

# VEER NARMAD SOUTH GUJARAT UNIVERSITY

## B.E.- III (Information Technology)

### Semester - V

B.E.III (IT) 5 <sup>th</sup> Semester		Teaching Scheme					Examination Scheme					
							Theory Exam		Practical/Quiz/Viva/T.W. etc.			
Course	Course No.	L Hrs.	T Hrs.	P Hrs.	Duration Hrs.	Marks	University Exam.		Tutorial	Cont. Evaluation	Total Marks	
							Duration Hrs.	Marks				
System Analysis & Design	IT 501 IT	3	0	0	3	100	0	00	0	00	00	
Multimedia Systems	IT 502 IT	3	1	2	3	100	3	30	25	20	75	
Numerical Methods in Engineering	IT 503 IT	3	0	2	3	100	3	30	0	20	50	
Communication Techniques	EC 504 IT	3	0	2	3	100	3	30	0	20	50	
Computer Networks	IT 505 IT	3	1	2	3	100	3	30	25	20	75	
Java Programming	IT 506 IT	3	0	2	3	100	3	30	0	20	50	
<b>TOTAL:</b>		<b>18</b>	<b>2</b>	<b>10</b>	<b>-</b>	<b>600</b>	<b>-</b>	<b>150</b>	<b>50</b>	<b>100</b>	<b>300</b>	
<b>Total Contact Hours: 30</b>							<b>Total Marks: 900</b>					

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BE – III (IT)

Semester - V

## SYSTEM ANALYSIS AND DESIGN IT 501 IT

	Lecture	Tutorial	Practical
Teaching Hours	3	0	0
Examination Scheme Marks	100	00	Cont. Evaluation : 0 Examination : 0

### 1. Information systems development

Overview of systems analysis & Design, role of Systems Analyst, categories of business systems - TPS, MIS, DSS, OAS., ESS, AI Strategic information systems. Systems development strategies - Classical, structured and prototyping.

Reasons for systems project initiation, Project selection and review - committee methods, project requests.

Preliminary investigation - scopes of project, feasibility study, institutional v/s end - user applications.

### 2. Systems requirement specification and analysis.

Requirement determination - process, data used, information produced, schedule, controls, transaction and decision requirements etc. Fact finding techniques - interview, questionnaire, document scanning, observation. Tools for specifications - decision trees, decision tables.

Structured Analysis, physical and logical data flow diagrams, process charts, data dictionaries.

Application prototyping - rationale, suitability, steps uses. Tools for prototyping - 4GL, report generators, application generators, screen generators, strategies for prototyping.

**Automated tools** - Front-end, Back end, integrated tools, case tools functionalities and benefits.

### 3. System design

Objectives in system design, components to be designed output files, database, input, controls, procedures, codes, program specifications, management of design process.

Output design- needs, types of output, presentation of outputs, printed outputs, input and controls - capture of input data, source documents, coding methods, input validation - batch controls, transaction controls, check digit system, hash totals, data entry forms design

User interface design - purpose, characteristics, actions to be incorporated, navigation, message display. Dialogue design.

File design storage media selection, Types of files by purpose, file organization and access methods. Backup and recovery design database design entity relationship

Data communication design - Choice of communication channels control device and protocols, Design of LAN systems, Client / Server strategies.

#### **4. System Implementation**

Program development and testing. Tools for document HIPO structured flow charts, warnier / orr diagrams. Quality assurance - testing verification and validation testing strategies, creation /conversion of master files. Loading the database, Preparation of system documentation.

User Training, conversion from old system to new system, Post implementation review.

System development management - Estimation of development time, team management.

Managing change relationships. Stress and communication. Elements of change management.

Hardware/software selection, selection criteria, benchmarking, purchase/lease/rent options. Evaluation of make or buy software options.

#### **5. Ethical and social Impact of Information Systems.**

#### **6. Standards , patents , Copyrights, IT laws.**

#### **References:**

- (1) Analysis and design of information systems, James Senn McGraw - Hill 1998
- (2) System analysis and design, Elias Awad, Galgotia, 1997
- (3) Analysis and design of information systems, V Rajaraman, Prentice-Hall India, 1991
- (4) Systems analysis and design methods, Whitten, Bentley and Barlow, Galgotia, 1995
- (5) Modern systems analysis & design , Jeffrey A. Hoffer, Joey F. George, Pearson Education , India.

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Semester - V

## MULTIMEDIA SYSTEMS: IT 502 IT

	Lecture	Tutorial	Practical
Teaching Hours	3	1	2
Examination Scheme	100	25	Cont. Evaluation : 20
Marks			Examination : 30

### (A) THEORY

(1) **Introductory concepts** : Coordinate representation, Pixel, Raster Scan & Random Scan methods, Video Memory, dual port memory; Color CRT Raster Scan Basics, Video Basics, Interactive Devices, Graphics Input and Output Devices : Mouse, Track-ball, Light Pen, Digitizer, Thumb-wheel. Raster Scan Graphics : Line Drawing Algorithms : Simple, DDA, Bresenham's Line Drawing algorithm, Integer & General Bresenham's Line Drawing Algorithm; Basic Graphics Primitives.

(2) **Circle & Ellipse**: Conventional methods & bresenham's Algorithm. Polygon : Real time Scan Conversion & Run length encoding; Representation of polygon; Conventional methods for drawing polygons; Scanline algorithm; Edge List algorithm, Edge fill algorithm, Frence fill algorithm, Edge flag algorithm, Seed Fill algorithms; Scan Line Seed Fill algorithms.

(3) **Transformations**: Different Operations: Scaling, Rotation, Translation; Combined Transformations: Solid Body transformations, Translation & Homogeneous coordinates; 2-D transformation matrices for above operations.

(4) **3-D Graphics**: 3-D representation, 3-D Transformations: Scaling, Shearing Rotation, Reflection, Translation; Multiple Transformations; Projections: perspective, parallel and orthographics projection, Axonometric, Oblique projections; Perspective Tranformations. Techniques for generating perspective views; 3-D transformation matrices for different transformations.

(5) **Clipping**: 2-D Clipping, Sultherland-Cohen subdivision Line Clipping algorithm, Mid-point subdivision algorithms, 3-D Clipping, 3-D Mid-point subdivision algorithm; Polygon Clipping, Sutherland-Hodgeman algorithm; Character Clipping.

(6) **Audio**: Uses of audio in computer applications, basic concepts, capture, digital representation of sound and processing music speech file formats for sound streaming.

(7) **Video/ Image** : Analog and Digital Video/Image, video capture and processing color models, color model transformations, color video and its formats, streaming.

(8) **Advanced Topics**: Color; additive and Subtractive picture representation, Shading, Rendering, Shadows, Texture & Ray Tracing, Fractals, Half-toning, Antialiasing.

(9) **Applications:** HTML Web-page Design & Implementation; Introduction to VRML.

(B) **PRACTICALS:**

Based upon the syllabus prescribed above.

(C) **TUTORIAL ASSIGNMENTS:**

Based upon the syllabus prescribed above.

(D) **REFERENCES :**

- (1) Roy A Plastock, Gordon Kalley, Computer Graphics, McGraw Hill
- (2) Computer Graphics by Donald Hearn & M. Pauline Baker, PHI Second Edition, fifth Printing 1995.
- (3) John I. Koegel Buford, 'Multimedia System' ACM press 2000
- (4) J.D. Foley, A Van Dam, 'Fundamental of Interactive Computer Graphics' Addison Wesley year, addition.
- (5) Ralf Staimnetz, Karl Nahrstedrm, multimedia :Computing, communications, and applications, PEA
- (6) Computer Graphics - A Programming approach by Steven Harrington, Mgh Second International Edition 1994.
- (7) Principles of Interactive Compouter Graphics by William M. Newman & Robert F. Sproull, MGH Interl Ed. 1993.
- (8) Procedural Elements for Compouter Graphics by David F Rogers, McGraw-hill International Ed, 1985 reprint.

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# VEER NARMAD SOUTH GUJARAT UNIVERSITY

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## NUMERICAL METHODS IN ENGINEERING: IT 503 IT

	Lecture	Tutorial	Practical
Teaching Hours	3	0	2
Examination Scheme Marks	100	00	Cont. Evaluation: 20 Examination: 30

### (A) THEORY

(1) **Error Analysis And Solution Of Non Linear Equations:** Mathematical background, Approximations and errors, significant figures, accuracy and precision; round off and truncation errors; Error propagation, Taylor's series.

(2) **Roots of equations:** Mathematical background, Bisection method; Method of false position; Newton-Raphson method; Secant method; Roots of polynomials.

(3) **Interpolation And Extrapolation:** Newton-Gregory formula; Lagrange interpolation formula; Interpolation through central differences; Formulation of polynomials; Cubic spline interpolation; Interpolation in two or more dimensions.

(4) **Numerical Integration And Differentiation:** Mathematical background, Classical integration formula for equally spaced abscissa; Trapezoidal formula for a single interval; Solution of linear systems; Numerical derivatives

(5) **Matrices:** Gauss Jordan elimination; Row vs. column elimination strategies; LU decomposition; Matrix inversion; Determinant of a matrix; Complex system of equations; Singular value decomposition; Vander monde matrices and toeplitz matrices, Gauss siedel and Jacobin's method

(6) **Numerical Solution Of Ordinary And Partial Differential Equation:** Picards method, Range-Kutta method for ordinary differential equations; Initial value and boundary value problems; Eulers method.

### (B) PRACTICALS ASSIGNMENT:

Based up on the theory course prescribed above.

### (C) REFERENCES:

- (1) SASTRY S.S. : Introductory Methods of Numerical Analysis, Prentice-Hall India, and Edition 1994.
- (2) GOTTFRIED: Programming with C, Tata McGraw-Hill, Edition 1991, Reprint 1996.
- (3) PRESS, TEUKOLSKY, VELLERLING AND FLANNERY : Numerical Recipes in C, The Art of Scientific Computing Cambridge University Press first Indian Edition 1993.

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# VEER NARMAD SOUTH GUJARAT UNIVERSITY

BE – III (IT)

Semester - V

## COMMUNICATION TECHNIQUES: EC 504 IT

	Lecture	Tutorial	Practical
Teaching Hours	3	0	2
Examination Scheme Marks	100	00	Cont. Evaluation: 20 Examination: 30

### (A) THEORY

#### (1) Fourier Analysis / Series & Transform:

Overview of Aperiodic & Periodic Signals, Analog signals, Frequency Spectrum & Bandwidth. Digital Signals: Amplitude, Period & Phase, Decomposition of a digital signal, Medium Bandwidth & Data Rate: Channel Capacity, Use of Analog Signals to transmit digital data, line coding Techniques.

#### (2) Encoding

Analog to Analog Encoding: Amplitude Modulation (AM), Frequency Modulation (FM), Phase Modulation (PM). Analog to Digital Encoding: Pulse Amplitude Modulation (PAM), Pulse Code Modulation (PCM) (A – LAW, U LAW), Sampling Rate. Digital to Digital Encoding: Unipolar, Polar, Bipolar; Digital to Analog Encoding: Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK), Phase Shift Keying (PSK), DPSK, Quadrature Amplitude Modulation (QAM). Bit/Baud Comparison.

#### (3) Multiplexing

Frequency – Division Multiplexing (FDM), Time Division Multiplexing (TDM), Inverse Multiplexing. (Stress on E1 Systems); Multiplexing Application: Telephone System Common Carrier Services & Hierarchies, Analog Services, Digital Services.

#### (4) Transmission of Digital Data: Interfaces & Modems.

Digital Data Transmission: Parallel Transmission, Serial Transmission, Centronics Parallel Interface. DTE-DCE Interface: Data Terminal Equipment (DTE), Data Circuit-Terminating Equipment (DCE), Standards, EIA-232 Interface (RS232); Other Interface Standards: EIA-449 (RS422 & RS 423), EIA-530, X.21; Modems: Transmission Rate, Modem Standards. Typical AT Commands & Registers.

#### (5) Transmission Media:

Guided Media: Twisted Pair Cable, Coaxial Cable, Optical Fiber; Unguided Media Radio Frequency Allocation, Propagation of Radio Waves, Terrestrial Microwave, Satellite Communication, Cellular Telephony, Performance.

### (B) PRACTICALS ASSIGNMENT:

Based up on the theory course prescribed above.

(C) **REFERENCES :**

- (1) Principles of Communication System by Taub Shilling (TMH).
- (2) Principles of Communication by Haykin , WIE
- (3) Digital Communication : Fundamentals and Applications by Bernard Sklar  
(Pearson)
- (4) Analog and Digital Communication by Leon Couch (Pearson)
- (5) Introduction to Data Communication and Networking by Behrouz Forouzan

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## COMPUTER NETWORKS: IT 505 IT

	Lecture	Tutorial	Practical
Teaching Hours	3	1	2
Examination Scheme Marks	100	25	Cont. Evaluation: 20 Examination : 30

### (A) THEORY

(1) **The OSI Model:** The Model – Layered Architecture: Functions Of the Layers: Physical Layer, Data Link Layer, Network Layer, Transport Layer, Session Layer, Presentation Layer, Application Layer & Summary of Layer Functions.

(2) **Data Link Layer:** Line Discipline - ENQ 1 ASK., Flow Control - Stop and wait, Sliding Window. Error Control - Automatic Repeat Request (ARQ), Stop and wait ARQ, Sliding Window ARQ. Asynchronous Protocols - XMODEM, YMODEM, ZMODEM, BLAST, Kermit; Synchronous Protocols: Character Oriented Protocols - Binary Synchronous Communication ( BSC ), BSC Frames, Data Transparency.; Bit Oriented Protocols- HLDC , Frames, link Access Procedures.

**Error Detection & Correction:** Single Bit Error, Multiple-Bit Error, Burst Error. Detection: Redundancy, Vertical Redundancy Check (VRC), Longitudinal Redundancy Check (LRC), Cyclic Redundancy Check (CRC), Checksum; Error Correction: Single Bit Error Correction, Hamming Code, Multiple-Bit Error Correction.

(3) **Local Area Networks:** MAC Methods, Pure ALOHA, Slotted ALOHA, CSMA, CSAM/CD, IEEE 802.1, LLC 309, MAC 309, and Protocol Data Unit (PDU), IEEE 802.3, Ethernet-Access Method: CSMA/CD, Addressing, Electrical Specification, Frame Format, Implementation. Comparison Of Ethernet, Token Bus & Token Ring, and Switched LAN, FAST Ethernet, GIGABIT Ethernet, and FDDI-Access Method: Token Passing, Addressing, Electrical Specification, Frame Formats, and Implementation: Physical Medium Development (PMD) Layer. Comparison.

#### (4) **Metropolitan Area Networks**

IEEE 802.6 - Access method: Dual Bus, Distributed Queues, Ring Configuration, Operation: DQDB Layers, Implementation. - SMDS - Connection and Access, Summary.

#### (5) **Network Layer**

Services offered to Transport Layer Routing Algorithms - Non Adaptive ( Shortest Path Flooding , Flow Based ) , Adaptive ( Distance Vector , Link State ) ;Congestion Control Prevention Polices , Congestion Control Algorithms ( Leaky Bucket Algorithm ) ; Firewall.

**Switching** : Circuit Switching - Space Division Switched, Time Division Switches, Space - and Time - Division Switching combinations. ; Packet Switching - Datagram Approach , Virtual Circuit Approach. Message Switching. ; Network Layer - Connection Oriented & Connectionless Services.

**(6) Transport Layer**

Duties of The Transport Layer - End to End Delivery , Addressing , Reliable Delivery, Flow Control , Multiplexing. ; Connection - Connection Establishment , Connection Termination .,The OSI Transport Protocol - Transport Classes , Transport Protocol Data Unit ( TPDU ), Connection - Oriented and Connectionless Services; TCP/IP - Overview of TCP/IP – TCP/IP and the Internet, TCP/IP and OSI , Encapsulation. ;Network Layer - Internetwork Protocol (IP), Other Protocols in the Network Layer. Transport Layer - User Datagram Protocol (UDP), Transmission Control Protocol (TCP).

**(7) Application Layer :Introduction, Protocols**

**(8) Integrated Services Digital Network ( ISDN )**

Services - Bearer Services, TeleServices , Supplementary Services. ;History - Voice Communication over analog Networks, Voice and Data Communication over Analog networks, Analog and Digital Services to Subscribers., Integrated Digital Network (ISDN), Integrated Services Digital Network (ISDN ) ;Subscriber Access to the ISDN- B Channels, D Channels , H Channels, User Interfaces, Functional Grouping, Reference Points. ;The ISDN Layers - Physical Layer , Data Link Layer , Network Layer. ; BroadBand ISDN- Services.

**(9) Other Advanced Topics: X.25, ATM, SONET/SDH, VOIP**

**(B) PRACTICAL AND TERM WORK**

The Practical and Term work will be based on the topics covered in the syllabus. Minimum 10 experiments should be carried out.

**(C) TUTORIAL ASSIGNMENTS:**

Based upon the syllabus prescribed above

**(D) REFERENCE BOOKS:**

- (1) Computer Networks by A.S. Tanenbaum.
- (2) Introduction to Data Communication and Networking by Behrouz Forouzan
- (3) Electronics Communication - By Roody Coolan

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# VEER NARMAD SOUTH GUJARAT UNIVERSITY

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## JAVA PROGRAMMING : IT 506 IT

	Lecture	Tutorial	Practical
Teaching Hours	3	0	2
Examination Scheme Marks	100	00	Cont. Evaluation: 20 Examination : 30

(A) **THEORY**

(1) **Introduction:** The JAVA Architecture – How Java works, java features; Introduction to OOP.

(2) **Fundamental Programming Structures:** Data Types; Comments; Assignment & Initialization; Operators and Expressions; Strings; Scope rules; java's inner classes; java's data type and method modifiers; Flow Control Statements; Class Methods; Arrays

(3) **Inheritance:** Casting; abstract class; protected access; Object: The Cosmic Super Class; The Class; Reflection; Using Java Interfaces.

(4) **Exception Handling:** Basic Model; Use & Hierarchy of Exception Handling; Exception Handling Constructs; Methods available to exceptions: the Throw statements and throw clause; creating your own exception classes.

(5) **Threads and Multithreading:** Thread Basics; Overview of Multithreading.

(6) **Event Handling:** Event Driven Programming; Basics of event handling; The AWT event hierarchy; Semantic and low level events in the AWT; Individual Events; Multicasting; Advanced event handling.

(7) **Applets:** Applet Basics; The Applet HTML Tags and attributes; Pop-up windows in Applets; Multimedia; The Applet context.

(8) **Graphics Programming**

(9) **Streams and Files**

(10) **Client Server Programming using JAVA**

(B) **PRACTICAL**

The Practical and term work will be based on the topics covered in the syllabus. Minimum 12 experiments should be carried out

(C) **REFERENCE BOOKS:**

(1) The Complete Reference Java 2, 4<sup>th</sup> Ed., Herbert Schild, TMH

(2) Teach yourself Java , -Jeseph O'Neil(edited by Herb Schildt), TMH

(3) Core Java, Volume 1 - Fundamentals , Cay S Horstmann & Gary Cornell, Prentice Hall.