Bachelor of Technology (Information Technology)

Semester – V (w.e.f. Session 2017-18)

S. No.	Course No.	Course Title	Teaching Schedule				Allotment of Marks				Duration of Exam (Hrs.)
			L	T	P	Hours/ Week	Theory	Sessional	Practical	Total	
1.	IT-301N	Linux Operating System	4	1	--	5	75	25	--	100	3
2.	IT-303N	Introduction to Digital & Data Communication	4	--	--	4	75	25	--	100	3
3.	IT-305N	JAVA Programming	4	1	--	5	75	25	--	100	3
4.	IT-307N	Multimedia & Virtual Reality	4	--	--	4	75	25	--	100	3
5.	IT-309N	Computer Graphics	4	1	--	5	75	25	--	100	3
6.	IT-311N	Computer Graphics Lab	--	--	3	3	---	40	60	100	3
7.	IT-313N	Multimedia Lab	--	--	2	2	---	40	60	100	3
8.	IT-315N	JAVA Programming Lab	--	--	3	3	---	40	60	100	3
9.	IT-317N	Linux Lab	----	--	2	2	--	40	60	100	3
10.	IT-319N	Industrial Training-I	1	--	---	1	---	100	----	100	
		Total	21	3	10	34	375	385	240	1000	

Note: Industrial Training which was undergone by the students after IV sem is to be evaluated during V sem as **(IT-319N)** through submission of certified computerized report to the Head of the Department followed by viva-voce, seminar/presentation.

Semester – VI (w.e.f. Session 2017-18)

S. No.	Course No.	Course Title	Teaching Schedule				Allotment of Marks				Duration of Exam (Hrs.)
			L	T	P	Hours/ Week	Theory	Sessional	Practical	Total	
1.	IT-302N	Analysis & Design of Algorithms	4	1	-	5	75	25	--	100	3
2.	IT-304N	Software Engineering	4	--	-	4	75	25	--	100	3
3.	IT-306N	Computer Networks	4	--	--	4	75	25	--	100	3
4.	IT-308N	Introduction to Microcontroller	4	--	--	4	75	25	--	100	3
5.	IT-310N	Data Warehouse & Data Mining	4	1	--	5	75	25	--	100	3
6.	IT-312N	Software Engineering Lab	---	--	2	2	---	40	60	100	3
7.	IT-314N	Networking Lab	--	--	2	2	---	40	60	100	3
8.	IT-316N	Visual *Basic.net* Lab	--	--	3	3	---	40	60	100	3
9.	IT-318N	Microcontroller Lab	--	--	2	2	---	40	60	100	3
10.	IT-320N	Colloquium & Professional Proficiency	---	--	2	2	--	100	--	100	--
		Total	20	2	11	33	375	385	240	1000	--

Note: The students will have to undergo another six weeks Industrial Training after VI sem and it will be evaluated during VII sem through submission of certified computerized report to the Head of the Department followed by viva-voce, seminar/presentation.

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IT-301 N	Linux Operating System					
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time
4	1	-	75	25	100	3
Purpose	The course helps students to prepare for the real world in which there is a diversity of operating system & platform.					
CO 1	To familiarize with basic commands of Linux.					
CO 2	To study Linux networking and file system.					
CO 3	To understand the installation of server.					
CO 4	Security in Linux.					

Unit-1

Introduction: Basic concepts of the operating system. Commands, shells and processes; users and groups; file system and directories. System installation, configuration and upgrade Installation stages; network installation; disk partitioning; post-install system customization and upgrade; dpkg and APT package installation, remove, upgrade and query; semiautomatic system installation.
Kernel: Kernel tasks; managing kernel modules at runtime; kernel configuration and compilation boot loaders GRUB and LILO.

Unit-2

Linux Networking: Basic concepts of networking: Network packets, TCP/IP protocol suit, address resolution protocol (ARP); IP addresses and network mask; subnets and routing; IPV4 and Network classes; ports. Configuring Linux machine on the network; arp, ipconfig and netstat commands. Network services and tools; telnet, rsh, ftp, rcp, ssh, rsync, inetd.conf; opening and closing ports.
Network File system (NFS): File system sharing or the network; remote procedure call (R P C) services; NFS server and client sides; NFS installation & configuration; and statistic mount and auto mount configuration; when trouble shooting NFS; security and optimization
Network information service (NIS): Centralized authentication systems; sharing user and host information or the network; IS server and client sides and configuration; compatibility mode; net group; security issues.

Unit –3

Integrating Linux and Windows: Elements of windows networking; Net BIOS SMB\ \ CIFS protocols; domain controller; Samba server on Linux for centralized window logon; file sharing and printing, samba client; samba installation and configuration; Unix and windows password. Dual Boot: running windows and Linux on the same PC; GRUB and NT Boot loaders; accessing windows files systems from Linux and vice versa;
Light Weight Directory Access Protocol (LDAP): Overview of Unix authentication and naming service; introduction to LDAP: Domain component (DC); organizational Unit (OU); common names (CN); Schemas; IDIF format; services; polls and commands; server and client sides; Open LDAP installation and configuration; LDAP applications. Shell scripting, syntax of brash; looping; case statement; function; command substitution; awk, grep, sed. Startup and Run Levels. Scheduled jobs. Boot up and login process sequence; run levels; startup scripts; scheduling jobs with at and cron.

Unit-4

Linux Security: System vulnerabilities; port scanning; encryption, encrypted services and connections; PGP/GPG Intrusion protection: tcp-wrappers, IP-firewalls (iptables), NAT and DMZ; Intrusion detection systems: tripwire; Secure system management practices.
Email Server: Steps of Email transaction; Email envelope and headers; SMTP servers; IMAP and POP3 servers; E-mail relay; Postfix configuration; Spam and viruses,
Domain Name Server (DNS): Host name resolution; domain name hierarchy; DNS zones; configuration of master, slave and caching DNS servers with BIND 9.

Text Books
1. Bell & Duff , *Red Hat Linux 9* –- Pearson.
2. Richard L. Peterson , *Complete Reference, Red Hat Linux*—TMH.
3. Tery Dawson, Gregor N. Purdy, Tony Bautts ; *Linux N/W Administration Guide*– OREILLY.

Reference Books
1. Christopher Negus *, Red Hat Linux 9 Bible*- WILEY publishing.
2. Patrick Volker Ding, Kevin Richard, Eric Foster-Johnson, *Linux Configuration & Installation* BPB publication.
3. John Goerzen, *Linux Programming Bible* -Wiley Dream Tech India (P) Ltd.

NOTE: Eight questions each of 15 marks are to be set in all by the examiner taking two questions from each unit. Students will be required to attempt five questions in all, selecting at least one question from each unit.

IT - 303 N	Introduction to Digital & Data Communication					
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time
4	--	--	75	25	100	3
Purpose	To provide the knowledge of digital data communication					
CO 1	To introduce the concept of communication.					
CO 2	To study pulse modulation.					
CO 3	To educate about the various modulation techniques in digital communication					
CO 4	To understand various methods for data transmission.					

Unit-1

Introduction

What is communication , Elements of communication system , Signal , Concept of bandwidth , sources of signal , Types of communication channels , classification of electronic communication system , Modulation , Introduction to analog modulation system – AM , FM , PM ; Elements of Digital communication system , Comparison of analog and digital modulation , advantages and disadvantages of digital communication , Limitations of communication system , Electromagnetic spectrum for communication

Unit-2

Pulse Modulation:

Sampling theorem, Nyquist rate, Introduction to PAM, PWM, PPM; Quantization, Introduction to PCM and delta modulation, Introduction to TDM and FDM

Unit-3

Digital Modulation

Line coding, introduction to Encoding schemes: RZ , NRZ ; Modulation Techniques – ASK-FSK-PSK-QPSK

Unit-4

Digital data Transmission

Classification: Parallel, Serial, Asynchronous and synchronous transmission; Error Detection and correction techniques: Parity checks, Hamming code; DTE & DCE interface,
Introduction to: a) RS-232C, b) RS-449, c) USB , d) HDMI.

Text Books:
1. Proakis, *"Digital Communications",* Mc Graw Hill.
2. Sanjay Sharma , *" Digital communication"* , S.K. Kataria and sons

Reference Books :
1. W.Stalling, *"Wireless Communication And Networks"* , Pearson.
2. Stallings, *"Data & computer Communications",* PHI.
3. Forouzen*, "Data Communication & Networking",* Tata Mcgraw Hill.
4. Miller, *"Introduction to Digital & Data Communications"*, Jaico Pub.

NOTE: The course is introductory in nature. Eight questions each of 15 marks are to be set in all by the examiner taking two questions from each unit. Students will be required to attempt five questions in all, selecting at least one question from each unit.

IT-305 N			JAVA Programming			
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time
4	1	-	75	25	100	3
Purpose	To understand design and implementation of various software applications.					
CO 1	To study basic concept of OOP.					
CO 2	Learn about the interfaces, multithreading in JAVA.					
CO 3	To study database connectivity with JAVA.					
CO 4	To familiarize the student to server side programming.					

Unit-1

Introduction to Java & Principles of Object Oriented Programming: Basic Concepts of OOP and it's Benefits. Application of OOP. The Creation of Java, Importance of Java for the Internet, Java's Magic: The Byte-code, Features of Java. Object-Oriented Programming in Java, Java Program Structure.

Defining Classes: Defining of a Class, Definition of Methods, Constructors, Creating Objects of a Class, Assigning Object Reference Variables, The keyword "this" , Defining and Using a Class, Automatic Garbage Collection.

Arrays and Strings: Arrays, Arrays of Characters, String handling Using String Class, Operations on String Handling Using. String Buffer Class.

Extending Class and Inheritance: Using Existing Classes, Class Inheritance, Choosing Base Class, Access Attributes, Polymorphism, Multiple Levels of Inheritance, Abstraction through Abstract Classes, Using Final Modifier, The Universal Super class-Object Class.

Unit-2

Package & Interfaces: Understanding Packages, Defining a Package, Packaging up your Classes, Adding Classes from a Package to your Program, Understanding CLASSPATH, Standard Packages, Access Protection in Packages, Concept of Interface.

Exception Handling: The Idea behind Exceptions, Types of Exceptions, Dealing with Exceptions, Exception Objects, Defining Your Own Exceptions, Checked and Unchecked Exceptions.

Multithreading Programming: The Java Thread Model, Understanding Threads, The Main Thread, Creating a Thread: extending Thread and implementing Runnable, Creating Multiple Threads, Thread Priorities, Synchronization, Deadlocks inter-thread communication, Deadlocks.

Input/Output in Java: I/O Basic, Byte and Character Structure, I/O Classes, Reading Console Input, Writing to Console Output, Reading and Writing on Files, Random Access Files, Storing and Retrieving Objects from File. Stream Benefits.

Unit-3

Creating Applets in Java: Applet Basics, Applets Architecture, Applet Life Cycle, Simple Applet Display Methods, Requesting Repainting, Using the Status Window, The HTML APPLET Tag, Passing parameters to Applets.

Java Data Base Connectivity (JDBC): Database Connectivity- Relation Databases, JDBC API, Reusing Database Objects, Transactions, Advance Techniques.

Working with Windows: AWT Classes, Window Fundamentals, Working with Frame, Creating a Frame Window in an Applet, displaying information within a Window.

Unit-4

Event Handling: Two Event Handling Mechanisms, The Delegation Event Model, The Event Handling Process, Event Classes, Sources of Events, event Listener Interfaces, Using the Delegation Event Model, Adapter Classes.

Java Servlet Programming: Role and Advantages of Java Servlets in Web application Development.

HTTP Servlets- Introduction, page generation, server side includes, servlet chaining, java Server pages.

Server Life Cycle: Servlet Alternative, Reloading, Init and Destroy, Single Thread Model, Background Processing Last Modified times, synchronization, Persistent state capabilities.

Text Books / Reference:
1. Herbertz Schildt , *The complete Reference Java,* Mc Graw.
2. Ivor Horton , *Beginning JAVA 2 (JDK1.3 Edition),* , WROX Public.
3. Bruce Eckel , *Thinking in Java,* Prentice Hall.
4. Jamie Jaworski, "*Java Unleashed",* SAMS Techmedia Publication, 1999.
5. JAVA 2 (1.3) API Documentations.
6. E. Balaguruswamy , *"Programming with Java"* , Tata McGraw-Hill Education.

NOTE: Eight questions each of 15 marks are to be set in all by the examiner taking two questions from each unit. Students will be required to attempt five questions in all, selecting at least one question from each unit.

IT-307 N	Multimedia & Virtual Reality					
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time
4	-	-	75	25	100	3
Purpose	To familiarize with different techniques and tools of multimedia applications.					
CO 1	Introduction to basics of multimedia technologies.					
CO 2	To study file system and information model of multimedia.					
CO 3	To familiarize with the animation in multimedia.					
CO 4	To study the virtual reality concepts.					

UNIT - 1

Basics of Multimedia Technology: Computers, communication and entertainment, multimedia an introduction & emerging applications, framework for multimedia systems, multimedia devices, CD-AUDIO,CD_ROM, multimedia presentation tools.
Audio, Video And Image: Digital representation of sound, transmission of digital sound, MPEG-Audio ,audio compression and decompression, brief survey of speech recognition and generation, musical instrument digital interface, evaluating a compression system-redundancy and visibility , video compression techniques, JPEG-image compression standards, MPEG-motion video compression standard-DVI Technology

UNIT - 2

Multimedia File Systems and Information Models: The case of multimedia information system, file support for continuous media-data models for multimedia and hyper media information, multimedia presentation and authoring, current state of industry-design paradigms and user interface-barriers to widespread use, multimedia system service architecture, media stream protocol and services and window system, client control of continuous media, file system support, hyper applications.

UNIT - 3

Multimedia Communication Systems: Multimedia services over the public network, requirements, architecture and protocols-applications-network services-network protocols-multimedia interchange :Quicktime movie file format(QMF)-MHEG(Multimedia and Hypermedia information and coding expert group)-format function and representation summary-real time interchange-Multimedia conferencing: teleconferencing systems.
Animation: Introduction, Basic terminology techniques, Motion graphics 2D & 3D animation. Introduction to MAYA (Animating tool): Fundamentals, Modeling: NURBS, Polygon, Organic, animation, paths & boxes, deformers, working with MEL: Basics & programming Rendering &special effects: shading & texturing surfaces lighting, special effects.

UNIT - 4

Virtual Reality: Introduction to Virtual Reality, Four key elements of virtual reality - a) virtual world, b) immersion, c) sensory feedback d) interactivity, ; Desktop virtual reality, VR operating system, virtual environment displays & orientation making; visually coupled system requirements; intelligent VR software systems.

Text Books:
1. David Hillman ,*"Multimedia Technology & Applications",* Galgotia publications.
2. John.F.Koegel Buford, *Multimedia Systems*, Pearson education,1994.
3. John Villamil Louis Molina *, Multimedia An Introduction* PHI.
4. Jose Lozano , *Multimedia: Sound & video*, PHI(Que)
5. Sherman & Craig*. Understanding Virtual Reality – Interface, Application, and Design*, Morgan   Kaufmann, 2002.

Reference Books:
1. John Villamil *Multimedia : Production, planning and delivery ,* Que E&T, 1997.
2. Jeff Coate Judith , "*Multimedia in Action"*, 1995, PHI.
3. Norman Desmarais,   *Multimedia on the PC: A Guide for Information Professionals,* Mc Graw Hill.
4. Ze-Nian Li and Mark S.Drew, *Fundamentals of Multimedia ,* Pearson education.

NOTE: Eight questions each of 15 marks are to be set in all by the examiner taking two questions from each unit. Students will be required to attempt five questions in all, selecting at least one question from each unit.

IT-309 N	Computer Graphics					
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time
4	1	-	75	25	100	3
Purpose	To provide the conceptual knowledge of Computer Graphics.					
CO 1	Introduction to different graphics algorithm.					
CO 2	To acquaint with viewing system and clipping.					
CO 3	To study different transformation techniques and projection of an object.					
CO 4	To familiarize with 3D curves and surfaces.					

Unit – 1

Introduction: What is Computer Graphics, Computer Graphics Applications, Two dimensional Graphics Primitives: Points and Lines, Point Plotting Techniques: Coordinate system, Incremental Method, Line drawing algorithms: DDA & Bresenhams's; Circle generating algorithms: Using polar coordinates, Mid point circle drawing algorithms . Filled area algorithms: Scan line polygon filling algorithms, Boundary filled algorithms.
Graphic devices: Light pen, Mouse, Tablet, Touch panel, Digitizers

Unit – 2

Two Dimensional Viewing: Two dimensional geometric transformations, Viewing pipeline, Window to view port transformation, Window to view port mapping.
Clipping: Point & Line clipping algorithm, Cohen-Sutherland Line clipping algorithms, Polygon clipping: Sutherland-Hodgeman Polygon clipping algorithm. Curve clipping, Text clipping.

Unit – 3

Three Dimensional Viewing: Introduction to Three-dimensional display methods : Parallel & Perspective Projection , depth cueing , surface rendering ; Three-Dimensional Geometric and Modeling Transformations; Viewing pipeline, Viewing coordinates,.

Unit – 4

Representation of 3-D Curves and Surfaces: Curved lines and surfaces, spline representations, interpolation and approximation splines, Parametric continuity conditions, Geometric continuity conditions.
Bezier curves and surfaces: Bezier curves, properties of Bezier curves, Bezier surfaces, B-spline curves and surfaces.
Hidden Surfaces removal: Classification of Visible-Surface Detection algorithms , Hidden surface elimination, depth buffer algorithm, scan line coherence and area coherence algorithm, priority algorithm.
Introduction to animation: Design of Animation Sequences, General Computer-Animation Functions, Morphing

Text Books
1. Hern & Baker – *Computer Graphics*, 2nd Ed. PHI.
2. Newmann & Sprawl – *Introduction to interactive Computer Graphics*, MGH.
Reference Books
1. Harrington – *Computer Graphics* – A programming Approach.
2. Rogers – *Principles of Computer Graphics* – MGH.
3. Folay – *Fundamental of Interactive Computer Graphics* – Addison Welsey
NOTE: The course is introductory in nature. Eight questions each of 15 marks are to be set in all by the examiner taking two questions from each unit. Students will be required to attempt five questions in all, selecting at least one question from each unit.

IT-311 N	Computer Graphics Lab					
Lecture	Tutorial	Practical	Minor Test	Practical Exam	Total	Time
--	--	3	40	60	100	3
Purpose	To provide the conceptual knowledge of Computer Graphics.					
CO 1	To implement different graphics algorithm.					
CO 2	To perform practical on viewing system and clipping.					
CO 3	To study different transformation techniques and projection of an object.					
CO 4	To implement Beizer curve					

List of experiments:

1. Write a program to implement DDA line drawing algorithm.

2. Write a program to implement Bresenham's line drawing algorithm.

3. Implement the Bresenham's circle drawing algorithm.

4. Write a program to implement the midpoint circle drawing algorithm.

5. Write a program to implement 2-D transformations.

6. Write a program to show a ball moving on the screen according to the given requirements.

7. Write a program to implement the midpoint circle drawing algorithm.

8. Write a program to implement the Beizer curve.

9. Implement the line clipping algorithm using C.

10. Implement boundary fill algorithm using C.

11. Implement the depth buffer algorithm using C.

Note: A student has to perform 10 experiments. At least seven experiments should be performed from the above list. Three experiments may be designed & set by the concerned institution as per the scope of the syllabus.

IT-313 N	Multimedia Lab					
Lecture	Tutorial	Practical	Minor Test	Practical Exam	Total	Time
--	--	2	40	60	100	3
Purpose	To familiarize different techniques and tools of multimedia applications.					
CO 1	Introduction to basics of multimedia technologies.					
CO 2	Creation of websites					
CO 3	To study animation in multimedia.					
CO 4	To use adobe photoshop for editing.					

List of experiments:

1. Create any two slides using power point

2. Create a website on any of your favorite topic.

3. Create a website of your college using HTML tags

4. Perform the following using Movie star:

    a) Video Capturing

    b) Video Editing and

    c) Creating Video CD.

5. Animate a ball using Flash

6. Using Adobe Deluxe Photoshop edit a digital photo by changing the background color, changing the theme,
    changing the part of the photo and editing the different parts of the photo.

7. Animate the following using GIF animator**:**

    a) Image

    b) Banner Text

8. Perform the following using Multimedia Software**:**

    a) Clip a portion of an audio wave file

    b) Add another audio file to the above clipped file

9. Perform the following using Multimedia software

    a) Extract audio from video file like .avi/.dat/.mpeg and save it in MP3

    b) Change the format of above audio file into midi/wav/asf/wm/cda

Note: A student has to perform 9 experiments. At least seven experiments should be performed from the above list. Two experiments may be designed & set by the concerned institution as per the scope of the syllabus.

IT-315 N	JAVA Programming Lab					
Lecture	Tutorial	Practical	Minor Test	Practical Exam	Total	Time
--	--	3	40	60	100	3
Purpose	To introduce the principles and paradigms of Java Programming.					
CO 1	Introduction to the concept of OOP.					
CO 2	To implement various programs in JAVA					
CO 3	To study database connectivity with JAVA.					
CO 4	To study server side programming					

List of experiments:

1. Write a program to illustrate the concept of simple and multilevel inheritance.

2. Write a program to illustrate the concept of "this" keyword.

3. Write a program to illustrate the concept of Constructor and method Overloading.

4. Write a program to draw a Pyramid in JAVA.

5. Write a program to implement Binary Search.

6. Write a program to illustrate the concept of Threads by using yield (), stop (), and sleep () methods.

7. Write a program to illustrate the concept of synchronization in Threads.

8. Write a program to illustrate the concept of applets.

9. Write a program to draw shapes using Graphics Methods

10. Write a program to read a record into database using JDBC Connectivity.

11. Write a program to illustrate the concept of Event Handling

Note: A student has to perform 10 experiments. At least seven experiments should be performed from the above list. Three experiments may be designed & set by the concerned institution as per the scope of the syllabus.

IT-317 N	Linux Lab					
Lecture	Tutorial	Practical	Minor Test	Practical Exam	Total	Time
--	--	2	40	60	100	3
Purpose	To introduce the student to Linux OS					
CO 1	To explore basic commands of Linux.					
CO 2	To study Linux networking and file system.					
CO 3	To learn installation of server.					
CO 4	To familiarize with administration of Linux operating system					

LIST OF EXPERIMENTS

1.   Install Linux on the system dual boot with the windows Operating System.

2.   Do the following tasks :-

     a)   Create, remove & resize various types of partitions through GUI as well as command line.

     b)   Configure printers in Linux through GUI as well as command line.

3.   Creating, Removing of Swap space as well as swap files trough command line as well as GUI.

4.   Implementation Disk Quotas- enabling, creating, mounting, configuring, assigning, disabling.

5.   Managing Users and Groups in Linux- Adding, Modifying, Password aging.

6.   Configuration Networks on Linux through GUI & Command Line- Ethernet, Modem, ISDN,   Wireless.

7.   Configuring NFS (Network File System) on Linux both GUI & Command Line.

8.   Configuring Samba server on Linux both GUI & Command line.

9.   Configuring D.N.S (Domain Name system) server on Linux both GUI & Command Line.

10.   Configure an e-mail server in Linux-send mail.

11.   Configuring Firewalls and managing various services of Linux.

12.   Configuring Log Server in Linux.

Note: A student has to perform 10 experiments. At least seven experiments should be performed from the above list. Three experiments may be designed & set by the concerned institution as per the scope of the syllabus.

IT-302 N	Analysis & Design of Algorithms					
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time
4	1	-	75	25	100	3
Purpose	To explore fundamentals of algorithm design.					
CO 1	To study the behavior of an algorithm.					
CO 2	To familiarize with dynamic programming.					
CO 3	To focus on back tracking and branch and bound problems.					
CO 4	To learn the computational graph searching and tree traversals.					

Unit – 1

Introduction: Algorithm, Analyzing algorithm, Designing algorithm, Concept of algorithmic efficiency, Run time analysis of algorithms, Asymptotic Notations.
Divide and conquer: Structure of divide and conquer algorithms: examples; binary search, quick sort, Strassen Multiplication; Analysis of divide and conquer run time recurrence relations.

Unit – 2

Greedy Method: Overview of the greedy paradigm examples of exact optimization solution (minimum cost spanning tree), approximate solution (Knapsack problem), Singles source shortest paths.
Dynamic programming: Overview, difference between dynamic programming and divide and conquer, Applications: Shortest path in graph, Matrix multiplication, Travelling salesman problem, longest common sequence.

Unit – 3

Back tracking: Overview, 8-queen problem, and Knapsack problem
Branch and bound: LC searching Bounding, FIFO branch and bound, LC branch and bound application: 0/1 Knapsack problem, Traveling Salesman Problem.

Unit – 4

Graph searching and Traversal: Overview, Traversal methods (depth first and breadth first search).
Trees: Review of trees, Binary search tree, Traversal, Insertion & Deletion in Binary Search Tree, B-Trees, B+Trees, Basic operations on B Trees.
Computational Complexity: Complexity measures, Polynomial Vs non-polynomial time complexity; NP-hard and NP-complete classes, examples.

Text Book:
1. E. Horowitz, S. Sahni, and S. Rajsekran, *" Fundamental of Computer Algorithms,"* Galgotia Publication

Reference Books:
1. T. H. Cormen, Leiserson, Revest and Stein, *"Introduction of Somputer algorithm,"* PHI.
2. Sara Basse, A. V. Gelder, *" Computer Algorithms,"* Addison Wesley.

NOTE: Eight questions each of 15 marks are to be set in all by the examiner taking two questions from each unit. Students will be required to attempt five questions in all, selecting at least one question from each unit.

IT-304 N	Software Engineering					
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time
4	--	--	75	25	100	3
Purpose	To familiarize the students with the concept of designing the software.					
CO 1	To study different software life cycle model.					
CO 2	To acquaint with requirement analysis and designing phase of software development.					
CO 3	To learn different testing and maintenance in software engineering					
CO 4	To explore quality assurance and reliability of the software.					

Unit – 1

Introduction: Program vs. software products, emergence of software engineering, software life cycle, models: waterfall, prototype, evolutionary and spiral model, Software Characteristics, Applications, Software crisis.

Software project management: Project management concepts, software process and project metrics Project planning, project size estimation metrics, project estimation techniques, empirical estimation techniques, COCOMO, A Heuristic estimation techniques, staffing level estimation, team structures, staffing, risk analysis and management, project scheduling and tracking.

Unit – 2

Requirements Analysis and specification: Requirements engineering, system modeling and simulation Analysis principles modeling, partitioning Software, prototyping, Prototyping methods and tools, Specification principles, Representation, the software requirements specification and reviews Analysis Modeling: Data Modeling, Functional modeling and information flow: Data flow diagrams, Behavioral Modeling, The mechanics of structured analysis: Creating entity/relationship diagram, data flow model, control flow model, the control and process specification, The data dictionary, Other classical analysis methods.

System Design: Design concepts and principles: the design process: Design and software quality, design principles, Design concepts: Abstraction, refinement, modularity, software architecture, control hierarchy, structural partitioning, data structure software procedure, information hiding, Effective modular design: Functional independence, Cohesion, Coupling, Design Heuristics for effective modularity; The design model; Design documentation. Architectural Design: Software architecture, Data Design: Data modeling, data structures, databases and the data warehouse, Analyzing alternative Architectural Designs, architectural complexity; Mapping requirements in to software architecture; Transform flow, Transaction flow; Transform mapping; Refining the architectural design.

Unit – 3

Testing and maintenance: Software Testing Techniques, software testing fundamentals: objectives, principles, testability; Test case design, Unit testing: white box testing, basic path testing: Control structure testing: Black box testing, testing for specialized environments, architectures and applications. Software Testing Strategies: Verification and validation, Integration testing, Validation testing, alpha and beta testing. System testing: Recovery testing, security testing, stress testing performance testing; The art of debugging process debugging approaches. Software re-engineering: Reverse engineering, restructuring, forward engineering.

Unit – 4

Software Reliability and Quality Assurance: Quality concepts, Software quality assurance, SQA activities; Software reviews: cost impact of software defects, defect amplification and removal; formal technical reviews: The review meeting, review reporting and record keeping, review guidelines; Formal approaches to SQA; Statistical software quality assurance; software reliability: Measures of reliability and availability, The ISO 9000 Quality standards, SEI-CMM Capability Maturity Model.

Computer Aided Software Engineering: CASE, building blocks, integrated case environments and architecture, repository.

Text Books:
1. Roger S. Pressman, *Software Engineering – A Practitioner's Approach,* , 1966, MGH.
2. Rajib Mall , *Fundaments of software Engineering,* , PHI

Reference Books:
1. Pankaj Jalote, *An Integrated Approach to Software Engineering* 1991 Narosa.
2. Ian Sommerville , *Software Engineering* , Pearson Edu, 5th edition, 1999, AW.
3. Ali Behforooz and Frederick J. Hudson. *Software Engineering Fundamentals*, Oxford University,

NOTE: Eight questions each of 15 marks are to be set in all by the examiner taking two questions from each unit. Students will be required to attempt five questions in all, selecting at least one question from each unit.

IT-306 N	Computer Networks					
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time
4	--	-	75	25	100	3
Purpose	This course covers the concepts of computer networking and communication.					
CO 1	Introduction to fundamental of networking model.					
CO 2	To study different protocols used for transmitting data.					
CO 3	To explore physical and data link layer of networking model.					
CO 4	To study Network and transport layer of networking model.					

Unit – 1

Introduction: Basics of Computer Networks, need and Evolution of computer networks, description of LAN, MAN, WAN & wireless networks.

Basics terminology of Computer Networks: Bandwidth, physical and logical topologies, media 10 base A, 10base 5, 10 base 5, 10base-T, 100 base FX, 100base LX and wireless.

LAN & WAN devices – Router, Bridge Ethernet switch HUB, Modem SCU/DSU.

OSI Reference Model:

Laying architecture of networks, OSI model, Functions of each layer, Services and Protocols of each Layer.

Unit – 2

TCP/IP: Introduction History of TCP/IP, Layers of TCP/IP, Protocols, Internet Protocol, Transmission control protocol, User Datagram Protocol, IP Addressing, IP address classes, Subnet addressing, Internet control Protocols, ARP, RARP, ICMP, application layer, Domain Name System, Email-SMTP, POP, IMAP, FTP, NNTP, HTTP, SNMP,TELNET, overview of IP version 6.

OSI and TCP/IP model with description of data encapsulation & peer to peer communication, comparison of OSI and wireless.

Unit – 3

Physical Layer: Representation of a bit on physical modem that is in wired network, optical network and wireless network. Encoding/Modulation – TTL, Manchester Encoding, AM, FM and PM. Dispersion, Jitter, Latency and Collision. Different types of media-twisted pair, unshielded twisted pair, coaxial cable, optical Fiber cable and wireless.

Data Link Layer: LLC and MAC sub layer, MAC addressing layer 2 devices, framing error control and flow control. Error detection & correction CRC, block codes parity and checksum, elementary data link protocol, sliding window protocol, channel allocation problem-static and dynamic, Multiple Access protocol- ALOHA, CSMA/CU, Token bus, token ring, FDDI.

Unit – 4

Network Layer: Segmentations and autonomous system path determination, network layer addressing, network layer data gram, IP addressed Classes. Sub netting – Sun network, Subnet Mask, Routing algorithm-optionally principle, Shortest path routing, hierarchical routing, Broadcast routing, Multicast routing, routing for mobile host – tunneling, fragmentation and DHCP, Routing protocol- RIP, IGRP, USPF and EIGRP.

Transport Layer: TCP & UDP. Three way handshaking . ATM AAL layer protocol.

Text Book:
1. Tanenbaum. *"Computer Networks",* PHI

Reference Books:
1. Darlx, *" Computer Network and their protocols",* DLA Labs.
2. Freer, "*Comp. Communication and Networks*", East – West-Press.
3. Halsall Fred, *Data Communications, Computer Networks & open systems* Addison Wesley
4. Fitzgerald Jerry, *Business data communications*,
5. Larry L. Peterson & Bruce S. Davie *Computer Networks – A system approach*, , 2nd Ed TMH.

NOTE: Eight questions each of 15 marks are to be set in all by the examiner taking two questions from each unit.
Students will be required to attempt five questions in all, selecting at least one question from each unit.

IT – 308 N	Introduction to Microcontroller					
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time
4	--	--	75	25	100	3
Purpose	To learn programming of 8051 microcontroller and its interfacing					
CO 1	To study the Architecture of 8051 microcontroller					
CO 2	Familiarization with the instruction / commands of microcontroller					
CO 3	To study timing delays					
CO 4	To learn how various devices can be interfaced with microcontroller					

UNIT-1

Introduction: - Evaluation of Microcontrollers; Classification of Microcontroller; Comparison between Microprocessor and Microcontrollers; Overview of 8051 microcontroller family. Block Diagram, Architecture and pin description of 8051. ; Types of Registers and flags of 8051.

UNIT-2

Introduction to programming of Microcontroller: - 8051 Instruction Format, Addressing modes, Data transfer instructions; Logical operations, Arithmetic operations, looping, jump and call instructions, Programming in C.

UNIT-3

Timer Programming and interrupts :- 8051 timer Programming ;   8051 Serial port programming;   8051 interrupt programming; External memory interfacing.

UNIT-4

Interfacing of microcontroller :- LCD ,   Keyboard interfacing ; A/D , D/A and sensor interfacing;   Microcontroller interfacing with a) Relays b) opto-isolators , c) stepper motor d) DC motor

Text Books
1. Muhammad Ali Mazidi., *"The 8051 Microcontroller And Embedded Systems Using Assembly And C"* , Pearson , 2nd edition
2. Kenneth J. Ayala , *"The 8051 Microcontroller"* .

Reference Books
1. Mackenzie , *"The 8051 Microcontroller" ,* Pearson Education.
2. Ghoshal Subrata *, "8051 Microcontroller: Internals, Programming & Interfacing",* Pearson Education..

Note: The course is introductory in nature. Eight questions each of 15 marks are to be set in all by the examiner taking two questions from each unit. Students will be required to attempt five questions in all, selecting at least one question from each unit.

IT-310 N	Data Warehouse & Data Mining					
Lecture	Tutorial	Practical	Major Test	Minor Test	Total	Time
4	1	-	75	25	100	3
Purpose	This course provides a way to understand the organization and collection of data.					
CO 1	To study basic concept of data warehouse.					
CO 2	To study the techniques of data warehouse.					
CO 3	To understand the basic concept of data mining.					
CO 4	To study data mining rules.					

UNIT-1

Introduction of Data Warehousing: The evolution of Data Warehousing (The Historical Context). The data warehousing –a brief history, today's development environment. Principles of Data Warehousing (Architecture and Design Techniques): Types of data and their uses, conceptual data architecture, design techniques, introduction to the logical architecture. Creating the Data Asset: Business Data Warehouse Design.

UNIT-2

Unlocking the Data Asset for end users (The use of Business Information) : Designing business information warehouse, populating business information warehouse, user access to information, information data in context. Implementing the Warehouse (Managing the project and environment) : Obstacles to implementation, planning your implementation, justifying the warehouse, organizational implications of data Warehousing, the data warehouse in your organization, data warehouse management, looking to the future.

UNIT-3

Introduction of Data Mining: Motivation, importance, data mining, kind of data, functionalities, interesting patterns, classification of data mining system, major issues. Data warehouse and OLAP technology for data mining : data warehouse, operational database systems and data warehouse architecture, implementation, development of data cube technology, data warehousing to data mining, data warehouse usage.

UNIT-4

Data Preparation: Preprocess data cleaning, data integration and transformation, data reduction, discrimination and concept hierarchy generation. Data Mining Primitives, languages and system architectures, graphical user interfaces. Concept Description: Characterization and comparison data generalization and summarization based characterization, analytical characterization, and analysis of attribute relevance, mining class comparison, and mining descriptive statistical measures in large databases. Mining association rules in large databases, mining single dimensional Boolean association rules from transactional databases, mining multi-dimensional association rules from relational databases and data warehouses, from association to correlation analysis, constraint based association.

Text Books
1. J. Han & M. Kamber, *Data Mining*: *Concepts and Techniques*, Morgan Kaufmann/Elsevier, India, 2001
2. D. Hand, H. Mannila, & P. Smyth. *Principles of Data Mining*, MIT Press, 2001.

Reference books
1. M. Jarke et al. *Fundamentals of Data Warehouses (2nd ed.),* Springer, 2003, ISBN 3-540-42089-4.
2. C. Seidman, *Data Mining with Microsoft SQL Server 2000* Technical Reference Microsoft Press, ISBN 0-7356-1271-4

NOTE: Eight questions each of 15 marks are to be set in all by the examiner taking two questions from each unit.
Students will be required to attempt five questions in all, selecting at least one question from each unit.

IT-312 N	Software Engineering Lab					
Lecture	Tutorial	Practical	Minor Test	Practical Exam	Total	Time
--	--	2	40	60	100	3
Purpose	To familiarize the students with the concept of designing the software applications.					
CO 1	To study different software life cycle model.					
CO 2	To study Requirement and designing phase of software development.					
CO 3	To study testing and maintenance phase of software development.					
CO 4	To study quality assurance and reliability of software.					

LIST OF EXPERIMENTS

1. Study and categorize the generic phases of software development and maintenance.

2. Study various software development models.

3. Study various types of feasibility study and steps in doing feasibility study.

4. Study various steps for doing the requirement analysis of any project.

5. Write algorithm and draw flow chart to implement the constructive cost estimation model (COCOMO).

6. Making use of Graphical Design notation, study the concept in developing data flow diagram (DFD) for any selected project.

7. Making use of object oriented design, implement a student & employee record system using the concept of inheritance.

8. Select an appropriate programming language & translate the detailed design made in experiment 7 in appropriate programming language.

9. Develop a complete test strategy for the project selected in exp-8. Document it in a test specification.

10. Apply the debugging process to the project selected in exp-9 in accordance with the result generated from its testing in exp-9.

11. Study various concepts involved in cost / benefit analysis.

12. Draw flow chart and write algorithm for designing an editor.

Note: A student has to perform 10 experiments. At least seven experiments should be performed from the above list. Three experiments may be designed & set by the concerned institution as per the scope of the syllabus.

IT-314 N	Networking Lab					
Lecture	Tutorial	Practical	Minor Test	Practical Exam	Total	Time
--	--	2	40	60	100	3
Purpose	This course covers the concepts of computer networking and communication.					
CO 1	To learn the basic concept and networking model.					
CO 2	To study different protocols used for transmitting data.					
CO 3	To study physical and data link layer of networking model.					
CO 4	To study Network and transport layer of networking model.					

LIST OF EXPERIMENTS

1. Study the physical media of connectivity.

2. Study the pin-structure of cross-over cable.

3. Study the different LAN Technologies.

4. Study the functioning of a Switch.

5. Study the Functioning of a Router.

6. Establishing LAN (Star topology) for your LAB using Hubs (18 ports, 16 ports).

7. Study and install the media converting using optical fiber.

8. Install and configure the LAN card.

9. Install and configure window 200 Server.

10. Study and implement the virtual network.

Note: A student has to perform 10 experiments. At least seven experiments should be performed from the above list. Three experiments may be designed & set by the concerned institution as per the scope of the syllabus.

IT-316 N	Visual Basic.net Lab					
Lecture	Tutorial	Practical	Minor Test	Practical Exam	Total	Time
--	--	3	40	60	100	3
Purpose	This course covers the concepts of .net programming.					
CO 1	To learn the basic concept of GUI					
CO 2	To study SMTP					
CO 3	To study encryption and decryption					
CO 4	To study how to create drawing application in VB.Net					

LIST OF EXPERIMENTS

1. Create a calculator that can be used for adding, subtracting, multiplication and division.

2. Write an application to use WMI to retrieve information about your PC.

3. Write an application to create a File and Folder browser.

4. Write a program in VB.NET to send an email via SMTP.

5. Write a program to create a MDI web browser.

6. Write an application to access registry in VB.NET.

7. Write a program to retrieve a web page source from the Internet.

8. Create a slot machine game using standard controls and random number generator.

9. Write a program to create a word processor.

10. Write a program for encryption and decryption.

11. Write an application to capture screen.

12. Create a drawing application in VB.NET.

13. Write an application in VB.NET to play MP#3 files.

Note: A student has to perform 10 experiments. At least seven experiments should be performed from the above list. Three experiments may be designed & set by the concerned institution as per the scope of the syllabus.

IT-318 N	Microcontroller Lab					
Lecture	**Tutorial**	**Practical**	**Minor Test**	**Practical Exam**	**Total**	**Time**
--	--	2	40	60	100	3
Purpose	To train the student on how to use Microcontroller.					
CO 1	To introduce the student to Microcontroller programming					
CO 2	To control LCD module.					
CO 3	Use of microcontroller in controlling stepper motor					
CO 4	Practical approach in interfacing of microcontrollers with different devices.					

LIST OF EXPERIMENTS

1. Introduction to microcontroller trainer and interfacing modules.

2. To display the digital output of ADC on 16*2 LCD Module.

3. To display character 'A' on 8*8 LED Matrix.

4. To display the data and time on LCD Module

5. To interface the seven segment display with microcontroller 8051.

6. To create a series of moving lights using 8051 on LEDs.

7. To interface the stepper motor with microcontroller.

8. To switch on and off relay by using keys.

9. To interface the DC motor using H-Bridge.

10. To interface a keypad with microcontroller.

Note: A student has to perform 10 experiments. At least seven experiments should be performed from the above list. Three experiments may be designed & set by the concerned institution as per the scope of the syllabus.

IT-320 N	Colloquium & Professional Proficiency					
Lecture	**Tutorial**	**Practical**	**Minor Test**	**Practical Exam**	**Total**	**Time**
-	--	2	100	-	100	
Purpose	To enhance holistic view of students so as to improve their employability skills.					
CO 1	To develop inter personal skills and be an effective goal oriented team player.					
CO 2	To develop communication and problem solving skills.					
CO 3	To develop aptitude					
CO 4	To enhance general knowledge of students in various domains of life.					

A practical and activity oriented course with continuous assessment for 100 marks.

The course will comprise of:
a) Class room interaction and activities: Technical Quiz, aptitude tests, extempore speech, general knowledge test etc.
b) Seminars
c) Presentation

The student will submit a course report comprising of credits / results based on the above.