ACE
Engineering College
An Autonomous Institution

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Ankushapur,Ghatkesar,Medchal,Hyderabad-501301

DEPARTMENT OF INFORMATION TECHNOLOGY
COURSE STRUCTURE – R22

III YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	IT501PC	Software Engineering	3	0	0	3
2	IT502PC	Data Communications and Computer Networks	3	1	0	4
3	IT503PC	Machine Learning	3	0	0	3
4		Professional Elective - I	3	0	0	3
5		Professional Elective - II	3	0	0	3
6	IT504PC	Software Engineering & Computer Networks Lab	0	0	2	1
7	IT505PC	Machine Learning Lab	0	0	2	1
8	EN508HS	Advanced English Communication Skills Lab	0	0	2	1
9	IT506PC	UI design- Flutter	0	0	2	1
10	*MC510	Intellectual Property Rights	3	0	0	0
		Total	18	1	8	20

Professional Elective – I

IT511PE	Biometrics
IT512PE	Advanced Computer Architecture
IT513PE	Data Analytics
IT514PE	Image Processing
IT515PE	Principles of Programming Languages

Professional Elective - II

IT521PE	Computer Graphics
IT522PE	Quantum Computing
IT523PE	Advanced Operating Systems
IT524PE	Distributed Databases
IT525PE	Pattern Recognition

IT501PC: SOFTWARE ENGINEERING

B.Tech. III Year I Sem.   **L T P C**
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Course Objectives
- The aim of the course is to provide an understanding of the working knowledge of the techniques for estimation, design, testing and quality management of large software development projects.
- Topics include process models, software requirements, software design, software testing, software process/product metrics, risk management, quality management and UML diagrams.

Course Outcomes
- Ability to translate end-user requirements into system and software requirements, using e.g. UML, and structure the requirements in a Software Requirements Document (SRD).
- Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices.
- Will have experience and/or awareness of testing problems and will be able to develop a simple testing report.
- Develop the test cases using white box and black box testing techniques.
- To learn the case tools using design phase.
- To learn the implementation of various test cases using unit testing, integration testing.

UNIT - I
Introduction to Software Engineering: The evolving role of software, changing nature of software, software myths.
A Generic view of process: Software engineering- a layered technology, a process framework, The capability maturity model integration (CMMI).
Process models: The waterfall model, Spiral model and Agile methodology

UNIT - II
Software Requirements: Functional and non-functional requirements, user requirements, system requirements, interface specification, the software requirements document.
Requirements engineering process: Feasibility studies, requirements elicitation and analysis, requirements validation, requirements management.

UNIT - III
Design Engineering: Design process and design quality, design concepts, the design model. Creating an architectural design: software architecture, data design, architectural styles and patterns, architectural design, conceptual model of UML, basic structural modeling, class diagrams, sequence diagrams, collaboration diagrams, use case diagrams, component diagrams.

UNIT - IV
Testing Strategies: A strategic approach to software testing, test strategies for conventional software, black-box and white-box testing, validation testing, system testing, the art of debugging.
Metrics for Process and Products: Software measurement, metrics for software quality.

UNIT - V
Risk management: Reactive Vs proactive risk strategies, software risks, risk identification,

riskprojection, risk refinement, RMMM.
Quality Management: Quality concepts, software quality assurance, software reviews, formal technical reviews, statistical software quality assurance, software reliability, the ISO 9000 quality standards.

TEXT BOOKS:
1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition, McGraw HillInternational Edition.

2. Software Engineering- Sommerville, 7th edition, Pearson Education.

REFERENCE BOOKS:
1. The unified modeling language user guide Grady Booch, James Rambaugh, Ivar Jacobson,Pearson Education.
2. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiley.
3. Software Engineering principles and practice- Waman S Jawadekar, The McGraw-Hill Companies.
4. Fundamentals of object-oriented design using UML Meiler page-Jones: Pearson Education.

IT502PC: DATA COMMUNICATIONS AND COMPUTER NETWORKS

B.Tech. III Year I Sem.	L	T	P	C
	3	1	0	4

Course Objectives:
- Explore basic concepts of data communication
- Introduce students to TCP/IP and OSI models along with their merits and demerits.
- Explore in detail services offered by various layers of OSI Model.
- Understand link layer protocols, UDP, TCP and application layer protocols.

Course Outcomes:
- Understand and explore the basics of communication and computer networks
- Explore different network topologies and protocols.
- Understand Physical and data link layers concepts of a computer network.
- Examine the role and functions of the MAC (Media Access Control) sub-layer in network communication.
- Understand Network and transport layers concepts of a computer network.
- Understand the working of application layer protocols.

UNIT – I
Data Communications: Components, Direction of Data flow, Networks, Components and Categories, Types of Connections, Topologies, Protocols and Standards, ISO / OSI model, Example Networks such as ATM, Frame Relay, ISDN.
Physical Layer: Transmission modes, Multiplexing, Transmission Media, Switching, Circuit Switched Networks, Datagram Networks, Virtual Circuit Networks.

UNIT – II
Data link Layer: Introduction, Framing, Error Detection and Correction, Parity, LRC , CRC, Hamming code, Flow and Error Control, Noiseless Channels, Noisy Channels, HDLC, Point to Point Protocols, Medium Access sub layer, ALOHA, CSMA/CD, LAN - Ethernet IEEE 802.3, IEEE 802.5, IEEE 802.11, Random access, Controlled access, Channelization.

UNIT – III
Network Layer: Logical Addressing, Internetworking, Tunneling, Address mapping, ICMP, IGMP,Forwarding, Uni Cast Routing Protocols, Multicast Routing Protocols.

UNIT – IV
Transport Layer: Process to Process Delivery, UDP and TCP protocols, Data Traffic, Congestion, Congestion Control, QoS, Integrated Services, Differentiated Services, QoS in Switched Networks.

UNIT – V
Application Layer: Domain name space, DNS in Internet, Electronic Mail, SMTP, FTP, WWW, HTTP,SNMP.

TEXT BOOKS:
1. Data Communications and Networking, Behrouz A. Forouzan, Fourth Edition TMH.

REFERENCE BOOKS:
1. Computer Networks, Andrew S Tanenbaum, 6th Edition. Pearson Education.
2. Computer Networking: A Top-Down Approach Featuring the Internet. James F. Kurose & Keith W. Ross, 3 rd Edition, Pearson Education
3. Data communications and Computer Networks, P.C Gupta, PHI.
4. An Engineering Approach to Computer Networks, S. Keshav, 2nd Edition, Pearson Education.

IT503PC: MACHINE LEARNING

B.Tech. III Year I Sem.   **L T P C**
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Course Objectives:
- To introduce students to the basic concepts and techniques of Machine Learning.
- To have a thorough understanding of the Supervised and Unsupervised learning techniques.
- To study the various probability-based learning techniques.

Course Outcomes:
- Distinguish between, supervised, unsupervised and semi-supervised learning.
- Understand algorithms for building classifiers applied on datasets of non-linearly separableclasses.
- Understand the principles of evolutionary computing algorithms.
- Design an ensembler to increase the classification accuracy.
- Understand the difference between training and testing data.
- Analyze datasets, perform data preprocessing, and interpret the results of machine learning models.

UNIT - I
Learning: Types of Machine Learning, Supervised Learning, The Brain and the Neuron, Design a Learning System, Perspectives and Issues in Machine Learning, Concept Learning Task, Concept Learning as Search, Finding a Maximally Specific Hypothesis, Version Spaces and the CandidateElimination Algorithm.
Linear Discriminants: Perceptron, Linear Separability, Linear Regression.

UNIT - II
Multi-layer Perceptron: Going Forwards, Going Backwards: Back Propagation Error, Multi-layer Perceptron in Practice, Examples of using the MLP, Overview, Deriving Back-Propagation, Radial Basis Functions and Splines, Concepts, RBF Network, Curse of Dimensionality, Interpolations and Basis Functions, Support Vector Machines.

UNIT - III
Learning with Trees: Decision Trees, Constructing Decision Trees, Classification and Regression Trees, Ensemble Learning, Boosting, Bagging, Different ways to Combine Classifiers, Basic Statistics, Gaussian Mixture Models, Nearest Neighbor Methods, Unsupervised Learning, K meansAlgorithms.

UNIT - IV
Dimensionality Reduction, Linear Discriminant Analysis, Principal Component Analysis, Factor Analysis, Independent Component Analysis, Locally Linear Embedding, Isomap, Least SquaresOptimization.
Evolutionary Learning, Genetic algorithms, Genetic Offspring: Genetic Operators, Using Genetic Algorithms.

UNIT - V
Reinforcement Learning, Overview, Getting Lost Example.
Markov Chain Monte Carlo Methods, Sampling, Proposal Distribution, Markov Chain Monte Carlo, Graphical Models, Bayesian Networks, Markov Random Fields, Hidden Markov Models, TrackingMethods.

TEXT BOOKS:
1. Stephen Marsland, Machine Learning, An Algorithmic Perspective, Second Edition,Chapman and Hall/CRC Machine Learning and Pattern Recognition Series, 2014.

REFERENCE BOOKS:
1. Tom M Mitchell, Machine Learning, First Edition, McGraw Hill Education, 2013.
2. Peter Flach, Machine Learning: The Art and Science of Algorithms that Make Sense of Data,First Edition, Cambridge University Press, 2012.
3. Jason Bell, Machine learning Hands on for Developers and Technical Professionals, FirstEdition, Wiley, 2014
4. Ethem Alpaydin, Introduction to Machine Learning 3e (Adaptive Computation and MachineLearning Series), Third Edition, MIT Press, 2014

IT511PE: BIOMETRICS (Professional Elective – I)

B.Tech. III Year I Sem.   L T P C
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Prerequisites:
1. Data structures

Course Objectives:
- Will learn the biometric technologies.
- Learn the computational methods involved in the biometric systems.
- Learn methods for evaluation of the reliability and quality of the biometric systems.

Course Outcomes: After completion of the course, students will be able to:
- Identify the various Biometric technologies.
- Design of face recognition systems for the organization.
- Design finger print, hand geometry applications.
- Develop simple applications for privacy.
- Evaluate various biometric modalities in terms of their impact on privacy
- Comprehend the principles of biometric cryptography

UNIT - I
Introduction, history, type of Biometrics, General Architecture of Biometric Systems, Basic Working of biometric Matching, Biometric System Error and performance Measures, Design of Biometric Systems, Applications of Biometrics, Benefits of Biometrics Versus Traditional Authentication Methods

UNIT - II
Face Biometrics & Retina And Iris Biometrics Introduction, Background of Face Recognition, Design of Face Recognition System, Neural Network for Face Recognition, Face Detection in Video Sequences, Challenges in Face Biometrics, Face Recognition Methods, Advantages and Disadvantages, Performance of Biometrics.

UNIT -III
Design of Retina Biometrics, Iris Segmentation Method, Determination of Iris Region, Experimental Results of Iris Localization, Applications of Iris Biometrics, Advantages and Disadvantages.

UNIT - IV
Vein and Fingerprint Biometrics & Biometric Hand Gesture Recognition For Indian Sign Language. Biometrics Using Vein Pattern of Palm, Fingerprint Biometrics, Fingerprint Recognition System, Minutiae Extraction, Fingerprint Indexing, Experimental Results, Advantages and Disadvantages, Basics of Hand Geometry, Sign Language, Indian Sign Language, SIFT Algorithms- Practical Approach Advantages and Disadvantages.

UNIT - V
Privacy Enhancement Using Biometrics & Biometric Cryptography And Multimodal Biometrics: Introduction, Privacy Concerns Associated with Biometric Developments, Identity and Privacy, PrivacyConcerns, Biometrics with Privacy Enhancement, Comparison of Various Biometrics in Terms ofPrivacy, Soft Biometrics - Introduction to Biometric Cryptography.

TEXT BOOKS:
1. G r Sinha and Sandeep B. Patil, Biometrics: concepts and applications, Wiley, 2013.
2. Paul Reid, Biometrics for Network Security, Pearson Education.

REFERENCE BOOKS:
1. Samir Nanavathi, Micheal Thieme and Raj Nanavathi, Biometrics, Identity verification in anetworked world, Wiley, dream Tech.
2. John D. Woodward and Jr. Wiley Dreamtech, Biometrics, The Ultimate Reference.

Online websites / Materials:
1. https://www.biometricsinstitute.org
2. https://www.tutorialspoint.com/biometrics/biometrics_quick_guide.htm

IT512PE: ADVANCED COMPUTER ARCHITECTURE (Professional Elective – I)

B.Tech. III Year I Sem.   **L T P C**
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Prerequisites: Computer Organization
Course Objectives:
- To impart the concepts and principles of parallel and advanced computer architectures.
- To develop the design techniques of Scalable and multithreaded Architectures.
- To Apply the concepts and techniques of parallel and advanced computer architectures todesign modern computer systems

Course Outcomes:
- Computational models and Computer Architectures.
- Concepts of parallel computer models.
- Scalable Architectures, Pipelining, Superscalar processors.
- Analyze and compare different parallel computer models.
- Explain the importance of cache coherence and synchronization mechanisms in maintaining data consistency in shared-memory multiprocessors.
- Understand the concept of compound vector processing and its impact on vector algorithm design.

UNIT - I
Theory of Parallelism, Parallel computer models, The State of Computing, Multiprocessors and Multicomputers, Multivector and SIMD Computers, PRAM and VLSI models, Architectural development tracks, Program and network properties, Conditions of parallelism, Program partitioning and Scheduling, Program flow Mechanisms, System interconnect Architectures.

UNIT - II
Principles of Scalable performance, Performance metrics and measures, Parallel Processing applications, Speed up performance laws, Scalability Analysis and Approaches, Hardware Technologies, Processes and Memory Hierarchy, Advanced Processor Technology, Superscalar and Vector Processors

UNIT - III
Shared-Memory Organizations, Sequential and weak consistency models, Pipelining and superscalartechniques, Linear Pipeline Processors, Non-Linear Pipeline Processors, Instruction Pipeline design, Arithmetic pipeline design, superscalar pipeline design.

UNIT - IV
Parallel and Scalable Architectures, Multiprocessors and Multicomputers, Multiprocessor systeminterconnects, cache coherence and synchronization mechanism, Three Generations of Multicomputers, Message-passing Mechanisms, Multivetor and SIMD computers.

UNIT - V
Vector Processing Principles, Multivector Multiprocessors, Compound Vector processing, SIMD computer Organizations, The connection machine CM-5.

TEXT BOOK:
1. Advanced Computer Architecture, Kai Hwang, 2nd Edition, Tata McGraw Hill Publishers.

REFERENCE BOOKS:

1. Computer Architecture, J.L. Hennessy and D.A. Patterson, 4th Edition, ELSEVIER.
2. Advanced Computer Architectures, S.G.Shiva, Special Indian edition, CRC, Taylor &Francis.
3. Introduction to High Performance Computing for Scientists and Engineers, G. Hager and G.Wellein, CRC Press, Taylor & Francis Group.
4. Advanced Computer Architecture, D. Sima, T. Fountain, P. Kacsuk, Pearson education.
5. Computer Architecture, B. Parhami, Oxford Univ. Press.

IT513PE: DATA ANALYTICS (Professional Elective – I)

B.Tech. III Year I Sem.   **L T P C**
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Prerequisites
1. A course on "Database Management Systems".
2. Knowledge of probability and statistics.

Course Objectives:
- To explore the fundamental concepts of data analytics.
- To learn the principles and methods of statistical analysis
- Discover interesting patterns, analyze supervised and unsupervised models and estimate theaccuracy of the algorithms.
- To understand the various search methods and visualization techniques.

Course Outcomes: After completion of this course students will be able to
- Understand the impact of data analytics for business decisions and strategy
- Carry out data analysis/statistical analysis
- To carry out standard data visualization and formal inference procedures
- Design Data Architecture
- Understand various Data Sources
- Apply statistics methods to develop models

UNIT - I
Data Management: Design Data Architecture and manage the data for analysis, understand various sources of Data like Sensors/Signals/GPS etc. Data Management, Data Quality(noise, outliers, missing values, duplicate data) and Data Processing & Processing.

UNIT - II
Data Analytics: Introduction to Analytics, Introduction to Tools and Environment, Application of Modeling in Business, Databases & Types of Data and Variables, Data Modeling Techniques, MissingImputations etc. Need for Business Modeling.

UNIT - III
Regression – Concepts, Blue property assumptions, Least Square Estimation, Variable Rationalization, and Model Building etc.
Logistic Regression: Model Theory, Model fit Statistics, Model Construction, Analytics applications tovarious Business Domains etc.

UNIT - IV
Object Segmentation: Regression Vs Segmentation - Supervised and Unsupervised Learning, Tree Building - Regression, Classification, Overfitting, Pruning and Complexity, Multiple Decision Trees etc. **Time Series Methods:** Arima, Measures of Forecast Accuracy, STL approach, Extract features from generated model as Height, Average Energy etc and Analyze for prediction

UNIT - V
Data Visualization: Pixel-Oriented Visualization Techniques, Geometric Projection Visualization Techniques, Icon-Based Visualization Techniques, Hierarchical Visualization Techniques, VisualizingComplex Data and Relations.

TEXT BOOKS:
1. Student's Handbook for Associate Analytics - II, III.
2. Data Mining Concepts and Techniques, Han, Kamber, 3rd Edition, Morgan KaufmannPublishers.

REFERENCE BOOKS:
1. Introduction to Data Mining, Tan, Steinbach and Kumar, Addision Wisley, 2006.
2. Data Mining Analysis and Concepts, M. Zaki and W. Meira
3. Mining of Massive Datasets, Jure Leskovec Stanford Univ. Anand Rajaraman Milliway LabsJeffrey D Ullman Stanford Univ.

IT514PE: IMAGE PROCESSING (Professional Elective – I)

B.Tech. III Year I Sem.   **L T P C**
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Prerequisites
1. Students are expected to have knowledge in linear signals and systems, Fourier Transform, basic linear algebra, basic probability theory and basic programming techniques; knowledge ofdigital signal processing is desirable.
2. A course on "Computational Mathematics"
3. A course on "Computer Oriented Statistical Methods"

Course Objectives
- Provide a theoretical and mathematical foundation of fundamental Digital Image Processing concepts.
- The topics include image acquisition; sampling and quantization; preprocessing; enhancement; restoration; segmentation; and compression.

Course Outcomes
- Demonstrate the knowledge of the basic concepts of two-dimensional signal acquisition,sampling, and quantization.
- Demonstrate the knowledge of filtering techniques.
- Demonstrate the knowledge of 2D transformation techniques.
- Demonstrate the knowledge of image enhancement, segmentation, restoration andcompression techniques.
- Understand degradation models in image restoration
- Understand the redundancies in images and methods for their removal

UNIT - I
Digital Image Fundamentals: Digital Image through Scanner, Digital Camera. Concept of Gray Levels. Gray Level to Binary Image Conversion. Sampling and Quantization. Relationship between Pixels. Imaging Geometry. 2D Transformations-DFT, DCT, KLT and SVD.

UNIT - II
Image Enhancement in Spatial Domain Point Processing, Histogram Processing, Spatial Filtering,Enhancement in Frequency Domain, Image Smoothing, Image Sharpening.

UNIT - III
Image Restoration Degradation Model, Algebraic Approach to Restoration, Inverse Filtering, LeastMean Square Filters, Constrained Least Squares Restoration, Interactive Restoration.

UNIT - IV
Image Segmentation Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region Oriented Segmentation.

UNIT - V
Image Compression Redundancies and their Removal Methods, Fidelity Criteria, Image CompressionModels, Source Encoder and Decoder, Error Free Compression, Lossy Compression.

TEXT BOOK:
1. Digital Image Processing: R.C. Gonzalez & R. E. Woods, Addison Wesley/ Pearson Education,2nd Ed, 2004.

REFERENCE BOOKS:
1. Fundamentals of Digital Image Processing: A. K. Jain, PHI.
2. Digital Image Processing using MAT LAB: Rafael C. Gonzalez, Richard E. Woods, Steven L.Eddins: Pearson Education India, 2004.
3. Digital Image Processing: William K. Pratt, John Wiley, 3rd Edition, 2004.

IT515PE: PRINCIPLES OF PROGRAMMING LANGUAGES (Professional Elective – I)

B.Tech. III Year I Sem.   **L T P C**

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Prerequisites:
1. A course on "Mathematical Foundations of Computer Science".
2. A course on "Computer Programming and Data Structures".

Course Objectives:
- Introduce important paradigms of programming languages
- To provide conceptual understanding of high-level language design and implementation
- Topics include programming paradigms; syntax and semantics; data types, expressions and statements; subprograms and blocks; abstract data types; concurrency; functional and logic programming languages; and scripting languages

Course Outcomes:
- Acquire the skills for expressing syntax and semantics in formal notation
- Identify and apply a suitable programming paradigm for a given computing application
- Gain knowledge of the features of various programming languages and their comparison
- Understand the concepts and terms used to describe languages that support the imperative, functional, object-oriented, and logic programming paradigms.
- Solve problems using the logic programming paradigm.
- Critically evaluate what paradigm and language are best suited for a new problem.

UNIT - I
Preliminary Concepts: Reasons for Studying Concepts of Programming Languages, Programming Domains, Language Evaluation Criteria, Influences on Language Design, Language Categories, Language Design Trade-Offs, Implementation Methods, Programming Environments Syntax and Semantics: General Problem of Describing Syntax and Semantics, Formal Methods of Describing Syntax, Attribute Grammars, Describing the Meanings of Programs

UNIT - II
Names, Bindings, and Scopes: Introduction, Names, Variables, Concept of Binding, Scope, Scope and Lifetime, Referencing Environments, Named Constants
Data Types: Introduction, Primitive Data Types, Character String Types, User Defined Ordinal Types, Array, Associative Arrays, Record, Union, Tuple Types, List Types, Pointer and Reference Types, Type Checking, Strong Typing, Type Equivalence Expressions and Statements, Arithmetic Expressions, Overloaded Operators, Type Conversions, Relational and Boolean Expressions, Short Circuit Evaluation, Assignment Statements, Mixed-Mode Assignment Control Structures, Introduction, Selection Statements, Iterative Statements, Unconditional Branching, Guarded Commands.

UNIT - III
Subprograms and Blocks: Fundamentals of Sub-Programs, Design Issues for Subprograms, Local Referencing Environments, Parameter Passing Methods, Parameters that Are Subprograms, Calling Subprograms Indirectly, Overloaded Subprograms, Generic Subprograms, Design Issues for Functions, User Defined Overloaded Operators, Closures, **Coroutines Implementing Subprograms:** General Semantics of Calls and Returns, Implementing Simple Subprograms, Implementing Subprograms with Stack-Dynamic Local Variables, Nested Subprograms, Blocks, Implementing Dynamic Scoping
Abstract Data Types: The Concept of Abstraction, Introductions to Data Abstraction, Design Issues, Language Examples, Parameterized ADT, Encapsulation Constructs, Naming Encapsulations

UNIT - IV
Concurrency: Introduction, Introduction to Subprogram Level Concurrency, Semaphores, Monitors, Message Passing, Java Threads, Concurrency in Function Languages, Statement Level Concurrency. **Exception Handling and Event Handling:** Introduction, Exception Handling in Ada, C++, Java.

Introduction to Event Handling, Event Handling with Java and C#.

UNIT - V
Functional Programming Languages: Introduction, Mathematical Functions, Fundamentals of Functional Programming Language, LISP, Support for Functional Programming in Primarily ImperativeLanguages, Comparison of Functional and Imperative Languages
Logic Programming Language: Introduction, an Overview of Logic Programming, Basic Elements ofProlog, Applications of Logic Programming.
Scripting Language: Pragmatics, Key Concepts, Case Study: Python – Values and Types, Variables, Storage and Control, Bindings and Scope, Procedural Abstraction, Data Abstraction, Separate Compilation, Module Library. (Text Book 2)

TEXT BOOKS:
1. Concepts of Programming Languages Robert. W. Sebesta 10/E, Pearson Education.
2. Programming Language Design Concepts, D. A. Watt, Wiley Dreamtech, 2007.

REFERENCE BOOKS:
1. Programming Languages, 2nd Edition, A.B. Tucker, R. E. Noonan, TMH.
2. Programming Languages, K. C. Louden, 2nd Edition, Thomson, 2003.

IT521PE: COMPUTER GRAPHICS (Professional Elective – II)

B.Tech. III Year I Sem.   **L T P C**
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Prerequisites
1. Programming for problem solving and Data Structures.

Course Objectives
- Provide the basics of graphics systems including Points and lines, line drawing algorithms, 2D,3D objective transformations.

Course Outcomes
- Explore applications of computer graphics.
- Understand the characteristics of graphics monitors, workstations, and various input devices.
- Understand 2D, 3D geometric transformations and clipping algorithms.
- Understand 3D object representations, curves, surfaces, polygon rendering methods, colormodels.
- Analyze animation sequence and visible surface detection methods.
- Understanding the Computer Animation Functions

UNIT - I
Introduction: Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random-scan systems, graphics monitors and work stations and input devices.
Output primitives: Points and lines, line drawing algorithms (DDA and Bresenham's Algorithm) circle-generating algorithms and ellipse - generating algorithms.
Polygon Filling: Scan-line algorithm, boundary-fill and flood-fill algorithms.

UNIT - II
2-D geometric transformations: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems.
2-D viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, clipping operations, point clipping, Line clipping-Cohen Sutherland algorithms, Polygon clipping-Sutherland Hodgeman polygon clipping algorithm.

UNIT - III
3-D object representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces, Polygon rendering methods, color models and color applications.

UNIT - IV
3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations.
viewing: Viewing pipeline, viewing coordinates, projections, view volume and general projection transforms and clipping.

UNIT - V
Computer animation: Design of animation sequence, general computer animation functions, raster animations, computer animation languages, key frame systems, motion specifications.
Visible surface detection methods: Classification, back-face detection, depth-buffer method, BSP- tree method, area sub-division method and octree method.

TEXT BOOKS:

1. "Computer Graphics C version", Donald Hearn and M. Pauline Baker, Pearson Education.

REFERENCE BOOKS:

1. Procedural elements for Computer Graphics, David F Rogers, Tata Mc Graw hill, 2nd edition.
2. Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
3. Principles of Computer Graphics, Shalini Govil, Pai, 2005, Springer.
4. "Computer Graphics Principles & practice", second edition in C, Foley, Van Dam, Feiner and Hughes, Pearson Education.
5. Computer Graphics, Steven Harrington, TMH.

IT522PE: QUANTUM COMPUTING (Professional Elective – II)

B.Tech. III Year I Sem.   L T P C
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Course Objectives
- To introduce the fundamentals of quantum computing
- The problem-solving approach using finite dimensional mathematics

Course Outcomes
- Understand basics of quantum computing
- Understand physical implementation of Qubit
- Understand Quantum algorithms and their implementation
- Understand The Impact of Quantum Computing on Cryptography
- Implement quantum cryptography techniques for secure communication.
- Comprehend the challenges posed by noise and errors in quantum computing.

UNIT - I
History of Quantum Computing: Importance of Mathematics, Physics and Biology. Introduction to Quantum Computing: Bits Vs Qubits, Classical Vs Quantum logical operations

UNIT - II
Background Mathematics: Basics of Linear Algebra, Hilbert space, Probabilities and measurements. Background Physics: Paul's exclusion Principle, Superposition, Entanglement and super-symmetry, density operators and correlation, basics of quantum mechanics, Measurements in bases other than computational basis. Background Biology: Basic concepts of Genomics and Proteomics (Central Dogma)

UNIT - III
Qubit: Physical implementations of Qubit. Qubit as a quantum unit of information. The Bloch sphere Quantum Circuits: single qubit gates, multiple qubit gates, designing the quantum circuits. Bell states.

UNIT - IV
Quantum Algorithms: Classical computation on quantum computers. Relationship between quantum and classical complexity classes. Deutsch's algorithm, Deutsch's-Jozsa algorithm, Shor's factorizationalgorithm, Grover's search algorithm.

UNIT - V
Noise and error correction: Graph states and codes, Quantum error correction, fault-tolerant computation. Quantum Information and Cryptography: Comparison between classical and quantum information theory. Quantum Cryptography, Quantum teleportation

TEXT BOOKS:
1. Nielsen M. A., Quantum Computation and Quantum Information, Cambridge

REFERENCE BOOKS:
1. Quantum Computing for Computer Scientists by Noson S. Yanofsky and Mirco A. Mannucci
2. Benenti G., Casati G. and Strini G., Principles of Quantum Computation and Information, Vol.I: Basic Concepts, Vol II
3. Basic Tools and Special Topics, World Scientific. Pittenger A. O., An Introduction to QuantumComputing Algorithms

IT523PE: ADVANCED OPERATING SYSTEMS (Professional Elective – II)

B.Tech. III Year I Sem.   **L T P C**
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Course Objectives
- To study, learn, and understand the main concepts of advanced operating systems (parallel processing systems, distributed systems, real time systems, network operating systems, and open-source operating systems), Hardware and software features that support these systems.

Course Outcomes
- Understand the design approaches of advanced operating systems
- Analyze the design issues of distributed operating systems.
- Evaluate design issues of multi-processor operating systems.
- Identify the requirements Distributed File System and Distributed Shared Memory.
- Formulate the solutions to schedule the real time applications.
- Implement load distributing algorithms and DSM algorithms in practical scenarios.

UNIT - I
Architectures of Distributed Systems: System Architecture Types, Distributed Operating Systems, Issues in Distributed Operating Systems, Communication Primitives.
Theoretical Foundations: Inherent Limitations of a Distributed System, Lamport's Logical Clocks, Vector Clocks, Causal Ordering of Messages, Termination Detection.

UNIT - II
Distributed Mutual Exclusion: The Classification of Mutual Exclusion Algorithms, Non-Token – Based Algorithms: Lamport's Algorithm, The Ricart-Agrawala Algorithm, Maekawa's Algorithm.
Token-Based Algorithms: Suzuki-Kasami's Broadcast Algorithm, Singhal's Heurisric Algorithm, Raymond's HeuristicAlgorithm.

UNIT - III
Distributed Deadlock Detection: Preliminaries, Deadlock Handling Strategies in Distributed Systems, Issues in Deadlock Detection and Resolution, Control Organizations for Distributed Deadlock Detection, Centralized Deadlock Detection Algorithms, Distributed Deadlock Detection Algorithms, HierarchicalDeadlock Detection Algorithms.

UNIT - IV
Multiprocessor System Architectures: Introduction, Motivation for multiprocessor Systems, Basic Multiprocessor System Architectures Multi Processor Operating Systems: Introduction, Structures of Multiprocessor Operating Systems, Operating Design Issues, Threads, Process Synchronization, Processor Scheduling.
Distributed File Systems: Architecture, Mechanisms for Building Distributed File Systems, Design Issues.

UNIT - V
Distributed Scheduling: Issues in Load Distributing, Components of a Load Distributed Algorithm, Stability, Load Distributing Algorithms, Requirements for Load Distributing, Task Migration, Issues in task Migration Distributed Shared Memory: Architecture and Motivation, Algorithms for Implementing DSM, Memory Coherence, Coherence Protocols, Design Issues.

TEXT BOOK
1. Advanced Concepts in Operating Systems, Mukesh Singhal, Niranjan G. Shivaratri, Tata McGraw-Hill Edition 2001

REFERENCE BOOK
1. Distributed Systems: Andrew S. Tanenbaum, Maarten Van Steen, Pearson Prentice Hall, Edition – 2, 2007.

IT524PE: DISTRIBUTED DATABASES (Professional Elective – II)

B.Tech. III Year I Sem.   **L T P C**
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Prerequisites:
1. A course on "Database Management Systems"

Course Objectives:
- The purpose of the course is to enrich the previous knowledge of database systems and expose the need for distributed database technology to confront the deficiencies of the centralized database systems.
- Introduce basic principles and implementation techniques of distributed database systems.
- Equip students with principles and knowledge of parallel and object-oriented databases.
- Topics include distributed DBMS architecture and design; query processing and optimization; distributed transaction management and reliability; parallel and object database managementsystems.

Course Outcomes:
- Understand theoretical and practical aspects of distributed database systems.
- Study and identify various issues related to the development of distributed database systems.
- Understand the design aspects of object-oriented database systems and related developments.
- Fragment a database both horizontally and vertically for optimal performance and Allocate replicas of fragments for best performance.
- Add distributed transaction management control including concurrency control and replica control to a distributed database.
- Discuss how current database products implement database distribution including query optimization.

UNIT - I
Introduction; Distributed Data Processing, Distributed Database System, Promises of DDBSs, Problemareas.
Distributed DBMS Architecture: Architectural Models for Distributed DBMS, DDMBS Architecture. **Distributed Database Design**: Alternative Design Strategies, Distribution Design issues,Fragmentation, Allocation.

UNIT - II
Query processing and decomposition: Query processing objectives, characterization of query processors, layers of query processing, query decomposition, localization of distributed data.
Distributed query Optimization: Query optimization, centralized query optimization, distributed queryoptimization algorithms.

UNIT - III
Transaction Management: Definition, properties of transaction, types of transactions, distributed concurrency control: serializability, concurrency control mechanisms & algorithms, time - stamped & optimistic concurrency control Algorithms, deadlock Management.

UNIT - IV
Distributed DBMS Reliability: Reliability concepts and measures, fault-tolerance in distributed systems, failures in Distributed DBMS, local & distributed reliability protocols, site failures and networkpartitioning.

Parallel Database Systems: Parallel database system architectures, parallel data placement, parallelquery processing, load balancing, database clusters.

UNIT - V
Distributed object Database Management Systems: Fundamental object concepts and models, object distributed design, architectural issues, object management, distributed object storage, object query Processing.

Object Oriented Data Model: Inheritance, object identity, persistent programming languages, persistence of objects, comparison OODBMS and ORDBMS

TEXT BOOKS:
1. M. Tamer OZSU and Patuck Valduriez: Principles of Distributed Database Systems, PearsonEdn. Asia, 2001.
2. Stefano Ceri and Giuseppe Pelagatti: Distributed Databases, McGraw Hill.

REFERENCE BOOK:
1. Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer Widom: "Database Systems: The CompleteBook", Second Edition, Pearson International Edition.

IT525PE: PATTERN RECOGNITION (Professional Elective – II)

B.Tech. III Year I Sem.   **L T P C**
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Prerequisites:
- Programming for problem solving
- Computer Oriented Statistical Methods

Course Objectives:
- Introducing fundamental concepts, theories, and algorithms for pattern recognition andmachine learning.

Course Outcomes:
- Understand the importance of pattern recognition and its representation
- Analyza the variants of NN algorithm
- Understand the necessity of Hidden markov models, decision tree and SVM for classification
- Understand different types of clustering algorithms
- Understanding of Pattern Recognition Fundamentals
- Practical Application in Clustering and Pattern Recognition Projects.

UNIT - I

Introduction: Pattern Recognition, Data Sets for Pattern Recognition, Different Paradigms for Pattern Recognition.

Representation: Data Structures for Pattern Representation, Representation of Clusters, Proximity Measures, Size of Patterns, Abstractions of the Data Set, Feature Extraction, Feature Selection, Evaluation of Classifier, Evaluation of Clustering.

UNIT - II

Nearest Neighbor Based Classifier: Nearest Neighbor Algorithm, Variants of the NN Algorithm, use of the Nearest Neighbor Algorithm for Transaction Databases, Efficient Algorithms, Data Reduction, Prototype Selection.

Bayes Classifier: Bayes Theorem, Minimum Error Rate Classifier, Estimation of Probabilities, Comparison with the NNC, Naïve Bayes Classifier, Bayesian Belief Network.

UNIT - III

Hidden Markov Models: Markov Models for Classification, Hidden Morkov Models, Classification usingHMMs.

Decision Trees: Introduction, Decision Tree for Pattern Classification, Construction of Decision Trees, Splitting at the Nodes, Overfitting and Pruning, Examples of Decision Tree Induction.

UNIT - IV

Support Vector Machines: Introduction, Learning the Linear Discriminant Functions, Neural Networks,SVM for Classification.

Combination of Classifiers: Introduction, Methods for Constructing Ensembles of Classifiers, Methods for Combining Classifiers.

UNIT - V

Clustering: Importance of clustering, Hierarchical Algorithms, Partitional Clustering, Clustering Large Data Sets.

An Application-Hand Written Digit Recognition: Description of the Digit Data,

Preprocessing of Data, Classification Algorithms, Selection of Representative Patterns, Results.

TEXT BOOK:

1. Pattern Recognition: An Algorithmic Approach: Murty, M. Narasimha, Devi, V. Susheela,Spinger Pub, 1st Ed.

REFERENCE BOOKS:

1. Machine Learning - Mc Graw Hill, Tom M. Mitchell.
2. Fundamentals of Speech Recognition: Lawrence Rabiner and Bing- Hwang Juang. PrenticeHall Pub.

Preprocessing of Data, Classification Algorithms, Selection of Representative Patterns, Results.

TEXT BOOK:

1. Pattern Recognition: An Algorithmic Approach: Murty, M. Narasimha, Devi, V. Susheela,Spinger Pub, 1st Ed.

IT504PC: SOFTWARE ENGINEERING & COMPUTER NETWORKS LAB

B.Tech. III Year I Sem.   **L T P C**
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Course Objectives:
- To have hands-on experience in developing a software project by using various softwareengineering principles and methods in each of the phases of software development.
- To understand the working principle of various communication protocols.

Course Outcomes:
- Ability to translate end-user requirements into system and software requirements
- Ability to generate a high-level design of the system from the software requirements
- Implement data link layer farming methods
- Analyze error detection and error correction codes.
- Implement and analyze routing and congestion issues in network design.

Software Engineering
List of Experiments:
Do the following seven exercises for any two projects given in the list of sample projects or any otherProjects:
1. Development of problem statements.
2. Preparation of Software Requirement Specification Document, Design Documents andTesting Phase related documents.
3. Preparation of Software Configuration Management and Risk Management relateddocuments.
4. Study and usage of any Design phase CASE tool
5. Performing the Design by using any Design phase CASE tools.
6. Develop test cases for unit testing and integration testing
7. Develop test cases for various white box and black box testing techniques.
   Sample Projects:
   1. Passport automation System
   2. Book Bank
   3. Online Exam Registration

Computer Networks:
List of Experiments:
1. Implement the data link layer framing methods such as character, character-stuffing and bitstuffing.
2. Write a program to compute CRC code for the polynomials CRC-12, CRC-16 and CRC CCIP
3. Develop a simple data link layer that performs the flow control using the sliding windowprotocol, and loss recovery using the Go-Back-N mechanism.
4. Implement Dijsktra's algorithm to compute the shortest path through a network
5. Take an example subnet of hosts and obtain a broadcast tree for the subnet.
6. Implement distance vector routing algorithm for obtaining routing tables at each node.
7. Implement data encryption and data decryption

IT505PC: MACHINE LEARNING LAB

B.Tech. III Year I Sem.   **L T P C**
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Course Objective:
- The objective of this lab is to get an overview of the various machine learning techniques andcan demonstrate them using python.

Course Outcomes:
- Understand modern notions in predictive data analysis.
- Select data, model selection, model complexity and identify the trends.
- Understand a range of machine learning algorithms along with their strengths andweaknesses.
- Build predictive models from data and analyze their performance.

List of Experiments
1. Write a python program to compute Central Tendency Measures: Mean, Median,Mode Measure of Dispersion: Variance, Standard Deviation.
2. Study of Python Basic Libraries such as Statistics, Math, Numpy and Scipy.
3. Study of Python Libraries for ML application such as Pandas and Matplotlib.
4. Write a Python program to implement Simple Linear Regression.
5. Implementation of Multiple Linear Regression for House Price Prediction using sklearn.
6. Implementation of Decision tree using sklearn and its parameter tuning.
7. Implementation of KNN using sklearn.
8. Implementation of Logistic Regression using sklearn.
9. Implementation of K-Means Clustering.
10. Performance analysis of Classification Algorithms on a specific dataset (Mini Project).

TEXT BOOK:
1. Machine Learning – Tom M. Mitchell, - MGH.

REFERENCE BOOK:
1. Machine Learning: An Algorithmic Perspective, Stephen Marshland, Taylor & Francis.

EN508HS: ADVANCED ENGLISH COMMUNICATION SKILLS LAB

III Year B.Tech. I Sem   **L T P C**
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1. Introduction

The introduction of the Advanced English Communication Skills Lab is considered essential at the B.Tech 3rd year level. At this stage, the students need to prepare themselves for their career which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be a laboratory course to enable students to use appropriate English and perform the following:

1. Gathering ideas and information to organise ideas relevantly and coherently.
2. Making oral presentations.
3. Writing formal letters.
4. Transferring information from non-verbal to verbal texts and vice-versa.
5. Writing project/research reports/technical reports.
6. Participating in group discussions.
7. Engaging in debates.
8. Facing interviews.
9. Taking part in social and professional communication.

2. Objectives:

This Lab focuses on using multi-media instruction for language development to meet the following targets:

- To improve the students' fluency in English, with a focus on vocabulary.
- To enable them to listen to English spoken at normal conversational speed by educated English speakers.
- To respond appropriately in different socio-cultural and professional contexts.
- To communicate their ideas relevantly and coherently in writing.
- To prepare the students for placements..

3. Syllabus:

The following course content to conduct the activities is prescribed for the Advanced English Communication Skills (AECS) Lab:

1. **Activities on Listening and Reading Comprehension:** Active Listening – Development of Listening Skills Through Audio clips - Benefits of Reading - Methods and Techniques of Reading
   – Basic Steps to Effective Reading – Common Obstacles – Discourse Markers or Linkers - Sub- skills of reading - Reading for facts, negative facts and Specific Details- Guessing Meanings from Context, Inferring Meaning - Critical Reading – Reading Comprehension – Exercises for Practice.
2. **Activities on Writing Skills**: Vocabulary for Competitive Examinations - Planning for Writing - Improving Writing Skills - Structure and presentation of different types of writing – Free Writing and Structured Writing - Letter Writing -Writing a Letter of Application -Resume vs. Curriculum Vitae
   - Writing a Résumé **–** Styles of Résumé - e-Correspondence - Emails - Blog Writing - (N)etiquette
   - Report Writing - Importance of Reports - Types and Formats of Reports- Technical Report Writing– Exercises for Practice.
3. **Activities on Presentation Skills -** Starting a conversation - responding appropriately and relevantly - using the right language and body language - Role

Play in different situations including Seeking Clarification, Making a Request, Asking for and Refusing Permission, Participating in a Small Talk - Oral presentations (individual and group) through JAM sessions- PPTs - Importance of Presentation Skills – Planning, Preparing, Rehearsing and Making a Presentation – Dealing with Glossophobia or Stage Fear – Understanding Nuances of Delivery - Presentations through Posters/Projects/Reports - Checklist for Making a Presentation and Rubrics of Evaluation

4. **Activities on Group Discussion (GD):** Types of GD and GD as a part of a Selection Procedure -Dynamics of Group Discussion- Myths of GD - Intervention, Summarizing - Modulation of Voice, Body Language, Relevance, Fluency and Organization of Ideas **–** Do's and Don'ts - GD Strategies.
   – Exercises for Practice.

5. **Interview Skills**: Concept and Process - Interview Preparation Techniques - Types of Interview Questions - Pre-interview Planning, Opening Strategies, Answering Strategies - Interview Through Tele-conference & Video-conference - Mock Interviews.

4. **Minimum Requirement:**
   The Advanced English Communication Skills (AECS) Laboratory shall have the following infrastructural facilities to accommodate at least 35 students in the lab:
   - Spacious room with appropriate acoustics
   - Round Tables with movable chairs
   - Audio-visual aids
   - LCD Projector
   - Public Address system
   - One PC with latest configuration for the teacher
   - T. V, a digital stereo & Camcorder
   - Headphones of High quality

5. **Suggested Software:** The software consisting of the prescribed topics elaborated above should be procured and used.
   - **TOEFL & GRE** (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
   - **Oxford Advanced Learner's Dictionary**, 10th Edition
   - **Cambridge Advanced Learner's Dictionary**
   - **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.**
   - **Lingua TOEFL CBT Insider**, by Dreamtech

6. **Books Recommended:**
   1. Rizvi, M. Ashraf (2018). *Effective Technical Communication*. (2nd ed.). McGraw Hill Education(India) Pvt. Ltd.
   2. Suresh Kumar, E. (2015). *Engineering English.* Orient BlackSwan Pvt. Ltd.
   3. Bailey, Stephen. (2018). Academic *Writing: A Handbook for International Students.* (5th Edition). Routledge.
   4. Koneru, Aruna. (2016). *Professional Communication.* McGraw Hill Education (India) Pvt. Ltd.
   5. Raman, Meenakshi & Sharma, Sangeeta. (2022). *Technical Communication, Principles and Practice.* (4TH Edition) Oxford University Press.
   6. Anderson, Paul V. (2007). *Technical Communication.* Cengage Learning Pvt. Ltd. New Delhi.
   7. McCarthy, Michael; O'Dell, Felicity & Redman, Stuart. (2017). *English Vocabulary in Use* Series. Cambridge University Press
   8. Sen, Leela. (2009). *Communication Skills.* PHI Learning Pvt Ltd., New Delhi.
   9. Elbow, Peter. (1998   ). *Writing with Power.* Oxford University Press.
   10. Goleman, Daniel. (2013). *Emotional Intelligence*: *Why it can matter more than IQ.* Bloomsbury Publishing.

IT506PC: UI DESIGN-FLUTTER

B.Tech. III Year I Sem.   **L   T   P   C**
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Course Objectives:
- Learns to Implement Flutter Widgets and Layouts
- Understands Responsive UI Design and with Navigation in Flutter
- Knowledge on Widges and customize widgets for specific UI elements, Themes
- Understand to include animation apart from fetching data

Course Outcomes:
- Implements Flutter Widgets and Layouts
- Responsive UI Design and with Navigation in Flutter
- Create custom widgets for specific UI elements and also Apply styling using themes and customstyles.
- Design a form with various input fields, along with validation and error handling
- Fetches data and write code for unit Test for UI components and also animation

List of Experiments:

Students need to implement the following experiments

1. a) Install Flutter and Dart SDK.
   b) Write a simple Dart program to understand the language basics.

2. a) Explore various Flutter widgets (Text, Image, Container, etc.).
   b) Implement different layout structures using Row, Column, and Stack widgets.

3. a) Design a responsive UI that adapts to different screen sizes.
   b) Implement media queries and breakpoints for responsiveness.

4. a) Set up navigation between different screens using Navigator.
   b) Implement navigation with named routes.

5. a) Learn about stateful and stateless widgets.
   b) Implement state management using set State and Provider.

6. a) Create custom widgets for specific UI elements.
   b) Apply styling using themes and custom styles.

7. a) Design a form with various input fields.
   b) Implement form validation and error handling.

8. a) Add animations to UI elements using Flutter's animation framework.
   b) Experiment with different types of animations (fade, slide, etc.).

9. a) Fetch data from a REST API.
   b) Display the fetched data in a meaningful way in the UI.

10. a) Write unit tests for UI components.
    b) Use Flutter's debugging tools to identify and fix issues.

TEXT BOOK:
1. Marco L. Napoli, Beginning Flutter: A Hands-on Guide to App Development.

*MC510: INTELLECTUAL PROPERTY RIGHTS

B.Tech. III Year I Sem.   **L T P C**
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Course Objectives:
- Significance of intellectual property and its protection
- Introduce various forms of intellectual property

Course Outcomes:
- Distinguish and Explain various forms of IPRs.
- Identify criteria to fit one's own intellectual work in particular form of IPRs.
- Apply statutory provisions to protect particular form of IPRs.
- Appraise new developments in IPR laws at national and international level

UNIT – I
Introduction to Intellectual property: Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

UNIT – II
Trade Marks: Purpose and function of trademarks, acquisition of trade mark rights, protectable matter, selecting, and evaluating trade mark, trade mark registration processes.

UNIT – III
Law of copyrights: Fundamental of copyright law, originality of material, rights of reproduction, rights to perform the work publicly, copyright ownership issues, copyright registration, notice of copyright, International copyright law.
Law of patents: Foundation of patent law, patent searching process, ownership rights and transfer

UNIT – IV
Trade Secrets: Trade secret law, determination of trade secret status, liability for misappropriations of trade secrets, protection for submission, trade secret litigation.
Unfair competition: Misappropriation right of publicity, false advertising.

UNIT – V
New development of intellectual property: new developments in trade mark law; copyright law, patent law, intellectual property audits.
International overview on intellectual property, international – trade mark law, copyright law, international patent law, and international development in trade secrets law.

TEXT BOOK:
1. Intellectual property right, Deborah. E. Bouchoux, Cengage learning.

REFERENCE BOOK:
1. Intellectual property right – Unleashing the knowledge economy, prabuddha ganguli, TataMcGraw Hill Publishing company ltd.