

UNIVERSITY OF LUCKNOW
FACULTY OF ENGINEERING AND TECHNOLOGY

Evaluation Scheme for B. Tech.

Branch: Computer Science & Engineering

SEMESTER - VII

S. No.	Subject Code	Subject Name	L-T-P	Evaluation					Credit
				Sessional			ESE	Grand Total	
				CT	TA	Total			
Theory									
01.	CS-701	Advance DBMS	3--1--0	20	10	30	70	100	4
02.	CS-702	Computer Graphics	3--1--0	20	10	30	70	100	4
03.	CS-703	Artificial Intelligence	3--1--0	20	10	30	70	100	4
04.	CS-704X	Any one from the list (DE-2)	3--1--0	20	10	30	70	100	4
05.	AS-701/ AS-702	Engineering Economics/ Industrial Management	3--0--0	20	10	30	70	100	3
Practical									
06.	CS-751	Advance DBMS Lab	0--0--2	-	20	20	30	50	1
07.	CS-752	Graphics Lab	0--0--2	-	20	20	30	50	1
08.	CS-753	Industrial Training	0--0--2	-	-	50	-	50	1
09.	CS-754	Project	0--0--3	-	-	150	-	150	2
10.	GP-701	General Proficiency				50		50	
			15--4--9					800	24

Abbreviations:

CT - Class Test

ESE - End Semester Examination

TA - Teacher's Assessment

DE - Departmental Elective

Departmental Elective (DE)-2:

1. CS-7041 Cryptography
2. CS-7042 Distributed Computing
3. CS-7043 Semantic Web
4. CS-7044 Data Mining
5. CS-7045 Soft Computing
6. CS-7046 Data Analytics

UNIVERSITY OF LUCKNOW
FACULTY OF ENGINEERING AND TECHNOLOGY

Evaluation Scheme for B. Tech.

Branch: Computer Science & Engineering
SEMESTER - VIII

S. No.	Subject Code	Subject Name	L-T-P	Evaluation					Credit
				Sessional			ESE	Grand Total	
				CT	TA	Total			
Theory									
01.	OE-80XX	Any one from the Open Elective list	3--1--0	20	10	30	70	100	4
02.	CS-801X	Any one from the list (DE-3)	3--1--0	20	10	30	70	100	4
03.	CS-802	Digital Image Processing	3--1--0	20	10	30	70	100	4
04.	AS-801/ AS-802	Engineering Economics/ Industrial Management	3--0--0	20	10	30	70	100	3
Practical									
05.	CS-851	DIP Lab	0--0--2	-	20	20	30	50	1
06.	CS-852	Project	0--0--12	-		100	250	350	8
07.	GP-801	General Proficiency				50		50	
			12-3-14					800	24

Abbreviations:

CT - Class Test

ESE - End Semester Examination

OE – Open Elective

TA – Teacher’s Assessment

DE - Departmental Elective

Departmental Elective (DE)-3:

1. CS-8011 Parallel Algorithms
2. CS-8012 Pattern Recognition
3. CS-8013 Computer Vision
4. CS-8014 Design Pattern
5. CS-8015 Machine Learning
6. CS-8016 Service Oriented Architecture

Open Electives: Refer list of Open Electives in APPENDIX.

CS-701
ADVANCE DBMS

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Unit-1 **08**
Transaction and schedules: Introduction, concurrent execution of transaction, conflict and view serializability, testing for serializability, concepts in recoverable and cascade-less schedules.

Unit-2 **08**
Locking Protocols: Lock based protocols, time stamp-based protocols, multiple granularity and multiversion techniques, enforcing serializability by locks, locking system with multiple lock modes and architecture for locking scheduler.

Unit-3 **08**
Distributed transactions management: Data distribution, fragmentation and replication techniques, distributed commit, distributed locking schemes, long duration transactions, and moss concurrency protocol.

Unit-4 **08**
Issues of recovery and atomicity in distributed databases: Traditional recovery techniques, log based recovery, recovery with concurrent transactions, recovery in message passing systems, checkpoints, algorithms for recovery line, concepts in orphan and inconsistent messages.

Unit-5 **08**
Distributed query processing: Multiway joins, semi joins, cost based query optimization for distributed database, updating replicated data, protocols for distributed deadlock detection, eager and lazy replication techniques.

Text Books:

1. Silberschatz, Korth and Sudershan, "Database System Concept", McGraw Hill.
2. Ramakrishna and Gehrke, "Database Management System", McGraw Hill.
3. Elmasari, Navathe , "Fundamentals of Database Systems", Pearson.

Reference Books:

1. Garcia-Molina, Ullman, Widom, "Database System Implementation", Pearson.
2. Ceei and Pelagatti, "Distributed Database", TMH.
3. Singhal and Shivratri, "Advance Concepts in Operating Systems", MC Graw Hill.

CS-702
COMPUTER GRAPHICS

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Unit-1 **08**

Introduction and Line Generation: Types of computer graphics, graphic displays- random scan displays, raster scan displays, frame buffer and video controller, points and lines, line drawing algorithms, circle generating algorithms, mid-point circle generating algorithm and parallel version of these algorithms.

Unit-2 **08**

Transformations: Basic transformation, matrix representations and homogeneous coordinates, composite transformations, reflections and shearing. **Windowing and clipping:** Viewing pipeline, viewing transformations, 2-D clipping algorithms- line clipping algorithms such as Cohen Sutherland line clipping algorithm, Liang Barsky algorithm and polygon clipping – Sutherland Hodgeman polygon clipping.

Unit-3 **08**

Three Dimensional: 3-D geometric primitives, 3-D object representation, 3-D transformation, 3-D viewing, projections and 3-D clipping.

Unit-4 **08**

Curves and Surfaces: Quadric surfaces, spheres, ellipsoid, blobby objects, polygon meshes parametric and cubic curves, introductory concepts of spline, Bspline, Bezier curves and surfaces.

Unit-5 **08**

Hidden Lines and Surfaces: Back face detection algorithm, depth buffer method, a- buffer method, scan line method, basic illumination models– ambient light, diffuse reflection, specular reflection and Phong model, combined approach, warn model, intensity attenuation, color consideration, transparency and shadows.

Text Books:

1. Donald Hearn and M Pauline Baker, “Computer Graphics C Version”, Pearson.
2. Foley, Vandam, Feiner, Hughes, “Computer Graphics principle”, Pearson.
3. Rogers, “Procedural Elements of Computer Graphics”, McGraw Hill

Reference Books:

1. W.M.Newman, R.F.Sproull ,“Principles of interactive computer graphics”,McGraw
2. Amrendra N Sinha and Arun D Udai,” Computer Graphics”, Tata MCGraw Hill.
3. M.C. Trivedi, NN Jani, "Computer Graphics & Animations", Jaico Publications.

CS-703
ARTIFICIAL INTELLIGENCE

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3 1 0

Unit-1

08

Introduction: Introduction to artificial intelligence, foundations and history of artificial intelligence, applications of artificial intelligence, intelligent agents, structure of intelligent agents, computer vision and natural language processing.

Unit-2

08

Introduction to Search : Searching for solutions, uniformed search strategies, informed search strategies, local search algorithms and optimistic problems, adversarial search, search for games and alpha - beta pruning.

Unit-3

08

Knowledge Representation & Reasoning: Propositional logic, theory of first order logic, inference in first order logic, forward & backward chaining, resolution, probabilistic reasoning, utility theory, Hidden Markov models (HMM) and Bayesian networks.

Unit-4

08

Machine Learning : Supervised and unsupervised learning, decision trees, statistical learning models, learning with complete data - Naive Bayes models and learning with hidden data - EM algorithm and reinforcement learning.

Unit-5

08

Pattern Recognition: Introduction, design principles of pattern recognition system, statistical pattern recognition, parameter estimation methods - Principle Component Analysis (PCA) and Linear Discriminant Analysis (LDA); **Classification techniques** – Nearest Neighbor (NN) rule, Bayes classifier, Support Vector Machine (SVM) and k – means and clustering.

Text Books:

1. Stuart Russell, Peter Norvig, "Artificial Intelligence-A Modern Approach", Pearson.
2. Elaine Rich and Kevin Knight, "Artificial Intelligence", McGraw-Hill.
3. E Charniak and D McDermott, "Introduction to Artificial Intelligence", Pearson.

Reference Books:

1. Dan W. Patterson, "Artificial Intelligence and Expert Systems", Prentice Hall.
2. Saroj Kaushik, "Artificial Intelligence", Cengage Learning.
3. Philip C Jackson, "Introduction to Artificial Intelligence ", Dover Publications.

**CS-7041
CRYPTOGRAPHY**

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Unit-1 **08**

Introduction: Security attacks and cryptography. **Conventional Encryption:** Conventional encryption model, classical encryption techniques- substitution ciphers and transposition ciphers, cryptanalysis, stereography, stream and block ciphers.

Unit-2 **08**

Modern Block Ciphers: Block ciphers principals, Shannon’s theory of confusion and diffusion, Feistel structure, DES, strength of DES, differential and linear crypt analysis of DES, block cipher modes of operations, triple DES, IDEA encryption and decryption, strength of IDEA, confidentiality using conventional encryption, traffic confidentiality, key distribution, and random number generation.

Unit-3 **10**

Finite Fields: Introduction to graph, ring and field, prime and relative prime numbers, modular arithmetic, Fermat’s and Euler’s theorem, primality testing, Euclid’s algorithm, Chinese remainder theorem, discrete logarithms. principals of public key crypto systems, RSA algorithm, security of RSA, key management, Diffie-Hellman key exchange algorithm, introductory idea of elliptic curve cryptography, and Elgamal encryption.

Unit-4 **08**

Message Authentication and Hash Function: Authentication requirements, authentication functions, message authentication code, hash functions, birthday attacks, security of hash functions and MACS, MD5 message digest algorithm, secure hash algorithm(SHA). **Digital Signatures:** Digital signatures, authentication protocols, digital signature standards (DSS), and proof of digital signature algorithm.

Unit-5 **06**

Authentication Applications: Kerberos and X.509, directory authentication service, electronic mail security-pretty good privacy (PGP), and S/MIME.

Text Books:

1. William Stallings, “Cryptography and Network Security: Principals and Practice”, Pearson.
2. Johannes A. Buchmann, “Introduction to Cryptography”, Springer-Verlag.
3. Bruce Schiener, “Applied Cryptography”, Wiley.

Reference Books:

1. Oded Goldreich ,”Foundations of Cryptography” , Cambridge University Press.
2. Alfred J. Menezes, Paul C. Van Oorschot, Scott A. Vanstone “A Handbook of Applied Cryptography”, CRC Press.
3. Wembo Mao, “Modern Cryptography: Theory and Practice”, Pearson Education.

DISTRIBUTED COMPUTING

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Unit-1 **08**

Fundamentals: Evolution of distributed computing systems, System models, issues in design of distributed systems, primitives for distributed communications, synchronous vs asynchronous executions, and models of communication networks.

Unit-2 **08**

Message Passing: Inter process communication, features and issues of message passing systems, issues in IPC by message, synchronization, buffering, multidatagram messages, encoding and decoding of message data, process addressing, failure handling, and group communication.

Unit-3 **10**

Remote Procedure Calls: RPC model, transparency of RPC, implementing RPC mechanism, stub generation, RPC messages, marshalling arguments and results, server management, communication protocols for RPCs, complication RPCs, client server binding, exception handling, security, some special types of RPCs, lightweight RPC, and optimization for better performance.

Unit-4 **06**

Distributed Shared Memory: Design and implementation issues of DSM, granularity, structure of shared memory space, consistency models, replacement strategy, thrashing, other approaches of DSM, and advantages of DSM.

Unit-5 **08**

Synchronization: Clock synchronization and event ordering, **Mutual Exclusion:** Lamport's algorithm, Ricart–Agrawala algorithm, Maekawa's algorithm, token based algorithms, and election Algorithm.

Text Books:

1. M.L.Liu, "Distributed Computing: Principles and Applications", Pearson Education.
2. Ajay D. kshemkalyani, MukeshSinghal, "Distributed Computing", Cambridge Publication.
3. SunitaMahajan, Seema Shah, "Distributed Computing", Oxford Publications.

Reference Books:

1. G. Coulouris, J. Dollimore, "Distributed Systems Concepts and Design", Addison Wesley.
2. M. Singhal, N.G. Shivarathri, "Advanced Operating Systems", McGraw Hill.
3. A.S. Tanenbaum, "Distributed Operating Systems", Prentice Hall.

CS-7043
SEMANTIC WEB

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Unit-1 **08**

Web Intelligence: Thinking and intelligent web applications, the information age ,the world wide web, limitations of today’s web, the next generation web, machine intelligence, artificial intelligence, ontology, inference engines, software agents, Berners-Lee www, semantic road map, and logic on the semantic web.

Unit-2 **08**

Knowledge Representation for the Semantic Web: Ontologies and their role in the semantic web,ontologies languages for the semantic web –resource description framework(RDF) / RDF schema, Ontology Web Language(OWL), UML, and XML/XML schema.

Unit-3 **08**

Ontology Engineering: Ontology engineering, constructing ontology, ontology development tools, ontology methods, ontology sharing and merging, ontology libraries, ontology mapping, logic, rule and inference engines.

Unit-4 **08**

Semantic Web Applications, Services and Technology: Semantic web applications and services, semantic search, E-learning, semantic bioinformatics, knowledge base ,XML based web services, creating an OWL-S ontology for web services, semantic search technology, web search agents, and semantic methods.

Unit-5 **08**

Social Network Analysis and Semantic Web: Social networks analysis, development of the social networks analysis, electronic sources for network analysis – electronic discussion networks, blogs and online communities, web based networks, and building semantic web applications with social network features.

Text Books:

1. Berners Lee, Godel, Turing, “Thinking on the Web” , Wiley.
2. Peter Mika, “Social Networks and the Semantic Web”, Springer.
3. Liyang Yu,”Introduction to the Semantic Web and Semantic Web Services” , CRC Press.

Reference Books:

1. Pascal Hitzler, Markus, Sebastian, “Foundation of Semantic Web Technologies”, CRC Press.
2. Javier Lacasta, Javier Noguerras-Iso,“Terminological Ontologies: Design, Management and Practical Applications (Semantic Web and Beyond)” , Springer.
3. H. Peter Alesso, Craig F. Smith ,”Developing Semantic Web Services”, CRC Press.

CS-7044
DATA MINING

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Unit-1 **08**

Introduction: Overview, motivation (for data mining), data mining-definition & functionalities, data processing, form of data preprocessing, data cleaning: missing values, noisy data,(binning, clustering, regression, computer and human inspection),inconsistent data, data integration and transformation. **Data Reduction:** Data cube aggregation, dimensionality reduction, data compression, numerosity reduction, and clustering, discretization and concept hierarchy generation.

Unit-2 **08**

Concept Description: Definition, data generalization, analytical characterization, analysis of attribute relevance, mining class comparisons, statistical measures in large databases, measuring central tendency, measuring dispersion of data, graph displays of basic statistical class description, mining association rules in large databases, association rule mining, mining single-dimensional Boolean association rules from transactional databases– apriori algorithm, mining multilevel association rules from transaction databases, and mining multi-dimensional association rules from relational databases.

Unit-3 **08**

Classification and Predictions: Classification & prediction, issues regarding classification and prediction, decision tree, Bayesian classification, classification by back propagation, multilayer feed-forward neural network, back propagation algorithm, classification methods k nearest neighbor classifiers, and genetic algorithm.

Unit-4 **08**

Cluster Analysis: Data types in cluster analysis, categories of clustering methods, partitioning methods. **Hierarchical clustering-** CURE and Chameleon. **Density based methods-**DBSCAN, OPTICS. **Grid based methods-** STING, CLIQUE. **Model based method-** Statistical approach, neural network approach, and outlier analysis.

UNIT-5 **08**

Data Warehousing: Overview, definition, delivery process, difference between database system and data warehouse, multi-dimensional data model, data cubes, stars, snowflakes, fact constellations, concept hierarchy, process architecture, 3 tier architecture, and data marting.

Text books:

1. Jiawei Han, MichelineKamber, "Data Mining Concepts and Techniques",Morgan Kaufman Publications.
2. Alex Berson, Stephen Smith, "Data Warehousing, Data Mining& OLAP", McGraw Hill.
3. Charu C. Aggarwal, "Data Mining -The Textbook", Springer.

Reference Books:

1. Margaret H Dunhan, "Data Mining Introductory and Advanced Topics", Pearson Education.
2. Ian H. Witten Eibe Frank, "Data Mining", Morgan Kaufman Publications.
3. Pang-Ning Tan Michael Steinbach, Vipin Kumar, Data Mining, Pearson Education.

CS -7045
SOFT COMPUTING

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Unit-1

08

Neural Network-I (Introduction & Architecture): Neuron, nerve structure and synapse, artificial neuron and its model, activation functions, neural network architecture: single layer and multilayer feed forward networks, recurrent networks. Various learning techniques; Perception and convergence rule, auto-associative, and hetro-associative memory.

Unit-2

08

Neural Network-II (Back Propagation Networks): Architecture: perceptron model, solution, single layer artificial neural network, multilayer perception model, back propagation learning methods, effect of learning rule co-efficient , back propagation algorithm, factors affecting back propagation training, and applications.

Unit-3

08

Fuzzy Logic-I (Introduction): Basic concepts of fuzzy logic, fuzzy sets and crisp sets, fuzzy set theory and operations, properties of fuzzy sets, fuzzy and crisp relations, and fuzzy to crisp conversion.

Unit-4

08

Fuzzy Logic –II (Fuzzy Membership, Rules): Membership functions, interference in fuzzy logic, fuzzy if-then rules, fuzzy implications and fuzzy algorithms, fuzzification & defuzzification, fuzzy controller, and industrial applications.

Unit-5

08

Genetic Algorithm: Basic concepts, working principle, procedures and flowchart of genetic algorithm, genetic representations, initialization and selection, genetic operators, mutation, generational cycle, and applications.

Text Books:

1. Saroj Kaushik, Sunita Tiwari, “Soft Computing”, McGraw Hill.
2. Sivanandam, Deepa, “Principles of Soft Computing”, Wiley.
3. Melanic Mitchell, “An Introduction to Genetic Algorithm”, MIT Press.

Reference Books:

1. Timothy J. Ross, “Fuzzy Logic with Engineering Applications”, Wiley.
2. Simon Haykin, “Neural Networks and Learning Machines”, PHI.
3. Kumar Satish, “Neural Networks”, Tata McGraw Hill.

CS -7046
DATA ANALYTICS

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08

Unit-1

Introduction to Big Data: Introduction to big data platform, challenges of conventional systems, web data, evolution of analytic scalability, analytic processes and tools, analysis vs reporting - modern data analytic tools. **Statistical concepts:** Sampling distributions, resampling, statistical inference and prediction error.

Unit-2

08

Data Analysis: Regression modeling, multivariate analysis, Bayesian modeling, inference and Bayesian networks, support vector and kernel methods. **Analysis of time series:** Linear systems analysis, nonlinear dynamics, rule induction. **Neural networks:** Learning and generalization, competitive learning, principal component analysis and neural networks. **Fuzzy logic:** Extracting fuzzy models from data, fuzzy decision trees and stochastic search methods.

Unit-3

08

Mining Data Streams: Introduction to streams concepts, stream data model and architecture, stream computing, sampling data in a stream, filtering streams, counting distinct elements in a stream, estimating moments, counting oneness in a window, decaying window, Real-Time Analytics Platform(RTAP) applications, case studies, real time sentiment analysis and stock market predictions.

Unit-4

08

Frequent Item sets and Clustering: Mining frequent item sets, market based model, apriori algorithm, handling large data sets in main memory, limited pass algorithm, counting frequent item sets in a stream, clustering techniques, hierarchical, K- means, clustering high dimensional data, CLIQUE and PROCLUS, frequent pattern based clustering methods, clustering in non-Euclidean space, clustering for streams and parallelism.

Unit-5

08

Frameworks and Visualization: Map reduce, Hadoop, Hive, map-R, sharding, NoSQL databases, S3, Hadoop distributed file systems, visualizations , visual data analysis techniques, interaction techniques, systems and applications.

Text Books:

1. A. Rajaraman and J. David Ullman, "Mining of Massive Datasets", Cambridge University Press.
2. EMC Education Services, "Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data", Wiley publishers.
3. Bart Baesens, "Analytics in a Big Data World: The Essential Guide to Data Science and its Applications", Wiley Publishers.

Reference Books:

1. Dietmar Jannach and Markus Zanker, "Recommender Systems: An Introduction", Cambridge University Press.
2. Kim H. Pries and Robert Dunnigan, "Big Data Analytics: A Practical Guide for Managers " CRC Press.
3. Jimmy Lin and Chris Dyer, "Data-Intensive Text Processing with Map Reduce", Synthesis Lectures on Human Language Technologies, Vol. 3, Morgan Claypool publishers.

AS-701
ENGINEERING ECONOMICS

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3 0 0

Unit-1 **08**
Introduction of Engineering Economics and Demand Analysis: Meaning and nature of economics, relation between science, engineering, technology and economics; Meaning of demand, determinants of demand, shifts in demand, law of demand, price elasticity of demand & types, income elasticity, cross price elasticity, determinants of elasticity and uses and importance of elasticity.

Unit-2 **08**
Concept of Supply: Law of supply, factors affecting supply, and elasticity of supply. Demand forecasting: introduction, meaning and forecasting, methods or techniques of demand forecasting, criteria for good demand forecasting and demand forecasting for a new product.

Unit-3 **08**
Cost Analysis: Introduction, types of costs, cost-output relationship: cost function, cost-output relationships in the short run, and cost-output relationships in the long run; Short run and long run, break- even analysis; Production functions: laws of variable proportions, law of returns and economies of scale: internal and external.

Unit-4 **08**
Market Structure: Market structure perfect competition, imperfect competition – monopolistic, oligopoly and duopoly salient features of price determination and various market conditions.

Unit-5 **08**
Nature and characteristics of Indian economy: Concepts of LPG, elementary concepts of national income, inflation and business cycles, concept of N.I and measurement, meaning of inflation, types and causes and phases of business cycle investment decisions for boosting economy (national income and per capital income).

Text Books:

1. Premvir Kapoor, "Sociology and Economics for Engineers", Khanna Publishing.
2. Salvatore D, "Principles of Microeconomics", Oxford University Press.
3. Koutsoyiannis A, "Modern Microeconomic", Macmillan Education Ltd.

Reference Books:

1. Dwivedi DN, "Principles of Microeconomics", Pearson Education.
2. Cowell, FA, "Microeconomic Principles and Analysis", Oxford University Press.
3. Riggs J L, "Engineering Economics", McGraw hills.

AS-702
INDUSTRIAL MANAGEMENT

L T P
3 0 0

- Unit-1** **08**
Introduction: Concept and scope of industrial management. **Productivity:** definition, measurement, productivity index, types of production system and industrial ownership.
- Unit-2** **08**
Functions of Management: Taylor’s scientific management theory, Fayol’s principles of management, social responsibilities of management, introduction to human resources management: nature of HRM, functions and importance of HRM.
- Unit-3** **08**
Work Study: Introduction, definition, objectives, steps in work study; **Method study:** Definition, objectives, steps of method study; **Work measurement:** Purpose, types of study: Stop watch methods steps: Allowances, standard time calculations, work sampling, production planning and control inventory control: inventory, cost, models of inventory control: EOQ, ABC, VED.
- Unit-4** **08**
Quality Control: Statistical quality control, control charts for variables and attributes, acceptance sampling: single sampling- double sampling plans and introduction to TQM.
- Unit-5** **08**
Project Management: Project network analysis, CPM, PERT and project crashing and resource leveling.

Text Books:

1. Gideon Halevi, “Industrial Management- Control and Profit: A Technical Approach” Springer.
2. A.P. Verma and N. Mohan “A Textbook of Industrial Management” S.K. Kataria & Sons.
3. S. K. Sharma, Savita Sharma “Industrial Engineering and Organization Management”, Kataria and Sons.

References:

1. S.C. Sharma & T.R. Banga, ”Engineering Management” (Industrial Engineering & Management), Khanna Book Publishing Co.
2. P. Khanna, ”Industrial Engineering and Management”, Dhanpatrai publications Ltd.
3. Paneer Selvam, “Production & Operation Management”, PHI.

CS-751
ADVANCE DBMS LAB

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0 0 2

LIST OF EXPERIMENTS:

1. Creation of a database and writing SQL queries to retrieve information from the database.
2. Performing Insertion, Deletion, Modifying, Altering, Updating and Viewing records based on conditions.
3. Creation of Views, Synonyms, Sequence, Indexes, Save point.
4. Creating an Employee database to set various constraints.
5. Creating relationship between the databases.
6. Study of PL/SQL block.
7. Write a PL/SQL block to satisfy some conditions by accepting input from the user.
8. Write a PL/SQL block that handles all types of exceptions.
9. Creation of Procedures.
10. Creation of database triggers and functions
11. Mini project (Application Development using Oracle/ MySQL)
 - a) Inventory Control System.
 - b) Material Requirement Processing.
 - c) Hospital Management System.
 - d) Railway Reservation System.
 - e) Personal Information System.
 - f) Web Based User Identification System.
 - g) Timetable Management System.
 - h) Hotel Management System

Note: The Instructor may add/delete/modify/tune experiments, wherever he/she feels in a justified manner.

CS-752
GRAPHICS LAB

L T P
0 0 2

LIST OF EXPERIMENTS:

1. To implement DDA algorithms for line and circle.
2. To implement Bresenham's algorithms for line, circle and ellipse drawing
3. To implement Mid-Point Circle algorithm using C.
4. To implement Mid-Point Ellipse algorithm using C.
5. To perform 2D Transformations such as translation, rotation, scaling, reflection and shearing.
6. To implement Cohen-Sutherland 2D clipping and window-viewport mapping.
7. To implement Liang Barsky Line Clipping Algorithm.
8. To perform 3D Transformations such as translation, rotation and scaling.
9. To convert between color models.
10. To perform animation using any Animation software
11. To perform basic operations on image using any image editing software
12. To draw different shapes such as hut, face, kite, fish etc.

Note: The Instructor may add/delete/modify/tune experiments, wherever he/she feels in a justified manner.

CS-8011
PARALLEL ALGORITHMS

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Unit-1 **08**

Introduction: Sequential model, need of alternative model, parallel computational models such as PRAM, LMCC, hypercube, cube connected cycle, butterfly, perfect shuffle computers, tree model, pyramid model, fully connected model, PRAM-CREW, EREW models and simulation of one model from another one.

Unit-2 **08**

Performance: Performance measures of parallel algorithms, speed-up and efficiency of PA, cost- optimality, an example of illustrate cost- optimal algorithms- such as summation and min/max on various models.

Unit-3 **08**

Parallel Algorithms and Sorting Networks: Parallel sorting networks, parallel merging algorithms on CREW/EREW/MCC, parallel sorting networks CREW/EREW/MCC, and linear array.

Unit-4 **08**

Parallel Searching Algorithm: Parallel searching algorithm, K^{th} element, K^{th} element in $X+Y$ on PRAM, parallel matrix transportation and multiplication algorithm on PRAM, MCC, vector-matrix multiplication, solution of linear equation and root finding.

Unit-5 **08**

Graph Algorithms: Connected graphs, search and traversal, combinatorial algorithms- permutation, combinations, and derangements.

Text Books:

1. M.J. Quinn, "Designing Efficient Algorithms for Parallel Computer", McGrawHill
2. Akl, S.G., "The Design and Analysis of Parallel Algorithms", Prentice Hall, Englewood Cliffs, New Jersey.
3. S.G. Akl, "Parallel Sorting Algorithm", Academic Press

Reference Book:

1. Ananth Grama , George Karypis , Vipin Kumar and Anshul Gupta, "Introduction to Parallel Computing"
2. Virendra Kumar, " Parallel Algorithm and Computation", Khanna Book Publications.
3. Joseph JaJa, "Introduction to Parallel Algorithms", Addison-Wesley Professional.

CS-8012
PATTERN RECOGNITION

L T P
3 1 0

Unit-1 **08**

Introduction: Basics of pattern recognition, design principles of pattern recognition system, learning and adaptation, pattern recognition approaches, **Mathematical foundations** – linear algebra, probability theory, expectation, mean and covariance, normal distribution, multivariate normal densities and chi squared test.

Unit-2 **08**

Statistical Patten recognition: Bayesian decision theory, classifiers, normal density and discriminant functions.

Unit-3 **08**

Parameter Estimation Methods:Maximum-likelihood estimation, Bayesian parameter estimation, dimension reduction methods - Principal Component Analysis (PCA), Fisher linear discriminant analysis, Expectation-Maximization (EM), Hidden Markov Models (HMM) and Gaussian mixture models.

Unit-4 **08**

Nonparametric Techniques: Density estimation, Parzen windows, k-nearest neighbor estimation, nearest neighbor rule and fuzzy classification.

Unit-5 **08**

Unsupervised Learning & Clustering: Criterion functions for clustering, clustering techniques: iterative square - error partitional clustering – K means, agglomerative hierarchical clustering, and cluster validation.

Text Books:

1. William Gibson, "Pattern Recognition"Oxford University Press.
2. Narasimha Murthy and Susheela Devi, "Pattern Recognition" Universities Press.
3. Christopher M. Bishop, "Pattern Recognition and Machine Learning"Springer.

Reference Books:

1. Richard O. Duda, Peter E. Hart and David G. Stork, "Pattern Classification", 2nd Edition, John Wiley.
2. C. M. Bishop, "Pattern Recognition and Machine Learning", Springer.
3. S. Theodoridis and K. Koutroumbas, "Pattern Recognition", 4th Edition, Academic Press.

**CS-8013
COMPUTER VISION**

**L T P
3 1 0
08**

Unit-1

Digital Image Formation and Low-Level Processing: Overview and state-of-the-art, fundamentals of image formation, transformation: orthogonal, Euclidean, affine, projective, etc., Fourier transform, convolution and filtering, image enhancement, restoration, and histogram processing.

Unit-2

08

Depth Estimation and Multi-camera Views: Perspective, binocular stereopsis: camera and epipolar geometry, homography, rectification, DLT, RANSAC, 3-d reconstruction framework; auto-calibration, and apparel.

Unit-3

08

Feature Extraction Edges: Canny, LOG, DOG; line detectors (Hough Transform), corners - Harris and Hessian Affine, orientation histogram, SIFT, SURF, HOG, GLOH, scale-space analysis- image pyramids and Gaussian derivative filters, Gabor filters, and DWT.

Unit-4

08

Image Segmentation: Region growing, edge based approaches to segmentation, graph-cut, mean-shift, MRFs, texture segmentation, and object detection.

Unit-5

08

Pattern Analysis Clustering: K-Means, K-Medoids, mixture of Gaussians, classification: discriminant function, supervised, un-supervised, semi-supervised; classifiers: Bayes, KNN, ANN models; dimensionality reduction: PCA, LDA, ICA, and non-parametric methods.

Text Books:

1. Richard Szeliski, "Computer Vision: Algorithms and Applications", Springer-Verlag London Limited.
2. D. A. Forsyth, J. Ponce, "Computer Vision: A Modern Approach", Pearson Education.
3. R.C. Gonzalez and R.E. Woods, "Digital Image Processing", Addison- Wesley.

References Books:

1. Richard Hartley and Andrew Zisserman, "Multiple View Geometry in Computer Vision", Cambridge University Press.
2. K. Fukunaga; Introduction to Statistical Pattern Recognition, Academic Press.
3. R.C. Gonzalez and R.E. Woods, "Digital Image Processing", Addison- Wesley.

CS-8014
DESIGN PATTERN

L T P
3 1 0

Unit-1 **08**

Introduction: What is a design pattern? design patterns in Smalltalk MVC, describing design patterns, the catalog of design patterns, organizing the catalog, how design patterns solve design problems, how to select a design pattern and, and how to use a design pattern.

Unit-2 **08**

Designing a Document Editor: Design problems, document structure, formatting, embellishing the user interface, supporting multiple look-and-feel standards, supporting multiple window systems, user operations spelling checking, and hyphenation.

Unit-3 **08**

Creational Patterns: Abstract factory, builder, factory method, prototype, singleton, and discussion of Creational Patterns.

Unit-4 **08**

Structural Patterns: Study of various structural patterns like adapter, bridge, composite, decorator, façade, flyweight, and proxy.

Unit-5 **08**

Behavioral Patterns: Chain of responsibility, command, interpreter, iterator, mediator, memento, observer, strategy, template method, and visitor. Conclusion: what to expect from design patterns, and the pattern community.

Text Books:

1. Erich Gamma, “Design Patterns”, Pearson Education.
2. Alan Shalloway, “Design Patterns Explained”, Pearson Education.
3. Wolf Gang, “Meta Patterns”, Pearson.

Reference Books:

1. Mark Grand, “JAVA Enterprise Design Patterns Vol-III” WileyDreamTech.
2. Mark Grand, “Pattern”s in JAVA Vol-I” Wiley DreamTech.
3. Mark Grand, ”Pattern”s in JAVA Vol-II”, WileyDreamTech.
4. Eric Freeman, “Head First Design Patterns”, Oreilly-spd.

CS-8015
MACHINE LEARNING

L T P
3 1 0

Unit-1 **08**

Introduction: Well defined learning problems, designing a learning system, issues in machine learning; the concept learning task - general-to-specific ordering of hypotheses, find-s, list then eliminate algorithm, candidate elimination algorithm, and inductive bias

Unit-2 **08**

Decision Tree Learning: Decision tree learning algorithm-inductive bias- issues in decision tree learning; **Artificial neural networks** – Perceptron’s, gradient descent and the delta rule, adaline, multilayer networks, derivation of backpropagation rule, backpropagation algorithm, convergence, and generalization.

Unit-3 **08**

Evaluating Hypotheses: estimating hypotheses accuracy, basics of sampling theory, comparing learning algorithms; **Bayesian learning:** Bayes theorem, concept learning, Bayes optimal classifier, naïve Bayes classifier, Bayesian belief networks, and EM algorithm

Unit-4 **08**

Computational Learning Theory: Sample complexity for finite hypothesis spaces, sample complexity for infinite hypothesis spaces, the mistake bound model of learning; instance-based learning – k-nearest neighbor learning, locally weighted regression, radial basis function networks, and case-based learning

Unit-5 **08**

Genetic Algorithms: An illustrative example, hypothesis space search, genetic programming, models of evolution and learning; learning first order rules-sequential covering algorithms general to specific beam search-foil; reinforcement learning - the learning task, and q learning.

Text Books:

1. Tom M. Mitchell, "Machine Learning", McGraw-Hill Education (India) Private Limited.
2. Ethem Alpaydin, "Introduction to Machine Learning (Adaptive Computation and Machine Learning)", The MIT Press.
3. Stephen Marsland, "Machine Learning: An Algorithmic Perspective", CRC Press.

Reference Books:

1. Bishop, C., "Pattern Recognition and Machine Learning". Berlin: Springer-Verlag.
2. Stephen Marsland, "Machine Learning: An Algorithmic Perspective", CRC Press.
3. Ethem Alpaydin, "Introduction to Machine Learning (Adaptive Computation and Machine Learning)", The MIT Press.

CS-8016
SERVICE ORIENTED ARCHITECTURE

L T P
3 1 0
08

Unit-1

Introduction: Roots of SOA, characteristics of SOA, comparing SOA to client-server and distributed internet architectures, anatomy of SOA, How components in an SOA interrelate, and principles of service orientation.

Unit-2

Web Services: Service descriptions, messaging with SOAP, message exchange patterns , coordination, atomic transactions, business activities,orchestration choreography, service layer abstraction, application service layer, business service layer, and orchestration service layer.

Unit-3

Service Oriented Analysis: Business-centric SOA, deriving business services, service modeling, service oriented design, WSDL basics, SOAP basics, SOA composition guidelines, entity-centric business service design, application service design, and taskcentric business service design.

Unit-4

SOA Platform Basics: SOA support in J2EE, java API for XML-based web services (JAX-WS), java architecture for XML binding (JAXB), java API for XML Registries (JAXR), java API for XML based RPC (JAX-RPC), web services interoperability technologies (WSIT), SOA support in .NET, common language runtime, ASP.NET web forms, ASP.NET web services, and Web Services Enhancements (WSE).

Unit-5

WS-BPEL Basics: WS-Coordination overview, WS-choreography, WS-policy, WSsecurity.

Text Books:

1. Thomas Erl, “Service-Oriented Architecture: Concepts, Technology, and Design”, Pearson Education.
2. Newcomer, Lomow, “Understanding SOA with Web Services”, Pearson Education.
3. Dan Woods and Thomas Mattern, “Enterprise SOA Designing IT for Business Innovation” O’REILLY.
4. Thomas Erl, “Service Oriented Architecture: Concepts, Technology, and Design”, Pearson Education.

Reference Books:

1. Frank P.Coyle, “XML, Web Services and the Data Revolution”, Pearson Education.
2. Eric Newcomer, Greg Lomow, “Understanding SOA with Web Services”, Pearson Education.
3. James McGovern, Sameer Tyagi, Michael E.Stevens, Sunil Mathew, “Java Web Services Architecture”, Morgan Kaufmann Publishers.

CS-802
DIGITAL IMAGE PROCESSING

L T P
3 1 0

Unit-1 **08**

Introduction: Fundamental steps in digital image processing, components of an image processing system, sampling and quantization, representing digital images (data structure), some basic relationships between pixels- neighbors and connectivity of pixels in image, applications of image processing: medical imaging, robot vision, character recognition and remote sensing.

Unit-2 **08**

Image Enhancement in The Spatial Domain: Some basic gray level transformations, histogram processing, enhancement using arithmetic/logic operations, basics of spatial filtering, smoothing spatial filters, sharpening spatial filters and combining spatial enhancement methods.

Unit-3 **08**

Image Enhancement in Frequency Domain: Introduction, Fourier transform, discrete Fourier transform (DFT), properties of DFT, discrete cosine transform (DCT) and image filtering in frequency domain.

Unit-4 **08**

Image Segmentation: Introduction, detection of isolated points, line detection, edge detection, edge linking, and region based segmentation- region growing, split and merge technique, local processing, regional processing, hough transform and segmentation using threshold.

Unit-5 **08**

Image Compression: Introduction, coding redundancy, inter-pixel redundancy, image compression model, lossy and lossless compression, Huffman coding, arithmetic coding, LZW coding, transform coding, sub-image size selection, blocking, DCT implementation using FFT and run length coding.

Text Books:

1. Rafael C G., Woods R E. and Eddins S L, “Digital Image Processing”, Prentice Hall.
2. William K Pratt “Digital Image Processing”, PIKS Scientific Inside.
3. Jayaraman S “Digital Image Processing”, TMH.

Reference Books:

1. Milan Sonka, “Image Processing, analysis and Machine Vision”, Thomson Press India Ltd.
2. Anil K. Jain “Fundamentals of Digital Image Processing”, Prentice Hall of India.
3. S. Sridhar “Digital Image Processing”, Oxford University Press.

AS-801
ENGINEERING ECONOMICS

L T P
3 0 0

Unit-1 **08**

Introduction of Engineering Economics and Demand Analysis: Meaning and nature of economics, relation between science, engineering, technology and economics; Meaning of demand, determinants of demand, shifts in demand, law of demand, price elasticity of demand & types, income elasticity, cross price elasticity, determinants of elasticity and uses and importance of elasticity.

Unit-2 **08**

Concept of Supply: Law of supply, factors affecting supply, and elasticity of supply. Demand forecasting: introduction, meaning and forecasting, methods or techniques of demand forecasting, criteria for good demand forecasting and demand forecasting for a new product.

Unit-3 **08**

Cost Analysis: Introduction, types of costs, cost-output relationship: cost function, cost-output relationships in the short run, and cost-output relationships in the long run; Short run and long run, break- even analysis; Production functions: laws of variable proportions, law of returns and economies of scale: internal and external.

Unit-4 **08**

Market Structure: Market structure perfect competition, imperfect competition – monopolistic, oligopoly and duopoly sorbent features of price determination and various market conditions.

Unit-5 **08**

Nature and characteristics of Indian economy: Concepts of LPG, elementary concepts of national income, inflation and business cycles ,concept of N.I and measurement, meaning of inflation, types and causes and phases of business cycle investment decisions for boosting economy(national income and per capital income).

Text Books:

1. Premvir Kapoor, "Sociology and Economics for Engineers", Khanna Publishing.
2. Salvatore D, "Principles of Microeconomics", Oxford University Press.
3. Koutsoyiannis A, "Modern Microeconomic", Macmillan Education Ltd.

Reference Books:

1. Dwivedi DN, "Principles of Microeconomics", Pearson Education.
2. Cowell, FA, "Microeconomic Principles and Analysis", Oxford University Press.
3. Riggs J L, "Engineering Economics", McGraw hills.

AS-802
INDUSTRIAL MANAGEMENT

L T P
3 0 0

Unit-1 **08**
Introduction: Concept and scope of industrial management. **Productivity:** definition, measurement, productivity index, types of production system and industrial ownership.

Unit-2 **08**
Functions of Management: Taylor’s scientific management theory, Fayol’s principles of management, social responsibilities of management, introduction to human resources management: nature of HRM, functions and importance of HRM.

Unit-3 **08**
Work Study: Introduction, definition, objectives, steps in work study; **Method study:** Definition, objectives, steps of method study; **Work measurement:** Purpose, types of study; Stop watch methods steps: Allowances, standard time calculations, work sampling, production planning and control inventory control: inventory, cost, models of inventory control: EOQ, ABC, VED.

Unit-4 **08**
Quality Control: Statistical quality control, control charts for variables and attributes, acceptance sampling: single sampling- double sampling plans and introduction to TQM.

Unit-5 **08**
Project Management: Project network analysis, CPM, PERT and project crashing and resource leveling.

Text Books:

1. Gideon Halevi, “Industrial Management- Control and Profit: A Technical Approach” Springer.
2. A.P. Verma and N. Mohan “A Textbook of Industrial Management” S.K. Kataria & Sons.
3. S. K. Sharma, Savita Sharma “Industrial Engineering and Organization Management”, Kataria and Sons.

References:

1. S.C. Sharma & T.R. Banga, ”Engineering Management” (Industrial Engineering & Management), Khanna Book Publishing Co.
2. P. Khanna, ”Industrial Engineering and Management”, Dhanpatrai publications Ltd.
3. Paneer Selvam, “Production & Operation Management”, PHI.

CS-851
DIP LAB

L T P
0 0 2

LIST OF EXPERIMENTS:

1. To create a program to display grayscale image using read and write operation.
2. To create a vision program to find histogram value and display histogram of a grayscale and color image.
3. To create a vision program for nonlinear filtering technique using edge detection.
4. To create a vision program to determine the edge detection of an image using different operators.
5. To create a program to discretize an image using Fourier transformation.
6. To create a program to eliminate the high frequency components of an image.
7. To create a color image and perform read and write operation.
8. To obtain the R, B, G colour values and resolved colour values from a colour box by choosing any colour.
9. To create a program performs discrete wavelet transform on image.
10. To create a program for segmentation of an image using watershed transforms.

Note: The Instructor may add/delete/modify/tune experiments, wherever he/she feels in a justified manner.