

Modules	Sr. No.	Topic and Details	No of Lectures Assigned	Marks Weightage %
UNIT - I	1	**Introduction To Java** History, Comparison with C++. Byte Code, JVM, Run time Environment, Just-in-time, Compiler, JDK, Buzzwords/Features, OOP Principles, Data Types & Operators, Variables, Dynamic Initialization, Type conversion & Casting. Arrays: One dimensional, multi-dimensional, Operators: Arithmetic, Relational, Boolean, Logical. Control Statements, Classes & Objects: Objects, The General Form of a Class, Declaring Objects, Assigning Object Reference Variables, Garbage Collection, The finalize() Method.	5	10
	2	**Constructors** Definition, Parameterized Constructors, The This Keyword: Instance Variable Hiding, A Stack Class, Overloading Constructors	3	6
UNIT - II	3	**Method Overloading :** Adding a Method to the Class, Returning a Value, Adding a Method That Takes Parameters, Recursion, Overloading Methods, Varargs: Variable-Length Arguments, Overloading Varargs Methods, Varargs and Ambiguity	3	6
	4	**Inheritance** Definition, Need of Inheritance, Types of Inheritance, Inheritance Basics: Base class/Super class, Derived /Sub class, Member Access and Inheritance, A Superclass Variable, Superclass methods, Multilevel Hierarchy, When Constructors Are Called.	4	8
	5	**Method Overriding** Definition, Dynamic Method Dispatch, Why Overridden Methods?, Applying Method Overriding, Using Final with Inheritance, Using Final to Prevent Overriding.	3	6

	6	**Abstract Classes & Interfaces** Abstract Classes, Interfaces, Defining an Interface, Implementing Interfaces, Nested Interfaces, Applying Interfaces, Variables in Interfaces, Interfaces can be extended, abstract class vs. interface.	4	8
UNIT - III	7	**String Handling** String Handling- length(), equals(), charAt(), toString(), getchar(), compareTo(), indexOf(), lastIndexOf(), concat(), valueOf(), substring(), replace(), trim(), toUpperCase(), toLowerCase().	3	6
	8	**Java Exceptions** Fundamentals, Exception Types, Uncaught Exception, Using try catch, Multiple Catch, Nested try, throw, throws, Finally, Java's Built-in-exception, creating own exception subclasses, chained exception.	3	6
	9	**Threading:** Thread Model, Thread priorities, synchronization, Messaging, The thread class and the runnable interface. The main() Thread, Creating a thread, Implementing Multi thread, using isAlive() & join().	3	6
UNIT -IV	10	**Java I/O** I/O: The I/O Classes, I/O Basics, Streams, Byte Streams and character streams, Byte stream, classes and character stream classes, Byte Stream class, Buffered InputStream, BufferedOutputStream, ByteArrayInput, ByteArrayOutput, DataInput, Data Output, PrintStream, Character Stream Class, BufferedReader, BufferedWriter, InputStreamReader, OutputStreamWriter, PrintWriter, Reading Console Input, Writing Console output, I/O operations from a file using Reader & Writer classes, I/O operations from a file using InputStream & OutputStream classes.	4	8
	11	**Applets** Applet, Initialization and Termination, Init(), Start(), Paint(), Stop(), Destroy(), Overriding update(), Simple Applet Display Methods(), Repainting, Using Status window, The HTML Applet tag, Passing parameters to Applets.	4	8
	12	**Networking-** Networking Basics, Socket overview, Client/Server, Reserved Socket, Internet Addressing, DNS, Java & The Net, Networking classes and interfaces- InetAddress, TCP/IP client sockets, Format URL connection, TCP/IP Server sockets, Datagrams, DatagramPacket, Datagram server and client, The Collections Framework, Collections Interfaces, The list Interface, Set Interface, Sorted Set Interface.	4	8
	13	**Basics of AWT and Swing:** Control fundamentals, Adding & Removing controls, Responding to controls, Using Buttons, ActionListener, itemsStateChanged(), Choice Control, Handling choice Lists, Using Lists, Handling Lists, Managing Scroll bar, Textfield, Using TextArea, Panels, Checkbox, Dialogs and frames, Using menus, Using the adapter class, LayOut Manager-Flow,	4	8

		Border Grid, Card Using Insets, Event Handling – Events, Event Sources, Event Listeners, Event Classes		
	14	**Database Connectivity:** Database connectivity with JDBC, Java Security.	3	6
		TOTAL	**50**	**100**

Text Book:

1. Herbert Schildt, "Java 2 the Complete Reference J2se", 5th Edition , 2003.

Reference Books

1. The Complete Reference JAVA 2
2. Programming with Java A Primer, E. Balaguruswamy Tata McGraw Hill Companies.
3. Java Programming John P. Flynt Thomson 2nd.
4. Java Programming Language Ken Arnold Pearson.
5. Big Java, Cay Horstmann 2nd edition, Wiley India Edition.

Branch: B.Sc.(IT)	Semester-III
Subject Code: 3202	Lecture: 02 Credit: 02
Course Opted	Core Course Practical - 8
Subject Title	JAVA PROGRAMMING - LAB

Course Objectives:
- To make students aware of various OOP concepts and their implementations.
- To enable students to install and use various versions of JAVA & some of its editors.
- To enable students to write, compile, run & debug java programs using core java language.
- Implementation of various OOP entities like classes, objects, inheritance etc. using java.
- To learn JAVA dealing with GUI & IO devices.
- Learning advanced Java features like Generics, Multi-Threading, Autoboxing etc.

Course Outcomes:
- Basic knowledge of programming in JAVA.
- Experience with developing and debugging software in Java.
- Developing software skills for developing real world applications using Java Programming language.

Modules	Sr. No.	Topic and Details	No. of Lectures/ Practicals Assigned	Marks Weightage %
UNIT - I	1	**Introduction and Programming with java:** Installing & Setting Up Java Environment And Various Java Editors. Developing First Java Program, Implementation of Data Types, Type conversion & Casting, Java Automatic Conversions, Casting Incompatible Types, Arrays: one, Multi-dimensional, **Operators:** Arithmetic, Modulus Assignment, Increment & Decrement, Relational Boolean, Logical operators. **Control Statements:** All Control Statements, Jump Statement. **Classes & Objects**: Class Fundamentals- General form, Simple class, Declaring Objects, Assigning Object reference variables.	2	4
	2	**Implementation of Constructor & Methods:** Constructors, This keyword, Garbage Collection, Finalise() method, A stack Class	1	2
UNIT-II	3	**Implementation of Method Overloading:** Overloading Recursion, Static.	1	2
	4	**Inheritance:** Implementing Inheritance& Method Overriding: Basics, Using Super, Multilevel, Overriding, Dynamic Method dispatch.	2	4
	5	**Method Overriding** Dynamic Method Dispatch, Why Overridden Methods? Applying Method Overriding, Using final methods.	2	4
	6	**Special Features of java:** Implementing Abstract classes Interface & packages, Packages Access Protection, Importing Package, Interface.	2	4
	7	**Strings:** Implementations of String Handling functions	2	4

UNIT-III	8	**Exception Handling:** Implementation of try catch, Multiple catch, Nested Try, throw, throws, finally statements Java's Built-in- Exception	2	4
	91	**Implementation of threading:** Single and Multiple thread	2	4
UNIT-IV	10	**I/O:** Implementation of Console I/O functions, I/O operations from a file using Reader & Writer classes, I/O operations from a file using InputStream & OutputStream classes	2	4
	11	**Applets:** Implementation of I/O functions, Implementation of Applet- Initialization and Termination, Init(), Start(), Paint(), Stop(), Destroy(), Overriding update(), Simple Applet Display Methods(), Repainting, Using Status window, The HTML Applet tag, Passing parameters to Applets.	2	4
	12	**Networking classes and interfaces**: InetAddress, Factory Methods, Instance Methods, TCP/IP client sockets, whois URL, Format URL connection, TCP/IP Server sockets, Datagrams, DatagramPacket, Datagram server and client.	1	2
	13	**Implementation of AWT& Layout Managers:** Control fundamentals, Adding & Removing controls, Responding to controls, Basic of Swings: Panels, Checkbox, Dialogs and frames, Using menus, Using the adapter class , Using Buttons, Listeners	2	4
	14	**Database Connectivity:** Database connectivity with JDBC	2	4
		TOTAL	**25**	50

Text Book:

1. Herbert Schildt, "Java 2 the Complete Reference J2se", 5TH Edition , TMH,2003.

Reference Books:

1. Programming with Java A Primer, E. Balaguruswamy Tata McGraw Hill Companies.
2. Java Programming John P. Flynt Thomson 2nd.
3. Java Programming Language Ken Arnold Pearson.
4. Big Java, Cay Horstmann 2nd edition, Wiley India Edition.

Branch: B.Sc.(IT)	Semester-III
Subject Code: 3103	Lecture: 04 Credit: 04
Course Opted	Core Course - 9
Subject Title	COMPUTER NETWORKS

Course Objectives:
- To study TCP/IP & OSI protocol suites
- To develop an understanding of computer networking basics
- Learn how computer network hardware and software operate
- Investigate the fundamental issues of network design
- To develop an understanding of different components of computer networks, various protocols, modern technologies and their application
- Students will be able to describe and execute network administrator duties and utilities.

Course Outcomes:
- Characterize and appreciate computer networks from the view point of components and from the view point of services
- Display good understanding of the flow of a protocol in general and a network protocol in particular
- Model a problem or situation in terms of layering concept and map it to the TCI/IP stack
- Select the most suitable Application Layer protocol (such as HTTP, FTP, SMTP, DNS, Bit torrent) as per the requirements of the network application and work with available tools to demonstrate the working of these protocols.
- Design a Reliable Data Transfer Protocol and incrementally develop solutions for the requirements of Transport Layer.
- Recognize transport layer services and infer UDP and TCP protocols
- Classify routers, IP and Routing Algorithms in network layer
- Describe the essential principles of Network Layers and use IP addressing to create subnets for any specific requirements
- Understand the Wireless and Mobile Networks covering IEEE 802.11 Standard
- Describe Networking and Network Management
- To understand various protocols for network security to protect against the threats in the networks.

Modules	Sr. No.	Topic and Details	No of Lectures Assigned	Marks Weightage %
UNIT - I	1	**Introduction to Computer Networks**: Introduction: Definition of a Computer Network; What is a Network? Components of a computer network: Use of Computer networks; Networks for companies, Networks for people, Social Issues: Classification of networks; Based on transmission technology, Based on their scale, Local area networks, Metropolitan area networks, Wide area networks, Wireless network.	4	8
	2	**Data Communications:** Introduction: basis for communication, Transmission impairments; Attenuation distortion, Delay distortion, Dispersion, Noise: Data transmission modes; Serial & Parallel, Simplex, Half duplex & full duplex, Synchronous & Asynchronous transmission	3	6

	3	**Network Software & Network Standardization**: Introduction: Networks Software; Protocol hierarchy, Design issues for the layers, Merits and De-merits of Layered Architecture, Reference models; The OSI Reference Model, The TCP/IP Reference Model, Comparison of the OSI & the TCP/IP Reference Models	5	10
UNIT - II	4	**Physical layer-** Transmission media-guided and Unguided, Switching systems- Circuit switching, Datagram Switching & Virtual circuit switching, Example of networks- X.25, Frame Relay & ATM, cable modem and DSL technologies	4	8
	5	**Data link layer**: Framing, Flow & Error control Protocols, Multiple access techniques-random access, controlled access & Channelization, Ethernet types-bridged, Switched, Full duplex, Fast & gigabit Ethernet. Introduction to Data link layer in 802.11 LAN, Connecting devices like passive hubs, repeaters, Active hubs, Bridges, Two-layer Switches, Routers, three layer switches, Gateway etc., Backbone networks, Virtual LANs. MAC Sub layer: MAC Addressing	5	10
	6	**Network Layer and Transport Layer** Network Layer: IPv4 address, IPv6 address, Address mapping-ARP, RARP & DHCP, IPv4 datagram detail format, IPv6 datagram detail format, ICMP, Network layer issues like Delivery, forwarding, Intradomain and Interdomain routing, Routing algorithms like Shortest path routing, Flooding, Distance Vector Routing, Link State Routing, Path vector routing etc., IP address security threats : Social engineering, Online stalking. Transport layer-Process to process delivery, Connection oriented & Connectionless Transport, UDP, TCP, congestion control and Quality of Service	5	10
	7	**Application layer** Application layer protocols and applications like Ping, FTP, telnet, http (www), SMTP, SNMP, Trace route, TFTP, BOOTP, DNS, X-server, E-mail, Introduction to streaming Audio/Video, P2P file sharing, Introduction to socket	3	6
UNIT - III	8	**Basics of Network Security:** Network security: Introduction to Cryptography, Secret key algorithm, public key algorithm, Basics of Security Requirements/Services/Dimensions, Basics of Security attacks, Basics of Security mechanisms / solutions	5	10
	9	**Network Administration:** UTP Cabling for PC-to-PC communication, Network tester, network monitoring, internet access through Dialup/DSL/Leased Line/Mobile handset.	3	6
	10	**Overview of Network Security**: Elements of Network Security , Classification of Network Attacks ,Security Methods ,Symmetric-Key Cryptography :Data Encryption Standard (DES),Advanced Encryption Standard (AES) , Public-	5	10

		Key Cryptography ,Hash Function , Secure Hash Algorithm (SHA) , Digital Signatures , Firewalls and Packet Filtering ,Packet Filtering , Proxy Serve		
UNIT - IV	11	**Wireless and Mobile Networks:** Introduction, Wireless Links and Network Characteristics: CDMA, iFi:802.11 Wireless LANs: The 802.11 Architecture, The 802.11 MAC Protocol, The IEEE 802.11 Frame, Mobility in the Same IP Subnet, Advanced Features in 802.11, Personal Area Networks: Bluetooth and Zigbee, Cellular Internet Access	8	16
	12	**Case Study** Study of Different Type of LAN& Network Equipment, Implementation of ipv4 and v6 design on the college network and Study and Verification of standard Network topologies i.e. Star, Bus, Ring etc.		
		TOTAL	**50**	**100**

Text Book:
1. A.S. Tannenbaum ,"Computer Networks", 4th edition Prentice hall of India

Reference Books:
1. Behrouz A. Forouzan (2006), Data communication and Networking, 4th Edition, Mc Graw-Hill, India
2. Wireless Communications & Networks , William Stallings
3. Cryptography and Network Security , Atul Kahate

Branch: B.Sc.(IT)	Semester-III
Subject Code: 3104	Lecture: 04 Credit: 04
Course Opted	Core Course - 10
Subject Title	COMPUTER ORGANISATION AND ARCHITECTURE

Course Objectives:
- To give a basic understanding of concepts and structure of computers.
- To understand the organization of Cache memory and memory management hardware.
- To study the working of different interrupts & Mapping Techniques.
- To study register organization.
- To understand the different addressing modes.
- To demonstrate the working of central processing unit and RISC and CISC Architecture.

Course Outcomes:
- To describe basic structure of the computer system.
- To demonstrate the arithmetic algorithms for solving ALU operations.
- To demonstrate the memory mapping techniques.
- To Identify various types of buses, interrupts and I/O operations in a computer system
- Learn the concepts of parallel processing, pipelining and inter-processor communication.
- Exemplify the I/O and memory organization.

Modules	Sr. No.	Topic and Details	No. of Lectures Assigned	Marks Weightage %
UNIT - I	1	**Basic Structure of computers:** Basic organization of computer, Intel 8086 Architecture, Basic Measures of Computer Performance, CPU: Registers, Computer Function: Instruction Cycle, Interrupts, Interconnection Structures, Bus Interconnection, Peripheral Component Interconnection (PCI).	10	20
UNIT - II	2	**Memory Organization:** Classifications of primary and secondary memories. Types of RAM (SRAM, DRAM, SDRAM, DDR, SSD) and ROM, Characteristics of memory, Memory hierarchy: cost and performance measurement.	6	10
	3	**Cache Memory:** Principles, Elements of cache design (Size, Mapping, Replacement, Write policies, Block size) Virtual Memory Concept.	6	10
UNIT - III	4	**Input/Output:** External devices, I/O Modules, Programmed I/O, Interrupted-Driven I/O, Direct Memory Access.	9	20
	5	**Central Processing Unit:** Instruction sets: Instruction characteristics, Types of operands, Types of operations on operands, addressing modes of 8086 processor, Processor Organization, Register organization.	9	20

UNIT - IV	6	**RISC:** Instruction Execution, RISC Characteristics, and RISC Pipelining, RISC Vs. CISC, Reduced Instruction Set Computers (RISCs), Introduction to CISC. CISC Characteristics	5	10
	7	**Parallel organization:** Multiple processor organizations (SISD, SIMD, MISD and MIMD)	5	10
		TOTAL	**50**	**100**

Text Books:
1. William Stallings, Computer Organization and Architecture: Designing for Performance, Pearson Publication, 10th Edition, 2013
2. John P. Hayes, Computer Architecture and Organization, McGraw-Hill, 1988
3. Douglas V. Hall, "Microprocessor and Interfacing", Tata McGraw-Hill 2nd Edition
4. Barry B. Brey, "The Intel Microprocessors 8086/8088…", PHI, 4th Edition

Reference Books:
1. Andrew S. Tanenbaum Structured Computer Organization, Pearson, Sixth Edition
2. Morris Mano. Computer System Architecture Pearson Publication, 3rd Edition, 2007
3. Kai Hwang, Faye Alaye Briggs. Computer architecture and parallel processing, McGraw-Hill
4. P. Pal Chaudhuri. Computer Organization and Design Prentice Hall India, 2004
5. Dr. M. Usha, T.S. Shrikant. Computer System Architecture and Organization Wiley India, 2014.