### Chhattisgarh Swami Vivekanand Technical University, Bhilai

#### Scheme of teaching and examination

**B.E. VII Semester Information Technology**

<table>
<thead>
<tr>
<th>S.N o</th>
<th>Board of Study</th>
<th>Subject Code</th>
<th>Subject; Name</th>
<th>Periods per week</th>
<th>Scheme of Exam</th>
<th>Total Marks</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>L</td>
<td>T</td>
<td>P</td>
<td>ESE</td>
<td>CT</td>
</tr>
<tr>
<td>1</td>
<td>Computer Sc. &amp; Engg</td>
<td>333731(22)</td>
<td>Data Mining &amp; Warehousing</td>
<td>3</td>
<td>1</td>
<td>80</td>
<td>20</td>
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<tr>
<td>2</td>
<td>Information Technology</td>
<td>333732(33)</td>
<td>Management Information System &amp; IT</td>
<td>3</td>
<td>1</td>
<td>80</td>
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<tr>
<td>3</td>
<td>Computer Sc. &amp; Engg</td>
<td>333733(22)</td>
<td>Artificial Intelligence &amp; Expert Systems</td>
<td>3</td>
<td>1</td>
<td>80</td>
<td>20</td>
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<tr>
<td>4</td>
<td>Computer Sc. &amp; Engg</td>
<td>322734(22)</td>
<td>Cryptography &amp; Network Security</td>
<td>3</td>
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<td>5</td>
<td>Refer Table-2</td>
<td>Professional Elective-2</td>
<td>4</td>
<td>80</td>
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<td>6</td>
<td>Computer Sc. &amp; Engg</td>
<td>333761(22)</td>
<td>Network Security Lab</td>
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<td>40</td>
<td>20</td>
<td>60</td>
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<td>7</td>
<td>Computer Sc. &amp; Engg</td>
<td>333762(22)</td>
<td>Artificial Intelligence &amp; Expert Systems Lab</td>
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<td>8</td>
<td>Info. Technology</td>
<td>333763(33)</td>
<td>Andriod Lab</td>
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<td>20</td>
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<td>Info. Technology</td>
<td>333764(33)</td>
<td>Minor Project</td>
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<td>10</td>
<td>Management</td>
<td>333765(76)</td>
<td>Innovative &amp; Entrepreneurial Skills</td>
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<td>Info. Technology</td>
<td>333766(33)</td>
<td>** Practical Training ** Evaluation / Library</td>
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<td>TOTAL</td>
<td>16</td>
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</tbody>
</table>

L: Lecture   T: Tutorial   P: Practical   ESE: End Semester Examination   CT: Class Test
TA: Teacher's Assessment

**Note 1:** Duration of all theory papers will be of Three Hours

**Note 2:** **To be completed after VI semester and before the commencement of VII Semester**
### Table-2: Professional Elective II

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Board of Study</th>
<th>Subject Code</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Computer Science &amp; Engg.</td>
<td>322740(22)</td>
<td>Digital Image Processing</td>
</tr>
<tr>
<td>2</td>
<td>Computer Science &amp; Engg.</td>
<td>322741(22)</td>
<td>Advanced Computer Architecture</td>
</tr>
<tr>
<td>3</td>
<td>Computer Science &amp; Engg.</td>
<td>322742(22)</td>
<td>Operation Research</td>
</tr>
<tr>
<td>4</td>
<td>Computer Science &amp; Engg.</td>
<td>322743(22)</td>
<td>E-Commerce &amp; Strategic IT</td>
</tr>
<tr>
<td>5</td>
<td>Computer Science &amp; Engg.</td>
<td>322744(22)</td>
<td>Natural Languages Processing</td>
</tr>
<tr>
<td>6</td>
<td>Computer Science &amp; Engg.</td>
<td>322745(22)</td>
<td>OODBMS</td>
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<tr>
<td>7</td>
<td>Computer Science &amp; Engg.</td>
<td>322746(22)</td>
<td>Cloud Computing</td>
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<td>8</td>
<td>Computer Science &amp; Engg.</td>
<td>322747(22)</td>
<td>Grid Computing</td>
</tr>
<tr>
<td>9</td>
<td>Information Technology</td>
<td>333748(33)</td>
<td>Multimedia and Communication</td>
</tr>
<tr>
<td>10</td>
<td>Computer Science &amp; Engg.</td>
<td>333749(22)</td>
<td>Wireless Networks</td>
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<tr>
<td>11</td>
<td>Computer Science &amp; Engg.</td>
<td>333750(22)</td>
<td>Advanced Database Management System</td>
</tr>
</tbody>
</table>

Note (1)- 1/4<sup>th</sup> of total strength of students subject to Minimum strength of twenty students is required to offer an elective in the college in a particular academic session.

Note (2)- Choice of elective course once made for an examination cannot be changed for future examination.
CHHATTISGARH SWAMI VIVEKANAD TECHNICAL UNIVERSITY
BHILAI (C.G.)

Semester: VII
Subject: Data mining and warehousing
Total Theory Periods: 40
Total Marks in End Semester Exam: 80

Branch: Information Technology.
Code: 333731(22)
Total Tutorial Periods: 12
Minimum number of CT to be conducted: 02

Course objective:
- To understand the overall architecture of a data warehouse.
- The different data mining models and techniques will be discussed in this course.
- Evaluate different models used for OLAP and data pre-processing;
- Design and implement systems for data mining and evaluate the performance of different data mining algorithms;
- Propose data mining solutions for different applications.
- Differentiate Online Transaction Processing and Online Analytical processing

Unit-I: Overview and Concepts: Need for data warehousing, basic elements of data warehousing, Trends in data warehousing. Planning and Requirements: Project planning and management, Collecting the requirements. Architecture And Infrastructure: Architectural components, Infrastructure and metadata.

Unit-II: Data Design And Data Representation: Principles of dimensional modeling, Dimensional modeling advanced topics, data extraction, transformation and loading, data quality.

Unit-III: Information Access and Delivery: Matching information to classes of users, OLAP in data warehouse, Data warehousing and the web. Implementation And Maintenance: Physical design process, data warehouse deployment, growth and maintenance.


Course outcome: After successful completion of this course students will be
- Design a data warehouse for an organization
- Develop skills to write queries using DMQL
- Extract knowledge using data mining techniques
- Adapt to new data mining tools.
- Explore recent trends in data mining such as web mining, spatial-temporal mining.

Text Books:
1. Data warehousing- concepts, Techniques, Products and Applications by Prabhu, Prentice hall of India
3. Data Mining Introductory and Advanced Topics by M.H. Dunham, Pearson Education.

Name of Reference Books:
1. Data Warehousing Fundamentals by Paulraj Ponniah, John Wiley.
2. Introduction to Data mining with Case Studies by Gupta, PHI.
3. The Data Warehouse Lifecycle toolkit by Ralph Kimball, John Wiley.
4. Introduction to Building the Data warehouse, IBM, PHI.
Course Objectives:
- Understand the role of information systems for business and management;
- Understand the role of information technology for competitive advantage;
- Understand the role of the major types of information systems in a business environment and their relationship to each other;
- Understand the system lifecycle methodology and gain the knowledge about ethics for the computer users and laws;
- Identify the major management challenges to building and using information systems and learn how to find appropriate solutions to those challenges.

UNIT – I : Management Information System and System Concepts:

UNIT -II: CBIS, Information System for competitive advantage & computer use in an international market:


UNIT-V: Case Studies: Study, Analysis, and Design of the following Management Information Systems...
1. Payroll Management System
2. Inventory Control Management System e.g. Medical Shop
3. Library Management System
4. University Result Management System
Finalizing Inputs, Processes, and Outputs. Organization of inputs, design of output formats. Finalizing Data Entry modules(AA-Add After, IN-Inquire, DL-Delete, UP-Update, LI-List, PR-Print, EX-Exit), Menus, Sub Menus, etc. Finalizing the Processing modules, their workings, Menus, Sub Menus, etc. Use of techniques viz. IPO charts, HIPO charts, Decision tables, Flow Charts, etc. is expected.
(Note: The teachers and students should perform the Study, Analysis, and Design. They should study the relevant written and non-written rules and regulations e.g. Service rules, Manuals, Ordinances, etc. They should download the relevant material from the Internet)

**Course Outcomes:** At the completion of the course student will be able to -
- Describe the basic concepts and technologies used in the field of management information systems;
- Identify the different types of management information systems;
- Explain the ethical, social, and security issues of information systems;
- Describe the role of information systems in organizations, the strategic management processes, and the implications for the management;
- Describe about the importance of managing organizational change associated with information systems implementation;
- Describe the practical approach of developing and implementing information systems.

**Text Books:**

**Reference Books:**
3. Analysis and Design of Information System, V. Rajaraman (PHI)
Course Objective:
- To understand the principles and practices of cryptography and network security
- To understand the practical applications that have been implemented and are in use to provide network security


Course Outcome: after successful completion of this course, the students will be able to explain
- Conventional encryption algorithms for confidentiality and their design principles
- Public key encryption algorithms and their design principles
- Use of message authentication codes, hash functions, digital signature and public key certificates
- Network security tools and applications
- System-level security issues like threat of and countermeasures for intruders and viruses, and the use of firewalls and trusted systems.

Text Book:

Reference books:
UNIT I Overview & Search Techniques:

UNIT II Knowledge Representation (KR):

UNIT III Handling uncertainty & Learning:

UNIT IV Natural Language Processing (NLP) & Planning:

UNIT V Expert System & AI languages:

Course outcome: After successful completion of the course, students will be able
• Demonstrate fundamental understanding of artificial intelligence (AI) and expert systems.
• Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
• Demonstrate awareness and a fundamental understanding of various applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.
• Demonstrate proficiency in applying scientific method to models of machine learning.

Text Books:-
1. Artificial Intelligence by Elaine Rich and Kevin Knight, Tata McGraw Hill.
2. Introduction to Artificial Intelligence and Expert Systems by Dan W. Patterson, Prentice Hall of India.

Reference Books :-
Course Objectives:

- To understand the fundamentals of Cryptography through practical implementation.
- To implement standard algorithms used to provide confidentiality, integrity and authenticity.
- To understand the various key distribution and management schemes.
- To understand how to use cutting edge simulation tools
- To design security applications in the field of Information technology.

The following exercises are based on the cryptographic algorithms. They can be implemented using C, C++, Java, etc. However the students are advised to use Java cryptographic packages to implement the programs in UNIX environment. Minimum 12 experiments should be performed.

1. Write a C program that contains a `string` (char pointer) with a value ‘Hello world’. The program should XOR each character in this string with 0 and displays the result.
2. Write a C program that contains a `string` (char pointer) with a value ‘Hello world’. The program should
   a. AND and
   b. XOR
   Each character in this string with 127 and display the result.
3. Write a Java program to perform encryption and decryption using the following algorithms
   a. Caesar cipher
   b. Substitution cipher
   c. Hill Cipher
4. Write a C/Java program to implement the 8 bits simplified DES algorithm logic
5. Write a C/Java program to implement the Blowfish algorithm logic.
6. Write the RC4 logic in Java
7. Implement the Euclid Algorithm to generate the GCD of an array of 10 integers in ‘C’.
9. Write a Java program to implement RSA algorithm.
10. Implement the Diffie-Hellman Key Exchange mechanism using HTML and JavaScript.
11. Write a Java program to calculate the message digest of a text using the SHA-1 algorithm.
12. Calculate the message digest of a text using the MD5 algorithm in JAVA.
13. Create a digital certificate of your own by using the Java keytool.
14. Write Java program to hide of confidential information within Image using Steganography technique
15. Configure a firewall to block the following for 5 minutes and verify the correctness of this system using the configured parameters:
   a. Two neighborhood IP addresses on your LAN
   b. All ICMP requests
   c. All TCP SYN Packets

Course outcome: Students will be able to

- Develop programs to implement various encryption and decryption techniques.
- Develop programs to implement symmetric and asymmetric key crypto system.
- Develop programs to implement message authentication codes, digital signature.
- Use the cryptographic packages available in JDK.
Semester: VII
Subject: Artificial Intelligence & Experts Systems Lab
Total Practical Periods: 42
Total Marks in End Semester Exam: 40
Course Objectives:

Suggested List of Experiments (but should not be limited to):

1. Write a prolog program to find the rules for parent, child, male, female, son, daughter, brother, sister, uncle, aunt.
2. Write a program to find the length of a given list
3. Write a program to find the last element of a given list
4. Write a program to delete the first occurrence and also all occurrences of a particular element in a given list.
5. Write a program to find union and intersection of two given sets represented as lists.
6. Write a program to read a list at a time and write a list at a time using the well defined read & write functions.
7. Write a program given the knowledge base,
   If x is on the top of y, y supports x.
   If x is above y and they are touching each other, x is on top of y.
   A cup is above a book. The cup is touching that book. Convert the following into wff’s, clausal form; Is it possible to deduce that 'The book supports the cup'.
8. Write a program given the knowledge base,
   If Town x is connected to Town y by highway z and bikes are allowed on z, you can get to y from x by bike.
   If Town x is connected to y by z then y is also connected to x by z.
   If you can get to town q from p and also to town r from town q, you can get to town r from town p.
   Town A is connected to Town B by Road 1. Town B is connected to Town C by Road 2.
   Town A is connected to Town C by Road 3. Town D is connected to Town E by Road 4.
   Town D is connected to Town B by Road 5. Bikes are allowed on roads 3, 4, 5.
   Bikes are only allowed on Road 1 or on Road 2 every day. Convert the following into wff’s, clausal form and deduce that 'One can get to town B from town D'.
9. Solve the classical Water Jug problem of AI.
10. Solve the classical Monkey Banana problem of AI.
11. Solve the classical Crypt arithmetic problems such as DONALD + GERALD = ROBERT of AI.
12. Solve the classical Missionary Cannibals problem of AI.
13. Solve the classical Travelling Salesman Problem of AI.
14. Solve the classical Blocks World Problem of AI.
15. Write a program to search any goal given an input graph using AO* algorithm.

List of Equipments/Machine required:
(i) PC with Windows xp
(ii) Visual prolog compiler

Recommended Books:
1. Ivan Bratko : Logic & prolog programming.
2. Carl Townsend : Introduction to Turbo Prolog, BPB, Publication.
Course objective:

- Understanding the working of Android applications
- To learn how to create GUI and handle events in Android applications.
- Understanding development of applications with data storage, APIs and Databases

Suggested List of Experiments (but should not be limited to)

1. Download and setup Android Environment
2. Using the Development environment
   a. Create a new Project using wizard
   b. Add source and resource files.
   c. Import existing projects into workspace
   d. Create testing Emulator
   e. Compile and run the project
   f. Debug the project
   g. Debug on android device.
3. XML Files
   a. AndroidManifest.xml
      a.i. Edit the manifest and change min sdk and target sdk of application.
      a.ii. Add main activity entries in manifest.
      a.iii. Add second activity entries in manifest.
      a.v. Add uses permissions for reading files, internet, camera.
   b. Layouts
      b.i. Create Linear Layout in xml
      b.ii. Create Relative Layout in xml
      b.iii. Create frame layout in xml
      b.iv. Create a complex mixed layout using all above layouts
   c. Drawables
      c.i. Create xml drawable for rectangular, oval and other basic shapes
      c.ii. Create xml drawable with Layer list for complex shapes.
   d. Values
      d.i. Create strings.xml to store all your application strings.
      d.ii. Create color.xml to store all your color values
      d.iii. Create styles.xml to store all your custom themes and style objects
   e. Alternate resources based on qualifiers
      e.i. Create separate drawables folders and xml files based on screen density (LDPI, MDPI, HDPI, XHDPi, XXHDPi)
      e.ii. Create separate styles.xml based on different android versions.
      e.iii. Create separate layout folders based on device screen sizes and orientations.
4. Creating User Interface
   a. Create application with Basic Views (TextView, Button, ListView)
   b. Create application with different Layouts (Linear, Relative, Frame)
   c. Create application to handle and respond on click using Click Listeners
5. Assets and Images
   a. Create application which will access files from Assets folder (Images, sounds, Custom Fonts)
6. Application Fundamentals
   a. Activities
      a.i. Create application with one activity and display a layout created in xml.
      a.ii. Create application which will log all activity lifecycle events using Android log api.
      a.iii. Create application which should be Saving and restoring app state (eg textview text, checkbox checked state)
   b. Intents
      b.i. Create application which will start another activity using intent.
      b.ii. Create an activity which will pass data to second activity using intent.
      b.iii. Create activity which will start second activity and get response back from second activity.
   c. Services
      c.i. Create

7. Content Providers
   a. System provided content providers
      a.i. Create application which can access/modify Contacts of device.
      a.ii. Create application which can access & display Images available on device.
      a.iii. Create application which can access and play Media files (Audio & Video)
   b. Custom Contact providers
      b.i. Create application which will provide some data to other applications using ContentProvider system.

8. Broadcast Receivers
   a. Create application to Listen to following system events using Receivers
      a.i. Incoming SMS
      a.ii. In and outgoing Phone Call
      a.iii. Low Battery
      a.iv. Storage state changed
   b. Create application which will broadcast Custom event to custom Receivers.

9. Create application which will display following Notifications
   a.i. Toast notification
   a.ii. Status bar notification
   a.iii. Dialog notification

10. Preference & Data Storage
    a. Create application which will save and read back data using Shared Preference
    b. SQLite database
       b.i. Create app to create database using Open helper
       b.ii. Create app to read, write and delete database entries

11. Networking & Web API
    a. HTTP connectivity
       a.i. Create app to connect and fetch data from a Http server/ website using URLConnection
       a.ii. Create app to connect and fetch data from a Http server/ website using HTTPClient library
       a.iii. Create app to connect and post data to Http server/ website using URLConnection
       a.iv. Create app to connect and post data to Http server/ website using HTTPClient library
    b. TCP Sockets or Sockets
       b.i. Create a server app using tcp socket, it will send “Welcome” to client when its connected.
       b.ii. Create a client app using tcp socket, it will send “Hello” to server once connected.

12. Google API
    a. Create application using Maps api, it should display marker on current location of user
    b. Create application which will display ads using Admob api

13. Accessing android hardware
    a. Create Application to take picture and save it to file storage using camera api
    b. Create application to display current direction using sensor api
    c. Create application to show a toast if phone is waved in air.
    d. Create application to show list of paired and nearby bluetooth devices.

14. Facebook SDK
a. Create application which can share link on facebook using Facebook sdk.
b. Create application which can share photo on facebook using Facebook sdk.

15. Publish to playstore
   a. Enable Obfuscation for your application using Proguard
   b. Export Signed application package
   c. Prepare Store listing
   d. Upload and publish apk

COURSE OUTCOMES: Once the student has successfully completed this course, he/she will be able to answer the following questions or perform following activities:

- Understands basic concepts and technique of developing applications for the Android phone.
- Able to use the SDK and other development tools.
- Acquaintances with how to publish Android applications to the Android Market.

Reference Books:
Head First Android- By Jonathan Simon
Course Objective
- Cover the basic theory and algorithms that are widely used in digital image processing
- Expose students to current technologies and issues that are specific to image processing systems
- Develop hands-on experience in using computers to process images
- Develop critical thinking about shortcomings of the state of the art in image processing

UNIT I: Introduction:
Image formation model, Spatial & Gray level resolution, Image enhancement in special domain: Piecewise transformation functions, Histogram equalization, Histogram specification, image averaging, spatial filters- smoothing and sharpening, Laplacian filter, Canny edge detector.

UNIT II: Image Enhancement in Frequency Domain & Image segmentation:
2D discrete Fourier transform & its inverse, filtering in frequency domain, Ideal & Gaussian low pass filters, High pass filtering, FFT, Line detection, Edge detection, Edge linking & boundary detection, Thresholding, Region based segmentation.

UNIT III: Morphological Image Processing:
Logic operations involving binary image, Dialation & Erosion, Opening & Closing, Applications to Boundary extraction, region filling, connected component extraction.

UNIT IV: Image compression:
Coding redundancy- Huffman coding, LZW coding, run length coding, Lossy compression- DCT, JPEG, MPEG, video compression.

UNIT V: Image representation & 3D:
Boundary descriptors, Shape numbers, Texture, Projective geometry, Correlation based and feature based stereo correspondence, shape from motion, optical flow.

Outcomes: After successful completion of the course, student will be able to
- Describe, analyze and reason about how digital images are represented, manipulated, encoded and processed, with emphasis on algorithm design, implementation and performance evaluation.
- Apply principles and techniques of digital image processing in applications related to digital imaging system design and analysis.
- Analyze and implement image processing algorithms.

Name of Text Books:-
2. Sonka and Brooks, Image Processing, TSP ltd,

Name of Reference Books:-
1. Jain and Rangachar, Machine Vision, MGH.
Course Objective
- To provide in-depth coverage of current and emerging trends in computer architectures, focusing on performance and the hardware/software interface.
- To analyzing fundamental issues in architecture design and their impact on application performance.

UNIT I: Pipeline:
Linear: pipeline processor, Non linear pipeline processor, Instruction pipeline design, Mechanisms, Dynamic instruction scheduling, Arithmetic pipeline design, Super-scalar processors, VLIW architecture.

UNIT II: Memory Hierarchy and I/O Organization ON:
Cache memories, Cache coherence, High bandwidth memories, High bandwidth I/O, Disk I/O, Bus specifications and standards.

UNIT III: Parallel Computer Models & Program Parallelism:
Classification of Machines, SISD, SIMD & MIMD, Condition of parallelism, data and resource dependencies, Program partitioning & scheduling, grain size latency, control flow versus data control, data flow architecture.

UNIT IV: synchronous Parallel processing:
Vector instruction types, vector access memory schemes, vector and symbolic processors, SIMD architecture, SIMD parallel algorithms, SIMD computers and performance enhancements.

UNIT V: System Interconnection:
Network properties and routing, static interconnection networks, dynamic interconnection networks, Multiprocessor system interconnection, Multistage & combining networks.

Course Outcomes: After successful completion of this course, students will be
- Discuss the organization of computer-based systems and how a range of design choices are influenced by applications
- Differentiate different processor architectures and system-level design processes.
- Understand the components and operation of a memory hierarchy and the range of performance issues influencing its design.
- Understand the organization and operation of current generation parallel computer systems, including multiprocessor and multi core systems.
- Understand the principles of I/O in computer systems, including viable mechanisms for I/O and secondary storage organization.

Text Books:-

Reference Books:-
1. Parallel Computer 2 –Arch..& Algo, R.W. Hockney, C.R. Jesshope, Adam Hilger.
2. Advanced Computer Architecture with Parallel Programming, K. Hwang, MGH.
3. Parallel Computing, Theory and Practice, Michel J. Quinn, MGH.
Course Objectives:

- To discuss the technical details of common multimedia data formats, protocols, and compression techniques of digital images, video and audio content.
- To describe and understand the technical details of JPEG and MPEG families of standards.
- To discuss the significance of “Quality of Service” in multimedia networking.
- To describe the principles and technical details of several wired and wireless networking protocols.
- Develop simple but demonstrative multimedia applications using JAI and JMF.


UNIT-II: Compression Techniques:

UNIT-III: Multimedia System Architecture:

UNIT-IV: Multimedia Information Management:
Multimedia Database Design, Content Based Information Retrieval: Image Retrieval, Video Retrieval, Overview of MPEG-7, Design of video- on-Demand Systems

UNIT-V: Virtual Reality:
Introduction to Virtual Reality and Virtual Reality Systems, Related Technologies: Tele-operation and Augmented Reality Systems Interface to the Virtual World-Input; Head and hand trackers, data globes, hap tic input devices. Interface to the Virtual World- Output, Stereo display, head-mounted display, auto stereoscopic displays, holographic displays, hap tic and force feedback. VRML Programming; Modeling objects and virtual environments Domain Dependent applications: Medical, Visualization, Entertainment etc.

Course Outcome: After successfully completing this course, students will be able to develop a thorough understanding of the major aspects of technical details of multimedia data representation, and multimedia content delivery platforms. The techniques and understandings will support proper evaluation, development, and enhancement of distributed multimedia applications.

Text Book:-
2. Multimedia Concept & Practice, Hartman & Carey, PHI
Course Objective:
- Understand the architecture and applications of current and next generation wireless networks: Cellular, WLANs, sensor networks, mobile ad-hoc networks and intermittently connected mobile networks.
- Learn how to design and analyze various medium access and resource allocation techniques wireless networks.
- Learn to design and analyze transport layer protocols, with an emphasis on congestion control, including TCP over wireless, congestion sharing mechanisms, explicit and precise rate control, utility optimization-based approaches, and backpressure-based utility optimization.

UNIT-1

UNIT-2

UNIT-3
CELLULAR COMMUNICATION-Frequency reuse and mobility Management, Cell Cluster Concept, Co Channel and Adjacent Channel Interference, Call Blocking and Delay at Cell Site, Cell Splitting, Sectoring;

UNIT-4
Multiple Access Technique, Random Access, Carrier Sense Multiple Access( CSMA), Conflict Free Multiple Access Technology and Spectral Efficiency-FDMA, TDMA, CDMA; Mobility management and In wireless network-CAC, Handoff Management, Location Management for Cellular Network and PCS network, Traffic calculation.

UNIT-5

Course outcome:
- Have knowledge and understanding of basic mobile network architecture
- Have knowledge and understanding of some basic technologies that are in use
- Be able to make critical assessment of mobile systems
- Be able to analyze and propose broad solutions for a range of mobile scenarios

Text Books:1
1. WIRELESS COMUNICATION & NETWORKING by Mark & Zhuang , PHI
2. Wireless Communications And Networks, WILLIAM STALLINGS , PHI

Reference Books:
2. Principles Of Wireless Networks, By PAHLAVAN , PHI
CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY
BHILAI (C. G.)

Semester: B.E. 7th
Subject: Advanced Database Management Systems
Total Theory Periods: 50
Total Marks in End Semester Exam: 80
Minimum number of class tests to be conducted: 02

Branch: Information Technology.
Code: 322750(22)
Total Tutorial Periods:
Assignments: 1 per Unit

Course Objective
- Introduce basic concepts and major techniques in DBMS implementations. These include concepts and techniques for data storage, query processing, and transaction management.
- Introduce research development ability in databases.

UNIT-I DISTRIBUTED DATABASE DESIGN: Design strategies, Distribution design issues, Fragmentation, Allocation, Oracle DDB design, Distributed database system architecture, Date’s rule for DDBS.

UNIT-II DATA REPLICAATION & QUERY PROCESSING IN DDBS : Classification of replica control strategies, Consistency & Request ordering, The Gossip Architecture, Process groups & ISIS, Replication in Oracle, Query optimization in Centralized system, Objective of query processing, Query decomposition, Distributed query optimization algorithms, Query optimization in Oracle.


Course Outcome:

Upon completion of this course, students should be able to:
- Explain in detail DBMS architecture.
- Explain in detail query processing and techniques involved in query optimization.
- Explain the principles of concurrency control and recovery management.
- Explain the Security management in Databases

Text book:
1. Database system concepts, 4th edition, Silberschatz-Korth-Sudarshan, MH

References:-
1. Database concepts & systems, 2nd edition, Ivan Bayross, SPD
2. Database Management System, Rajesh Narang, PHI.
3. An Introduction to database systems, 7th edition, C.J. Date, Pearson education
Course Objective

- To introduce use quantitative methods and techniques for effective decisions-making; model formulation and applications those are used in solving business decision problems.
- To model decision making problems using major modeling formalisms of artificial intelligence and operations research, including propositional logic, constraints, linear programs and Markov processes.
- To evaluate the computational performance of search, satisfaction, optimization and learning algorithms.
- To apply search, satisfaction, optimization and learning algorithms to real world problems.

UNIT – 1 Linear Programming: LP formulations, Graphical method for solving LP with 2 variables, Simplex method, Application of simplex method for maximization and minimization of LP problems, Artificial variable technique for finding the initial basic feasible solution, The Big-M method, Degeneracy in simplex method, Duality theory in LP, Dual simplex method.


UNIT- 3: Inventory Model: Introduction to the inventory problem, Deterministic models, The classical EOQ (Economic order quantity) model, Purchasing model with no shortage, Manufacturing model with no shortage, purchasing model with shortage, Manufacturing model with shortage, Inventory models with probabilistic demand.

UNIT –4: Sequencing and Queuing Theory: Sequencing problem, Johnson's algorithm for processing N-jobs through 2 machine problem, N-jobs through 3 machine problem, 2- job through N machine by graphical method, Characteristics of queuing system- steady state M/M/1, M/M/1K and M/M/C queuing models.

UNIT- 5: CPM and PERT: Arrow network, Time estimates – Earliest expected time, Latest allowable occurrence time and slack, Critical path, Probability of meeting scheduled date of completion of project, Calculation on CPM network, Various floats for activities, Critical Path, Updating project, Operation time cost trade off curve & project time cost trade off curve, selection of schedule based on cost analysis.

Course Outcome:

- Identify and develop operational research models from the verbal description of the real system.
- Understand the mathematical tools that are needed to solve optimization problems.
- Develop a report that describes the model and the solving technique, analyze the results and propose recommendations in language understandable to the decision-making processes in Management Engineering.

Name of Text Books:–
1. Operation Research, Panneerselvam, Prentice Hall of India

Name of Reference Books:-
3. Vohra N.D., Quantitative Techniques in Managerial, T.M.H.
Course Objective:
- To understand the business impact and potential of e-commerce
- To learn about the technologies required to make e-Commerce viable
- To learn e-commerce from an enterprise point of view
- To learn about the working of various electronic payment systems

UNIT – Introduction:

UNIT –II -Network Infrastructure:
LAN, Ethernet (IEEE standard 802.3) LAN, WAN, Internet, TCP/IP Reference Model, Domain Name Server, Internet Industry Structure.

UNIT–III: Electronic payment systems:
Types of electronic payment systems, digital token-based electronic payment systems, smart cards & electronic payment systems, credit card based electronic payment systems, risk and electronic payment systems, designing electronic payment systems.

UNIT–IV: Information Distribution and Messaging:
FTP, E-Mail, www server, HTTP, Web service implementation, Information publishing, Web Browsers, HTML, Common Gateway Interface

UNIT –V: Mobile & wireless computing fundamentals:
Mobile computing framework, wireless delivery technology and switching methods, mobile information access devices, mobile data internetworking standards, cellular data communication protocols, mobile computing applications, personal communication service.

Course outcome: After successful completion of the course, students
- Will be able to apply the skills necessary for large-scale web based e-commerce project development.
- Will be able to work on information distribution and messaging services in e-commerce application.
- Will be able to work on business applications of wireless and mobile technologies for e-commerce.

Text books:
1. Frontiers of E-commerce by Kalakota & Whinston, Addison Wesley.
2. E-business road map for success by Dr. Ravi Kalakota & Marcia Robinson, Addison Wesley.

Reference book:
3. Electronic Commerce by Bharat Bhasker, TMH.
CHHATTISGARH SWAMI VIVEKANAD TECHNICAL UNIVERSITY  
BHILAI (C.G.)

<table>
<thead>
<tr>
<th>Semester: VII</th>
<th>Code: 322744(22)</th>
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<tbody>
<tr>
<td>Subject: Natural Language Processing</td>
<td>Total Theory Periods: 50</td>
</tr>
<tr>
<td>Code: 322744(22)</td>
<td>Total Tutorial Periods: NIL</td>
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<tr>
<td>Total Marks in End Semester Exam: 80</td>
<td>Minimum number of CT to be conducted: 02</td>
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**Course objective:**
1. To understand the concepts of morphology, syntax, semantics and pragmatics of the language.
2. To recognize the significance of pragmatics for natural language understanding.
3. To describe the simple system based on logic and demonstrate the difference between the semantic presentation and interpretation of that presentation.
4. To describe the application based on natural language processing and to show the points of syntactic, semantic and pragmatic processing.

**Unit –I: Introduction and syntactic processing**
The study of Language, Linguistic background, Grammars and Parsing, Features and Augmented Grammars, Grammars for Natural Language, towards efficient parsing, Ambiguity Resolution.

**Unit –II: Semantic interpretation**

**Unit –III: Pragmatics**

**Unit –IV: Natural Language generation**
Introduction to language generation, architecture for generation, surface realization, systemic grammar, functional unification grammar, discourse planning.

**Unit –V: Machine translation**
Language Similarities and Differences, transfer metaphor, syntactic transformations, lexical transfer, idea of Interlingua, direct translation, using Statistical Techniques

**Course Outcomes:** After successful completion of the course, students
1. Can set up, implement and evaluate natural language technology experiment step by step
2. Will be familiar with a sample of machine learning techniques and can assess which ones are suitable for a given problem
3. Can explain the interaction between rule based and probabilistic methods in language technology.

**Text Books:**
1. Speech and Language Processing, by Jurafsky, D. & Martin, J.H.
2. Natural Language Understanding, Allen, J

**Reference Books:**
1. Foundations of General Linguistics by Atkinson, M, Kilby, D A & Roca, I
2. An Introduction to Language by Fromkin, V & Rodman, R
3. Natural Language Processing for Prolog Programmers by Covington, M A
4. Natural language processing in Prolog: an introduction to computational linguistics by Gazdar, G& Mellish.
Course objective:
1. This course discusses the requirements for advanced database features in database applications.
2. Introduce Parallel and Distributed databases.
3. Understand the enhanced data models for advanced applications
4. Examines the concepts of various emerging database technologies.

UNIT I: The extended Entity- Relationship Model and Object model:
The ER model revisited, Motivation for complex data types, User defined abstract data types and structured types, Subclasses, Super classes, Inheritance, Specialization and Generalization, Constraints and characteristics of specialization and Generalization, Relationship types of degree higher than two.

UNIT II: Object oriented databases:
Overview of Object-Oriented concepts, Object identity, Object structure, and type constructors, Encapsulation of operations, Methods, and Persistence, Type hierarchies and Inheritance, Type extents and queries, Complex objects; Database schema design for OODBMS; OQL, Persistent programming languages; OODBMS architecture and storage issues; Transactions and Concurrency control, Example of ODBMS.

UNIT III: Object relational and extended relational databases:
Database design for an ORDBMS - Nested relations and collections; Storage and access methods, Query processing and Optimization; An overview of SQL3, Implementation issues for extended type; Systems comparison of RDBMS, OODBMS, ORDBMS

UNIT IV: Parallel and distributed database and Client server architecture:
Architectures for parallel databases, Parallel query evaluation; Parallelizing individual operations, Sorting, Joins; Distributed database concepts, Data fragmentation, Replication, and allocation techniques for distributed database design; Query processing in distributed databases; Concurrency control and Recovery in distributed databases. An overview of Client-Server architecture.

UNIT V: Databases on the web and semi structured data:
Web interfaces to the Web, Overview of XML; Structure of XML data, Document schema, Querying XML data; Storage of XML data, XML applications; The semi structured data model, Implementation issues, Indexes for text data. Enhanced Data Models for Advanced Applications: Active database concepts. Temporal database concepts. Spatial databases, Concepts and architecture; Deductive databases and Query processing; Mobile databases, Geographic information systems.

Course outcome: After successful completion of the course, students will be
1. Able to understand the needs and concepts of object-oriented database, spatial database, web database, data warehousing and data mining.
2. Able to analyze, design and evaluate the construct of various advanced databases such as object-oriented, object-relational, semi-structured, unstructured and distributed databases.
3. Be able to implement practical solutions to GIS database problems using OO/OR database, spatial database, data warehousing and data mining approaches.

Text Books:
1. Object Oriented Interfaces and Databases, Rajesh Narang, Prentice Hall of India

Reference books:
1. Fundamentals of Database Systems, Elmasri and Navathe, Pearson Education
Course objective:
1. Cloud computing represents a latest in the long history computing mainframe, Personal computing networked computing and expected to revolutionize the business is done.
2. This course covers the theoretical and practical aspects of cloud computing. At the end of the course, student will be able to appreciate the computing paradigm, recognize its various forms and able to implement some cloud computing features.


UNIT III Cloud as: Communication-as-a-Service (CAAS), Infrastructure-as-a-Service (IAAS), Monitoring-as-a-Service (MAAS), Platform-as-a-Service (PAAS), Software-as-a-Service (SAAS).

UNIT IV The MSP Model, Evolution from the MSP Model to Cloud Computing and Software-as-a-Service, TheCloud Data Center, Basic Approach to a Data Center-Based SOA, Open Source Software, Service- Oriented Architectures as a Step Toward Cloud Computing.


Course Outcome:
1. Students will be able to perform cloud oriented analysis.
2. Students will be able to model cloud candidate derived from existing business documentation.
3. Students will be able to design the composition of a cloud services.
4. Students will be able to design application services for technology abstraction.

Text Books:

Reference Books:
CHHATTISGARH SWAMI VIVEKANAD TECHNICAL UNIVERSITY
BHILAI (C.G.)

Semester: VII Branch: Information Technology.
Subject: Grid Computing Code: 322747(22)
Total Theory Periods: 50 Total Tutorial Periods: NIL
Total Marks in End Semester Exam: 80 Minimum number of CT to be conducted: 02

Course objective:
- To understand the need for and evolution of Grids in the context of processor- and data-intensive applications
- To be familiar with the fundamental components of Grid environments, such as authentication, authorization, resource access, and resource discovery

UNIT I: Concepts and Architecture:

UNIT II: Grid Monitoring: GRID MONITORING

UNIT III: Grid Security and Resource Management:

UNIT IV: Data Management and Grid Portals

UNIT V: Grid Middleware
List of globally available Middlewares - Case Studies-Recent version of Globus Toolkit and gLite - Architecture, Components and Features. Features of Next generation grid.

Course Outcome: After successful completion of the course students will be
- be able to justify the applicability, or non-applicability of Grid technologies for a specific application
- be able to evaluate enabling technologies such as high-speed links and storage area networks for building computer grids;
- be able to design a grid computing application in one of the key application areas e.g. Computer Animation, E-Research;

Text Books:

Reference Books: