

VEER NARMAD SOUTH GUJARAT UNIVERSITY

**FACULTY OF TECHNOLOGY INCLUDING ENGINEERING
BOARD OF STUDIES IN INFORMATION TECHNOLOGY**

**Proposed Teaching and Examination Scheme and Detailed Syllabus
For
BE-III (INFORMATION TECHNOLOGY)**

**(As decided in the meeting of the Board of Studies in Information
Technology)
April 17,2003**

VEER NARMAD SOUTH GUJARAT UNIVERSITY

B.E.- III (Information Technology)

Semester - V

B.E.III (IT) 5 th Semester		Teaching Scheme			Examination Scheme							
					Theory Exam		Practical/Quiz/Viva/T.W. etc.					
Course	Course No.	L Hrs.	T Hrs.	P Hrs.	University Exam.		University Exam.		Tutorial	Cont. Evaluation	Total Marks	
					Durati on Hrs.	Marks	Durati on 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	
TOTAL:		18	2	10	-	600	-	150	50	100	300	
Total Contact Hours: 30					Total Marks: 900							

VEER NARMAD SOUTH GUJARAT UNIVERSITY

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.

VEER NARMAD SOUTH GUJARAT UNIVERSITY

BE – III (IT)

Semester - V

MULTIMEDIA SYSTEMS: IT 502 IT

	Lecture	Tutorial	Practical
Teaching Hours	3	1	2
Examination Scheme Marks	100	25	Cont. Evaluation : 20 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 & brsenham'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, paralll 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-Hodgman 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, Gorden 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.

VEER NARMAD SOUTH GUJARAT UNIVERSITY

BE – III (IT)

Semester – V

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, Error, Approximations and errors, significant figures, accuracy and precision; round off and truncation errors;

(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

(6) **Numerical Solution Of Ordinary And Partial Differential Equation:** Taylor's series; Picards method, Range-Kutta method for ordinary differential equations; Initial value and boundary value problems; Gauss-Seidel and Jacobi's method for partial differential equations.

(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.

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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BE – III (IT)

Semester - V

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, CSMA/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

VEER NARMAD SOUTH GUJARAT UNIVERSITY

BE – III (IT)

Semester - V

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, 4th Ed., Herbert Schild, TMH

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

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

VEER NARMAD SOUTH GUJARAT UNIVERSITY

B.E.- III (Information Technology)

Semester - VI

B.E.III (IT) 6 th Semester		Teaching Scheme			Examination Scheme						
					Theory Exam		Practical/Quiz/Viva/T.W. etc.				
		University Exam.		University Exam.			Tutori al	Cont. Evalu ation	Total Marks		
Course	Course No.	L Hrs.	T Hrs.	P Hrs.	Durati on Hrs.	Marks				Durati on Hrs.	Marks
Computer Architecture & Peripherals	IT 601 IT	3	1	0	3	100	0	0	25	0	25
Microprocessors	IT 602 IT	3	1	2	3	100	3	30	25	20	75
Automata & Formal Language	ECC 603 CO/IT	3	1	2	3	100	3	30	25	20	75
Language Processor	ECC 604 CO/IT	3	0	2	3	100	3	30	0	20	50
Simulation & Modelling	IT 605 IT	3	1	2	3	100	3	30	25	20	75
Elements of information Theory	IT 606 IT	3	0	0	3	100	0	0	0	0	0
TOTAL:		18	4	8	-	600	-	120	100	80	300
Total Contact Hours: 30						Total Marks: 900					

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BE – III (IT)

Semester - VI

COMPUTER ARCHITECTURE AND PERIPHERALS: IT 601 IT

	Lecture	Tutorial	Practical
Teaching Hours	3	1	0
Examination Scheme Marks	100	25	Cont. Evaluation : 00 Examination : 00

(A) THEORY

- (1) Principles of Computer Design: Software/Hardware interaction, Cost/Benefit, Concept of layers in architecture design
- (2) Basic computer organization and design : Instruction codes common bus system, Instructions, Instruction cycle, Memory reference instructions, Input-Output and interrupt, Design of basic computer, Design of accumulator logic
- (3) Computer Arithmetic : Binary arithmetic, Add, Subtract , Multiply, Divide, Algorithms and implementations, Carry look ahead and fast adders
- (4) CPU Design: Choice of Instruction set, Control structure- Hardwired and Microprogrammed control
- (5) RISC V/s CISC, Pipelining in CPU Design, Superscalar machines
- (6) Memory Hierarchy Design: Caches, Main Memory, Internal Memory, Virtual Memory, Architectural aids in implementing these.
- (7) I/O Modes and I/O Performance Measures: Programmed, Interrupt, DMA Channel, I/O Processor Buses Connecting I/O Devices to CPU/ Memory. Interaction with operating system, Serial/Parallel Interfaces
- (8) Multiprocessors
- (9) Parallel & Distributed Computers
- (10) Intefacing typical PC Peripherals: Interfacing Floppy disk, Hard disk Controllers: Read / Write Logic circuits, Commands & Programming. Data Storage formats.Printer Interfacing, PC - Keyboard Interfacing, CRT Terminals, CRT Controller – Intel 8275, Motorola 6845. Display Adapters - MDA, CGA, EGA and VGA, SVGA. Other Input & Output: OCR, MICR, Bar Code Reader, Voice Input & Output, Sound card & Sampling
- (11) Architecture of 80186, 80286, 80386, 80486, Pentium, Pentium Pro Typical Memory Management unit hardware & operations. Protected Virtual Mode

(12) Bus Standards: Study of the PC, PC - AT, ISA, EISA, IEEE -488 Bus, IDE, EIDE, SCSI, VESA, PCI, PC Card (PC MCIA) Bus.

(B) TUROTIAL ASSIGNMENTS:

Based upon the syllabus prescribed above.

(C) REFERENCE BOOKS

- (1) Computer system architecture by Morris Mano(PHI Edition)
- (2) IBM PC and clones by B Govindarajalu (TMH)
- (3) Computer architecture by Patterson Hennessy
- (4) Computer organization and design by pal Chaudhary
- (5) Perspective in computer architecture by P. Vs. Rad
- (6) Digital computer design Principles by M. R. Bhujade
- (7) Computer peripherals by Cook and White (Edward Arnold)
- (8) Berry B. Brey - The Intel Microprocessor 8086/88, 80186/188, 808286, 80386, 80486, Pentium and Pentium PRO Processor, PHI Edition

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BE – III (IT)

Semester - VI

MICROPROCESSOR TECHNIQUES: IT 602 IT

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

(A) THEORY

- (1) **Brief overview of 8085 Microprocessor architecture and its operation:** Address, Data and control Buses, Pin functions, Demultiplexing of Buses, Introduction to Interfacing of Memory and Input/Output Devices.
- (2) **Instruction & timing:** generation of Control Signals, Instruction cycle, Machine Cycles, T-States, Instruction Classification and Format, Instruction timing and operation status, Introduction to 8085 instruction set; Data transfer instruction, Arithmetic and logical operations.
- (3) **Brief overview of assembly Language Programming:** Writing, Assembling & Executing a Program, Debugging the programs, Decision Making, Looping, Stack & Subroutines, Developing counters and Time Delay Routines, Code Conversion, BCD Arithmetic and 16-Bit data Operations
- (4) **Interrupt Management:** Intel 8085 Interrupts Different types of interrupts, Interrupt Service Routines, Enabling and disabling Interrupts, Interrupt Vectors, Typical Interrupt Acknowledgement and Response.
- (5) **Interfacing Concepts, Ports, Interfacing of I/O Devices** **General Purpose Programmable Peripheral Devices :** Basics in Programmable I/Os, Intel 8255 Programmable Peripheral Interface, Intel 8253 Programmable Interval Timer; Interfacing, Initialization. Programming typical Applications of all the Devices. **Special purpose Programmable Peripheral Devices :** Interfacing Intel 8279 Programmable Keyboard / Display; Intel 8259 Programmable Interrupt Controller, modes; Intel 8257 DMA Controller, modes; Interfacing, Initialization, Programming typical application of all the devices.
- (6) **Serial Data Communication:** Serial I/O, Software Controlled Asynchronous Serial I/O, Hardware Controlled Serial I/O; Synchronous Serial Communication; Intel 8250 UART & Intel 8251 USART interfacing, initialization, programming application.
- (7) **Introduction to 16-bit microprocessors:** Intel 8086 architecture, Internal Operation, Addressing Modes, Intel 8086/8088 Configurations-Minimum Mode and Maximum Mode

(8) Overview of Intel 8086 Family assembly Language Programming: Practice with Simple sequence Programs,. Writing & Using Procedures, Macros Use of DOS / BIOS interrupts.

(9) Intel 8086 maximum mode operations: memory banks, multiplexing of buses, clock generation, ready synchronization and reset synchronization using 8284, 8288, bus controller, interfacing of 8284 and 8288 with 8086

(10) Interrupts: Interrupt Vector Table, introduction to software and hardware interrupts.

(D) PRACTICAL WORK:

(1) 8085 instructions based assembly level programming in detail.

(2) Introduction of Assembler and other Development Tools like Loader, Compiler, Locator, debugger,
8086 Programming for simple problems, subroutines, macros and DOS and BIOS interrupts.

(E) TUTORIAL ASSIGNMENTS:

Based upon the syllabus

(F) REFERENCES:

(1) Microprocessor Architecture, Programming, and Application with the 8085 (4th Edition) by Ramesh

S. Gaonkar Pub: Penram international

(2) Douglas V Hall, Microprocessors and Interfacing, McGraw Hill, 2nd Edition, Reprint 1995.

(3) Yu Cheng Liu and Glenn A Gibson , Microcomputer systems - The 8086/8088 Family Architecture, Programming and Design , Prentice Hall of India , Reprint 1997.

(4) Govind Rajalu - IBM PC and its Clones, TMH Publication, 1994.

(5) IBM PC AT Technical Reference Manual.

(6) Berry B. Brey - The Intel Microprocessor 8086/88, 80186/188, 808286, 80386, 80486, Pentium and Pentium PRO Processor, PHI Edition

VEER NARMAD SOUTH GUJARAT UNIVERSITY

BE – III (IT)

Semester - VI

AUTOMATA & FORMAL LANGUAGES : ECC 603 CO/IT

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

(A) **THEORY:**

(1) **Introduction:** Basic : Mathematical objects : Sets, Logic, Functions, Relations, strings, Alphabets, Languages; Graphs & Trees; Mathematical Inductions : Inductive proofs, Principles; Recursive Definitions; Set Notation;.

(2) **Finite Automata & Regular Expressions:** Finite State systems, Regular Languages & Regular Expressions, The Memory required to recognize a Language; Finite Automata; Nondeterministic Finite Automata, Kleen's Theorem; two-way Finite Automata, FA with output.

(3) **Properties of Regular sets:** The Pumping Lemma for Regular sets, closure properties, Decision algorithms, The myhill-nerode Theorem,

(4) **Context Free Grammers:** Definition, Derivation trees & Ambiguity, Motivation & Introduction, Simplification of CFG, Chomsky Normal form, Inherently ambiguous Cfls; The Chomsky Hierarchy : Regular grammars, Unrestricted grammars, Context-sensitive languages, relations between classes of languages.

(5) **Pushdown Automata:** definitions , Deterministic PDA, PDA and CFLs

(6) **Properties of CFLs :** The Pumping Lemma, Closure properties, Decision algorithms.

(7) **Turing Machines:** The TM Model , Church Turing thesis , Computable languages and functions, Techniques for TM construction , Modifications of TM , Tms enumerators , Restricted Tms.

(8) Introduction to Recursive Function theory

(9) **Deterministic Context-Free Languages:** Normal forms, Closure of DCFLs, Predicting machines, Additional Closure properties of DCFLs, Decision Properties, LR (0) grammars.

(10) **Closure properties of Families of languages:** Trios & Full trios, Generalized Sequential Machine mappings, Abstract families of languages, Independence of the AFL operations.

(11) Highlights of Other Important Languages Classes: Auxiliary Pushdown Automata, Stack automata, Indexed languages, Developmental systems.

(B) PRACTICALS:

Based up on the syllabus prescribed above.

(C) TUTORIAL ASSIGNMENTS:

Based up on the syllabus prescribed above.

(D) REFERENCES:

- (1) J E Hopcroft & J D Ullman - Introduction to Automata Theory, Languages & Computations, 1987 ed, 1995 reprint, Addison - Wesley Pub, narosa reprint.
- (2) John C Martin - Introduction to languages & the theory, languages & Computation, McGraw-Hill International ed, 1997.
- (3) Deniel A Cohen- Introduction to Computer Theory, John-Willey & Sons, 1990 Ed, Reprint 1994.

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BE – III (IT)

Semester - VI

LANGUAGE PROCESSORS: ECC 604 CO/IT

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

(A) **THEORY:**

(1) Introduction to System software, utility Software, systems programming.

(2) **Assemblers:** Introduction, Cross assembler , Micro Assembler , Meta Assemble, Single pass Assemblers , Two Pass Assembler , Design of Operation code table , Symbol table , Literal table.

(3) **Macro processor:** Introduction of Macros , macro processor design , Forward reference , Backward reference , positional parameters , keyword parameters , conditional assembly , Macro calls within Macros , Implementation of macros within Assembler . Designing Macro name table , Macro Definition table , Kew word parameter table , Actual parameter table , Expansion time variable storage etc.

(4) **Compilers:** Introduction , Analysis of the programme , Lexical Analysis , syntzx analysis , phase of a compiler , Scanning , Parsing , Type checking and conversion , Storage organization and allocation strategies , Symbol tables , parameter passing , local and nonlocal variables , Intermediate code generation of declaration , Assignment statement. Boolean Expression, Conditional Statement etc ., Code generation , Code optimization , Compiler writing tools e.g. (Lex , Yacc) , Incremental Compiler , Interpreter.

(5) **Loader and Linkage Editor:** Absolute Loader, Relocation - Relocating loader, Dynamic loader, Bootstrap loader, Linking loader, Program relocatability, design of Absolute Loader, Design of direct - linking editor, other loader scheme e.g. (Binders , Linking Loaders , Overlays , Dynamic Binders etc.)

(B) **PRACTICALS:**

Based up on the syllabus prescribed above.

(C) **REFERENCES :**

(1) D.M. Dhamdhare : systems Programming & Operating System , TMH Edition , 2 nd edition , 1996.

(2) John J . Donovan : Systems Programming , McGraw-Hill International Edition , 1993 Reprint.

(3) Houlb : Compiler Design in C , PHI , EEE , 1995.

VEER NARMAD SOUTH GUJARAT UNIVERSITY

BE – III (IT)

Semester - VI

SIMULATION AND MODELLING: IT 605 IT

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

(A) THEORY

(1) **Introduction:** Objective of modelling, System Theory: State Variables, System and its model, Theory of models, basic nature of simulation, motivation, examples.

Analytic Simulation, Measurement. Analytic Modelling Probability Theory, Random Variables, Poisson process, Markov

Simulation Modelling, Continuous and Discrete Event Simulation, Monte Carlo Simulation, Pseudo Random Number Generation, Non-Uniform Random Number generation.

(2) **Simulation of queuing systems:** Basic of queuing theory; single-server, two-server and more general queues, Little's law, M/M/I, M/M/C queing models, M/G/I (Impact variation in service times)

Petrinets and Stochastic Petrinets(sp_n), Gpss, Gasp Iv, Csim Estimation of simulation, Output Matrix Confidence Intervals, Regenerative Simulation, Method of Banch Means

(3) **Simulation of PERT network:** Network model of a project; analysis of activity duration, example, resource allocation and cost considerations.

(4) **Inventory control & forecasting:** Basic concepts, simulation of Possion and Erlang and cost considerations.

(5) Case Studies, Application to operating systems, databases, network architecture.

(6) Furthur Reading: G/G/I , G/G/C Correlation Queues, Queuing Networks, Mean Value Analysis,Gtpn, Espn.

(B) PRACTICAL AND TERM WORK:

Practicals 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) Narsingh Deo; System simulation with digital computer;Prentice Hall International.
- (2) R L Woods & K L Lawrence, Modeling & simulation of Dynamic Systems, Prentice Hall
- (3) A M Law & W D Kelton, Simulation Modelling & Analysis, McGraw-hill International Edition
- (4) M.K.Molloy, Fundamentals of Performance Modelling, McMillan, 1984
- (5) R.K.Nelson, Probability, Stochastic Processing, Queuing Theory, Springer-Verlag
- (6) K.S.Trivedi, Probability and Statistics , Reliability Queueing and Computer Science Applications PHI.
- (7) P.A. Fishwick, Getting Started with Simulation Programming in C and C++

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BE – III (IT)

Semester - VI

ELEMENTS OF INFORMATION THEORY: IT 606 IT

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

(A) THEORY

(1) **Review of spectral analysis:** Fourier series; response of a linear system; normalized power and power spectral density; effect of transfer function on power spectral density. The Fourier transforms. Convolution.

(2) **Random process and noise:** Review of probability concepts; a communications examples, signal determination with noise described by distribution function, random processes, autocorrelation and power spectral density, power spectral density of digital data. Sources of external and internal noise.

(3) **Analog to digital conversation:** Noisy communication channels. The sampling theorem, its effect on low-pass signal

(4) **The concept of information:** Discrete messages; qualification of the concepts of the information. Average information, entropy, information rate, Coding to increase average information per bit. Shanon's theorem, channels capacity; capacity of Gaussin channel, bandwidth-S/N tradeoff.

(5) **Nature of multimedia information:** Audio signals, video signals-analog and digital, data compression, entropy encoding, source encoding, the JPEG and MPEG standards.

(6) **Security of Information:** Cryptography, basis issue, substitution and transposition ciphers, onetime pads, secret-key and public-key algorithms, authentication, digital signatures, steganography

(B) REFERENCE BOOK:

- (1) H Taub & D L Schilling, Principal of Communication Systems, McGraw-Hill International Edition
- (2) A S Tanenbaum, Computer Networks, Prentice Hall International
- (3) B. P. Lathi, Modern Communication Systems, Addison Wesley.
