

DEPARTMENT OF INFORMATION TECHNOLOGY

Course Outcomes
SE: III SEM (REV- 2019 'C' Scheme)

Course Code:	ITC301
Course:	Engineering Mathematics-III
	Student should be able to:
CO-1	Find Laplace transform and inverse Laplace transform of functions using the properties and properties
CO-2	Find inverse Laplace transform using convolution theorem and partial fraction method
CO-3	Expand periodic functions using Fourier series, understand the concept of half range sine and cosine series and Parseval's Identity
CO-4	Apply the concept of complex variable theory, application of harmonic conjugate to get orthogonal trajectories and analytic functions.
CO-5	Apply the concept of correlation and regression to find correlation coefficient, rank correlation and regression lines
CO-6	Find the probability using Baye's theorem, mean and variance of the probability distributions

Course Code:	ITC302
Course:	Data Structure and Analysis
	Student should be able to:
CO-1	Classify and apply the concepts of stacks, queues and linked list in real life problem solving.
CO-2	Classify, apply and analyze the concepts trees in real life problem solving.
CO-3	Illustrate and justify the concepts of graphs in real life problem solving.
CO-4	List and examine the concepts of sorting, searching techniques in real life problem solving.
CO-5	Use and identify the concepts of recursion, hashing in real life problem solving.
CO-6	Examine and justify different methods of stacks, queues, linked list, trees and graphs to various applications.

Course Code:	ITC303
Course:	DATABASE MANAGEMENT SYSTEM
	Student should be able to:
CO-1	Identify the need of Database Management System.
CO-2	Design conceptual model for real life applications.
CO-3	Create Relational Model for real life applications.
CO-4	Formulate query using SQL commands.
CO-5	Apply the concept of normalization to relational database design.
CO-6	Demonstrate the concept of transaction, concurrency and recovery.

Course Code:	ITC304
Course:	Principle of Communication
	Student should be able to:
CO-1	Describe analog and digital communication systems
CO-2	Differentiate types of noise, analyses the Fourier transform of time and frequency domain.
CO-3	Design transmitter and receiver of AM, DSB, SSB and FM
CO-4	Describe Sampling theorem and pulse modulation systems.
CO-5	Explain multiplexing and digital band pass modulation techniques.
CO-6	Describe electromagnetic radiation and propagation of waves.

Course Code:	ITC305
Course:	Paradigms and Computer Programming Fundamentals
	Student should be able to:
CO-1	Describe and Compare different programming paradigms
CO-2	Describe the Object Oriented Constructs and use them in program design
CO-3	Explain the concepts of declarative programming paradigms through functional and logic programming
CO-4	Design and Develop programs based on declarative programming paradigm using functional and/or logic programming.
CO-5	Explain role of concurrency in parallel and distributed programming.
CO-6	Explain different application domains for use of scripting languages.

Course Code:	ITL301
Course:	Data Structure Lab
	Student should be able to:
CO-1	Use the basic concepts and principles of various linked lists, stacks and queues.
CO-2	Apply the methods in basic trees.
CO-3	Use and identify the methods in advanced trees.
CO-4	Apply the methods in graphs.
CO-5	Apply the techniques of searching, hashing and sorting
CO-6	Illustrate and examine the methods of linked lists, stacks, queues, trees and graphs to various real time problems

Course Code:	ITL302
Course:	SQL LAB
	Student should be able to:
CO-1	Define problem statement and construct the conceptual model for real life application.
CO-2	Create and populate a RDBMS using SQL.
CO-3	Formulate and write SQL queries for efficient information retrieval.
CO-4	Apply view, triggers and procedures to demonstrate specific event handling.
CO-5	Demonstrate database connectivity using JDBC.
CO-6	Demonstrate the concept of concurrent transactions.

Course Code:	ITL303
Course:	Computer programming Paradigms Lab
	Student should be able to:
CO-1	Apply Object Oriented concepts in C++.
CO-2	Design and Develop solution based on declarative programming paradigm using functional and logic programming using Haskell
CO-3	Explain the multithreaded programs in Java and C++
CO-4	Describe the need and use of exception handling and garbage collection in C++ and JAVA
CO-5	Design and develop a solution to the same problem using multiple paradigms
CO-6	Compare the implementations in multiple paradigms at coding and execution level

Course Code:	ITL304
Course:	Java Lab (SBL)
	Student should be able to:
CO-1	Explain the fundamental concepts of Java Programming.
CO-2	Describe the concepts of classes, objects, members of a class and the relationships among them needed for a finding the solution to specific problem.
CO-3	Demonstrate how to extend java classes and achieve reusability using Inheritance, Interface and Packages.
CO-4	Construct robust and faster programmed solutions to problems using concept of Multithreading, exceptions and file handlingC
CO-5	Design and develop Graphical User Interface using Abstract Window Toolkit and Swings along with response to the events.
CO-6	Develop Graphical User Interface by exploring JavaFX framework based on MVC architecture



Course Code:	ITM301
Course:	Mini Project –1 A for Front end /backend Application using JAVA
	Student should be able to:
CO-1	Identify and explain problems based on societal /research needs.
CO-2	Apply Knowledge and skill to solve societal problems in a group and develop interpersonal skills to work as member of a group or leader
CO-3	Draw the proper inferences from available results through theoretical/ experimental/simulations.
CO-4	Analyse the impact of solutions in societal and environmental context for sustainable development and use standard norms of engineering practices
CO-5	Excel in written and oral communication
CO-6	Demonstrate capabilities of self-learning in a group, which leads to lifelong learning and Demonstrate project management principles during project work.

SE: IV SEM (REV- 2019 ‘C’ Scheme)

Course Code:	ITC401
Course:	Engineering Mathematics-IV
	Student should be able to:
CO-1	Apply the concepts of eigenvalues and eigenvectors in engineering problems.
CO-2	Use the concepts of Complex Integration for evaluating integrals, computing residues & evaluate various contour integrals.
CO-3	Apply the concept of Z- transformation and inverse in engineering problems.
CO-4	Use the concept of probability distribution and sampling theory to engineering problems.
CO-5	Apply the concept of Linear Programming Problems to optimization.
CO-6	Solve Non-Linear Programming Problems for optimization of engineering problems.

Course Code:	ITC402
Course:	Computer Network and Network Design
	Student should be able to:
CO-1	Describe the functionalities of each layer of the models and compare the Models
CO-2	Categorize the types of transmission media and explain data link layer concepts design issues and protocols
CO-3	Analyse the routing protocols and assign IP address to networks
CO-4	Explain the data transportation and session management issues and related protocols used for end-to-end delivery of data.
CO-5	List the data presentation techniques and illustrate the client/server model in application layer protocols.
CO-6	Use of networking concepts of IP address, Routing and application services to design a network for an organization

Course Code:	ITC403
Course:	Operating System
	Student should be able to:
CO-1	Explain the basic concepts related to Operating System.
CO-2	Describe the process management policies and illustrate scheduling of processes by CPU.
CO-3	Explain and apply synchronization primitives and evaluate deadlock conditions as handled by Operating System.
CO-4	Describe and analyze the memory allocation and management functions of Operating System.
CO-5	Analyze and evaluate the services provided by Operating System for storage management
CO-6	Compare the functions of various special-purpose Operating Systems.

Course Code:	ITC404
Course:	Automata Theory
	Student should be able to:
CO-1	Design, construct, analyze and interpret regular languages, expression and grammars
CO-2	Design different types of finite automata and machines as acceptor, verifier and translator.
CO-3	Design, analyze and interpret context free languages, expression and grammars. Design, analyze and interpret context free languages, expression and grammars.
CO-4	Design different types of push down automata as simple parser
CO-5	Design different types of turing machines as acceptor, verifier, translator and basic computing machine.
CO-6	Develop understanding of applications of various Automat

Course Code:	ITC405
Course:	Computer Organization & Architecture
	Student should be able to:
CO-1	Demonstrate the fundamentals of Digital Logic Design
CO-2	Describe basic organization of computer, the architecture of 8086 microprocessor and implement assembly language programming for 8086 microprocessors.
CO-3	Demonstrate control unit operations and conceptualize instruction level parallelism.
CO-4	List and Identify integers and real numbers and perform computer arithmetic operations on integers.
CO-5	Categorize memory organization and explain the function of each element of a memory hierarchy.
CO-6	Examine different methods for computer I/O mechanism.

Course Code:	ITL401
Course:	Network Lab
	Student should be able to:
CO-1	Execute and evaluate network administration commands and demonstrate their use in different network scenarios
CO-2	Demonstrate the installation and configuration of network simulator.
CO-3	Demonstrate and measure different network scenarios and their performance behavior.
CO-4	Implement the socket programming for client server architecture.
CO-5	Analyze the contents the packet contents of different protocols.
CO-6	Design a network for an organization using a network design tool.

Course Code:	ITL402
Course:	UNIX LAB
	Student should be able to:
CO-1	Understand the architecture and functioning of Unix
CO-2	2. Identify the Unix general purpose commands
CO-3	3. Apply Unix commands for system administrative tasks such as file system management and user management.
CO-4	4. Execute Unix commands for system administrative tasks such as process management and memory management
CO-5	5. Implement basic shell scripts for different applications.
CO-6	6. Implement advanced scripts using awk & perl languages and grep, sed, etc. commands for performing various tasks.

Course Code:	ITL403
Course:	Microprocessor Lab
	Student should be able to:
CO-1	Demonstrate various components and peripheral of computer system
CO-2	Analyze and design combinational circuits
CO-3	Build a program on a microprocessor using arithmetic & logical instruction set of 8086.
CO-4	Develop the assembly level programming using 8086 loop instruction set
CO-5	Write programs based on string and procedure for 8086 microprocessor.
CO-6	Design interfacing of peripheral devices with 8086 microprocessor.

Course Code:	ITL404
Course:	Python Lab (SBL)
	Student should be able to:
CO-1	Describe the structure, syntax, and semantics of the Python language.
CO-2	Explain advanced data types and functions in python
CO-3	illustrate the concepts of object-oriented programming as used in Python
CO-4	Create Python applications using modules, packages, multithreading and exception handling.
CO-5	Using File Handling programs ,also create GUI applications and evaluate database operations in python.
CO-6	Design and Develop cost-effective robust applications using the latest Python trends and technologies

Course Code:	ITM401
Course:	Mini Project – 1 B for Python based automation projects
	Student should be able to:
CO-1	Identify and explain problems based on societal /research needs.
CO-2	Apply Knowledge and skill to solve societal problems in a group and Develop interpersonal skills to work as member of a group or leader
CO-3	Draw the proper inferences from available results through theoretical/ experimental/simulations.
CO-4	Analyse the impact of solutions in societal and environmental context for sustainable development and Use standard norms of engineering practices
CO-5	Excel in written and oral communication
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TE: V SEM (REV- 2019 ‘C’ Scheme)

Course Code:	ITC501
Course:	Internet Programming
	Student should be able to:
CO-1	Select protocols or technologies required for various web applications.
CO-2	Apply JavaScript to add functionality to web pages.
CO-3	Design front end application using basic React.
CO-4	Design front end applications using functional components of React.
CO-5	Design back-end applications using Node.js.
CO-6	Construct web based Node.js applications using Express

Course Code:	ITC502
Course:	Computer network security
	Student should be able to:
CO-1	Explain the fundamentals concepts of computer security and network security.
CO-2	Identify the basic cryptographic techniques using classical and block encryption methods
CO-3	Study and describe the system security malicious software.
CO-4	Describe the Network layer security, Transport layer security and application layer security.
CO-5	Explain the need of network management security and illustrate the need for NAC.
CO-6	Identify the function of an IDS and firewall for the system security

Course Code:	ITC503
Course:	Entrepreneurship & E-Business
	Student should be able to:
CO-1	Explain the concept of entrepreneurship and its close relationship with enterprise and owner-management.
CO-2	Discuss the various aspects of Entrepreneurship development and leadership.
CO-3	Recognize the methods of Business Venture and analyze the important factors for business development.
CO-4	Identify the issues and decisions involved in financing and resourcing a business start-up.
CO-5	Describe various E-business Models and E-business Strategies.
CO-6	Discuss Strategic Initiatives for Technology contributing the overall development of Business.

Course Code:	ITC504
Course:	Software Engineering
	Student should be able to:
CO-1	Explain and use basic knowledge in software engineering.
CO-2	Identify requirements, analyze and prepare models.
CO-3	Plan, schedule and track the progress of the projects.
CO-4	Design & develop the software solutions for the growth of society.
CO-5	To demonstrate and evaluate real time projects with respect to software engineering principles.
CO-6	Apply testing and assure quality in software solution.

Course Code:	ITDO5012
Course:	Advance Data Management Technologies
	Student should be able to:
CO-1	Measure query costs and design alternate efficient paths for query execution.
CO-2	Apply sophisticated access protocols to control access to the database.
CO-3	Implement Distributed databases.
CO-4	Organize strategic data in an enterprise and build a data Warehouse.
CO-5	Analyse data using OLAP operations so as to take strategic decisions.
CO-6	Design modern applications using NoSQL databases.

Course Code:	ITDO5014
Course:	Advanced Data structure and Analysis
	Student should be able to:
CO-1	Understand the different methods for analysis of algorithms.
CO-2	Choose an appropriate advanced data structure to solve a specific problem
CO-3	Apply an appropriate algorithmic design approach for a given problem.
CO-4	Apply the dynamic programming technique to solve a given problem
CO-5	Select an appropriate pattern matching algorithm for a given application
CO-6	Understand the concepts of Optimization, Approximation and Parallel computing algorithms.

Course Code:	ITL501
Course:	IP Lab
	Student should be able to:
CO-1	Identify and apply the appropriate HTML tags to develop a webpage.
CO-2	Identify and apply the appropriate CSS tags to format data on webpage
CO-3	Construct responsive websites using Bootstrap
CO-4	Use JavaScript to develop interactive web pages.
CO-5	Construct front end applications using React
CO-6	Construct back end applications using Node.js/Express

Course Code:	ITL502
Course:	Security Lab
	Student should be able to:
CO-1	To apply the knowledge of symmetric cryptography to implement classical ciphers.
CO-2	To analyze and implement public key encryption algorithms, hashing and digital signature algorithms.
CO-3	To explore the different network reconnaissance tools to gather information about networks.
CO-4	To explore the tools like sniffers, port scanners and other related tools for analyzing.
CO-5	To Scan the network for vulnerabilities and simulate attacks.
CO-6	To set up intrusion detection systems using open-source technologies and to explore email security.

Course Code:	ITL503
Course:	DevOps Lab
	Student should be able to:
CO-1	Learn the fundamentals of DevOps engineering and be fully proficient with DevOps terminologies, concepts, benefits, and deployment options to meet your business requirements
CO-2	Obtain complete knowledge of the “version control system” to effectively track changes augmented with Git and GitHub
CO-3	Demonstrate the importance of Jenkins to Build and deploy Software Applications on server environment
CO-4	Learn the importance of Selenium and Jenkins to test Software applications
CO-5	Learn concept of containerization and Analyze the Containerization of OS images and deployment of applications over Docker
CO-6	Synthesize software configuration and provisioning using Puppet /Ansible.

Course Code:	ITL504
Course:	Advanced DevOps
	Student should be able to:
CO-1	Learn the fundamentals of Cloud Computing and be fully proficient with Cloud based DevOps solution deployment options to meet your business requirements
CO-2	Deploy single and multiple container applications and manage application deployments with rollouts in Kubernetes
CO-3	apply best practices for managing infrastructure as code environments and use terraform to define and deploy cloud infrastructure
CO-4	Identify and remediate application vulnerabilities earlier and help integrate security in the development process using SAST Techniques.
CO-5	Use Continuous Monitoring Tools to resolve any system errors (low memory, unreachable server etc.) before they have any negative impact on the business productivity
CO-6	Engineer a composition of nanoservices using AWS Lambda and Step Functions with the Serverless Framework

Course Code:	ITL505
Course:	Professional Communication & Ethics-II
	Student should be able to:
CO-1	Plan and prepare effective business/ technical documents which will in turn provide solid foundation for their future managerial roles.
CO-2	Strategize their personal and professional skills to build a professional image and meet the demands of the industry
CO-3	Emerge successful in group discussions, meetings and result-oriented agreeable solutions in group communication situations.
CO-4	Deliver persuasive and professional presentations
CO-5	Develop creative thinking and interpersonal skills required for effective professional communication
CO-6	Apply codes of ethical conduct, personal integrity and norms of organizational behavior.

Course Code:	ITM501
Course:	Mini Project – 2 A Web Based Business Model
	Student should be able to:
CO-1	Identify problems based on societal /research needs.
CO-2	Apply Knowledge and skill to solve societal problems in a group and develop interpersonal skills to work as member of a group or leader
CO-3	Draw the proper inferences from available results through theoretical/ experimental/simulations.
CO-4	Analyse the impact of solutions in societal and environmental context for sustainable development using standard norms of engineering practices
CO-5	Excel in written and oral communication
CO-6	Demonstrate project management principles and capabilities of self-learning in a group, which leads to life long learning.

TE: VI SEM (REV- 2019 'C' Scheme)

Course Code:	ITC601
Course:	Data Mining and Business Intelligence
	Student should be able to:
CO-1	Demonstrate an understanding of the importance of data warehousing and data mining and the principles of BI
CO-2	Organize and prepare the data needed for data mining using pre processing techniques
CO-3	Perform exploratory analysis of the data to be used for mining.
CO-4	Implement the appropriate data mining methods like classification, clustering or Frequent Pattern mining on large data sets.
CO-5	Define and apply metrics to measure the performance of various data mining algorithm
CO-6	Apply BI to solve practical problems: Analyze the problem domain, use the data collected in enterprise apply the appropriate data mining technique, interpret and visualize the results and provide decision support.

Course Code:	ITC602
Course:	Webx.0
	Student should be able to:
CO-1	Understand the basic concepts related to web analytics and semantic web.
CO-2	Understand how TypeScript can help you eliminate bugs in your code and enable you to scale your code.
CO-3	Understand AngularJS framework and build dynamic, responsive single-page web applications.
CO-4	Apply MongoDB for frontend and backend connectivity using REST API.
CO-5	Apply Flask web development framework to build web applications with less code.
CO-6	Develop Rich Internet Application using proper choice of Framework.

Course Code:	ITC603
Course:	Wireless Technology
	Student should be able to:
CO-1	Describe the basic concepts of Wireless Network and Wireless Generations.
CO-2	Demonstrate and Evaluate the various Wide Area Wireless Technologies.
CO-3	Analyze the prevalent IEEE standards used for implementation of WLAN and WMAN Technologies
CO-4	Appraise the importance of WPAN, WSN and Ad-hoc Networks.
CO-5	Analyze various Wireless Network Security Standards.
CO-6	Review the design considerations for deploying the Wireless Network Infrastructure.

Course Code:	ITC604
Course:	AI and DS – 1
	Student should be able to:
CO-1	Develop a basic understanding of the building blocks of AI as presented in terms of intelligent agents.
CO-2	Apply an appropriate problem-solving method and knowledge-representation scheme.
CO-3	Develop an ability to analyze and formalize the problem (as a state space, graph, etc.). They will be able to evaluate and select the appropriate search method.
CO-4	Apply problem solving concepts with data science and will be able to tackle them from a statistical perspective
CO-5	Choose and apply appropriately from a wider range of exploratory and inferential methods for analyzing data and will be able to evaluate and interpret the results contextually.
CO-6	Understand and apply types of machine learning methods for real world problems.

Course Code:	ITDO6012
Course:	Image Processing
	Student should be able to:
CO-1	Define image and explain formation of image and recall its types and calculate image parameters by reading images using a programming language.
CO-2	Apply and differentiate point, mask and histogram processing techniques suitable for enhancing images required for an applications.
CO-3	List and calculate discrete image transform coefficients and use it for enhancement, compression and representation.
CO-4	Compute compression ratio and fidelity criteria to evaluate and compare method efficiency and classify compression techniques into lossless and lossy methods.
CO-5	Apply the segmentation techniques to highlight and select the region of interest and determine and describe using chain code, shape number and moments for representing objects in an image.
CO-6	Choose structuring elements and apply morphological operations to find a suitable shape for an object in the image.

Course Code:	ITDO6014
Course:	Ethical Hacking and Forensic
	Student should be able to:
CO-1	Define the concept of ethical hacking.
CO-2	Recognize the need of digital forensics and define the concept of digital evidence and incident response.
CO-3	Apply the knowledge of computer forensics using different tools and techniques.
CO-4	Detect the network attacks and analyze the evidence.
CO-5	Apply the knowledge of computer forensics using different tools and techniques.
CO-6	List the method to generate legal evidence and supporting investigation reports

Course Code:	ITL601
Course:	BI LAB
	Student should be able to:
CO-1	Identify sources of Data for mining and perform data exploration
CO-2	Organize and prepare the data needed for data mining algorithms in terms of attributes and class inputs, training, validating, and testing files
CO-3	Implement the appropriate data mining methods like classification, clustering or association mining on large data sets using open-source tools like WEKA
CO-4	Implement various data mining algorithms from scratch using languages like Python/ Java etc.
CO-5	Evaluate and compare performance of some available BI packages
CO-6	Apply BI to solve practical problems: Analyze the problem domain, use the data collected in enterprise apply the appropriate data mining technique, interpret and visualize the results and provide decision support

Course Code:	ITL602
Course:	Web Lab
	Student should be able to:
CO-1	Understand open source tools for web analytics and semantic web apps development and deployment.
CO-2	Understand the basic concepts of TypeScript for designing web applications.
CO-3	Implement Single Page Applications using AngularJS Framework
CO-4	Develop Rich Internet Applications using AJAX.
CO-5	Create REST Web services using MongoDB.
CO-6	Design web applications using Flask.

Course Code:	ITL603
Course:	Sensor Lab
	Student should be able to:
CO-1	Differentiate between various wireless communication technologies based on the range of communication, cost, propagation delay, power and throughput.
CO-2	Conduct a literature survey of sensors used in real world wireless applications.
CO-3	Demonstrate the simulation of WSN using the Network Simulators (Contiki/ Tinker CAD/ Cup carbon etc).
CO-4	Demonstrate and build the project successfully by hardware/sensor requirements, coding, emulating and testing
CO-5	Report and present the findings of the study conducted in the preferred domain
CO-6	Demonstrate the ability to work in teams and manage the conduct of the research study

Course Code:	ITL604
Course:	MAD AND PWA Lab
	Student should be able to:
CO-1	Learn cross platform mobile application development using Flutter framework
CO-2	Design and Develop interactive Flutter App by using widgets, layouts, gestures and animation
CO-3	Analyze and Build production ready Flutter App by incorporating backend services and deploying on Android / iOS
CO-4	Learn various PWA frameworks and their requirements
CO-5	Design and Develop a responsive User Interface by applying PWA Design techniques
CO-6	Develop and Analyse PWA Features and deploy it over app hosting solutions

Course Code:	ITL605
Course:	DS using Python Skill based Lab
	Student should be able to:
CO-1	Understand the concept of Data science process and associated terminologies to solve real-world problems
CO-2	Analyze the data using different statistical techniques and visualize the outcome using different types of plots.
CO-3	Analyze and apply the supervised machine learning techniques like Classification, Regression or Support Vector Machine on data for building the models of data and solve the problems.
CO-4	Apply the different unsupervised machine learning algorithms like Clustering, Decision Trees, Random Forests or Association to solve the problems.
CO-5	Design and Build an application that performs exploratory data analysis using Apache Spark
CO-6	Design and develop a data science application that can have data acquisition, processing, visualization and statistical analysis methods with supported machine learning technique to solve the real-world problem

Course Code:	ITM601
Course:	Mini Project –2 BWeb Based on ML
	Student should be able to:
CO-1	Identify problems based on societal /research needs.
CO-2	Apply Knowledge and skill to solve societal problems in a group.
CO-3	Develop interpersonal skills to work as member of a group or leader.
CO-4	Draw the proper inferences from available results through theoretical/ experimental/simulations.
CO-5	Demonstrate capabilities of self-learning in a group, which leads to life long learning.
CO-6	Demonstrate project management principles during project work.

BE: VII SEM (REV- 2016 ‘CBCGS’ Scheme)

Course Code:	ITC701
Course:	Enterprise Network Design
	Student should be able to:
CO-1	Analyzing the customer requirements and apply a methodology to network design
CO-2	Student will be able to create structure and modularize the network.
CO-3	Student will be design basic campus and data center network.
CO-4	Student will be able to design remote connectivity for enterprise network.
CO-5	Student will be able to design ip addressing and select suitable routing protocols for the network
CO-6	Student will be able to compare openflow controllers and switches with other enterprise networks.

Course Code:	ITC702
Course:	Infrastructure Security
	Student should be able to:
CO-1	Understand the concept of vulnerabilities, attacks and protection mechanisms
CO-2	Analyze and evaluate software vulnerabilities and attacks on databases and operating systems
CO-3	Explain the need for security protocols in the context of wireless communication
CO-4	Understand and explain various security solutions for web and cloud infrastructure
CO-5	Understand, and evaluate different attacks on open web applications and web services
CO-6	Design appropriate security policies to protect infrastructure components

Course Code:	ITDLO7032
Course:	MOBILE APPLICATION DEVELOPMENT
	Student should be able to:
CO-1	Describe android platform, architecture and features.
CO-2	Design user interface and develop activity for android app.
CO-3	Use intent , broadcast receivers and internet services in android app.
CO-4	Design and implement database application and content providers.
CO-5	Use multimedia, camera and location based services in android app.
CO-6	Discuss various security issues in android platform.

Course Code:	ITDLO7034
Course:	Software Testing and Quality Assurance
	Student should be able to:
CO-1	Investigate the reason for bugs and analyze the principles in software testing to prevent and remove bugs
CO-2	Implement various test processes for quality improvement
CO-3	Design test planning
CO-4	Manage the test process
CO-5	Apply the software testing techniques in commercial environment
CO-6	Use practical knowledge of a variety of ways to test software and an understanding of some of the trade-offs between testing techniques.

Course Code:	ITC703
Course:	Artificial Intelligence
	Student should be able to:
CO-1	Demonstrate knowledge of the building blocks of AI as presented in terms of intelligent agents
CO-2	Analyze and formalize the problem as a state space, graph, design heuristics and select amongst different search or game-based techniques to solve them.
CO-3	Develop intelligent algorithms for constraint satisfaction problems and also design intelligent systems for Game Playing
CO-4	Attain the capability to represent various real life problem domains using logic-based techniques and use this to perform inference or planning
CO-5	Formulate and solve problems with uncertain information using Bayesian approaches.
CO-6	Apply concept Natural Language processing to problems leading to understanding of cognitive computing.

Course Code:	ITL701
Course:	Network Design Lab
	Student should be able to:
CO-1	To be familiarized with the requirements of an enterprise and address its major design areas
CO-2	To recognize the hierarchical network model for the enterprise
CO-3	Identify the networking devices and their configurations required for the design and also prepare a bill of materials
CO-4	Propose a design for the Server Farm of an enterprise network and discuss up gradations if needed.
CO-5	Provide suitable IP addressing plan and best possible routing protocol for an enterprise network.
CO-6	Construct a suitable design for an enterprise network and test it using a tool.

Course Code:	ITL702
Course:	Advance Security Lab
	Student should be able to:
CO-1	Implement and analyze program and database vulnerabilities buffer overflow and sql injection
CO-2	Explore and analyze different security tools to secure mobile devices, web browser, wireless network and router
CO-3	Explore reconnaissance, attack and forensics tools in kali linux
CO-4	Learn security of system using personal firewall installation
CO-5	Understand aaa using raduis
CO-6	Understand aaa using tacacs

Course Code:	ITL703
Course:	Intelligent system Lab
	Student should be able to:
CO-1	Design the building blocks of an Intelligent Agent using PEAS representation
CO-2	Analyze and formalize the problem as a state space, graph, design heuristics and select amongst different search or game based techniques to solve them.
CO-3	Develop intelligent algorithms for constraint satisfaction problems and also design intelligent systems for Game Playing
CO-4	Attain the capability to represent various real life problem domains using logic based techniques and use this to perform inference or planning.
CO-5	Formulate and solve problems with uncertain information using Bayesian approaches
CO-6	Apply concept Natural Language processing and cognitive computing for creation of domain specific ChatBots

Course Code:	ITL704
Course:	ANDROID APPS DEVELOPMENT LAB
	Student should be able to:
CO-1	Install and configure an integrated development environment for android application development
CO-2	Design and implement user interfaces and layouts of android app.
CO-3	Use intents for activity and broadcasting data in android app.
CO-4	Design and implement database application and content providers.
CO-5	Experiment with camera and location based service.
CO-6	Develop android app with security features.

Course Code:	ITM705
Course:	PROJECT-I
	Student should be able to:
CO-1	Discover potential research areas in the field of IT
CO-2	Conduct a survey of several available literature in the preferred field of study
CO-3	Compare and contrast the several existing solutions for research challenge
CO-4	Demonstrate an ability to work in teams and manage the conduct of the research study.
CO-5	Formulate and propose a plan for creating a solution for the research plan identified
CO-6	To report and present the findings of the study conducted in the preferred domain

Course Code:	ILO7011
Course:	Product Lifecycle Management
	Student should be able to:
CO-1	1.Explain the phases of PLM, PLM strategies and methodology for PLM feasibility study and PDM implementation.
CO-2	2. Illustrate various approaches and techniques for designing and developing products.
CO-3	3. Apply product engineering guidelines / thumb rules in designing products for moulding, machining, sheet metal working etc.
CO-4	4.Acquire knowledge in applying virtual product development tools for components, machining and manufacturing plant
CO-5	5. Illustrate various environmental aspects in product design
CO-6	6. Demonstrate the relevance between Understand product lifecycle assessment and life cycle cost analysis.

Course Code:	ILO7013
Course:	Management Information System
	Student should be able to:
CO-1	Explain the impact of Information Systems on Organisations and Society at large.
CO-2	Discuss the implementaion of data and information management in an organisation and the challenges associated with it.
CO-3	Describe ethical issues, potential threats to privacy and the methods to protect Information resources.
CO-4	Analyse the effect of Social Computing and the ways in which modern organizations use this technology.
CO-5	Explain how businesses can use different types of computer networks along with latest technologies.
CO-6	Learn the various information systems that modern organizations utilize.

Course Code:	ILO7015
Course:	Operation Research
	Student should be able to:
CO-1	Understand the theoretical workings of the simplex method, the relationship between a linear program and its dual, including strong duality and complementary slackness.
CO-2	Perform sensitivity analysis to determine the direction and magnitude of change of a model's optimal solution as the data change.
CO-3	Solve specialized linear programming problems like the transportation and assignment problems, solve network models like the shortest path, minimum spanning tree, and maximum flow problems.
CO-4	Understand the applications of integer programming and a queuing model and compute important performance measures

Course Code:	ILO7016
Course:	Cyber Security and Laws
	Student should be able to:
CO-1	Understand the concept of cybercrime and its effect on outside world
CO-2	Understand different cyber offences and cyber crime on different environment
CO-3	Analyse various tools used in performing cybercrime
CO-4	Understand the legal requirement of cyberspace
CO-5	Distinguish different aspects of cyber law
CO-6	Identify the need for different Information Security Standards compliance during software design and development

BE: VII SEM (REV- 2016 ‘CBCGS’ Scheme)

Course Code:	ITC801
Course:	Big Data Analytics
	Student should be able to:
CO-1	Student will be able to explain the motivation for big data systems and identify the main sources of Big Data in the real world.
CO-2	Student will be able to demonstrate an ability to use frameworks like Hadoop, NOSQL to efficiently store retrieve and process Big Data for Analytics.
CO-3	Student will be able to implement several Data Intensive tasks using the Map Reduce Paradigm.
CO-4	Student will be able to apply several newer algorithms for Clustering Classifying and finding associations in Big Data.
CO-5	Student will be able to design algorithms to analyze Big data like streams, Web Graphs and Social Media data.
CO-6	Student will be able to design and implement successful Recommendation engines for enterprises.

Course Code:	ITC802
Course:	Internet of Everything
	Student should be able to:
CO-1	Apply the concepts of IOT
CO-2	Identify the different technology
CO-3	Apply IOT to different applications
CO-4	Analysis and evaluate protocols used in IOT.
CO-5	Design and develop smart city in IOT.
CO-6	Analysis and evaluate the data received through sensors in IOT

Course Code:	ITDLO8041
Course:	User Interaction Design
	Student should be able to:
CO-1	Students will be able to identify and criticize bad features of interface designs.
CO-2	Students will be able to predict good features of interface designs
CO-3	Students will be able to illustrate and analyze user needs and formulate user design specifications
CO-4	Students will be able to interpret and evaluate the data collected during the process
CO-5	Students will be able to evaluate designs based on theoretical frameworks and methodological approaches.
CO-6	Students will be able to produce/show better techniques to improve the user interaction design interfaces.

Course Code:	ITDLO8045
Course:	Enterprise Resource Planning
	Student should be able to:
CO-1	Explain the basic concepts of Enterprise Resource Planning.
CO-2	Identify different technologies used in Enterprise Resource Planning.
CO-3	Analyse the concepts of ERP Manufacturing Perspective and ERP Modules.
CO-4	Discuss the benefits of Enterprise Resource Planning.
CO-5	Review different activities carried out in the Enterprise Resource Planning life cycle.
CO-6	Examine the role of E-Commerce & E-Business in Enterprise Resource Planning.

Course Code:	ITL801
Course:	Big Data Lab
	Student should be able to:
CO-1	Demonstrate capability to use Big Data Frameworks like Hadoop
CO-2	Program applications using tools like Hive, pig, , NO SQL and MongoDB for Big data Applications
CO-3	Construct scalable algorithms for large Datasets using Map Reduce techniques
CO-4	Implement algorithms for Clustering, Classifying and finding associations in Big Data
CO-5	Design and implement algorithms to analyze Big data like streams, Web Graphs and Social Media data and construct recommendation systems.
CO-6	Apply the knowledge of Big Data gained to fully develop a BDA applications for real life

Course Code:	ITL802
Course:	Internet of Everything Lab
	Student should be able to:
CO-1	Identify the requirements for the real world problems.
CO-2	Conduct a survey of several available literatures in the preferred field of study.
CO-3	Study and enhance software/ hardware skills.
CO-4	Demonstrate and build the project successfully by hardware/sensor requirements, coding, emulating and testing.
CO-5	To report and present the findings of the study conducted in the preferred domain
CO-6	Demonstrate an ability to work in teams and manage the conduct of the research study.



Course Code:	ITL803
Course:	DevOps Lab
	Student should be able to:
CO-1	Summarize the importance of DevOps tools used in software development life cycle
CO-2	Summarize the importance of Jenkins to Build, Deploy and Test Software Applications
CO-3	Examine the different Version Control strategies
CO-4	Analyze & Illustrate the Containerization of OS images and deployment of applications over Docker
CO-5	Summarize the importance of Software Configuration Management in DevOps
CO-6	Synthesize the provisioning using Chef/Puppet/Ansible or Saltstack

Course Code:	ITL804
Course:	R-PROGRAMMING LAB
	Student should be able to:
CO-1	Install and use R for simple programming tasks.
CO-2	Extend the functionality of R by using add-on packages
CO-3	Extract data from files and other sources and perform various data manipulation tasks on them.
CO-4	Code statistical functions in R. 5. Use R Graphics and Tables to visualize results of various statistical operations on data .
CO-5	Use R Graphics and Tables to visualize results of various statistical operations on data .
CO-6	Apply the knowledge of R gained to data Analytics for real life applications.

Course Code:	ITM805
Course:	PROJECT-II
	Student should be able to:
CO-1	Discover potential research areas in the field of IT
CO-2	Conduct a survey of several available literature in the preferred field of study
CO-3	Compare and contrast the several existing solutions for research challenge
CO-4	Demonstrate an ability to work in teams and manage the conduct of the research study.
CO-5	Formulate and propose a plan for creating a solution for the research plan identified
CO-6	To report and present the findings of the study conducted in the preferred domain

Course Code:	ILO8021
Course:	Project Management
	Student should be able to:
CO-1	Gain project management foundation and various organizational structures knowledge
CO-2	Apply selection criteria and select an appropriate project from different options
CO-3	Write work break down structure for a project and develop a schedule based on it.
CO-4	Identify opportunities and threats to the project and decide an approach to deal with them strategically
CO-5	Use Earned value technique and determine & predict status of the project
CO-6	Capture lessons learned during project phases and document them for future reference

Course Code:	ILO8028
Course:	Digital Business Management
	Student should be able to:
CO-1	Summarize drivers of digital business.
CO-2	Illustrate various approaches and techniques for E-business and management
CO-3	Explain different digital business support services and technologies in E infrastructure
CO-4	Explain various ethics and societal impacts of ecommerce
CO-5	Identify the need of security and summarize various security techniques.
CO-6	Develop E-business plan

Course Code:	ILO8022
Course:	Finance Management
	Student should be able to:
CO-1	Explain the importance and components of the Indian Financial System
CO-2	Estimate the risk & returns and present / future value of of various investments
CO-3	Describe corporate finance and significance of financial statements & ratio analysis
CO-4	Calculate capital budgeting using various investment appraisal criterias & also the working capital requirements
CO-5	Explain the various sources of finance and capital structure theories & approaches
CO-6	Describe the dividend policy theories & approaches



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Course Code:	ILO8029
Course:	Environmental Management
	Student should be able to:
CO-1	1. Identify environmental Issues relevant to India and Global concerns.
CO-2	2. Understand and apply the concept of Environment Management and Sustainable development.
CO-3	3. Relate to the scope of Environment Management and identify career opportunities.
CO-4	4. Understand the concept of ecology, Ecosystem, its interdependence and food chain.
CO-5	5. Demonstrate awareness of environment related legislations.
CO-6	6. Develop awareness of EMS and ISO-14000.