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

CE 502 System Programming

<table>
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</table>

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

Reference Books
4 Calingare P. Assemblers, Compilers And Program Translation Rockville, Md. Computer Science.
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 Programming, 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

<table>
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1 **Introduction Of Software Engineering**, Study Of Different Models:

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

3 **Structured System Design**

4 **Data Oriented Analysis & Design**

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**

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.
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CE 505 Computer Oriented Statistical & Numerical Technique

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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**

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**

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:**

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
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 :
2. Introduction to Numerical Analysis - By S. S. Sastry – PHI , Delhi
   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
   Pub: Sultan Chand & Sons
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B.E. SEM V (COMPUTER ENGINEERING)  

**CE 506 Seminar**

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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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**B.E. SEM VI (COMPUTER ENGINEERING)**

### CE 601 Theory Of Computation

<table>
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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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B.E. SEM VI (COMPUTER ENGINEERING)

CE 602 Cryptography & Network Security

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<td>University 3 Hrs 100</td>
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1. **Conventional Encryption**
   Conventional Encryption Model, Steganography, Classical Encryption Techniques

2. **Conventional Encryption Techniques**

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**

6. **Network Security**

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**

**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**:
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.
1. **Introduction.**

2. **Processes & Shared Memory Programming**

3. **Basic Parallel Programming Techniques.**
Loop Splitting – Ideal Speedup – Spin-Locks, Contention And Self-Scheduling.

4. **Scheduling.**

5. **Barriers And Race Conditions.**
The Barrier Calls – Expression Splitting.

6. **Programmability Issues.**

7. **Thread-Based Implementation.**

8. **Distributed Computing – I: Message Passing Model.**
Message Passing Model – General Model – Programming Model – PVM.

9. **Distributed Computing – II: Remote Procedure Call**

10. **Algorithms For Parallel Machines.**

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
1 **Introduction**
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**

11 **Interactive 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.

**Reference Books**
1 An Introduction To Splines For Use In Computer Graphics And Geometric Modelling By R.H.Bartels, J.C.Beatty And B.ABarsky
2 Computer Graphcis By Foley And Vandam
Students are expected to learn tools like Visual C++, Visual Basic, Java, .NET and prepare a small project using them.
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**

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.Dhamdhere, 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

<table>
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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**

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

<table>
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</table>

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
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. 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 :**
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
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
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.
- Compilers, Languages and Libraries for the Grid.
- 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

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 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)

Reference Books


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}
8. Distributed Systems :
   Architecture And Applications :
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 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 8051 Microcontroller and Embedded Systems”*, Pearson Education

**References**
2. Craig Hollabaugh, *“Embedded Linux”*, 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


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.


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:

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

CE 705 Elective – II

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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. Javadoc 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
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 Wesley
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:
2. Planning And Requirements: Project planning and management, Collecting the requirements.
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.

[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
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

Text books
2. M.H. Dunham, “Data Mining Introductory and Advanced Topics”, Pearson Education.
3. Han, Kamber, “Data Mining Concepts and Techniques”, Morgan Kaufmann

References:
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 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**


**References**

1. Ian Heywood, Sarah Cornelius, Steve Carver, “An Introduction to Geographical Information System”, Person Education
4. Image Processing


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


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**


**References**

5. Artificial Intelligence

1 Problems And State Space Search

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

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

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
15 **Introduction To Prolog**

**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
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.
6. Digital Signal Processing


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


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.
5. S Sallivahanan, “*Digital Signal Processing*”, TMH.
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 Sahannon-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**


**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
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  

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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

**References:**

**CE802: Advance Computer Architecture**

<table>
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**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:**


Reference Book:
1. R.K. Ghose, Rajan Moona & Phalfui Gupta, “Foundation of parallel processing”; Narosa publication

CE803: Soft Computing and Neural Network

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**NEURAL NETWORKS**

**FUZZY SET THEORY**

**GENETIC ALGORITHM:**

**ROUGH SET:**

**NEURO FUZZY MODELING**

**NEURO-GENETIC INFORMATION PROCESSING FOR OPTIMIZATION:**
MACHINE LEARNING

APPLICATIONS OF COMPUTATIONAL INTELLIGENCE

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

TEXT BOOK

REFERENCES
- Neural network fuzzy logic genetic algorithm synthesis and application- S. Rjaesh Karan.
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

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**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

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**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 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 sahni and sanguthevar Rajasekarm
CE807: Service Oriented Computing

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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

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