

Chhattisgarh Swami Vivekananda Technical University, Bilai

Branch: **Information Technology**

Semester: **VI**

Subject: **Computer Graphics and Data Visualization**

Code: **C033611(033)**

Total Theory Periods: 40

Total Tutorial Periods: 10

No. of Class tests to be conducted: **2(Minimum)**

Maximum Marks in ESE: **100**

No. of Assignments to be submitted: **One per Unit**

Minimum Marks in ESE: **35**

ESE Duration: **Three Hours**

COURSE OBJECTIVES

- To comprehend the fundamental concepts of graphics and data visualization.
- To gain and apply the acquired knowledge pertaining to 2D and 3D concepts in graphics programming.
- To understand the basic modeling and rendering techniques.
- Acquire skills to apply visualization techniques to a problem and its associated dataset

COURSE OUTCOME

1. To enumerate the functionalities of pixels and coordinate systems pertaining to graphics manipulation.
2. Design and demonstrate the 2D and 3D objects using graphics algorithms.
3. Have the ability to model and render objects by comprehending the complexities of illumination in virtual scenes.
4. Identify the different data types, visualization types to bring out the insight. Relate the visualization towards the problem based on the dataset.
5. Identify the different attributes and showcasing them in plots. Identify and create various visualizations for geospatial and table data.

Unit I

Basic Concepts & Techniques: Pixel, Coordinate Representations, Raster and Random generator. Graphics Functions, RGB Color Component, Brenham's Line Drawing Algorithm. Midpoint Circle Algorithm. Midpoint Ellipse Algorithm. Pixel Addressing and Object Geometry. Fill Methods for Areas with Irregular Boundaries.

Unit II

Two & Three Dimensional Graphics Primitives: Basic Transforms, **Viewing:** Normalization and Viewport Transformations.

Unit III

Curve and Surface Modeling: Continuity Conditions, Bezier and B spline curve and surfaces, **Visible-Surface Detection Methods:** Back-Face Detection, Depth-Buffer Method. Ray-Casting Method. Basic Illumination Models: Ambient Light, Diffuse Reflection, Specular Reflection and the Phong Model.

Unit IV

Introduction to Data Visualization: Overview of data visualization: - Data Abstraction -Analysis: Four Levels for Validation- Task Abstraction - Analysis: Four Levels for Validation, Visualization Techniques: Scalar and point techniques Color maps Contouring Height Plots - Vector visualization techniques Vector properties Vector Glyphs Vector Color Coding Stream Objects.

Unit V

Visual Analytics: Visual Variables- Networks and Trees - Map Color and Other Channels- Manipulate View, Visualization Tools and Techniques: Introduction to data visualization tools- Tableau - Visualization using R.

Text Book:

1. Donald Hearn, Pauline Baker, "Computer Graphics with OpenGL - C Version", 4th Edition, Pearson Education, 2016.
2. Tamara Munzer, Visualization Analysis and Design -, CRC Press 2014
3. AlexandruTelea, Data Visualization Principles and Practice CRC Press 2014

Reference Book:

1. John F. Hughes, Andries Van Dam, Morgan Mc Guire ,David F. Sklar , James D. Foley, Steven K. Feiner and Kurt Akeley, "Computer Graphics: Principles and Practice", 3rd Edition, AddisonWesley Professional, 2013.
2. Paul Deitel Harvey Deitel ,Java, How to Program, Prentice Hall; 9th edition , 2011.
3. Cay Horstmann BIG JAVA, 4th edition,John Wiley Sons,2009
4. Nicholas S. Williams, Professional Java for Web Applications, Wrox Press, 2014

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Branch: **Information Technology**

Semester: **VI**

Subject: **Compiler Design**

Code: **C033612(033)**

Total Theory Periods: 40

Total Tutorial Periods:10

No. of Class tests to be conducted: **2(Minimum)**

Maximum Marks in ESE:**100**

No. of Assignments to be submitted: **One per Unit**

Minimum Marks in ESE:**35**

ESE Duration: **Three Hours**

COURSE OBJECTIVES

- Course objective is to make the student to understand the process involved in a compiler, create an overall view of various types of translators, linkers, loaders, and phases of a compiler, understand what is syntax analysis, various types of parsers especially the top down approach, awareness among students the various types of bottom up parsers, understand the semantic analysis and intermediate code generation, the role of symbol table and its organization, Code generation, machine dependent code optimization .

COURSE OUTCOMES

On successful completion of the course, the student will be able to:

1. Explain the concepts of Compilers and roles of the lexical analyzer.
2. Apply the concepts of different Parsing techniques and implement the knowledge to Yacc tool.
3. Develop syntax directed translation schemes.
4. Implement the principles of scoping, parameter passing and runtime memory management.
5. Use the new code optimization techniques to improve the performance of a program in terms of speed & space and develop algorithms to generate code for a target machine.

Unit I: Introduction

Introduction to Compiler, single and multi-pass compilers, Translators, Phases of Compilers, Compiler writing tools, Finite Automata and Lexical Analyzer: Role of Lexical Analyzer, Specification of tokens, Recognition of tokens, Regular expression, Finite automata, from regular expression to finite automata, transition diagrams, Implementation of lexical analyzer with LEX.

Unit II: Syntax Analysis and Parsing Techniques

Context free grammars, Bottom-up parsing and top down parsing, Top down Parsing : elimination of left recursion, recursive descent parsing, Predicative Parsing, Bottom Up Parsing : Operator precedence parsing, LR parsers, Construction of SLR, Canonical LR and LALR parsing tables, Construction of SLR parse tables for Ambiguous grammar, parser generator- YACC, error recovery in top down and bottom up parsing.

Unit III: Syntax Directed Translation & Intermediate Code Generation

Synthesized and inherited attributes, Construction of syntax trees, bottom up and top down evaluation of attributes, S- attributed and L-attributed definitions ,Postfix notation; Three address codes, quadruples, triples and indirect triples, Translation of assignment statements, control flow, Boolean expression and Procedure Calls.

Unit IV: Run-time Environment

Storage organization, activation trees, activation records, allocation strategies, Parameter passing symbol table, dynamic storage allocation.

Unit V: Code Optimization and Code Generation

Basic blocks and flow graphs, Optimization of basic blocks, Loop optimization, Global data flow analysis, Loop invariant computations. Issue in the design of Code generator, register allocation, the target machine, and simple Code generator

TEXT BOOKS:

1. Compilers Principles, Techniques and Tools , Alfred V. Aho, Ravi Sethi and Ullman J.D. 2nd Addison Wesley
2. Principle of Compiler Design, Alfred V. Aho and J.D. Ullman, Narosa Publication
3. Introduction to Compiler Techniques J.P. Bennet 2nd Tata McGraw-Hill

REFERENCE BOOKS:

1. Compiler Design in C, A.C. Holub, PHI
2. Compiler construction (Theory and Practice), A. Barret William and R.M., Bates, Galgotia Publication
3. Compiler Design, O.G. Kakde, 4th Laxmi Publication

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Branch: **Information Technology**

Semester: **VI**

Subject: **Information Theory and Coding**

Code: **C033613(033)**

Total Theory Periods: 40

Total Tutorial Periods:10

No. of Class tests to be conducted: **2(Minimum)**

Maximum Marks in ESE:**100**

No. of Assignments to be submitted: **One per Unit**

Minimum Marks in ESE:**35**

ESE Duration: **Three Hours**

COURSE OBJECTIVES:

The main Objective to include this subject in Information Technology discipline is:

- To design and study of the mathematical model of communication systems and their corresponding probabilistic predictions.
- To motivate the students to optimize the bandwidth of communication channel, develop a secure and compact communication model.
- To understand different methods to reduce the errors during transmission.
- To minimize and control the erroneous condition in communication.
- Able to calculate capacity of Communication Channels.

COURSE OUTCOMES:

1. Students will be able to acknowledge about the different probability of erroneous condition in communication and how to control it.
2. They will learn to optimize the channel bandwidth and different conditions to improve efficiency of the communication system.
3. Understand the basic concept of Source Coding Techniques to enhance the performance of Communication System.
4. To acquire knowledge of different types of channels. Understand basic concepts of complexity of cryptographic security methods and their practical applications.
5. Apply and control specific coding methods and be able to calculate the rate and error probabilities achieved.

Unit I INFORMATION THEORY

Uncertainty, Information, Information rate, mutual information; Marginal, conditional and joint Entropies; Shannon's concept of information; Shannon's measure of information; Model for Communication system; Source coding and line/channel coding; channel mutual information capacity (Bandwidth)

Unit II SOURCE CODING

Model for source coding theorem; entropy of binary memory less source and its extension to discrete memory less source, Source with memory and its entropy, Encoding of the source output, source coding theorem, Huffman coding, Shannon-Fano coding, Discrete memory less Channels.

Unit III CHANNEL CODING

Binary Symmetric Channel, mutual information & its properties, Channel capacity, channel coding theorem and its application to BSC, Shannon's theorem on channel capacity, capacity of a channel of infinite bandwidth, bandwidth - S/N trade off, practical communication systems in light of Shannon's theorem, Fading channel, channels with memory.

Unit IV ERROR CONTROL CODING:

BLOCK CODES: Types of codes; Error detecting codes, Parity check codes- Single parity codes; Parity check polynomials; error correcting codes, Block codes; Linear block codes, Cyclic codes -Syndrome calculation, Encoder and decoder - CRC Hamming codes, Hamming weight, Hamming distance, Minimum distance decoding, Hamming codes, Repetition codes.

Unit V ERROR CONTROL CODING

CONVOLUTIONAL CODES: Convolutional codes- Feedforward Convolutional Encoder, Trellis Representation, Viterbi Decoder for convolutional codes, Viterbi Decoder (contd.), Recursive convolutional encoders, Recursive convolutional encoders, Puncturing, Turbo encoders, Turbo Encoders (contd), Turbo Decoders, Free distance of convolutional codes. LDPC codes.

TEXT BOOKS:

1. Communication Systems by R. P. Singh and S. D. Sapre, 2 nd Edition TMH.
2. Information Theory, Coding and Cryptography by Ranjan
3. Communication Systems –II by J.S.Chittode

REFERENCE BOOKS:

1. Elements of Information Theory by Thomas M. Cover, Joy A. John Wiley & Sons, 2nd edition, 2006.
2. John G. Proakis, “Digital Communications”, 2nd Edition, McGraw Hill, 1989. 3. Digital Communication by Proakis, TMH

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Branch: **Information Technology**

Semester: **VI**

Subject: **Computer Graphics and Data Visualization Lab**

Code: **C033621(033)**

Total Lab Periods: 36

Batch Size: 30

Maximum Marks :**40**

Minimum Marks :**20**

1. To study the different graphics functions supported by C / C++.
2. To Demonstrate the Bresenham's line drawing Algorithm.
3. To implement Midpoint circle algorithm.
4. To practice the following 2D transformation operations upon various 2D-polygons:
 - a) Translation.
 - b) Rotation.
 - c) Scaling.
5. To practice the following 2D transformation operations upon various 2D-polygons
 - d) Reflection.
 - e) Shearing.
6. To Practice the following filling (in Raster Graphics Display) Algorithms.
 - a) Boundary-fill
 - b) Flood-fill.
7. To implement line-clipping algorithms upon given line segments.
8. To Implement Bezier Curve.
9. Acquiring and plotting data
10. Statistical Analysis such as Multivariate Analysis, PCA, LDA, Correlation, regression and analysis of variance
11. Time-series analysis stock market
12. Visualization on Streaming dataset
13. Dashboard Creation
14. Text visualization

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Branch: **Information Technology**

Semester: **VI**

Subject: **Mobile Application Development (Android) Lab**

Code: **C033622(033)**

Total Lab Periods: 36

Batch Size: 30

Maximum Marks :**40**

Minimum Marks :**20**

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.iv. Add Entries for Service, Broadcast receivers.
 - 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 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

Chhattisgarh Swami Vivekananda Technical University, Bilai

Branch: **Information Technology**

Semester: **VI**

Subject: **Web Application Development Lab**

Code: **C033623(033)**

Total Lab Periods: 36

Batch Size: 30

Maximum Marks :**40**

Minimum Marks :**20**

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

Client Side Scripting: Bootstrap, AJAX:-

1. Getting started with Bootstrap
2. Write a program to demonstrate Bootstrap Containers
3. Write a program to demonstrate Bootstrap Grids
4. Write a program to create tables using bootstrap
5. Write a program to create alerts and buttons using bootstrap
6. Write a program to design a table with pagination using bootstrap
7. Write a program to design login and signup using bootstrap
8. Introduction to AJAX
9. AJAX for text and xml response.
10. Write a program to generate dynamic contents for a bootstrap component using AJAX.

Server side Programming: Angular 10 (&above), Node JS

1. Introduction and working of server side program execution
2. Data types and Processing
3. Different Tags and Usage
4. Html Form request handling i.e. get and post
5. Login panel working
6. Data base connectivity
7. Session tracking and cookies
8. Dynamic content and page generation
9. Deployment of web application
10. Testing and solution for i.e. SQL Injection, code injection etc.

Chhattisgarh Swami Vivekananda Technical University, Bilai

Branch: **Information Technology**

Semester: **VI**

Subject: **Project-1 (Android)**

Code: **C033624(033)**

Total Lab Periods: 36

Batch Size: 30

Maximum Marks :**40**

Minimum Marks :**20**

COURSE OBJECTIVES:

- To understand the components and structure of mobile application development frameworks for Android mobiles.
- To understand how to work with various mobile application development frameworks.
- To understand the capabilities and limitations of mobile devices.

COURSE OUTCOMES:

Upon Completion of the course, the students will be able to:

1. Develop mobile applications relating to real world apps
2. Develop Mobile applications for enhancement of existing ideas

CONTENTS

1. Develop mobile applications using GUI and Layouts.
2. Develop mobile applications using Event Listener.
3. Develop mobile applications using Databases.
4. Develop mobile applications using RSS Feed, Internal/External Storage, SMS, Multithreading and GPS.
5. Analyze and discover own mobile app for simple needs.

REFERENCES:

1. Build Your Own Security Lab, Michael Gregg, Wiley India

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Program / Semester: B.Tech (VI)	Branch: Humanities
Subject: Technical Communication & Soft Skills	Course Code: C000601(046)
Total Marks (Internal Assessment): 10	L: 0 T:0 P: 2 Credit(s): 0
Internal Assessments to be conducted: 02	Duration (End Semester Exam): NA

UNIT-1 Communication Skills-Basics: Understanding the communicative environment, Verbal Communication; Non Verbal Communication & Cross Cultural Communication, Body Language & Listening Skills; Employment Communication & writing CVs, Cover Letters for correspondence. Common errors during communication, Humour in Communication.

UNIT-2 Interpersonal communication: Presentation, Interaction and Feedbacks, Stage Manners, Group Discussions (GDs) and facing Personal Interviews, Building Relationships, Understanding Group Dynamics- I, Emotional and Social Skills, Groups, Conflicts and their Resolution, Social Network, Media and Extending Our Identities.

UNIT- 3 Vocational skills: Managing time: Planning and Goal setting, managing stress: Types of Stress; Making best out of Stress, Resilience, Work-life balance, Applying soft-skills to workplace.

UNIT-4 Mindsets and Handling People: Definitions and types of Mindset, Learning Mindset, Developing Growth Mindset, Types of People, How to Lead a Meeting, How to Speak Effectively in Meetings, Behaviour & Roles in Meetings, Role Play: Meeting. On Saying "Please", How to say "NO".

UNIT-5 Positive Psychology: Motivating oneself, Persuasion, Survival Strategies, Negotiation, Leadership and motivating others, controlling anger, Gaining Power from Positive Thinking.

Text Books:

1. Petes S. J., Francis. Soft Skills and Professional Communication. New Delhi: Tata McGraw-Hill Education, 2011.
2. Stein, Steven J. & Howard E. Book. The EQ Edge: Emotional Intelligence and Your Success. Canada: Wiley & Sons, 2006.
3. Dorch, Patricia. What Are Soft Skills? New York: Execu Dress Publisher, 2013.

Reference Books:

- Kamin, Maxine. Soft Skills Revolution: A Guide for Connecting with Compassion for Trainers, Teams, and Leaders. Washington, DC: Pfeiffer & Company, 2013.
- Peale Norman Vincent. The Power of Positive Thinking: 10 Traits for Maximum Result. Paperback Publication. 2011.
- Klaus, Peggy, Jane Rohman & Molly Hamaker. The Hard Truth about Soft Skills. London: Harper Collins E-books, 2007.

Course Outcomes

1. Learn to listen actively to analyse audience and tailor the delivery accordingly.
2. Increase their awareness of communication behaviour by using propriety-profiling tool.
3. Master three "As" of stressful situation: Avoid, Alter, Accept; to cope with stressors and create a plan to reduce or eliminate them.
4. Develop growth mind-set and able to handle difficult person and situations successfully.
Develop technique of turning negativity into positivity and generate self-motivation skills

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Branch: **Information Technology**

Semester: **VI**

Subject: **Wireless and Mobile Communication**

Code: **C033631(033)**

Total Theory Periods: 40

Total Tutorial Periods:10

No. of Class tests to be conducted: **2(Minimum)**

Maximum Marks in ESE:**100**

No. of Assignments to be submitted: **One per Unit**

Minimum Marks in ESE:**35**

ESE Duration: Three Hours

COURSE OBJECTIVES

- To introduce the fundamental design principles & issues in cellular & mobile communications.
- To enable the student to understand the basic features of cellular-mobile communication systems and digital radio system.
- To motivate students to understand the different technology for working of mobile devices, their advantages and disadvantages and emerging problems.

COURSE OUTCOMES

After successful completion of the course students will be able to

1. Understand the basic physical-layer architecture of a mobile communication system.
2. Understand various multiple-access techniques for mobile communications, and their advantages and disadvantages.
3. Students will be able to acknowledge about the working and development of mobile and wireless devices in detail, services provided by them and recent trends in this field.

Unit- I: Introduction, Cell Coverage &, Frequency Management:

Mobile and wireless devices, Frequencies for radio transmission, A basic cellular system, Cell Size. Elements of cellular radio systems, Design and Interference, Concept of frequency reuse, cell splitting, Channels, Multiplexing, Access Techniques, Medium Access control, Spread spectrum, Specialized MAC, Cell Throughput,, Co-channel interference reduction factor, Frequency management, fixed channel assignment, non-fixed channel assignment, traffic & channel assignment, Why hand off, types of handoff and their characteristics, dropped call rates & their evaluation, Improving Coverage and capacity in Cellular systems.

Unit- II: GSM Architecture & Services:

GSM Services and Features, GSM System Architecture, GSM Radio Subsystem, GSM Channel Types, Frequency and Channel Specifications, Example of a GSM Call, Signal Processing in

GSM, Authentication and security. New Data Services: DECT Functional Concept, DECT Radio Link, Personal Access Communication Systems, UMTS

Unit- -III: Wireless Networks

Introduction-WLAN technologies: Infrared, UHF narrowband, spread spectrum -IEEE802.11: System architecture, protocol architecture, physical layer, MAC layer, 802.11b, 802.11a – Hiper LAN: WATM, BRAN, HiperLAN2 – Bluetooth: Architecture, Radio Layer, Baseband layer, Link manager Protocol, security - IEEE802.16.

Unit- -IV: Mobile network, Transport and Application layer

Mobile Network Layer; Mobile IP, DHCP, ADHOC Networks; Mobile Transport Layer; Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP; Fast Transmit/Fast Recovery, Transmission/Time Out Freezing, Selective Retransmission, Transaction Oriented TCP, Introduction of WAP, WAP applications, WAP Architecture, WAP Protocol Stack.

Unit- –V: Beyond 3G

LTE, VoLTE, Requirements and targets for the long term evolution, 4G Technologies, Network architecture and protocols: Introduction, overall architecture overview, protocol architecture, Introduction to 5G Networks and its recent trends.

TEXT BOOKS

1. Mobile Communications – Schiller, Jochen; 2nd Indian Reprint, Pearson Education Asia – Addison Wesley Longman PTE. Ltd.
2. Wireless Communication Principles and Practice, Theodore S Rappaport, 2nd Ed, Pearson Education.
3. Wireless Communication & Networks - 3G and Beyond, By ITI Saha Misra, McGraw Hill Education; Second edition

REFERENCE BOOKS:

1. Mobile Data Wireless LAN Technologies – Dayem, Rifaat A.; Prentice Hall International.
2. The Essential Guide to Wireless Communication Applications – Dornan, A.; 1st Indian Reprint, Pearson Education Asia.
3. Sandeep Singhal, “The Wireless Application Protocol”, Pearson Education Asia,
4. P. Stavronlakis, “Third Generation Mobile Telecommunication systems”, Springer Publishers.
5. Beyond 3G – Bringing Networks, Terminals and the Web Together, By Martin Sauter, WILEY Publication

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Branch: **Information Technology**

Semester: **VI**

Subject: **Parallel Computing**

Code: **C033632(033)**

Total Theory Periods: 40

Total Tutorial Periods:10

No. of Class tests to be conducted: **2(Minimum)**

Maximum Marks in ESE:**100**

No. of Assignments to be submitted: **One per Unit**

Minimum Marks in ESE:**35**

ESE Duration: **Three Hours**

COURSE OBJECTIVES:

1. To study the scalability and clustering issues and the technology necessary for them.
2. To understand the technologies enabling parallel computing.
3. To study the different types of interconnection networks.
4. To study the different parallel algorithms and programming models.
5. To study the software support needed for shared memory programming.

COURSE OUTCOMES:

On completion of the course, student will be able to–

1. Understand the technologies used for parallel computation
2. Understand parallel programming models, including MPI, OpenMP and Pthreads.
3. Develop an efficient parallel algorithm to solve a given problem.
4. Analyze the performance of the parallel algorithm on the basis of time complexity, as a function of the problem size and number of processors.
5. Describe common parallel computing architectures, including shared memory coherence and synchronization, GPU architecture and control structure and memory hierarchy.

Unit-I: SCALABILITY AND CLUSTERING

Evolution of Computer Architecture – Dimensions of Scalability – Parallel Computer Models – Basic Concepts Of Clustering – Scalable Design Principles – Parallel Programming Overview – Processes, Tasks and Threads – Parallelism Issues – Interaction / Communication Issues – Semantic Issues In Parallel Programs.

Unit-II: ENABLING TECHNOLOGIES

System Development Trends – Principles of Processor Design – Microprocessor Architecture Families – Hierarchical Memory Technology – Cache Coherence Protocols – Shared Memory Consistency – Distributed Cache Memory Architecture – Latency Tolerance Techniques – Multi-threaded Latency Hiding.

Unit-III: SYSTEM INTERCONNECTS

Basics of Interconnection Networks – Network Topologies and Properties – Buses, Crossbar and Multistage Switches, Software Multithreading – Synchronization Mechanisms.

Unit-IV: PARALLEL PROGRAMMING Paradigms And Programmability – Parallel Programming Models – Shared Memory Programming.

Unit-V: MESSAGE PASSING PROGRAMMING

Message Passing Paradigm – Message Passing Interface – Parallel Virtual Machine

TEXT BOOK

1. Kai Hwang and Zhi.Wei Xu, “Scalable Parallel Computing”, Tata McGraw-Hill, New Delhi, 2003.

REFERENCE BOOKS:

1. David E. Culler & Jaswinder Pal Singh, “Parallel Computing Architecture: A Hardware/Software Approach”, Morgan Kaufman Publishers, 1999.
2. Michael J. Quinn, “Parallel Programming in C with MPI & Open MP”, Tata McGraw-Hill, New Delhi, 2003.
3. Kai Hwang, “Advanced Computer Architecture”, Tata McGraw-Hill, New Delhi, 2003.
4. Ananth Grama, Anshul Gupta, George Karypis, and Vipin Kumar. Introduction to parallel computing, second edition, Addison-Wesley, 2003

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Branch: **Information Technology**

Semester: **VI**

Subject: **Advanced Database Management Systems**

Code: **C033633(033)**

Total Theory Periods: 40

Total Tutorial Periods:10

No. of Class tests to be conducted: **2(Minimum)**

Maximum Marks in ESE:**100**

No. of Assignments to be submitted: **One per Unit**

Minimum Marks in ESE:**35**

ESE Duration: Three Hours

COURSE OBJECTIVES:

- To provide understanding of advanced database development techniques.
- To understand the different database models and language queries to access databases
- To understand the normalization forms in building an effective database tables
- To provide in-depth exploratory skills in distributed and parallel databases.
- To provide basic understanding of query optimization techniques including online query and adaptive query processing.

COURSE OUTCOMES:

On completion of the course, student will be able to–

1. Design conceptual and logical data models.
2. Identify, describe and categorize transactions.
3. Protect the data and the database from unauthorized access and manipulation
4. Comprehend the complex query processing techniques and write query structures.
5. Develop skill set in file organization, Query Optimization, and Transaction management.

Unit-1 Relational Model Issues ER Model

Normalization - Query Processing - Query Optimization - Transaction Processing - Concurrency Control - Recovery - Database Tuning.

Unit-2 Distributed Databases and Parallel Databases

Inter and Intra Query Parallelism - Distributed Database Features - Distributed Database Architecture - Fragmentation - Distributed Query Processing - Distributed Transactions Processing - Concurrency Control - Recovery - Commit Protocols, Parallel Architectures, performance measures, shared nothing/shared disk/shared memory based architectures, Data partitioning, Intra-operator parallelism, Pipelining, Scheduling, Load balancing.

Unit-3 Advanced Transaction Models

Savepoints, Sagas, Nested Transactions, Multi-Level Transactions. Recovery: Multilevel recovery, Object Oriented Databases Introduction to Object Oriented Data Bases - Approaches Modelling and Design - Persistence - Query Languages - Transaction - Concurrency - Multi Version Locks - Recovery - POSTGRES - JASMINE - GEMSTONE - ODMG Model.*

Unit-4 Emerging Systems with Current Issues

Enhanced Data Models - Client/Server Model - Data Warehousing and Data Mining – Web Databases - Mobile Databases - XML and Web Databases - Rules - Knowledge Bases - Active and Deductive Databases - Multimedia Databases - Multimedia Data Structures - Multimedia Query languages - Spatial Databases.

Unit-5 Query processing: Query optimization

Algorithms, Online query processing and optimization, Adaptive query processing, Introduction to NoSQL - Aggregate Data Models - Hbase: Data Model and Implementations - Hbase Clients – Examples – Cassandra: Data Model – Examples – Cassandra Clients.

TEXT BOOKS

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, “Database System Concepts”, Fifth Edition, Tata McGraw Hill, 2006.
2. C. J. Date, A. Kannan, S. Swamynathan, “An Introduction to Database Systems”, Eighth Edition, Pearson Education, 2006.

REFERENCE BOOKS

1. Thomas Connolly, Carlolyn Begg, “Database Systems: A Practical Approach to Design, Implementation, and Management”, Fifth Edition, Addison-Wesley, 2009.
2. R. Elmasri, S. B. Navathe, “Fundamentals of Database Systems”, Fifth Edition, Pearson/Addison Wesley, 2006. CSE Dept. Flexible Curriculum NITTUGCSE19 97
3. P. J. Sadalage, M. Fowler, “NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence”, Addison-Wesley Professional, 2012.
4. Lars George, “HBase: The Definitive guide”, O'Reilly Media Inc., 2011.
5. Eben Hewitt, “Cassandra: The definitive Guide”, O'Reilly Media Inc., 2010.

Chhattisgarh Swami Vivekananda Technical University, Bilai

Branch: **Information Technology**

Semester: **VI**

Subject: **Augmented and Virtual Reality**

Code: **C033634(033)**

Total Theory Periods: 40

Total Tutorial Periods:10

No. of Class tests to be conducted: **2(Minimum)**

Maximum Marks in ESE:**100**

No. of Assignments to be submitted: **One per Unit**

Minimum Marks in ESE:**35**

ESE Duration: Three Hours

COURSE OBJECTIVES:

- To know basic concepts of Virtual Reality.
- To understand visual computation in Computer Graphics.
- To provide understanding of interaction between system and computer.
- To know application of Virtual Reality in Digital Entertainment.
- To know basic concepts of Augmented Reality.

COURSE OUTCOMES:

On completion of the course, student will be able to–

1. Understand the basic concepts and frameworks of Virtual Reality
2. Know the computer-human interaction
3. Apply Virtual Reality in Digital Entertainment.
4. Differentiate between Augmented Reality and Virtual Reality
5. Explore the research issues in Augmented Reality and Virtual Reality.

Unit-1 Introduction of Virtual Reality

Fundamental Concept and Components of Virtual Reality - Primary Features and Present Development on Virtual Reality - Multiple Models of Input and Output Interface in Virtual Reality: Input - Tracker - Sensor - Digital Glove - Movement Capture - Video-based Input - 3D Menus & 3DScanner – Output - Visual /Auditory / Haptic Devices.

Unit-2 Visual Computation in Virtual Reality:

Fundamentals of Computer Graphics - Software and Hardware Technology on Stereoscopic Display - Advanced Techniques in CG: Management of Large Scale Environments & Real Time Rendering.

Unit-3 Interactive Techniques in Virtual Reality:

Body Track - Hand Gesture - 3D Manus - Object Grasp. Development Tools and Frameworks in Virtual Reality: Frameworks of Software Development Tools in VR. X3D Standard; Vega – Multi Gen – Vir tools.

Unit-4 Application of VR in Digital Entertainment

VR Technology in Film & TV Production - VR Technology in Physical Exercises and Games - Demonstration of Digital Entertainment by VR.

Unit-5 Augmented and Mixed Reality: Taxonomy

Technology and features of augmented reality - difference between AR and VR - Challenges with AR - AR systems and functionality - Augmented reality methods - visualization techniques for augmented reality - wireless displays in educational augmented reality applications - mobile projection interfaces - marker-less tracking for augmented reality - enhancing interactivity in AR environments - evaluating AR systems.

TEXT BOOKS

1. Burdea, G. C., P. Coffet., “Virtual Reality Technology”, Second Edition, Wiley-IEEE Press, 2003/2006.
2. Alan B. Craig, “Understanding Augmented Reality, Concepts and Applications”, Morgan Kaufmann, 2013.

REFERENCE BOOKS

1. Alan Craig, William Sherman, Jeffrey Will, “Developing Virtual Reality Applications, Foundations of Effective Design”, Morgan Kaufmann, 2009.

Chhattisgarh Swami Vivekananda Technical University, Bilai

Branch: **Information Technology**

Semester: **VI**

Subject: **Data Mining**

Code: **C033635(033)**

Total Theory Periods: 40

Total Tutorial Periods:10

No. of Class tests to be conducted: **2(Minimum)**

Maximum Marks in ESE:**100**

No. of Assignments to be submitted: **One per Unit**

Minimum Marks in ESE:**35**

ESE Duration: Three Hours

COURSE OBJECTIVES:

- To provide students with basic concepts in Data Mining and Data Warehousing.
- To provide a comprehensive introduction to data mining techniques and knowledge discovery.
- To make the students understand the basic and state-of-the algorithms used for analyzing data obtained from different sources.
- To identify supervised and unsupervised techniques for uncovering hidden patterns in large data sets including recommendation system.
- To provide basic understanding of advanced data mining topics like web mining, text mining, spatial and temporal mining.

COURSE OUTCOMES:

On completion of the course, student will be able to–

1. To discover patterns from raw data and make predictions of the outcomes.
2. To apply data mining techniques for solving practical problems.
3. Aware of various critical operations involved in designing a data warehouse for application domains.
4. Implement well-known data mining techniques for obtaining interesting knowledge from data.
5. Formulate new techniques for analyzing complex data.

Unit-1 Introduction to Data Mining and Knowledge Discovery,

Introduction to Data mining: Motivation for Data Mining, its importance, Role of Data in Data Mining, Data Mining functionalities, patterns in data mining, Type of patterns, Classification of Data Mining Systems, Major issues in Data Mining, Data Mining Applications and trends, Data Warehousing and OLTP technology for Data Mining, Characteristics of data warehouse, Data Preprocessing, Data Cleaning, Data Integration, Data Reduction, Data Transformation and Data Discretization.

Unit-2 Association Rules:

Association Rule Mining, Association Rules in Large Databases, Apriori Algorithm, Frequent Itemsets, Closed Itemsets, Pattern Evaluation Method, Advanced Association Rule Techniques, Measuring the quality of rules.

Unit-3 Supervised Techniques

Classification and Prediction, Decision Tree Induction, Bayes Classification Method, Rule-Based Classification, Model Evaluation and Selection, Discriminant Analysis, Logistic Regression.

Unit-4 Unsupervised Techniques

Cluster Analysis, Partitioning Methods, Hierarchical Methods, Density-based Methods, Grid-based Methods, Evaluation of Clustering, Outlier Detection.

Unit-5 Recommendation System

Advanced Techniques, Mining Complex Data, Text Mining: Extracting attributes (Keywords), structural approaches (parsing, soft parsing), Bayesian approach to classifying text, Web Mining: Classifying web pages, extracting knowledge from the web, Mining Spatial Databases, Temporal Data Mining.

TEXT BOOKS:

- 1 Jiawei Han, Micheline Kamber and Jian Pei, *Data Mining: Concepts and Techniques*, Morgan Kaufmann, 3rd Edition, 2012
2. Data Mining: Introductory and Advanced Topics Author M. H. Dunham, Pearson Education, 2001

REFERENCE BOOK:

1. Data Warehousing, Data Mining, & OLAP Author Alex Berson, Stephen J. Smith, Tata McGraw Hill, 2004
2. Pang-Ning Tan, Vipin Kumar and Michael Steinbach, *Introduction to data mining*, Pearson, 2007
3. Ian H. Witten and Eibe Frank, , *Data Mining: Practical Machine Learning Tools and Techniques*, Elsevier, 2008.