FACULTY OF COMPUTER SCIENCE & IT

SYLLABUS

of

M.Sc. (Computer Science)

(Semester - I &II)

(Under Continuous Evaluation System)

Session: 2018-19

The Heritage Institution

KANYA MAHA VIDYALAYA JALANDHAR (Autonomous)

M.Sc. (Computer Science)
(Session 2018-19)
PROGRAMME SPECIFIC OUTCOMES

PSO1: Master in Computer Science offers significant benefits to students. After successfully completing their MSc students will able to get knowledge to fit them as desirable candidates for industry, teaching and other competitive exams.

PSO2:Students will enhance their knowledge and understanding of computers, its architecture and working through Advanced Computer architecture and Microprocessors.

PSO3:Students will enhance their ability to solve programming problemsknowing the concepts of JAVA, ASP.NET and Object Oriented Programming and develop software for real world related problems

PSO4: Student will learn principles and techniques from the selective areasto develop special expertise. Such expertise will be used for analyzing real-world problems and devise computer-based solutions.

PSO5: Students with gain knowledge of researchoriented topics like Cloud computing and image processing.

PSO6: At end semester students have to work in team activity to develop projects related with industry/academia/research problems. Thus they will able to learn in team activities.

Scheme of Studies and Examination
M.Sc. (Computer Science)
(Session 2018-19)

SEMESTER - I

COURSE CODE	COURSE NAME	COURSE TYPE	Marks				Examination Time (in Hours)
			Total	Ext.		CA	
				L	P		
MCSL–1111	Advanced Data Structures	C	100	80	-	20	3
MCSL–1112	Advanced Computer Architecture	C	100	80	-	20	3
MCSL–1113	Network Design & Performance Analysis	C	100	80	-	20	3
MCSL–1114	Discrete Structures	C	100	80	-	20	3
MCSL–1115	Soft Computing	C	100	80	-	20	3
MCSP–1116	Programming Laboratory - I (Based on Advanced Data Structures)	C	100	-	80	20	3
	Total		600				

M.Sc. (Computer Science)
(Session 2018-19)

SEMESTER – II

COURSE CODE	COURSE NAME	COURSE TYPE	Marks				Examination Time (in Hours)
			Total	Ext.		CA	
				L	P		
MCSL–2111	Theory of Computation	C	100	80	-	20	3
MCSL–2112	Image Processing	C	100	80	-	20	3
MCSL–2113	Design & Analysis of Algorithms	C	100	80	-	20	3
MCSL–2114	Cloud Computing	C	100	80	-	20	3
MCSL–2115	Distributed Database Systems	C	100	80	-	20	3
MCSP–2116	Programming Laboratory – II	C	100	-	80	20	3
	Total		600				

M.Sc. Computer Science (Semester – I)

(Session 2018-19)

COURSE CODE:MCSL-1111

ADVANCED DATA STRUCTURES

Course Outcomes:

After passing this course the student will be able to:

CO1: design, analyze and implement algorithms and check their performances against specified parameters.

CO2: understand the necessary mathematical abstraction to solve problems.

CO3: work on variety of algorithm design techniques and data structures.

M.Sc. Computer Science (Semester – I)

(Session 2018-19)

COURSE CODE:MCSL-1111

ADVANCED DATA STRUCTURES

Max. Marks: 100
Theory: 80
CA: 20

Time: 3 Hrs. Pass % = 40%

Instructions for Paper Setter -

Eight questions of equal marks are to set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts(not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

UNIT-I

Review of algorithm analysis, Binary search trees, balanced binary search trees (red-black trees), Btrees, AVL Trees, 2-3 trees, 2-3-4 trees.

UNIT-II

Binary heaps, heap operations, implementation and applications.Priority queue operations, and double-ended, priority queues.

UNIT-III

Binomial heaps, Fibonacci heaps. Data structures for disjoint sets.
Amortized analysis, string matching, and graph algorithms.

UNIT-IV

External data structures - external storage, external files, external sorting searching indexing files, external hashing.

References:

1. Alfred V. Aho, Jeffrey D. Uuman, John E. Hopcroft, "Data Structures and Algorithms" AddisionWesley, 1983.

2. Dinesh P. Mehta, I. SartajSahni, "Handbook of Data Structures and Applications", Chapman &Hall/CRC, 2004.

3. Sorenson and Trembley, "An Introduction to Data Structures with Applications, McGraw Hill, 2006 Edition.

M.Sc. Computer Science (Semester – I)

(Session 2018-19)

COURSE CODE: MCSL-1112

ADVANCED COMPUTER ARCHITECTURE

Course Outcomes:

After passing this course the student will be able to:

CO1:Give students broad knowledge of computer architecture and paradigms of computer system.

CO2:Give students knowledge ofconcepts of parallel computing models and parallel computer structures.

CO3:To understand the concepts of pipelining and multiprocessors.

M.Sc. Computer Science (Semester – I)

(Session 2018-19)

COURSE CODE: MCSL-1112

ADVANCED COMPUTER ARCHITECTURE

Max. Marks: 100
Theory: 80
CA: 20

Time: 3 Hrs. Pass % = 40%

Instructions for Paper Setter -

Eight questions of equal marks are to set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts(not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

UNIT-I

Paradigms of Computing: Synchronous – Vector/Array, SIMD, Systolic

Asynchronous – MIMD, reduction Paradigm, Hardware taxonomy: Flynn's classification, Software taxonomy: Kung'staxonomy, SPMD.

UNIT-II

Parallel Computing Models

Parallelism in Uniprocessor Systems: Trends in parallel processing, Basic Uniprocessor Architecture, Parallel Processing Mechanism.

UNIT-III

Parallel Computer Structures: Pipeline Computers, Array Computers, Multiprocessor Systems

Architectural Classification Schemes: Multiplicity of Instruction-Data Streams, Serial versus Parallel Processing, Parallelism versus Pipelining

UNIT-IV

Pipelining: An overlapped Parallelism, Principles of Linear Pipelining, Classification of Pipeline Processors, General Pipelines and Reservation Tables

References

Computer Architecture and Parallel Processing, Faye A. Briggs, McGraw-Hill International, 2007 Edition

Computer Systems Organization & Architecture, John d. Carpinelli, Addison Wesley, 2007 Edition.

M.Sc. Computer Science (Semester – I)

(Session 2018-19)

COURSE CODE: MCSL-1113

NETWORK DESIGN & PERFORMANCE ANALYSIS

Course Outcomes:

After passing this course the student will be able to:

CO1: To analyze the design of computer communication network,planning and performance.

CO2: To apply traffic engineering techniques.

CO3:To gain an understanding of the process used to plan network operations and performance characteristics.

M.Sc. Computer Science (Semester – I)

(Session 2018-19)

COURSE CODE: MCSL-1113

NETWORK DESIGN & PERFORMANCE ANALYSIS

Max. Marks: 100
Theory: 80
CA: 20

Time: 3 Hrs Pass % = 40%

Instructions for Paper Setter -

Eight questions of equal marks are to set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts(not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

UNIT-I

Requirements, planning, & choosing technology: System requirements, traffic sizing characteristics time & delay consideration.

Network performance modeling-Creating traffic matrix, design tools, components of design tools, types of design projects.

UNIT-II

Traffic engineering and capacity planning: Throughput calculation traffic characteristics &sourcemodels, traditional traffic engineering, queued data & packet switched traffic modeling, designing for peaks, delay or latency

UNIT-III

Technology Comparisons- Generic packet switching networks characteristics, private vs. public networking, Business aspects of packet, frame and cell switching services, High speed LAN protocols comparison, Application performance needs, Throughput, burstiness, response time and delay tolerance, selecting service provider, vendor, service levels etc.

UNIT-IV

Access Network Design- N/W design layers, Access N/W design, access n/w capacity, Backbone n/w design, Backbone segments, backbone capacity, topologies, Tuning the network, securing the network, Design for network security.

Documentation and network management- Documentation, network management, SNMP, RMON

References:

1. James D. McCabe, Network Analysis, Architecture and Design, 2nd Edition, Morgan Kaufman Series in Networking, 2007 Edition.

2. YoueuZheng, ShakilAkhtar, Network for Computer Scientists and Engineers, Indian University, Oxford University Press, 2007 Edition.

3. A. Forouzan, Data Communications and Networking, Tata McGraw Hill, 2007 Edition.

M.Sc. Computer Science (Semester – I)

(Session 2018-19)

COURSE CODE: MCSL-1114

DISCRETE STRUCTURES

Course Outcomes:

After passing this course the student will be able to:

CO1: understand set relation, functions, Venn diagram, Pigeonhole principle, Inclusion-Exclusion Principle, equivalence/partial orders, elementary counting techniques, classification of binary relations, graphs, trees etc.

CO2: compute factorials, recursive relation, permutation and combination.

CO3: define and interpret rings, subrings, morphism of rings,Boolean algebra in logic circuits and switching functions.

M.Sc. Computer Science (Semester – I)

(Session 2018-19)

COURSE CODE: MCSL-1114

DISCRETE STRUCTURES

Max. Marks: 100
Theory: 80
CA: 20

Time: 3 Hrs

Pass % = 40%

Instructions for Paper Setter -

Eight questions of equal marks are to set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts(not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

UNIT-I

Sets and Functions:

Sets, Relations, Functions, Pigeonhole principle, Inclusion – Exclusion Principle, Equivalence and Partial orderings, Elementary counting techniques, relation of partial order partitions, binary relations.

UNIT-II

Graph Theory:

Definition, Walks, Paths, Directed and Undirected graphs, connected graphs, regular and bipartite graphs, Eulerian chains and cycles. Hamiltonian chains and cycles, planar graphs, Trees and rooted tree, Spanning trees, Chromatic number Connectivity and other graphical parameter application.

UNIT-III

Combinatorial Mathematics:

Basic counting principles Permutations and combinations, Recurrence relations, generating Function, Application.

UNIT-IV

Rings and Boolean algebra: Rings Subrings morphism of rings ideals and quotient rings. Euclidean domains Integral domains and fields Boolean algebra direct product morphisms Application of Boolean algebra in logic circuits and switching functions.

References:

1. Ehrig, H., Mahr, B. Fundamentals of Algebraic Specification I, EATCS Monographs on Theory. Comp. Sc. Vol. 6 spinger, Berlin 1985.

2. Gersting J. Mathematical Structures for Computer Science, W.H. Freman, New York, 1987.

3. Gibons, A. Algorithmic Graph theory Cambridge University Pres, 1985.

4. Knuth, D.E. The art of Computer Programming Vol. I: Fundamental Algorithms. 2nd ed. Reading, Mas, Adison Wesley 1973.

5. Kolman B. Busby R. Discrete Mathematical Structures for Computer Science, Prentice Hall EnglewodClifs. 1987.

6. Sahni, S. Concepts in Discrete Mathematics Fridley MN., Camelot Publ. Comp., 1981.

7. Schmidt G. Strohlein T. Relations Graphs Program, EATS Monograph on Theor.Comp.Sc.Vol.29 Berlin Spinger 1993.

8. Wheler W. Universal Algebra for Computer Scientist EATCS Monographs on Theor.Comp.Sc.Vol.25 Spinger-Verlag, Berlin 191.

M.Sc. Computer Science (Semester – I)

(Session 2018-19)

COURSE CODE: MCSL-1115

SOFT COMPUTING

Course Outcomes:

After passing this course the student will be able to:

CO1:To understand fundamental theory and concepts of neural networks, neuro-modeling, several neural network paradigms and its applications.

CO2: To understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems and other machine intelligence applications of fuzzy logic and probabilistic reasoning.

CO3: To understand the basics of genetic algorithms and its application to engineering optimization problems.

M.Sc. Computer Science (Semester – I)

(Session 2018-19)

COURSE CODE: MCSL-1115

SOFT COMPUTING

Max. Marks: 100
Theory: 80
CA: 20

Time: 3 Hrs

Pass % = 40%

Instructions for Paper Setter -

Eight questions of equal marks are to set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts(not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section

UNIT-I

Neural Networks

Introduction to neural networks, working of an artificial neuron, linear seperability, perceptron, perceptron training algorithm, back propagation algorithm, adalines and madalines.

UNIT-II

Supervised and unsupervised learning, counter-propagation networks, adoptive resonance theory, neocognitron and bidirectional associative memory.

UNIT-III

Fuzzy Logic

Introduction to fuzzy logic and fuzzy sets, fuzzy relations, fuzzy graphs, fuzzy arithmetic and fuzzy if-then rules.

Applications of fuzzy logic, neuro-fuzzy systems and genetic algorithm.

UNIT-IV

Probabilistic Reasoning

Introduction to probability theory, conditional probability, Baye's theorem, fuzzy logic and its relationship with probability theory.

References:

1. Elements of artificial neural networks by KishanMehrotra, Chilkuri K. Mohan and Sanjay Ranka, 2007 Edition.

2. Fundamentals of artificial neural networks by Mohammad H. Hassoun, Prentice Hall of India, 2007 Edition.

2. Neural networks and fuzzy systems by Bart Kosko, Prentice Hall of India, 2007 Edition.

3. Fuzzy logic, intelligence, control and information by John Yen and Reza Langari, Pearson Education, 2007 Edition.

4. Probability and statistics by Murray R. Spiegel, John Schiller and R. AluSrinivasan, Schaum's Outlines, Tata McGraw Hill Publishing Company Limited, 2007 Edition.

M.Sc. Computer Science (Semester – I)

(Session 2018-19)

COURSE CODE: MCSP-1116

PROGRAMMING LABORATORY – I

Max. Marks: 100
Practical : 80
CA: 20

Time: 3 Hrs

Pass % = 40%

Programs based on Advanced Data Structures using C/C++

M.Sc. Computer Science (Semester – II)

(Session 2018-19)

COURSE CODE: MCSL-2111

THEORY OF COMPUTATION

Course Outcomes:

After passing this course the student will be able to:

CO1: Design finite automata, write Regular expressions, prove non- regularity of a Language using Pumping lemma theorem.

CO2: Define production rules for Context Free Grammar. Convert CFG into Chomsky Hierarchy and understand problem of derivation languages.

CO3: Construct high computing machines viz. Push Down Automata, Turing machine, parsingtablefor LL(K) and LR(K) grammar.

M.Sc. Computer Science (Semester – II)

(Session 2018-19)

COURSE CODE: MCSL-2111

THEORY OF COMPUTATION

Max. Marks: 100
Theory: 80
CA: 20

Time: 3 Hrs

Pass % = 40%

Instructions for Paper Setter -

Eight questions of equal marks are to set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts(not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section

UNIT-I

Operations on Languages: Closure properties of Language Classes. Context Free Languages:The Chomsky Griebach Normal Forms. Linear Grammars and regular Languages.Regular Expressions Context Sensitive Languages; The Kuroda Normal Form, One sided Context Sensitive Grammars.

UNIT-II

Unrestricted Languages: Normal form and Derivation Graph, Automata and their Languages: Finite Automata, Push down Automata and Turing Machines, The Equivalence of the Automata and the appropriate grammars.

UNIT-III

Syntax Analysis: Formal Properties of LL(k) and L.R.(k) Grammars.

UNIT-IV

Derivation Languages: Rewriting Systems, Algebraic properties, Canonical Derivations, Context Sensitivity.

References:

1. G.E. Reevsz, Introduction to Formal Languages, McGraw Hill 1983.

2. M.H. Harrison, Formal Language Theory Wesley 1978.

3. Wolfman Theory and Applications of Cellular Automata, World Scientific, Singapore, 1986.

4. K.L.P. Mishra, N. Chandrasekaran, Theory of Computer Science (Automata,\ Languages and Computation), 2nd Edition, Prentice Hall of India, 2006.

M.Sc. Computer Science (Semester – II)

(Session 2018-19)

COURSE CODE: MCSL-2112

IMAGE PROCESSING

Course Outcomes:

After passing this course the student will be able to:

CO1: Learn the fundamental concepts of Digital Image Processing and basic image processing operations.

CO2: Understand image analysis algorithms.

CO3: Know about current applications in the field of digital image processing.

M.Sc. Computer Science (Semester – II)

(Session 2018-19)

COURSE CODE: MCSL-2112

IMAGE PROCESSING

Max. Marks: 100
Theory: 80
CA: 20

Time: 3 Hrs
Pass % = 40%

Instructions for Paper Setter -

Eight questions of equal marks are to set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts(not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section

UNIT-I

Background: Introduction to electronic systems for image transmission and storage, computer processing and recognition of pictorial data, overview of practical applications.

UNIT-II

Fundamentals: Mathematical and perceptual preliminaries, human visual system model, image signal representation, imaging system specification building image quality, role of computers, image data formats.

UNIT-III

Image Processing Techniques: Image enhancement, image restoration, image data compression and statistical pattern recognition.

Applications of Image Processing: Picture data archival, machine vision, medical image processing.

UNIT-IV

Techniques of Colour Image Processing: Colour image signal representation, colour system transformations, extension of processing techniques to colour domain.

References:

1. Pratt, W.K. Digital Image Processing, John Wiley, N.Y./1978.

2. Rosenfield, A and Kak, A.C., Picture processing, Academic Press N.Y., 1982.

3. Jain, A.K., Fundamentals of Digital Image Processing, Englewood Cliffs, Prentice Hall, 1989.

4. Chris Soloman, Stuart Gibson, Fundamentals of Digital Image Processing: A Practical Approach using MatLab, John Wiley and Sons, 2007.

5. Digital Image Processing by Gonzalez & Wood, Addison Wesley, 2000.

M.Sc. Computer Science (Semester – II)

(Session 2018-19)

COURSE CODE: MCSL-2113

DESIGN & ANALYSIS OF ALGORITHMS

Course Outcomes:

After passing this course the student will be able to:

CO1: To make the student familiar with subjects concerning algorithm complexity and find an optimal solution to practical problems.

CO2:Analyse several design techniques like divide-and-conquer, greedy and dynamic programming) and use these methods to solve simple and complex problems.

CO3: Understand the search and traversal techniques of trees and graphs.

M.Sc. Computer Science (Semester – II)

(Session 2018-19)

COURSE CODE: MCSL-2113

DESIGN & ANALYSIS OF ALGORITHMS

Max. Marks: 100
Theory: 80
CA: 20

Time: 3 Hrs

Pass % = 40%

Instructions for Paper Setter -

Eight questions of equal marks are to set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts(not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section

UNIT-I

Introduction: Concept of Algorithm, Algorithm Specification, Performance Analysis (Time and space complexities), Asymptotic Notations.

UNIT-II

Divide and Conquer: General Method, Binary Search, Finding the Maximum and Minimum, Quick Sort, Selection.

UNIT-III

Greedy Method: General Method, Knapsack Problem, Minimum Cost Spanning Trees (Prim's Algorithm, Kruskal's Algorithm) and Sibnngle-Source Shortest Path.

UNIT-IV

Dynamic Programming: General Single Method, Multistage Graphs, All Pairs Shortest Paths, Single-Source Shortest Paths, Optimal Binary Search Tress, 0/1 Knapsack and Travelling Saleman Problem.

Backtracking: General Method, 8-Queens Problem, Graph Coloring and Hamiltonian Cycles.

Search and Traversal Technique: Techniques for Binary Trees, Techniques for Graphs.

References:

1. V. Aho, J.E. Hopcroft, J.D. Ullman, Design and Analysis of Algorithms, Addison Wesley, 1976.

2. Horowitz, S. Sahni, Fundamentals of Computer Algorithms, Galgotia Publishers, 1984.

3. K. Mehlhorn, Data Structures and Algorithms, Vols. 1 and 2, Springer Verlag, 1984.

4. Purdom, Jr. and C. A. Brown, The Analysis of Algorithms, Holt Rinechart and Winston, 1985.

5. D. E. Kunth, The Art of Computer Programming, Vols. I and 3, Addison Wesley, 1975.

6. AnanyLevitin, Introduction to the Design & Analysis of Algorithms, Addison, Wesley, 2002.

M.Sc. Computer Science (Semester – II)

(Session 2018-19)

COURSE CODE: MCSL – 2114

CLOUD COMPUTING

Course Outcomes:

After passing this course the student will be able to:

CO1: Articulate the main concepts, key technologies, strengths, and limitations of Cloud computing.

CO2: Identify the architecture and infrastructure of various Cloud services and deployment models.

CO3: Explain the main issues related with Cloud computing such as quality of service, security, privacy etc. and select technologies, algorithms, and approaches corresponding to these issues.

CO4: Provide the prevalent solutions to Cloud computing applications and innovate new ideas.

M.Sc. Computer Science (Semester – II)

(Session 2018-19)

COURSE CODE: MCSL – 2114

CLOUD COMPUTING

Max. Marks: 100
Theory: 80
CA: 20

Time: 3 Hrs

Pass % = 40%

Instructions for Paper Setter -

Eight questions of equal marks are to set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts(not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section

UNIT-I

Introduction: Definition, Vision, Reference Model, Benefits, Limitations, Terminology, Open Challenges.

Virtualization: Definition, Type of Virtualization, Benefits, Limitations, Virtualization and Cloud, Virtual Appliance.

UNIT-II

Cloud Computing Architecture: Service Models, Deployment Models, Cloud Entities, Cloud Clients, Service Level Agreement (SLA) and Quality of Service (QoS) in Cloud Computing.

UNIT-III

Programming Models in Cloud: Thread Programming, Task Programming and Map–Reduce Programming.

Cloud Security: Infrastructure Security, Data Security, Identity and Access Management, Privacy Management, Security as a Service on Cloud.

UNIT-IV

Advance Topic in Cloud: Energy Efficiency in cloud, Market Oriented Cloud Computing, Big–Data Analytics, Federated Cloud Computing.

Textbooks:

1. RajkumarBuyya, Christian Vecchiola and ThamaraiSelvi, Mastering Cloud Computing: Foundation and Application Programming, Tata McGraw Hill, ISBN–13: 978–1–25–902995–0, New Delhi, India, Feb 2013.

2. Tim Mather, SubraKumaraswamy, ShahedLatif, Cloud Security and Privacy, O'Reilly,ISBN–13: 978–8–18–404815–5.

Reference Books:

1. Barrie Sosinsky, Cloud Computing Bible, Wiley India Pvt. Ltd., ISBN–13: 978–8–12–652980–3, New Delhi, India, 2011.

2. Dr. Saurabh Kumar, Cloud Computing: Insights Into New–Era Infrastructure, Wiley India Pvt. Ltd, ISBN–13: 978–8–12–652883–7, New Delhi, India, 2011.

3. Fern Halper, Hurwitz, Robin Bloor, Marcia Kaufman, Cloud Computing for Dummies, Wiley India Pvt. Ltd, ISBN–13: 978–0–47–059742–2, New Delhi, India, 2011.

M.Sc. Computer Science (Semester – II)

(Session 2018-19)

COURSE CODE: MCSL-2115

DISTRIBUTED DATABASE SYSTEMS

Course Outcomes:

After passing this course the student will be able to:

CO1: To understand the basic concepts of distributed databases and design of distributed database.

CO2: To translate global queries into fragment queries and solve query optimization problem.

CO3: To understand the management of distributed transaction, concurrency control mechanisms and reliability protocols, distributed database administration, protection and security schemes.

M.Sc. Computer Science (Semester – II)

(Session 2018-19)

COURSE CODE: MCSL-2115

DISTRIBUTED DATABASE SYSTEMS

Max. Marks: 100
Theory: 80
CA: 20

Time: 3 Hrs
Pass % = 40%

Instructions for Paper Setter -

Eight questions of equal marks are to set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts(not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section

UNIT-I

Introduction to distributed databases, comparison of distributed and centralized systems, DDBMS, global relations, fragment and physical image, types of schemas, methods of fragmentation of a relation, levels of transparency in a distributed system, integrity constraints.

UNIT-II

Representation of database operation in form of a query, operation in form of a query, operations on a query, unary and binary tree in a query, converting a global query into fragment query, join and union operations involving a query, aggregate functions, and parametric queries.

UNIT-III

Introduction to query optimization, estimation of profiles of algebraic operations, optimization graphs, reduction of relation using semi-join and join operation.

Properties and goals of transaction management, distributed transactions, recovery mechanism in case of transaction failures, log based recovery, check pointing, and communication and site failures in case of a transaction and methods to handle them, serializability and timestamp in distributed databases.

UNIT-IV

Introduction to distributed deadlocks, local and global wait for graphs, deadlock detection using centralized and hierarchical controllers, prevention of deadlocks, 2 and 3 phase locking and commitment protocols, reliability in commitment and locking protocols, reliability and concurrency control, reliability and removal of inconsistency.

Distributed database administration, authorization and protection in distributed databases, distributed database design, heterogeneous database system.

References:

1. Distributed Databases Principles and Systems by Stefano Ceri and GuiseppePelagatti, McGraw-Hill International Editions, 2004.

2. Distributed Database Systems by David Bell, JameGrimson, Addison-Wesley, 1992.

3. M.TamerOzsu, Patrick Valdureiz, 'Principles of Distributed Database Systems' Second Edition, Prentice Hall, 2002.

4. RomezElmasri, ShamkantB.Navathe, 'Fundamentals of Database Systems' Pearson Education, 2005.

5. Silberschatz, Korth, Sudershan "Database System Concepts" 4th Ed. McGraw Hill, 2006.

6. Connolly &Begg "Database Systems – A practical approach to Design, Implementation and Management, 3rd Ed. Pearson Education, 2005.

M.Sc. Computer Science (Semester – II)

(Session 2018-19)

COURSE CODE: MCSP-2116

PROGRAMMING LABORATORY – II

Max. Marks: 100
Practical: 80
CA: 20

Time: 3 Hrs

Pass % = 40%

Implementations based on Design & Analysis of Algorithms OR Image Processing OR Distributed Database Systems OR Cloud Computing.