

Subject List M. Tech CSE

S. No.	PTU Code	Subject Name
1	MTCS-101-18	Mathematical foundations of Computer Science
2	MTCS-102-18	Advanced Data Structures
3	MTCS-105-18	Machine Learning
4	MTCS 108-18	Data Science
5	MTRM 101-18	Research Methodology and IPR
6	MTA-XX	Audit Course
7	MTCS 103-18	Advanced Data Structures Lab.
8	MTCS-104-18	Machine Learning Lab
9	MTCS-201-18	Advance Algorithms
10	MTCS-202-18	Soft computing
11	MTCS-208-18	Computer vision
12	MTCS 209-18	Human Computer Interactions
13	MTA-XX	Audit Course
14	MTCS 203-18	Advance Algorithms Lab
15	MTCS 204-18	Computer vision Lab
16	MTCS-205-18	Mini Project with seminar
17	MTCS-303-18	Compiler for HPC
18	MTOE 301-18	Business Analytics
19	MTCS 301-18	Dissertation -I
20	MTCS 305-18	Institutional Training
21	MTCS 401-18	Dissertation - II

Course Outcomes M.Tech 1st Year CSE

1st Semester

Mathematical Foundation of Computer Science (MTCS 101-18)	
CO1	Identify the characteristics of different discrete and continuous distributions and the type of statistical situation to which different distributions can be applied.
CO2	Demonstrate understanding of the theory of sampling distribution and maximum likelihood estimation.
CO3	Make use of graphs as unifying theme for various combinatorial problems.
CO4	Interpret the methods of statistical inference and the role that sampling distributions play in those methods.
CO5	Develop the understanding of the mathematical and logical basis to many modern techniques in information technology like machine learning, programming language design and concurrency.

Advanced Data Structure (MTCS 102-18)	
CO1	Choose appropriate data structures and algorithms, understand the concept of advanced abstract data type and use it to design algorithms to solve complex engineering problems.
CO2	Constructing various symbol tables using hash techniques to solve problems efficiently and provide better solution in terms of complexity.
CO3	Identify various algorithms for skip list & trees and come up with analysis of efficiency and proofs of correctness
CO4	Develop algorithms for text processing applications and analyse their performance.
CO5	Select algorithm design approaches to solve computational geometry problems in a specific manner to improve performance.

Machine Learning (MTCS 105-18)	
CO1	Identify the basics of learning problems with hypothesis and version spaces.
CO2	Demonstrate the features of machine learning to apply on real world problems.
CO3	Categorize the machine learning algorithms as supervised and unsupervised learning approach and analyse them.
CO4	Analyse the concept of neural networks for learning linear and non-linear activation functions.
CO5	Elaborate the concepts in Bayesian analysis from probability models and methods.
CO6	Analyse and design various Genetic Algorithm for optimization of engineering problems.

Data Science (MTCS 108-18)	
CO1	Illustrate with the knowledge and expertise to become a proficient data scientist.
CO2	Demonstrate an understanding of statistics and machine learning concepts that are vital for data science
CO3	Build Python code to statistically analyses a dataset
CO4	Evaluate data visualizations based on their design and use for communicating stories from data
CO5	Create database connectivity with front end

Research Methodology-IPR (MTRM 101-18)	
CO1	Summarize research problem formulation.
CO2	Analyse research related information.
CO3	Plan a well-structured research paper and scientific presentations.
CO4	Assess various IPR components and process of filing.
CO5	Infer the adequate knowledge on patent and rights.

Audit Course - English for Research Paper Writing (MTA-A01)	
CO1	Outline that how to improve your writing skills
CO2	Identify techniques improve level of readability
CO3	Develop skills of writing each section of the paper
CO4	Analyzing skills required to write a quality paper
CO5	Improve technical thinking and creative abilities

Advanced Data Structure Lab (MTCS 103-18)	
CO1	Analyze algorithms and to determine algorithm correctness and complexity using hashing techniques.
CO2	Design programs using a variety of data structures, including list, tree structures and analyse their complexity.
CO3	Implement and know the application of algorithms for computational geometry problems
CO4	Illustrate how text processing algorithms can be used to solve various real time problems.
CO5	Apply and implement learned algorithms design techniques in a project to get exposure to solve problems.

Machine Learning Lab (MTCS 104-18)	
CO1	Make use of the various machine learning tools.
CO2	Implement and analyse the procedures for supervised and unsupervised learning.
CO3	Design and implement Python programs to solve real time problems.
CO4	Apply appropriate datasets to implement SVM classification and analyse them through graphical outcomes.
CO5	Apply and implement learned algorithms design techniques in a project to get exposure to solve problems.

2nd Semester

Advanced Algorithm (MTCS 201-18)	
CO1	Analyze the complexity/performance of different algorithms.
CO2	Determine the appropriate algorithms for solving a particular set of problems.
CO3	Conclude necessary mathematical abstraction to solve problems.
CO4	Categorize the different problems in various classes according to their computation difficulties.
CO5	Discuss recent activities in the field of the advanced data structure.

Soft Computing (MTCS 202-18)	
CO1	Infer the concepts of soft computing techniques and identify their roles in building intelligent machines.
CO2	Implement fuzzy logic and neural based methods to handle uncertainty and solve various engineering problems.
CO3	Apply genetic algorithms to combinatorial optimization problems.
CO4	Implementation of the different methods using tools and libraries.
CO5	Evaluate recent trends of machine learning and deep learning algorithms with its application.

Computer Vision (MTCS 208-18)	
CO1	Interpret the basics of Image Formation, Measurement, and, Analysis
CO2	Analyze various Image Detection and Segmentation techniques
CO3	Implement Dimensionality reduction methods for Feature Extraction
CO4	Applying several Clustering and Classification algorithms using different classifier techniques

Human Computer Interaction (MTCS 209-18)	
CO1	Explain the structure of models and theories of human computer interaction and vision.
CO2	Identify and apply the guidelines for user interface.
CO3	Examine the architecture of mobile Human Computer interaction.
CO4	Design an interactive web interface on the basis of models studied.

Audit Course - English for Research Paper Writing (MTA-A01)	
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Advanced Algorithm Lab (MTCS 203-18)	
CO1	Implement Dijkstra's algorithm for single-source shortest path in a weighted directed graph.
CO2	Determine all-pairs shortest path using Floyd-Warshall algorithm.
CO3	Formulate inverse of a triangular matrix using divide and conquer strategy
CO4	Compile modulo representation from base (decimal/hexa) representation.
CO5	Implement FFT.

Computer Vision Lab (MTCS 204-18)	
CO1	Developed the practical skills necessary to build computer vision applications
CO2	Analyze various Image Detection and Segmentation techniques
CO3	Perceive exposure to Object and Scene Recognition and categorization from images
CO4	Discuss the principles of state-of-the-art Deep Neural Networks

Mini Project with seminar (MTCS 205-18)	
CO1	Inspect about advance programming tools and techniques
CO2	Identify and solve real-world problems
CO3	Improve skills to write technical report
CO4	Develop moral ethics such as commitment, teamwork spirit to achieve continuous development
CO5	Propose and communicate ideas clearly in a creative manner

2nd Year

3rd Semester

Compiler for HPC (MTCS 303-18)	
CO1	Familiar with the structure of compiler.
CO2	Parallel loops, data dependency and exception handling and debugging.

Business Analytics (MTOE 301-18)	
CO1	Students will demonstrate knowledge of data.
CO2	Students will demonstrate the ability of think critically in making decisions based on data and deep analytics.
CO3	Students will demonstrate the ability to use technical skills in predicative and prescriptive modeling to support business decision-making.
CO4	Students will demonstrate the ability to translate data into clear, actionable insights.

Dissertation - I (MTCS 301-18)	
CO1	Demonstrate sound fundamentals in a chosen area of computing
CO2	Identify and formulate a problem of research interest in the chosen area of computing
CO3	Analyze the computing problem and propose solutions
CO4	Apply the emerging technologies like – Blockchain, IoT, Robotics, ML, AI, Datamining, Big Data Analytics in solving some challenging problem in chosen area
CO5	Illustrate the work at all stages of the project

Institutional Training (MTCS 305-18)	
CO1	Organize opportunities for practical, hands-on learning from practitioners in the students' areas of specialization.
CO2	Discuss use of advanced tools and techniques encountered during industrial training and visit.
CO3	Interview with industrial personnel and follow engineering practices and discipline prescribed in industry.
CO4	Take part in preparing professional work reports and presentations.

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4th Semester

Dissertation - II (MTCS 401-18)	
CO1	Identify a suitable problem to be solved computationally
CO2	Analysis proposed solutions to the identified computing problem
CO3	Design and develop solutions to the problem and analyze results
CO4	Originate a thesis and defend the thesis on the work done
CO5	Perceive the knowledge base in the chosen area of computing, adhering to ethical practices at every stage