GUJARAT UNIVERSITY
B.E. SEM III (INFORMATION TECHNOLOGY)

IT 301 Advanced Mathematics

Subject	Code	Teaching Scheme		Examination Scheme					
		Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
Advanced Mathematics	IT 301	04	-	Sessional	1.5 Hr	50	-	-	150
				University	3 Hr	100			

1. Fourier series :

Periodic functions, Drichlet's conditions, Fourier series, Euler's formula. Fourier expansion of periodic functions with periodic functions with period 2π, Fourier series of even and odd functions. Fourier series of periodic functions with arbitrary periods, Half range Fourier series. Harmonic analysis.

2. Higher Order differential equations :

Linear differential equations of higher order with constant coefficients, Method of variation of parameters, Higher order linear differential equations with variable coefficients (Cauchy's and legendre forms), Series solution, Simultaneous linear differential equations, Models for the real world problems and their solutions.

3. Partial Differential equations :

Formation of partial differential equations, Directly integrable equations, Lagrange's equation, Solutions of special type of non-linear partial differential equations of the first order, Homogeneous linear equations with constant coefficients, Method of separation of variables, solution of one dimensional wave equation, heat equation and Laplace equation.

4. Matrices:

Caley-Hamilton's theorem, Special matrices like Hermitian, Skew-Hermitian and Unitary. Reduction to diagonal form, Quadratic forms.

5. Functions of complex variables :

Reorientation, Analytic function, Cauchy- Riemann equations (Cartesian and polar forms), Harmonic functions, orthogonal property, conformal mappings, some standard conformal transformation. Complex integration, Cauchy's integral theorem and Cauchy's integral formula.

Reference Books :

1. Erwin Kreyszig : Advanced Engineering Mathematics (8^{th} Edition) Wiley Eastern Ltd., New Delhi.
2. Dr. K.R. Kachot : Higher Engineering Mathematics, Vol-II Mahajan Publishers, Ahmedabad.
3. Dr. B.S. Grewal : Higher Engineering Mathematics Khanna Publishers, New Delhi.
4. N.P. Bali, Ashok Saxena & Iyengar : A Text book on Engineering Mathematics Laxmi Publications (P) Ltd., New Delhi.
5. H.K. Dass : Advanced Engineering Mathematics S. Chand & Co. (Pvt.) Ltd., New Delhi.
6. G.V. Kumbhojkar : Engineering Mathematics – Vol. I, II, III, IV Jamnadas & Co. Bombay

GUJARAT UNIVERSITY
B.E. SEM III (INFORMATION TECHNOLOGY)

IT 302 Data & File Structures

Subject	Code	Teaching Scheme		Examination Scheme					
Data & File Structures	IT 302	Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
		04	02	Sessional	1.5 Hr	50	25	25	200
				University	3 Hr	100			

1 Introduction To Data Structures
Types Of Data Structures, Linear & Non Linear Data Structures

2 Linear Data Structures & Their Sequential Storage Representation, Storage Structures For Arrays,
Stack-Definitions & Concepts, Operations On Stacks, Double Stack, Applications Of Stacks-Recursion, Polish Expressions And Their Compilation.
Queue-Representation Of Queue, Operation On Queue, Priority Queues.
Linked List-Linked Linear List-Operation On Linear List Using Singly Linked Storage Structures, Circularly Linked List, Doubly Linked Linear List, Applications Of Linked Linear List-Polynomial Manipulation.

3 Non Linear Data Structures
Trees-Definitions And Concepts, Operations On Binary Trees, Storage Representation And Manipulation Of Binary Trees-Linked & Threaded, Conversion Of General Trees To Binary Trees, Sequential And Other Representations Of Trees, Applications Of Trees-The Manipulation Of Arithmetic Expressions, Multi Linked Structures-Sparse Matrices.
Graphs-Matrix Representation Of Graphs, Breadth First Search, Depth First Search, Spanning Trees.

4 Sorting & Searching
Sorting-Notation And Concepts, Selection Sort, Bubble Sort, Merge Sort, Quick Sort, Radix Sort, Address Calculation Sort, Summary of Sorting.
Searching-**Sequential & Binary Searching, Search Trees-Height Balanced, Weight Balance,**
Hash Table Methods-Introduction, Hashing Functions, Collision-Resolution Techniques.

5 **File Structures**: Concepts of fields, records and files, Sequential, Indexed and Relative/Random File Organisation, Indexing structure for index files, hashing for direct files, Multi-Key file organization and access methods.

Practical and Term work

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

Text Book:

1 An Introdution to Data Structures with Applications
-By Jean-Paul Tremblay & Paul G. Sorenson
Publisher-Tata McGraw Hill.

Reference Books:

1. Data Structures using C & C++
   -By Tenebaum Publisher – Prenctice-Hall International.
2. Data Structures: A Pseudo-code approach with C
   -By Gilberg & Forouzan Publisher-Thomson Learning.
3. Data Structures and Algorithm Analysis in C
   -By Mark Allen Weiss Publisher-Pearson Education
4. Data Structures and Program Design in C
   -By Robert L. Kruse Publisher – Prenctice-Hall International.
5. Data Management and file processing
   -By Mary E.S. Loomis Publisher – Prentice –Hall India

GUJARAT UNIVERSITY
B.E. SEM III (INFORMATION TECHNOLOGY)

IT 303 Database Management Systems

Subject	Code	Teaching Scheme		Examination Scheme					
Database Management Systems	IT 303	Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
		04	02	Sessional	1.5 Hr	50	25	25	200
				University	3 Hr	100			

1 Introductory concepts of DBMS
Introduction, applications, Purpose of data base systems, view of data, database languages, Relational database, database design, Data storage and queringm, transaction management, Database architecture, Database users and DBA

2 Relational Model
Structure of relational databases, Relational algebra – fundamental, additional, Extended relational algebra operation

3 Entity-Relationship model
Basic concepts, Design process, constraints, Design issues, E-R diagrams, weak entity sets, extended e-r features, reduction to E-R database schema

4 Relational Database design
Functional Dependency – definition, trivial and non-trivial FD, closure of FD set, closure of attributes, irreducible set of FD, Normalization – 1Nf, 2NF, 3NF, Decomposition using FD- dependency preservation, BCNF, Multi-valued dependency, 4NF, Join dependency and 5NF

5 Query Processing & Query Optimization
Overview, measures of query cost, selection operation, sorting, join, evaluation of expressions, transformation of relational expressions, estimating statistics of expression results, evaluation plans, materialized views

6 Transactions
Transaction concepts and state, implementation of atomicity and durability, concurrent executions, serializability, recoverability, implementation of isolation, testing for serializability

7 Concurrency Control
Lock base protocol, Deadlock handling, Insert and delete operations

8 Recovery System
Failure classification, Storage structure, recovery and atomicity, log-based recovery, recovery with concurrent transactions, Buffer management, Failure with loss of non-volatile storage

9 SQL Concepts
Basic structure – creation, alteration, defining constraints – Primary key, foreign key, unique, not null, check, IN operator, aggregate functions, Built-in functions –numeric, date, string functions, set operations, sub-queries, correlated sub-queries, join, Exist, Any, All , view

10 PL/SQL Concepts
Cursors, Stored Procedures, Stored Function, Database Triggers

Practical and Term work

The practical and Term work will be based on the topics covered in the syllabus. Minimum 10 to 12 experiments should be carried out both in SQL and PL/SQL

Text Books:

1. Database System Concepts, Abraham Silberschatz, Henry F. Korth & S. Sudarshan, McGraw Hill.
2. An introduction to Database Systems, C J Date, Addition-Wesley.

Reference Books:

1. Understanding SQL by Martin Gruber, BPB
2. SQL- PL/SQL by Ivan bayross
3. Oracle – The complete reference – TMH /oracle press

GUJARAT UNIVERSITY
B.E. SEM III (INFORMATION TECHNOLOGY)

IT 304 Fundamentals of Digital Electronics

Subject	Code	Teaching Scheme		Examination Scheme					
Fundamentals of Digital Electronics	IT 304	Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
		04	02	Sessional	1.5 Hr	50	25	25	200
				University	3 Hr	100			

1. **Binary Systems:** Binary numbers, number base conversions, Octal & hex number systems, complements binary codes, binary storage & registers, binary logic, integrated circuits

2. **Boolean Algebra & Logic Gates:** Basic definitions, Axiomatic definition of boolean algebra, Basic theorems and properties of boolean algebra, Boolean functions, Canonical & standard forms, Digital logic gates and IC's, Digital logic families

3. **Simplification of Boolean functions**: The map method, 2,3 & 4 variable maps, Product of sums simplification, NAND & NOR implementation, Don't care conditions

4. **Combinational Logic:** Introduction, Design procedure, Adders, Subtractors, Code conversion, Analysis procedure, Multilevel NAND, NOR circuits, NOR circuits, Exclusive OR & equivalence functions

5. **Combinational Logic with MSI & LSI:** Introduction, Binary parallel adder, Decimal adder, Magnitude comparator, Decoders, Multiplexers, Read Only Memory, PLA.

6. **Sequential Logic:** Introduction, Flip-Flops, Triggering of flip-flops, Analysis of clocked sequential circuits, State reduction & assignment, Flip-flop excitation tables, design procedures, Design of counters, Design with state equations

7. **Registers, Counters & Memory:** Introduction, Registers, Shift registers, Ripple counters, Synchronous counters, Timing sequences, The memory unit, Random access memories

8. **Digital Integrated circuits:** Introduction, Bipolar transistor characteristic, RTL, DTL, IIL, TTL,ECL, MOS, CMOS logic families.

Practical and Term work

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

Text Book:

1. Digital Logic & Computer Design, M. Morris Mano, Prentice Hall of India.

Reference Books:

1. Digital Components - Bartee
2. Modern Digital Electronics, R. P. Jain, Tata McGraw Hill
3. Digital Computer Fundamentals, Bartee, Tata McGraw Hill
4. Digital Computer Electronics: An introduction to Microcomputers, Malvino, Tata McGraw Hill

GUJARAT UNIVERSITY
B.E. SEM III (INFORMATION TECHNOLOGY)

IT 305 Data Communication Techniques

Subject	Code	Teaching Scheme		Examination Scheme					
Data Communication Techniques	IT 305	Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
		04	02	Sessional	1.5 Hr	50	25	25	200
				University	3 Hr	100			

1 Introduction

Data Communication: Components,
Networks: Distributed Processing, Network Criteria & Applications.
Protocols & Standards: Protocols, Standards,
Standards Organizations: Standards Creation Committees, Forums & Regulatory Agencies.

2 **Basic Concepts**

Line Configuration: Point to Point & Multipoint.
Topology: Mesh, Star, Tree, Bus, Ring, Hybrid Topologies;
Transmission Mode: Simplex, Half-Duplex, Full – Duplex; Categories of Networks: Local Area Network (LAN), Metropolitan Area Network (MAN), Wide Area Network (WAN), Internetworks.

3 **Signals:** analog and digital signal, Aperiodic & Periodic Signals, Simple Analog Signals, time and frequency domains, composite signal, Complex Signals, Frequency Spectrum and Bandwidth. ; Digital Signals: Amplitude, Period And Phase, Decomposition Of A Digital Signal, Medium Bandwidth And Significant Bandwidth, Medium Bandwidth And Data Rate: Channel Capacity, Use Of Analog Signals To Transmit Digital Data.

4 **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), Sampling Rate. Digital To Digital Encoding :Unipolar, Polar , Bipolar ; Digital To Analog Encoding : Aspects Of Digital To Analog Encoding, Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK), Phase Shift Keying (PSK), DPSK , Quadrature Amplitude Modulation (QAM), Bit / Baud Comparison.

5 **Transmission of Digital Data:** Interfaces and Modems.

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

6 **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., Transmission impairment :attenuation, distortion, noise, Performance :throughput, propagation speed, propagation speed, wavelength, Shannon capacity, The mobile telephone System: First generation mobile phones: Analog Voice, Second Generation mobile phones :digital voice, Third generation mobile phones :Digital voice and data, Cable television :Community antenna television, Internet over cable, Spectrum Allocation, Cable Modem, ADSL versus cable

7 **Multiplexing**

Types of Multiplexing

Frequency Division Multiplexing (FDM), Time Division Multiplexing (TDM), Inverse Multiplexing.; Multiplexing Applicatin : Telephone System , Common Carrier Services & Hierarchies, Analog Services , Digital Services, spread spectrum

8 **Error Detection & Correction**

Types of Errors: 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

9 **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.

Practical and Term work

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

Text Book:

Introduction to Data Communication and Networking by Behrouz Forouzan.

Reference Books:

1. Computer Networks Andrew S. Tanenbaum
2. Electronics Communication – By Roody Coolan
3. Data Communication By Schweber W.L

GUJARAT UNIVERSITY
B.E. SEM III (INFORMATION TECHNOLOGY)

IT 306 Software Tools Lab

Subject	Code	Teaching Scheme		Examination Scheme					
Software Tools Lab	IT 306	Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
		-	02	Sessional	-	-	25	25	50
				University	-	-			

Students are expected to learn tools like Visual C++ , Visual Basic, Front page, HTML, Java Script and prepare a small project using them.

GUJARAT UNIVERSITY
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IT 401 Computer Oriented Statistical Methods

Subject	Code	Teaching Scheme		Examination Scheme					
Computer Oriented Statistical Methods	IT 401	Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
		04	02	Sessional	1.5 Hr	50	25	25	200
				University	3 Hr	100			

1. Computer Arithmetic (10%)
Floating Point Representation Of Numbers, Arithmetic Operations With Normalized Floating Point Numbers And Their Consequences, Error In Number Representation - Pitfalls In Computing, Error Propagation In Evaluation.

2. Iterative Methods (20%)
Bisection, False Position, Scant, Newton-Raphson Methods. Successive Approximation Method, Newton Raphson Method For Two Variables, Discussion Of Convergence Solving Polynomial Equations, Budan's Theorem, Barirstow's Method, Graeffe's Root Squaring Method.

3. Interpolation And Approximation (20%)
Polynomial Interpolation, Truncation Error In Interpolation, Difference Tables And Calculus Of Differences, Cubic Splines, Inverse Interpolation, Linear Regression And Nonlinear Regression Using Least Square Approximation, Approximation Of Function By Taylor Series And Chebyshev Polynomials.

4. Numerical Differentiation And Integration (15%)
Differentiation Formulas Based On Polynomial Fit, Pit-Falls In Differentiation Trapezoidal, Simpson's And Gossip Quadrature Formulas.

5. Solution Of Simultaneous Linear Equation And Ordinary Differential Equations (20%)
Refinement Of Solution In Gauss Elimination Method Pivoting, Ill Conditional Equations, Gauss-Seidal And Gauss Jacobi Interative Methods, Taylor Series And Euler Methods, Error Analysis, Runge- Kutta Methods, Predictor-Corrector Methods. Automatic Error Monitoring And Change Of Step Size Stability Of Solution.

6. Statistical Methods (10%)
Frequency Distributions, Data Analysis, Expectations And Moments, Correlation And Regression.

Practical and Term work

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

Text Book :

1 Computer Oriented Numerical Methods
By R. S. Salaria – Khann Prork Publishis Co. (P) Ltd. 1695, New Sarak Delhi – 110 006

Reference Books :

1. Computer Oriented Numerical Methods - By V Rajaraman , Prentice – Hall of India , Delhi
2. Introduction to Numerical Analysis - By S. S. Sastry – PHI , Delhi
3. Numerical Methods for Scientific & Engineering Computation -By M. K . Jain , S.R.K. Lyenger , R. K. Jain Wiley Eastern Ltd.
4. Fortran 77 Prg. Ram Kumar – Tata McGraw-Hill Pub. Co. Ltd.
5. A test book on Computational Methods - By Br. G. T. Kochav – Nirali Prakashan , Pune
6. Numerical Methods in Science & Engineering Prog.- By Dr. B. S. Grawal , Khann Pub, New Delhi
7. Miller & Freund's Probability and Statistics for Engineers – By Richard A Johnson – Pub: Prentice-hall of India
8. Fundamentals of Mathematical Statistics – By S. C. Gupta & V. K. Kapoor , - Pub: Sultan Chand & Sons

GUJARAT UNIVERSITY
B.E. SEM IV (INFORMATION TECHNOLOGY)

IT 402 Object Oriented Concepts & Programming

Subject	Code	Teaching Scheme		Examination Scheme					
Object Oriented Concepts & Programming	IT 402	Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
		04	02	Sessional	1.5 Hr	50	25	25	200
				University	3 Hr	100			

1 **Introduction to Object Oriented modeling and Design**
What is object oriented (OO), Object modeling Concepts, OO methodology, OO themes.

2 **Object Modeling**
Object and Classes: Object modeling concepts in details: links, association, generalization, inheritance, meta data, etc.
A sample Object Model.

3 **Dynamic Modeling**
Dynamic modeling concepts. A sample dynamic model, Relation of object and dynamic model with example.

4 **Functional Modeling**
Functional Modeling Concepts, A sample functional model.

5 **Fundamental of Programming in Java**
Bytecode, JVM, Buzz-wrods, Application and applets, Data Types, Comments, variables, Assignment and initializations, operators, Control Flow, arrays and Strings,Class, Methods

6 **Inheritance , Interfaces & Packages**
Casting, Abstract Class, Protected Access, Object: The Cosmic Super class, The *Class* class, Reflection.

7 **Exceptions** : Try …Catch…Finally, Throw, Throws

8 **Streams & Files :** File and Directories, Byte streams and character streams, Random Access Files.

9 **Applets :** Introduction, Life cycle of applet, Graphics class, using color, text, applet dimensions, applet in a Web page. Using image thread and double buffering.

10 **AWT & Event Handling** :
AWT basic components, Event delegation model, Event classes and listeners, Adapter classes, Inner classes and anonymous inner class.

Practical and Term work

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

Text Books:

1) Teach yourself Java - by Joseph O'neil. (TMH publication)
2) Object Oriented Design by Rumbaugh (Pearson publication)

Reference Books:

1) The Complete Reference, Java^{tm} 2 (Fourth Edition), Herbert Schild (TMH)

GUJARAT UNIVERSITY
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IT 403 Computer Networks

Subject	Code	Teaching Scheme		Examination Scheme					
Computer Networks	IT 403	Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
		04	02	Sessional	1.5 Hr	50	25	25	200
				University	3 Hr	100			

1. **Introduction :**
   Uses of computer network, network hardware, network software, OSI model, TCP/IP model, Comparison of OSI and TCP/IP model, Example network: The internet, X.25, Frame Relay, ATM, Ethernet, wireless LANs: 802.11
2. **The Data Link Layer** :
   Design Issues: framing, error control, flow control; Error detection and correction; Elementary data link protocols: simplex, stop and wait, sliding window protocol, HDLC
3. **The Medium Access Control Sublayer**
   The channel allocation problem, Multiple Access protocols: ALOHA, CSMA, Collision Free Protocols, Limited Contention Protocols, Wavelength Division Multiple Access Protocols, Wireless LAN protocols; Ethernet: Traditional Ethernet, Switched Ethernet, Fast Ethernet, Gigabit Ethernet, IEEE 802.2: LLC Data link layer switching : Bridges, local Internetworking, Spanning tree bridges, Remote Bridge, Repeaters, Hub, Switches ,routers, gateway, Virtual LANs
4. **The network Layer :**
   Design Issues: Store and forward Packet switching, service provided to transport layer, implementation of connection oriented and connection less service. Comparison of virtual circuit and datagram subnets
   Routing algorithms: The Optimality principle, Shortest path routing, flooding, distance vector routing, link state routing hierarchical routing , broadcast routing, multicast routing, routing for mobile host, routing in ad hoc network
   Congestion control algorithms: Principles, prevention policies, congestion control in virtual circuit subnets, congestion control in datagram subnets, load shedding, jitter control
   Quality of service: Requirements, techniques for achieving good quality of service
   Internetworking: How network can be connected, concatenated virtual circuit, connectionless internetworking, tunneling, internet work routing, and fragmentation
   The network layer in the internet: The IP protocol, IP addresses, Internet control protocol, OSPF, BGP, Internet multicasting, mobile IP, IPv6

5. **The transport layer**
   The transport service: Services provided to the upper layers, transport service primitives, socket
   Elements of transport protocols: Addressing, connection establishment, connection release, flow control, multiplexing, crash recovery, The transport protocol: UDP, TCP

6. **The Application layer**
   DNS: The DNS name space, Resource records, name servers,
   Electronic mail: Architecture and services, the user agent, Message formats, message transfer, final delivery,
   World Wide Web: Architectural overview, HTTP

Practical and Term work

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

Text Book:

Computer network by Andrew S. Tanenbaum

Reference Books:

1 Introduction to Data Communication and Networking by Behrouz Forouzan
2 Computer Network by Natalie Olifer, Victor Olifer (Wiley-India edition)
3 Data and computer communication by William Stallings.

GUJARAT UNIVERSITY
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IT 404 Business Information System

Subject	Code	Teaching Scheme		Examination Scheme					
Business Information System	IT 404	Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
		03	02	Sessional	1.5 Hr	50	25	25	200
				University	3 Hr	100			

1 **Business and Management Information**
-Business Organization -Business Work Area-Business Information-Levels of Information-Categories of Information-Quality of Information-Management Information -Management Reports-System Theory-Deterministic and Probabilistic Systems-Closed and Open Systems-Regulation in Systems Open-loop Systems-Data systems and Users-User requirements-User/D.P. staff co-operation-User knowledge and training – Personnel – Steering committees

2 **Computer In Business**
- Development of Data Systems – Data transmission and real time D.P. – Minicomputers – Microcomputers – Software – Networks – Office automation – Future developments – Structure of computer – Multiprocessing – Backing storage – Terminals – Computer configurations – Reliability of computer configurations – Data representation - Minicomputers – Characteristics of minicomputers – Microcomputers – Memory – Processors – Backing storage – Visual display unit (VDU) – Printers – Programming – Operation systems – Software – Large microcomputers – Portable microcomputers – Data communication – Data transmission – Distributed processing – Data switching – Local Area Network(LAN) – Fiber optics – Real time and on line systems – Office automation – Word Processing – Electronic Mail – Videotex – Electronics fund transfer (EFT)

3 **Data Capture and Computer Input / Output**
- Keyboards and Pointing Devices – Optical Character Recognition – Capturing Pictures, Sounds and Video – Storing and Retrieving Data – Paper and Micro graphics – Magnetic Tapes and Disks – Optical Disks – Flash Memory – Screen Outputs – Paper Outputs – Audio Outputs

4 **Computer Files And Databases**
- Business Files – Data Storage Media – Direct Access File Organization – Data Modeling: Documenting Information Architecture – User's View of a Computerized Database – Database Management Systems (DBMS) – Text Database and Hypertext – Evaluating Information Used in Business Processes – Models as Components of Information Systems

5 **Systems Investigation**
- general aspects – Planning the Systems Investigation – User's Information Requirements – Usage and Flow of Data – Current Activities – User Department Staffing – Current System Costs – Entity sets – Fact Finding Methods

6 **Systems Design**
- Design Philosophy – Code Number Systems – Output Subsystem – Logical File Subsystem – Input Subsystem – System Architecture – Security and Audit – Computer Job Scheduling – Costs and Savings of New System – System Documentation

7 **System Implementation**
- D.P. Staff – System Testing – Database Creation – Changeover Procedure – System presentation – System Appraisal and Maintenance – Data Processing Resources

8 **Information System Security and Control**
- Threat of Project Failure – Threat of Accidents and Malfunctions – Threat of Computer Crime – Factors that Increase the Risks - Methods for Minimizing Risks

9 **Computer Application In Sickness and in Health :** computer for Medicine and Sports
- At the doctor's office – as an Aid to Diagnostic – In the laboratory – In the pharmacy – Hospital Information Systems – Integration of Hospital Systems – Micro technology for Disabled – Computers for Health – Computers for Sports Administration

10 **The use of computer in Government , the Military and Politics**
- The White House – The Census Bureau – The Internal Revenue Service – Law Environment – The Postal Services – Military Systems – Social Security Administration – Political Campaigns – conventions - Elections

11 **The Inventory Management (INMANS) System Design**

12 **The Account Payable System (ACPAYS) Design**

13 **The Payroll System (PAYSY) Design**

14 **The Financial Account System (FAS) Design**

Practical and Term work

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

Reference Books:

1 Business Data Systems – H. D. Clifton
2 Business Systems for Microcomputers – William D. Haueisen & James L. Camp
3 Information Systems – Steven Alter
4 Computers : Technology , Application and Social Implications – Khateeb M. Hussain & Donna S. Hussain

GUJARAT UNIVERSITY
B.E. SEM IV (INFORMATION TECHNOLOGY)

IT 405 Microprocessor Architecture and Programming

Subject	Code	Teaching Scheme		Examination Scheme					
Microprocessor Architecture and Programming	IT 405	Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
		03	02	Sessional	1.5 Hr	50	25	25	200
				University	3 Hr	100			

1 Introduction To Microprocessor and Microprocessor System with Bus organization, Memory, Memory and I/O operations, 8085 Pin functions

2 8085 microprocessor Architecture, Address, Data And Control Buses, Demultiplexing Of Buses, Generation Of Control Signals, Instruction Cycle, Machine Cycles, T-States, Memory Interfacing.

3 8085 Assembly Language Programming Basics, Addressing Modes, Classification of Instructions, 8085 Instruction Set, Instruction And Data Formats, 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 Advanced Processors : 8086 Architecture with segmentation, Logical block diagram of 80286/386/486, features of Pentium processor, Concepts of RISC processor and comparison between RISC and CISC

5 Operating modes in 80286/386, Protected modes operation in 286/386 including Memory segmentation, descriptors, descriptor tables, selectors, privilege level, Paging mechanism with page tables and directories, multitasking with task state segments

Practical and Term work

The Practical and Term work will be based on 8085 microprocessor programming.

Text Books:

1. Microprocessor Architecture, Programming, and Applications with the 8085 (- Ramesh S. Gaonkar Pub: Penram International.
2. Microprocessor and Assembly Language Programming – M. T. Savaliya Pub : Atul Prakashan
3. Advanced 80386 Programming Techniques : James Turley, Pub : TMH

GUJARAT UNIVERSITY
B.E. SEM IV (INFORMATION TECHNOLOGY)

IT 406 Managerial Economics

Subject	Code	Teaching Scheme		Examination Scheme					
Managerial Economics	IT 406	Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
		02	-	Sessional	1.5 Hr	25	0	0	75
				University	3 Hr	50			

1. National income
Economic planning and public finance

2. Organization Concept
Principles line & staff functions, organization structure and its importance system concept of organization

3. Management Concept and Functions
Concepts function (planning), Organizing, directing, Coordinating ,Controlling motivating Principles of management, Traditional v/s modern management approaches, Decision making, Delegation

4. Productivity & its Techniques
Concepts, Gain of productivity, Productivity of economic development, Role of management in promotion of productivity, Selected productivity techniques, Work, study (time study & work management), Quality control, Waste reduction, Job evaluation Incentives, Inventory control

5. CPM & PERT
Personal Management, Personal functions, man power assessment, recruitment, training & development, wage, salary administration, participative management, performance appraisal & counseling discipline improvement, grievance handling union management relation, (industrial relation) trade unionism in India.

6. Human Side of Management
Understanding of human behaviour, group dynamics, interpersonal behaviour, motivation communication , leadership

7. **Financial Management**
Financial management & quantitative techniques, management accounting, break even analysis, preparation & analysis of balance sheets, capital budgeting, cost accounting, cost & budgetary control

8. Marketing Management
Introduction, marketing management, concepts and approach, product development & diversification, industrial marketing.

Reference Books:

1 Management Analysis, Concepts & Cases by Haynes & Massie(PHI)
2 Personal Management by R.S. Davar (Vikas Publishing House Ltd., Delhi

GUJARAT UNIVERSITY
B.E. SEM V (INFORMATION TECHNOLOGY)

IT 501 Data warehousing & Mining

Subject	Code	Teaching Scheme		Examination Scheme					
Data warehousing & Mining	IT 501	Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
		04	02	Sessional	1.5 Hr	50	25	25	200
				University	3 Hr	100			

Data Warehousing:

1. **Overview And Concepts:** Need for data warehousing, Basic elements of data warehousing, Trends in data warehousing.
2. **Planning And Requirements:** Project planning and management, Collecting the requirements.
3. **Architecture And Infrastructure:** Architectural components, Infrastructure and metadata.
4. **Data Design And Data Representation:** Principles of dimensional modeling, Dimensional modeling advanced topics, data extraction, transformation and loading, data quality.
5. **Information Access And Delivery:** Matching information to classes of users, OLAP in data warehouse, Data warehousing and the web.
6. **Implementation And Maintenance:** Physical design process, data warehouse deployment, growth and maintenance.

Data Mining:

1. **Introduction:** Basics of data mining, related concepts, Data mining techniques.
2. **Data Mining Algorithms:** Classification, Clustering, Association rules.
3. **Knowledge Discovery :** KDD Process
4. **Web Mining:** Web Content Mining, Web Structure Mining, Web Usage mining.
5. **Advanced Topics:** Spatial mining, Temporal mining.
6. **Visualisation :** Data generalization and summarization-based characterization, Analytical characterization: analysis of attribute relevance, Mining class comparisons: Discriminating between different classes, Mining descriptive statistical measures in large databases
7. **Data Mining Primitives, Languages, and System Architectures:** Data mining primitives, Query language, Designing GUI based on a data mining query language, Architectures of data mining systems
8. **Application and Trends in Data Mining:** Applications, Systems products and research prototypes, Additional themes in data mining, Trends in data mining

Text Books:

1. Paulraj Ponnian, "*Data Warehousing Fundamentals*", John Wiley.
2. M.H. Dunham, "*Data Mining Introductory and Advanced Topics*", Pearson Education.
3. Han, Kamber, "*Data Mining Concepts and Techniques*", Morgan Kaufmann

References:

1. Ralph Kimball, "*The Data Warehouse Lifecycle toolkit*", John Wiley.
2. M Berry and G. Linoff, "*Mastering Data Mining*", John Wiley.
3. W.H. Inmon, "*Building the Data Warehouses*", Wiley Dreamtech.
4. R. Kimpall, "*The Data Warehouse Toolkit*", John Wiley.
5. E.G. Mallach, "*Decision Support and Data Warehouse systems*", TMH.

GUJARAT UNIVERSITY
B.E. SEM V (INFORMATION TECHNOLOGY)
IT 502 Operating Systems

Subject	Code	Teaching Scheme		Examination Scheme					
Operating Systems	IT 502	Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
		04	02	Sessional	1.5 Hr	50	25	25	200
				University	3 Hr	100			

1 Introduction:

2 Evolution Of Operating Systems, Operating System Services, Types Of Operating System, Different View Of Operating System

3 Process Management:

4 Process, Process Control Block, Process States, Threads, Types of Threads, Multithreading, Scheduling Algorithms, Performance Evaluation Of Algorithms. Interprocess Communication: Race Conditions, Critical Section, Mutual Exclusion, Hardware Solution, Strict Alternation , Peterson's Solution, The Producer Consumer Problem, Semaphores, Event Counters, Monitors, Message Passing, Classical IPC Problems: Reader's & Writer Problem, Dinning Philosopher Problem etc. Deadlock Deadlock Problem, Deadlock Characterization, Deadlock Prevention, Deadlock Avoidance : Banker's Algorithm For Single Resource & Multiple Resources, Deadlock Detection

5 Memory Management:
Paging : Principle Of Operation, Page Allocation, H/W Support For Paging, Multiprogramming With Fixed No. Of Task, Multiprogramming With Variable No. Of Task, Segmentation, Virtual Memory : Concept, Performance Of Demand Paging, Page Replacement Algorithms, Thrashing, Locality.

6 Input Output Management

7 Principles Of Input/Output H/W : I/O Devices, Device Controllers, Direct Memory Access, Principles Of Input/Output S/W : Goals Of The I/O S/W, Interrupt Handler, Device Driver, Device Independent I/O Software Disks : Disks Arm Scheduling Algorithm, Error Handling

8 File Systems

9 Files : File Naming, File Structure, File Types, File Access, File Attributes, File Operations, Memory Mapped Files, Directories : Hierarchical Directory System, Pathnames, Directory Operations, File System Implementation, Implementing Files : Contiguous Allocation, Linked List Allocation, Linked List Using Index, Inodes, Implementing Directories In C, MS-DOS, UNIX. Shared Files, Disk Space Mgmt, File System Reliability, File System Performance, Security : Security Environment, Design Principles Of Security, User Authentication, Protection Mechanism : Protection Domain, Access Control List

10 Case Study: Unix, Linux, Windows 2000.

11 Unix/Linux Operating System

12 Development Of Unix/Linux, Roll Of Kernel & Function Of Kernel, System Calls, Elementary Shell Programming, Directory Structure, System Administration

13 Introduction to Multiprocessor and Distributed Operating System

Practical and Term work

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

Text Books

1 Modern Operating Systems By Andrew S. Tanenbaum (PHI)

Reference Books

1 Operating System – Internals & Design Principles By William Stallings (PHI)
2 Operating Systems By D.M.Dhamdhare (TMH)
3 Unix System Concepts & Applications By Sumitabha Das (TMH)
4 Operating System Concepts By Peterson Unix Shell Programming By Yashwant Kanitkar

GUJARAT UNIVERSITY
B.E. SEM V (INFORMATION TECHNOLOGY)

IT 503 Executive Information System

Subject	Code	Teaching Scheme		Examination Scheme					
Executive Information System	IT 503	Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
		04	02	Sessional	1.5 Hr	50	25	25	200
				University	3 Hr	100			

1 What is Supply chain management, Generic Types of Supply Chain, Various Definitions and Implications, Major Drivers of Supply chain, SCM as a professional

2 Strategic Decision in Supply Chain Management, Business Strategy, Core Competencies in Supply Chains, Strategic Supply Chain Decisions, CRM strategy ,Supplier Relationship Management Strategy

3 Source Management in Supply Chain, Elements of Strategic sourcing, A Collaborative Perspective, Development of partnership

4 Inventory Management in Supply Chain, Definition of Inventories, Types of Inventory Supply/Demand Uncertainties, Inventory costs, selective Inventory control, Vendor Managed Inventory System, Inventory Performance Measures

5 Transportation Management in the Supply Chain, Transportation selection, Trade off, Models for Transportation Distribution, Third party Logistics, Overview of Indian Infrastructure for Transportation

6 Information Technology in Supply chain, EDI, Internet /Intranet, Data Mining/Data Warehousing and Data Marts, E-commerce, E-procurement, Barcode Technology

7 Information System in supply chain, Computer based information system, computer models, perception about ERP,ERP and SCM, Information System and bull Whip Effect

9 THE EVOLUTION OF THE E-CONOMY BUSINESS MODEL OF CRM-Business Process Models and CRM..

10 Foundations of Customer-Centric Business

11 Point-of-Order Customer- .

12 Pre-Order Customer-Support Issues.

13 Post-Order Customer-Support Issues.

14 ANALYSIS OF SUCCESSFUL CRM SITES-CRM CASE STUDY

Text Boooks

1.Supply Chain Management Theories & Practices
By R.P.Mohanty
S.G.Deshmukh Pub: Biztantra/WileyIndia(Dreamtech)

2.Customer Relationship Management Essentials
By John, G And Thomsan Boehm, Pub: PHI

Reference Books

1 E-Business Roadmap For Success By Dr. Ravi Kalakota, Marcia Robinson, Addison Wesley

2. CRM AT THE SPEED OF LIGHT Capturing and Keeping Customers in Internet Real Time By GREENBERG, PAUL, Tata McGraw-Hill

GUJARAT UNIVERSITY
B.E. SEM V (INFORMATION TECHNOLOGY)

IT 504 Computer Organization & Architecture

Subject	Code	Teaching Scheme		Examination Scheme					
Computer Organization & Architecture	IT 504	Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
		03	02	Sessional	1.5 Hr	50	25	25	200
				University	3 Hr	100			

1 **Basic computer organization and design:** Introduction, Instruction code, Design of computer instructions, Timing and Control Design, Instruction execution, Input-Output Instruction, Interrupt, Design of Basic Computer.

2 **Central Processor Organization :** Processor bus organization, Arithmetic Logic Unit, Stack Organization, General Instruction Format, Addressing Modes in instruction set, Data transfer instructions, Data Manipulations instructions, Program Control instructions, Microprocessor/Micro computer organization

3 **Micro program control organization:** Conventional control/Micro Prog. Control, Control memory, Address sequencing, Micro program sequencer, Micro instruction format, Advantages & Applications.

4 **Arithmetic processor Design:** Introduction. Algorithm for Addition, subtraction, Multiplication, Division for - Unsigned number, Signed magnitude numbers, 1's Complement numbers, 2's complement numbers, Floating point numbers,

5 **Input output Organization :** Peripheral devices, I/O interfaces, Synchronous data transfer, Asynchronous data transfer, software/hardware approach for data transfer, Direct memory access, Priority interrupt, I/O processor, Multiprocessor system organization

6 **Memory organization :** Auxality memory, Microcomputer memory, Memory hierarchy, Associative memory, Virtual memory, semiconductor memories, cache memory, memory management hardware

7 **Parallel processing :** Introduction to parallel processing, multiprogramming, time sharing, Pipeline processing, parallel processing with multiple CPUs and Functional units, Race conditions, Semaphores in process, Synchronization, Memory interleaving , RISC processor, SISC processors etc.

References : -

1. Morris Mano - Computer Systems Architecture, 3 rd Edition, PHI, 1997 reprint
2. Tanenbaum - Structured Computer Organization , PHI EEE, 1995 Reprint
3. Stallings - Computer Organization & Architecture : Designing For Performance, PHI EEE ed, 4th Ed, 1997
4. Hamacher - Computer Organization, McGraw-Hill IS ed, 1994 ed

GUJARAT UNIVERSITY
B.E. SEM V (INFORMATION TECHNOLOGY)

IT 505 Computer Graphics & Multimedia

Subject	Code	Teaching Scheme		Examination Scheme					
Computer Graphics & Multimedia	IT 505	Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
		04	02	Sessional	1.5 Hr	50	25	25	200
				University	3 Hr	100			

1 Survey of Computer Graphics, Computer-Aided Design, Application Of Graphics
2 Overview of Graphics System Video Display Device, Raster Scan System, Random Scan Disply, Input/Output Devices
3 Output Primitives, Line, Circle, Ellipse generating Algorithms,Filled Area primitives
4 Two-dimensional Geometric Transformation
5 Two dimensional viewing Window to viewport coordinate transformation, Clipping, point clipping, Line clipping, Polygon clipping
6 Three-dimensional Geometric Transformation
7 Multimedia System Design
An Introduction – Multimedia applications – Multimedia System Architecture – Evolving technologies for Multimedia – Defining objects for Multimedia systems – Multimedia Data interface standards – Multimedia Databases.
8 Multimedia File Handling
Compression & Decompression – Data & File Format standards – Multimedia I/O technologies - Digital voice and audio – video image and animation – Full motion video – Storage and retrieval Technologies
9 Hypermedia
Multimedia Authoring & User Interface – Hypermedia messaging - Mobile Messaging – Hypermedia message component – creating Hypermedia message – Integrated multimedia message standards – Integrated Document management – Distributed Multimedia Systems

Text Books

1. Donald Hearn and M.Pauline Baker, “Computer Graphics C Version”, Pearson Education, 2003.
(: Chapters 1,2,3,4,5,6,11)
2. Prabat K Andleigh and Kiran Thakrar, “Multimedia Systems and Design”, PHI, 2003. (UNIT 3 to 5)

Reference Books

1. Judith Jeffcoate, “Multimedia in practice technology and Applications”, PHI,1998.
2. Foley, Vandam, Feiner, Huges, “Computer Graphics: Principles & Practice”, Pearson Education, second edition 2003.

GUJARAT UNIVERSITY
B.E. SEM V (INFORMATION TECHNOLOGY)

IT 506 Seminar

Subject	Code	Teaching Scheme		Examination Scheme					
Seminar	IT 506	Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
		-	01	Sessional	-	-	25	25	50
				University	-	-			

The candidates have to give the seminar on the topics from the current semester subject or on advanced topics related with Computer Engineering field. Seminar is to be evaluated as practical during the semesters and when candidates give seminar and write up of seminar is to be evaluated as term work

GUJARAT UNIVERSITY
B.E. SEM VI (INFORMATION TECHNOLOGY)

IT 601 Operation Research

Subject	Code	Teaching Scheme		Examination Scheme					
Operation Research	IT 601	Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
		03	02	Sessional	1.5 Hr	50	25	25	200
				University	3 Hr	100			

1. Introduction to OR

Concepts, genesis, Art of modelling, components of model, Types of OR models, Eeffect of data availability on modelling Computations in OR, Phases of OR study

2. Linear Programming (LP)

Concepts, Formulation of model , Graphical solution ,Maximisation / Minimisation – Simplex Algorithm , Use of slack / surplus / artificial variables , BigM and Two phase method – Nature & type of solutions , Interpretation of optimal solution. Dual problem – relation between primal and dual , Dual simplex method – Interpretation of dual variables Introduction to Integer programming , Developing software for LP solution methods and exposure to available LP & IP Packages.

3. Transportation & Assignment problems.

Concepts, formulations of models , Solution procedures, Optimality checks, Balanced/Unbalanced , Maximum/Minimum problems , Prohibited case – degeneracy

4. Network Analysis

Network Definition , Minimal spanning tree problem , Shortest route problem , Maximal flow problem concepts and solution algorithm as applied to problems. Project planning and control by CPM network Probability assessment in PERT network. Introduction to resource smoothing and allocation. Development of software for the techniques and exposure to Project Management Packages.

5. Queuing Models

Concepts relating to Queuing systems, types of queuing system (use of six character code) , Basic elements of Queuing Model , Role of Poison & Exponential Distribution Concepts of Birth and Death process , Steady state measures of performance , M/M/1 model with and without limitation of q-size M/G/1, single channel with poisson arrival rate and general service time.

6. Computer Modelling & Simulation

Use of Computer in modelling real life situations , Distribution functions, Random number generation , Sselection of input probability distribution , Design of simulation models Experimental design, output analysis variance reduction techniquesIntroduction to simulation languages Programming tools for developing simulation models.

7. Replacement & Maintenance Models

Replacement of items, subject to deterioration of items subject to random failure Group Vs. Individual replacement policies.

Practical and Term work

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

Text Books

1. Quantitative Techniques in management, ND Vora – Tata McGraw Hill
2. Operations Research – An Introduction – Fifth edition by Hamdy A Taha- Prentice Hall of India , New Delhi.
3. Wagner, H.M. Principles of Operations Research : With Applications to Management Decisions, Prentice-Hall of India, New Delhi, 1982.

Reference Books

1. Hillier, F.S. and Lieberman, G.J., Operations Research, Holden Day Inc., San Francisco, 1974.
2. Littlechild, S.C. (ed), Operational Research for Managers, Philip Allan, Oxford, 1977. Mitchell, G.H. (ed), Operational Research Techniques and examples, The English Universities Press Ltd., London ,1972.
3. Moder, J.J. and Elmaghraby, S.E. (ed.), Handbook of Operations Research : Models and Applications, Van Nostrand Reinhold Co., New York, 1987.
4. Payne, T. A. , Quantitative Techniques for Management : A Practical Approach, Reston Publishing Co. Inc., Virginia, 1982.
5. Wilkes, F.M., Baum, P. and Smith, G.D., Management Science : An introduction, John Wiley and Sons, Santa Barbara, 1979.

Objectives:

The objective of this course is to impart some modelling techniques and to offer basic operations research tools & techniques which are used for decision making. The new focus of this course is to provide an understanding of OR models. The emphasis of the course will be on the application and computational aspects of OR and simulation models.

GUJARAT UNIVERSITY
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IT 602 Software Engineering

Subject	Code	Teaching Scheme		Examination Scheme					
Software Engineering	IT 602	Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
		04	02	Sessional	1.5 Hr	50	25	25	200
				University	3 Hr	100			

1 **Introduction Of Software Engineering, Study Of Different Models:**
Software Characteristics, Components, Applications, Layered Technologies, Processes, Methods And Tools, Generic View Of Software Engineering, Incremental, Spiral And Concurrent Development Model.

2 **Requirements Engineering**
Problem Recognition, Evaluation And Synthesis, Modeling, Specifications And Review Techniques.

3 **Structured System Design**
Data Design, Architectural Designing, Process And Optimization, Interface Design, Procedural Design, Object Oriented Design.

4 **Data Oriented Analysis & Design**
Difference Between Data And Information, Er Diagram, Dataflow Model, Control Flow Model, Control And Process Specification, Data Dictionary.

5 **Analysis & Design Of Real Time Systems**
Introduction To Real Time Systems, System Consideration, Integration And Performance, Interrupt Handling, Real Time Database Os And Languages.

6 **Software Quality Assurance.**
Quality Control, Assurance, Movements, Sqa-Software Quality Assurance, Approaches To Sqa, Reliability, Iso9000 And 9001, Cmm Levels

7 **User Interface Design**
Concepts Of Ui, Interface Design Model, Internal And External Design, Evaluation, Interaction And Information Display.

8 **Software Complexity & Reliability**
Computing Function, Point Matrix, Complexity Matrix, Comparison Of Different Matrices.

9 **Software Project Management.**
Management Spectrum, People Involved And Problem, Co-Ordination And Communication, Importance Of Team Management.

10 **Case Tools And Study**
Introduction To Case, Building Blocks Of Case, Integrated Case Environment

Practical and Term work

The Practical and Term work will be based on the topics covered in the syllabus. Minimum 8 experiments should be carried out.

Texts Books:

1 Pressman R.S., Software Engineering : A Practitioner's Approach, Mcgraw Hill.
2 Sommerville I., Software Engineering, Addision-Wesley

GUJARAT UNIVERSITY
B.E. SEM VI (INFORMATION TECHNOLOGY)

IT 603 Data Compression

Subject	Code	Teaching Scheme		Examination Scheme					
Data Compression	IT 603	Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
		03	02	Sessional	1.5 Hr	50	25	25	200
				University	3 Hr	100			

1. Introduction To Data Compression
The Audience, Why C?, Which C?, Keeping Score, The Structure

2. The Data Compression Lexicon, With A History
The Two Kingdoms, Data Compression = Modeling + Coding, The Dawn Age, Coding An Improvement Modeling, Statistical Modeling, Ziv & Lempel LZ77 LZ78, Lossy Compression, Programs to Know

3. The Dawn Age: Minimum Redundancy Coding
The Sahnnon-Fano Algorithm, The Huffman Algorithm, Huffman in C, BITIO.C, A Reminder about Prototypes, MAIN-C.C & MAIN-E.C, MAIN-C.C, ERRHAND.C, Into the Huffman Code, Counting the Symbols, Saving the Counts, Building the Tree, Using the Tree

4. A Significant Improvement: Adaptive Huffman Coding
Adaptive Coding, Updating the Huffman Tree, What swapping Does, The Algorithm, An Enhancement, The Escape Code, The Overflow Bonus, A Rescaling Bonus, The Code, Initialization of the Array, The Compress Main Program, The Expand Main Program, Encoding the Symbol, Decoding The Symbol

5. Huffman One Better: Arithmetic Coding
Difficulties, Arithmetic Coding: A Step Forward, Practical Matters, A Complication, Decoding, Where's the Beef

6. Dictionary-Based Compression
An Example, Static vs. Adaptive, Adaptive Methods, A Representative Example, Israeli Roots, History, ARC: The Father of MS-DOS Dictionary Compression, Dictionary Compression, Danger Ahead-Patents, Conclusion

7. Sliding Window Compression
The Algorithm, Problems with LZ77, An Encoding Problem, LZSS compression, Data structures, A balancing Act Greedy vs. Best Possible. The Expansion Routine, Improvements.

8. Speech Compression
Digital Audio Concepts, Fundamentals, Sampling Variables, PC-Based sound, Lossless Compression of Sound, Problems and Results, Loss compression, Silence Compression, Other Techniques.

9. Lossy Graphics Compression

Enter Compression, Statistical And Dictionary Compression Methods Lossy Compression Differential Modulation Adaptive Coding, A Standard That Works: JPEG, JPEG Compression, The Discrete Cosine Transform, DCT Specifics, Why Bother? Implementing the DCT, Matrix Multiplication, Optimized Improvements, Output Of The DCT, Quantization, Selecting A Quantization Matrix. The Sample Program, Input Format, Initialization, the Forward DCT Routine, Write DCT Data (), File Expansion, Read DCT Data (), The Inverse DCT.

Practical and Term work

The practical and Term work will be based on the topics covered in the syllabus.

Text Books:

1. "Data Compression", Mark Nelson
2. "Data Compression", Khalid Shayood, Morgon Kaufmann
3. "Data Compression : The Complete Reference", David Saloman, Springer

GUJARAT UNIVERSITY
B.E. SEM VI (INFORMATION TECHNOLOGY)

IT 604 Information Security

Subject	Code	Teaching Scheme		Examination Scheme					
Information Security	IT 604	Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
		04	02	Sessional	1.5 Hr	50	25	25	200
				University	3 Hr	100			

1. Concepts and Principles of Security
Need for Security, Security Approaches, Principles of Security, Types of Attacks

2. Cryptographic Techniques
Plain Text and Cipher Text, Substitution Techniques, Transposition Techniques, Encryption and Decryption, Key Management, Computer-based Symmetric Key Cryptographic Algorithms , Computer-based Asymmetric Key Cryptographic Algorithms

3. Public Key Infrastructure (PKI)
Digital certification, PKIX model, PKCS, XML and security

4. Internet Security Protocols
SSL, SHHTP, TSP, SET, 3D secure, Electronic money, Email security, web security, GSM security

5. User Authentication Mechanisms
Password, Authentication tokens, Biometrics authentication, kerberos

6. Network Security
Firewall , IT security, VPN

7. Advanced topics:
Concepts of IT acts and cyber laws

Practical:
Practical will be based on above syllabus. And Case Studies on Cryptography and Security

Text book:

- Cryptography and Network security by Atul Kahate, TMH
- Practical Cryptography by Bruce Scheneier , Wiley

GUJARAT UNIVERSITY
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IT 605 Web Technology

Subject	Code	Teaching Scheme		Examination Scheme					
Web Technology	IT 605	Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
		04	02	Sessional	1.5 Hr	50	25	25	200
				University	3 Hr	100			

1. **Introduction**
   The www Architecture and History and Web Site, www, Http Request and Response Mechanism, Architecture of www
2. **Study of web servers**
   IIS Server: Features Of IIS, Introduction To MMC, Virtual Directory And Mapping, Start And Stop A Server, Features of MMC .Apache Server:
3. **Apache As Web Server, Different Configuration Parameters Of Apache Web Server From The File Httpd.Conf**
4. **Study of Html And Different Web Page, Web Graphics Tools And Editors**
   Introduction To HTML , Different Tags Of HTML, Tags For Putting Images In Html, Tools Like Front page, Visual Interdev (Ms) etc.
5. **Cascading Style sheets (CSS)**
   Introduction of CSS, sytax, types of style sheets, CSS examples
6. **Java Script**
   Introduction to client side technology, syntax of java script, java script objects like string, date etc, java script HTML DOM
7. **Server side Programming**
   Active server pages: ASP introduction, vb script syntax, ASP objects, File access with ASP, Session & state management, Cookies, Database connectivity, Ad Rotator and other advanced controls
8. **XML**
   Introduction, syntax, attributes, elements, valid and wellformed documents, DTS, schema, xml parsing
9. **XSL & XSLT**
   XSLT introduction, transforms, template, value-of, for – each, sort, if, choose, XSLT on client and server, XSLT functions
10. **AJAX**
    AJAX Intro, AJAX HTTP Request, AJAX Example, AJAX Browsers, AJAX XMLHttpRequest, AJAX Server, AJAX Server Script

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.

Text Books

1 ASP Prgramming, Wrox Publication (SPD) India
2 Mastering ASP, BPB.
3 PC Inside, Peternorton, BPB.
4 Windows NT Complete Reference, BPB.

References

1 www.apache.com
2. www.w3schools.com
3 www.javasoft.com

GUJARAT UNIVERSITY
B.E. SEM VI (INFORMATION TECHNOLOGY)

IT 606 Software Project Lab

Subject	Code	Teaching Scheme		Examination Scheme					
Software Project Lab	IT 606	Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
		-	02	Sessional	-	-	25	25	50
				University	-	-			

Students are expected to learn tools like Visual C++ , Visual Basic, Java, .NET and prepare a small project using them.

GUJARAT UNIVERSITY
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IT 701 Distributed Database Application & System

Subject	Code	Teaching Scheme		Examination Scheme					
Distributed Database Application & System	IT 701	Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
		03	02	Sessional	1.5 Hr	50	25	25	200
				University	3 Hr	100			

1. **Introduction to Database Systems**
   The Rationale of a Data Engineering Viewpoint , The Role of Information Systems, and Information System Architecture , Multiprocessor and Distributed Heterogeneous Information Systems The Role of Communications, Information, and Database Technology
2. **Categories of Distributed Systems**
   Distributed Systems Overview , Multiprocessor Systems ,Distributed Computer Systems , A Perspective on Distributed Environments, Campus Versus National Network Considerations
3. **Other Distributed Database Issues**
   Concurrency Control , Backup and Recovery ,Security and Access Control , The Design Process ,Client-Server Architectures ,Protocols for Distributed Systems An Enterprise Viewpoint--The Road to Data Location, The Necessity of an Enterprise Viewpoint , Suggested Methodology for Design , Decisions distributed Memory, Memory Hierarchies, Directories, and Data Retrieval , Memory Hierarchies, Location of Data, Directories
4. **Designing Distributed Applications**
   Using Active Server Pages, ADO, CORBA, EJBCORBA Distributed Objects and COM/DCOM Technology
5. **Learning ADO Basics and Basics of ASP**
   Getting the Most Out of Record sets. Unusual ADO: Executing DDL with ADOX and Using ADO with Nontraditional Data Sources.
6. **Using Remote Data Services in Web Applications.**
7. **DEVELOPING A DISTRIBUTED APPLICATION WITH ADO**.
   Methodology, Assumptions, and Architecture of a Distributed ADO Application. Developing an Enterprise-Level Application with ADO: Adding, Updating, and Deleting. And Transaction Processing.

Practical and Term work

The practical and Term work will be based on the topics covered in the syllabus.
Minimum 6 experiments should be carried out.

References :

1. The Architecture of Distributed Computer Systems : A Data Engineering Perspective on Information Systems by Richard L. Shuey, David L. Spooner, Ophir Frieder

2. Designing Distributed Applications With Xml : Asp Ie5 Ldap and Msmq by Stephen T. Mohr, Stephen F. Mohr

3. Building Distributed Applications With ADO by William Martiner, James Falino, David Herion

4. Client/Server Programming with JAVA/CORBA By Robert Orfali and Dan Harkey, SHROFF Pub.

5. Active Server Pages 3.0 from scratch By Nicholas Chase,QUE

GUJARAT UNIVERSITY
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IT 702 Enterprise Resource Planning

Subject	Code	Teaching Scheme		Examination Scheme					
Enterprise Resource Planning	IT 702	Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
		04	02	Sessional	1.5 Hr	50	25	25	200
				University	3 Hr	100			

1. Introduction to ERP
Enterprise – An Overview, Integrated Management Information, Business Modeling, Integrated Data Model

2. ERP and Related Technologies
Business Processing Reengineering(BPR), Data Warehousing, Data Mining, On-line Analytical Processing(OLAP), Supply Chain Management

3. ERP Manufacturing Perspective

4. ERP Modules
Finance, Plant Maintenance, Quality Management, Materials Management,

5. Benefits of ERP

Reduction of Lead-Time, On-time Shipment, Reduction in Cycle Time, Improved Resource Utilization, Better Customer Satisfaction, Improved Supplier Performance, Increased Flexibility, Reduced Quality Costs, Improved Information Accuracy and Design-making Capability

6. ERP Implementation Lifecycle
Pre-evaluation Screening, Package Evaluation, Project Planning Phase, Gap Analysis, Reengineering, Configuration, Implementation Team Training, Testing, Going Live, End-user Training, Post-implementation (Maintenance mode)

7. ERP Case studies
E-Commerce to E-business, E-Business structural transformation, Flexible Business Design, Customer Experience, Create the new techo enterprise, New generation e-business leaders, memo to CEO, Empower your customer, Integrate Sales and Service, Integrated Enterprise applications,

8. E-Business Architecture
Enterprise resource planning the E-business Backbone, Enterprise architecture planning, ERP usage in Real world, ERP implementation, Future of ERP applications ,memo to CEO, E-Procurement, Developing the E-Business Design

TextBooks

1. E-Business Roadmap For Success By Dr. Ravi Kalakota , Marcia Robinson, Addison Wesley (Pearson Eduction)
2. Enterprise Resource Planning- Alexix Leon , Tata McGraw Hill.

Reference Books

1. Enterprise Resource Planning - Ravi Shankar & S. Jaiswal , Galgotia.

2. Network Resource planning using SAP R/3 Baan and Peoplesoft : A Practical Guide to Planning ERP Application, Annetta Clewwto and Dane Franklin, McGRaw-Hill, 1997

3. The SAP R/3 Handbook, Jose Antonio, McGraw – Hill, 1998

Practical and Term work

The Practical and Term work will be based on the topics covered in the syllabus Minimum Six Case Studies should be carried out during practical hours.

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IT 703 Wireless Communication

Subject	Code	Teaching Scheme		Examination Scheme					
Wireless Communication	IT 703	Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
		04	02	Sessional	1.5 Hr	50	25	25	200
				University	3 Hr	100			

1. Mobile Computing architecture

Architecture for mobile computing, Three tier architecture, design considerations for mobile computing, mobile computing through internet, making existing applications Mobile-Enabled

2. Mobile Computing through telephony

Evolution of telephony, multiple access procedures, mobile computing through telephone, Developing an IVR application, voice XML, telephony application programming interface

3. Mobile Technologies

Bluetooth, Radio frequency identification(Rfid),Wireless Broadband, Mobile IP,IPv6,javacard

4. Global system for mobile communication

Global system for mobile communication, GSM architecture, GSM entities, call routing in GSM,PLMN interface, GSM addresses and identifiers, network aspects in GSM,GSM frequency allocation, authentication and security

5. Short message services

Mobile computing over SMS,SMS, value added services through SMS, accessing the SMS bearer

6. **General packet radio service(GPRS)**

GPRS and packet data network, GPRS network architecture, GPRS network operation, data services in GPRS, Applications of GPRS, Billing and charging in GPRSWireless Application Protocol(WAP) WAP,MMS,GPRS application, CDMA and 3G Spread-spectrum Technology, CDMA versus GSM, Wireless data, third generation networks, applications in 3G

7. Wireless LAN

Wireless LAN advantages,IEEE802.11 standards ,Wireless LAN architecture, Mobility in Wireless LAN, Deploying Wireless LAN, Deploying Wireless LAN, Mobile ad hoc networks and sensor networks, wireless LAN security, WiFi v/s 3G

8. Voice over Internet protocol and convergence

Voice over IP,H.323 framework for voice over IP,SIP, comparison between H.323 ad SIP, Real time protocols, convergence technologies, call routing, call routing, voice over IP applications, IMS, Mobile VoIP

9. Security issues in mobile

Information security, security techniques and algorithms, security framework for mobile environment

Practical work
Project in WAP And WMLscript Etc. Applications in J2ME

Text Books:

1 Mobile Computing
Asoke K Telukder,Roopa R Yavagal by TMH
2 The complete reference J2ME
TMH
3. Handbook of Wireless Networks and Mobile Computing
Ivan Stojmenovic , Wiley

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IT 704 Elective – I

Subject	Code	Teaching Scheme		Examination Scheme					
Elective – I	IT 704	Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
		04	02	Sessional	1.5 Hr	50	25	25	200
				University	3 Hr	100			

Elective – I

1. Client Server Technology

Basic client/server concepts

Network technologies, architectures, protocols, and NOS

Remote procedure calls, remote data access, and message-passing middleware

Client/server databases

The worldwide Web and Web-based software application architectures

Active and passive client/server technologies

Public, enterprise-wide, and inter-enterprise decision and operations support

Web page and web site design and web servers

Architecture of a browser and the browser object model

HTML, JavaScript , DHTML, Java, and Java applets

Common Gateway Interfaces (CGI's), Active Server Pages (ASP), and Java Server Pages (JSP))

Internet client/server database access and back-end database servers

State maintenance, channels, and webcasting

XML, DTD, XSL, data islands, XML and DB, XML for decision support

Web services, search engines, and .NET

Client/server application development with TCP/IP

Thin-clients/servers; graphical user interfaces

Security, public/private key cryptography, digital signatures, digital certificates, SSL, firewalls, and proxy servers

Java client/server applications and legacy applications

E-commerce and models for e-business and e-commerce

Texts

- H.M. Dietel, P.J. Dietel, and T.R. Nieto, *Internet and World Wide Web, How to Program*, Prentice Hall, 2002, ISBN 0-13-030897-8

2. Distributed Operating System

- INTRODUCTION TO DISTRIBUTED COMPUTING SYSTEM
- COMPUTER NETWORKS
- MESSAGE PASSING
- REMOTE PROCEDURE CALLS
- DISTRIBUTED SHARED MEMORY
- SYNCHRONIZATION
- RESOURCE MANAGEMENT
- PROCESS MANAGEMENT
- DISTRIBUTED FILE SYSTEMS
- NAMING
- SECURITY

TEXTS/REFERENCES :

1. Distributed Operating Systems {By Pradeep K Sinha}
2 Distributed Systems : Concepts And Design, { By G.F.Colouris, J.Dollimore And T.Kindberg} Addison Wesley, 2nd Ed.1994.
3 Introducation To Distributed Algorithms, { By G.Tel } Cambridge University Press, 1994.
4 Programme Verification, { By K.R.Apte} 1991.
5 Distrubuted System, { By S.Mullender (Ed)} Addison Wesley, 1989.
6 Distributed Computing : Concept And Implementations,{ By P.L.Mcentre, Et.Al} Ieee Press, 1984.
7 Distributed Computer Systems, { By Y. Parkar (Ed) } Academic Press, 1983.
8 Distributed Systems : Architecture And Applications : An Advance Course, { By B.W.Lampson (Ed)} Springer-Verlag.1981.
9 Fault-Tolerant Distributed Computing, { By B.Simon And A Spector (Eds)} Springer, 1990.
10 Research Paper From Some Current Journals.

3. Grid computing

- Why computational grids? A discussion of the need, potential users and techniques for use of grids. Grid requirements of end users, application developers, tool developers, grid developers, and system managers.
- Grid Architecture
- Networking Infrastructure, Protocols and Quality of Service. >
- Computing Platforms. Operating Systems and Network Interfaces.
- Compilers, Languages and Libraries for the Grid.
- Grid Scheduling, Resource Management, Resource Brokers, Resource Reservations.
- Instrumentation and Measurement, Performance Analysis and Visualization.
- Security, Accounting and Assurance.
- The Globus Toolkit: Core systems and related tools such as the Message Passing Interface communication library, the Remote I/O (RIO) library, and the Nimrod parameter study library
- Legion and related software
- Condor and the Grid
- Open Grid Service Architecture and Data Grids
- Grid Portal Development
- Application Types: geographically distributed , high-throughput, on demand, collaborative, and data intensive supercomputing, computational steering, real-time access to distributed instrumentation systems

References:

1. Grid Computing: Making The Global Infrastructure a Reality by Fran Berman (Editor), Geoffrey Fox (Editor), Anthony J.G. Hey (Editor), John Wiley & Sons; (April 8, 2003), ISBN 047085319

2. The Grid 2: Blueprint for a New Computing Infrastructure by Ian Foster and Carl Kesselman, Morgan Kaufmann Nov 2003, ISBN: 1558609334.

3. VLSI

1. **Introduction to VLSI & practical consideration :** Introduction, Size & complexity of integrated circuit, The microelectronic field, IC Design process, economics, yield, Trends in VLSI design

2. **Technology :** IC production process, Semiconductor processes, Design rules & process parameters, Layout technique & practical consideration

3. **Device modeling & Circuit simulation :** Modeling, MOS models Diode models, Bipolar models, passive component models. Circuit simulation using spice, MOSFET model, Diode model ,BJT model

4. **Basic IC building blocks :** Switches, active resistors, current sources & sinks, current mirrors/amplifiers, voltage & current references

5. **Amplifiers :** Inverting amplifiers, improving the performance of inverting amplifier, Differential amplifiers, Output amplifiers, operational amplifiers, comparators.

6. **Digital Circuits :** Design abstraction, Characteristics of digital circuits, single channel MOS inverters, NMOS NOR & NAND logic circuits , Complementary MOS inverters, CMOS logic gates, Transmission gates, single propagation delays, Capacitive loading consideration, Power dissipation, Noise in digital logic circuits.

7. **Structured Digital Circuits & systems :** Random logic versus structured logic forms, PLA, Structured gate layout, Logic gate arrays, MOS clocking schemes, Dynamic MOS storage circuit, Clocked CMOS logic, Semiconductor memories, Read only memory, Static RAM memories, Dynamic RAM memory, Register storage circuit, PLA based finite state machine, Microcoded controllers, Microprocessor design, Systolic arrays.

8. **Introduction to computer based VLSI design**

References : -

1. Randall L Gieger Phillip E. Allen, Noel R. Strader, VLSI Design Techniques for Analog & Digital Circuits.
2. Jaeger, Microelectronics Circuit Design McGraw Hill. IS Edition.
3. Sze, VLSI Technology, 2nd Edition, 199 , McGraw Hill, IS Edition.
4. Laker K. R. & Sansen W.M.C., Design of Analog Integrated Circuits & Systems, McGraw Hill, IS Edition, 1996.

5. Embedded System

1. **An overview of embedded systems:** Introduction to embedded systems, Categories and requirements of embedded systems, Challenges and issues related to embedded software development, Hardware/Software co-design, Introduction to IC technology, Introduction to design technology
2. **Embedded Software development:** Concepts of concurrency, processes, threads, mutual exclusion and inter-process communication, Models and languages for embedded software, Synchronous approach to embedded system design, Scheduling paradigms, Scheduling algorithms, Introduction to RTOS, Basic design using RTOS
3. **Embedded C Language:** Real time methods, Mixing C and Assembly, Standard I/O functions, Preprocessor directives, Study of C compilers and IDE, Programming the target device
4. **Hardware for embedded systems:** Various interface standards, Various methods of interfacing, Parallel I/O interface, Blind counting synchronization and Gadfly Busy waiting, Parallel port interfacing with switches, keypads and display units, Memory and high speed interfacing, Interfacing of data acquisition systems, Interfacing of controllers, Serial communication interface, Implementation of above concepts using C language
5. **Study of ATMEL RISC Processor:** Architecture, Memory, Reset and interrupt , functions, Parallel I/O ports, Timers/Counters, Serial communication, Analog interfaces, Implementation of above concepts using C language, Implementation of above concepts using C language
6. **Case studies and Applications of embedded systems:** Applications to: Communication, Networking, Database, Process Control, Case Studies of: Digital Camera, Network Router, RTLinux

Textbook

1. Raj Kamal, "*Embedded Systems*", TMH
2. David E. Simon, "*An Embedded Software Primer* ", Pearson Education
3. Muhammad Ali Mazidi and Janice Gillispie Mazidi, "*The 8051Microcontroller and Embedded Systems",* Pearson Education

References

1. Frank Vahid, Tony Givargis, "*Embedded System Design: A Unified Hardware/Software Introduction*", John Wiley
2. Craig Hollabaugh, "*Embedded Linux*", Pearson Education
3. Daniel Lewis, "*Fundamentals of Embedded Software*", Pearson Education.
4. Barnett, Cox, O'Cull, "*Embedded C Programming and the Atmel AVR* ", Thomson Learning
5. Myke Predko, "*Programming and Customizing the 8051 Microcontroller*", TMH

IT 705 Elective – II

Subject	Code	Teaching Scheme		Examination Scheme					
Elective – II	IT 705	Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
		04	02	Sessional	1.5 Hr	50	25	25	200
				University	3 Hr	100			

Elective - II

1. Advanced Java

1 Difference Between Java 2 And Old Java Platform
2 Introduction To Java 2 Sdk Tool Set
3 Introduction To Application Programming In Java2, Creating Window Application, Writing Console Application, Use Of Utility And Math Packages
4 Introduction To Swing, Mvc Architecture, Swing Awt And Jfc
Writing Swing Application, Swing Components, Changing Look And Feel Of Application
5 Enhancing Application Using Clipboard, Drag And Drop, I/O Stream Enhancement, Printing, Internationalization
6 Javadatabase Programming, Java.Sql Package Study, Jdbc, Different Types Of Drivers Of Jdbc
7 Introduction Java Servlet Programming And Web Development
8 Javabeans, Beans Development Kit, Developing Beans, Notable Beans
9 Network Programming With Java.Net Package, Client Programs And Server Programs, Content And Protocol Handlers, Naming And Directory Services Jndi
10 Introduction To Distributed Applications, Distributed Application Architecture, Introduction To RMI, And Corba

Practical and Term work

The Practical and Term work will be based on the topics covered in the syllabus.
Minimum 6 experiments should be carried out.

Text Books:

1 Core Java Vol I&Ii,Addison Wislley
2 Unleashed Java 2 Platform, Sams Techmedia
3 J2EE 1.4 Black Book

References Books:

1 Java Swings , O'Reilly Series,Spd
2 Java Networking, O'Reilly Series,Spd
3 Java Servlets, O'Reilly Series,Spd
4 Java Beans, O'Reilly Series,Spd

2. Artificial Intelligence

1 **Problems And State Space Search**
The AI Problems, The Underlying Assumption, What Is An AI Techniques, The Level Of The Model, Criteria For Success, Some General References, One Final Word.

2 **Problems, Problem Spaces And Search**
Defining The Problems As A State Space Search, Production Systems, Production Characteristics, Production System Characteristics, And Issues In The Design Of Search Programs, Additional Problems.

3 **Heuristic Search Techniques**
Generate-And-Test, Hill Climbing, Best-First Search, Problem Reduction, Constraint Satisfaction, Means-Ends Analysis.

4 **Knowledge Representation Issues**
Representations And Mappings, Approaches To Knowledge Representation.

5 **Using Predicate Logic**
Representation Simple Facts In Logic, Representing Instance And Isa Relationships, Computable Functions And Predicates, Resolution.

6 **Representing Knowledge Using Rules**
Procedural Versus Declarative Knowledge, Logic Programming, Forward Versus Backward Reasoning.

7 **Symbolic Reasoning Under Uncertainty**
Introduction To Non-monotonic Reasoning, Logics For Nonmonotonic Reasoning.

8 **Statistical Reasoning**
Probability And Bays' Theorem, Certainty Factors And Rule-Base Systems, Bayesian Networks, Dempster-Shafer Theory, Fuzzy Logic.

9 **Weak Slot-And-Filler Structure**
Semantic Nets, Frames.

10 **Advance Topics**

11 **Game Playing: Overview, And Example Domain**
The Blocks World, Components Of A Planning System, Goal Stack Planning, Nonlinear Planning Using Constraint Posting, Hierarchical Planning, Reactive Systems, Other Planning Techniques.

12 **Natural Language Processing**
Introduction, Syntactic Processing, Semantic Analysis, Semantic Analysis, Discourse And Pragmatic Processing.

13 **Connectionist Models**
Introduction: Hopfield Networld, Learning In Neural Networld, Application Of Neural Networks, Recurrent Networks, Distributed Representations, Connectionist AI And Symbolic AI.

14 **Expert Systems**
An Introduction To Expert System, Explanation Facilities, Expert System Developments Process, knowledge Acquisition.

15 **Introduction To Prolog**
Introduction To Prolog: Syntax & Numeric Function, Basic List Manipulation Functions In Prolog, Functions, Predicates & Conditional, Input, Output & Local Variables, Iteration & Recursion, Property Lists & Arrays, Miscellaneous Topics, LISP & Other AI Programming Languages.

Practical and Term work

The Practical and Term work will be based on the topics covered in the syllabus.

Text Book:

1 "Artificial Intelligence"
-By Elaine Rich And Kevin Knight (2nd Edition)
Tata Mcgraw-Hill
2 Introduction to Prolog Programming By Carl Townsend

References:

1 "Artificial Intelligence And Expert System, Development"
-By D.W.Rolston
Mcgraw-Hill International Edition.
2 "Artificial Intelligence And Expert Systems "
-By D.W.Patterson
3 "PROLOG Programming For Artificial Intelligence"
-By Ivan Bratko(Addison-Wesley)
4 "Programming With PROLOG" –By Klocksin And Mellish.

3. Digital Signal Processing

1. **Discrete Time Signals & System:** Discrete–time signals, Discrete–time systems, Analysis of discrete-time LTI systems, Discrete-time systems described by differential equations, Implementation of discrete-time systems, Correlation of discrete-time systems
2. **Z-Transform:** Definition and Properties of Z-transform, Rational Z-transforms, Inverse Z-transform, one-sided Z-transform, Analysis of LTI systems in Z-domain
3. **Frequency Analysis of Signals and Systems:** Frequency analysis: Continuous time signals and Discrete-time signals, Properties of the Fourier transform for discrete-time signals, Frequency domain characteristics of LTI systems, LTI system as a frequency selective filter, Inverse systems and deconvolution
4. **Discrete Fourier Transform:** Frequency domain sampling, Properties of DFT, Linear filtering method based on DFT, Frequency analysis of signals using DFT, FFT algorithm, Applications of FFT, Goertzel algorithm, Quantisation effects in the computation of DFT
5. **Implementation of Discrete Time Systems:** Structure of FIR systems, Structure of IIR systems, quantization of filter coefficients, round-off effects in digital filters
6. **Design of Digital Filters:** Design of FIR filters, Design of IIR filters from analog filters, frequency transformations, Design of digital filters based on least-squares method digital filters from analogue filters, Properties of FIR digital filters, Design of FIR filters using windows, Comparison of IIR and FIR filters, and Linear phase filters.
7. **Introduction to DSP co-processors:** TMS 320C40/50, Analog Devices.
8. **Applications :** Image processing, Control, Speech, Audio, Telecommunication

Textbook

1. J.G. Proakis, "*Introduction to Digital Signal Processing*", PHI
2. Oppenhiem and Schaffer, "*Discrete Time Signal Processing*"

References

1. S.K. Mitra, "*Digital Signal Processing*", TMH.
2. T.J. Cavicchi, "*Digital Signal Processing*", John Wiley.
3. L.C. Ludeman," *Fundamentals Of Digital Signal Processing*", John Wiley.
4. E.C. Ifeachor, B.W. Jervis, "*Digital Signal Processing*", Pearson Education.
5. S Sallivahanan, "*Digital Signal Processing*", TMH.
6. Ashok Ambardar, "*Analog and Digital Signal Processing*", Thompson Learning.

4. Geographical Information System & Geographical Positioning System

1. **Introduction To GIS:** Introduction, Definition of GIS, Evolution of GIS, Component of GIS.
2. **Maps And GIS:** Map scale, Classes of map, Mapping process, Coordinate systems, Map projection, Spatial framework for mapping locations, Topographic mapping, Attribute data for Thematic mapping
3. **Digital Representation Of Geographic Data:** Technical issues to digital representation of data, Database and Database management System, Raster geographic data representation, Vector geographic data representation, Object oriented geographic data representation, Relationship between Data representation and Data analysis.
4. **Data Quality And Standards:** Concepts and definition of data quality, Component of geographic data, Data quality assessment, Spatial data error management, Geographic data standards, Geographic data standards and GIS development.
5. **GIS Data Processing, Analysis And Visualization:** Raster based GIS data processing, Vector based GIS data processing, Human computer interaction and GIS, Visualization of geographic information, Principles of Cartographic design in GIS, Generation of information product.
6. **Data Modeling:** Digital Terrain Modeling, Approaches to digital terrain data modeling, Acquisition of digital terrain data, Data processing, Analysis and visualization, Spatial modeling, Descriptive statics, Spatial autocorrelation, Quadrat counts and Nearest- Neighbor analysis, Trend surface analysis, Gravity models.
7. **GIS Project Design And Management:** Software engineering as applied to GIS, GIS project planning, System analysis and study of user requirement, Geographic database design methodology, GIS application software design methodology, System implementation, System maintenance and support.
8. **GIS Issues And Future Of GIS:** Issues of implementing GIS, Trend of GIS development, GIS
   applications and GIS users.

Textbook

1. C.P. Lo, Albert K.W. Yeung, "*Concepts and Techniques of Geographic Information Systems*", PHI
2. Kang-Tsung Chang, "*Introduction to Geographic Information Systems*", TMH

References

1. Ian Heywood, Sarah Cornelius, Steve Carver, "*An Introduction to Geographical Information System*", Person Education
2. Peter A Burrough, R. A. McDonnell, "*Principles of Geographical Information System*", Oxford Press

5. Image Processing

1. **Digital Image Processing Systems:** Introduction, Structure of human eye, Image formation in the human eye, Brightness adaptation and discrimination, Image sensing and acquisition, Storage, Processing, Communication, Display. Image sampling and quantization, Basic relationships between pixels
2. **Image Transforms (Implementation):** Introduction to Fourier transform, DFT and 2-D DFT, Properties of 2-D DFT, FFT, IFFT, Walsh transform, Hadamard transform, Discrete cosine transform, Slant transform, Optimum transform: Karhunen - Loeve (Hotelling) transform.
3. **Image Enhancement in the Spatial Domain:** Gray level transformations, Histogram processing, Arithmetic and logic operations, Spatial filtering: Introduction, Smoothing and sharpening filters
4. **Image Enhancement in the Frequency Domain:** Frequency domain filters: Smoothing and Sharpening filters, Homomorphic filtering
5. **Wavelets and Multiresolution Processing:** Image pyramids, Subband coding, Haar transform, Series expansion, Scaling functions, Wavelet functions, Discrete wavelet transforms in one dimensions, Fast wavelet transform, Wavelet transforms in two dimensions
6. **Image Data Compression:** Fundamentals, Redundancies: Coding, Interpixel, Psycho-visual, Fidelity criteria, Image compression models, Error free compression, Lossy compression, Image compression standards: Binary image and Continuous tone still image compression standards, Video compression standards.
7. **Morphological Image Processing:** Introduction, Dilation, Erosion, Opening, Closing, Hit-or-Miss transformation, Morphological algorithm operations on binary images, Morphological algorithm operations on gray-scale images
8. **Image Segmentation:** Detection of discontinuities, Edge linking and Boundary detection, Thresholding, Region based segmentation
9. **Image Representation and Description:** Representation schemes, Boundary descriptors, Regional descriptors

Textbook

1. R.C.Gonsales R.E.Woods**, "**Digital Image Processing", Second Edition, Pearson Education
2. Anil K.Jain, "Fundamentals of Image Processing", PHI

References:

1. William Pratt, "*Digital Image Processing*", John Wiley
2. Milan Sonka,Vaclav Hlavac, Roger Boyle, "*Image Processing, Analysis, and Machine Vision*" Thomson Learning
3. N Ahmed & K.R. Rao, "*Orthogonal Transforms for Digital Signal Processing*" Springer
4. B. Chanda, D. Dutta Majumder, "*Digital Image Processing and Analysis*", PHI.

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IT 706 Technical White Paper

Subject	Code	Teaching Scheme		Examination Scheme					
Technical White Paper	IT 706	Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
		-	1	Sessional	-	-		50	50
				University	-	-			

Candidates have to collect the technical literature/Information of latest development in the computer field and defend it in the form of seminar and write-up is to be evaluated as term work

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Semester - VIII

801	Industry Project									
	(a) Continuous Assessment	-	6	-	-	-	-	-	200	200
	(b) Project Work	-	24	-	-	-	-	200	400	600
		-	30	-	-	-	-	200	600	800