Rationale & Objective:

For effective teaching / learning of ”Artificial Intelligence & Expert System”, it is necessary that the list of assignment should be prepared by the subject teacher based on the topic covered in related theory papers and given to the students based on present day professional scenario. The assignment should cover problems related to “Artificial Intelligence & Expert System” based on wide requirement in Information technology / Computer science. These should strive to inculcate the skills necessary for a student to effectively use the tools & techniques as per the present day industry requirement.

The teacher should prepare the students to cover minimum Ten problems.

CONTENTS:
Same as theory paper [07310(A)].
Contents:

Topic: 01 [10]

Meaning of artificial intelligence, artificial intelligence and the world, representation in artificial intelligence, state space search, AND-OR game tree search, Breadth first search, Depth First Search, Adding heuristics to searches, Hill climbing search, Least cost search, advantages and disadvantages of each searching techniques.

Topic: 02 [10]

Architecture of artificial intelligence system, production system design, implementation and limitation, Intervention & control, logic, uncertainty, Fuzzy logic.

Topic: 03 [10]

Knowledge representation, predicates calculus, logic & deductions using predicates calculus, syntax & semantics, qualifiers and anioms, encoding facts as predicate calculus, deduction as search-forward chaining & unification, sholeneisation, backward chaining, goal trees for backward chaining.
TOPIC: 04: [10]

Natural language processing, approaches to natural language processing, restricting language, the state machine, NLP pairer, context free recursive descent, NLP power, Noise disposal power, question answering.

TOPIC: 05: [10]

Vision expert system, defining the problems, overview of the solution, philosophical issues, human versus machine, MYCIN & DENDRAL.

Books Recommended:

3. Artificial Intelligence & Expert System, - W. Patterson PHI

SCHEME OF EXAMINATION FOR FINAL EXAMINATION F.M. : 80

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The above table refers to the annual examinations only.
Rationale:

This course will provide an introduction to fundamental concepts in Computer Graphics from a practical perspective. It aims to cover mathematical concepts essential for computer graphics, graphic devices, various algorithms and multimedia systems. Ideally, a student who successfully completed these courses will be familiar with modern methods in computer graphics, with the use of commonly used tools in this area and having knowledge to write algorithms for generating images.

Objective:

This course is an introduction to computer graphics and provides familiarity with graphics software and hardware systems. The course covers the following concepts:

- Understanding of graphics and its applications
- The fundamentals of input, display and hardcopy devices, scan conversion of geometric primitives
- Output primitives
- Geometric representations
- Two and Three-dimensional Transformations
- Windowing and clipping methods
- Segments
- Three-dimensional concepts
- Hidden-element removal
- Multimedia hardware and applications
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<td>2D Drawing Geometry</td>
<td>(08)</td>
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<td>Conics and Curves</td>
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<td>Multimedia</td>
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</table>

**CONTENTS:**

**TOPIC: 01 – INTRODUCTION AND APPLICATIONS:** [03]

History (from simple picture to photo realism)
What is CG, GUI?
Applications: Presentation graphics, painting and drawing, photo editing, scientific visualization, image processing, digital art, education and training, entertainment, CAD in architecture, mechanical engineering, aeronautical and automobile industry, simulation, animation, video games.

**TOPIC: 02 – GRAPHIC DEVICES:** [03]

Display devices: Random-scan and raster scan monitors, Color CRT, Plasma panel displays, LCD Panels
Plotters, Film recorders, Graphics workstations, display processors, graphics software, Input/Output Devices, touch panels, light pens, graphics tablets.
TOPIC: 03 – 2 D DRAWING GEOMETRY: [08]

Mathematics for computer graphics: A brief concept of Trigonometry, Polar coordinates, Parametric Functions, Vectors (scalar product, cross product), Matrices (scalar multiplication, matrix addition and multiplication, matrix inverse)
2 D transformation: Use of homogeneous coordinate systems, translation, scaling, rotation, mirror reflection, rotation about an arbitrary point, Zooming and panning, Rubber band methods, dragging, Parametric representation of a line segment.

TOPIC: 04 – CONICS AND CURVES: [05]

Bresenham's circle drawing algorithm, Generation of ellipses through transformation on circles, Curve drawing; Parametric representation, need of cubic curves, Drawing cubic Bezier and B-spline curves (No derivations needed), Condition for smoothly joining curve segments

TOPIC: 05 – GRAPHIC OPERATIONS: [09]

Windowport and viewport:
- Elimination of totally visible and totally invisible lines with respect to a rectangular window using line end point codes
- Explicit line clipping algorithm
- Sutherland cohen algorithm
- Mid point sub-division algorithm

Filling:
- Stack based and queue based seed fill algorithms
- Scan line seed fill algorithm
- Generation of bar charts, pie charts
- Character generation
TOPIC: 06 – 3 D GRAPHICS:

Transformations:
- Right handed coordinate system with vertical y-axis
- Transformation matrices for translation, scaling and rotation around axis

Parallel Projection:
- Multiviews - front, top and side views
- Oblique view - Projection on xy plane with rays along a given direction

Perspective Projection:
- Transformation matrix to yield one vanishing point perspective view with viewpoint lying on z axis
- Effect of translating the object
- Computing the vanishing point
- Numerical examples

Hidden Surface Removal:
- Back face removal
- Floating horizon technique

TOPIC: 07 – ANIMATION:

Basics of animation, Tweeking and Morphing

TOPIC: 08 – GRAPHIC STANDARDS:

Introduction to Open GL - Command Syntax, rendering pipeline, related libraries setting windows to an arbitrary colour, Drawing point, line and polygon drawing dashed lines, learn use of vertex arrays specify desired colours, smoothy shading.

TOPIC: 09 – MULTIMEDIA:

Concept of hypertext/ hypermedia
Multimedia applications: Education, video conferencing, training, entertainment and electronic encyclopedias
Music and Sound: Audio Basic Concepts, Analog Vs Digital, Digital Audio
Basic Concepts
MIDI Hardware, MIDI Messages, MIDI File
Video: Basic Concepts, Analogue Video and Digital Video
Images and Graphics: Basic Concepts, Image Formats, Graphics Format,
File Format, Image Quality and Graphic Systems
Compression: Image Compression, Compression Requirements, Standards
(JPEG, MPEG and H.261)
Multimedia Hardware - CD ROM, Audio speaker, Sound Card, Video
Cameras, Scanners, Multimedia platforms
Currently available multimedia software

Books Recommended:

Text Books

   Prentice Hall of India
   Pearson Education Asia
   McGraw Hill

Reference Books

   Addison Wesley
   Tiwari, Excel Publications
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Rationale & Objective:

CONTENTS:

List of Experiments:

01 Consider a PCM system in which 24 signals are to be time-multiplexed. Each signal has a bandwidth from 400 to 3.4 KHz the sampling rate is 33.33% higher than the theoretical minimum, and 8 bits are used for each sample. Determine the output bit rate.

02 A very heavily loaded 1-km-long 10-Mbps token ring has a propagation speed of 200m/ usec. Fifty stations are uniformly spaced around the ring. Data frames are thus included as spare bits within the data frames and are effectively free. The token is 8 bits. Calculate the effective data rate of the ring.
03 Explain the steps involved in computing the checksum for a given message frame, and hence find the complete frame bit pattern for the data given below:
Data polynomial $D(x) = 1101101111$
Generator polynomial $G(x) = x^4 + x + 1$

04 Write a program to simulate the operation of a token ring with no priorities. Take into account the walk time between stations and the time required to drain the ring before regenerating the token. Now change the simulator to allow stations to regenerate the token as soon as they are done transmitting, without waiting to drain the ring.

05 Write a program to simulate a sliding window protocol using selective repeat. The program should read in the following parameters: transmission rate of the channel, length of a data frame, length of an ACK/NAK frame, probability of a frame being lost, propagation time of the channel, and rate at which a host produces new messages. For each set of parameters, the program should print out the effective data rate achieved.

06 Configure a machine to assign an IP address to it and also put a suitable subnet mask.

07 Connect two machines to a hub and ping one machine from the other. Now change the subnet masks of the machines and see the effects.

08 Connect a client to a server via a hub and telnet to log in to the server.

09 Connect two machines to two different hubs and connect the hubs to a switch. Connect a server to the switch and telnet to the server from the machines.

SCHEME OF EXAMINATION FOR FINAL EXAMINATION

F.M. : 80
Rationale:

This course will allow students to develop background knowledge as well as core expertise in data communications and networking, which is one of the fastest growing technologies in our culture today. It forms an integral part of the modern Information Technology. Starting from Intranet in small offices to the global Internet, principles of data communication and networking play an important role.

Objective:

At the end of the course, the students will be able to know:

- Evolution of data communication and networking up to the internet
- Principles of data communication, channel characteristics, signalling, modulation and encoding
- Various transmission media, their comparative study, fibre optics and wireless communication in details
- Categories and topologies of networks
- OSI model vis-à-vis TCP/IP architecture
- Multiplexing, channel error detection and correction, data link protocols
- Ethernet and token ring, X.25 ATM, BISDN
- Details of IP operations in the INTERNET and associated routing principles
• Operation of optical networks, satellite networks and wireless mobile systems
• Strategies for securing network application using cryptography
• Emerging technologies such as SONET, FDDI, mobile telephony etc.

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<td>Data Modems</td>
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<td>Multichannel Data Communication</td>
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<td>Networking Fundamentals</td>
<td>(04)</td>
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<td>06</td>
<td>OSI Model and TCP/IP Suite</td>
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<td>Data Link Protocol</td>
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<td>Local Area Network (LAN)</td>
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<td>Wide Area Network (WAN)</td>
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<td>Wireless Communication</td>
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<td>Security and Privacy</td>
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</table>

CONTENTS:

TOPIC: 01 – FUNDAMENTALS OF DATA COMMUNICATIONS:  [03]

TOPIC: 02 – TRANSMISSION MEDIA:

Guided Media:
- Twisted pair
- Co-axial cable
- Optical fibre

Unguided Media
- Radio, VHF, Microwave, Satellite

Infrared Transmission

Fibre Optics Communication:
- Components (Source, Channel Detector)

TOPIC: 03 – DATA MODEMS:

Concept of Modulation, Pulse Code Modulation (PCM), Shift Keying (ASK, FSK, PSK, QPSK, DPSK), Encoding techniques and CODEC, Classification of modems, Standards and Protocols, Protocols used by modem to transfer files, Establishing a connection

TOPIC: 04 – MULTICHANNEL DATA COMMUNICATION:

Circuits, channels and multichanneling, Multiplexing (FDM, TDM, CDM, WDM), Access Techniques (FDMA, TDMA, Spread Spectrum Techniques and CDMA), Digital hierarchies (SONET/SDH).
TOPIC: 05 – NETWORKING FUNDAMENTALS:

An overview of networking
Switching techniques:
- Circuit Switching
- Packet Switching
- Datagram
- Virtual Circuit and Permanent Virtual Circuit
- Connectionless and Connection oriented communication
- Message Switching
- Cell Switching (ATM)

Network Topologies:
- Bus Topologies, examples of bus topology
- Ethernet
- Local Talk

Ring Topologies:
- Examples of Token Ring Topology: IBM Token Ring FDDI (Fibre Distributed Data Interface)

Star Topologies:
- Examples of Star Network: ATM (Asynchronous Transmission Mode)

TOPIC: 06 – OSI MODEL AND TCP/IP SUITE:

Network architectures, Layering the communication process, The need for layered solutions, Open Systems Interconnection (OSI) model, TCP/IP protocol, Data transmission by TCP and Ethernet, Data encapsulation, Data routing, An Error Reporting Mechanism - The Internet Control Message Protocol (ICMP), User Datagram Protocol (UDP), TCP/IP services and application protocols (The Client/Server Model, Telnet, File Transfer Protocol (FTP), Trivial File Transfer Protocol (TFTP), Simple Mail Transfer Protocol (SMTP), Network File System (NFS), Simple Network Management Protocol (SNMP), Domain Name System (DNS), Internet Architecture)
**TOPIC: 07 – DATA LINK PROTOCOL:**

Protocol, Transmission Control Procedure:
- Synchronous Protocols
- Asynchronous Data Link Control (DLC) Protocols

Character Oriented Protocols (COP):
- Binary Synchronous Protocol (Bisync or BSC)

Bit Oriented Protocols (BOP):
- X.25 CCITT standard for packet data transmission

Synchronous Data Link Control Protocol (SDLC)
High Level Data Control Protocol (HDLC)
Transmission Control Procedure Types,
Non-procedure
Basic Control Procedure
HDLC Procedure

**TOPIC: 08 – LOCAL AREA NETWORK (LAN):**

Baseband versus Broadband, Media Access Control, LAN hardware, LAN operating systems, Transmission media.
Implementing LAN: Implementation of LAN using coaxial cables.
Implementation of LAN using twisted pair.
Implementation of LAN using fibre optic cables.
Implementation of LAN using wireless technology.
Fast LAN, Nonstandard LANs.
Extending LAN: Fibre Optic Extension, Repeaters, Bridges, Router, Gateways, Switching Hubs, Virtual LANs
TOPIC: 09 – WIDE AREA NETWORK (WAN):

Network using WAN and network services:
- Host to Terminal Connection
- LAN to LAN Connection
- Remote LAN Connection

Router Concepts:
- Forwarding Function
- Filtering Function

Routing Method - Static and Dynamic routing

Local Routing:
- ARP (Address Resolution Protocol) Table
- Distributed Routing
- Hierarchical Routing
- Distance-Vector Protocol
- Link-State Protocol
- Communication Protocols over WAN

TOPIC: 10 – LOCAL AREA NETWORK (LAN):

Telephone Networks:
- Dial up Telephone Networks
- Leased Line
- X.25

The Integrated Services Digital Network (ISDN):
- Narrow band ISDN
- Broadband ISDN Service

Frame Relay, Congestion Control, Cell Relay, ATM Structure

TOPIC: 11 – WIRELESS COMMUNICATION:

Cellular Radio, Telephony (GSM), VSAT

TOPIC: 12 – SECURITY AND PRIVACY:

Network Security, Firewall, VPN
Books Recommended:

**Text Books**

   Tata McGraw Hill
   Prentice Hall of India
   John Wiley and Sons, India

**Reference Books**

   Pearson Education
   Tata McGraw Hill
3. An Engineering Approach to Computer Networking, 1999 - S. Keshav
   Addison Wesley
   Brook Cole Publishing Company
5. Local Area Networks, 1997 - C.E. Keiser
   Tata McGraw Hill

**SCHEME OF EXAMINATION FOR FINAL EXAMINATION**

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Data Warehouse and Data Mining

Subject Code
07310(C)

Theory

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Rationale:

Objective:

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Total (50)
CONTENTS:

**TOPIC: 01 – EVOLUTION OF DECISION SUPPORT SYSTEMS AND THE DATE WAREHOUSE ENVIRONMENT:**

01.01 The Evolution.
01.02 4 GL technology.
01.03 The Architected Environment.

**TOPIC: 02 – DATA WAREHOUSE AND DESIGN & GRANULARITY IN THE DATA WAREHOUSE:**

02.01 Beginning with Operational Data.
02.02 Data/Process Models and the Architected Environment.
02.03 Data Model and Iterative Development.
02.04 Normalization/Denormalization.
02.05 Managing Reference Tables in data Warehouse.
02.06 Direct and Indirect Access of Data Warehouse Data.
02.07 Granularity and levels of Granularity.

**TOPIC: 03 – DATA WAREHOUSE AND DISTRIBUTED DATA WAREHOUSING:**

03.01 Managing Large Amount of Data.
03.02 Programmer/Designer Control of data Placement.
03.03 Efficient Index Utilization and Compaction of Data.
03.04 DBMS Types and data warehouse.
03.05 Metadata in the data warehouse Environment.
03.06 The Distributed and the Local Data Warehouse.
03.07 The Global Data Warehouse.
03.08 Building the Warehouse on Multiple Levels.
TOPIC: 04 – EXECUTIVE INFORMATION SYSTEMS AND DATA WAREHOUSE:

04.01 Drill-Down Analysis.
04.02 The Data Warehouse as a Basis for EIS
04.03 Event Mapping.
04.04 Detailed data and EIS.

TOPIC: 05 – EXTERNAL/UNSTRUCTURED DATA AND DATA WAREHOUSE:

05.01 External/Unstructured Data and the Data Warehouse.
05.02 Metadata and External Data.
05.03 Modelling and External/Unstructured Data.
05.04 Archiving External Data.

TOPIC: 06 – MIGRATION TO THE ARCHITECTED ENVIRONMENT:

06.01 A Migration Plan.
06.02 The Feedback Loop.
06.03 Methodology and Migration.

TOPIC: 07 – DATA MINING AND MACHINE LEARNING:

07.01 Introduction.
07.02 Machine Learning.
07.03 Machine Learning and Statistics.
07.04 Generalization as search.

TOPIC: 08 – KNOWLEDGE REPRESENTATION:

08.01 Decision Tables.
08.02 Decision Trees.
08.03 Classification Rules.
08.04 Association Rules.
08.05 Rules with Exception.
08.06 Rules Involving Relations.

**Books Recommended:**


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Rationale & Objective:
For effective teaching / learning of "Data Ware Housing & Data Mining", it is necessary that the list of assignment should be prepared by the subject teacher based on the topic covered in related theory papers and given to the students based on present day professional requirement. The assignment should cover problems related to “Data Ware Housing & Data Mining” because it is an essential requirement in Information technology / Computer field for successful completion of big projects. These should strive to inculcate the skills necessary for a student to effectively use the tools & techniques as per the present day industry requirement.

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Problems based on following topics:-

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Rationale & Objective:

For effective teaching / learning of “Electronic Commerce” or "Doing, business online", it is necessary that the list of assignment should be prepared by the subject teacher based on the topic covered in related theory papers and given to the students because e-commerce is becoming critical in three interrelated dimensions. Customer-to-business interactions, customer-to-customer, intra-business interactions. Electronic Commerce facilitates the network form of organization where small flexible firms rely on other partner companies for component supplies and product distribution to meet changing customer demand more effectively. The assignment should cover present explosive problems related to e-commerce. These should strive to inculcate the skills necessary for a student to effectively use the tools & techniques as per the present day industry requirement.

CONTENTS:

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<td>05</td>
<td>Electronic Payment Systems</td>
<td></td>
</tr>
<tr>
<td>06</td>
<td>Electronic Commerce Applications</td>
<td></td>
</tr>
<tr>
<td>07</td>
<td>Implementation of E-commerce</td>
<td></td>
</tr>
<tr>
<td>08</td>
<td>Legal and Social Issues</td>
<td></td>
</tr>
<tr>
<td>09</td>
<td>Tools for e-commerce: Cold fusion, e-shop etc.</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Banking system in e-commerce.</td>
<td></td>
</tr>
</tbody>
</table>
Rationale & Objective:

"Electronic Commerce" or "Doing, business online" is becoming critical in three interrelated dimensions. Customer-to-business interactions, customer-to-customer, intra-business interactions. Electronic Commerce facilitates the network form of organization where small flexible firms rely on other partner companies for component supplies and product distribution to meet changing customer demand more effectively. The transaction management aspect of electronic commerce enables firms to reduce costs by enabling better coordination in sales, production and distribution processes and automated supply chain network. Electronic Data Interchange (EDI), Electronic Mail and Electronic Fund Transfer (EFT), streamline business process, reduces paperwork and increase automation. The course will enable the students to understand e-commerce, its applications, the processes and the security issues.

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Topics</th>
<th>Periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Electronic Commerce Framework</td>
<td>(06)</td>
</tr>
<tr>
<td>02</td>
<td>Architectural Frame Work of E-Commerce</td>
<td>(06)</td>
</tr>
<tr>
<td>03</td>
<td>E-Business Activities</td>
<td>(04)</td>
</tr>
<tr>
<td>04</td>
<td>Security Issues</td>
<td>(06)</td>
</tr>
<tr>
<td>05</td>
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<tr>
<td>07</td>
<td>Implementation of E-commerce</td>
<td>(08)</td>
</tr>
</tbody>
</table>
CONTENTS:

TOPIC: 01 – ELECTRONIC COMMERCE FRAMEWORK: [06]

Defining electronic commerce; technology of digital convergence; convergence of content and transmission types of electronic commerce – inter-organizational E-commerce, EDI over WAN, Extranets, Electronic Fund Transfer, e-mail, Fax, Intra-organizational e-mail, Customer to Business e-mail (B2B, B2C, C2C).

Components of E-Commerce
- Institutions – Government, Merchants, Manufacturers, Suppliers, consumers, banks, financial institutions
- Processes – Marketing, Sales, Payments, Fulfillment, Support
- Networks – Corporate, Internet, Commercial

TOPIC: 02 – ARCHITECTURAL FRAME WORK OF E-COMMERCE: [06]

- Web Architecture - web browser, HTTP, TCP/IP, Web server, HTML, CGI Scripts
- Multimedia web extensions - Java, Real Audio
- Standards - EDIFACT, EDI

TOPIC: 03 – E-BUSINESS ACTIVITIES: [04]

Supply-chain management, selling-chain management, operating resource management, ERP, CRM, customer asset management.
**TOPIC: 04 – SECURITY ISSUES:**

Firewalls and proxy application gateways, Secure Electronic Transaction (SET), public and private key encryption, digital signatures and digital certificates, Secure Socket Layer (SSL)

**TOPIC: 05 – ELECTRONIC PAYMENT SYSTEMS:**

Digital cash, electronic to ATM, Debit cards at Point of Sale (POS), Smart Cards, Online Credit Card based Systems, Electronic Fund Transfer (EFT), Payment gateways.

**TOPIC: 06 – ELECTRONIC COMMERCE APPLICATIONS:**


**TOPIC: 07 – IMPLEMENTATION OF E-COMMERCE:**

Visit most popular sites (as indiamarket.com, e-greetings.com, moneycontrol.com, bazee.com, naukari.com, monster.com, shadi.com, hindu.com, timesofindia.com etc.)
Developing E-commerce Enabled Application - getting an internet, merchant bank account, web hosting, obtaining digital certificate, finding a provider of online transactions, creating of purchasing a shopping cart software

**TOPIC: 08 – LEGAL AND SOCIAL ISSUES:**


TOPIC: 09 – TOOLS FOR E-COMMERCE: [04]

Cold fusion, e-shop etc.

Books Recommended:

   Addison Wesley (Singapore) Pvt. Ltd., New Delhi
2. E-Business - Roadmap for Success - Ravi Kalakota and Maxia Robinson
   Addison Wesley (Singapore) Pvt. Ltd., New Delhi
3. E-Business (R) Evolution - Amor
   Addison Wesley (Singapore) Pvt. Ltd., New Delhi
4. Frontiers of Electronic Commerce - Ravi Kalakota and Andrew B. Whinston
   Addison Wesley (Singapore) Pvt. Ltd., New Delhi
5. E-Business with Net Commerce (with CD) - Shurety
   Addison Wesley (Singapore) Pvt. Ltd., New Delhi

SCHEME OF EXAMINATION FOR FINAL EXAMINATION  F.M. : 80

<table>
<thead>
<tr>
<th>Types of Questions</th>
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<tr>
<td>Total Marks</td>
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<td>25</td>
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</table>

The above table refers to the annual examinations only.
Rationale & Objective:

Internet is the easiest and fastest way of communication. The use of Internet can be easily seen in our day to day life, be it sending a mail or looking for same information, its importance can’t be overruled. This subject exposes the diploma students to basic networking technology and the Internet technology. IT will teach the students, the Internet technology and different features available on the Internet.

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Topics</th>
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<td>(07)</td>
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<tr>
<td>02</td>
<td>IP Addressing</td>
<td>(07)</td>
</tr>
<tr>
<td>03</td>
<td>IP Datagram</td>
<td>(07)</td>
</tr>
<tr>
<td>04</td>
<td>Case Study : IPV6</td>
<td>(07)</td>
</tr>
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<td>05</td>
<td>TCP</td>
<td>(07)</td>
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<tr>
<td>06</td>
<td>Domain Name System</td>
<td>(07)</td>
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<tr>
<td>07</td>
<td>E-mail and File transfer</td>
<td>(10)</td>
</tr>
<tr>
<td>08</td>
<td>World Wide Web (WWW)</td>
<td>(08)</td>
</tr>
<tr>
<td></td>
<td><strong>Total:-</strong></td>
<td><strong>(60)</strong></td>
</tr>
</tbody>
</table>
CONTENTS:

TOPIC: 01 – REVIEW OF NETWORK CONCEPTS:

01.01 Packets, Frames and error detection.
01.02 Network Topology, Repeaters, Bridges, Switches.
01.03 WAN Technologies and Routing.
01.04 OSI Stack and TCP/IP model.

TOPIC: 02 – IP ADDRESSING:

02.01 Scheme.
02.02 Hierarchy Classes.
02.03 Division of Address space.
02.04 Special Address.

TOPIC: 03 – IP DATAGRAM:

03.01 Header.
03.02 Virtual Packet.
03.03 Routing Tables.
03.04 Datagram Forwarding.
03.05 Encapsulation, Fragmentation, Reassembly.

TOPIC: 04 – FDD:

04.01 Datagram format.
04.02 Fragmentation.
04.03 Reassembly.
04.04 Path MTU, Addressing and Hexadecimal Notation.
**TOPIC: 05 –TCP:**

05.01 Protocol
05.02 Service to application
05.03 Reliability, Retransmission, flow control
05.04 Three way handshake
05.05 Congestion control, Segment formats.

**TOPIC: 06 –DOMAIN NAME SYSTEM:**

06.01 Structure
06.02 DNS client, server model
06.03 Hierarchy Multiple Server
06.04 Resolving a Name.

**TOPIC: 07 –E-MAIL AND FILE TRANSFER:**

07.01 SMTP
07.02 Mail Transfer
07.03 Dial up and POP
07.04 FTP general model and user interface.
07.05 File name translation and Network file system.

**TOPIC: 08 –WORLD WIDE WEB (WWW):**

08.01 Interface.
08.02 Hypertext.
08.03 Hypermedia.
08.04 HTML format and representation.
08.05 Embedding graphics and images.
08.06 HTTP.
Books Recommended:

1. Network Theory - A. Tanaunbomb
3. Using the world wide web, Prentice Hall of India Pvt., New Delhi - Wall
5. HTML 4.0 Unlashed, Tech Media - Rick Dranell Publication
6. Teach yourself HTML 4.0 with XML, - Stephanie, Cottrell, Bryant DHTML and Java Script, IDG Books India Pvt. Ltd., New Delhi

SCHEME OF EXAMINATION FOR FINAL EXAMINATION

<table>
<thead>
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<th>Types of Questions</th>
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The above table refers to the annual examinations only.
Inplant Training and Visit to Works

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**Sessional**

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<td>L  T  P/S</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 weeks (in vacations)</td>
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</tbody>
</table>

**Rationale:**

A student is required to develop a skill to synthesize his knowledge, skill and attitudes gained while going through different courses. So, it is essential to expose the students to the world of work to be familiar with the real life situations and understand the problem there in.

**Objective:**

So, “In plant training and visit to work” is introduced to place the students in actual work situations for stipulated period with the objectives:-

- To understand and conceptualize the subject based knowledge given in class room in the context of its application st work places.
- To develop understanding regarding the nature of activities, size and scale of operations & environments in which they are going to work.
- To understand how the technical, managerial, quality control, safety & other principles are being applied in real life situations.
- To know how a supervisor / technician perform day to day work and co-ordinate shop floor activities.
• To develop confidence amongst them to use and apply institute based knowledge and skills to solve practical problems in world of work.
• Develop interpersonal relationship, communication skill and positive attitudes.

CONTENTS

The industries / organisations for industrial training / visit should be decided by institute faculty in consultation with respective industrial establishment. It is necessary that each organization is visited will in advance and activities to be performed by students are well defined. The chosen activities should be of curricular interest to students and of professional value to industrial / field organizations. Efforts should be made to provide opportunities of task oriented or problem solving oriented to students. Students are to prepare report of work done by them.

The report should include the followings :-

S.No.    | Topics
---|---
01    | Introduction.
02    | Types of industries.
03    | Location.
04    | Organisation Structure
05    | Technical Details.
06    | Marketing & Marketing Details.
07    | Man Power & its Management.
08    | Performance Details
09    | Future Programme
10    | Conclusion-
          | - Observations
          | - Typical Characteristics
          | - Area of Weakness
          | - Suggestions
It is advisable that the students may be assured both by Industry & Institute faculty. The suggested performance criteria for continuous assessment is given below:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Weightage in %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Punctuality &amp; Regularity</td>
<td>10 %</td>
</tr>
<tr>
<td>Initiative in learning / working at site</td>
<td>05 %</td>
</tr>
<tr>
<td>Level / proficiency of practical skills acquired</td>
<td>20 %</td>
</tr>
<tr>
<td>Sense of responsibility</td>
<td>10 %</td>
</tr>
<tr>
<td>Self Expression / Communication Skill</td>
<td>10 %</td>
</tr>
<tr>
<td>Interpersonal Skills / Human relations</td>
<td>05 %</td>
</tr>
<tr>
<td>Report Writing Skills</td>
<td>25 %</td>
</tr>
<tr>
<td>Viva Voca</td>
<td>15 %</td>
</tr>
</tbody>
</table>
# Internet and Web Technology

<table>
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<tr>
<td>Practical</td>
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<td>Full Marks</td>
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<td>Annual Exam.</td>
<td>:</td>
</tr>
<tr>
<td>Internal Exam.</td>
<td>:</td>
</tr>
</tbody>
</table>

## Rationale & Objective:

Internet is a great source of information and communication in present world. This course will allow student to explore basics of Internet. The students are expected to create web pages and to connect them, using features available in HTML and DHTML. This course allows students to study more about the web browsers present in present market and to compose them with this course the diploma student is expected to learn more about Internet and web technologies.

## CONTENTS:

### List of Experiments:

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Topics</th>
<th>Periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Introduction of basic commands of HTML.</td>
<td>(06)</td>
</tr>
<tr>
<td>02</td>
<td>To create a web page using basic feature of HTML.</td>
<td>(06)</td>
</tr>
<tr>
<td>03</td>
<td>To create two web pages and connect them using functions available in HTML.</td>
<td>(06)</td>
</tr>
<tr>
<td>04</td>
<td>To add pictures in a web page, changing in a web page, changing size and alignment of picture using HTML.</td>
<td>(04)</td>
</tr>
<tr>
<td>05</td>
<td>Using the internet- Studying the basic features of web pages.</td>
<td>(06)</td>
</tr>
</tbody>
</table>
To understand the differences and features available in different web browsers. (04)

Using the telnet to access the resources from the server. (08)

Creating web pages using Dynamic HTML and inter lunching them. (08)

Using Basics of Internet-Google search, E-mail etc., downloading files from Internet. (06)

Estimating Connection using dial up and troubleshooting the errors if any. (06)

**Total:** (60)

**Books Recommended:**

1. Network Theory - A. Tanaunbomb
3. Using the world wide web, Prentice Hall of India Pvt., New Delhi
5. HTML 4.0 Unlashed, Tech Media - Rick Dranell Publication
6. Teach yourself HTML 4.0 with XML, - Stephanie, Cottrell, Bryant DHTML and Java Script, IDG Books India Pvt. Ltd., New Delhi

**SCHEME OF EXAMINATION FOR FINAL EXAMINATION**

F.M. : 40
Rationale & Objective:

CONTENTS:

List of Experiments:

01 Write a program to display prime numbers between 0-50

02 Write a program, which will read a string and count all occurrences of a particular letter.

03 An Employee class has the following attributes and behaviours.

<table>
<thead>
<tr>
<th>Employee</th>
</tr>
</thead>
<tbody>
<tr>
<td>employeeName</td>
</tr>
<tr>
<td>employeeAddress</td>
</tr>
<tr>
<td>department</td>
</tr>
<tr>
<td>annualSalary</td>
</tr>
<tr>
<td>displayDetails()</td>
</tr>
</tbody>
</table>

04 In the program above initialize the variables and write code to display some test values. Code the main() method invoking the methods of the above class and save the file, compile it and execute it.
05 Extend the Employee class to another class called `empProject`. Add a new variable called `ProjectName` and methods called `getProjectName()` and `setProjectName` to get and set the new variable.

06 Define a class called `manager` extending the Employee class and adds a variable `projectArray`. It should implement the interface defined above (printReport and implement the method defined by it) for printing of reports as needed.

07 Create an interface called `Calculator` implemented by a class called `mathProcessor`.
   (a) Add
   (b) Subtract
   (c) Multiply
   (d) Divide
any two numbers i.e. int's, double or float.
Note: Instead of accepting input from the user assign suitable values to relevant variables to test the working.

08 Write an exception that generates every time an integer passed on to a method is outside the range 1-9.

09 Write a program which takes command line arguments and does the following processing accordingly using nested try and catch statements:
   (a) If one command-line argument is present than divide-by-zero exception is generated.
   (b) If two command line arguments are present than an array out of bounds exception is generated.
   (c) If no command line arguments is passed then an appropriate message is displayed.

10 Write a Program, which throws an exception when a particular function `throws Demo` is called, and then this exception is caught inside the main where this function is called. What are the results if you do not catch the exception thrown by `throws Demo` function.
11 Design a multithread application that uses two classes,
(a) Star Class that prints "*****" on the console
(b) Dollar class prints "$$$$$" on the console
(c) Let object of start class constitute thread-1 and the object of Dollar class constitute thread-2. Both threads have the same priority.

12 Write an application to do the following:
Inherit a class from thread class that has a constructor that takes a string as a parameter and passes it to the Thread class. In the run method, execute a loop 10 times to print the name of the thread that is executing and invoke the sleep method.
Define another class called Start Thread that invokes the start method of Thread.

13 Create a small text editor, which creates an array of String objects and after reading a line of text stores it in a array. The text editor created should read upto 50 lines or till you enter "exit".

14 Create an applet to display welcome message and embed it in a web page.

15 Modify this program so that the applet welcomes a specific person whose name is passed to it as an HTML parameter. If no name is passed, the applet should use a default name. Also pass the font size and style as parameters to the applet.

16 Embed the applet created above in an HTML file in such a way that the text is aligned centrally and provide a gap of 50 pixels all around the applet.
Rationale & Objective:

CONTENTS:

List of Experiments:

01 Write a program to display prime numbers between 0-50

02 Write a program, which will read a string and count all occurrences of a particular letter.

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   (a) Add
   (b) Subtract
   (c) Multiply
   (d) Divide
   any two numbers i.e. int's, double or float.
   Note: Instead of accepting input from the user assign suitable values to relevant variables to test the working.

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   (c) If no command line arguments is passed then an appropriate message is displayed.
Write a Program, which throws an exception when a particular function **throws Demo** is called, and then this exception is caught inside the main where this function is called. What are the results if you do not catch the exception thrown by **throws Demo** function.

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(c) Let object of start class constitute thread-1 and the object of Dollar class constitute thread-2. Both threads have the same priority.

Write an application to do the following:
Inherit a class from thread class that has a constructor that takes a string as a parameter and passes it to the Thread class. In the run method, execute a loop 10 times to print the name of the thread that is executing and invoke the sleep method.
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Embed the applet created above in an HTML file in such a way that the text is aligned centrally and provide a gap of 50 pixels all around the applet.
Rationale:

This course is designed to impart knowledge and skills required to solve the real world problems using object-oriented approach utilizing Java language constructs. This course covers the subject in two parts, viz, Java Language and Java Library.

Objective:

After completion of the course students is expected to understand the following:
- Java tokens for creating expressions and creating datatypes.
- The way various expression and data types are assembled in packages.
- Implementation of Inheritance, Exception handling and Multithreading in Java.
- Java I/O basics and Applets.
- Setting up GUI using AWT/ Swing.
- Network Programming in Java.
- Accessing relational databases from Java Programmes.

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Topics</th>
<th>Periods</th>
</tr>
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<td>The JAVA Language</td>
<td>(25)</td>
</tr>
<tr>
<td>02</td>
<td>The JAVA Library</td>
<td>(25)</td>
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<tr>
<td></td>
<td><strong>Total:</strong></td>
<td><strong>(50)</strong></td>
</tr>
</tbody>
</table>
CONTENTS:

TOPIC: 01 – THE JAVA LANGUAGE:

01.01 Introduction to Java
01.01.01 An overview of JAVA, JAVA Applets and Applications.
01.01.02 Difference between Java Script and JAVA.
01.01.03 Object Oriented programming features.

01.02 Data types, Variable & Arrays
01.02.01 Java Token & Keywords
01.02.02 Integers types, Floating point types
01.02.03 The JAVA class libraries
01.02.04 Declaring a variable, Dynamic initialization
01.02.05 The scope and lifetime of variable
01.02.06 Type conversion and casting
01.02.07 Arrays:
   - One-dimensional arrays
   - Multi-dimensional arrays
01.02.08 Alternative array declaration syntax

01.03 Operators
01.03.01 Arithmetic operations
01.03.02 The Bitwise operators
01.03.03 Relational operators
01.03.04 Boolean logical operators
01.03.05 The assignment operator
01.03.06 The ? Operator
01.03.07 Operator precedence

01.04 Control Statements
01.04.01 Selection statements
01.04.02 Iteration statements
01.04.03 Jump statements

01.05 Introduction Classes and objects
01.05.01 Class fundamentals
01.05.02 Declaring objects, Assigning object reference variables
01.05.03  Introducing methods
01.05.04  Constructors
01.05.05  The this keyboard
01.05.06  Garbage Collection
01.05.07  The Finalize () method
01.05.08  A stack class, overloading constructors
01.05.09  Using objects as parameters, argument passing
01.05.10  Returning objects, Recursion
01.06  Inheritance
01.06.01  Inheritance basics, member access and inheritance
01.06.02  Using class, creating a multilevel hierarchy
01.06.03  Method overriding, dynamic method dispatch
01.06.04  Using abstract classes, using final with inheritance, the object class
01.07  Packages and Interfaces
01.07.01  Packages: Defining a package, understanding classpath, importing packages.
01.07.02  Interfaces: Defining an interface, Implementing interfaces, Applying Interfaces, Variables in interfaces.
01.08  Exception handling
01.08.01  Exception handling fundamentals
01.08.02  Exception types, uncaught exceptions, using try and catch
01.08.03  JAVA's build-in exceptions, user defined exception subclasses
01.09  Multithreaded Programming
01.09.01  The JAVA thread model, The main thread, creating a thread
01.09.02  Alive () and Joint (), Suspend () and Resume (), Thread priorities.
01.09.03  Synchronization, Interthread communication
01.10  I/O, Applets and Other Topics
01.10.01  I/O Basics: Streams, The stream classes, The predefined streams, Reading console input, Writing console output, Reading and Writing files.
01.10.02  Applet fundamentals
01.10.03  The transit and volatile modifiers
01.10.04  Using instance of native methods
TOPIC: 02 – THE JAVA LIBRARY: [25]

02.01 String Handling
02.01.01 The string constructor, Special string operations
02.01.02 Character extraction, String searching & comparison
02.01.03 Data conversion using value of ( ), String buffer

02.02 Exploring JAVA Lang
02.02.01 Simple type wrappers, Runtime memory management
02.02.02 Array Copy, Object, Clone ( ) and the cloneable interface.
02.02.03 Class & class loader
02.02.04 Math functions: Transcendental functions, Exponential functions, Rounding functions, Miscellaneous math methods
02.02.05 Compiler, Thread, Threadgroup and runnable
02.02.06 Throwable, Security Manager
02.03 The Utility Classes
02.03.01 The enumeration interface, Vector & Stack
02.03.02 Dictionary, Hash-table, string tokenizer
02.03.03 Bitset
02.03.04 Date: Date Comparison, String and time zones
02.03.05 Random, Observer interface
02.04 Input/ Output - Exploring JAVA I/O
02.04.01 The JAVA I/O classes and interface
02.04.02 File Namefilter & Directories
02.04.03 I/O stream classes: File input stream, file output stream, Byte array input stream, Byte array output stream, Filtered streams
02.04.04 Buffered streams: Buffered input stream, Buffered output stream, Pushback input stream, Sequence input stream
02.04.05 Print stream
02.04.06 Random Access File
02.05 Networking
02.05.01 Socket overview, Reserved sockets, proxy servers
02.05.02 Internet addressing, Domain naming services (DNS)
02.05.03 JAVA and the net, The networking classes and interfaces
02.05.04 Inet address, Factory methods, Introspection
02.05.05 TCP/IP server sockets
02.05.06 DataGrams: Datagram packet, Datagram server and client
02.06  Applet Class
02.06.01 The applet class, Applet architecture
02.06.02 An applet skeleton:
   - Initialization and termination
   - Overriding update ( )
02.06.03 Status Windows
02.06.04 Handling events:
   - The event class
   - Processing mouse events
   - Handling keyboard events
02.06.05 HTML applet tag, Passing parameters to applets
02.06.06 Applet context and show document ( )
02.06.07 The audioclip & appletstub interface
02.06.08 Outputting to the console

02.07  Swing
02.07.01 Swing & its features
02.07.02 Text fields, Buttons, Toggle Buttons, Check Boxes and Radio Buttons
02.07.03 Viewports, Scrolling, Sliders and Lists
02.07.04 Combo Boxes, Progress Bars, Tooltips, Separators and Choosers
02.07.05 Layered Panes, Tabbed Panes, Split Panes and Layouts
02.07.06 Menus and Toolbars
02.07.07 Windows, Desktop Panes, Inner Frames and Dialog Boxes
02.07.08 Tables and Trees, Text Components

02.08  Images
02.08.01 File Formats
02.08.02 Image fundamentals: creating, loading and displaying
02.08.03 Image observer, Double buffering, Media Tracker

02.09  JAVA Database Connectivity (JDBC)
02.09.01 Introduction to JDBC, Type of JDBC connectivity
02.09.02 Accessing relational database from Java programs
02.09.03 Establishing database connections
Books Recommended:

**Text Books**

1. The Complete Reference - Java2, - H. Schildt
2. Java: How to Program Java 2, Second - Dietal and Dietel
   Edition, 2001 - Pearson Education

**Reference Books**

1. Java Examples in a Nutshell, Third - D. Hanagan
   Edition, 2001 - 'O' Reilly
   Primer Publication
3. Java Foundation Classes - M.T. Nelson
   - Tata McGraw Hill

**SCHEME OF EXAMINATION FOR FINAL EXAMINATION**

<table>
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The above table refers to the annual examinations only.
Rationale & Objective:

This course will enable the students to understand the basic concepts of graphics and multimedia, familiarize with multimedia input, output and storage devices and appreciate features of multimedia software and develop small applications.

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<td>02</td>
<td>Multimedia Hardware</td>
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<td>03</td>
<td>Multimedia Software</td>
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<td>04</td>
<td>Basic Concepts of Virtual Reality</td>
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<td>05</td>
<td>Multimedia System and its Applications</td>
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CONTENTS:

**TOPIC: 01 – INTRODUCTION TO COMPUTER GRAPHICS AND MULTIMEDIA:**

- Concepts of pixel, resolution, aspect ratio, interlacing, raster scanned and vector scanned monitors
- Introduction to multimedia, concepts of animation and simulation, various applications of multimedia in education, research and development, business and games

**TOPIC: 02 – MULTIMEDIA HARDWARE:**

Sound and Video cards, optical drives such as CD ROM and DVD, image and sound file formats, compression techniques scanners, digital cameras, printers, plotters and other peripheral and storage devices.

**TOPIC: 03 – MULTIMEDIA SOFTWARE:**

Features of any one of authoring tools such as Macro-media/ Adobe Photoshop/ 3-D studio/ Paint-Shop Pro/ Animator Pro/ Director and Harvard graphics

**TOPIC: 04 – BASIC CONCEPTS OF VIRTUAL REALITY:**

**TOPIC: 05 – MULTIMEDIA SYSTEM AND ITS APPLICATIONS:**

Education, Video Conferencing, training, Entertainment, electronic encyclopedia, Music & Sound: Audio basic concepts, Analog and Digital concepts, MIDI hardware, MIDI messages, MIDI file.

Video: Basic concepts, Analog Video & Digital Video, Text, Sound MIDI, Digital Audio file format, MIDI under video environments, Audo & Video capture.
Books Recommended:

1. Multimedia - Villam Casanove and Molina
   Prentice Hall of India, New Delhi
2. Multimedia Bible - Win Rosch
3. Multimedia Making IT work, - Tay Vaughan
   Osborne McGraw Hill
4. Multimedia System, Addison - Buford
   Wesley
5. Multimedia System, Excel - Agrwal & Tiwari
7. Multimedia Technology and Its Application, Galgotia Publications - David Hillman
8. Multimedia Systems, Addison - Sleinritz
   Wesley

SCHEME OF EXAMINATION FOR FINAL EXAMINATION

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The above table refers to the annual examinations only.
Rationale & Objective:

For effective teaching / learning of "Multimedia", it is necessary that the list of assignment should be prepared by the subject teacher based on the topic covered in related theory papers and given to the students based on present day professional requirement. Students will enable the students to understand the basic concepts of graphics and multimedia, familiarize with multimedia input, output and storage devices and appreciate features of multimedia software and develop small applications. These should strive to inculcate the skills necessary for a student to effectively use the tools & techniques as per the present day industry requirement.

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<td>03</td>
<td>CD ROM and DVD</td>
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<td>04</td>
<td>sound file formats, compression techniques scanners, digital cameras,</td>
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<td>printers, plotters and other peripheral and storage devices.</td>
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<td>Features of any one of authoring tools such as Macro-media/ Adobe Photo-shop/ 3-D studio/ Paint-Shop Pro/ Animator Pro/ Director and Harvard graphics</td>
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<td>Music &amp; Sound: Audio basic concepts, Analog and Digital concepts, MIDI hardware, MIDI messages, MIDI file.</td>
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<td>Video: Basic concepts.</td>
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<td>Analog Video &amp; Digital Video</td>
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<td>10</td>
<td>Text, Sound MIDI, Digital Audio file format, MIDI under video environments, Audio &amp; Video capture.</td>
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</table>
Rationale:

C++ is an object-oriented language, which enables a programmer to write programs, so that the object can be made to work collaboratively to produce the solution to live problems. By undergoing this course, the students will be able to understand the principles of object oriented programming, write programs in C++ and use them to make small application programs.

Objective:

The objective of the course is to make the students understand the basic concepts of object-oriented programming language C++ (Classes, Objects, Inheritance and Polymorphism).

The Course will enable the students to:

- Understand OOPs concepts.
- Use of various C++ constructs and functions.
- Use of C++ to develop programs to solve the real world problems.
- Implementing Inheritance, Encapsulation, Operator Over-loading and Dynamic Binding in C++.
- C++ Streams and concept of exception handling, class libraries, fundamentals of Microsoft foundation classes.
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<td>03</td>
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<td>Constructors and Destructors</td>
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<td>Operator Overloading</td>
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<td>07</td>
<td>Derived Classes and Inheritance</td>
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<td>14</td>
<td>Testing and Debugging Simple Program</td>
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</table>

**CONTENTS:**

**TOPIC: 01 – INTRODUCTION TO OBJECTS ORIENTED PROGRAMMING (OOP):**
- Basic concept of OOPs
- Comparison of procedural programming and OOP
- Advantages of OOP, OOP Languages
- Definitions: Class, Objects
- Concepts of inheritance and encapsulation
- Operator overloading
- Dynamic binding
- Overview of OOP using C++
- Basic program construction: main and functions, Program statements, class declaration, comments, C++ compilation
TOPIC: 02 – ELEMENTS OF C++ LANGUAGE:

- Tokens and Identifiers: Character Set and Symbols, Keywords, C++ Identifiers
- Variables and Constants: Integers & Characters, Constants and Symbolic constants, Dynamic initialization of variables, reference variables, enumerated variables
- Data Types: Basic data types, arrays and strings, user defined data types
- Operators: Arithmetic, relational operators and operators precedence, logical operators, manipulators, type conversions and type cast operators
- Console I/O: cin, cout functions
- Control Statements: The *if* statement, *if-else; else ... if* switch statements
- Loops: *for* and *While-do* statements, *Break, continue, go to*

TOPIC: 03 – FUNCTIONS:

- Simple functions: Declaration of functions, calling functions, function definition
- Passing arguments and returning values: Passing constants and variables, pass by value
- Return statement, types of functions
- Passing and returning structure variables
- Reference variables and arguments: Overload functions, inline functions, default arguments, returning by reference

TOPIC: 04 – OBJECTS AND CLASSES:

- Declaration of classes and objects in C++, Class definition
- Declaration of members, objects as date, time, objects as functions arguments
- Array of objects
- Returning objects from function
- Structures and classes
TOPIC: 05 – CONSTRUCTORS AND DESTRUCTORS:

- Basic constructors, parameterized constructors, multiple constructors, constructors with detail arguments
- Dynamic initialization of objects
- Use of copy constructor, shallow copying and deep copying
- Dynamic constructors
- Destructors
- Constraints on constructors and destructors

TOPIC: 06 – OPERATOR OVERLOADING:

- Overloading unary operators: Operator keyword, Argument and return values, Laminations of increment operators
- Overloading binary operators: Arithmetic operators, Examples: Addition of polar coordinates and concatenation of strings, Multiple overloading, Comparison operators, Arithmetic assignments operators
- Data and type conversions: Conversion between basic types, Conversion between object and basic types, Conversion between objects of different classes, Constraints in type conversion

TOPIC: 07 – DERIVED CLASSES AND INHERITANCE:

- Derived classes and Base class: Defining a derived class, Accessing the base class members, The protected access specifier
- Derived class constructors
- Overriding the member functions
- Class hierarchies: Abstract base class, Constructors and member functions
- Inheritance: Public and private inheritance, Access combinations and uses of access specifiers, Class
TOPIC: 08 – POINTERS:

- Addresses and Pointers: The address of operator & Pointer variables, Accessing the variable pointed to Pointer to void
- Pointer and Arrays
- Pointers and Functions: Call by value, Call by reference, pointer to functions, passing function to another function
- Pointers and strings: Pointer to string constants, strings as function arguments, Arrays of pointers to strings
- Memory Management using new and delete operators
- Pointers to objects, Pointers to pointers, debugging pointers

TOPIC: 09 – VIRTUAL FUNCTIONS:

- Virtual function and polymorphism, Friend functions, Static functions
- Comparison of macros and inline function

TOPIC: 10 – STREAMS:

Stream Classes: Streams class hierarchy, Header files, IOS flags, Stream Manipulators, String streams, Character stream classes, Object I/O (Writing/Reading an object to/ from Disk, File streams, Disk I/O with member function

TOPIC: 11 – EXCEPTION HANDLING:

- Use of exception handling
- Try block, Catch handler, Throw statement
- Exception specification

TOPIC: 12 – CLASS LIBRARIES:

- Class Libraries: String class, stack class, container class hierarchy, array class, date, list and queue classes
- User defined classes
- Microsoft Foundation Classes (MFC) - Overview only
TOPIC: 13 – ADVANCED CLASSES:

- Templates: Generic functions, Generic Class
- Template: Class and Template functions
- Over-riding of generic functions
- Containers and Nested classes.
- Aggregation

TOPIC: 14 – TESTING AND DEBUGGING SIMPLE PROGRAMS:

Books Recommended:

Text Books

4. Object Oriented Programming with C++, 1999 - Nabajyoti Barkakati PHI

Reference Books

### Scheme of Examination for Final Examination

**F.M. : 80**

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</table>

The above table refers to the annual examinations only.
Rationale:

The Project work and its presentation in seminar has impressed a lot to the professionals by giving tangible result in achieving the required competence in handling a project and finding out solutions to various problem and at the same time enhancing the knowledge by interactions and discussions in a seminar on the project. Therefore this subject has its unchallenged place in the curriculum.

Objective:

The objective to achieve by covering this curriculum are many fold:

- Innovative skills in the students.
- self confidence.
- Ability to select a problem.
- Ability to analyse the problem.
- Logical approach to solution of a problem.
- Skill in quality documentation and report writing.
- Ability to prepare Project Report (Computer Printed).
- Ability to participate in Seminar.
- Commercial Skill.
- Learning to learn the process in a student.
CONTENTS

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Topics</th>
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<tbody>
<tr>
<td>01</td>
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<td>02</td>
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<td>03</td>
<td>Presentation in Seminar.</td>
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<tr>
<td>04</td>
<td>Final Report.</td>
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</table>

**TOPIC 01:- PROJECT WORK**

The project assignments may consist of :-

01.01 Installation of Computer Systems, peripherals & software.
01.02 Programming customer based application.
01.03 Web page designing.
01.04 Data Base applications.
01.05 Networking.
01.06 Software Development.
01.07 Fabrication of Components / equipments.
01.08 Fault diagnosis & their rectification in computer systems / equipments.
01.09 Bringing improvements in the existing Systems / equipments.

**TOPIC 02 : REPORT WRITING**

The Project report should consists of :-

02.01 Introduction.
02.02 Problem statement.
02.03 Background.
02.04 Organisational Setup.
02.05 Plan Lay Out.
02.06 General Environment of Problem and problem identification.
02.07 Analysis of problem & Development of Algorithm.
02.08 Probable Solution.
02.09 Reasons.
02.10 Suggestions.
02.11 Others-as introduced by teacher.guide.

**TOPIC 03 : PRESENTATION IN SEMINAR**

03.01 Presentation of the project work.
03.02 Discussion by participation.
03.03 Suggestion of improvement in report to be recorded.
03.04 Incorporation of approved suggestions in the report.

**TOPIC 04 : FINAL REPORT**

04.01 Preparation of final project report incorporating all suggestions approved.

**NOTE:-**

The students have various aptitudes and strengths. Project Work, therefore, should match the aptitudes of students. For this purpose, students should be asked to identify the type of Project Work, they would like to execute. It is also essential that the faculty of the respective department may have a brain storming to identify suitable project assignments.

The project work should be done individually. It is not possible, them it can not be done in group of more than 3 students.

The teachers are free to evolve another criteria, depending upon the type of project report.

It is advisable that two students or two projects which are related best be given merit certificate preferably at the annual day of the institute.
## SCHEME OF EXAMINATION

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**Total** : **100**
GOVERNMENT OF BIHAR
DEPARTMENT OF SCIENCE & TECHNOLOGY

STATE BOARD OF TECHNICAL EDUCATION
BIHAR, PATNA

COURSE OF STUDY
FOR
PART - II Diploma
IN
Computer Science & Engineering

THREE YEARS DIPLOMA COURSE
### Scheme of Teaching and Examination for 3-years

**PART-III DIPLOMA in Computer Science & Engineering**

#### THEORY

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#### PRACTICAL

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#### SESSIONAL

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Total Periods per week: 42
Total Marks = 1500
Software Engineering

Subject Code: 07306

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Rationale & Objective:

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<td>Software Engineering Concepts</td>
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<td>02</td>
<td>Software Life Cycle Models</td>
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<td>03</td>
<td>Software Requirements Analysis and Design</td>
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<td>04</td>
<td>Programming Tools and Standards</td>
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<td>05</td>
<td>Testing and Maintenance</td>
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<td>06</td>
<td>Software Project Management</td>
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<td>Software Quality Assurance</td>
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CONTENTS:

**TOPIC: 01 – SOFTWARE ENGINEERING CONCEPTS:** [06]

01.01 Categories and characteristics of software systems
01.02 Attributes of a good software product
01.03 Software Engineering (SE) principles and their role in software system design
01.04 Relationship of software engineering to other disciplines

**TOPIC: 02 – SOFTWARE LIFE CYCLE MODELS:**

02.01 Classical life cycle, iterative waterfall model, spiral model, comparison of different models

**TOPIC: 03 – SOFTWARE REQUIREMENTS ANALYSIS AND DESIGN:**

03.01 Need and preparation of Software requirements.
03.02 Design concepts and notations; high level and low level design; modularization techniques; structured and object-oriented design; software development environments; attributes of good requirement specifications and design.
03.03 CASE tools and their use.

**TOPIC: 04 – PROGRAMMING TOOLS AND STANDARDS:**

04.01 Procedural and nonprocedural languages..
04.02 GLs and visual systems.
04.03 Features and attributes of a language required to implement the principles of software engineering.
04.04 Coding standards and guidelines.
04.05 Software engineering environments.

**TOPIC: 05 – TESTING AND MAINTENANCE:**

05.01 Introduction to verification and validation methods.
05.02 Debugging and testing strategies.
05.03 Black box and white box testing of software systems
05.04 Software maintenance, configuration management.
TOPIC: 06 – Software Project Management: [08]

06.01 Project size and its categories
06.02 Planning and estimations
06.03 Gantt and PERT charts; software measures: LOC, function point and COCOMO models; project-control
06.04 Software tools for scheduling and monitoring software projects
06.05 Introduction to project management tool (such as MS-Project/Project Scheduler etc.)

TOPIC: 07 – SOFTWARE QUALITY ASSURANCE: [06]

07.01 Attributes of a good software product; quality metrics; ISO 9000 and software process maturity framework of SEI.

Books Recommended:

1. Software Engineering - R.S. Pressman

   Prentice Hall of India

SCHEME OF EXAMINATION FOR FINAL EXAMINATION F.M. : 80

<table>
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<th>Types of Questions</th>
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The above table refers to the annual examinations only.
System Maintenance

Subject Code

07312

Practical

<table>
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<td>L T P/S</td>
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Rationale & Objective:

This course will allow the students with hand on experience on various components of the computer system. The student can explore the PC and can learn to troubleshoot the problems and errors of any. The diploma students are expected to learn the basic of various component and there interconnection and troubleshooting, through this course.

CONTENTS:

List of Experiments:

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Topics</th>
<th>Periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>To identify various components, devices and section of PC</td>
<td>(04)</td>
</tr>
<tr>
<td>02</td>
<td>To study motherboard</td>
<td>(06)</td>
</tr>
<tr>
<td>03</td>
<td>To interconnect the system with the video monitor, mouse, keyboard etc. and testing the operation of PC.</td>
<td>(04)</td>
</tr>
<tr>
<td>04</td>
<td>To interconnect hard disk, and to connect Input / Output devices such as printers and TV tuner card and to install them.</td>
<td>(06)</td>
</tr>
<tr>
<td>05</td>
<td>Study the bus system and various signal lines.</td>
<td>(04)</td>
</tr>
<tr>
<td>06</td>
<td>Study of peripherals and their speed and capacity</td>
<td>(08)</td>
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</tbody>
</table>
07 To install various operating systems such as Windows, Unix and Linux. (12)
08 To study the protection required for Windows and Linux Operating System. (06)
09 To study the various functions such as disk fragmentation and add/remove hardware / software functions under Windows Operating System. (06)
10 To study the Burning process of CD under the latest version of any CD writing CD. Study exiting multisession disk etc. (04)

Total:— (60)

Books Recommended:

1. IBM PC Technical Manual -
2. Computer maintenance and repair - Schott Muller
3. Computer Architecture - Raffiquzzaman

SCHEME OF EXAMINATION FOR FINAL EXAMINATION F.M. : 40
**Rationale & Objective:**

Today, the computer has become a household thing. In order to understand the proper functioning of Computer System one need to get exposed to various hardware components in the computer system. This subject will expose the diploma students to understand the various hardware components and will teach them to troubleshoot the problems in these components.

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Topics</th>
<th>Periods</th>
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<tbody>
<tr>
<td>01</td>
<td>Hardware Organization of PC</td>
<td>(10)</td>
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<tr>
<td>02</td>
<td>Bus Standard and Architecture</td>
<td>(08)</td>
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<tr>
<td>03</td>
<td>HDD</td>
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<td>04</td>
<td>FDD</td>
<td>(12)</td>
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<tr>
<td>05</td>
<td>Monitors</td>
<td>(08)</td>
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<tr>
<td>06</td>
<td>Printers</td>
<td>(08)</td>
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<tr>
<td>07</td>
<td>PC Installation</td>
<td>(06)</td>
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**Total:-** (60)
CONTENTS:

**TOPIC: 01 – HARDWARE ORGANIZATION OF PC:** [10]

01.01 The Motherboard of PC
01.02 Case Study: Pentium
01.03 Memory Organization: BIOS, ROM, RAM etc.
01.04 Keyboard, Mouse and audio-speaker interfacing
01.05 HDD, FDD, display and different Cards, Connecting them to motherboard.

**TOPIC: 02 – BUS STANDARD AND ARCHITECTURE:** [08]

02.01 PC Bus: 16 bit, 32 bit.
02.02 Slots: ISA, EIAS, PCI.
02.03 Ports: USB, Serial, Com

**TOPIC: 03 – HDD:** [08]

03.01 Understanding types (IDE, SCSI, ESDI)
03.02 Jumper setting & Cable selection.
03.03 Trouble shooting using software and hardware technique.
03.04 Connecting HDD.

**TOPIC: 04 – FDD:** [12]

04.01 Understanding various types of FDD.
04.02 Troubleshooting FDDs-alignment, Read/Write error, cleaning.

**TOPIC: 05 – MONITORS:** [08]

05.01 Type of monitors CCA, MGA, HGA, VCP, SVGA, PGA and their functions.
05.02 Troubleshooting.
TOPIC: 06 – PRINTERS:

06.01 Types of printers: Dot matrix, inkjet, Laserjet and their working.
06.02 Troubleshooting circuit portion & head assembly.

TOPIC: 07 – PC INSTALLATION:

07.01 Installation of motherboard, peripheral devices and Operating System.
07.02 Troubleshooting : Diagnostic Software

Books Recommended:

1. IBM PC Technical Manual
2. Computer maintenance and repair - Schott Muller
3. Computer Architecture - Raffiquzzaman
4. Hardware and Software of PC, Willey - S. K. Bose
   Eastern Ltd., New Delhi.
5. Computer Installation and Trouble - M. Radhakrishnan and D. Balasubramaniam
   shooting, I.S.T.E.

SCHEME OF EXAMINATION FOR FINAL EXAMINATION   F.M. : 80

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The above table refers to the annual examinations only.
System Software

Subject Code 07303

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Rationale & Objective:

This course will enable the students to have understanding and knowledge of various System Softwares like assembler, compiler, macro-processor, linker and loader.

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CONTENTS:

**TOPIC: 01 – INTRODUCTION:** [02]

01.01 What is System Software?
01.02 Components of System Software
01.03 Evolution of System Software
01.04 The model of a computer system

**TOPIC: 02 – LANGUAGE PROCESSORS:** [04]

02.01 Introduction
02.02 Language Processing activities.
02.03 Fundamental of Language Processing.
02.05 Language Processor Development Tools.

**TOPIC: 03 – DATA STRUCTURES FOR LANGUAGE PROCESSING:** [04]

03.01 Search Data Structures.
03.02 Allocation Data Structures.

**TOPIC: 04 – SCANNING & PARSING:** [04]

04.01 Scanning
04.02 Parsing

**TOPIC: 05 – ASSEMBLERS:** [06]

05.01 Elements of Assembly Language Programming.
05.02 A Simple Assembly Scheme.
05.03 Pass Structure of Assemblers.
05.04 Design of a Single Pass Assemblers for IBM PC.
TOPIC: 06 – MACROS AND MACRO PROCESSORS:

06.01 Macro Definition and Call
06.02 Macro Expansion
06.03 Features of macro facility

TOPIC: 07 – COMPILERS AND INTERPRETERS:

07.01 Aspects of compilation
07.02 Memory Allocation
07.03 Compilation of Expressions
07.04 Compilation of Control Structures
07.05 Various phases of a compiler and their functions
07.06 Code Optimization
07.07 Interpreters

TOPIC: 08 – LINKERS:

08.01 Relocation and Linking Concepts
08.02 Design of a Linker
08.03 Self-Relocating Programs
08.04 A Linker for MS DOS
08.05 Linking of Overlays
08.06 Loaders
08.07 Various types of linking and loading schemes

TOPIC: 09 – SOFTWARE TOOLS:

09.01 Software Tools for Program Development
09.02 Editors
09.03 Debug Monitors
09.04 Programming Environments
09.05 User Interfaces
**Books Recommended:**

1. System Programming - J.J. Donovan  
   McGraw Hill, New Delhi

2. System Programming and Operating Systems - Dhamdhere  
   Tata McGraw Hill, New Delhi

3. Assemblers, Compilers and Program Translation - P. Calingaert  
   Computer Science Press, Meryland


**SCHEME OF EXAMINATION FOR FINAL EXAMINATION**  

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### Visual Basic

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**Rationale & Objective:**

**CONTENTS:**

**List of Experiments:**

01 Create a form with one textbox and two command buttons having caption "Font" and "Exit". The user types text in the textbox and clicks on Fonts. The current form gets enlarged and now in addition to above controls, the form contains frame on which following control are placed.

(a) Combo box, which will contain list of fonts.
(b) Combo box, which will contain font style (bold, italic).
(c) Combo box, which will contain font size.
(d) Check box with caption "Underline".
(e) Checkbox with caption "Strikethrough".
(f) Label with caption "Sample" for showing preview.
(g) Two command buttons with caption "OK" and "Cancel" respectively.
The user should now be able to do the following:

(i) Choose an option from each combo box for Font, Style & Size.
(ii) Select effect as Underline or Strikethrough.
(iii) While performing a & b, the user should be able to see the preview as label.
(iv) To complete the task, the user has to click on OK. The form should shrink back to its original size and display, and the text should be displayed according to the attribute set.
(v) Exit is used to terminate the application.

02 Develop an application, which will contain numbers of images using control array. Using scrollbar increase or decrease numbers of images.

03 Develop a program that will cut, copy and paste text of text box.

04 Create a project that will open & save contents of file using menu editor.

05 Create a project with a file list, picture box & command button. Write appropriate code in appropriate event of controls so that upon startup, the list box should display the list of all *.bmp & *.ice in the current directory. After the user selection of file from the list box, the selected file should be displayed in the picture box control on clicking a command button.

06 Write a user-defined procedure that:
   (a) Takes a name of text file as arguments, opens that file, reads it & then displays its contents in a textbox.
   (b) Open a text file & retrieve the contents of the first line in the text file. Put first 3 text words into three string variables.

07 Write a simple animation application using timer control. Your project should contain an image, which moves around the form and changes its direction when it hits, the sides of the form.
Create a form with two command button having caption "Display Windows Directory" and "Exit". Make use of windows API DLL GetWindowDirectory( ) to display the directory in which Microsoft Window is installed when command button named "Display Window Directory" is clicked. "Exit" button is used to exit the application.

Develop an application that will take the name of sound file (e.g. file with extension.wav) as an argument and will play the file. Use API function for playing the file.

Create an Employee database named emp.mdb. Select six fields at minimum such as empno, empname, salary, destination etc. Design a form so that senior manager of the company can navigate through the records using
(a) Data control
(b) DAO

Design a control, by extending textbox by offering the following features:
(a) The textbox will support all the regular properties values that the standard textbox control supports, but it will not accept numeric letters.
(b) The textbox will also contain two new properties called Autosize that supply four possible values -> NA, 2-small, 3-medium, 4-large. These values will appear as an enumeration in dropdown list box inside a properties window. When set to 1-NA, the textbox font size will not change. When set to 2-small the text box will be sized to 25% of the textbox height value. When set to 4-large the text box will be sized to 75% of the textbox height value.
(c) The textbox will also contain two new properties called Ucase & Lcase. These will be boolean properties. When Ucase is set to true, the text in the textbox will be converted to uppercase letters. When Lcas is set to true, the text in the textbox will be converted to lowercase letters. Both Ucase & Lcase are said to be false by default. Your control must make sure when one of the case property is set to true, the other is set to false.
(d) The textbox will also have an event called Badkey for, when the user tries to type something like numeric letter in the textbox.

12 The home page of AdWorld should contain a list of all the stores containing "Toys, Flowers, Books and Confectionery". Write a code for the following.

(a) The caption of the web page "AdWorld" should be in blue colour and centered.
(b) The scrolling text displaying "A shop at your fingertips" should be in green.
(c) The list of stores on the web page should be displayed in red colour and the font size should be 30.
(d) The home page should have the pink colour as background.
(e) When the user moves the mouse pointer or click on any of the stores, the corresponding image associated with the store should appear along with the description of the store.
(f) Whenever the mouse moves over the item, flowers from the list of stores the item colour should change to green and the size should change to 60.

SCHEME OF EXAMINATION FOR FINAL EXAMINATION  F.M. : 40
Visual Basic

Subject Code
07308

Theory

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Full Marks : 100
Annual Exam. : 80
Internal Exam. : 20

Rationale & Objective:

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<th>Topics</th>
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<td>01</td>
<td>Visual Basic 6.0</td>
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<tr>
<td>02</td>
<td>Visual Basic Development</td>
<td>(06)</td>
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<tr>
<td>03</td>
<td>Building Objects in Visual Basic</td>
<td>(08)</td>
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<tr>
<td>04</td>
<td>Connecting to Databases</td>
<td>(08)</td>
</tr>
<tr>
<td>05</td>
<td>Introduction to Building Internet Applications</td>
<td>(12)</td>
</tr>
<tr>
<td>06</td>
<td>Designing User Interfaces</td>
<td>(08)</td>
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<td>Building Programs in the Windows Environment</td>
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<td>08</td>
<td>Working with the Windows API</td>
<td>(06)</td>
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The above table refers to the annual examinations only.