Course: Diploma   **Semester: V**

Branch: Computer Science and Engineering   **w.e.f. Academic Session: 2024-25**

DCSE501 Web Technology

Course Objectives:

1. To provide a comprehensive understanding of the fundamental technologies and frameworks used in web development.

2. To teach Client-side Scripting languages and technologies, including HTML, CSS, and JavaScript.

3. To introduce security best practices and performance optimization techniques in web applications.

Unit I: Introduction to Web Designing and HTML

Role of website in E-Commerce; website strategies & web-site design principles HTML - Concept, meaning ,History of HTML, HTML tags and attributes; Tags v/s elements; Structure of HTML , Working with HTML elements –Paragraphs, Headings, fonts, comments, physical style, logical style , Horizontal Rule, Adding Images ;Use of Hyperlinks in html –Linking to same page, linking to other pages in html; List tags in html-Ordered, Unordered and Nested ; Creating and designing tables in HTML; Creating Simple forms using-Textbox, Password, Checkbox, Radio button ,button, dropdown, etc. Creating free websites using Google Sites.

Unit II: Core CSS:

CSS- Overview, Introduction, Advantages, Versions, Creation and maintenance of CSS, CSS Syntax, Type Selectors, Universal Selectors, Descendant Selectors, Class Selectors, ID Selectors, Child Selectors, Attribute Selectors, Multiple Style Rules, Grouping Selectors, CSS –Inclusion - Embedded CSS - The Element, Attributes, Imported CSS - @Import Rule, CSS Rules Overriding, CSS Comments.

Unit III: Advanced CSS:

CSS ─ Measurement Units, COLORS - Hex Codes, Short Hex Codes, RGB Values, Building Color Codes, Browser Safe Colours. CSS ─ BACKGROUND, CSS FONTS – Setting of Font Family, Style, Variant, Weight, Size, Size Adjust, Stretch, Shorthand Property. CSS TEXT Setting of Text Colour, Direction, Indent, Alignment, DECORATING THE TEXT – Setting of White Space Between Text, Text Cases, Text Shadow, CSS BORDERS - Color Property, Style Property, Width Property, Border Properties Using Shorthand.

Unit IV: Core Java Script:

Java Script - Introduction, Internal Vs. External Scripts, Internal JavaScript Code, Understand JavaScript Language & The Document Object Model. Variable Declaration, Operators, Types of Operators: Arithmetic Operators, Assignment Operators, Comparison Operators, Logical,

Operators, Conditional Operators, Type Operators. Control Statements: Conditional Statement: If, If Else, Else If. Looping Statement: While, Do_While, For Loop.

Unit V: Advanced Java Script:

Function: Function Declaration, built in Functions, Standard Date and Time Functions, HTML Document Object Model, working with HTML Form and Its Elements, Passing Parameter to Function, Returning A Value from Function, Array, Object: Creating Object, Accessing Object Properties, Array Object, String Object, Date Object, Math Object, Window Object, Navigator Object. Events: Event Type: Mouse Events, Frame/Object Events, Form Events.

Reference Books:

1. Desai Biplin C. (2001), "An Introduction to Database Management System", Galgotia Publication Pvt. Ltd. New Delhi.
2. Ivan Byrose, "SQL Programming".
3. Peter Rob & Carlos Coronel, "Database System Concepts", Indian Edition, Cengage Learning India Pvt. Ltd.
4. Leon, "SQL Complete Reference", TMH.

Course Outcome:

At the end of the course, students should be able to:

1. Explain the key technologies and frameworks used in modern web development.

2. Develop interactive client-side features using HTML, CSS, and JavaScript.

3. Create user-friendly and responsive web interfaces that adhere to design principles.

4. Identify common security vulnerabilities in web applications and implement measures to mitigate them.

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DCSE502 Software Testing

Course Objectives:

1. Understand the importance of software testing and its role in SDLC.

2. Learn various testing techniques like manual, automated, black-box, and white-box.

3. Design effective test cases using test design techniques.

4. Understand defect management and reporting.

Unit I: Basics of Software Testing and Testing Methods:
Software Testing, Objectives of Testing. Failure, Error, Fault, Defect, Bug Terminology. Test Case, When to Start and Stop Testing of Software (Entry and Exit Criteria). Verification and Validation (V Model), Quality Assurance, Quality Control. Methods of Testing: Static and Dynamic Testing. The Box approach: White Box testing, Black Box Testing.

Unit II: Types and Levels of Testing:
Levels of Testing. Unit Testing: Driver, Stub. Integration Testing: Top-Down Integration, Bottom-Up integration, Bi-Directional Integration. Testing on Web Application: Performance Testing, Load Testing, Stress Testing, Security Testing, Client-Server Testing. Acceptance Testing: Alpha Testing and Beta Testing, Special Tests: Regression Testing, GUI Testing.

Unit III: Test Management:
Test Planning: Preparing a Test Plan, Deciding Test Approach, Setting Up Criteria of Testing, Identifying Responsibilities, Staffing, Resource Requirements, Test Deliverables, Testing Tasks. Test Management: Test Infrastructure Management, Test People Management. Test Process: Base Lining a Test Plan, Test Case Specification. Test Reporting: Executing Test Cases, Preparing Test Summary Report.

Unit IV: Defect Management:
Defect Classification, Defect Management process. Defect Life Cycle, Defect Template. Estimate Expected Impact of a Defect, Techniques for Finding Defects, Reporting a Defect.

Unit V: Testing Tools and Measurements:
Manual Testing and Need for Automated Testing Tools. Advantages and Disadvantages of using Tools. Selecting a Testing Tool. When to Use Automated Test Tools, Testing Using Automated Tools. Metrics and Measurements: Types of Metrics, Product Metrics and Process Metrics, Object Oriented Metrics in Testing.

Reference Books:

1. "Software Testing: Principles and Practices", Srinivasan Desikan Gopalaswamy Ramesh, PEARSON Publisher: Pearson India 2005.

2. "Software Testing", Singh Yogesh, Cambridge University Press, Bangluru.
3. "Software Testing: Principles and Practices", Chauhan Naresh, Oxford University Press Noida.

Course Outcomes:

At the end of the course, students should be able to:

1. Define software testing concepts and testing levels.

2. Design and execute effective test cases using various techniques.

3. Perform manual and automated testing for software quality.

4. Report and manage defects using defect tracking tools.

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DCSE503 Wireless and Mobile Computing

Course Objectives:

1. To understand the fundamental concepts of wireless communication systems and mobile networking technologies.

2. Learn about various mobile communication standards and technologies such as GSM, CDMA, 3G, 4G, and emerging 5G technologies.

3. Study mobile computing architectures, network protocols, and mobile applications that enable efficient communication and data transfer.

4. Understand wireless network design principles and the importance of security in mobile and wireless networks.

Unit I: Wireless Technology:
Comparison of Wired and Wireless Mechanism. Basic Equipments in Wireless Communication: Wireless Access Point, Wireless Access Cards, Routers etc. Various types of Wireless Communication Technologies Used in Mobiles, Antennas etc. Concept of Spread Spectrum, Various Types of Spread Spectrum, Spreading Sequences.

Unit II: Wireless LAN:
Wireless Local Loops. Wireless Access Protocols. Various types of Wireless LAN Technologies Like Infrared, Microwave LANs etc. IEEE 802.11x Standards for Wireless LANs.

Unit III: Cellular System:
Cell Fundamentals: Cell Site, Cell Capacity, Frequency Reuse Clustering, Co Channel Interference, Cell Splitting, Cell Sectoring. Mobile Station (MS), Base Transceiver Station (BTS), Mobile Switching Center (MSC), Functions of MSC, Base Station System, Base Station Control, HLR, VLR. Mobile Station (MS) Registration.
Evolution of Cellular System: Short Message Services (SMS), Enhanced Message Services (EMS), Multimedia Message Services (MMS) & Mobile Instant Messaging (MIM). 1G Cellular Systems. 2G Cellular Systems. 2.5G Cellular Systems. 3G Cellular Systems. 4G Cellular Systems.

Unit IV: GSM Technology:
GSM Network Architecture. GSM Channel Concepts: Logical Channel, Broadcast Channel, Common Control Channel & Dedicated Control Channel. GSM Identities: Mobile Station Associated Numbers, Network Numbering Plans, Mobile Station Roaming Number. GSM System Operation: GSM Call Setup Phase, GSM Call Confirmation and Call accepted, GSM Location Updating, GSM Connection Release. Overview of CDMA Technology.

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Unit V: Reflection and Propagation Models:

Mobile Radio Propagation. Ground Reflection Model. Diffraction Sculpturing. Indoor Propagation Models. Outdoor Propagation Models. Ray Tracing.

Reference Books:

1. "Wireless Communication and Networks" by William Stallings, 1st edition.
2. "Wireless and Mobile Network Architectures" by Yi-Bing Lin and Imrichchlamtac.
3. "Wireless & Cellular Telecommunications" 3/e, Dr. William C.Y. Lee, TMH.
4. "Introduction to Wireless telecommunication systems and networks", Mullett, Cengage Learning.
5. "Wireless Communication: Principle and practice" – T.S. Rappaport.
6. "Mobile Communication" – Schwartz.
7. "Introduction to wireless and mobile systems" 2nd edition by Dharmprakash Agrawal & Qing- An Zeng, Cengage Learning, Indian edition.
8. "Wireless Communication" by T.L. Singal Tmhi New Delhi.

Course Outcome:

At the end of the course, students should be able to:

1. Explain the basic concepts of wireless communication, mobile networks, and cellular systems.

2. Identify and compare various mobile communication technologies (e.g., GSM, CDMA, 3G, 4G, and 5G).

3. Design and implement mobile and wireless network systems using standard protocols and technologies.

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DCSE504 Hardware Installation and Maintenance

Course Objectives:

1. To provide an understanding of the various hardware components of a computer system, including the motherboard, CPU, RAM, storage devices, and peripherals.

2. To develop the skills needed to install and configure computer hardware components, ensuring they are properly integrated into the system.

3. To equip students with the knowledge and tools required to diagnose and troubleshoot common hardware problems effectively.

4. To teach the procedures for routine maintenance, cleaning, and upgrading of computer hardware to ensure system longevity and performance.

Unit I: PC Fundamentals:

Elements of Computers, Processors Specifications, SMPS, Types of Data Cables and Power Cables, USB, Types of Connectors, Headers I/O Ports: Serial, Parallel. Chipset, Video System, Sound System, Drive System, MODEM, USB Printers.

Unit II: Motherboard:

Motherboard Controllers & System Resources, Memory Mapping, Interrupts Request Line (IRQ): Purpose, Standard Assignments, Conflicts, Sharing & ISA, PCI, PnP Configuration of IRQ. System Buses: Industry Standard Organization, Micro Channel Architecture, Enhanced Industry Standard Architecture, UESA Local Bus, Peripheral Component Interconnect, Accelerated Graphics Ports, PCI-X. Chipsets: Northbridge & South Bridge, Function of Chipset. Motherboard Form Factor & Power supplies: AT, ATX, LPX & NLX, Voltage & Signal Lines, Power Supply Quality & Specifications, Form Factors, Ribbon Cable and Adopter Card Installation. Batteries: Charging, Rating, CMOS Backup Batteries, Backup Battery Replacement.

Unit III: Memory:

Logical Organization of Memory: Real Mode, Protected Mode, Lower, BIOS Data Area, Upper Memory, High Memory Area, Frame Buffer, Shadow & Cache. Memory Packaging: DTPP, STPP, SIMM, DIMM, RIMM. RAM Types: EDO, SDRAM, VRAM, SGRAM, RDRAM, DDRAM, PPRAM, DDR 1, DDR 2, DDR 3. Memory Performance: Speed, Inter Living & Caching. Interfaces: IDE, ATA 1 to 6, Master Slave Configuration, SCSI, SATA, PATA. SCSI Interface: BUS ID, Logical Unit Number, Termination, Signaling Types, SCSI Standards, Comparison between IDE & SCSI. Optical Storage Devices: CD, DVD and Blu-Ray Disc.

Unit IV: BIOS:

BIOS Functions. Cold & Warm Booting. BIOS Error Codes. BIOS Interrupts. Identification of

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different BIOS (AMI & AWARD BIOS). BIOS Memory Assignments. BIOS Advance Set-UP.

Unit V: Assembling and Maintenance of Computer:

PC Case / Cabinet Preparation, Mounting Process of The Motherboard, CPU Installation, Attaching Heat Sink and Cooling Fan, RAM Installation, Connecting SMPS to Different Devices, Connecting Hard-Drive and Its Cables, Installation of Optical Drives, Video Card, Sound Card, PCI Card and Expansion Card. Error Codes: Beep Codes, Post Codes. Windows System Tools: Back Up, Disk Clean Up, Disk Defragmenter, Files and Settings Transfer Wizard, Scheduled Tasks, Security Center, System Information, System Restore. Antivirus and Other Complete Security Tools.

Reference Books:

1. Subhadeep Choudhary, The A-Z of PC Hardware & Maintenance part I and II.
2. Govindrajalu, IBM PC and Clones.
3. Balasubramanyam, Computer Installation and Servicing.

Course Outcome:

At the end of the course, students should be able to:

1. Identify and Describe Hardware Components.

2. Install and Configure Hardware Components.

3. Diagnose and Troubleshoot Hardware Issues.

4. Perform Routine Maintenance and Upgrades.

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Elective I DCSE5051 Software Engineering

Course Objectives:

1. Familiarize students with the various phases of software development, from requirements gathering to maintenance.

2. Teach fundamental principles, methodologies, and best practices in software engineering, including Agile and Waterfall models.

3. Introduce concepts of software design, including design patterns, software architecture, and user interface design.

4. Provide insights into managing software projects, including planning, scheduling, and risk management.

Unit I: The Software Product and Software Process:
Software Product and Process Characteristics, Software Process Models: Linear Sequential Model, Prototyping Model, RAD Model, Evolutionary Process Models like Incremental Model, Spiral Model, Component Assembly Model, RUP and Agile processes. Software Process Customization and improvement, CMM, Product and Process Metrics.

Unit II: Requirement Elicitation, Analysis, and Specification:
Functional and Non-functional requirements, Requirement Sources and Elicitation Techniques, Analysis Modeling for Function-oriented and Object-oriented software development, Use case Modeling, System and Software Requirement Specifications, Requirement Validation, Traceability.

Unit III: Software Design:
The Software Design Process, Design Concepts and Principles, Software Modeling and UML, Architectural Design, Architectural Views and Styles, User Interface Design, Function-oriented Design, SA/SD Component Based Design, Design Metrics.

Unit IV: Software Analysis and Testing:
Software Static and Dynamic analysis, Code inspections, Software Testing, Fundamentals, Software Test Process, Testing Levels, Test Criteria, Test Case Design, Test Oracles, Test Techniques, Black-Box Testing, White-Box Unit Testing and Unit, Testing Frameworks, Integration Testing, System Testing and other Specialized, Testing, Test Plan, Test Metrics, Testing Tools. , Introduction to Object-oriented analysis, design and comparison with structured Software Engg.

Unit V: Software Maintenance & Software Project Measurement:
Need and Types of Maintenance, Software Configuration Management (SCM), Software Change

Management, Version Control, Change control and Reporting, Program Comprehension Techniques, Re-engineering, Reverse Engineering, Tool Support. Project Management Concepts, Feasibility Analysis, Project and Process Planning, Resources Allocations, Software efforts, Schedule, and Cost estimations, Project Scheduling and Tracking, Risk Assessment and Mitigation, Software Quality Assurance (SQA). Project Plan, Project Metrics.

Reference Books:

1. Pankaj Jalote, "An Integrated Approach to Software Engineering", Narosa Pub, 2005.
2. Rajib Mall, "Fundamentals of Software Engineering" Second Edition, PHI Learning.
3. R S Pressman, "Software Engineering: A Practitioner's Approach", Sixth edition 2006, McGraw-Hill.
4. Sommerville, "Software Engineering", Pearson Education.
5. Richard H. Thayer, "Software Engineering & Project Managements", Wiley India.
6. Waman S. Jawadekar, "Software Engineering", TMH
7. Bob Hughes, M. Cotterell, Rajib Mall "Software Project Management", McGrawHill.

Course Outcome:

At the end of the course, students should be able to:

1. Explain the stages of the software development life cycle and the importance of each phase.

2. Gather and analyze software requirements using various techniques and document them effectively.

3. Develop a software application from scratch, employing coding standards and best practices.

4. Apply project management principles to plan, execute, and monitor software projects.

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Elective I DCSE5052 Artificial Intelligence

Course Objectives:

1. Introduce students to the fundamental concepts and techniques of artificial intelligence, including its history and evolution.

2. Provide an understanding of various machine learning algorithms and their applications in solving real-world problems.

3. Encourage students to develop problem-solving skills by applying AI techniques to diverse challenges.

4. Highlight the applications of AI in various fields, including healthcare, finance, robotics, and natural language processing.

Unit I: Meaning and Definition of Artificial Intelligence:
Meaning and definition of artificial intelligence, various types of production systems, Characteristics of production systems, Study and comparison of breadth first search and depth first search. Techniques, other Search Techniques like hill Climbing, Best first Search, A* Algorithm, AO* Algorithms and various types of Control Strategies.

Unit II: Knowledge Representation:
Knowledge Representation, Problems in representing knowledge, knowledge representation using propositional and predicate logic, comparison of propositional and predicate logic, Resolution, refutation, deduction, theorem proving, inferencing, monotonic and nonmonotonic reasoning.

Unit III: Probabilistic Reasoning:
Probabilistic reasoning, Baye's theorem, semantic networks scripts schemas, frames, conceptual dependency, fuzzy logic, forward and backward reasoning.

Unit IV: Game Playing Techniques:
Game playing techniques like minimax procedure, alpha-beta cut-offs etc, planning, Study of the block world problem in robotics, Introduction to understanding and natural languages processing.

Unit V: Introduction to Learning:
Introduction to learning, Various techniques used in learning, introduction to neural networks, applications of neural networks, common sense, reasoning, some example of expert systems.

Reference Books:
1. Rich E and Knight K, Artificial Intelligence, TMH, New Delhi.

2. Nelsson N.J., Principles of Artificial Intelligence, Springer Verlag, Berlin.
3. Waterman D.A., A guide to Expert System, Addison Wesley, Reading (Mars).
4. Giarratand & Riley, Expert Systems: Principles and Programming, Thomson

Course Outcome:

At the end of the course, students should be able to:

1. Explain the core principles of artificial intelligence and its relevance in today's technology landscape.
2. Preprocess and analyze data to prepare it for machine learning models.
3. Utilize AI tools and frameworks to develop and deploy AI models.
4. Apply AI techniques to design solutions for real-world problems in various domains.