



**DR. A P J ABDUL KALAM UNIVERSITY,  
INDORE**

## **SYLLABUS**

*of*

**MASTER OF TECHNOLOGY (COMPUTER SCIENCE  
ENGINEERING)**

**Department of Computer Science  
(Second Year)**

**(Session July- December 2017)**

**College of Engineering**

**Dr. A P J Abdul Kalam University, Indore**

# **DR. A P J ABDUL KALAM UNIVERSITY, INDORE**

## **Syllabus for Master of Technology (Computer Science Engineering)**

### **Department of Computer Science**

#### **List of Subject (Second Year)**

<b>S. No.</b>	<b>Subject Code</b>	<b>Subject name</b>	<b>Page No.</b>
1	MTCSE-301[1]	Data mining and warehousing	3
2	MTCSE-301[2]	Digital Image Processing	4
3	MTCSE-302[ 1]	Network security and cryptography	5
4	MTCSE-302[ 2]	Simulation and modelling	6
5	MTCSE-303	Seminar	7
6	MTCSE-304	Dissertation Part I (Literature Review/Problem Formulation/Synopsis)	8
7	MTCSE 401	Dissertation Part- II	9
8			
9			
10			
11			
12			
13			
14			
15			
16			

**Unit 1 : Introduction**:- Data Mining: Definitions, KDD v/s Data Mining, DBMS v/s Data Mining , DM techniques, Mining problems, Issues and Challenges in DM, DM Application areas.

**Unit 2: Association Rules & Clustering Techniques:** Introduction, Various association algorithms like A Priori, Partition, Pincer search etc., Generalized association rules. Clustering paradigms; Partitioning algorithms like K-Medoid, CLARA, CLARANS; Hierarchical clustering, DBSCAN, BIRCH, CURE; categorical clustering algorithms, STIRR, ROCK, CACTUS.

**Unit 3 : Other DM techniques & Web Mining:** Application of Neural Network, AI, Fuzzy logic and Genetic algorithm, Decision tree in DM. Web Mining, Web content mining, Web structure Mining, Web Usage Mining.

**Unit 4 : Temporal and spatial DM:** Temporal association rules, Sequence Mining, GSP, SPADE, SPIRIT, and WUM algorithms, Episode Discovery, Event prediction, Time series analysis. Spatial Mining, Spatial Mining tasks, Spatial clustering, Spatial Trends.

**Unit 5 : Data Mining of Image and Video :** A case study. Image and Video representation techniques, feature extraction, motion analysis, content based image and video retrieval, clustering and association paradigm, knowledge discovery.

#### **References :**

- [1]. Data Mining Techniques ; Arun K.Pujari ; University Press.
- [2]. Data Mining; Adriaans & Zantinge; Pearson education.
- [3]. Mastering Data Mining; Berry Linoff; Wiley.
- [4]. Data Mining; Dunham; Pearson education.
- [5]. Text Mining Applications, Konchandy, Cengage

**Unit 1:** Image representation, fundamental steps in image processing, image model. Sampling & quantization. Neighbors of a pixel, connectivity and distance measures. Basic transformations and perspective transformations. Two dimensional Fourier transform, Discrete Fourier transform and their properties. Fast Fourier transform, Walsh Transform, Hadamard transform and Discrete Cosine transform.

**Unit 2:** Image Enhancement: Intensity transformations, histogram processing, Image subtraction, image averaging, Spatial filtering-smoothing and sharpening filters, frequency domain filtering methods-low pass filtering, high pass filtering, median filtering.

**Unit 3:** Image compression: Redundancy and its types. Image compression model, variable length coding, bit plane coding, constant area coding, run length coding, lossless and lossy predictive coding, transform coding.

**Unit 4:** Image restoration and Segmentation: Degradation model, effect of diagonalisation on degradation, algebraic approach. Detection of discontinuities by point, line and edge detection. Edge linking, graph theoretic techniques, thresholding techniques, region oriented segmentation.

**Unit 5:** Representation & Description: Chain codes, polygonal approximations, signatures, boundary segments, skeleton, boundary descriptors, shape descriptors regional descriptors, image morphology-dilation, erosion, opening, closing, thickening, thinning, skeleton, pruning, hit or miss transform.

**References:-**

- [1]. R.C Gonzalez & Richard E Wood, "Digital Image Processing" ,Addison Wesley Publishing
- [2].Anil K Jain, "Fundamentals of Digital image processing". PHI.
- [3] Sonka, Hlavac, Boyle, "Digital image processing and computer vision", cengage learning,India Edition.
- [4]B Chanda, D. Dutta Majumder, "Digital image Processing and Analysis", PHI

**Unit 1:Convention Encryption :** Conventional Encryption Model , Steganography , Classical Encryption Techniques, Simplified DES , Block Cipher Principles , The Data Encryption Standard, The Strength of DES , Differential and Linear Cryptanalysis, Block Cipher Design Principles, Block Cipher Modes of operation,

**Unit 2: Conventional Encryption algorithms :**Public Key Encryption And Hash Functions Public Key Cryptography , Principles of Public Key Cryptosystems , The RSA Algorithm ,

**Unit 3: Key Management ,** Diffie Hellman Key Exchange , Elliptic Curve Cryptography Message Authentication and Hash Functions Authentication Requirements, Authentication Functions, Message Authentication Codes , Hash Functions , Security of Hash Functions Hash And Mac Algorithms MD5 Message Digest Algorithm , Secure Hash Algorithm (SHA-D) , RIPEMD , HMAC Digital Signatures and Authentication Protocols Digital Signatures ,

**Unit 4: Authentication Protocols -**Digital Signature Standard Authentication Applications , IP Security , Web Security Intruders, Viruses and Worms Intruders , Viruses and Related Threats Firewalls Firewall Design Principles , Trusted Systems

**References:**

- [1]. William Stallings, “ Cryptography and Network Security”, Second edition, Prentice Hall, 1999.
- [2]. Atul Kahate, “ Cryptography and Network Security,” TMH
- [ 3]. William Stallings,"Cryptography and Network Security",Third Edition, Pearson Ed
- [4]. Introduction to network security, Krawetz, Cengage

**Unit 1: Introduction to modeling and simulation:** Modeling and simulation methodology, system modeling , concept of simulation, continuous and discrete time simulation. Basic concept of probability and random variables continuous and discrete random variables, distribution of random variables: discrete and continuous, Compartmental models: linear, nonlinear and stochastic models.

**Unit 2: Introduction to Queuing Theory:** Characteristics of queuing system, Poisson's formula, birthdeath system, equilibrium of queuing system, analysis of M/M/1 queues. Application of queuing theory in computer system like operating systems, computer networks etc. System Dynamics

**Unit 3: modeling:** Identification of problem situation , preparation of causal loop diagrams and flow diagrams, equation writing, level and rate relationship. Simulation of system dynamics models.

**Unit 4: Verification and validation:** Design of simulation experiments, validation of experimental models, testing and analysis. Simulation languages comparison and selection, study of Simulation sw -SIMULA, DYNAMO, STELLA, POWERSIM.

**References :**

- [1]. Gordon G., System simulation, Printice Hall.
- [2]. Payer T., Introduction to system simulation, McGraw Hill.
- [3]. Seila, Applied Simulation Modeling, Cengage
- [4]. Spriet, Computer Aided Modeling and Simulation, W.I.A.
- [5]. Sushil, System Dynamics, Wiley Eastern Ltd.
- [6]. Shannon R.E., System simulation, Prentice Hall

