IPS Academy
Institute of Engineering & Science
Department of Computer Science & Information Technology

V-Semester

PCC-CSIT501	Database Management System	2L: 1T: 2P (5 hrs.)	4 credits

Course Objective:

The main objective of this course is to understand fundamental of database management system.

Course Contents: (45 hrs.)

Module 1: **(06 hrs.)**

Introduction to DBMS, File system vs DBMS, Advantages of database systems, Database System architecture, Data models, Schemas and instances, Data independence, Functions of DBA and designer, Design issues, Entity-Relationship model :Basic concepts, Design process, E-R diagrams, weak entity sets, extended E-R features –generalization, specialization and aggregation

Module 2: **(08hrs.)**

Structure of relational databases, Domains, Relations, Relation algebra – fundamental operators and syntax, relational algebra queries, . Types of relational calculus i.e. Tuple oriented and domain oriented relational calculus and its operations, Integrity constraints, Referential integrity, Keys.

Module 3: **(14 hrs.)**

Data definition in SQL, update statements and views in SQL: Data storage and definitions, Data retrieval queries and update statements, Query Processing & Query Optimization: Overview, measures of query cost, selection operation, sorting, join, evaluation of expressions, transformation of relational expressions, estimating statistics of expression results, evaluation plans. Case Study of ORACLE and DB2.

Module 4: **(09 hrs.)**

Functional Dependency –definition, trivial and nontrivial FD, closure of FD set, closure of attributes, irreducible set of FD, Normalization –1NF, 2NF,3NF, Decomposition using FD-dependency preservation, lossless join, BCNF, Multi-valued dependency, 4NF, Join dependency and 5NF.

Module 5: **(08 hrs.)**

Introduction of transaction, transaction processing and recovery, Concurrency control:
Lock management, specialized locking techniques, concurrency control without locking,
Protection and Security Introduction to: Distributed databases, Basic concepts of object oriented data base system.

Course Outcome:

1. Describe basic concepts of DBMS and Explain ER model.
2. Solve queries using Relational Algebra and Extended ER features
3. Analyze and renovate to use a DDL, DML, Data Retrieval Query and discuss the Query optimization methods.
4. Understanding of functional dependencies, normalization theory and apply knowledge to the design of a database.
5. Explain term like transaction processing, concurrency control and distributed database.

List of Text / Reference Books:

1. Date C J, "An Introduction to Database System", Pearson Educations, 8th Edition,2003.
2. Korth, Silbertz,Sudarshan, "Fundamental of Database System", McGraw Hill,5th Edition,2006.
3. Peter Rob, " Data Base System:Design Implementation & Management", Cengage Learninig 4th Edition,2000.
4. Elmasri, Navathe, "Fundamentals of Database Systems", Pearson Educations,7th Edition 2017.
5 . Atul Kahate ," Introduction to Database Management System", Pearson Educations,2004.
6. Oracle 9i Database Administration Fundamental-I, Volume I, Oracle Press, TMH.
7. Paneerselvam,"DataBase Management System", PHI Learning,3rd Edition,2018.
8. J. D. Ullman, "Principles of Database and Knowledge – Base Systems", Computer Science Press,2nd Edition 1988.
9. Serge Abiteboul, Richard Hull, Victor Vianu,"Foundations of Databases", Addison-Wesley,1995.

List of Experiments:

1. Introduction to Oracle and SQL
2. Write the queries for Data Definition language(DDL)
3. Write the queries for Data manipulation language(DML)
4. Use of various types of Integrity Constraints
5. Write the queries for Data Control language(DCL)
6. Use of SELECT command with different clauses.
7. Write SQL queries using logical operation (AND, OR, NOT)
8. Write SQL queries for aggregate functions (Max, Min, Sum, Avg, Count)
9. Write SQL queries for group by and Having
10. Write SQL queries for sub queries and nested queries
11. Write an SQL query to implement JOINS
12. Write SQL queries to create views
13. Write program by the use of PL/SQL
14. Design and implementation of any Data base system (like Banking, University etc).

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V-Semester

PCC-CSIT502	Formal Languages & Automata	3L: 0T : 2P (5 hrs.)	4credits

Prerequisite: Discrete structure

Course Objective:

The main objective of this course is to understand fundamental of formal languages and automata.

Course Contents: (40 hrs.)

Module 1: **(08 hrs.)**

Introduction of the theory of computation, Finite state automata – description of finite automata, properties of transition functions, Transition graph, designing finite automata, FSM, DFA, NFA, 2-way finite automata, equivalence of NFA and DFA, Mealy and Moore machines.

Module 2: **(08 hrs.)**

Regular grammars, regular expressions, regular sets, closure properties of regular grammars, Arden's theorem, Myhill-Nerode theorem, pumping lemma for regular languages, Application of pumping lemma, applications of finite automata, minimization of FSA.

Module 3: **(08 hrs.)**

Introduction of Context-Free Grammar - derivation trees, ambiguity, simplification of CFGs, normal forms of CFGs- Chomsky Normal Form and Greibach Normal forms, pumping lemma for CFLs, decision algorithms for CFGs, designing CFGs, Closure properties of CFL's.

Module 4: **(08 hrs.)**

Introduction of PDA, formal definition, closure property of PDA, examples of PDA, Deterministic Pushdown Automata, NPDA, conversion PDA to CFG, conversion CFG to PDA.

Module 5: **(08 hrs.)**

Turing machines - basics and formal definition, language acceptability by TM, examples of TM, variants of TMs – multitape TM, NDTM, Universal Turing Machine, offline TMs, equivalence of single tape and multitape TMs. Recursive and recursively enumerable languages, decidable and undecidable problems – examples,halting problem, reducibility. Introduction of P, NP, NP complete, NP hard problems and Examples of these problems.

Course Outcome:

1. Convert between finite automata, regular grammars, and regular expression representations of regular languages
2. Convert between grammars and push-down automata for context-free languages
3. Translate a context-free grammar from one form to another
4. Understand Push down automata
5. List examples of un-decidable problems

List of Text / Reference Books:

1. Daniel I.A. Cohen,"Introduction to Computer Theory",Wiley India, 2nd Edition,2003.
2. John E Hopcroft, Jeffrey D. Ullman and Rajeev Motwani, "Introduction to Automata Theory, Languages and Computation", Pearson Education, 2nd Edition,2001.
3. K.L.P Mishra & N.Chandrasekaran,"Theory of Computer Science", PHI Learning, 3rdEdition,2006.
4. Peter Linz, "Introduction to Automata Theory and Formal Languages", Narosa Publishing. 3rdEdition,2007.
5. John C Martin, "Introduction to languages and the theory of computation", TATA McGraw Hill, 3rd Edition 2013.
6. Harry R. Lewis and Christos H. Papadimitriou, "Elements of the Theory of Computation", Pearson Education Asia,2nd edition, 1998.
7. Dexter C. Kozen, "Automata and Computability", Undergraduate Texts in Computer Science, Springer,1st edition,2012.
8. Michael Sipser, "Introduction to the Theory of Computation", PWS Publishing., 3rdedition,2012.

List of Experiments:

Design a Program for:

1. Creating machine that accepts three consecutive one.
2. Creating machine that accepts the string always ending with 101.
3. Mode 3 Machine
4. Accepting decimal number divisible by 2.
5. Creating a machine which accepts string having equal no. of 1's and 0's.
6. Creating a machine which count number of 1's and 0's in a givenstring.
7. Find 2's complement of a given binary number.
8. Increment the given binary number by 1.
9. Convert NDFA to DFA.
10. Create PDA machine that accept the well-formed parenthesis.
11. PDA to accept WCWR where w is any string and WR is reverse of that string and C is a Special symbol.
12. Turing machine that's accepts the following language $a^n b^n c^n$ where n>0.

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V-Semester

PCC-CSIT503	Operating System	2L : 1T : 2P (5 hrs.)	4 credits

Prerequisite: Computer Organization & Architecture

Course Objective:

The objective of this course is to focus on process, memory & file system.

Course Contents: (40 hrs.)

Module 1: **(06 hrs.)**
Introduction to Operating Systems: Function, Evolution, Different Types, Desirable Characteristics and features of an O/S, Operating Systems Services: Types of Services, Different ways of providing these Services – Utility Programs, System Calls, Operating System Structure, and Spooling & Buffering.

Module 2: **(12 hrs.)**
CPU Scheduling : Process Concept, Scheduling Concepts, Types of Schedulers, Scheduling Criteria, Process State Diagram, Scheduling Algorithms, Operation on Process, Algorithms Evaluation, System calls for Process Management; Multiple Processor Scheduling; Concept of Threads. Concurrent Processes : Real and Virtual Concurrency, Mutual Exclusion, Synchronization, Inter- Process Communication, Critical Section Problem, Solution to Critical Section Problem : Semaphores – Binary and Counting Semaphores, WAIT & SIGNAL Operations and their implementation. Deadlocks: Deadlock Problems, Characterization, Prevention, Avoidance, Recovery.

Module 3: **(10 hrs.)**
Memory Management: Different Memory Management Techniques – Partitioning, Swapping, Segmentation, Paging, Paged Segmentation, Comparison of these techniques, Techniques for supporting the execution of large programs: Overlay, Dynamic Linking and Loading, Virtual Memory – Concept, Implementation by Demand Paging etc., Page replacement algorithms.

Module 4: **(08 hrs.)**
File Systems: File Concept, User's and System Programmer's view of File System, Disk Organization, Tape Organization, Different Modules of a File System, Disk Space Allocation Methods – Contiguous, Linked and Indexed. Directory Structures, File Protection, System Calls for File Management, Disk Scheduling Algorithms.

Module 5: **(04 hrs.)**
Introduction to Network, Distributed and Multiprocessor Operating Systems.
Case Studies: Unix/Linux, WINDOWS and other Contemporary Operating Systems.

Course Outcome:

1. State the core concepts of operating system, evolution and types of operating system.
2. Illustrate various input output concepts, interprocess communication and deadlock
3. Illustrate process scheduling and memory management techniques.
4. Describe the concept of file and disk management.
5. State the core concepts of network, distributed and multiprocessor operating system.

List of Text / Reference Books:

1. Avi Silberschatz, Peter Galvin, Greg Gagne, "Operating System Concepts Essentials", Wiley Asia Student Edition, 10th Edition, 2018.
2. William Stallings, "Operating Systems: Internals and Design Principles", Prentice Hall of India, 5th Edition, 2005.
3. Charles Crowley, "Operating System: A Design-oriented Approach", Irwin Publishing, 1st Edition.
4. Gary J. Nutt, "Operating Systems: A Modern Perspective", Addison-Wesley, 2nd Edition.
5. Maurice Bach, "Design of the Unix Operating Systems", Prentice-Hall of India, 8th Edition.
6. Daniel P. Bovet, Marco Cesati, "Understanding the Linux Kernel", O'Reilly and Associates, 3rd Edition.
7. Andrew S. Tanenbaum, "Modern Operating Systems", Prentice Hall, 3rd Edition,2007.
8. Bovet & Cesati, "Understanding the Linux Kernel", O'Reily, 3rd Edition.

List of Experiments:

Write a program:

1. To implement FCFS CPU scheduling algorithm.
2. To implement SJF CPU scheduling algorithm.
3. To implement Priority CPU Scheduling algorithm.
4. To implement Round Robin CPU scheduling algorithm.
5. To compare various CPU Scheduling Algorithms over different Scheduling Criteria.
6. To implement classical inter process communication problem (producer consumer).
7. To implement classical inter process communication problem (Reader Writers).
8. To implement classical inter process communication problem (Dining Philosophers).
9. To implement & Compare various page replacement algorithms.
10. To implement & Compare various Disk & Drum scheduling Algorithms
11. To implement Banker's algorithms.
12. To implement Remote Procedure Call (RPC).
13. Write a Devices Drivers for any Device or peripheral.

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V-Semester

PCC-CSIT504	Computer Peripherals	0L : 0T : 4P (5 hrs.)	2 credits

Course Objective:

To learn the functional and operational details of various Computer peripheral devices.

Course Contents: (20 hrs.)

Module 1: **(04 hrs.)**

Hardware Organization of PC: Types of motherboard and their details (Form Factor, Chipset), types of processors (INTEL, AMD etc) and their compatibility with motherboards.

Input and Output Devices: Overview of input devices like keyboard, mouse, scanner. Overview of output devices like printer, impact and non-impact printer etc. Study of various display monitors like CRT (Cathode Ray Tube), LCD (Liquid Crystal Display), LED (Light-Emitting Diodes), and Plasma.

Module 2: **(04hrs.)**

Ports: PS/2 port and its specification, PCI Ports,VGA Port and its specification, Serial port and its specification and applications, Parallel Ports and its specification, USB Port and its specification,RJ45 connector, DVI ports and connectors, Modem ,RJ-11 port.

Module 3: **(04 hrs.)**

Cables: Ethernet Connection Cables, USB cable, Unshielded Twisted Pair (UTP) Cable, Shielded Twisted Pair (STP), Coaxial Cable, Fiber Optic Cable, Molex connector

Module 4: **(04 hrs.)**

Storage Devices: Types of Hard Disk Drives. Constructional features and working of hard disk drive, optical (CD, DVD, Blue Ray) disk drive and Flash Drive, Logical structure of Hard Disk and its organization, boot record, Cache Memory, Virtual Memory. Types of RAM and ROM. Concept of BIOS. Function of BIOS

Module 5: **(04 hrs.)**

Power Supplies: Working of SMPS, On-Line/Off-Line/Line-Interactive/uninterrupted power supplies (UPS), basic principle of working their importance and maintenance

Course Outcome:

1. Differentiate various types of Processor's and Motherboard.
2. Overview different kinds of input and output devices.
3. Distinguishing various types of ports and cables.
4. Explain various types of storage devices.
5. Overview of Computer power supply.

List of Text / Reference Books:

1. B. Govinda Rajalu "IBM PC and Clones :Hardware Trouble Shooting and Maintenance", Tata McGraw Hill,1991 .
2. Robert, S Lai Addison "The waite group writing MS DOS Device, Drives" Wesley Publishing Co,2nd Edition,2002.
3. SK Bose, "Hardware and Software of Personal Computers,"Wiley Eastern Limited, New Delhi, 3rd Edition, 1991.
4. Hall, Douglas "Microprocessors and Interfacing," McGraw Hill,2005.
5. Uffenbeck "Microprocessors and Interfacing" ,2011.
6. Sukhvir Singh "Fundamentals of Computers," Khanna Publishers, New Delhi.
7. Levis Hahensteu "Computer Peripherals for Micro Computers, Microprocessor and PC" .
8. Peter Norton "Inside the PC," (Eight Edition) Tech Media Publication, New Delhi, 8th edition 1999.

List of Experiments:

1. To make the comparative study of various motherboards.
2. Study of Ethernet cables.
3. Study of various cables used in computer communication.
4. Study of Hard Disk Drive Partitioning and Formatting.
5. Study of various ports used in computer communication.
6. Study of various cards used in a Computer System.
7. Study rotational and loading mechanisms of the Hard disk, CD ROM, DVD recordable drives
8. Study of various display monitors.
9. Exercise on assembling a PC with peripherals and testing the same.
10. Installation of multiple Operating Systems on same hard-drive.

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V-Semester
Elective-I

PEC-CSIT501	Software Engineering & Project Management	4L : 0T : 0P (4 hrs.)	4 credits

Course Objective:

The course aims are to develop a broad understanding of the discipline of software engineering and management of software systems.

Course Contents: (45 hrs.)

Module 1: **(08 hrs.)**

Introduction, Software- problem and prospects Software development process: Software life cycle models, Open source software development, the unified process, documentation, configuration management, Safety, risk assessment.

Module 2: **(08 hrs.)**

Measures, Metrics and Indicators, Metrics in the Process and Project Domains, Software Measurement, Metrics of Software Quality, S/W reliability, Software estimation techniques, loc and FP estimation. Empirical models like COCOMO, project tracking and scheduling, reverse engineering.

Module 3: **(10 hrs.)**

Software requirements and specification: feasibility study, Informal/formal specifications, pre/post conditions, algebraic specification and requirement analysis models, Specification design tools. Software design and implementation: Software design objectives, design techniques, User interface design, modularity Functional decomposition Data flow design, Data structure design, Object-oriented design, Design patterns implementation strategies
like top- down, bottom-up, team etc.

Module 4: **(09 hrs.)**

Coding standard and guidelines, programming style, code sharing, code review, software components, rapid prototyping, specialization, construction, class extensions, intelligent software agents, reuse performance improvement, debugging. Software Testing Strategies: Verification and Validation, Strategic Issues, test plan, white box, black-box testing, unit and integration testing, system testing test case design and acceptance testing, maintenance activities.

Module 5: **(10 hrs.)**

Organizing: Alternatives for project managers, matrix organization, Staffing, Directing: leadership, delegation, motivation, Controlling risk analysis and RMMM plan, project scheduling and tracking plan, SQA and quality planning, SCM activities and plan, project management plan. Re-engineering, reverse, forward engineering, web engineering, Software project management standards.

Course Outcome:

1. Apply project management concepts and techniques to an IT project.
2. Identify issues that could lead to IT project success or failure.
3. Explain project management in terms of the software development process.
4. Describe the responsibilities of IT project managers.
5. Apply project management concepts through working in a group as team leader or active team member on an IT project.

List of Text / Reference Books:

1. Schwalbe, Kathy "Information Technology Project Management" 8th Edition, 2016.
2. P, S. Pressman "Software Engineering. A Practitioner's Approach" New edition, McGraw Hills,7th edition,2010/
3. Kieron Conway "Software project Management from concept to development Black Book" Dreamtech Press.
4. Deepak Jain, "Software Engineering principle and practices" Oxford University Press,2008.
5. Bell Douglas "Software Engineering for students" ,Pearson Education.,4th Edition,2005.
6. Kelkar "Software Project Management," PHI Learning,3rd edition 2012.

List of Experiments:

1. Identifying the requirements from problem statements.
2. Modeling UML use case diagram & capturing use case scenarios.
3. E-R modeling from the problem statements.
4. Activity & state chart modeling.
5. Modeling UML class diagram & collaboration diagrams/sequence diagrams.
6. Identifying domain classes from the problem statements.
7. Modeling DFD.
8. Designing test suite.
9. Estimation of test coverage metrics & structural complexity.
10. Estimation of project metrics.

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V-Semester

PEC-CSIT501	**Advance Computer Architecture**	**4L : 0T : 0P (4 hrs.)**	**4 credits**

Prerequisite: Computer Organization & Architecture

Course Objective:

This subject aims to provide students with a fundamental knowledge of computer hardware and computer systems, with an emphasis on system design and performance.

Course Contents: (42 hrs.)

Module 1: **(08 hrs.)**

Flynn's Classification, System Attributes to Performance, Parallel computer models - Multiprocessors and multicomputers, Multivector and SIMD Computers. Data and resource dependences, Hardware and software parallelism, Program partitioning and scheduling, Grain size and latency, Control flow, data flow and Demand driven mechanisms. Static interconnection networks, Dynamic interconnection Networks: Bus Systems, Crossbar Switch, Multiport Memory, Multistage and Combining Networks.

Module 2: **(08 hrs.)**

Instruction set architecture, CISC Scalar Processors, RISC Scalar Processors, VLIW architecture, Memory Hierarchy, Inclusion, Coherence and Locality, Memory capacity planning. Interleaved memory organization-memory interleaving, pipelined memory access, Bandwidth and Fault Tolerance. Backplane Bus System: Backplane bus specification, Addressing and timing protocols, Arbitration transaction and interrupt.

Module 3: **(08 hrs.)**

Linear pipeline processor, Nonlinear pipeline processor, Instruction pipeline design, Mechanisms for instruction pipelining, pipeline hazards, Dynamic instruction scheduling -score boarding and Tomosulo's algorithm, Branch handling techniques, Arithmetic Pipeline Design, Static arithmetic pipeline, Multifunctional arithmetic pipelines. Superscalar pipeline design, Super pipeline processor design.

Module 4: **(10 hrs.)**

Cache coherence, Snoopy protocols, Directory based protocols. Message routing schemes in multicomputer network, deadlock and virtual channel. Vector Processing Principles, Vector instruction types, Vector-access memory schemes. Vector supercomputer architecture, SIMD organization: distributed memory model and shared memory model. Principles of Multithreading: Multithreading Issues and Solutions, Multiple-Context Processors.

Module 5: **(08 hrs.)**

Parallel Programming Models, Shared-Variable Model, Message-Passing Model, Data-Parallel Model, Object-Oriented Model, Functional and Logic Models, Parallel Languages and Compilers, Language Features for Parallelism, Parallel Programming Environment, Software Tools and Environments.

Course Outcome:

1. Discuss the classes of computers, and new trends and developments in computer architecture.
2. Study advanced performance enhancement techniques such as pipelines, dynamic scheduling branch predictions, caches.
3. Compare and contrast the modern computer architectures such as RISC, Scalar, and multi CPU systems.
4. Critically evaluate the performance of different CPU architecture.
5. Improve the performance of applications running on different CPU architectures.
6. Develop applications for high performance computing systems.

List of Text / Reference Books:

1. Kai Hwang, "Advanced computer architecture", TMH,2001.
2. J.P.Hayes, "computer Architecture and organization"; MGH,3rd edition.
3. V.Rajaranam & C.S.R.Murthy, "Parallel computer"; PHI Learning,7th edition,2006.
4. Kain,"Advance Computer Architecture: -A System Design Approach", PHI Learning,1st edition 2010.
5. M.J Flynn, "Computer Architecture, Pipelined and Parallel Processor Design"; Narosa Publishing,2011.
6. Hwang and Briggs, "Computer Architecture and Parallel Processing"; MGH,2017.
7. David E. Callav & Jaswinder Pal Singh Marge Kaufmann",Advance Computer Architecture", EIS India.
8. Sajjan G. Shiva, Taylar & Francis, "Advance Computer Architecture,2018.

List of Experiments:

1. Write an assembly language code to implement data transfer instruction.
2. Write an assembly language code to store numbers in reverse order in memory location.
3. Write an assembly language code to implement arithmetic instruction.
4. Write an assembly language code to add two numbers using lxi instruction.
5. Write an assembly language code to add two 8 bit numbers stored in memory and also storing the carry.
6. Write an assembly language code to find the factorial of a number.
7. Design & Verify Half Adder & Full Adder Using VHDL code.
8. Design & Verify multiplexer & de-multiplexer Using VHDL code.
9. Simulation of ALU using VHDL code.
10. Simulation of simple Processor(CPU) using VHDL code.

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V-Semester

PEC-CSIT501	**Agile Software Development**	**4L : 0T : 0P (4 hrs.)**	**4 credits**

Course Objective:

To learn best practices and methods of software development

Course Contents: (40 hrs.)

Module 1: **(08 hrs.)**

Fundamentals of Agile Process: Introduction and background, Agile Manifesto and Principles, Stakeholders and Challenges, Overview of Agile Development Models: Scrum, Extreme Programming, Feature Driven Development, Crystal, Kanban, and Lean Software Development.

Module 2: **(08 hrs.)**

Agile Projects: Planning for Agile Teams: Scrum Teams, XP Teams, General Agile Teams, Team Distribution; Agile Project Lifecycles: Typical Agile Project Lifecycles, Phase Activities, Product Vision, Release Planning: Creating the Product Backlog, User Stories, Prioritizing and Estimating, Creating the Release Plan; Monitoring and Adapting: Managing Risks and Issues, Retrospectives.

Module 3: **(08 hrs.)**

Introduction to Scrum: Agile Scrum Framework, Scrum Artifacts, Meetings, Activities and Roles, Scrum Team Simulation, Scrum Planning Principles, Product and Release Planning, Sprinting: Planning, Execution, Review and Retrospective; User story definition and Characteristics, Acceptance tests and Verifying stories, Burn down chart, Daily scrum, Scrum Case Study.

Module 4: **(08 hrs.)**

Introduction to Extreme Programming (XP): XP Lifecycle, The XP Team, XP Concepts: Refactoring, Technical Debt, Timeboxing, Stories, Velocity; Adopting XP: Pre-requisites, Challenges; Applying XP: Thinking- Pair Programming, Collaborating, Release, Planning, Development; XP Case Study.

Module 5: **(08 hrs.)**

Agile Software Design and Development: Agile design practices, Role of design Principles, Need and significance of Refactoring, Refactoring Techniques, Continuous Integration, Automated build tools, Version control; Agility and Quality Assurance: Agile Interaction Design, Agile approach to Quality Assurance, Test Driven Development, Pair programming: Issues and Challenges.

Course Outcome:

After completing the course student should be able to:

1. Describe the fundamental principles and practices associated with each of the agile development methods.
2. Explain the Agile project life cycle.
3. Describe the Agile Scrum framework.
4. Explain the Extreme Programming (XP) concepts.
5. Apply core values and principles of Agile Methods in software development.

List of Text / Reference Books:

1. Robert C. Martin, "Agile Software Development- Principles, Patterns and Practices, Prentice Hall, 2013.
2. Kenneth S. Rubin, "Essential Scrum: A Practical Guide to the Most Popular Agile Process", Addison Wesley, 2012.
3. James Shore and Shane Warden, "The Art of Agile Development", O'Reilly Media, 2007.
4. Craig Larman, "Agile and Iterative Development: Amanager's Guide", Addison-Wesley,2004.
5. Ken Schawber, Mike Beedle, "Agile Software Development with Scrum", Pearson, 2001.
6. Cohn, Mike, "Agile Estimating and Planning", Pearson Education, 2006.
7. Cohn, Mike, "User Stories Applied: For Agile Software Development "Addison Wisley,2004.

Online Resources:

1. IEEE Transactions on Software Engineering
2. IEEE Transactions on Dependable and Secure Computing
3. IET Software
4. ACM Transactions on Software Engineering and Methodology (TOSEM)
5. ACM SIGSOFT Software Engineering Notes

List of Experiments:

1. Understand the background and driving forces for taking an Agile Approach to Software Development.
2. Understand the business value of adopting agile approach.
3. Understand agile development practices
4. Drive Development with Unit Test using Test Driven Development.
5. Apply Design principle and Refactoring to achieve agility
6. To study automated build tool.
7. To study version control tool.
8. To study Continuous Integration tool.
9. Perform Testing activities within an agile project.

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PEC-CSIT501	**Computer Graphics & Multimedia**	**4L : 0T : 0P (4 hrs.)**	**4 credits**

Course Objective:

The course objective of this subject to introduce the principles of computer graphics and the components of a graphics system.

Course Contents: (40 hrs.)

Module 1: **(08 hrs.)**

Introduction to Raster scan displays, Storage tube displays, Pixel, refreshing, flickering, interlacing, colour monitors, working of different types of printers , working principles of keyboard, mouse scanner, digitizing camera, track ball, tablets and joysticks, graphical input techniques, positioning techniques, rubber band techniques, dragging etc.

Module 2: **(08 hrs.)**

Scan conversion techniques, image representation, line drawing, simple DDA, Bresenham's Algorithm, Circle drawing, general method, symmetric DDA, Bresenham's Algorithm, curves, parametric function, Bezier Method, B-spline Method.

Module 3: **(08 hrs.)**

2D & 3D Co-ordinate system, Translation, Rotation, Scaling, Reflection Inverse transformation, Composite transformation, world coordinate system, screen coordinate system, parallel and perspective projection, Representation of 3D object on 2D screen, Point Clipping, Line Clipping Algorithms, Polygon Clipping algorithms, Introduction to Hidden Surface elimination, Basic illumination model, diffuse reflection, specular reflection, color models like RGB, YIQ, CMY, HSV.

Module 4: **(08 hrs.)**

Introduction to multimedia components applications, Multimedia System Architecture, Evolving technologies for Multimedia, Defining objects for Multimedia systems, Multimedia Data interface standards, Multimedia Databases, Multimedia Hardware, SCSI, IDE, MCI, Multimedia Tools, presentation tools, Authoring tools.

Module 5: **(08 hrs.)**

Compression & Decompression, Multimedia Data & File Format standards, TIFF, MIDI, JPEG, DIB, MPEG, RTF, Multimedia I/O technologies, Digital voice and audio, Video image and animation, Full motion video, Storage and retrieval technologies.

Course Outcome:

1. Understand the core concepts of computer graphics.
2. Implement various shapes drawing algorithms.

3. Apply geometric transformations on graphic objects and also implement clipping, shading and colour models.

4. Understand multimedia systems architecture, multimedia components and use various multimedia tools.

5. Perform activities involved in design, development and testing of modeling, rendering, shading and animation.

List of Text / Reference Books:

1. Donald Hearn and M.Pauline Baker, "Computer Graphics C Version", Pearson Education, 2003.
2. Prabat K Andleigh and Kiran Thakrar, "Multimedia Systems and Design", PHI Learning, 1996.
3. Tay Vaughan, "Multimedia making it work", Tata McGraw Hill edition,8th edition 2010.
4. Amarendra N Sinha & Arun D Udai, "Computer Graphics", McGraw Hill publication,1st edition,2008.
5. Mukherjee, "Fundamental of Computer Graphics and Multimedia", PHI Learning.

List of Experiments:

1. Study of input output devices.
2. Explain working and principle of CRT display.
3. Program to Draw a Line using DDA Algorithm
4. Program to Draw a Line using Bresenham's Algorithm
5. C Program implementing bresenham`s circle drawing algorithm
6. C program implementing midpoint circle drawing algorithm.
7. C program implementing polygon filling using seed fill(boundary fill/flood fill) algorithm.
8. C Program for 2D transformation.
9. C Program for Cohen Sutherland line clipping.
10. Program for Sutherland Polygon Clipping.
11. Program for 3-D Transformation.

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V-Semester

Open Elective-I

OEC-CSIT501	**Digital Marketing & SEO**	**3L : 0T : 0P (3hrs.)**	**3 credits**

Course Objective:

The objective of subject is to facilitate students to understand digital marketing and its importance.

Course Contents: (40 hrs.)

Module 1: **(08 hrs)**

Digital Marketing: Introduction, Moving from Traditional to Digital Marketing, Integrating Traditional and Digital Marketing, Reasons for Growth. Need for a comprehensive Digital Marketing Strategy. Concepts: Search Engine Optimization (SEO); Concept of Pay Per Click

Module 2: **(08 hrs)**

Social Media Marketing: Introduction, Process - Goals, Channels, Implementation, Analyze. Tools: Google and the Search Engine, Facebook, Twitter, YouTube and LinkedIn. Issues: Credibility, Fake News, Paid Influencers; Social Media and Hate/ Phobic campaigns. Analytics and linkage with Social Media. The Social CommUNITy.

Module 3: **(08 hrs)**

Email Marketing: Introduction, email marketing process, design and content, delivery, discovery. Mobile Marketing: Introduction and concept, Process of mobile marketing: goals, setup, monitor, analyze; Enhancing Digital Experiences with Mobile Apps. Pros and Cons; Targeted advertising. Issues: Data Collection, Privacy, Data Mining, Money and Apps, Security, Spam. Growth Areas.

Module 4: **(08hrs)**

Managing Digital Marketing: Content Production; Video based marketing; Credibility and Digital Marketing; IoT; User Experience; Future of Digital Marketing.

Module 5: **(06 hrs)**

SEO Analytics, Monitoring & Reporting : Google Search Console (GSC),Key Sections & Features of GSC; How to monitor SEO progress with Key Features of GSC: Overview, Performance, URL Inspection, Coverage, Sitemaps, Speed, Mobile Usability, Backlinks, Referring Domains, Security& Manual Actions, How to do SEO Reporting

Course Outcomes:

1. Understand the concept of digital marketing and its real-world iterations
2. Articulate innovative insights of digital marketing enabling a competitive edge
3. Understand how to create and run digital media based campaigns
4. Identify and utilise various tools such as social media etc.
5. Understand how to do SEO Audit

List of Text / Reference Books:

1. Dodson, Ian, " The Art of Digital Marketing - The Definitive Guide to Creating Strategic", Targeted, and Measurable Online Campaigns. Wiley,2016.
2. Ryan, Damien, " Understanding Digital Marketing - Marketing Strategies for Engaging the Digital Generation", Kogan Page Limited,2008.
3. Gupta, Sunil, "Driving Digital Strategy" Harvard Business Review Press,2018.
4. Tuten, Tracy L. and Solomon, Michael R. " Social Media Marketing", Sage,3rd edition 2017.
5. Bhatia, Puneet S." Fundamentals of Digital Marketing", Pearson,2nd edition,2019.
6. Kotler, Philip "Marketing 4.0: Moving from Traditional to Digital", Wiley,1st edition,2017.

IPS Academy
Institute of Engineering & Science
Department of Computer Science & Information Technology

V-Semester

Open Elective-I

OEC-CSIT501	Stress Management	3L : 0T : 0P (3hrs.)	3 credits

Course Objectives

The objective of this course is to enable students to understand and learn how to use various techniques and determine the most appropriate method to aid in managing reaction to stress.

Course Outcomes

Identify, describe and practice research-based coping strategies and relaxation techniques that contribute to managing life's stress.

Course Contents

Module-I

Introduction to Stress

Introduction to stress: Meaning, Definition, Eustress and Distress, Types of stress: Acute stress, Episodic Acute stress and chronic stress, Signs and Symptoms

Module -II

Sources of Stress across the Lifespan

Psychological, Social, Environmental, Academic, Family and Work stress, Adaptive and Maladaptive Behavior, Individual and Cultural Differences

Module - III

Impact of Stress

Physiological Impact of stress -Autonomic Nervous System Changes, Changes in Brain, General adaptive syndrome (GAD), Quality of sleep, Diet and Health effects (ii) Psychological Impact of stress - Impaired Mental functions, Poor memory (iii) Social Impact of stress - Stressful Life Events, Social support and health

Module - IV

Success over Stress

Understanding your stress level, Role of Personality Pattern, Self Esteem, Locus of Control, Role of Thoughts Beliefs and Emotions Coping Mechanisms: - Coping Mechanisms: Appraisal focus Use of Audio and Video Aids , Cultural Activities, Autogenic Training, Biofeedback, Relaxation, Yoga and Meditation Emotional focused and Problem focused , 'Fight or Flight' Response, Stress warning signals

Module –V

Project based learning

Project report on Stress Management (Students will prepare and submit a report under the guidance of the mentors)

Text Books:

1. Greenberg, J. S. (2017). Comprehensive Stress Management (14th edition). New York: McGraw Hill.
2. Roy, Sumita. (2005) Managing Stress: Handle, Control, Prevent Sterling Publisher
3. Davis M. (2000) *The Relaxation and Stress Reduction Work Book*, New Harbinger inc.
4. Simmons M., Daw W. (1994) *Stress, Anxiety, Depression: a Practical Workbook,* Winslow Press.
5. Tyler M. (1999) *Stress Management Training for Trainers Handbook*, Living with Stress Ltd
6. Udai, Y. (2015). Yogasan aur pranayam. New Delhi: N.S. Publications

Reference Books:

1. Cooper K. (1991) *Overcoming Hypertension*, Bantam Books.
2. Hambly K., Muir A. (1997) *Stress Management in Primary Care,* Butterworth Heinemann.
3. Jones H. (1997) *I'm too Busy to be Stressed,* Hodder and Stoughton
4. Payne R. (1995) *Relaxation Techniques: a Practical Handbook for Healthcare Professionals,* Churchill Livingstone.
5. Steinmetz J. (1980) *Managing Stress Before it Manages You,* Bull Publishing.