ANNEXURE-3

MVN UNIVERSITY

Department of Computer Science and Engineering

Master of Technology (Full time)

New Scheme and Syllabus

MVN University, Haryana

Department of Computer Science and Engineering

Master of Technology (Full Time) in Computer Science and Engineering

Semester I **Annexure 3**

Sr. no	Course title	Paper code	Teaching schedule			Total hours	credit	Evaluation scheme		
			L	T	P			internal	External	Total
1	Object Oriented Software Design & UML	CSL501-A	3	0	0	3	3	50	100	150
2	Software Engineering Concepts & Methodology	CSL503-A	3	0	0	3	3	50	100	150
3	Concepts of Distributed Systems	CSL505-A	3	0	0	3	3	50	100	150
4	Advanced C/C++ Programming	CSL507-A	3	0	0	3	3	50	100	150
5	Object Oriented Software Design & UML Lab	CSP501-A	0	0	2	2	1	20	30	50
6	Advanced C/C++ Programming Lab	CSP507-A	0	0	2	2	1	20	30	50
7	Matlab	CSP509-A	0	0	4	4	2	20	30	50
8	Seminar-I	CSS511-A	0	0	4	4	2	50	0	50
	Total		12	0	12	24	18	310	490	800

MVN University, Haryana

Semester II **Annexure 3**

Sr. no	Course title	Paper code	Teaching schedule			Total hours	credit	Evaluation scheme		
			L	T	P			internal	External	Total
1	Advanced Computer Architecture	CSL502-A	3	0	0	3	3	50	100	150
2	Advanced Operating System	CSL504-A	3	0	0	3	3	50	100	150
3	Advanced JAVA	CSL506-A	3	0	0	3	3	50	100	150
4	Grammar & Natural Language Processing	CSL508-A	3	0	0	3	3	50	100	150
5	Elective-I	1*	3	0	0	3	3	50	100	150
6	Advanced JAVA Lab	CSP506-A	0	0	2	2	1	20	30	50
7	Elective-I Lab	1*	0	0	2	2	1	20	30	50
8	Oracle lab	CSP512-A	0	0	2	2	1	50	0	50
9	Major Project	CSD514-A	0	0	6	6	3	60	90	150
	Total		15	0	12	27	21	310	490	800

MVN University, Haryana

Elective I

Sr. no	*Course title*	*Paper code*	*Teaching schedule*			*Total hours*	*credit*	*Evaluation scheme*		
			L	T	P			Internal	External	Total
1	Concepts of Soft Computing	CSL516-A	3	0	0	3	3	50	100	150
2	Concepts of Information Retrieval	CSL518-A	3	0	0	3	3	50	100	150
3	Concepts of Software Engineering	CSL522-A	3	0	0	3	3	50	100	150
4	Concepts of Data Warehousing and Data Mining	CSL524-A	3	0	0	3	3	50	100	150
5	Concepts of Soft Computing Lab	CSP516-A	0	0	2	2	1	20	30	50
6	Concepts of Information Retrieval Lab	CSP518-A	0	0	2	2	1	20	30	50
7	Concepts of Software Engineering Lab	CSP522-A	0	0	2	2	1	20	30	50
8	Concepts of Data Warehousing and Data Mining Lab	CSP524-A	0	0	2	2	1	20	30	50
9	Total		3	0	2	5	4	70	130	200

Annexure-3

CSL501-A	Object Oriented Software Engineering & UML	L T P	Cr
		3 0 0	3

Objective

This course discusses about software engineering principles using object-oriented (OO) software development methodologies. Unified Modeling Language (UML), which was put together in response for proposals initiated by the OMG (Object Management Group), in order to define a standard notation for modeling object-oriented applications.

Theory

Note: Total five questions are to be attempted from Sections A & B.

SECTION – A

Unit 1: Introduction

Introduction to Software Engineering: Software Engineering Development, Software Life Cycle Models, Comparison of various models.

Unit 2: Requirement Engineering

Requirement Elicitation: Introduction to Object Oriented Methodology, Overview of Requirements Elicitation, Requirements Model-Action & Use cases, Requirements Elicitation Activities, Managing Requirements Elicitation.

Unit 3: Modeling with UML

Basic Building Blocks of UML, A Conceptual Model of UML, Basic Structural Modeling, UML Diagrams.

SECTION – B

Unit 4: Architecture

Introduction, System development is model building, model architecture, requirements model, analysis model, the design model, the implementation model, test model.

Unit 5: Analysis and Construction

Introduction to analysis, the requirements model, the analysis model. Introduction to construction, the design model, block design, working with construction.

Unit 6: Testing

Introduction on testing, unit testing, integration testing, system testing, the testing process.

Text Books

1- Ivar Jacobson, “Object Oriented Software Engineering”, Pearson, 2004.

2- Grady Booch, James Rambaugh, Ivar Jacobson, “The UML User Guide”, Pearson, 2004.

Reference Books

1- K.K. Aggarwal-“Software Engineering”
2- Richard C. Lee, William M. Tepfenhard, “UML and C++, A Practical guide to object oriented Development”, Pearson

CSL503-A	Software Engineering Concepts & Methodology	L T P	Cr
		3 0 0	3

Objective

This subject let you know how computer software is developed using engineering approach.

Theory

Note: Total five questions are to be attempted from Sections A & B.

SECTION – A

Unit 1: Introduction

Introduction to Software Crisis, Software Characteristics, Applications and its Myths, Software life cycle models: Waterfall, Prototype, RAD, Evolutionary and Spiral Models, Product and Process.

Unit 2: Requirement Engineering

Requirement elicitation techniques like FAST, QFD & Use case approach, requirements analysis and negotiations, Information modeling- Data flow diagrams- Entity Relationship, Requirement Specification & Documentation.

Unit 3: Planning and Estimation

Software Project Planning, Advanced Size Estimation techniques, Risk Management- Risk Analysis, Risk Identification and Risk Projection and Refinement, Advanced concepts of Software Design- Function Oriented Design, Object Oriented Design, User Interface Design.

SECTION - B

Unit 4: Metrics and Measurement

Software Metrics and their types, Software measurements: What & Why & its Importance, Hardware Reliability & Software Reliability, Failure and Faults, Advanced Reliability Models, Advanced Software Quality Models.

Unit 5: Advance Testing Techniques

Introduction to Software Testing, Testing terminology and Methodology, Verification and validation, Black Box testing, White Box testing, Static testing, Validation Testing, Test

Automation and debugging.

Unit 6: Maintenance

Software Maintenance, Management of Maintenance, Maintenance Models, Reverse Engineering, Software Re-engineering, Configuration Management & Documentation.

Text Books

1- R. S. Pressman, “Software Engineering – A practitioner’s approach”, 5th Ed., McGraw Hill Int. Ed., 2001.
2- K.K. Aggarwal-“Software Engineering”

Reference Books

1- R. Fairley, “Software Engineering Concepts”, Tata McGraw Hill, 1997.
2- P. Jalote, “An Integrated approach to Software Engineering”, Narosa, 1991.
3- Stephen R. Schach, “Classical & Object Oriented Software Engineering”, IRWIN, 1996.
4- James Peter, W. Pedrycz, “Software Engineering”, John Wiley & Sons.
5- I. Sommerville, “Software Engineering”, Addison Wesley, 1999.
6. Nasib Singh Gill, “Software Engineering: Software Reliability, Testing and Quality Assurance”.

CSL505-A	Concepts of Distributed Systems	L T P	Cr
		3 0 0	3

Objective

Today is the era of distributed computing. This subject focuses on distributed architecture and problems.

Theory

Note: Total five questions are to be attempted from Sections A & B.

SECTION – A

Unit 1: Introduction to Distributed Systems

Introduction, Examples of distributed Systems and Resource sharing System Models: Architectural models, Fundamental Models.

Unit 2: Foundation and Goals of Distributed System

Limitation of Distributed system, Logical clocks, Causal ordering of messages, Goals Of Distributed System, Client – Server Model, Shared memory, Hardware and Software concepts, Global state.

Unit 3: Distributed Objects and Remote Invocation

Communication between distributed objects, Remote procedure call, Events and notifications, Security: Overview of security techniques, Cryptographic and Digital signatures pragmatics.

SECTION – B

Unit 4: Transactions and Concurrency Control

Transactions, Nested transactions, Locks, Optimistic Concurrency control, Timestamp ordering, Comparison of methods for concurrency control. Distributed Transactions: Flat and nested distributed transactions, Atomic Commit protocols.

Unit 5: Distributed System Processes

System Model, Threads, Process Allocation, Scheduling in Distributed System, Real Time Distributed System.

Unit 6: Synchronization and Deadlock in Distributed System

System model, Clock synchronization, Distributed deadlock prevention, Distributed deadlock avoidance, Distributed deadlock detection & resolution, File system introduction, Case study.

Text Books

1- Distributed Operating System – Andrew S. Tanenbaum, PHI

Reference Books

1- Singhal & Shivaratri, "Advanced Concept in Operating Systems", McGraw Hill

2- Operating System Concepts , P.S.Gill, Firewall Media

3. Pradeep K. Sinha, " Distributed Operating Systems: Concepts and Design".

MVN University, Haryana

CSL507-A	Advanced C/C++ Programming	L 3	T 0	P 0	Cr 3

Objective

This subject is covering the advance knowledge of programming in foundation languages like C and C++.

Theory

Note: Total five questions are to be attempted from Sections A & B.

SECTION – A

Unit 1: Introduction to Programming

All basic programming introduction(loops, function, array, structure and union), Pointers and addresses, pointers and function arguments, pointer and arrays, address arithmetic, character pointers and functions, initialization of pointer arrays, pointers and multidimensional arrays, command line arguments.

Unit 2: Memory Handling

Memory management, Structures: Defining and processing, passing to a function, Unions.

Unit 3: File Handling

Defining and opening file, closing file, I/O operation on files, error handling during I/O operations, Random Access to files and command line arguments.

SECTION – B

Unit 4: Basic terms and ideas

Abstraction, Encapsulation, Inheritance, Polymorphism, Encapsulation, information hiding, C++ class declaration, constructors and destructors, default parameter value.

Unit 5: Use of Base and Derive class

Inheritance, Class hierarchy, derivation – public, private & protected; aggregation, polymorphism, operator overloading, function name overloading, Overriding inheritance methods, Run time polymorphism, Multiple Inheritance.

Unit 6: File Handling and Template Library

Persistent objects, Streams and files, Namespaces, Exception handling, Generic Classes, Generic Functions. Files & Streams, Stream Manipulators.

Text books

1- E. Balagurusamy, “Objected Oriented Programming with C++”, TMH, 2003
2- Yashwant kanetkar “Let us C” , BPB Publication.

Reference Books

1- A.R.Venugopal, Rajkumar, T. Ravishanker “Mastering C++”, TMH, 2002
2- D . Parasons, “Object Oriented Programming with C++”,BPB Publication. 2002
3- Steven C. Lawlor, “The Art of Programming Computer Science with C++”, Vikas Publication. 2003
4- S. B. Lippman & J. Lajoie, “C++ Primer”, 3rd Edition, Addison Wesley, 2000.
5- R. Lafore, “Object Oriented Programming using C++”, Galgotia. 2003.

CSP509-A	Mat lab	L T P	Cr
		0 0 4	2

Objective

MATLAB is a software package for carrying out numerical computations and analyses. It uses blocks of data called matrices (MATLAB stands for matrix laboratory). MATLAB is the most commonly used scientific and engineering numerical software. The lab enables the student to program in Mat lab.

1- Introduction to MATLAB with its brief description of starting programming environment.
2- Write all commands to perform simple arithmetic, logarithmic, Exponential, Trigonometry and Complex number Operations.
3- Write commands to perform various operations on vector and matrix.
4- Write commands to perform various operations on vector and matrix using built in functions and indexing.
5- Write a script file to perform various operations using conditional statements.
6- Write a script file to perform various operations using flow of control loops and conditional statements.
7- Write a function file to perform various operations using flow of control loops.
8- Write a function file to perform various operations using flow of conditional statements.
9- Write a program to plot expressions.
10- Write a program to plot functions.
11- Write a program for writing and reading from a file.

MVN University, Haryana

CSS511-A	Seminar-I	L T P	Cr
		0 0 4	2

Each candidate is required to give one seminar on any chosen topic connected with the field of specialisation. The topic shall be chosen in consultation with the concerned Faculty and Head of the Department. Preparation and presentation of a seminar is intended to investigate an in-depth review of literature; to prepare a critical review and to develop confidence for making a good presentation. A report has to be submitted in the prescribed format and the seminar shall be evaluated by the respective department committee.

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CSL502-A	Advanced Computer Architecture	L T P	Cr
		3 0 0	3

Objective

Today is the era of parallel processing in Computer. This subject focuses on the Computer Architecture, pipelined and parallel processor design and algorithms used.

Theory

Note: Total five questions are to be attempted from Sections A & B.

SECTION – A

Unit 1: Introduction to Parallel Processing

Evolution of Computer Systems, Parallelism in Uniprocessor Systems, Parallel Computer Structures, Architectural Classification Schemes, Parallel Processing Application.

Memory and Input-Output Subsystems: Hierarchical Memory Structure, Virtual Memory System, Memory Allocation and Management, Cache Memories and Management, Input-Output Subsystems.

Unit 2: Principles of Pipelining And Vector Processing

Pipelining, Instruction And Arithmetic Pipelines, Principles Of Designing Pipelined Processors, Vector Processing Requirements.

Unit 3: Pipeline Computers and Vectorization Methods

The Space of Pipelined Computers, Architecture of Star-100, the instruction format of Star-100, Scientific attached processor: the architecture and instruction format of AP-120B, the recent vector processors: the architecture of Cray-1, pipeline chaining and vector loop, Vectorization and Optimization Methods: parallel language for vector processing, design of a vectorizing compiler, optimization of vector functions.

SECTION – B

Unit 4: Structures and Algorithms for Array Processors:

SIMD Array Processors, SIMD Interconnection Networks: static versus dynamic networks, mesh-connected illiac network, cube interconnection network, Parallel Algorithms for Array Processors: SIMD matrix multiplication, parallel sorting on array processors, Associative Array Processing: associative memory organization, study of STARAN.

SIMD Computers: The Space of SIMD Computers, the study of Illiac-IV system architecture.

Unit 5: Multiprocessor Architecture And Programming:

Functional Structures: loosely coupled and tightly coupled multiprocessors, processor characteristics for multiprocessing, Interconnection Networks: time shared or common bus, crossbar switch and multiport memories, Parallel Memory Organization: interleaved memory configurations, multicache problems and solutions, Exploiting Concurrency for Multiprocessing.

Unit 6: Multiprocessing Control And Algorithms

Interprocess Communication Mechanism, System Deadlock and Protection, Multiprocessor Scheduling Strategies: deterministic scheduling model, stochastic scheduling models, Parallel Algorithms for Multiprocessors: classification of parallel algorithms synchronized parallel algorithms, asynchronous parallel algorithms.

Text Books

1. Pipelined and Parallel Processor Design By Michael J. Fiynn – 1995, Na

Reference Books

1. Advanced Computer Architecture: Parallelism, Scalability, And Programmability By Kai Hwang. Publisher: Mcgraw Hill
2. Computer Architecture and Parallel Processing By Hwang & Briggs, TMH.

CSL504-A	Advanced Operating System	L T P	Cr
		3 0 0	3

Objective

This course of Advance Operating system provides knowledge about distributed computing and algorithms, deadlocks, failures and recovery, and protection.

Theory

Note: Total five questions are to be attempted from Sections A & B.

SECTION – A

Unit 1: Introduction

Functions of operating system, Design approaches, why resource planning, types of advanced operating system

Unit 2: Synchronization mechanisms

Concept of a process and concurrent processes, critical section and other synchronization problem: The Dining Philosopher Problem, Producer-consumer problem, readers-writers problem; Language mechanism for synchronization: Monitors, Serializers, Path Expressions, and Communicating Sequential Processes.

Unit 3: Process Deadlock

Preliminaries, models of deadlock, models of resources, and operations on general resource graph. Necessary and sufficient condition for a deadlock: Graph reduction Method, system with only consumable, Systems with only reusable resources: deadlock detection, deadlock prevention, deadlock avoidance: Banker's Algorithm.

SECTION – B

Unit 4: Distributed operating system

Architectures of distributed systems, distributed mutual exclusion: Introduction, classification of mutual exclusion algorithms: Non-Token-Based Algorithm (Lamport's Algorithm), Token-based Algorithm (Suzuki-Kasami's Broadcast Algorithm), agreement protocols: The System Model, classification of agreement problems, solution to the Byzantine Agreement problem, applications of agreement algorithms.

Unit 5: Failure Recovery

Classification of failures, backward and forward error recovery, consistent set of check points, synchronous and asynchronous check point and recovery.
Fault tolerance: atomic actions and committing, commit protocol, non-blocking commit protocol, voting and dynamic voting protocol, dynamic vote reassignment protocol.

Unit 6: Protection and security

Access and flow control: the access matrix model, advanced models of protection, cryptography: conventional and modern cryptography, the Kerberos system.

Text Books

1. Advanced concept in operating system by Mukesh Singhal, Pub. McGrawHill

Reference Books

1. Distributed Operating System – Andrew S. Tanenbaum, PHI
2. Operating System Concepts, P.S.Gill, Firewall Media
3. Operating System Concepts by Silberchatz et al, 5 edition, 1998, Addison- Wesley

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CSL506-A	Advanced JAVA	L T P	Cr
		3 0 0	3

Objective

This course of Advance JAVA provides knowledge about JDBC, Servlets, Java server pages, Beans, Frameworks, and J2EE technologies.

Theory

Note: Total five questions are to be attempted from Sections A & B.

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SECTION – A

Unit 1: Core java

Introduction to Java, Data types, variables, operators, Arrays, Control Statements, Classes &Methods, Inheritance, Exception Handling, Multithreading, Collections, I/O streams, AVVT & Apolet Programming.

Unit 2: Advance JDBC Programming

Overview of Database Driver Architecture,Introduction to JDBC Standard Extension API (javax.sql),Connection Pooling,JDBC Programming with ORACLE etc. ,Batch Processing,Connecting to non-conventional databases, Use of Excel API,Handling SQL escape syntax,Calling SQL functions, Database stored procedures,Dealing with Database Metadata,Handling Binary Data (Operation on Image File).

Unit 3: Introduction to J2EE: Servlet

Introduction to servlet,Servlet life cycle,Developing and Deploying Servlets,Exploring Deployment Descriptor (web.xml),Handling Request and Response,Initializing a Servlet,Accessing Database,Servlet Chaining,Session Tracking & Management,Dealing with cookies,Transferring Request.Accessing Web Context,Passing INIT and CONTEXT Parameter,Filtering Request and Response,Programming Filter,aFilter Mapping,Servlet Listeners.

SECTION – B

Unit 4: Java Server Pages Technology

Basic JSP Architecture,Life Cycle of JSP (Translation, compilation),JSP Tags and Expressions,Role of JSP in MVC,JSP with Database,JSP Implicit Objects,Tag Libraries,JSP Expression Language (EL),Using Custom Tag,JSP Capabilities: Exception Handling, Session Management, Directives,JSP with Java Bean.

Unit 5: RMI

architecture, Example demonstrating RMI**, JNDI :**JNDI overview, JNDI API, Context operations, Using JNDI in J2EE applications, **Enterprise JAVA Beans**: Enterprise Bean overview, Types of enterprise beans, Advantages of enterprise beans, The Life Cycles of Enterprise Beans, Working with Session Beans, State full vs. Stateless Session Beans, Working with Entity Beans, Message Driven Beans.

Unit 6: Other J2EE Technologies

Java Mail, JPA, Web Services, Hibernate, Spring Framework

Text Books

1. Professional Java server programming, “Subrahmanyan allamaraju and cedric Buest”

Reference Books

1. Struts 2 in Action by Donald Brown, Davis,Stanlick.
2. Struts 2 Design and Programming: A Tutorial by Budi Kurniawan
3. Core servlets and Java Server Pages: Volume 2,Advanced Technology by Marry Hall, Larry Brown, ChaiKin
4. Core J2EE Patterns: Best Practices and Design Strategies by Deepak Alur, Dan Malks, John Crupi.
5. Head First JSP, Head First Servlet,Head First EJB, ketthy siera orally.

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CSL508-A	Grammar & Natural Language Processing	L T P	Cr
		3 0 0	3

Objective

This subject focuses to have an understanding of grammars, knowledge of Turing machine and decidable and undecidable problems, understanding of natural language processing, provide a general introduction including the use of state automata for language processing, provide the fundamentals of syntax including a basic parse, explain advanced feature like feature structures and realistic parsing methodologies.

Theory

Note: Total five questions are to be attempted from Sections A & B.

SECTION – A

Unit 1: Grammar

Introduction to grammar, Chomsky hierarchies of grammars, Derivations and Languages , derivation trees , ambiguity ,simplification of CFG, Greiback Normal form ,Chomsky normal forms, Problems related to CNF and GNF.

Unit 2: Turing Machines

Deterministic and Non-Deterministic Turing Machines, Design of T.M, Halting problem of T.M., Turing machines – Computable Languages and functions – Turing Machine constructions – Storage in finite control – multiple tracks – checking of symbols – subroutines – two way infinite tape. Universal Turing Machines as an undecidable problem – Universal Languages.

Unit 3: Undecidability

Properties of recursive and Recursively enumerable languages , RAM model, Primitive and partial recursive functions, Logic - completeness and incompleteness, Decidability and Church-Turing hypothesis.

SECTION – B

Unit 4: Introduction

Ambiguity – Models and Algorithms – Language, Thought and Understanding. Regular Expressions and automata: Regular expressions – Finite-State automata. Morphology and Finite-State Transducers: Survey of English morphology – Finite-State Morphological parsing – Combining FST lexicon and rules.

Unit 5: Syntax

Tag sets for English – Part-of-speech tagging – Rule-based part-of-speech tagging – Stochastic part-of-speech tagging – Transformation-based tagging – Other issues. Context-Free Grammars for English: Constituency – Context-Free rules and trees – Sentence-level constructions – The noun phrase – Coordination – Agreement – The verb phase and sub categorization – Auxiliaries – Spoken language syntax – Grammars equivalence and normal form – Finite-State and Context-Free grammars – Grammars and human processing. Parsing with Context-Free Grammars.

Unit 6: Semantic

Representing Meaning: Computational desiderata for representations – Meaning structure of language – First order predicate calculus – Some linguistically relevant concepts – Related representational approaches – Alternative approaches to meaning. Semantic Analysis: Syntax-Driven semantic analysis – Attachments for a fragment of English – Integrating semantic analysis into the early parser – Idioms and compositionality – Robust semantic analysis. Lexical semantics: relational among lexemes and their senses.

Text Books

1. Daniel Jurafsky & James H.Martin, " Speech and Language Processing", Pearson Education (Singapore) Pte. Ltd., 2002.
2. Jurafsky, D. and J. H. Martin. Speech and language processing: An Introduction to Natural Language Processing, Computational Linguistics, and Speech Recognition, Second Edition, Upper Saddle River, NJ: Prentice-Hall, 2008.
3. Speech and Language Processing: An Introduction to Natural Language Processing Computational Linguistics, and Speech Recognition. by Daniel Jurafsky and James H. Martin, Prentice-Hall, 2000. (http://www.cs.colorado.edu/~martin/slp.html)
4. Manning, C.D.and H. schutzu "Foundation of Statistical Natural Language Processing" The MIT Press 1999 (ISBN 0-262-13360-1)

Reference Books

1. James Allen, "Natural Language Understanding", Pearson Education, 2003.

CSP512-A	Oracle Lab	L T P	Cr
		0 0 2	1

Objective

This laboratory of Oracle provides knowledge about data creation, editing, maintenance, and various other operations.

Practicals are based on following

1. Basic SQL SELECT statements
2. SQL * PLUS overview
3. Single – Row functions
4. Aggregating data and group functions
5. Joins and sub-queries
6. Modifying data
7. Managing tables and constants
8. Managing views
9. Other data base objects
10. User access and security
11. PL/SQL Basics
12. PL/SQL data handling
13. PL/SQL optimization techniques
14. Triggers
15. PL/SQL DBA packages
16. PL/SQL security packages
17. PL/SQL web packages
18. PL/SQL debugging

Text books

1. OCA/OCP : Introduction to SQL 9i SQL study guide by Chip Dawes and Biju Thomas, Pub. SYBEX
2. http://www.oracle.com/technetwork/database/features/plsql/overview/sample2174ch2-129586.pdf

Reference Books

1. OCA/OCP: Oracle9i ª DBA Fundamentals Study Guide by Biju Thomas Bob Bryla. Pub. Sybex

MVN University, Haryana

CSD514-A	Major Project	L T P	Cr
		0 0 6	3

A technical / research problem to be handled by the candidate and submit a report.

MVN University, Haryana

Elective - I

CSL516-A	Concepts of Soft Computing	L T P	Cr
		3 0 0	3

Objective

This subject let you know about the neural networks & fuzzy logics, operations on fuzzy sets & fuzzy arithmetic.

Theory

Note: Total five questions are to be attempted from Sections A & B.

SECTION-A

Unit-1: Neural Networks

History, overview of biological Neuro-system, Mathematical Models of Neurons, ANN architecture, Learning rules, Learning Paradigms-Supervised, Unsupervised and reinforcement Learning, ANN training Algorithms-perceptions, Training rules, Delta, Back Propagation Algorithm, Multilayer Perception Model, Hopfield Networks, Associative Memories, Applications of Artificial Neural Networks.

Unit-2: Fuzzy Logic

Introduction to Fuzzy Logic, Classical and Fuzzy Sets: Overview of Classical Sets, Membership Function, Fuzzy rule generation.

Unit-3: Operations on Fuzzy Sets

Compliment, Intersections, Unions, Combinations of Operations, Aggregation Operations.

SECTION-B

Unit-4: Fuzzy Arithmetic

Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on Intervals & Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations.

Unit-5: Fuzzy Logic

Classical Logic, Multivalued Logics, Fuzzy Propositions, Fuzzy Qualifiers, Linguistic Hedges.

Unit-6: Uncertainty based Information

Information & Uncertainty, Nonspecificity of Fuzzy & Crisp Sets, Fuzziness of Fuzzy Sets.
Genetic Algorithms, Scope & application areas, solution of 0-1Knapsack problem using GA

Text Books

1. “Fuzzy sets and Fuzzy Logic: Theory and applications”, G.J. Klir, B. Yuan, PHI

Reference Books

1. "Introduction to Fuzzy sets and Fuzzy Logic", M.Ganesh , PHI
2. "An Introduction to Fuzzy Control", D Driankov, H Hellendoorn, M Reinfrank, Narosa Publishing Company
3. Haykin S., "Neural Networks-A Comprehensive Foundations", Prentice-Hall International, New Jersey, 1999.
4. Anderson J.A., "An Introduction to Neural Networks", PHI, 1999

MVN University, Haryana

CSL518-A	Concepts of Information Retrieval	L T P	Cr
		3 0 0	3

Objective

This subject let you know, how search engines & its components used to retrieve information from WWW.

Theory

Note: Total five questions are to be attempted from Sections A & B.

SECTION - A

Unit 1: Introduction to Information Retrieval

Information retrieval problem, an inverted index, Processing Boolean queries, The extended Boolean model versus ranked retrieval, an inverted index, Bi-word indexes, Positional indexes, Combination scheme.

Unit 2: Index construction

Hardware basics, Blocked sort-based indexing, Single-pass in-memory indexing, Distributed indexing, dynamic indexing, other types of indexes

Index compression: Statistical properties of terms in information retrieval, Heaps' law: Estimating the number of terms, Zipf's law: Modeling the distribution of terms, Dictionary compression, Dictionary as a string, Blocked storage, Postings file compression.

Unit 3: Scoring, term weighting and the vector space model

Parametric and zone indexes, Weighted zone scoring, Learning weights, The optimal weight, Term frequency and weighting, Inverse document frequency, Tf-idf weighting, The vector space model for scoring, Variant tf-idf functions.

SECTION – B

Unit 4: Computing scores in a complete search system

Efficient scoring and ranking, Inexact top *K* document retrieval, Index elimination, Champion lists, Static quality scores and ordering, Impact ordering, Cluster pruning, Components of an information retrieval system, Tiered indexes

Unit 5: Web search basics

Background and history, Web characteristics, The web graph, Spam, Advertising as the economic model, The search user experience, User query needs Crawling, Crawler architecture, DNS resolution, The URL frontier, Link analysis, The Web as a graph, Anchor text and the web graph, PageRank, Markov chains, The PageRank computation, Topic-specific PageRank.

Unit 6: Language Models for Information Retrieval

Language models, Finite automata and language models, Types of language models, Multinomial distributions over words, The query likelihood model, Using query likelihood language models in IR, Estimating the query generation probability, Language modeling versus other approaches in IR.

Text books

1. Introduction to Information Retrieval by Christopher D. Manning, Prabhakar Raghavan, Hinrich Schütze published in Cambridge University Press Cambridge, England

MVN University, Haryana

CSL522-A	Concepts of Software Engineering	L T P	Cr
		3 0 0	3

Objective

This subject let you know about the concepts of advance topics in software engineering.

Theory

Note: Total five questions are to be attempted from Sections A & B.

SECTION-A

Unit1

Introduction: The process, software products, emergence of software engineering, evolving role of software, software life cycle models, Software Characteristics, Applications, Software crisis.

Requirements Analysis and specification requirements engineering, system modeling and simulation, prototyping: , Prototyping methods and tools; Specification principles, the software requirements specification(SRS IEEE Format),Modeling: Data Modeling, Functional modeling and information flow(DFDs), Behavioral Modeling; The mechanics of structured analysis: Creating entity/ relationship diagram, control flow model, The data dictionary; Other classical analysis methods.

Unit2

System Design: Design concepts and principles: the design process: Design and software quality, design principles; Design concepts: Abstraction, refinement, modularity, software architecture, control hierarchy, structural partitioning, data structure, software procedure, information hiding; Effective modular design: Functional independence, Cohesion, Coupling; The design model.

Unit3

Architectural Design: Software architecture, Data Design: Data modeling, data structures, databases and the data warehouse, Analyzing alternative Architectural Designs, architectural complexity; Mapping requirements into a software architecture; Transform flow, Transaction flow; Transform mapping: Refining the architectural design.

SECTION - B

Unit 4

Project Management Concepts

People, Product, Process, Project, Problems with software projects, project management and CMM,

Software Project Planning

Management and project evaluation, Project planning objectives, effort estimation models, estimation techniques: Function Point Analysis, COCOMO, Use case point analysis.

Activity planning: project schedules, projects and activities, network planning models, activity on node & activity on arrow networks.

Unit5

Risk Management: identification, assessment and projection, control, RMMM plan, Measurement and tracking planning, Configuration management: baselines, configuration items, configuration process, configuration audit, SCM standards

Project Execution and Closure

Project reporting structures, collecting the data: risk reporting. Visualizing progress: Gantt chart, Slip chart, Ball charts, Timeline charts. Earned value analysis,

Software Quality Assurance

Project management vs quality management, quality concepts, quality metrics, BS 6079:1996 standard

Unit 6

Testing and maintenance: Software Testing Techniques, software testing fundamentals: objectives, principles, testability; Test case design, white box testing, basis path testing: Control structure (cyclomatic complexity) testing, graph matrices, Black box testing. Software Testing Strategies: Verification and validation, Unit testing, Integration testing,; Validation testing, alpha and beta testing; System testing: Recovery testing, security testing, stress testing, performance testing; The art of debugging, the debugging process debugging approaches. Software re-engineering, reverse engineering, restructuring, forward engineering.

Text Books

1. K.K. Aggarwal-"Software Engineering"
2. Software Project Management Bob hughes, Mike Cotterell

Reference Books

1. R. Fairley, "Software Engineering Concepts", Tata McGraw Hill, 1997.
2. P. Jalote, "An Integrated approach to Software Engineering", Narosa, 1991.
3. Stephen R. Schach, "Classical & Object Oriented Software Engineering", IRWIN, 1996.
4. R. S. Pressman, "Software Engineering – A practitioner's approach", 5th Ed., McGraw Hill Int. Ed., 2001

MVN University, Haryana

CSL524-A	Concepts of Data Warehousing & Data Mining	L T P	Cr
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Objective

This subject let you know about the data warehouse and data mining, rules for data mining and recent trends & Web mining.

Theory

Note: Total five questions are to be attempted from Sections A & B.

SECTION-A

Unit-1: Introduction to Data Warehouse

Data warehousing Definition, DBMS vs data warehouse, Three-tier architecture, Multidimensional data model, Schemas for Multidimensional Databases, OLAP operations, multi-feature cubes.

Unit-2: Introduction to Data Mining

Data mining definition & task, KDD process, KDD versus data mining, data mining tools and applications, issues, data mining task primitives, supervised and unsupervised learning approaches, Data preprocessing.

Unit-3: Mining Association rules

The a-priori algorithm, generating rules, improving the efficiency of a-priori; rule mining by partitioning; Parallel and Distributed algorithms: CDA & DDA; advanced techniques: multi-dimensional and multi-level association rules, correlation rules; meta-rule guided mining and constraint based rule mining, Incremental rule mining.

SECTION-B

Unit 4: Clustering techniques

Cluster analysis, similarity and distance measures, partitioning methods: squared error, k-means, k-medoids and genetic algorithm approach; Hierarchical Clustering: agglomerative Vs Divisive, Density based methods: Basic definitions and DBSCAN algorithm; Constraint based clustering.

Unit 5: Classification and Prediction

Classification by Decision tree induction: information gain measure, Tree pruning methods, Bayesian classification, rule based classification, backpropagation through Neural Networks, Genetic Algorithm, Rough Sets, Support Vector Machines and Fuzzy techniques; Prediction: linear and non-linear regression techniques.

Unit 6: Recent trends and Web Mining Mining of Complex Data Objects, Spatial Databases, Temporal Databases; Web Mining, categories of web mining: web structure mining, web content mining and web usage mining, kinds of knowledge discovered in web mining.

Text Books

1. Data Mining: Introductory and advanced topics: Margaret H Dunham, S. Sridhar; Pearson education, 2008.

Reference Books

1. Data Warehousing In the Real World; Sam Anahory & Dennis Murray; 1997, Pearson.