

GUJARAT UNIVERSITY
B.E. SEM V (COMPUTER ENGINEERING)

CE 501 Advanced Microprocessor

Subject	Code	Teaching Scheme		Examination Scheme					
		Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
Advanced Microprocessor	CE 501	3	2	Sessional	1.5 Hrs	50	25	25	200
				University	3 Hrs	100			

1. **Introduction to 16-bit microprocessors**, 8086 architecture, segments, flags, Instruction set assembly language programming on 8086 using assembler, interrupts, writing interrupt services routines, debugging programs
2. **8086 pin functions**, minimum and 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
3. **Architecture of 80286,386,486** and Pentium, memory systems, programming models flags, real mode & protected mode operations, virtual 8086 mode paging system.
4. **Concepts of RISC**, RISC vs. CISC architecture of SUN SPARC, DEC

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 Microprocessor & Interfacing - Douglas Hall (TMH)
- 2 The Intel Microprocessor 8086/88, 80186/188, 80286, 80386, 80486, Pentium And Pentium PRO Processor - Berry B. Brey (PHI)
- 3 Advance Microprocessor - Deniel Taloak (TMH)
- 4 Advanced 80386 Programming Techniques : James Turley, Pub : TMH

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CE 502 System Programming

Subject	Code	Teaching Scheme		Examination Scheme					
		Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
System Programming	CE 502	4	2	Sessional	1.5 Hrs	50	25	25	200
				University	3 Hrs	100			

- 1 Language Processors**
Fundamental Of Language Processing
Fundamental Of Language Specification
- 2 Scanning And Parsing**
- 3 Assemblers.**
Elements Of Assembly Language Programming
Assembly Scheme
Pass Structure Of Assembler
Design Of Two Pass Assembler
- 4 Macro Processors.**
Macro Definition And Call
Macro Expansion
Nested Macro Calls
Advanced Macro Facilities
Design Of Macro Preprocessor
- 5 Loader & Linkers.**
Relocation Of Linking Concept
Design Of Linker
Linker For Ms Dos
Loaders
- 6 Introduction To Compilers.**
Aspects Of Compilation
Memory Allocation
Compilation Of Expression And Control Structure
Code Optimization
Interpreters
- 7 Editors & Debuggers.**
- 8 Introduction To Operating Systems**
Evolution Of OS
Os Functions
Types Of Os
Os Structure

Practical and Term work

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

Text Books

Dhamdhare, D.M. Introduction To Systems Software, Mcgraw Hill.

Reference Books

- 1 Aho. A.V. Sethi R. And Ulman J.D., Compilers, Principles, Techniques And Tools, Addison-Wesley.
- 2 Barron D.W., Assemblers And Loaders, 2/E, New York, Elsevier, 1972.
- 3 Beck.L.L., Systems Software : An Introduction To Systems Programming, Addison-Wesely, 1985.
- 4 Calingare P. Assemblers, Compilers And Program Translation Rockville, Md. Computer Science.
- 5 Ullman J.D. Fundamental Concepts Of Programming Systems, Addison-Wesley.
- 6 Aho A.V.And Ullman J.D., The Theory Of Parsing, Translation And Compiling, Vol. I Addison-Wesley

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CE 503 Web Technology

Subject	Code	Teaching Scheme		Examination Scheme					
		Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
Web Technology	CE 503	4	2	Sessional	1.5 Hrs	50	25	25	200
				University	3 Hrs	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, syntax, 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

CE 504 Software Engineering

Subject	Code	Teaching Scheme		Examination Scheme					
		Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
Software Engineering	CE 504	4	2	Sessional	1.5 Hrs	50	25	25	200
				University	3 Hrs	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, Addison-Wesley.

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CE 505 Computer Oriented Statistical & Numerical Technique

Subject	Code	Teaching Scheme		Examination Scheme					
		Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
Computer Oriented Statistical & Numerical Technique	CE 505	4	2	Sessional	1.5 Hrs	50	25	25	200
				University	3 Hrs	100			

1 Computer Arithmetic

Floating Point Representation Of Numbers, Arithmetic Operation With Normalized Floating Point Numbers And Their Consequences. Errors: Data Errors, Truncation Errors, Round Off Errors, Computational Errors, Absolute And Relative Errors

2 Iterative Methods

Bisection, False Position, Secant, Newton-Raphson Method Iterative Method (Including Extended), Newton-Raphson Method For Non Linear Equations In Two Variables, Convergence Of Iterative Methods. Showing Polynomial Equations, Descartes Rule Of Sign, Budan's Theorem.

3 Finite Differences And Interpolation

Finite Differences: Forward, Backward And Divided Differences. Differences Table, Newton's Forward, Backward And Divided Differences Interpolation Formula. Lagrange Interpolation Formula, Inverse Interpolation, Error Propagation In Difference Table, Estimate Of Errors In Interpolation.

4 Curve Fitting And Method Of Least Squares

Method Of Least Squares, Fitting A Straight Line And Polynomial Fitting A Non-Linear, Function: Fitting A Geometric And Exponential Curve, Fitting A Hyperbola At Fitting A. Trigonometric Function. Approximation Of Function By Taylor Series And Chebyshev Polynomials.

5 Numerical Differentiation And Integration.

Differentiation Formula Based On Functions Tabulator At Equal And Unequal Intervals Newton-Cotes Integration Formulae: Trapezoidal Rule, Simpson's 1/3 And 3/8th Rule

6 Solution of Simultaneous Linear Equation:

Solution Of Systems Of Linear Equations : Gauss Elimination Maths Pivots, Ill Conditions Equations, Gauss- Seidal And Gauss Jacobi Iterative Methods.

7 Numerical Solution Of Ordinary Differential Equation

Taylor Series And Euler's Methods, Rangekutta Method Of 4th Order, Milnes's Predictor – Corrector Methods.

8 Probability

- Introduction
- Objectives
- Probability : Its Definition
 - Classical Definition Of Probability
 - Limitation Of Classical Definition Of Probability
 - Statistical Definition Of Probability
 - Axiomatic Approach

- Simple Properties Of Probability Of An Event
- Conditional Probability
- Bayes Theorem
- Booles Inequality
- Independent Events
- Random Variable
- Expectation Or Mathematical Expectation
- Properties Of Expectation
- Distribution : Binomial, Poisson, Normal

9 Measures Of Central Tendency

- Introduction
- Objectives
- Measures Of Central Tendency
- Measures Of Dispersion
- Coefficient Of Variation And Coefficient Of Dispersion
- Moments, Skewness And Kurtosis

10 Correlation & Regression

- Introduction
- Objectives
- Correlation & Scatter Diagram
- Regression
- Graphical Representation Of Relation Between Correlation & 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

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CE 506 Seminar

Subject	Code	Teaching Scheme		Examination Scheme					
		Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
Seminar	CE 506	-	1	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

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CE 601 Theory Of Computation

Subject	Code	Teaching Scheme		Examination Scheme					
		Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
Theory Of Computation	CE 601	3	1	Sessional	1.5 Hrs	50	-	25	175
				University	3 Hrs	100			

- 1 **Concept of Automata** : Review Of Mathematical Terms And Theory
Basic Mathematical Notations And Set Theory, Logic, Functions And Relations, Alphabets, Language Definitions, Mathematical Inductions And Recursive Definitions
- 2 **Finite Automata**
Regular Expressions and Finite Automata, Non Determinism, \wedge -Transitions, Conversion from NFA to FA, NFA- \wedge to NFA and equivalence of three, Kleene's Theorem, Regular And Non Regular Languages – pumping lemma, Automata with output-Moore machine, Mealy machine
- 3 **Cfg (Context Free Grammar)**
Introduction To Cfg, Regular grammar, Bacos Naur Form(BNF), Left most & Right most derivations, parse trees, ambiguity, Normal Form – CNF
- 4 **Pushdown Automata, CFL And NCFL**
Introduction To PDA, Definition, Picture representation of PDA, PDA Corresponding To CFG, CFG Corresponding To PDA, pumping lemma for CFL, Decisions Problems And CFL
- 5 **Turing Machines**
Introduction, Definition Of Turing Machine, Model Of Computation And Church Turning Thesis, computing functions with TM, Tm And Language Acceptors, Combining TM, Variations Of Tm, Non Deterministic TM, Universal TM, Recursively and Enumerable Languages, Context sensitive languages and Chomsky hierarchy, Halting problem
- 6 **Computable Functions**
Partial, total, constant functions, Primitive Recursive Functions, Bounded Minimalisations, Regular function, Recursive Functions

Practical and Term work

Practical and Term work should be carried out as per the above syllabus. Minimum 10 exercises should be carried out.

Text Books:

- 1 Introduction To Languages And Theory Of Computation By John C. Martin, Third Edition, TMH
- 2 An introduction to automata theory and formal languages By Adesh K. Pandey, Publisher : S.K. Kataria & Sons

Reference book :

Introduction to computer theory By Deniel I. Cohen , Joh Wiley & Sons, Inc.

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CE 602 Cryptography & Network Security

Subject	Code	Teaching Scheme		Examination Scheme					
		Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
Cryptography & Network Security	CE 602	4	2	Sessional	1.5 Hrs	50	25	25	200
				University	3 Hrs	100			

- 1 **Conventional Encryption**
Conventional Encryption Model, Steganography, Classical Encryption Techniques
- 2 **Conventional Encryption Techniques**
Simplified Des, Block Cipher Principles, Data Encryption Standards, Differential And Linear Cryptography Principles, Block Cipher Design Principles, Modes Of Operations, Algorithms Like Triple Des, International Data Encryption Algorithm, Blowfish, Rc5, Cast-128, Rc2, Characteristics Of Advanced Symmetrical Block Cipher, Issues Of Conventional Encryption Like Traffic Distribution, Random Number Generation, Key Distribution
- 3 **Public Key Cryptography**
Principles Of Public-Key Cryptography, Rsa Algorithm, Key Management, Elliptic Curve Cryptography, Diffie-Hellman Key Exchange
- 4 **Number Theory**
Prime And Relative Prime Numbers, Modular Arithmetic, Euler's Theorem, Euclid's Algorithm, Discrete Logarithm Tics
- 5 **Message Authentication And Hash Functions**
Authentication Requirement, Functions, Message Authentication Code, Hash Functions, Security Of Hash Functions And Macs, Md5 Message Digest Algorithm, Secure Hash Algorithm, Ripemd-160, Hmac
- 6 **Network Security**
Digital Signatures, Authentication Protocols, Digital Signature Standards, Application Authentication Techniques Like Kerberos, X.509 Directory Authentication Services, Active Directory Service Of Windows@ Nt/Windows @ 2000
- 7 **IP Security E-Mail Security**
IP Security Overview, Architecture, Authentication Header, Encapsulation Security Payload, Combining Security Association, Key Management, Pretty Good Privacy, S/Mime And Types
- 8 **Web Security**
Web Security Requirement, Ssl And Transport Layer Security, Secure Electronic Transactions, Firewall Design Principles, Trusted Systems

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 Cryptography And Network Principles And Practice Second Edition, By William Stallings - Prentice Hall, Pearson Education Asia, Low Priced Edition

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CE 603 Computer Network

Subject	Code	Teaching Scheme		Examination Scheme					
		Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
Computer Network	CE 603	4	2	Sessional	1.5 Hrs	50	25	25	200
				University	3 Hrs	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, internetwork 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:

Introduction to Data Communication and Networking by Behrouz Forouzan

Computer Network by natalia olifer, victor olifer (wiley-india edition)

Data and computer communication by William Stallings.

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CE 604 Parallel Computing

Subject	Code	Teaching Scheme		Examination Scheme					
		Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
Parallel Computing	CE 604	4	2	Sessional	1.5 Hrs	50	25	25	200
				University	3 Hrs	100			

1 Introduction.

Parallel Processing – Shared Memory Multiprocessing – Distributed Shared Memory – Message Passing Parallel Computers - Using Parallelism – Utilizing Temporal Parallelism – Utilizing Data Parallelism – Comparison Of Temporal And Data Parallel Processing – Data Parallel Processing With Specialized Processors – Tools And Languages.

2 Processes & Shared Memory Programming

Processes - Shared Memory Programming – General Model Of Shared Memory Programming – Forking-Creating Processes – Joining Processes - Process Model Under UNIX.

3 Basic Parallel Programming Techniques.

Loop Splitting – Ideal Speedup – Spin-Locks, Contention And Self-Scheduling.

4 Scheduling.

Loop Scheduling – Variations On Loop Scheduling – Expression Scheduling – Self-Scheduling – Variations On Self-Scheduling – Indirect Scheduling – Block Scheduling – Special Scheduling.

5 Barriers And Race Conditions.

The Barrier Calls – Expression Splitting.

6 Programmability Issues.

Operating System Support – Types Of Operating Systems – Parallel Programming Models – Software Tools.

7 Thread-Based Implementation.

Thread Management – Example With Threads – Attributes Of Threads – Mutual Exclusion With Threads – Mutex Usage Of Threads – Thread Implementation – Events And Condition Variables – Deviation Computation With Threads – Java Threads.

8 Distributed Computing – I: Message Passing Model.

Message Passing Model – General Model – Programming Model – PVM.

9 Distributed Computing – II: Remote Procedure Call

Parameter Passing – Locating The Server – Semantics In The Presence Of Failures – Security – Problem Areas – Java Remote Method Invocation – DCE – Developing Applications In DCE.

10 Algorithms For Parallel Machines.

Models Of Computation – Analysis Of Parallel Algorithms – Prefix Computation – Histogram Computation – Parallel Reduction – Quadrature Problem – Sorting – Searching - Matrix Multiplication – Parallel Sorting Algorithms – Solving Linear Systems – Probabilistic Algorithms.

11 Semaphores And Events.

Semaphores, Events.

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 Introduction To Parallel Programming - By Steven Brawer
- 2 Introduction To Parallel Processing – By M.Sasikumar, Dinesh Shikhare And P. Ravi Prakash
- 3 Parallel Computers – Architecture And Programming – By V. Rajaraman And C. Siva Ram Murthy

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CE 605 Computer Graphics

Subject	Code	Teaching Scheme		Examination Scheme					
		Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
Computer Graphics	CE 605	4	2	Sessional	1.5 Hrs	50	25	25	200
				University	3 Hrs	100			

1 Introduction

What Is Computer Graphics? Elements Of Graphics, Workstation, Device Independence Fundamental Problems In Geometry.

2 Graphics Primitives

Introduction, Display Devices, Primitive Operations, The Display-File Interpreter, Normalized Device Co-Ordinates, Display-File Structure, Display-File Algorithms, Display Control, Text, The Line-Style Primitives

3 Geometric Manipulation And Line Generations

Introduction, Lines, Line Segments, Perpendicular Lines, Distance Between A Point And A Line, Vectors, Pixels And Frame Buffers, Vector Generation, Bresenham's Algorithm, Antialiasing Of Lines, Thick Line Segments, Character Generation, Displaying The Frame Buffer.

4 Polygons

Introduction, Polygon, Polygon Representation, Entering Polygons, An Inside Test, Polygon Interfacing Algorithms, Filling Polygons, Filling With A Pattern, Initialization, Antialiasing.

5 Transformations

Introduction, Matrices, Scaling Transformations, Sin And Cos, Rotation, Homogeneous Co-Ordinates And Translation, Coordinate Transformations, Rotations About An Arbitrary Point, Other Transformations, Inverse Transformations, Transformation Routines, Transformation And Patterns, Initialization, Display Procedures.

6 Segments

Introduction, The Segment Table, Segment Creation, Closing A Segment, Deleting A Segment, Renaming A Segment, Visibility, Image Transformation, Revising Previous Transformation Routines, Saving And Showing Segments, Other Display-File Structures, Some Raster Techniques.

7 Windows And Clipping

Introduction, The Viewing Transformation, Viewing Transformation Implementation, Clipping The Cohen-Sutherland Outcode Algorithm, The Sutherland-Hodgeman Algorithm, The Clipping Of Polygons, Adding Clipping To The System, Generalized Clipping, Position Relative To An Arbitrary Line, Multiple Windowing.

8 Three Dimensions

Introduction, 3d Geometry, 3d Primitives, 3d Transformations, Rotation About An Arbitrary Axis, Parallel Projection, Perspective Projection, Viewing Parameters,

Special Projections, Conversion To View Plane Co-Ordinates, Clipping In Three Dimensions, Clipping Planes, The 3d Viewing Transformations.

9 Hidden Surfaces And Lines

Back-Face Removal, Back-Face Algorithms, Z Buffers, Scan-Line Algorithms

10 Light, Color And Shading

Diffuse Illumination, Point-Source Illumination, Specular Reflection, Shading Algorithms, Shadows, Ray Tracing, Halftones, Color, Color Models, Color Tables.

11 Interactive Devices

Keyboards, Touch Panels, Light Pens, Graphics Tablets, Joysticks, Trackball, Mouse, Voice Systems, Logical Classification Of Input Devices, Locator Devices, Stroke Devices, String Devices, Valuator Devices, Choice Devices, Pick Devices

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 Computer Graphics By Steven Harrington, Mcgrawhill Publications.
- 2 Computer Graphics C Version By D.Hearn And P.Baker, Pearson Education

Reference Books

- 1 An Introduction To Splines For Use In Computer Graphics And Geometric Modelling By R.H.Bartels, J.C.Beatty And B.A.Barsky
- 2 Computer Graphcis By Foley And Vandam

GUJARAT UNIVERSITY
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CE 606 Software Project Lab

Subject	Code	Teaching Scheme		Examination Scheme					
		Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
Software Project Lab	CE 606	-	2	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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CE 701 Compiler Construction

Subject	Code	Teaching Scheme		Examination Scheme					
		Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
Compiler Construction	CE 701	4	2	Sessional	1.5 Hrs	50	25	25	200
				University	3 Hrs	100			

Overview of The Translation Process, Lexical Analysis

Hard Coding and Automatic Generation Lexical Analyzers, Parsing Theory

Top Down and Bottom Up Parsing Algorithms, Automatic Generation Of Parsers

1. Error Recovery

Error Detection & Recovery, Ad-Hoc And Systematic Methods

2. Intermediate Code Generation

Different Intermediate Forms, Syntax Directed Translation Mechanisms And Attributed Mechanisms And Attributed Definition.

3. Run Time Memory Management

Static Memory Allocation And Stack Memory Allocation Schemes, Symbol Table Management.

4. Code Generation

Machine Model, Order Of Evaluation, Register Allocation And Code Selection.

5. Code Optimization

Global Data Flow Analysis, A Few Selected Optimizations Like Command Sub Expression Removal, Loop Invariant Code Motion, Strength Reduction Etc.

Practical and Term work

The Practical and Term work will be based on the topics covered in the syllabus.
Minimum 5 experiments should be carried out.

Texts/References:

- 1 A.V.Aho, Ravi Sethi, J.D.Ullman, Compiler Tools Techniques, Addison Wesley
- 2 D.M.Dhamdhare, Compiler Construction-Principles And Practices - Mcmillian
- 3 Trembley J.P. And Sorenson, P.G. The Theory And Practice Of Compiler Writing, Mcgraw-Hill
- 4 Waite W.N. And Goos G., Compiler Construction Springer Verlag

GUJARAT UNIVERSITY
B.E. SEM VII (COMPUTER ENGINEERING)

CE 702 Mobile Computing

Subject	Code	Teaching Scheme		Examination Scheme					
		Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
Mobile Computing	CE 702	4	2	Sessional	1.5 Hrs	50	25	25	200
				University	3 Hrs	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 GPRS

7 Wireless Application Protocol(Wap)

WAP,MMS,GPRS application

8 CDMA And 3G

Spread-spectrum Technology, CDMA versus GSM, Wireless data, third generation networks, applications in 3G

9 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

10 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

11 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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CE 703 Special Trends in Internet Programming

Subject	Code	Teaching Scheme		Examination Scheme					
		Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
Special Trends in Internet Programming	CE 703	3	2	Sessional	1.5 Hrs	50	25	25	200
				University	3 Hrs	100			

1 Introduction to .NET

.NET framework, MSIL, CLR, CLS, Name spaces, Assemblies
The Common Language Implementation | Assemblies | Metadata and Intermediate Language | Garbage Collection | Versioning and Side-by-Side Execution | The End to DLL Hell | Managed Execution | COM InterOp

2 VB .NET

Language Features
Creating .NET Projects | NameSpaces | Data Structure and Language Highlights | Classes and Inheritance | Structured Error Handling | Exploring the Base Class Library | Compatibility with VB6 | The .NET Type System | Threads | C#

3 Console Applications

When to use Console Applications | Generating Console Output | Processing Console Input

4 Introduction to Windows Forms

Benefits of Windows Forms | Windows Forms compared to the classic VB 'Ruby' Forms mode | .NET Events | Visual Inheritance | Code-free re-sizing | Using ActiveX Controls

5 Introduction to ADO.NET

Benefits of ADO.NET | ADO.NET compared to classic ADO | DataSets | Managed Providers | Data Binding, DataSets and XML | Typed DataSets

6

Windows Forms and Controls in detail

The Windows Forms Model | Creating Windows Forms | Windows Forms Properties and Events | Windows Form Controls | Resizing | Menus | Dialogs | ToolTips

7 Data Types and Base Class Libraries

Understanding .NET Data Types | Exploring Assemblies and Namespaces | String Manipulation | Files and I/O | Collections | The Microsoft.VisualBasic Namespace

8 Object Oriented Programming with VB.NET

Creating Classes in VB.NET | Overloading | Constructors | Inheritance | Controlling scope and visibility | Dispose and Finalization | Debugging and Error Handling

9 **Visual Inheritance**

Apply Inheritance techniques to Forms | Creating Base Forms | Programming Derived Forms

10 **Mastering Windows Forms**

Printing | Handling Multiple Events | GDI+ | Creating Windows Forms Controls

11 **ASP .NET**

Introduction to ASP.NET, Working with Controls, Using Rich Server Controls
Accessing Data, Overview of ADO.NET | Connecting to Data | Executing Commands | Working with Data | Choosing an ADO.NET Provider , Configuration Overview | Using the Web Site Administration Tool | Programming Configuration Files | Encrypting Configuration Sections

12 **Data Binding**

Introducing Data Source Controls | Reading and Write Data Using the SqlDataSource Control | Displaying and Editing Middle-Tier Data using the ObjectDataSource Control | Displaying XML Data Using the XmlDataSource Control

13 **Validating User Input**

Overview of ASP.NET Validation Controls | Using the Simple Validators | Using the Complex Validators | Summarizing Results with the ValidationSummary Control | Separating Validation into Validation Groups

14 **Themes and Master Pages**

Creating a Consistent Web Site | ASP.NET 2.0 Themes | Master Pages
Displaying Data with the GridView Control
Introducing the GridView Control | Filter Data in the GridView Control | Allow Users to Select from a DropDownList in the Grid |
Add a Hyperlink to the Grid | Deleting a Row and Handling Errors

15 **Managing State**

Preserving State in Web Applications | Page-Level State | Using Cookies to Preserve State | ASP.NET Session State | Storing Objects in Session State | Configuring Session State | Setting Up an Out-of-Process State Server | Storing Session State in SQL Server | Using Cookieless Session IDs | Application State
Using the DataList and Repeater Controls | Overview of List-Bound Controls |
Creating a Repeater Control | Creating a DataList Control

16 **Creating and Consuming Web Services**

The Motivation for XML Web Services | Creating an XML Web Service with Visual Studio | Designing XML Web Services | Creating Web Service Consumers |
Discovering Web Services Using UDDI

Book List:

1. Professional VB. NET , Wrox publication
2. ASP .NET complete reference, TMH

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CE 704 Elective – I

Subject	Code	Teaching Scheme		Examination Scheme					
		Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
Elective – I	CE 704	4	2	Sessional	1.5 Hrs	50	25	25	200
				University	3 Hrs	100			

1. Distributed Database Application System

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
 Categories of Distributed Systems

2. Distributed Systems Overview

Multiprocessor Systems ,Distributed Computer Systems
 A Perspective on Distributed Environments
 Campus Versus National Network Considerations
 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

3. Distributed Memory, Memory Hierarchies,

Directories, and Data Retrieval ,Memory Hierarchies
 Location of Data ,Directories

4. Designing Distributed Applications Using

Active Server Pages, ADO, CORBA, EJB
 CORBA Distributed Objects and
 COM/DCOM Technology

5. Learning ADO Basics and Basics of ASP

Getting the Most Out of Recordsets.

Unusual ADO: Executing DDL with ADOX and Using ADO with Nontraditional Data Sources.

6. Using Remote Data Services in Web Applications.

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

2. 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

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.

4. Enterprise Resource Planning

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 techno 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 Education)

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.

5. 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. Introduction To Distributed Algorithms, { By G.Tel } Cambridge University Press, 1994.
4. Programme Verification, { By K.R.Apte} 1991.
5. Distributed 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.

6. 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 Gadget 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 ATMEGA 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 8051 Microcontroller 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

7. 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.

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CE 705 Elective – II

Subject	Code	Teaching Scheme		Examination Scheme					
		Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
Elective – II	CE 705	4	2	Sessional	1.5 Hrs	50	25	25	200
				University	3 Hrs	100			

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 Wisley
- 2 Unleashed Java 2 Platform, Sams Techmedia

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. Data warehousing and mining

[A] 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.

[B] 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.

3. 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 statistics, 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

4. 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.

5. 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 Network, Learning In Neural Network, 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 Klocksinn And Mellish.

6. 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. Oppenheim 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.

7.Data Compression

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

5. 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

6. 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.

7. Speech Compression

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

8. 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, Common 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, Morgan Kaufmann
3. "Data Compression : The Complete Reference", David Saloman, Springer

GUJARAT UNIVERSITY
B.E. SEM VII (COMPUTER ENGINEERING)

CE 706 Technical White Paper

Subject	Code	Teaching Scheme		Examination Scheme					
		Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
Technical White Paper	CE 706	-	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

GUJARAT UNIVERSITY
B.E. SEM VIII (Computer Engineering)

CE801: Distributed Computing

Subject	Code	Teaching Scheme		Examination Scheme					
		Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
Elective	CE 801	04	02	University	3 Hr	100	25	25	150

Distributed computing:

History, Forms of computing, Monolithic, Distributed, Parallel, Cooperative Strengths and weaknesses of distributed computing, OS basics, Programs and processes, Concurrent programming

Interconnection networks

Cache hit-rate model, Cache coherency, Static and Dynamic networks, Internet mega computer-Network resources and their identifications, OLE/ COM, Distributed objects and CORBA, RPC and Rendezvous, Internet agents, Porting of applications- accessibility, scalability, security, fault tolerance

Intercrosses communication

Archetypal IPC program interface, Event synchronization, Timeouts and threading, Deadlock and timeouts, Data representation, Data encoding, Text based protocols, Request response protocols, Event and sequence diagram, Connection vs. connectionless IPC

Distributed computing paradigms

Paradigms, Message passing, Client server, Peer to peer, Message system, Remote procedure call model, Distributed objects, Object space, Mobile agent, Network services, Collaborative application (groupware), Abstraction, Tradeoffs: abstraction vs. overhead, Scalability, cross-platform

Distributed Objects

Message passing vs distributed objects, Archetypal distributed object architecture, Distributed object systems, Remote procedure calls, Java RMI architecture, Client side Server side, Object registry, API for Java RMI, Remote interface, Server side software Client side software, RMI vs. socket API

Advanced RMI

Client callback, Client side, Server side, Stub downloading, RMI Security manager, Instantiation of a Security manager, Java security policy file, Specifying stub downloading

and a security policy file, Algorithms for building RMI application, Allowing for Stub downloading

Advanced Distributed Computing Paradigms

Message Queue system paradigm, Point to point, Publish/Subscribe, Mobile Agents, Basic architecture, Advantages, Mobile agent framework systems, Network services

Textbook:

- 1) Distributed Computing: Principles and Applications, M. L. Liu, Pearson/Addison-Wesley,
- 2) A. Taunenbaum, Distributed Systems: Principles and Paradigms
- 3) G. Coulouris, J. Dollimore, and T. Kindberg, Distributed Systems: Concepts and Design, Pearson Education

References:

1. M. Singhal, N. Shivaratri, Advanced Concepts in Operating Systems, TMH

CE802: Advance Computer Architecture

Subject	Code	Teaching Scheme		Examination Scheme					
		Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
Elective	CE 802	04	02	University	3 Hr	100	25	25	150

Introduction and review

Fundamentals of digital system and Review

Pipelining

Linear Pipeline processor: Nonlinear pipeline processor, instruction pipeline design, Mechanisms for instruction pipelining, dynamic instruction scheduling, Branch handling techniques, arithmetic pipelining design: Computer arithmetic principles, static arithmetic pipelines, multifunction arithmetic pipelines.

Storage and memory hierarchy

Register file, Virtual file, Cache memories, cache memory working principles, cache coherence issues, cache performance analysis, High bandwidth memories.

Instruction level parallelism

Super-scalar processors, VLIW architecture

Parallel computer models and program parallelism

Classification of machines, SISD, SIMD and MIMD, Conditions of parallelism, data and resource dependencies, hardware and software parallelism, program partitioning and scheduling, grain size latency, program flow mechanism, control flow versus data flow, data flow architecture, demand driven mechanisms, comparison of flow mechanisms

Vector Processor and synchronous parallel processing

Vector instruction types, vector-access memory schemes, vector and symbolic processors, SIMD architecture and programming principles: SIMD parallel algorithms, SIMD computers and performance enhancement.

System Interconnect architecture

Network properties and routing, static interconnection networks, Dynamic interconnection networks, multiprocessor system interconnects: Hierarchical bus system, crossbar switch and multi-port memory, multistage and combining network.

Multiprocessor architecture and programming

Functional structure, Interconnection network, Parallel memory organization, Multiprocessor operating system, Exploiting concurrency for multiprocessor.

TEXT BOOK:

1. Hennessey & D.A. Patterson, "Computer architecture: A quantitative approach", International student edition, 3rd edition, 2002, Morgan kaufmaan publisher.
2. Michael J. Flynn," Computer Architecture: Pipelined and parallel processor design", 1995, Jones and barlett, Boston.
3. Kai Hawang and Faye A. Briggs, " Computer architecture and parallel processing", International edition, 1993, TMH

Reference Book:

1. R.K. Ghose, Rajan Moona & Phalfui Gupta, "Foundation of parallel processing"; Narosa publication
2. D. Sima, T. Fountain, P. Kasuk, " Advanced computer architecture – A design space approach", 1997, Addison Wesley

CE803: Soft Computing and Neural Network

Subject	Code	Teaching Scheme		Examination Scheme					
		Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
Elective	CE 803	04	02	University	3 Hr	100	25	25	150

NEURAL NETWORKS

Supervised Learning Neural Networks – Perceptrons - Adaline – Backpropagation Multilayer Perceptrons – Radial Basis Function Networks – Unsupervised Learning Neural Networks – Competitive Learning Networks – Kohonen Self-Organizing Networks – Learning Vector Quantization – Hebbian Learning.

FUZZY SET THEORY

Introduction to Neuro – Fuzzy and Soft Computing – Fuzzy Sets – Basic Definition and Terminology – Set-theoretic Operations – Member Function Formulation and Parameterization – Fuzzy Rules and Fuzzy Reasoning – Extension Principle and Fuzzy Relations – Fuzzy If-Then Rules – Fuzzy Reasoning – Fuzzy Inference Systems – Mamdani Fuzzy Models – Sugeno Fuzzy Models – Tsukamoto Fuzzy Models – Input Space Partitioning and Fuzzy Modeling.

GENETIC ALGORITHM:

Difference between Traditional Algorithms and GA, The basic operators, Schema theorem, convergence analysis, stochastic models, applications in search and optimization. Encoding, Fitness Function, Reproduction, Cross Over, Mutation, Convergence Theory; Applications.

ROUGH SET:

Indiscernibility Relations, Reducts, Rough Approximation. Applications. Hybrid Systems: Neuro Fuzzy Systems, Fuzzy Logic Controlled GA, Fuzzy Membership Interpretation using Rough Set theory etc.

NEURO FUZZY MODELING

Adaptive Neuro-Fuzzy Inference Systems – Architecture – Hybrid Learning Algorithm – Learning Methods that Cross-fertilize ANFIS and RBFN – Coactive Neuro Fuzzy Modeling – Framework Neuron Functions for Adaptive Networks – Neuro Fuzzy Spectrum. Neuro-Fuzzy Systems for Pattern Recognition: Image-, Speech- and Language Processing

NEURO-GENETIC INFORMATION PROCESSING FOR OPTIMIZATION:

Adaptation in Intelligent Systems , Evolving Connectionist and Fuzzy Connectionist Systems, Applications for Adaptive Systems, On-line Intelligent Systems

MACHINE LEARNING

Learning from Examples - Inductive Concept Learning - Sequence Prediction - Effect of Noise in Input. Learning by Analogy- Concept formation - Derivational Analogy. Learning by Observation and Discovery - Search for Regularity-Conceptual Clustering, Computational Learning Theory.

APPLICATIONS OF COMPUTATIONAL INTELLIGENCE

Printed Character Recognition – Inverse Kinematics Problems – Automobile Fuel Efficiency Prediction – Soft Computing for Color Recipe Prediction.

Practical: Minimum 10 experiments should be carried out according to topic covered in subject.

TEXT BOOK

- J.S.R.Jang, C.T.Sun and E.Mizutani, “Neuro-Fuzzy and Soft Computing”, PHI, 2004, Pearson Education 2004.
- Michalski, Carbonnel & Michel (Eds.): Machine Learning - An A. I. Approach, Vol-I.

REFERENCES

- Timothy J.Ross, “Fuzzy Logic with Engineering Applications”, McGraw-Hill, 1997.
- Davis E.Goldberg, “Genetic Algorithms: Search, Optimization and Machine Learning”, Addison Wesley, N.Y., 1989.
- S. Rajasekaran and G.A.V.Pai, “Neural Networks, Fuzzy Logic and Genetic Algorithms”, PHI, 2003.
- Neuro-Fuzzy Techniques for Intelligent Information Systems by Nikola Kasabov and Robert Kozma (eds), ISBN 3-7908-1187-4.
- Neural network fuzzy logic genetic algorithm synthesis and application- S. Rjaesh Karan.

CE804 Advance Computer Network

Subject	Code	Teaching Scheme		Examination Scheme					
		Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
Elective	CE 804	04	02	University	3 Hr	100	25	25	150

Frame Relay

Circuit switching network, Packet switching network, Frame Relay Network

Asynchronous Transfer Mode

ATM protocol architecture, ATM logical connection, ATM cell, ATM service category, ATM adaption layer

Congestion Control in network

Effect of congestion, Congestion control, Traffic management, Congestion control in packet switching network, Frame Relay Congestion control

Traffic Congestion control in ATM network

Requirement for ATM traffic & congestion control, ATM traffic related issue, Traffic management framework, Traffic control, ABR,GFR Traffic management.

Integrated & Differentiated Service

Integrated Service Architecture, Queuing discipline, Random early detection, differentiated services.

Protocol for QOS support

Resource reservation Protocol (RSVP), Multiprotocol Label Switching (MPLS), Real time transport protocol

Sensor Network

Introduction, Sensor network Architecture, MAC layer protocol in sensor Network, Routing in sensor network, Sensor network Applications

Wireless LANs and PANs

WiFi ,Bluetooth (piconets, Scatternets) ,Zigbee

Wireless WANs and MANs

Cellular Telephony (+Femtocells),Wimax ,LTE

Other Advance Topic

Mobile Internet, IPTV,IP Telephony

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 BOOK:

1. High-Speed Networks and Internets: Performance and Quality of Service by **William Stallings** Publisher: Prentice Hall

CE805: Computer Vision

Subject	Code	Teaching Scheme		Examination Scheme					
		Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
Elective	CE 805	04	02	University	3 Hr	100	25	25	150

Computer vision issues

Achieving simple vision goals ,High-level and low-level capabilities,A range of representations,The role of computers,Computer vision research and applications

Image formation

Cameras,Radiometry – measuring light,Sources, shadows and shading Colour

Image models

Geometric image features,Analytical image features

Early vision: one image

Liner filters, Edge detection, Texture

Early vision: multiple images

The geometry of multiple views,Stereopsis,Affine structure from motion,Projective structure from motion

Mid level vision

Segmentation using clustering methods, fitting

High level vision

Correspondence and pose consistency, finding templates using classifiers

Applications and Topics

Application : finding in digital libraries, Application: image based rendering

Practical and Term work:

Practical and Term work should be carried out as per the above syllabus. Minimum 10 exercises should be carried out.

Textbook:

Computer Vision: A modern approach by Forsyth and Ponce, PHI publication.

References:

Computer Vision by Dana H. Ballard and Christopher M. Brown, Prentice-Hall Inc.

CE806: Algorithm Analysis & Design

Subject	Code	Teaching Scheme		Examination Scheme					
		Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
Elective	CE 807	04	02	University	3 Hr	100	25	25	150

Basics of Algorithms and Mathematics

What is an algorithm? Mathematics for Algorithmic, Sets , Functions and Relations, Vectors and Matrices , Linear Inequalities and Linear Equations

Analysis of Algorithm

The efficient of algorithm, average and worst case analysis, elementary operation, Asymptotic Notation, Analyzing control statement, Analyzing Algorithm using Barometer, Amortized analysis, solving recurrence Equation, Sorting Algorithm, Binary Tree Search

Greedy Algorithm

General Characteristics of greedy algorithms, Problem solving using Greedy Algorithm - Making change problem; Graphs: Minimum Spanning trees (Kruskal's algorithm, Prim's algorithm); Graphs: Shortest paths; The Knapsack Problem; Job Scheduling Problem

Divide and Conquer Algorithm

The general Template derives using multiplying large Integers Problem, Problem Solving using divide and conquer algorithm - Binary Search; Sorting (Merge Sort, Quick Sort); Matrix Multiplication; Exponential

Dynamic Programming

Introduction, The Principle of Optimality, Problem Solving using Dynamic Programming – Calculating the Binomial Coefficient; Making Change Problem; Assembly Line-Scheduling; Knapsack Problem; Shortest Path; Matrix Chain Multiplication; Longest Common Subsequence, memory functions

Exploring Graphs

An introduction using graphs and games, Traversing Trees – Preconditioning; Depth First Search - Undirected Graph; Directed Graph, Breath First Search, Backtracking – The Knapsack Problem; The Eight queens problem; General Template, Brach and Bound – The Assignment Problem; The Knapsack Problem, The minmax principle

String Matching

Introduction, The naïve string matching algorithm, The Rabin-Karp algorithm, String Matching with finite automata

Introduction to NP-Completeness

The class P and NP, Polynomial reduction, NP- Completeness Problem, NP-Hard Problems

Practical and Term work:

Practical and Term work should be carried out as per the above syllabus. Minimum 10 exercises should be carried out.

Text Books:

- 3 Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein

Reference book:

1. Fundamental of Algorithms by Gills Brassard, Paul Bratley, Publication : Pentice Hall of India
2. Fundamental of Computer Algorithms by Ellis Horowitz, Sartaz sahani and sanguthevar Rajasekarm

CE807: Service Oriented Computing

Subject	Code	Teaching Scheme		Examination Scheme					
		Theory	Lab/ Pract	Exam	Theory Paper	Theory Marks	Pract	TW	Total
Elective	CE 807	04	02	University	3 Hr	100	25	25	150

Introduction

Introduction, Brief history of information technology, Distributed computing in the large, Motivations for composition, Challenges for composition, Web Services Architectures and Standards.

Basic concepts

Directory services, SOAP, WSDL, UDDI

Enterprise architectures

Integration versus interoperation, J2EE, .NET, Model Driven Architecture, Legacy systems.

Principles of Service-Oriented Computing

Use cases: Intra-enterprise and Inter-enterprise Interoperation, Application, Configuration, Dynamic Selection, Software Fault Tolerance, Grid, and, Utility Computing, Elements of Service-Oriented Architectures, RPC versus Document, Orientation, Composing Services

Description: Modeling and representation

XML primer, Conceptual modeling, Ontologies and knowledge sharing, Relevant standards: RDF, RDFS, and OWL, Inferencing and tools, Matchmaking

Engagement

Execution Models: Messaging, CORBA, Peer to peer computing, Jini, Grid Computing, Transactions: ACID Properties, Schedules, Locking, Distributed Transactions, Transactions over Composed Services: Architecture, Properties, Compositional Serializability, Process specification: Processes, Workflows, Business Process Management, Process Specification Language, Relevant standards: BPEL4WS, WSCI, WS-C, ebXML, Relaxed transactions, Exception handling

Collaboration

Describing collaborations, Agents, Multiagent systems, Agent communication, languages, Protocols, Commitments and contracts, Planning, Consistency maintenance, Relevant standards: FIPA, OWL-S, Economic models, Organizational models

Selection

Quality of service, Application-level trust, Reputation mechanisms, Referral systems

Engineering

Engineering composed services, Compliance, Trust, Privacy.

Synthesis

Common threads, Open problems Status and trends

Text Book:

Service-Oriented Computing: Semantics, Processes, Agents

by Munindar P. Singh and Michael N. Huhns

John Wiley & Sons, Ltd., 2005

Reference Book:

Service-Oriented Architecture: Concepts, Technology, and Design

By Thomas Erl

Publisher: Prentice Hall PTR , 2005