

**TERNA ENGINEERING COLLEGE**  
**INFROMATION TECHNOLOGY**

SEM	SUBJECT CODE	SUBJECT	CO/LO	CO / LO STATEMENT
SEM III	ITC301	Engineering Mathematics-III	CO1	Understand the concept of Laplace transform and its application to solve the real integrals in engineering problems.
			CO2	Understand the concept of inverse Laplace transform of various functions and its applications in engineering problems.
			CO3	Expand the periodic function by using the Fourier series for real-life problems and complex engineering problems.
			CO4	Understand complex variable theory, application of harmonic conjugate to get orthogonal trajectories and analytic functions.
			CO5	Apply the concept of Correlation and Regression to the engineering problems in data science, machine learning, and AI.
			CO6	Understand the concepts of probability and expectation for getting the spread of the data and distribution of probabilities.
	ITC302	Data Structure and Analysis	CO1	Classify and Apply the concepts of stacks, queues and linked list in real life problem solving.
			CO2	Classify, apply and analyze the concepts trees in real life problem solving.
			CO3	Illustrate and justify the concepts of graphs in real life problem solving.
			CO4	List and examine the concepts of sorting, searching techniques in real life problem solving.
			CO5	Use and identify the concepts of recursion, hashing in real life problem solving.
			CO6	Examine and justify different methods of stacks, queues, linked list, trees and graphs to various applications.
	ITC303	Database Management System	CO1	Identify the need of Database Management System.
			CO2	Design conceptual model for real life applications.
			CO3	Create Relational Model for real life applications
			CO4	Formulate query using SQL commands.
			CO5	Apply the concept of normalization to relational database design.
			CO6	Demonstrate the concept of transaction, concurrency and recovery.
	ITC304	Principle of Communication	CO1	Describe analog and digital communication systems
			CO2	Differentiate types of noise, analyses the Fourier transform of time and frequency domain.
			CO3	Design transmitter and receiver of AM, DSB, SSB and FM.
			CO4	Describe Sampling theorem and pulse modulation systems.
			CO5	Explain multiplexing and digital band pass modulation techniques.
			CO6	Describe electromagnetic radiation and propagation of waves.
	ITC305	Paradigms and Computer Programming Fundamentals	CO1	Understand and Compare different programming paradigms.
			CO2	Understand the Object Oriented Constructs and use them in program design.
			CO3	Understand the concepts of declarative programming paradigms through functional and logic programming.
			CO4	Design and Develop programs based on declarative programming paradigm using functional and/or logic programming.
			CO5	Understand role of concurrency in parallel and distributed programming.
			CO6	Understand different application domains for use of scripting languages.
	ITL301	Data Structure Lab	LO1	Understand and use the basic concepts and principles of various linked lists, stacks and queues.
			LO2	Understand the concepts and apply the methods in basic trees.
			LO3	Use and identify the methods in advanced trees.
			LO4	Understand the concepts and apply the methods in graphs.
			LO5	Understand the concepts and apply the techniques of searching, hashing and sorting
			LO6	Illustrate and examine the methods of linked lists, stacks, queues, trees and
	ITL302	SQL Lab	LO1	Define problem statement and Construct the conceptual model for real life application.
			LO2	Create and populate a RDBMS using SQL.
			LO3	Formulate and write SQL queries for efficient information retrieval
			LO4	Apply view, triggers and procedures to demonstrate specific event handling.
			LO5	Demonstrate database connectivity using JDBC.
			LO6	Demonstrate the concept of concurrent transactions.
ITL303	Computer programming Paradigms Lab	LO1	Apply Object Oriented concepts in C++.	
		LO2	Design and Develop solution based on declarative programming paradigm using functional and logic programming using Haskell.	
		LO3	Understand the multithreaded programs in Java and C++	
		LO4	Understand the need and use of exception handling and garbage collection in C++ and JAVA	
		LO5	Design and Develop a solution to the same problem using multiple paradigms.	
		LO6	Compare the implementations in multiple paradigms at coding and execution level	
ITL304	Java Lab (SBL)	LO1	Explain the fundamental concepts of Java Programming.	
		LO2	Use the concepts of classes, objects, members of a class and the relationships among them needed for a finding the solution to specific problem.	
		LO3	Demonstrate how to extend java classes and achieve reusability using Inheritance, Interface and Packages.	
		LO4	Construct robust and faster programmed solutions to problems using concept of Multithreading, exceptions and file handling	
		LO5	Design and develop Graphical User Interface using Abstract Window Toolkit and Swings along with response to the events.	
		LO6	Develop Graphical User Interface by exploring JavaFX framework based on MVC architecture.	
ITC401	Engineering Mathematics-IV	CO1	Apply the concepts of eigenvalues and eigenvectors in engineering problems.	
		CO2	Use the concepts of Complex Integration for evaluating integrals, computing residues & evaluate various contour integrals.	
		CO3	Apply the concept of Z- transformation and inverse in engineering problems.	
		CO4	Use the concept of probability distribution and sampling theory to engineering problems.	
		CO5	Apply the concept of Linear Programming Problems to optimization.	
		CO6	Solve Non-Linear Programming Problems for optimization of engineering problems.	
ITC402	Computer Network and Network Design	CO1	Describe the functionalities of each layer of the models and compare the Models.	
		CO2	Categorize the types of transmission media and explain data link layer concepts, design issues and protocols.	
		CO3	Analyze the routing protocols and assign IP address to networks.	
		CO4	Explain the data transportation and session management issues and related protocols used for end to end delivery of data.	
		CO5	List the data presentation techniques and illustrate the client/server model in application layer protocols.	
		CO6	Use of networking concepts of IP address, Routing, and application services to design a network for an organization	
			CO1	Understand the basic concepts related to Operating System.
			CO2	Describe the process management policies and illustrate scheduling of processes by CPU.
			CO3	Explain and apply synchronization primitives and evaluate deadlock conditions as handled by Operating System.

## SEM -IV

ITC403	Operating System	CO4	Describe and analyze the memory allocation and management functions of Operating System.
		CO5	Analyze and evaluate the services provided by Operating System for storage management.
		CO6	Compare the functions of various special-purpose Operating Systems.
		CO1	Explain, analyze and design Regular languages, Expression and Grammars.
		CO2	Design different types of Finite Automata and Machines as Acceptor, Verifier and Translator.
		CO3	Analyze and design Context Free languages and Grammars.
ITC404	Automata Theory	CO4	Design different types of Push down Automata as Simple Parser.
		CO5	Design different types of Turing Machines as Acceptor, Verifier, Translator and Basic computing machine.
		CO6	Develop understanding of applications of various Automata.
		CO1	Demonstrate the fundamentals of Digital Logic Design
		CO2	Describe basic organization of computer, the architecture of 8086 microprocessor and implement assembly language programming for 8086 microprocessors.
		CO3	Demonstrate control unit operations and conceptualize instruction level parallelism.
ITC405	Computer Organization and Architecture	CO4	List and Identify integers and real numbers and perform computer arithmetic operations on integers.
		CO5	Categorize memory organization and explain the function of each element of a memory hierarchy.
		CO6	Examine different methods for computer I/O mechanism.
		LO1	Execute and evaluate network administration commands and demonstrate their use in different network scenarios
		LO2	Demonstrate the installation and configuration of network simulator.
		LO3	Demonstrate and measure different network scenarios and their performance behavior.
ITL401	Network Lab	LO4	Implement the socket programming for client server architecture.
		LO5	Analyze the traffic flow of different protocols
		LO6	Design a network for an organization using a network design tool
		LO1	Understand the architecture and functioning of Unix
		LO2	Identify the Unix general purpose commands
		LO3	Apply Unix commands for system administrative tasks such as file system management and user management.
ITL402	Unix Lab	LO4	Execute Unix commands for system administrative tasks such as process management and memory management
		LO5	Implement basic shell scripts for different applications.
		LO6	Implement advanced scripts using awk & perl languages and grep, sed, etc. commands for performing various tasks.
		LO1	Demonstrate various components and peripheral of computer system
		LO2	Analyze and design combinational circuits
		LO3	Build a program on a microprocessor using arithmetic & logical instruction set of 8086.
ITL403	Microprocessor Lab	LO4	Develop the assembly level programming using 8086 loop instruction set
		LO5	Write programs based on string and procedure for 8086 microprocessor.
		LO6	Design interfacing of peripheral devices with 8086 microprocessor.
		LO1	Understand the structure, syntax, and semantics of the Python language.
		LO2	Interpret advanced data types and functions in python
		LO3	illustrate the concepts of object-oriented programming as used in Python
ITL404	Python Lab (SBL)	LO4	Create Python applications using modules, packages, multithreading and exception handling.
		LO5	Gain proficiency in writing File Handling programs ,also create GUI applications and evaluate database operations in python.
		LO6	Design and Develop cost-effective robust applications using the latest Python trends and technologies
		LO1	Identify problems based on societal /research needs.
		LO2	Apply Knowledge and skill to solve societal problems in a group.
		LO3	Develop interpersonal skills to work as member of a group or leader.
ITM401	Mini Project – I B for Python based automation projects	LO4	Draw the proper inferences from available results through theoretical/ experimental/simulations.
		LO5	Analyse the impact of solutions in societal and environmental context for sustainable development.
		LO6	Use standard norms of engineering practices
		CO1	Select protocols or technologies required for various web applications.
		CO2	Apply JavaScript to add functionality to web pages.
		CO3	Design front end application using basic React.
ITC501	Internet Programming	CO4	Design front end applications using functional components of React.
		CO5	Design back-end applications using Node.js.
		CO6	Construct web based Node.js applications using Express.
		CO1	Explain the fundamentals concepts of computer security and network security.
		CO2	Identify the basic cryptographic techniques using classical and block encryption methods.
		CO3	Study and describe the system security malicious software.
ITC502	Computer Network Security	CO4	Describe the Network layer security, Transport layer security and application layer security.
		CO5	Explain the need of network management security and illustrate the need for NAC.
		CO6	Identify the function of an IDS and firewall for the system security.
		CO1	Understand the concept of entrepreneurship and its close relationship with enterprise and owner-management.
		CO2	Understand the nature of business development in the context of existing organizations and of new business start-ups.
		CO3	Comprehended important factors for starting a new venture and business development.
ITC503	Entrepreneurship and E business	CO4	Know issues and decisions involved in financing and resourcing a business start-up
		CO5	Describe various E-business Models
		CO6	Discuss various E-business Strategies.
		CO1	Understand and use basic knowledge in software engineering.
		CO2	Identify requirements, analyze and prepare models.
		CO3	Plan, schedule and track the progress of the projects.
ITC504	Software Engineering	CO4	Design & develop the software solutions for the growth of society
		CO5	To demonstrate and evaluate real time projects with respect to software engineering principles
		CO6	Apply testing and assure quality in software solution
		LO1	Identify and apply the appropriate HTML tags to develop a webpage.
		LO2	Identify and apply the appropriate CSS tags to format data on webpage
		LO3	Construct responsive websites using Bootstrap

SEM -V	ITL501	IP Lab	LO4	Use JavaScript to develop interactive web pages.
			LO5	Construct front end applications using React
			LO6	Construct back end applications using Node.js/Express
	ITL502	Security Lab	LO1	Illustrate symmetric cryptography by implementing classical ciphers.
			LO2	Demonstrate Key management, distribution and user authentication.
			LO3	Explore the different network reconnaissance tools to gather information about networks
			LO4	Use tools like sniffers, port scanners and other related tools for analyzing packets in a network.
			LO5	Use open-source tools to scan the network for vulnerabilities and simulate attacks.
			LO6	Demonstrate the network security system using open source tools.
	ITL503	DevOps Lab	LO1	To understand DevOps practices which aims to simplify Software Development Life Cycle
			LO2	To be aware of different Version Control tools like GIT, CVS or Mercurial
			LO3	To Integrate and deploy tools like Jenkins and Maven, which is used to build, test and deploy applications in DevOps environment
			LO4	To be familiarized with selenium tool, which is used for continuous testing of applications deployed.
			LO5	To use Docker to Build, ship and manage applications using containerization
			LO6	To understand the concept of Infrastructure as a code and install and configure Ansible tool.
	ITL504	Advance DevOps Lab	LO1	To understand DevOps practices and cloud native environments to achieve continuous software delivery pipelines and automated operations that address the gap between IT resources and growing cloud complexity.
			LO2	To Use Kubernetes services to structure N-tier applications.
			LO3	To be familiarized with Infrastructure as code for provisioning, compliance, and management of any cloud infrastructure, and service.
			LO4	To understand that security and speed in software development are not inversely-related objectives Internalizing the contribution of tools and automation in DevSecOps
			LO5	To understand various troubleshooting techniques by monitoring your entire infrastructure and business processes
			LO6	To understand how software and software-defined hardware are provisioned dynamically.
	ITL505	Professional Communication & Ethics-II (PCE-II)	LO1	plan and prepare effective business/ technical documents which will in turn provide solid foundation for their future managerial roles.
			LO2	strategize their personal and professional skills to build a professional image and meet the demands of the industry.
			LO3	emerge successful in group discussions, meetings and result-oriented agreeable solutions in group communication situations.
LO4			deliver persuasive and professional presentations.	
LO5			develop creative thinking and interpersonal skills required for effective professional communication.	
LO6			apply codes of ethical conduct, personal integrity and norms of organizational behaviour.	
ITM501	Mini Project – 2 A Web Based Business Model	LO1	Introduce and discuss the embedded system concepts, architecture of embedded systems and understand the embedded development environments	
		LO2	Describe the architecture of 8051 microcontroller and write embedded programs for 8051Microcontroller	
		LO3	Illustrate the interfacing of peripherals with 8051 microcontroller and write programs	
		LO4	Understand and apply the concepts of ARM architecture	
		LO5	Explain and Demonstrate the open source RTOS	
		LO6	Select the embedded platform and program it for real time application	
SEM-VI	ITC601	Data Mining & Business Intelligence	CO1	Demonstrate an understanding of the importance of data warehousing and data mining and the principles of business intelligence.
			CO2	Organize and prepare the data needed for data mining using pre preprocessing techniques.
			CO3	Perform exploratory analysis of the data to be used for mining.
			CO4	Implement the appropriate data mining methods like classification, clustering or Frequent Pattern mining on large data sets.
			CO5	Define and apply metrics to measure the performance of various data mining algorithms.
			CO6	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.
	ITC602	Web X.0	CO1	Understand the basic concepts related to web analytics and semantic web.
			CO2	Understand how TypeScript can help you eliminate bugs in your code and enable you to scale your code.
			CO3	Understand AngularJS framework and build dynamic, responsive single-page web applications.
			CO4	Apply MongoDB for frontend and backend connectivity using REST API.
			CO5	Apply Flask web development framework to build web applications with less code.
			CO6	Develop Rich Internet Application using proper choice of Framework.
	ITC603	Wireless Technology	CO1	Describe the basic concepts of Wireless Network and Wireless Generations.
			CO2	Demonstrate and Evaluate the various Wide Area Wireless Technologies.
			CO3	Analyze the prevalent IEEE standards used for implementation of WLAN and WMAN Technologies
			CO4	Appraise the importance of WPAN, WSN and Ad-hoc Networks.
			CO5	Analyze various Wireless Network Security Standards.
			CO6	Describe the basic concepts of Wireless Network and Wireless Generations.
	ITC604	AI and DS – 1	CO1	Develop a basic understanding of the building blocks of AI as presented in terms of intelligent agents.
			CO2	Apply an appropriate problem-solving method and knowledge-representation scheme.
			CO3	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.
			CO4	Apply problem solving concepts with data science and will be able to tackle them from a statistical perspective.
			CO5	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.
			CO6	Understand and apply types of machine learning methods for real world problems.
ITL601	BI Lab	LO1	Identify sources of Data for mining and perform data exploration	
		LO2	Organize and prepare the data needed for data mining algorithms in terms of attributes and class inputs, training, validating, and testing files	
		LO3	Implement the appropriate data mining methods like classification, clustering or association mining on large data sets using open-source tools like WEKA	
		LO4	Implement various data mining algorithms from scratch using languages like Python/ Java etc.	
		LO5	Evaluate and compare performance of some available BI packages	
		LO6	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	
		LO1	Understand open source tools for web analytics and semantic web apps development and deployment.	
		LO2	Understand the basic concepts of TypeScript for designing web applications.	
		LO3	Implement Single Page Applications using AngularJS Framework.	

SEM VII	ITL602	Web Lab	LO4	Develop Rich Internet Applications using AJAX.
			LO5	Create REST Web services using MongoDB.
			LO6	Design web applications using Flask.
	ITL603	Sensor Lab	LO1	Differentiate between various wireless communication technologies based on the range of communication, cost, propagation delay, power and throughput.
			LO2	Conduct a literature survey of sensors used in real world wireless applications.
			LO3	Demonstrate the simulation of WSN using the Network Simulators (Contiki/ Tinker CAD/ Cup carbon etc).
			LO4	Demonstrate and build the project successfully by hardware/sensor requirements, coding, emulating and testing
			LO5	Report and present the findings of the study conducted in the preferred domain.
			LO6	Demonstrate the ability to work in teams and manage the conduct of the research study.
	ITL604	MAD & PWA Lab	LO1	Understand cross platform mobile application development using Flutter framework
			LO2	Design and Develop interactive Flutter App by using widgets, layouts, gestures and animation
			LO3	Analyze and Build production ready Flutter App by incorporating backend services and deploying on Android / iOS
			LO4	Understand various PWA frameworks and their requirements
			LO5	Design and Develop a responsive User Interface by applying PWA Design techniques
			LO6	Develop and Analyse PWA Features and deploy it over app hosting solutions
	ITL605	DS using Python Lab (SBL)	LO1	Understand the concept of Data science process and associated terminologies to solve real-world problems
			LO2	Analyze the data using different statistical techniques and visualize the outcome using different types of plots.
			LO3	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.
			LO4	Apply the different unsupervised machine learning algorithms like Clustering, Decision Trees, Random Forests or Association to solve the problems.
			LO5	Design and Build an application that performs exploratory data analysis using Apache Spark
			LO6	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
	ITM601	Mini Project – 2 B Based on ML	LO1	Identify problems based on societal /research needs.
			LO2	Apply Knowledge and skill to solve societal problems in a group
			LO3	Develop interpersonal skills to work as member of a group or leader
LO4			Draw the proper inferences from available results through theoretical/ experimental/simulations.	
LO5			Analyse the impact of solutions in societal and environmental context for sustainable development	
LO6			Use standard norms of engineering practices	
ITC701	Enterprise Network Design	CO1	Understand the customer requirements and Apply a Methodology to Network Design	
		CO2	Structure and Modularize the Network	
		CO3	Design Basic Campus and Data Center Network.	
		CO4	Design Remote Connectivity	
		CO5	Design IP Addressing and Select suitable Routing Protocols for the Network	
		CO6	Compare Openflow controllers and switches with other enterprise networks.	
ITC702	Infrastructure Security	CO1	Understand the concept of vulnerabilities, attacks and protection mechanisms	
		CO2	Analyze and evaluate software vulnerabilities and attacks on databases and operating systems	
		CO3	Explain the need for security protocols in the context of wireless communication	
		CO4	Understand and explain various security solutions for Web and Cloud infrastructure	
		CO5	Understand, and evaluate different attacks on Open Web Applications and Web services	
		CO6	Design appropriate security policies to protect infrastructure components	
ITC703	Artificial Intelligence	CO1	Demonstrate knowledge of the building blocks of AI as presented in terms of intelligent agents.	
		CO2	Analyze and formalize the problem as a state space, graph, design heuristics and select amongst different search or game based techniques to solve them.	
		CO3	Develop intelligent algorithms for constraint satisfaction problems and also design intelligent systems for Game Playing	
		CO4	Attain the capability to represent various real life problem domains using logic based techniques and use this to perform inference or planning.	
		CO5	Formulate and solve problems with uncertain information using Bayesian approaches.	
		CO6	Apply concept Natural Language processing to problems leading to understanding of cognitive computing.	
ITL701	Network Design Lab	LO1	Understand the requirements of an enterprise and outline its major design areas	
		LO2	Identify functional areas to construct high level modules for enterprise architecture and analyze them.	
		LO3	Identify the networking devices, prepare a bill of materials and configure the devices as per the Core, Access and Distribution layers	
		LO4	Design the Server Farm for an enterprise network and discuss up gradations if needed.	
		LO5	Identify and select the technology for Remote site Connectivity, suitable IP addressing plan and routing protocol for an enterprise network.	
		LO6	Test and monitor the enterprise network using a tool	
ITL702	Advance Security Lab	LO1	Implement and analyze program and database vulnerabilities Buffer overflow and SQL Injection.	
		LO2	Explore and analyze different security tools to secure mobile devices, web browser, wireless network and router	
		LO3	Explore reconnaissance, attack and forensics tools in Kali Linux	
		LO4	Learn security of system using personal firewall installation	
		LO5	Understand AAA using RADIUS	
		LO6	Understand AAA using TACACS	
ITL703	Intelligence System Lab	LO1	Design the building blocks of an Intelligent Agent using PEAS representation .	
		LO2	Analyze and formalize the problem as a state space, graph, design heuristics and select amongst different search or game based techniques to solve them.	
		LO3	Develop intelligent algorithms for constraint satisfaction problems and also design intelligent systems for Game Playing	
		LO4	Attain the capability to represent various real life problem domains using logic based techniques and use this to perform inference or planning.	
		LO5	Formulate and solve problems with uncertain information using Bayesian approaches.	
		LO6	Apply concept Natural Language processing and cognitive computing for creation of domain specific ChatBots.	
ITL704	Android Apps Development Lab	LO1	Experiment on Integrated Development Environment for Android Application Development.	
		LO2	Design and Implement User Interfaces and Layouts of Android App.	
		LO3	Use Intents for activity and broadcasting data in Android App	
		LO4	Design and Implement Database Application and Content Providers.	
		LO5	Experiment with Camera and Location Based service.	
		LO6	Develop Android App with Security features	

SEM VIII	ITM705	Project-I	LO1	Discover potential research areas in the field of IT
			LO2	Conduct a survey of several available literature in the preferred field of study
			LO3	Compare and contrast the several existing solutions for research challenge
			LO4	Demonstrate an ability to work in teams and manage the conduct of the research study.
			LO5	Formulate and propose a plan for creating a solution for the research plan identified
			LO6	To report and present the findings of the study conducted in the preferred domain
	ITDLO7032	Mobile Application Development	CO1	Describe Android platform, Architecture and features.
			CO2	Design User Interface and develop activity for Android App
			CO3	Use Intent , Broadcast receivers and Internet services in Android App
			CO4	Design and implement Database Application and Content providers.
			CO5	Use multimedia, camera and Location based services in Android App
			CO6	Discuss various security issues in Android platform
ITC801	Big Data Analytics	CO1	Explain the motivation for big data systems and identify the main sources of Big Data in the real world.	
		CO2	Demonstrate an ability to use frameworks like Hadoop, NOSQL to efficiently store retrieve and process Big Data for Analytics.	
		CO3	Implement several Data Intensive tasks using the Map Reduce Paradigm	
		CO4	Apply several newer algorithms for Clustering Classifying and finding associations in Big Data	
		CO5	Design algorithms to analyze Big data like streams, Web Graphs and Social Media data.	
ITC802	Internet of Everything	CO6	Design and implement successful Recommendation engines for enterprises.	
		CO1	Apply the concepts of IOT. Identify the different technology.	
		CO2	Identify the different technology.	
		CO3	Apply IOT to different applications.	
		CO4	Analysis and evaluate protocols used in IOT.	
		CO5	Design and develop smart city in IOT.	
ITL801	Big Data Lab	CO6	Analysis and evaluate the data received through sensors in IOT.	
		LO1	Demonstrate capability to use Big Data Frameworks like Hadoop	
		LO2	Program applications using tools like Hive, pig, , NO SQL and MongoDB for Big data Applications	
		LO3	Construct scalable algorithms for large Datasets using Map Reduce techniques	
		LO4	Implement algorithms for Clustering, Classifying and finding associations in Big Data	
		LO5	Design and implement algorithms to analyze Big data like streams, Web Graphs and Social Media data and construct recommendation systems.	
ITL802	Internet of Everything Lab	LO6	Apply the knowledge of Big Data gained to fully develop a BDA applications for real life applications.	
		LO1	Identify the requirements for the real world problems.	
		LO2	Conduct a survey of several available literatures in the preferred field of study.	
		LO3	Study and enhance software/ hardware skills.	
		LO4	Demonstrate and build the project successfully by hardware/sensor requirements, coding, emulating and testing.	
		LO5	To report and present the findings of the study conducted in the preferred domain	
ITL803	DevOps Lab	LO6	Demonstrate an ability to work in teams and manage the conduct of the research study.	
		LO1	Remember the importance of DevOps tools used in software development life cycle	
		LO2	Understand the importance of Jenkins to Build, Deploy and Test Software Applications	
		LO3	Examine the different Version Control strategies	
		LO4	Analyze & Illustrate the Containerization of OS images and deployment of applications over Docker	
		LO5	Summarize the importance of Software Configuration Management in DevOps	
ITL804	R Programming Lab	LO6	Synthesize the provisioning using Chef/Puppet/Ansible or Saltstack.	
		LO1	Install and use R for simple programming tasks.	
		LO2	Extend the functionality of R by using add-on packages	
		LO3	Extract data from files and other sources and perform various data manipulation tasks on them.	
		LO4	Code statistical functions in R.	
		LO5	Use R Graphics and Tables to visualize results of various statistical operations on data .	
ITM805	Project-II	LO6	Apply the knowledge of R gained to data Analytics for real life applications.	
		LO1	Discover potential research areas in the field of IT	
		LO2	Conduct a survey of several available literature in the preferred field of study	
		LO3	Compare and contrast the several existing solutions for research challenge	
		LO4	Demonstrate an ability to work in teams and manage the conduct of the research study.	
		LO5	Formulate and propose a plan for creating a solution for the research plan identified	
		LO6	To report and present the findings of the study conducted in the preferred domain	