PO's & CO's of MCA Programme

MCA: Program objectives-

1. To provide to the country a steady stream of the necessary knowledge, skills and foundation for acquiring a wide range of rewarding careers into the rapidly expanding world of the Information Technology.
2. To inculcate learning aspects from four dimensions viz. Conceptual Learning, Skills Learning and Practical / Hands on with respect to four specialized tracks
3. To develop students to cater to the challenging opportunities being faced in Information Technology.
4. To develop basic and advanced skills in areas of student interest thereby increasing their level of expertise.
5. To strengthen students with all fundamental areas and aspects of technical and management training required for professional aspects of software development.

Program Specific Outcomes

Program Specific Outcomes or PSOs are abilities that a MCA Programme professional should have after successful completion of the program. Following PSOs have been defined:

A graduate will have

i. an ability to apply knowledge of mathematics and computer science to solve business problems by use of computer technology.
ii. an ability to develop computer code, analyze and interpret data, for reducing the errors in decision making.
iii. an ability to design user friendly system, or process to meet desired needs within realistic economic, environmental, social, ethical, health and safety, constraints.
iv. an ability to perform in multidisciplinary teams, and interact with various domain experts.
v. an ability to communicate effectively,

MCA: Course Specific Outcomes-

Sr. No.	Course Code	Course	Course Objectives	Course Outcomes
			Semester-I	
1	IT11	Fundamentals of Computer	To give basic knowledge of computer system, it's components and their organization. This will also introduce the basic data representation in the computer.	Student will have ability to- 1. Understand basic structure of computer system, its components and their organization. 2. Make use of number system to solve computer arithmetic operations 3. Illustrate the basic data representation in the computer. 4. Draw memory organization 5. Explain instruction level parallelism.

2	IT12	C Programming with Data Structure	This is the first programming language subject student will learn. This subject will teach them programming logic, use of programming instructions, syntax and program structure. This subject will also create foundation for student to learn other complex programming languages like C++, Java etc. By the end of the course students will be able to write C and basic DS programs.	Student will- 1. Understand the concepts of procedural programming 2. Compile C programs 3. Build C programs 4. Develop the logic of programming 5. Develop applications in C language
3	IT13	Software Engineering	The concepts related to software development and maintenance issues are introduced to students through this elaborative subject	Student will able to 1. Developing complex and evolving software-intensive systems. 2. Plan and deliver an effective software engineering process, based on knowledge of widely used development lifecycle models. 3. Employ group working skills including general organization, planning and time management and inter-group negotiation. 4. Capture, document and analyse requirements. 5. Translate a requirements specification into an implementable design, following a structured and organised process. 6. Make effective use of diagrams with design strategies
4	IT14	Database Management System	The concepts related to database, database models, SQL and database operations are covered in this subject. This creates a strong foundation for application database design.	Student will- 1. Define program-data independence, data models for database systems, database schema and database instances. 2. Recall Relational Algebra concepts, and use itto translate queries to Relational Algebra 3. Design ERD and Normalize of Database. 4. Identify the methodology of conceptual modeling through Entity Relationship model. 5. Develop an understanding of the differences between OODBMS, ORDBMS and RDBMS and the practical implications of each approach. 6. Analyze and design a real database application. 7. Develop and evaluate a real database application using a database management system.
5	BM11	Principles and Practices of Management and Organizational Behavior	The basic management concepts and use of management principles in the organization will be introduced to student through this elaborative subject.	Student will - 1. Learned the basic normative theories of management. 2. Examine a basic framework for understanding the role and functions of management 3. Be able to apply theories and course concepts to properly analyze and diagnose management problems. 4. Understand the theoretical underpinnings of organizational behavior as a discipline. 5. Evaluate the need for management in an organization. 6. Develop and use a structured approach to solve organizational problems.

6	BM12	Business Process Domains*	1. To learn & understand the processes and practices in business and their applications 2. To introduce advanced business applications like CRM and SCM. 3. To learn the financial aspect of business and management 4. To learn and analyze the financial statements of a business.	Student will capable to 1. Understand the processes and practices in business and their applications 2. Illustrate advanced business applications like CRM and SCM. 3. Identify and utilize the financial aspect of business and management 4. Analyze and formulate the financial statements of a business.
7	IT12L	C and DS Lab	To give hands on practice for writing C & DS programs and to inculcate good programming skills.	Student will 1. Compile C programs 2. Build C programs 3. Develop the logic of programming 4. Develop applications in C language
8	IT14L	DBMS Lab	To develop database handling, data manipulation and data processing skills through SQL & PL/SQL, which will help students to develop data centric computer applications.	Student will 1. Create table and manipulate data of table. 2. Apply the constraint in table. 3. Demonstrate PL/SQl examples. 4. Understand Procedure , Cursor and Trigger in database.
9	SS11	Word Power	To improve the vocabulary of English and competency for business English. Use of language lab / English learning tools such as mobile apps like Sling etc. are also encouraged and lot of listening practice, reading and understanding exposure should be given to the students. Interested students may appear for Cambridge English exam after completion of 1st year.	Student will- 1. Demonstrate in writing or speech the comprehension, analysis, and interpretation of variety of texts critically and proficiently. 2. Encourage students to make use of language lab / English learning tools such as mobile apps like Sling etc. and lot of listening practice, reading and understanding exposure should be given to the students. 3. Analyze and interpret texts written in English, evaluating and assessing the results in written or oral arguments using appropriate support 4. Improve the vocabulary of English and competency for business English
Semester-II				
10	IT21	Essentials of Operating system	To Learn and understand the fundamentals of Operating systems	Student will able - 1. To define, contrast and compare differing structures for operating systems. 2. To demonstrate knowledge of process control, threads, concurrency, memory management scheduling, I/O and files, distributed systems, security, networking. 3. To understand and analyse theory and implementation of: processes, resource control (concurrency etc.), physical and virtual memory, scheduling, I/O and files. 4. To develop software using multiprocessing and multithreading programming techniques
11	IT22	Web Technologies	This course enables students to understand web page	Student will-

			site planning, management and maintenance. The course explains the concepts of developing advanced HTML pages with the help of frames, scripting languages, and evolving technologies like DHTML.	1. Compile & Build web application projects 2. Choose right technology for web applications 3. Demonstrate web page site planning, management and maintenance. 4. Develop web applications using web technologies
12	IT23	Core Java	To enable the students to understand the core principles of the Java Language and use visual tools to produce well designed, effective applications and applets	Student - 1. Understand the concepts of object oriented programming 2. Compile & build java programs 3. Demonstrate the program for the core principles of the Java Language 4. Use visual tools to produce well designed, effective applications and applets
13	IT24	Essentials of Networking	To learn and understand fundamentals of computer network , network architectures, protocols and applications	Student will - 1. Understood fundamentals of computer network, network architectures, protocols and applications 2. Compare various Topologies. 3. Design the computer network topology. 4. Analysis the Network hardware like Hub, Switch etc. 5. Describe the process of designing and building data communications networks. 6. Evaluate data communication hardware and software products that are available through the public carriers and the private sector.
14	MT21	Discrete Mathematics	This is the first mathematics subject which revises the knowledge acquired previously by the student. Logic, Relations and Functions, Algebraic Functions and Graph Theory will be introduced in this course.	Student can - 1. Define basic concepts of mathematics subject. 2. Understand the basic principles of sets and operations in sets. 3. Demonstrate different traversal methods for trees and graphs. 4. Demonstrate an understanding of Logic, Relations and Functions and be able to determine their properties.
15	BM21	Essentials of Marketing*	1. To make students understand the essentiality of Marketing in business Environment. 2. To comprehend the functionalities of Marketing and IT enabled practices for organizations	Student able to - 1. Make use of the essentiality of Marketing concepts in business Environment. . 2. Understand the functionalities of Marketing and IT enabled practices for organizations 3. Demonstrate the marketing Plan with case study.
16	IT22L	Mini Project using Web Technology	Student should able to develop a small dynamic web application. A small dynamic web application will be developed by the students using knowledge of HTML, DHTML, JavaScript and ASP.	Student will- 1. Develop the project using web technologies 2. Compile & Build web application projects 3. Choose right technology for web applications 4. Demonstrate web page site planning, management and maintenance. 5. Develop web applications using web technologies
17	IT23L	Core Java Lab	This lab work will provide hands on practice to student to enhance their Java Programming Skills. Assignments on Java concepts such as Interfaces, Packages, Exception Handling, Applet, multithreading, Abstract Windows Toolkit, Java Input Output & Java collection can be included.	Student will 1. Enhance their Java Programming Skills. 2. Apply Java concepts such as Interfaces, Packages, Exception Handling, Applet, multithreading, Abstract Windows Toolkit, Java Input Output & Java collection 3. Develop java applications using AWT.

18	SS21	Oral Communication	To enhance the verbal communication of students. To focus on conversation with colleagues, Dialogues with Higher authorities. To focus on Formal and Informal Conversation, etiquettes	Student will- 1. Understood the importance of verbal communication. 2. Demonstrate appropriate and professional ethical behavior. 3. Apply appropriate communication skills across settings, purposes, and audiences and make use of technology to communicate effectively in various settings and contexts. 4. Develop skills to effectively deliver formal and informal oral presentations to a variety of audiences in multiple contexts. 5. Improve the vocabulary of English.
		Semester-III Common Courses		
19	MTC21	Probability & Combinatorics	i. Count similar things in sophisticated ways. ii. Understand the mathematical underpinnings of probability. iii. Use probability theory to solve interesting problems.	Student will- 1. Define counting principles to count similar things in simple ways. 2. Understand and illustrate the mathematical underpinnings of probability. 3. Apply rules and principles of probability to solve problems. 4. Analyze and simplify problems as per their type and distribution.
20	ITC31	Multimedia Tools for Presentation*	To Learn and understand various multimedia tools and software to make the presentation effective. The Institute can decide the Tools / Software to teach the subject. More assignments, case studies should be taken.	Student will- 1. Understand various multimedia tools 2. Learn various multimedia tools and software. 3. Make the effective presentation 4. Choose right multimedia tool for presentation
21	SSC31	Soft Skills-Presentation *	Non verbal communication-Personal appearance-Posture- Gestures-Facial expressions- Eye contact-Space distancing Business Presentations: Preparing successful presentations, Planning for audience Making effective use of visual aid, Delivering presentation, using prompts, dealing with questions and interruptions, Mock presentations. Effective usage of Tools (MS PowerPoint)	Student will- 1. Use of visual aid, Delivering presentation, using prompts, dealing with questions and interruptions, Mock presentations. 2. Use of Effective Tools (MS PowerPoint) for Presentation 3. Improve Communication skills
		Semester-III Track I : Software & Application Development		
22	T1-IT31	Advanced Data Structure and C++ programming	By the end of the course students will be able to write C++ as well as DS programs with CPP using advanced language features, utilize OO techniques to design C++ programs, use the standard C++ library, exploit advanced C++ techniques.	Student will- 1. Demonstrate DS programs with C-Apply C# concepts and develop websites as well as windows application. 2. Develop application and solve business problems. 3. Implement database concepts and business logics. 4. PP using advanced language features 5. Utilize OO techniques to design C++ programs 6. Use the standard C++ library 7. Apply advanced C++ techniques.
23	T1-IT32	Design And Analysis of Algorithm	To understand and learn advance algorithms and methods used in computer science to create strong logic and problem solving approach in student.	Student will able to - 1. Apply design principles and concepts to algorithm design 2. Develop mathematical foundation in analysis of algorithms 3. Demonstrate different algorithmic design strategies 4. Apply prior knowledge of standard algorithms to solve new problems

| | | | | 5. Solve problems which are algorithm based by using various design techniques. |
				6. Analyze the efficiency of algorithms using time and space complexity theory
24	T1-IT33	Object Oriented Analysis And Design	After completing this course students will be able to: Understand the issues involved in implementing an object-oriented design, Analyze requirements and produce an initial design. Develop the design to the point where it is ready for implementation. Design components to maximize their reuse. Learn to use the essential modeling elements in the most recent release of the Unified Modeling Language.	Student will able to - 1. Illustrate the issues involved in implementing an object-oriented design 2. Analyze requirements and propose an initial design. 3. Develop the design to the point where it is ready for implementation. 4. Design components to maximize their reuse. 5. Make use of the essential modeling elements in the most recent release of the Unified Modeling Language.
25	T1-IT34	Advance Internet Technologies	To provide extension to web development skills acquired in 2nd semester. HTML , XML, jQuery, AJAX and PHP are introduced for student to enhance their skills	Student will- 1. Demonstrate using HTML5, XML, jQuery, AJAX and PHP 2. Understand the concepts of Web server and Structure . 3. Provide extension to web development skills. 4. Design web example using PHP .
26	T1-IT31L	DS & C++ Lab	This lab work provides hands-on for C++ & DS programs using C++ language learnt in theory session. C++ Programming assignments based on class, inheritance, abstraction, encapsulation, dynamic binding, polymorphism, I/O systems, exception handling should be covered. DS using C++ assignments should be based on Stacks, Queue, Linked List and mainly it should cover Tree , Binary Threaded Tree & Graph programs.	Student will- 1. Demonstrate to C++ and DS program based on class, inheritance, abstraction, encapsulation, dynamic binding, polymorphism, I/O systems, exception handling 2. Compile & Build programs in C++ based on Stacks, Queue, Linked List. 3. Develop applications in data structure using C++
27	T1-IT34L	Mini Project using AIT	To get the practical knowledge of advanced Web Technologies. Students should able to develop web based systems using HTML5, XML, PHP, AJAX, JQuery and MySQL.	Student will able to- 1. Develop application using HTML5, XML, PHP, AJAX, JQuery and MySQL technologies. 2. Apply practical knowledge of advanced Web Technologies.
			Semester-III Track II :Infrastructure & Security Management	
28	T2-IT31	IT Infrastructure Architecture	This course enables the students to acquire knowledge of advance computer architecture and Operating System concepts.	Student will 1. Enables to acquire knowledge of advance computer architecture 2. Apply practical knowledge of Operating System concepts.
29	T2-IT32	Data Centre Architecture & Storage Management	i) To gain knowledge and understand the following areas, the design of a Data Centre, best practice of design in the Data Centre and appropriate understanding of the options in the running of an efficient Data Centre. ii) To understand the value of data to a business, Information Lifecycle, Challenges in data storage and data management, Solutions available for data storage.	Student will 1. Gain knowledge and understand the design of a Data Centre, best practice of design in the Data Centre and appropriate understanding of the options in the running of an efficient Data Centre. 2. Understand the value of data to a business, Information Lifecycle, Challenges in data storage and data management, Solutions available for data storage.
30	T2-IT33	Introduction to Information Security	To create awareness about the values of Information and how the Information security practices are	Student will describe Information and how the Information security practices are meticulously implemented in IT companies worldwide.

			meticulously implemented in IT companies worldwide.	
31	T2-IT34	Office Automation Tools	To enable the students to acquire basic knowledge in the various office automation tools and its applications in the various areas of business.	Student will- 1. Demonstrate basic knowledge in the various office automation tools. 2. Use tools for the various areas of business.
32	T2-IT31L	Mini Project on IT Architecture and Information Security	Case studies and practical on Information Security with the illustration on encryption, decryption using public and private keys etc are expected.	Student will able to - 1. Solved Case studies and explore practical on Information Security. 2. Illustration on encryption, decryption using public and private keys etc are expected.
33	T2-IT34L	Office Automation Tools – Lab	Lab exercise on Writer, Calc and Impress Guide. Students have to study and analyze the existing Office automation tools (office equipment, hardware and software) available present comparative analysis.	Student will do Practice on Writer, Calc and Impress Guide. Students have to study and analyze the existing Office automation tools available present comparative analysis.
Semester-III Track III : Information Management & Quality Control				
34	T3-IT31	Enterprise Resource Planning	To learn ERP systems its structure, modules, benefits, implementation and post implementation issues through real-life cases4	Student will- 1. Understand planning in an ERP system, steps and activities in the ERP life cycle and systematically develop plans for an enterprise 2. Understand concepts of reengineering and how they relate to ERP system implementations 3. Examine systematically the planning mechanisms in an enterprise, and identify all components in an ERP system and the relationships among the components; 4. Able to plan business processes using process mapping techniques 5. Identify and describe typical functionality in an ERP system 6. Elaborate the technical aspects of ERP systems
35	T3-IT32	Data Communication & Computer Networks	Various computer networks, technologies behind networks and application protocols, email and communication protocols along with introduction to advance network technologies like LTE, Cloud computing, Grid computing will be introduced to the students through this subject.	Student will- 1. Explain the importance of data communications and the Internet in supporting business communications and daily activities. 2. Recognize the different internetworking devices and their functions. 3. Explain the role of protocols in networking. 4. Analyze the services and features of the various layers of data networks. 5. Analyze the features and operations of various application layer protocols such as Http, DNS, and SMTP. 6. Design, calculate, and apply subnet masks and addresses to fulfill networking requirements.
36	T3-IT33	Data Warehouse, Mining, BI Tools & applications	At the end of the course students would be familiarized with the data-warehousing and data mining techniques and other advanced topics. You would also understand the importance of BI in emerging world.	Student will - 1. Understand the importance of BI in emerging world and business value of data warehousing and business analytics 2. 2.Understand data mining principles and techniques: Introduce DM as a cutting edge business intelligence method and acquaint the students with the DM techniques for building competitive advantage through proactive analysis, predictive modelling, and identifying new trends and behaviors.

				3. Describing and demonstrating basic data mining algorithms, methods, and tools
				4. Identifying business applications of data mining
				5. Analyze data warehouse characteristics and plan warehouse data 2. Illustrate trends towards data warehousing and data mining.
				6. Design and implement a data warehouse.
37	T3-IT34	Information Security & Audit	To create awareness about the values of Information and how the Information security practices are meticulously implemented in IT companies worldwide.	Student will- 1. Understand basic terminology and concepts related to network and system level security, basics of computers and networking including Internet Protocol, routing, Domain Name Service, and network devices. 2. Identify security weaknesses in information systems, and rectify them with appropriate security mechanisms 3. Explain the security controls in the aspects of physical, logical and operational security control 4. Elaborate basic cryptography, security management and network security techniques. 5. Design and audit a security system at conceptual level.
38	T3-IT32L	DCCN Lab	Different practical have to be covered including crimping, setting LAN, WLAN, dealing with network management tools like Pandora, wireshark etc. , Virtualization, configuring IP addresses, router configuration, firewall configuration.	Student will do practice including crimping, setting LAN, WLAN, dealing with network management tools like Pandora, wireshark etc.
39	T3-IT33L	BI Tools Lab	To Introduce students with business intelligence techniques such as MOLAP, data mining, data warehousing etc. Demonstration on various tools is expected. 1. Data Mining Techniques to get practical overview of classification, clustering, apriori analysis. 2. Data Visualization 3. Cube Generation and Cube Operations 4. Demonstration of Business Intelligence Tool like Pentaho 5. Spreadsheet based data mining tool & BI tools such as XLMiner	Student will- 1. Expose with Data Mining Techniques to get practical overview of classification, clustering, apriori analysis. 2. Understand Data Visualization 3. Cube Generation and Cube Operations 4. Demonstration of Business Intelligence Tool like Pentaho 5. Understand Spreadsheet based data mining tool & BI tools such as XLMiner
Semester-III Track IV :Networking				
40	T4-IT31	Network Administration I	1. To offer fundamental knowledge about the network administration along with the practical exposure by creating LAN'S, WAN'S etc. 2. To give basic configurations of router & switches	Student will- 1. Demonstrate essential IT support skills including installing, configuring, securing and troubleshooting operating systems and hardware. 2. Understand the ability to diagnose and solve operating system and hardware problems. 3. Apply essential networking skills including installing, configuring, securing and troubleshooting the devices, protocols and services within a network infrastructure. 4. Understand basic configurations of router & switches

41	T4-IT32	Windows Server Configurations	1. To give the complete knowledge of windows server configuration 2. Prepare the students for certification like MCITP (Microsoft Certified IT Professional) etc.	Student will 1. Understand windows server configuration. 2. Explain structure of window server. 3. Deploying and Managing the server 4. Understand the ability to Window server. 5. Compare window server with other servers. 6. Preparation for Certification Courses Like MCITP (Microsoft Certified IT Professional) etc
42	T4-IT33	IT Infrastructure Monitoring	To aware basics of the IT infrastructure with the help of tools to be used. As well as to offer the knowledge of project and operations management.	Student will- 1. Define and implement procedures to monitor the IT infrastructure and related events. 2. Understand that sufficient chronological information is being stored in operations logs to enable the reconstruction, review and examination of the time sequences of operations and the other activities surrounding or supporting operations. 3. Demonstrate - IT infrastructure with the help of tools to be used
43	T4-IT34	Linux Administration I	To aware the installation, basic configuration and file system.	Student will- 1. Understand and Install a Linux operating system with a custom partitioning scheme and log into and out of a UNIX/Linux computer system using graphical and command line environments. 2. Use UNIX/Linux command line (shell) commands to navigate and manage the. 3. Demonstrate how to work Linux with file system.
44	T4-IT31L	Network Administration Lab – I	To aware the students with all fundamentals of network administration with practical exposure.	Student will- 1. Install, configure and manage enterprise systems/networks, including hardware/software. 2. Implement and administer desktop and server operating systems (client/server), switching and routing devices. 3. Implement and configure active directory 4. Administer permissions for users, files and network resources. 5. Manage desktops and server computers using remote access.
45	T4-IT32L	Server Configuration Lab (Windows and Linux)	To aware the students for creating and configuring complete windows as well as Linux server.	Student will able to 1. Install and configure window server and Linux Server . 2. Demonstrate the installation and configuration of network simulator. 3. Configure IPv4 and IPv6 Addressing 4. Deploy and Configure Domain Name System
		Semester-IV Common Courses		
46	TC41	Optimization Techniques	To introduce linear programming, dynamic programming and related optimization theories to solve real life / simulated problems	Student will able to select optimum solution if there are number of feasible solutions, so that there is minimum cost and maximum profit.
47	ITC42	Research Methodology & Statistical Tools*	Research is a tool which helps the manager to identify, understand and solve management	Student will- 1. 1.Define linear programming, dynamic programming and related

			problems. Research improves the decision making ability of the manager. The objective of the subject is to create scientific attitude towards solving a management problem and impart knowledge about tools available for carrying out research with the evidence of statistical techniques.	optimization theories 2. Apply knowledge of optimization to formulate and solve engineering and technology problems. 3. 3.Understand the different methods of optimization and be able to suggest a technique for a specific problem. 4. Solve real life / simulated problems
48	SSC41	Soft Skills -Interview *	Preparing resumes & CV-Covering letter (effective usage of MS Word) Self introduction during interviews Interviews – Types of Interviews, preparing for interviews (Opening, body-answer Q, close-ask Q), Types of questions, facing interviews, reviewing performance Participating in mock interviews	Student will able to 1. 1.Prepare resumes & CV-Covering letter (effective usage of MS Word) Self introduction during interviews 2. 2.Build types of questions, facing interviews, reviewing performance Participating in mock interviews 3. 3.Participate mock interview 4. 4.Analyse the soft skill and measure the level for further improvement.
		Semester-IV Track I : Software & Application Development		
49	T1-IT41	Advanced Java	Students will be able to do socket programming, develop server side applications with database handling using servlets, JSP, JDBC and Hibernate and Springs framework.	Student will- 1. Understand the advanced java concepts 2. Develop applications in socket programming 3. Develop server side applications with database handling using servlets, JSP, JDBC and Hibernate and Springs framework
50	T1-IT42	Python programming	To develop problem solving skills and their implementation through Python, To understand and implement concepts of object oriented methodology using Python.	Student will - 1. Able to Install and run the Python interpreter 2. Construct and execute Python programs 3. Understand the concepts of file I/O 4. Implement concepts of object oriented methodology using Python.
51	T1-IT43	Advance DBMS	At the end of the course students should be able to: gain an awareness of the basic issues in object oriented data models, applications, familiarize with the data-warehousing and data-mining techniques and other advanced topics.	Student will 1. Understand basic issues in object oriented data models, applications, familiarize with the data-warehousing and data-mining techniques and other advanced topics 2. Expose with the further database techniques beyond which covered in the second year, and thus to acquaint the students with some relatively advanced issues. 3. familiar with the Web-DBMS integration technology and XML for Internet database applications and the data-warehousing and data-mining techniques
52	T1-IT44	Cloud Computing	This module gives students the skills and knowledge to understand how Cloud Computing Architecture can enable transformation, business development and agility in an organization.	Student will- 1. Understand Fundamentals of cloud computing architectures based on current standards, protocols, and best practices 2. Develop and deploy cloud application using popular cloud platforms, 3. Compare, contrast, and evaluate the key trade-offs between multiple approaches to cloud system design, and Identify appropriate design choices when solving real-world cloud computing problems.
53	T1-	Adv. Java Lab	This lab work will provide hands on practice to	Student will

	IT41L		student to enhance their Java Programming Skills. Assignments on Java concepts such as abstract Windows Toolkit, Java Input Output, Networking, JDBC, RMI, Java Beans can be included.	1. Apply Java Programming Skills 2. Compile & build advanced java applications 3. Develop applications using Java concepts such as abstract Windows Toolkit, Java Input Output, Networking, JDBC, RMI, Java Beans.
54	T1-IT42L	Python Programming Lab	This lab work will provide hands on practice to student to enhance their Python Programming Skills. Assignments on python concepts functions, strings, Lists, directories, modules, input output, exception handling, object oriented concepts can be included.	Student will able to 1. Implement basic concepts like functions, strings, Lists, directories, modules, input output, exception handling, object oriented concepts 2. Demonstrate the python use in web development
			Semester-IV Track IV :Networking	
55	T4-IT41	Network Administration II	To offer advanced knowledge about the network administration along with the practical exposure on VLAN, IP Routing, OSPF, IGRP,EIGRP etc.	Student will 1. Understand internet connectivity and database service administration. 2. Know the secure file transfer protocols and e-mail handling as well as management of kernel and other application through linux
56	T4-IT42	Internet of Things	To study the paradigm of objects interacting with people, information systems, and with other objects via network communications.	Student will 1. Define Concepts the Internet of Things. 2. Understand of IoT connectivity methods , technologies, Protocols 3. Evaluate The Internet of Things. 4. Describe Internet of Things Privacy, Security and Governance 5. Design a model for smart city
57	T4-IT43	Linux Administration II	1. To understand internet connectivity and database service administration. 2. To aware with the secure file transfer protocols and e-mail handling as well as management of kernel and other application through linux.	Student will- 1. Understand internet connectivity and database service administration. 2. Know the secure file transfer protocols and e-mail handling as well as management of kernel and other application through linux
58	T4-IT44	Wireless Networks	To get the complete knowledge on wireless technology including all generations.	Student wll able to 1. Define wireless local area networks 2. Design d-hoc & sensor networks 3. Understand Wireless Sensor networks- Classification, MAC and Routing protocols . 4. Analyze 4G features and challenges.
59	T4-IT41L	Virtualization Lab	To give the complete knowledge of hardware and software virtualization	Student will able to 1. Compare Virtualization Technologies 2. Install VMware Server, Citrix XenServer, Microsoft Virtual PC and VirtualBox 3. Configure Dedicated Servers with Virtualization, Desktop Virtualization, Network and Storage Virtualization 4. Build the Virtual Infrastructure
60	T4-IT44L	Wireless Network Lab	To give the practical exposure on wireless networks along with live cases which helps to configure and understand real issues on the site. Set of practical are helpful to become wireless administrator and builds	Student will able to 1. Install a WLAN Adapter Card 2. Topology Design with Cisco Network Designer (CND)

			the platform to become certified professional.	3. Configure Basic AP Settings 4. Resetting the Bridge and Antenna Setup 5. Design WLAN 6. Design Site Survey Active Mode 7. Develop Wireless Case Study of a School/Hospital/Hotel/Any organization
Semester-V Common Courses				
61	ITC51	Software Project Management	To learn process of software project management, cost estimation, use of project Management tools, configuration management, user roles and software teams.	Students will- 1. Understand process of software project management 2. Estimate Different cost incurred in Project management 3. Make up Use of different project Management tools
62	ITC51P	Project*	Student supposes to collect all requirements, do the analysis of the requirements of project. Student should prepare the SRS of the project. Student should complete the project up to design phase of SDLC.	Student will 1. Understand the requirements (user requirements, software and hardware requirements) of the project. 2. Analyze the requirements of the project. 3. Define the scope and explain the need for the project. 4. Design the respective (SDLC) diagrams (ERD, Functional Decomposition etc.) as per the requirement of the project.
63	SSC51	Soft Skills - Group Discussion*	Team building , Team briefing, Role of Team leader, Conflict resolution, Methodology of Group discussions, Role Functions in Group Discussion, Improving group performance, Mock group discussions	Student will- 1. Understand the key skills and behaviours required to facilitate a **group discussion**. 2. Recognize the nature of conflict and its impact on interpersonal relationships and organizations. 3. Analyze and understand the key practical and theoretical concepts of managing and resolving conflicts. 4. Apply responsible decision-making and personal accountability and the ability to work effectively with team or group. 5. Demonstrate the role of communication in generating productive conflict outcomes and to use communication skills effectively in a rage of specific conflict situations. 6. Improve decision making and individual leadership skills
Semester-V Track I : Software & Application Development				
64	T1-IT51	ASP .Net using C#	To teach student application development technology currently available.	Student will- 1. Understand the fundamentals of C# by using object oriented methodologie 2. Develop web applications using ASP.NET 3. Demonstrate database driven ASP.NET web applications and web services. 4. Discuss and deploy ASP.NET web applications
65	T1-IT52	Service Oriented Architecture	• To gain understanding of the basic principles of service orientation • To learn service oriented analysis techniques • To learn technology underlying the service design • To learn advanced concepts such as service composition, orchestration and Choreography	Student will- 1. Understand the basic principles of service orientation 2. Learn service oriented analysis techniques 3. Learn technology underlying the service design 4. Learn advanced concepts such as service composition, orchestration and Choreography

			• To know about various WS specification standards	5. Know about various WS specification standards
66	T1-IT53	Big Data Analytics	1. To Understand the Big Data challenges & opportunities ,its applications 2. Gain conceptual understanding of NOSQL Database. 3. Understanding of concepts of map and reduce and functional programming 4. Gain conceptual understanding of Hadoop Distributed File System.	Student will- 1. 1.Understand d the concept, opportunities of big data, NOSQL. Understood components of big data like, MR, Hadoop, PIG etc. 2. What is Hadoop Framework Hadoop Architecture,History of Hadoop – Facebook, Dynamo, Yahoo, Google 3. 3.Describe the concept Map and reduce and how work. 4. 4.How to work Distributed File System.
67	T1-IT54	Mobile Application Development	Student should able to develop the mobile application using Android	Student will able to 1. Understand Android concepts and Architecture Demonstrate various concept like Layout, Data base,Audio,Vedio,Map and Gtalk. 2. Apply phone call using Intent and other Concepts. 3. Apply concept in Android Project. 4. Develop the solution using Android App.
68	T1-IT51L	Mini Project using ASP .Net	In this mini project, student should design dynamic website using asp.net using c#. Visual Studio 2010 is strongly Preferred.	Student will- 1. Apply C# concepts and develop websites as well as windows application. 2. Develop application and solve business problems. 3. Implement database concepts and business logics design dynamics website.
69	T1-IT54L	Mini Project Using Mobile Application Development	This mini project work will provide hands on practice to student to enhance their Android Programming Skills. Android concepts such as Views and view groups, Layouts, Creating Menus Intents, Adapters, Dialogs, location based services, file handlings, CRUD operation on SQlite, Gtalk, Audio, Video can be included.	Student will- 1. Understand the Android Installation process and How to work Android Application. 2. Analyze the Hardware requirement and using Emulator. 3. Demonstrate example using concepts such as Views and view groups, Layouts, Creating Menus Intents, Adapters, Dialogs, location based services. 4. Apply concepts in Project like SQlite, Gtalk, Audio,Video . 5. Develop the project using Android concepts.
Semester-V Track IV :Networking				
70	T4-IT51	Network Routing Algorithms	To aware students with different types of network routing protocols and algorithms.	Student will- 1. Understand the fundamental design principles of current IP networks, 2. Understand the Dijkstra and Bellman-Ford routing algorithms, 3. Configure Internet routers using several intra-domain routing protocols, including RIP, OSPF, IS-IS and PIM-SM, 4. Demonstrate the network architecture for IP multicast and how IP multicast is distributed within a network, 5. Practically configure a network with label switching and traffic engineering using MPLS and RSVP.
70	T4-IT52	Computer and Network Security	To understand the various security measures related to computer and network security.	Student will able to 1. Describe information security awareness and a clear understanding of its importance,

				2. How threats to an organization are discovered, analyzed, and dealt with,
				3. Apply network security designs using available secure solutions (such as PGP, SSL, IPSec, etc),
				4. Find advanced security issues and technologies (such as DDoS attack detection and containment, and anonymous communications,)
72	T4-IT53	Cloud Architectures and Security	The course on cloud Architecture & Security introduces the basic concepts of security systems and cryptographic protocols, which are widely used in the design of cloud security. The issues related multi tenancy operation, virtualized infrastructure security and methods to improve virtualization security are also dealt with in this course	Student will able to learn- 1. Fundamentals of cloud computing architectures based on current standards, protocols, and best practices 2. Identify the known threats, risks, vulnerabilities and privacy issues associated with 3. Design Cloud security architectures that assures secure isolation of compute, network and storage infrastructures, comprehensive data protection, end-to-end identity and access management, monitoring and auditing processes and compliance with industry and regulatory mandates. methods to improve virtualization 4. Cloud computing security guidelines set forth by ISO, NIST, ENISA and Cloud Security Alliance (CSA) 5. Prepares for Cloud Security - CBK Certifications from Cloud Security Alliance (CSA).
73	T4-IT54	Unified Communication	1. To learn and understand the basic principles of Telecommunication switching, traffic and networks. 2. To learn and understand basic concepts of IP EPBAX system, wireless propagation and the techniques used to maximize the capacity of network .3.To learn and understand of working of VOIP and its protocols.	Student will able to 1. Understand the basic principles of Telecommunication switching, traffic and networks. 2. Apply basic concepts of IP EPBAX system, wireless propagation and the techniques used to maximize the capacity of network 3. Demonstrate working of VOIP and its protocols. 4. Examine IP Phones ,Gateways ,Session Border Controllers Call-Switching Servers -IP PBX, Conference Bridges/Controllers,Call Recorder.
74	T4-IT52L	Computer and Network Security – Lab	To highlight the issues with computer and network security by giving the hands on knowledge of various thing like monitoring and analyzing network traffic, installing and configuring different tools like wireshark, SNORT, NMAP, Port Scanners etc.	Student will- 1. Perform An Experiment For Port Scanning With Nmap, Superscan Or Any Other Software. 2. Demonstrate How To Sniff For Router Traffic By Using The Tool Wireshark. 3. Demonstrate Intrusion Detection System (Ids) Using Any Tool Eg . Snort Or Any Other S/W 4. Generate Password Hashes With Open ssl
75	T4-IT53L	Cloud Building within Organization (Deployment of cloud & cloud based applications)	Building cloud using open source technology and installing applications on such a cloud.	Student will able to 1. Design Cloud structure for organization 2. Develop of cloud & cloud based applications using open source technology
Semester-VI Common Courses				

76	ITC61	Open subject for each TRACK* (R Programming)	1.Overviews of R programming. Installation of R Programming. 2.To understand the RStudio interface. 3.To Learn and understand basic structure of R including packages. basic commands in the R programming language. 4. Learn how to handle add on packages, how to use the R help tools and generally how to find your way in the R world.	Student will learn- 1. Installation of R Programming 2. How to navigate in the RStudio interface. 3. Design graphs using data. 4. Understanding basic structure of R including packages. 5. Demonstrate basic commands in the R programming language. 6. You will also learn how to handle add on packages, how to use the R help tools and generally how to find your way in the R world.
77	ITC61L	Open subject LAB (R Programming)	Student should able to develop the Data Analysis as per requirement. learn how to handle add on packages, how to use the R help tools and generally how to find your way in the R world.	Student will- 1. Understand R expressions, variables, and functions 2. Grouping values into vectors, then doing arithmetic and graphs with them 3. Create and graphing two-dimensional data sets 4. Calculate and plot some basic statistics: mean, median, and standard deviation 5. Demonstrate Data Frames: Organizing values into data frames, loading frames from files and merging them 6. Work With Real-World Data: Testing for correlation between data sets, linear models and installing additional packages
78	ITC61P	Project	1.To Understand the customer requirement and Design logical Diagram 2. To Create project flow structure 3. To Recall project Development Life Cycle 4. To Relate SRS and Project Outcome 5. To Take part in Data Analysis Design and coding	Student will- 1. Understand the customer requirement and Design logical Diagram 2. Create project flow structure 3. Recall project Development Life Cycle 4. Relate SRS and Project Outcome 5. Take part in Data Analysis Design and coding 6. Formulate the various technologies in Project.