

Course Curriculum Scheme for M.Tech(5 yrs)

Code	Subject	Code	Subject
Semester 1		Semester 2	
IT-101A	Mathematics	IT-201	Chemistry and Environment Sciences
IT-106A	Communication Skills	IT-202	Probability and Statistical Methods
IT-103A	Physics	IT-203	Digital Computer Organization
IT-104	C Programming	IT-204	Basic Electronics
IT-105	PC Software	IT-206B	Programming with C++
IT-107C	C programming Lab	IT-207B	C++ Programming Lab
IT-107D	PC Software lab	IT-210C	Basic Electronics Lab
Semester 3		Semester 4	
IT-311	Linear Algebra	IT-401B	IT Act & Cyber Law
IT-301A	French	IT-402A	Numerical Analysis & Design
IT-304	Digital Electronics	IT-403B	Data Base Management System
IT-302B	DS with C++	IT-409	Data & Computer Communication
IT-306	Engineering Drawing	IT-405A	UNIX Operating System
IT-308D	Digital Elex. Lab	IT-407B	Data Base Management System Lab
IT-307B	DS Lab	IT-407D	UNIX Operating System Lab
Semester 5		Semester 6	
IT-501C	Computer Architecture	IT-601A	Computer Network and Security
IT-502A	Microprocessor and Assembly Language	IT-612	System Programming
IT-505B	Programming in Java	IT-610	Advanced Java
IT-511	System Analysis and Design	IT-603A	Web Technology
IT-512	Discrete Structures	IT-605A	Analysis and Design of Algorithms
IT-507C	Programming in Java Lab	IT-609A	Advanced Java Lab
IT-508E	Microprocessor and Assembly Language Lab	IT-608E	Web Technology Lab

Code	Subject	Code	Subject
Semester 7		Semester 8	
IT-711	Advanced Database Management System	IT-801B	Principles of Programming Language
IT-702A	Theory Of Computation	IT-804B	Mobile and Wireless Computing
IT-712	Computer Graphics and Multimedia	IT-803B	Artificial Intelligence
IT-705	Operating System	IT-802A	Software Engineering
IT-709A	Computer Graphics and Multimedia Lab	IT-805A	Cloud Computing
IT-710	Project		Elective –I 1.IT-808: Bio Informatics 2. IT-809: Image Processing 3. IT-810: Simulation and Modelling 4.IT-811A:Information Security 5.IT-812:Real Time System
Semester 9		Semester 10	
IT-901B	Data Mining and Warehousing	IT-1005D	Project
IT-908A	Object Oriented Analysis and Design		Industrial Project\ Dissertation of 12 valid credits
IT-902B	IT Project Management		
IT-903B	Research Methodology		
	Elective –II 1.IT-913A:Optimization Techniques 2.IT-914:Parallel Processing 3.IT-915:Information Extraction 4.IT-916:Design Patterns 5.IT-917:Distributed System		
IT-912	Object Oriented Analysis and Design Lab		
IT-906	Project phase I		

M.TECH(IT) 5YRS. SEMESTER I

IT-101A: Mathematics

Course Outcomes:

- CO1: Understand basic concepts of Partial differentiation, Maxima & Minima of the function, convergence and divergence of the series.
- CO2: Solve mathematical problems based on the course material.
- CO3: Develop mathematical skills and methods appropriate for students in the computer science.
- CO4: Gain knowledge to apply mathematics in complex computer engineering problems.

IT-106A: Communication Skills

Course Outcomes:

- CO1: Understand the need to reflect upon interpersonal communication practices.
- CO2: Gain knowledge of concepts, theories, and research findings in interpersonal communication.
- CO3: Practice communication skills in a supportive environment.

IT-103A: Physics

Course Outcomes:

- CO1: Understand the core concepts of physics.
- CO2: Apply knowledge and understanding of physics.
- CO3: Develop the analytical approach to model physical phenomena.
- CO4: Understand the impact of physics on society.

IT-104: C Programming

Course Outcomes:

- CO1: Develop the logic for the given problem.
- CO2: Recognize and understand the syntax and construction of C code.
- CO3: Gain experience of procedural language programming.
- CO4: Know the steps involved in compiling, linking and debugging C code.
- CO5: Apply all the concepts for problem solving in real life.

IT-105: PC Software

Course Outcomes:

- CO1: Understand basic units and model of computer.
- CO2: Learn number system for data representation in computer.
- CO3: Gain basic knowledge of Operating system and DBMS.
- CO4: Learn working with MS Office and Internet.

M.TECH(IT) 5YRS. SEMESTER II

IT-201: Chemistry & Environment Science

Course Outcomes:

- CO1: Gain knowledge about various polymers and uses of them.
- CO2: Understand different types of pollution.
- CO3: Understand society, ethics and human values.

IT-202 :- Probability and Statistical Methods

Course Outcomes:

- CO1: Understand basic concepts of Probability and Statistical Methods for data analysis.
- CO2: Learn Hypothesis testing.
- CO3: Learn the application of different tests such as Chi-square, T & F statistic.

IT-203: Digital Computer Organization

Course Outcomes:

- CO1: Study the various functional units of CPU.
- CO2: Study functioning of ALU and CU.
- CO3: Understand instruction formats and addressing modes.
- CO4: Understand interconnection and interfacing of various units of computer system.

IT-204: Basic Electronics

Course Outcomes:

- CO1: Understand basic components of circuits.
- CO2: Gain knowledge of the use of diodes as power supply rectifiers.
- CO3: Learn the operation of transistors as switching circuits.

IT-206B: Programming with C++

Course Outcomes:

- CO1: Understand object-oriented programming features in C++.
- CO2: Apply these features to program design and implementation.
- CO3: Learn the basic constructs and syntax of C++.
- CO4: Build good quality software using object-oriented techniques.

M.TECH(IT) 5YRS. SEMESTER III

IT-311: Linear Algebra

Course Outcomes:

- CO1: Develop the ability to solve problems using linear algebra.
- CO2: Understand basic concepts of linear equations, matrix calculus and basic vectors operations.
- CO3: Comprehend the use of various forms of complex numbers to solve numerical problems
- CO4: Emphasize computational problems of linear Algebra
- CO5: Develop abstract and critical reasoning by studying logical proofs and the Axiomatic method as applied to linear algebra

IT-301A French

Course Outcomes:

- CO1: Get acquainted with a foreign language-French.
- CO2: Understand vocabulary and grammar of French language.
- CO3: Practical command of French, emphasizing language as means of communication.
- CO4: Exposure of some aspects of France, its people and culture.
- CO5: Emphasize and develop structural ,phonological and semantical linguistics skills.

IT-304: Digital Electronics

Course Outcomes:

- CO1: Understand fundamental concepts and techniques in digital electronics

- CO2: Understand the structure of various number systems and its applications.
- CO3: Designing various combinational and sequential circuits and its applications.
- CO4: Understand TTL and CMOS circuit characteristics, followed by logic devices such as flip-flops, code converters, counters, multiplexers, and registers.

IT-302B: Data Structures with C++

Course Outcomes:

- CO1: Understand data structures such as linear lists, stacks, queues. Data structure and algorithms design method for a specified application.
- CO2: Write data structures programs using object-oriented design principles.
- CO3: Be familiar with advanced data structures such as balanced tree, search tree, priority queues and graphs.
- CO4: Get a good understanding of sorting and searching techniques.

IT-306: Engineering Drawing

Course Outcomes:

- CO1: Inculcate proper understanding of the theory of projection.
- CO2: Exposure of the visualization skills.
- CO3: Gain knowledge of various concepts like dimensioning, conventions and standards related to working drawings in order to become professionally efficient.
- CO4: Learn basics of CAD/CAM software tools.

M.TECH(IT) 5YRS. SEMESTER IV

IT-401B : IT Act & Cyber Laws

Course Outcomes:

- CO1: Understand the basics of Cyber crime and its peculiarity.
- CO2: Understand the Need for Cyber law and other governing laws.
- CO3: Knowledge of Cyber Law in International and national arenas.
- CO4: Handle the issues arising out of web and Internet transactions.
- CO5: Handle Practical Case laws on Cyber crimes in India.

IT-402A : Numerical Analysis & Design

Course Outcomes:

- CO1: Apply different numerical techniques to solve engineering problems .
- CO2 : Solve numerical approximations of an equation by Newton method, Bisection Method, Secant Method, etc.
- CO3: Using finite differences for interpolation and learn various interpolation methods.
- CO4: Understand numerical integration and differentiation.
- CO5: Establishing the limitations ,pros and cons of numerical methods.

IT-403B: Data Base Management System

Course Outcomes:

- CO1: Understand the necessary concepts for database designing.
- CO2: Design conceptual, logical database model and physical model.
- CO3: Evaluate set of query using SQL and Relational algebra.
- CO4: Understand the Concepts of RDBMS and Object oriented modeling

IT – 409 : Data and Computer Communication

Course Outcomes:

- CO1: Understand basic data communication components.

- CO2: Understand the fundamentals of signaling and data transmission.
- CO3 : Gain knowledge of Error detection and correction mechanisms
- CO4: Functions of Data link layer and data link protocols.
- CO5: Understand LAN standards.

IT-405A: UNIX Operating System

Course Outcomes:

- CO1 : Understand UNIX as operating system.
- CO2: Understand UNIX shell and its functionality.
- CO3: Learn to execute UNIX commands.
- CO4: Learn to send and receive electronic mail and what are its real-world limitations
- CO5: File handling and shell programming concepts.

M.TECH(IT) 5YRS. SEMESTER V

IT-501C Computer Architecture

Course Outcomes:

- CO1 : Understand the concepts of design and analysis of the hardware of a computer system and its components such as control unit, arithmetic and logical (ALU) unit, input/output, and memory unit.
- CO2: Concepts of microprogramming in the design of the central processing unit of a computer system.
- CO3: Understand various ways for interconnecting I/O devices to the system.
- CO4: Learn basic concepts of parallel processing

IT-502A: Microprocessor & Assembly Language

Course Outcomes :

- CO1: Understand the basic concepts of microprocessor and assembly language programming.
- CO2 : Understand the operation of microprocessors.
- CO3: Assembly language programming skills .
- CO4: Importance of peripheral devices
- CO5 : Case Study of some popular microprocessors.

IT-505B: Programming in Java

Course Outcomes :

- CO1: Understand fundamentals of Java programming language such as its syntax, idioms, patterns, and styles with object oriented programming concepts.
- CO2 : Understanding fundamentals of object oriented programming in the Java, including defining classes, invoking methods, using class libraries etc and exception handling mechanisms.
- CO3 : Have the ability to write a Java program to solve specified problems.
- CO4: Understand the principles of polymorphism and inheritance
- CO5: Identify the usage of interfaces, packages
- CO6: Identify the usage of collection framework

IT-511: System Analysis & Design

Course Outcomes :

- CO1 : Understand system characteristics, project management, prototyping, and systems development life cycle phases.
- CO2: Transform requirements specification onto practical and achievable design specifications

- CO3 : Evaluate a wide range of problems related to the analysis and design of information systems.
- CO4: Develop team building and communication and interviewing skills , which are essential to successful system projects

IT-512 : Discrete Structures

- CO1: Understand the notation of mathematical concepts, proofs .
- CO2: Enhance mathematical reasoning
- CO3: Understand Discrete Mathematics such as sets, permutations, relations, graphs, trees and finite-state machines.
- CO4 : Enhance algorithmic thinking and apply in problem solving.

M.TECH(IT) 5YRS. SEMESTER VI

IT-601A: Computer Networks and Security

Course Outcomes:

- CO1: Understand about network components, topologies, network models, protocols and algorithms.
- CO2: Understand the functions of OSI reference and TCP/IP model.
- CO3: Knowledge of the functions of Application layer and Presentation layer paradigms and Protocols.
- CO4: Understand the Session layer design issues and Transport layer services.
- CO5: Exposure of Network layer and routing algorithms, congestion handling mechanisms
- CO6: Exposure of cryptography and various network security algorithms.

IT-612: System Programming

Course Outcomes:

- CO1: Understand basic concepts of system software and system programming.
- CO2: Learn the design of assemblers, compilers and preprocessors.
- CO3: Understand the structure and design of assembler, compiler, linker and loader.
- CO4: Understand the concept and theory behind the implementation of high level languages.

IT-610: Advanced Java

Course Outcomes:

- CO1: Design and develop an understanding of the web applications of Java.
- CO2: Learn Java programming language with new and enhanced versions.
- CO3: Develop skills to program GUI, Threads, Servlets and JSP based systems.
- CO4: Develop distributed object applications.

IT-603A: Web Technology

Course Outcomes:

- CO1: Understand the fundamental concepts of working of internet.
- CO2: Design, format and link web pages
- CO3: Write dynamic interfaces using JavaScript.
- CO4: Connect databases to web sites.
- CO5: Develop web application using HTML, CSS, XML, JavaScript etc.

IT-605A: Analysis and Design of Algorithm

Course Outcomes:

- CO1: Learn good principles of algorithm design.

- CO2: Understand the application of algorithms and design techniques to solve problems.
- CO3: Analyze the complexities of various problems in different domains and design efficient algorithms.
- CO4: Understand asymptotic notation to provide a rough classification of algorithms
- CO5: Study algorithms for fundamental problems in computer science and engineering work and compare with one another.
- CO6: Understand the problems for which it is unknown whether there exist efficient algorithms or even algorithm

M.TECH(IT) 5YRS. SEMESTER VII

IT-711: Advanced Database Management System

Course Outcomes:

- CO1: Learn advanced features of DBMS and build capacity to implement and maintain an efficient database system using emerging trends.
- CO2: Master the concepts and design with proficiency databases under the relational model.
- CO3: Understand the concept of a transactions and ACID properties.
- CO4: Proficiency in the choice of DBMS platform to use for specific requirements.
- CO5: Acquaint with a broad range of data management issues including data integrity and security, transaction processing and others.
- CO6: Exposure of distributed DBMS, object database management, data warehousing and data mining.

IT-702A: Theory Of Computation

Course Outcomes:

- CO1: Gain knowledge about the basic concepts of Computation.
- CO2: Understand regular expressions, which are used to specify string patterns in many contexts, from office productivity software to programming languages.
- CO3: Understand finite automata, formalism mathematically equivalent to regular expressions, Finite automata are used in circuit design and in some kinds of problem-solving.
- CO4: Learn Context-free grammars to specify programming language syntax.
- CO5: Understand computability theory and decision problems.

IT -712: Computer Graphics & Multimedia

Course Outcomes:

- CO1: Understand the fundamental concepts of Computer Graphics and Multimedia.
- CO2: Learn the graphics techniques and algorithms.
- CO3: Knowledge of different display devices and their functioning.
- CO4: Exposure of Windowing and Clipping techniques.
- CO5: Knowledge of multimedia concepts and various I/O technologies.
- CO6: Develop design animations, flash movies etc.

IT-705: Operating System

Course Outcomes:

- CO1: Understands function, structures and history of operating system.
- CO2: Understanding of design issues associated with operating systems.
- CO3: Understands various process management concepts including scheduling, synchronization, multithreading and deadlocks.
- CO4: Understands concepts of memory management including virtual memory.
- CO5: Understands how system resources are shared among the users.

- CO6: Learn issues related to file system interface and disk management.
- CO7: Becomes familiar with protection and security mechanisms.
- CO8: Becomes familiar with various types of operating systems including Unix.

M.TECH(IT) 5YRS. SEMESTER VIII

IT-801B: Principles of Programming Languages

Course Outcomes:

- CO1: Define the semantics of programming language.
- CO2: Investigate semantic issues in programming languages
- CO3: Solve problems using a range of programming paradigms.
- CO4: Assessment of different programming paradigms for a particular problem.

IT-804B: Mobile and Wireless Computing

Course Outcomes:

- CO1 : Understand the basic concepts of cellular system .
- CO2: Understand the GSM architecture.
- CO3: Understand the concept of wireless LAN, Mobile networks and sensor networks.
- CO4: Acquaint with structures and components of mobile IP.
- CO5: Understanding the techniques for security and privacy.
- CO6: Possible future of Mobile Computing and Applications.

IT-803B: Artificial Intelligence

Course Outcomes:

- CO1: Exposure to techniques of solving problems that need human intelligence.
- CO2: Formulate Artificial Intelligence problems
- CO3: Using of heuristic techniques to solve the AI problem.
- CO4: Understand the concepts of Knowledge Representation and Issues.
- CO5: Explore the types of Knowledge, Representation and mapping, approaches and issues in knowledge representation.
- CO6: Formulate Predicate Logics.
- CO7: Learn and implements the concepts through Prolog Programming:

IT-802A: Software Engineering

Course Outcomes:

- CO1: Knowledge of various software application domains and different process model used in software development.
- CO2: Understand various activities undertaken for software development project.
- CO3: Develop a software project proposal
- CO4: Develop software requirement specification and design documents.
- CO5: Understanding of approaches of verification, validation and various testing approaches.
- CO6: Organize different activities of project as per Risk impact factor.
- CO7: Understanding of quality control standards.

IT-805A: Cloud Computing

Course Outcomes:

- CO1: Understand the concepts, characteristics, delivery models and benefits of cloud computing
- CO2: Understand the key security and compliance challenges of cloud computing
- CO3: Understand the key technical and organizational challenges
- CO4: Understand the different characteristics of public, private and hybrid cloud deployment

models.

CO5: Apply different cloud programming model as per need.

CO6: Explore some important cloud computing driven commercial systems such as Google Apps, Microsoft Azure and Amazon Web Services and other businesses cloud applications.

CO7: Explore the concepts of VM management and Cloud Security.

IT-808: Bio – Informatics

Course Outcomes:

CO1: Develop an understanding of the basic principles of molecular and cell biology.

CO2: Become familiar with existing tools and resources for computational analysis of biological data, including sequences, phylogenies, microarrays, ontologies, and bio-molecular interactions.

CO3: Understand basic abstractions and computational approaches used for analysis including data warehouses, data mining, programming languages.

CO4: Analyse biological data using computational methods, as well as investigating problems in molecular and biology from a computational perspective

IT-809: Image Processing

Course Outcomes:

CO1: Knowledge of basic concepts of a digital image processing system.

CO2 : Analyze images in the frequency domain using various transforms.

CO3 : Exposure of the techniques for image enhancement and image restoration.

CO4 : Learn various compression techniques.

CO5: Interpret Image compression standards.

CO6 : Learn image segmentation and representation techniques.

IT-811A: Information Security

Course Outcomes:

CO1: Knowledge of basic concepts of Information Security.

CO2: Insight and expertise in information security technology, digital forensics or security management.

CO3: Learn different Cryptographic Algorithms.

CO4: Apply knowledge in new areas within the field of information security.

IT-812: Real Time System

Course Outcomes:

CO1: Understand the basic concepts and the classification of real time systems.

CO2: Gain knowledge of requirements for Real time systems.

CO3: Become aware of various real time languages.

CO4: Model real time systems using the concepts of RTOS.

CO5: Analyze various examples of real time systems.

M.TECH(IT) 5YRS. SEMESTER IX

IT-901B: Data Mining & Warehousing

Course Outcomes:

CO1: Understand basic concepts of data warehousing and data mining.

CO2: Understand On Line Analytical Processing (OLAP).

CO3: Learn data mining techniques and understand various algorithms.

CO4: Knowledge of data mining tools and ETL tools.

IT-908A: Object Oriented Analysis and Design

Course Outcomes:

- CO1: Understand the importance and basic concepts of object oriented modelling,
- CO2: Specify, analyze and design the use case driven requirements for a particular system.
- CO3: Model the event driven state of object and transform them into implementation specific layouts.
- CO4: Identify, analyze the subsystems, various components and collaborate them interchangeably.

IT-902B: Information Technology & Project Management

Course Outcomes:

- CO1: Understand basic concepts of ITPM.
- CO2: Develop the concepts of project integration.
- CO3: Knowledge of project quality management etc.
- CO4: Concepts of Human resource planning.
- CO5: Understand project communication management.
- CO6 : Implementation of the concepts of ITPM in real world applications.

IT-903B: Research Methodology

Course Outcomes:

- CO1: Critically analyse research methodologies identified in existing literature
- CO2: Distinguish appropriate research designs and methodologies .
- CO3: Develop a comprehensive research methodology for a research question.
- CO4: Identify different ways to collect qualitative and quantitative data.
- CO5: Develop a broad understanding of the range of field-related education theories ,ideas and concepts
- CO6: Successfully develop and defend a research proposal

IT-913A: Optimization Techniques

Course Outcomes:

- CO1: Understand different techniques of optimization, which help in analyzing the process of decision- making.
- CO2: Learn problem formulation of optimization.
- CO3: Learn the methods of optimization.
- CO4: Exposure of the applications of optimization.
- CO5: Understand basic concepts of Linear programming and Dynamic Programming

IT-914: Parallel Processing

Course Outcomes:

- CO1: Understand the concepts of design hardware of Parallel systems and its components.
- CO2: Learn concept of parallel processing.
- CO3: Understand various model of parallel computing.
- CO4: Understand distributed computing systems.

M.TECH(IT) 5YRS. SEMESTER X

IT-1002 D Project

Course Outcomes:

- CO1: Prepare student for a professional career .
- CO2: Hands-on training as per the demand of industry.

CO3: Provides lifelong learning experience
