INFORMATION TECHNOLOGY DEPARTMENT

SE IT SEM III		
Course Code	Course Name	Course Outcome
ITC301	Applied Mathematics III	1. Apply the Set theory and Relation concepts. 2. Apply the Functions and define the recursive functions. 3. Apply Laplace transform to different applications. 4. Apply Inverse Laplace transform to different applications. 5. Identify the permutations and combinations. 6. Define variable and also identify the mapping.
ITC302	Logic Design	1. Understand the concepts of various components to design stable analog circuits. 2. Represent numbers and perform arithmetic operations. 3. Minimize the Boolean expression using Boolean algebra and design it using logic gates 4. Analyze and design combinational circuit. 5. Design and develop sequential circuits 6. Translate real world problems into digital logic formulations using VHDL
ITC303	Data Structures & Analysis	1. Select appropriate data structures as applied to specified problem definition. 2. Implement operations like searching, insertion, and deletion, traversing mechanism etc. on various data structures. 3. Students will be able to implement Linear and Non-Linear data structures. 4. Implement appropriate sorting/searching technique for given problem. 5. Design advance data structure using Non-Linear data structure. 6. Determine and analyze the complexity of given Algorithms.
ITC304	Database Management Systems	1. Explain the features of database management systems and Relational database 2. Design conceptual models of a database using ER modeling for real life applications and also construct queries in Relational Algebra 3. Create and populate a RDBMS for a real life application, with constraints and keys, using SQL. 4. Retrieve any type of information from a data base by formulating complex queries in SQL. 5. Analyze the existing design of a database schema and apply concepts of normalization to design an optimal database. 6. Build indexing mechanisms for efficient retrieval of information from a database
ITC305	Principle of Communications	1. Differentiate analog and digital communication systems 2. Identify different types of noise occurred, its minimization and able to apply Fourier analysis in frequency & time domain to quantify bandwidth requirement of variety of analog and digital communication systems. 3. Design generation & detection AM, DSB, SSB, FM transmitter and receiver 4. Apply sampling theorem to quantify the fundamental relationship between channel bandwidth, digital symbol rate and bit rate 5. Explain different types of line coding techniques for generation and detection of signals. 6. Describe Electromagnetic Radiation and propagation of waves.
ITL301	Digital Design Lab	Minimize the Boolean algebra and design it using logic gates. 2. Analyse and design combinational circuit. 3. Realise given function using combinational circuit. 4. Design and develop sequential circuits 5. Implement digital systems using programmable logic devices 6. Translate real world problems into digital logic formulations using VHDL.
ITL302	Data Structures Lab	1. Select appropriate data structures as applied to specified problem definition. 2. Implement operations like searching, insertion, and deletion, traversing mechanism etc. on various data structures. 3. Students will be able to implement Linear and Non-Linear data structures. 4. Implement appropriate sorting/searching technique for given problem. 5. Design advance data structure using Non-Linear data structure. 6. Determine and analyze the complexity of given Algorithms.
		1. Construct problem definition statements for real life applications and implement a database for the same.

ITL303	SQL Lab	2. Design conceptual models of a database using ER modeling for real life applications and also construct queries in Relational Algebra. 3. Create and populate a RDBMS, using SQL. 4. Write queries in SQL to retrieve any type of information from a data base. 5. Analyze and apply concepts of normalization to design an optimal database. 6. Implement indexes for a database using techniques like B or B+ trees.
ITL304	Java Programming Lab	1. Implement Object Oriented programming concept using basic syntaxes of control Structures, strings and function for developing skills of logic building activity. 2. Identify classes, objects, members of a class and the relationships among them needed for a finding the solution to specific problem 3. Demonstrates how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved. 4. Demonstrate understanding and use of different exception handling mechanisms and concept of multithreading for robust faster and efficient application development. 5. Identify and describe common abstract user interface components to design GUI in Java using Applet & AWT along with response to events 6. Identify, Design & develop complex Graphical user interfaces using principal Java Swing classes based on MVC architecture

SE IT SEM IV		
Course Code	Course Name	Course Outcome
ITC401	Applied Mathematics IV	1. Apply the Number Theory to different applications using theorem. 2. Apply probability and understand PDF. 3. Understand sampling theory and correlation. 4. Apply the graphs and trees concepts to different applications. 5. Understand group's theory. 6. Understand the Lattice theory.
ITC402	Computer Networks	1. Describe the functions of each layer in OSI and TCP/IP model. 2. Explain the functions of Application layer and Presentation layer paradigms and Protocols. 3. Describe the Session layer design issues and Transport layer services. 4. Classify the routing protocols and analyze how to assign the IP addresses for the given network. 5. Describe the functions of data link layer and explain the protocols. 6. Explain the types of transmission media with real time applications.
ITC403	Operating System	1. Describe the important computer system resources and the role of operating system in their management policies and algorithms. 2. Understand the process management policies and scheduling of processes by CPU 3. Evaluate the requirement for process synchronization and coordination handled by operating system 4. Describe and analyze the memory management and its allocation policies. 5. Identify use and evaluate the storage management policies with respect to different storage management technologies. 6. Identify the need to create the special purpose operating system.

ITC404	Computer Organization and Architecture	1. Describe basic organization of computer and the architecture of 8086 microprocessor. 2. Implement assembly language program for given task for 8086 microprocessor. 3. Demonstrate control unit operations and conceptualize instruction level parallelism. 4. Demonstrate and perform computer arithmetic operations on integer and real numbers. 5. Categorize memory organization and explain the function of each element of a memory hierarchy. 6. Identify and compare different methods for computer I/O mechanisms.
ITC405	Automata Theory	1. Understand, design, construct, analyze and interpret Regular languages, Expression and Grammars. 2. Design different types of Finite Automata and Machines as Acceptor, Verifier and Translator. 3. Understand, design, analyze and interpret Context Free languages, Expression and Grammars. 4. Design different types of Push down Automata as Simple Parser. 5. Design different types of Turing Machines as Acceptor, Verifier, Translator and Basic computing machine. 6. Compare, understand and analyze different languages, grammars, Automata and Machines and appreciate their power and convert Automata to Programs and Functions
ITL401	Networking Lab	different network scenarios 2. Demonstrate the installation and configuration of network simulator. 3. Demonstrate and measure different network scenarios and their performance behavior. 4. Analyze the contents the packet contents of different protocols. 5. Implement the socket programming for client server architecture.
ITL402	Unix Lab	1. Identify the basic Unix general purpose commands. 2. Apply and change the ownership and file permissions using advance Unix commands. administrative task. 6. Apply networking Unix commands. 3. Use the awk, grep, perl scripts. 4. Implement shell scripts and sed. 5. Apply basic of administrative task. 6. Apply networking Unix commands.
ITL403	Microprocessor Programming Lab	1. Apply the fundamentals of assembly level programming of microprocessors. 2. Build a program on a microprocessor using arithmetic & logical instruction set of 8086. 3. Develop the assembly level programming using 8086 loop instruction set. 4. Write programs based on string and procedure for 8086 microprocessor. 5.Analyze abstract problems and apply a combination of hardware and software to address the problem 6. Make use of standard test and measurement equipment to evaluate digital interfaces.
ITL404	Python lab	1. Describe the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python 2. Express different Decision Making statements and Functions 3. Interpret Object oriented programming in Python 4. Understand and summarize different File handling operations 5. Explain how to design GUI Applications in Python and evaluate different database operations 6. Design and develop Client Server network applications using Python

TE IT SEM V		
Course Code	**Course Name**	**Course Outcome**
ITC501	Microcontroller and Embedded Programming	1. Explain the embedded system concepts and architecture of embedded systems 2. Describe the architecture of 8051 microcontroller and write embedded program for 8051 microcontroller. 3. Design the interfacing for 8051 microcontroller. 4. Understand the concepts of ARM architecture. 5. Demonstrate the open source RTOS and solve the design issues for the same. 6. Select elements for an embedded systems tool.
ITC502	Internet Programming	1. Implement interactive web page(s) using HTML,CSS and JavaScript. 2. Design a responsive web site using HTML5 and CSS3. 3. Demonstrate Rich Internet Application . 4. Build Dynamic web site using server side PHP Programming and Database connectivity. 5. Describe and differentiate different Web Extensions and Web Services. 6. Demonstrate web application using Python web Framework-Django
ITC503	Advanced Data Management Technology	1. Explain and understand the concept of a transaction and how ACID properties are maintained when concurrent transaction occur in a database 2. Measure query costs and design alternate efficient paths for query execution. 3. Apply sophisticated access protocols to control access to the database. 4. Implement alternate models like Distributed databases and Design applications using advanced models like mobile, spatial databases. 5. Organize strategic data in an enterprise and build a data Warehouse. 6. Analyze data using OLAP operations so as to take strategic decisions.
ITC504	Cryptography & Network Security	1. Identify information security goals, classical encryption techniques and acquire fundamental knowledge on the concepts of finite fields and number theory. 2. Understand, compare and apply different encryption and decryption techniques to solve problems related to confidentiality and authentication 3. Apply the knowledge of cryptographic checksums and evaluate the performance of different message digest algorithms for verifying the integrity of varying message sizes 4. Apply different digital signature algorithms to achieve authentication and create secure applications 5. Apply network security basics, analyze different attacks on networks and evaluate the performance of firewalls and security protocols like SSL, IPSec, and PGP. 6. Apply the knowledge of cryptographic utilities and authentication mechanisms to design secure applications
ITL501	Internet Programming Lab	1. Design a basic web site using HTML5 and CSS3 to demonstrate responsive web design. 2. Implement dynamic web pages with validation using JavaScript objects by applying different event handling mechanism. 3. Use AJAX Programming Technique to develop RIA 4. Develop simple web application using server side PHP programing and Database Connectivity using MySQL. 5. Build well-formed XML Document and implement Web Service using Java. 6. Demonstrate simple web application using Python Django Framework.
ITL502	Security Lab	1. Apply the knowledge of symmetric cryptography to implement simple ciphers 2. Analyze and implement public key algorithms like RSA and El Gamal 3. Analyze and evaluate performance of hashing algorithms 4. Explore the different network reconnaissance tools to gather information about networks 5. Use tools like sniffers, port scanners and other related tools for analyzing packets in a network. 6. Apply and set up firewalls and intrusion detection systems using open source technologies and to explore email security.

ITL503	OLAP Lab	1. Implement simple query optimizers and design alternate efficient paths for query execution. 2. Simulate the working of concurrency protocols, recovery mechanisms in a database 3. Design applications using advanced models like mobile, spatial databases. 4. Implement a distributed database and understand its query processing and transaction processing mechanisms 5. Build a data warehouse 6. Analyze data using OLAP operations so as to take strategic decisions.
ITL504	IOT (Mini Project) Lab	1. Identify the requirements for the real world problems. 2. Conduct a survey of several available literatures in the preferred field of study. 3. Study and enhance software/ hardware skills. 4. Demonstrate and build the project successfully by hardware requirements, coding, emulating and testing. 5. To report and present the findings of the study conducted in the preferred domain 6. Demonstrate an ability to work in teams and manage the conduct of the research study.
ITL505	Business Communication and Ethics	1. Design a technical document using precise language, suitable vocabulary and apt style. 2. Develop the life skills/ interpersonal skills to progress professionally by building stronger relationships. 3. Demonstrate awareness of contemporary issues knowledge of professional and ethical responsibilities. 4. Apply the traits of a suitable candidate for a job/higher education, upon being trained in the techniques of holding a group discussion, facing interviews and writing resume/SOP. 5. Deliver formal presentations effectively implementing the verbal and non-verbal skills.
ITDLO5011	Advanced Data Structures & Analysis of Algorithms	1. Students will be able to choose appropriate advanced data structure for given problem. 2. Students will be able to calculate complexity. 3. Students will be able to select appropriate design techniques to solve real world problems. 4. Students will able to apply the dynamic programming technique to solve the problems. 5. Students will be able to apply the greedy programming technique to solve the problems. 6. Students will be able to select a proper pattern matching algorithm for given problem.
ITDLO5013	E-Commerce & E-Business	1. Define and differentiate various types of E-commerce. 2. Describe Hardware and Software Technologies for E-commerce. 3. Explain payment systems for E -commerce. 4. Describe the process of Selling and Marketing on web. 5. Define and Describe E-business and its Models. 6. Discuss various E-business Strategies.

TE IT SEM VI		
Course Code	**Course Name**	**Course Outcome**
ITC601	Software Engineering with Project Management	1. Define various software application domains and remember different process model used in software development. 2. Explain needs for software specifications also they can classify different types of software requirements and their gathering techniques. 3. Convert the requirements model into the design model and demonstrate use of software and user-interface design principles. 4. Distinguish among SCM and SQA and can classify different testing strategies and tactics and compare them. 5. Justify role of SDLC in Software Project Development and they can evaluate importance of Software Engineering in PLC.

		6. Generate project schedule and can construct, design and develop network diagram for different type of Projects. They can also organize different activities of project as per Risk impact factor.
ITC602	Data Mining and Business Intelligence	1. Demonstrate an understanding of the importance of data mining and the principles of business intelligence 2. Organize and Prepare the data needed for data mining using pre preprocessing techniques 3. Perform exploratory analysis of the data to be used for mining. 4. Implement the appropriate data mining methods like classification, clustering or Frequent Pattern mining on large data sets. 5. Define and apply metrics to measure the performance of various data mining algorithms 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.
ITC603	Cloud Computing & Services	1. Define Cloud Computing and memorize the different Cloud service and deployment models 2. Describe importance of virtualization along with their technologies. 3. Use and Examine different cloud computing services 4. Analyze the components of open stack & Google Cloud platform and understand Mobile Cloud Computing 5. Describe the key components of Amazon web Service 6. Design & develop backup strategies for cloud data based on features.
ITC604	Wireless Network	1. Explain the basic concepts of wireless network and wireless generations. 2. Demonstrate the different wireless technologies such as CDMA, GSM, GPRS etc 3. Appraise the importance of Ad-hoc networks such as MANET and VANET and Wireless Sensor networks 4. Describe and judge the emerging wireless technologies standards such as WLL, WLAN, WPAN, WMAN. 5. Explain the design considerations for deploying the wireless network infrastructure. 6. Differentiate and support the security measures, standards. Services and layer wise security considerations.
ITL601	Software Design Lab	1. Sketch a Modeling with UML. 2. Deploy Structural Modeling. 3. Deploy Behavioral Modeling. 4. Deploy Architectural Modeling. 5. Examine estimation about schedule and cost for project development. 6. Select project development tool.
ITL602	Business Intelligence lab	1. Identify sources of Data for mining and perform data exploration 2. Organize and prepare the data needed for data mining algorithms in terms of attributes and class inputs, training, validating, and testing files. 3. Implement the appropriate data mining methods like classification, clustering or association mining on large data sets using open source tools like WEKA 4. Implement various data mining algorithms from scratch using languages like Python/ Java etc. 5. Evaluate and compare performance of some available BI packages 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.
ITL603	Cloud Service Design Lab	1. Define & implement Virtualization using different types of Hypervisors 2. Describe steps to perform on demand Application delivery using Ulteo . 3. Examine the installation and configuration of Open stack cloud 4. Analyze and understand the functioning of different components involved in Amazon web services cloud platform. 5. Describe the functioning of Platform as a Service 6. Design & Synthesize Storage as a service using own Cloud
		1. Identify the requirements for the real world problems. 2. Conduct a survey of several available literatures in the preferred field of study.

ITL604	Sensor Network Lab	3. Study and enhance software/ hardware skills. 4. Demonstrate and build the project successfully by hardware/sensor requirements, coding, emulating and testing. 5. To report and present the findings of the study conducted in the preferred domain 6. Demonstrate an ability to work in teams and manage the conduct of the research study
ITM605	Mini-Project	1. Discover potential research areas in the field of IT 2. Conduct a survey of several available literature in the preferred field of study 3. Compare and contrast the several existing solutions for research challenge 4. Demonstrate an ability to work in teams and manage the conduct of the research study. 5. Formulate and propose a plan for creating a solution for the research plan identified 6. To report and present the findings of the study conducted in the preferred domain
ITDLO6023	Digital Forensics	1. Define the concept of ethical hacking and its associated applications in Information Communication Technology (ICT) world. 2. Underline the need of digital forensic and role of digital evidences . 3. Explain the methodology of incident response and various security issues in ICT world, and identify digital forensic tools for data collection . 4. Recognize the importance of digital forensic duplication and various tools for analysis to achieve adequate perspectives of digital forensic investigation in various applications /devices like Windows/Unix system. 5. Apply the knowledge of IDS to secure network and performing router and network analysis 6. List the method to generate legal evidence and supporting investigation reports and will also be able to use various digital forensic tools .

BE SEM-VII		
Course Code	**Course Name**	
ITC701	Software Project Management	Articulate similarities and differences between IT projects and other types of projects.
		Justify an IT project by establishing a business case
		Develop a project charter
		Develop a work breakdown structure for an IT project
		Estimate resources (time, cost, human being, etc.)
		Establish task inter-dependencies
		Construct and analyze a network diagram
		Identify IT project risks and develop risk mitigation strategies
		Ensure the quality of the project using various standards
		Demonstrate Team work and team spirit and how to overcome the conflicts
ITC702	Cloud Computing	Differentiate different computing techniques.
		Compare various cloud computing providers/ Software.
		Handle Open Source Cloud Implementation and Administration.
		Understand risks involved in cloud computing.
ITC703	Intelligent System	Students will develop a basic understanding of the building blocks of AI as presented in terms of intelligent agents.
		Students will be able to choose an appropriate problem-solving method and knowledge-representation scheme.
		Students will develop an ability to analyze and formalize the problem (as a state space, graph, etc.) and select the appropriate search method.
		Students will be able to develop/demonstrate/ build simple intelligent systems or classical toy problems using different AI techniques.
		Understand the new trends in mobile/wireless communications networks
		Understand the characteristics of mobile/wireless communication channels

ITC704	Wireless Technology	Understand the multiple radio access techniques
		Understand the multiuser detection techniques
		Understand various wireless networks and their technologies
		Understand need of securities and economies in wireless systems
ITC7053	E-Commerce & E-Business	Graduates will be able to design and conduct experiments, as well as analyze and interpret the technological, user, network requirements for developing the various modules of e commerce/business site, will be able to apply the knowledge gained and modern engineering tools in their application domain.
ITC706	Project-I	The learner should be able to prepare a synopsis of the work selected

BE SEM-VIII		
Course Code	**Course Name**	
ITC801	Storage Network Management and Retrieval	Students will be able to evaluate storage architectures, including storage subsystems, SAN, NAS, and IP-SAN, also define backup, recovery.
		Examine emerging technologies including IP-SAN.
		Define information retrieval in storage network and identify different storage virtualization technologies.
ITC802	Big Data Analytics	Understand the key issues in big data management and its associated applications in intelligent business and scientific computing.
		Acquire fundamental enabling techniques and scalable algorithms like Hadoop, Map Reduce and NO SQL in big data analytics.
		Interpret business models and scientific computing paradigms, and apply software tools for big data analytics.
		Achieve adequate perspectives of big data analytics in various applications like recommender systems, social media applications etc.
ITC803	Computer Simulation and Modeling	Understand the meaning of simulation and its importance in business, science, engineering, industry and services
		Identify the common applications of discrete-event system simulation.
		Practice formulation and modeling skills.
		Understand simulation languages
		Ability to analyze events and inter-arrival time, arrival process, queuing strategies, resources and disposal of entities
		An ability to perform a simulation using spreadsheets as well as simulation language/package
		Ability to generate pseudorandom numbers using the Linear Congruential Method
		Ability to perform statistical tests to measure the quality of a pseudorandom number generator
		Ability to define random variate generators for finite random variables
		Ability to analyze and fit the collected data to different distributions
ITC8041	Enterprise Resource Planning	The learner will be familiar with ERP and related technologies like Business Processing Reengineering (BPR), Supply Chain Management (SCM),Customer Relationship Management(CRM), MIS - Management Information System, DSS - Decision Support System, EIS - Executive Information System etc. The learner should gain the knowledge on ERP tools and ERP benefits.
ITC8045	Soft Computing	Student should be able to mimic human like thought process on deterministic machines and apply it to different real world problems faced in the professional front.
ITC805	Project II	Able to implement an example of application