

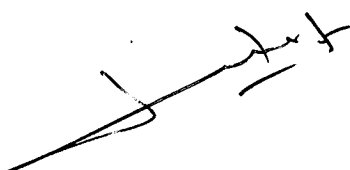
**Department of Computer Science & Application**  
**Bilaspur University, Bilaspur (C. G.)**  
Scheme and Syllabus

**Five Years Integrated B.Sc./M.Sc.(Computer Science)/ M.Sc. (Computer Science)**

**VIII<sup>th</sup> Semester and II<sup>nd</sup> Semester**

Course Code	Course Name	L	P/T	C	Sessional Marks	End Semester Marks	Total Marks
MCS 801	Advanced Java	4	1	5	25	75	100
MCS 802	Soft computing	4	1	5	25	75	100
MCS 803	Advanced Database Management System	4	1	5	25	75	100
MCS 804	Advanced Operating System	4	1	5	25	75	100
MCS 805	Advanced Java Lab	-	5	5	25	75	100

Abbreviation: L- Lecture, P- Practical, T-Tutorial, C-Credit



## MCS- 801 Advanced JAVA

### UNIT-I

**Core Java:** History and Evolution of JAVA, Overview of JAVA, Java Magic, JDK and JRE, Java SE and EE, Different IDE for writing JAVA program like Eclipse, NetBeans etc. Primitive Data Types, Variables, Array, operators, control statement, classes and objects, Abstract Classes, Polymorphism, Inheritance, Method Overriding, Method Overloading, Constructors, Keyword super, this, final, static, Packages and Interfaces, Multi threading and Exception Handling.

### UNIT-II

**JAVA Applet and Packages:** Applet class, Event Handling, AWT, Exploring JAVA Packages: java.lang, java.util, java.io.

### UNIT-III

**Network-Socket Programming and JDBC:** Introduction to Collections, Java Serialization, Network Programming, Socket Programming, Socket for client and server, Processing E-Mails with Java: Protocols and Servers, Creating Mailer, Writing the Mail Sender. Database Using JDBC: Concept, JDBC Driver Types, JDBC package, Establishing a database connection and executing SQL statements, Introduction to Swing, Introduction to Remote Method Invocation (RMI).

### UNIT-IV

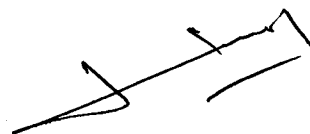
**Java Server Page (JSP):** Basics of Servlet, writing simple program in servlet, Introduction to Java Server Page (JSP), Embedding Java Code into HTML, Implicit JSP Objects, Overview of the JSP Tags, Directives, Declarations, Expressions, Deploying Servlet and JSP, JSTL.

### UNIT-V

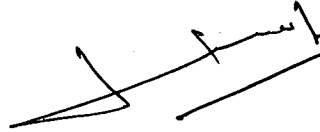
**JAVA, XML and Advance API:** Java and XML, XML syntax, Document type definition, Parsers, Simple API for XML (SAX), JAVA API for XML Processing (JAXP), Introduction, Types and Benefits of EJB, EJB Containers, Deploying EJB, Introduction to the Java Persistence API, Overview of Spring, Model View Controller (MVC). Introduction to Struts, JavaFX and Hibernate.

### Text /Reference Books:

1. The Complete Reference JAVA, Herbert Schildt, Tata McGraw Hill publication, 5<sup>th</sup> Edition.
2. Advance JAVA, Gajendra Gupta, Firewall Media, 1<sup>st</sup> Edition, 2006.
3. JAVA network programming, Elliotte Rusty Harold, O'Reilly Publication, 3<sup>rd</sup> Edition.
4. Core Java for Beginners, Rashmi Kanta Das, Vikas Publishing House Pvt. Ltd.
5. JAVA in a Nutshell, David Flanagan, O'Reilly Publication, 5<sup>th</sup> Edition.
6. Learning JAVA, Patrik Niemeyer and Jonathan Knudsen, O'Reilly Publication, 3<sup>rd</sup> edition.
7. Java Servlet and JSP Cookbook, Bruce W. Perry, O'Reilly Publication, 1<sup>st</sup> Edition.
8. Enterprise JAVA beans 3.1, Andrew Lee Rubinger and Bill Burke, O'Reilly Publication, 6<sup>th</sup> Edition.
9. The Struts Frameworks: Practical guide for Java Programmers, Sue Spielman, Murgan Kaufmann publisher.



10. Programming Jakarta Struts, Chuck Cavaness, O'Reilly Publication, 1<sup>st</sup> Edition.
11. Spring and Hibernate, K.Santosh Kumar, McGraw Hill Education (India) Pvt. Limited, 2<sup>nd</sup> edition.
12. Introduction to Programming with JAVA – A Problem Solving Approach , John Dean, Raymond Dean, Tata Mc Graw Hill.
13. Java2, Swing, Servlets, JDBC and JAVA Beans Programming Black Book Steven Holzner, Dreamtech press.
14. Core and Advanced JAVA (Black Book), Dreamtech Press.
15. JAVA and XML: Solutions to real world problem, Justin Edelson, Brett McLaughlin, O'Reilly Publication, 6<sup>th</sup> Edition.

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## MCS-802 Soft Computing

### UNIT-I

**Introduction** - What is soft computing?. Different tools of soft computing and its comparison, Area of application.

### UNIT-II

**Artificial Neural Network(ANN)** :Architecture, Introduction, Evolution of Neural Network, Biological Neural Network Vs ANN, Basic Model of ANN, Different types of ANN, Single layer Perceptron, Solving XOR problem, Activation function, Linear severability, Supervised and unsupervised learning, perceptron learning, delta learning, Feed-forward and Feedback networks, Error Back Propagation Network (EBPN), Associative memories and its types, Hopfield Network, Kohonen self organizing Map.

### UNIT-III

**Fuzzy Logic** - Introduction to Classical Sets and Fuzzy Sets, Membership Function, properties and operations of classical set and Fuzzy set,  $\alpha$ -cuts, Properties of  $\alpha$ -cuts, Linguistic Variables, Membership function, Classical relation and Fuzzy Relation and its properties and operations, Defuzzification and its methods, Fuzzy rule base.

### UNIT-IV

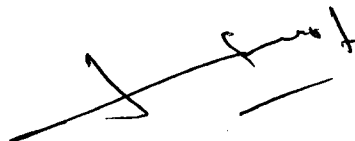
**Genetic Algorithm** - What is Optimization?, Introduction, Application, GA operators: selection, crossover and mutation ,different techniques of selection ,crossover and mutation, different types of chromosomes, Application of GA.

### UNIT-V

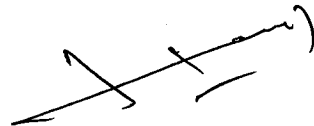
**Hybrid soft commuting**- Design of Neuro-Fuzzy model like ANFIS , Neuro-Genetic, Fuzzy-Genetic Neuro-Fuzzy-Genetic model, MATLAB environment for soft computing.

### Text/Reference Books:

1. Principles of soft computing , S.N. Shivanandan and S.N Deepa , Wiley publication, Wiley India Edition.
2. Neural network and Learning Machines, Simon Haykin, Pearson Education, 2011. Artificial Neural Networks, Robert J. Scholkoff, Mc Graw Hill Education( India) Pvt. Limited,1997.
3. Neural Networks and Fuzzy Systems, A dynamical Systems Approach to Machine Learning, Bart Kosko, PHI learning private limited.
4. Neural Networks, Fuzzy Logic and Genetic Algorithm: Synthesis and Applications, S. Rakasekaran, G.A. Vijayalakshmi Pai, PHI learning private limited, 14<sup>th</sup> Edition. 2003.
5. Neural Networks and Fuzzy Logic, K. Vinoth Kumar, R. Saravana Kumar, S. K. Kataraiia and Sons publication.
6. Artificial Neural Networks, B.Yegnanarayana Prentice Halll of India (P) Limited.
7. Introduction to Artificial Neural Systems, Jacek M. Zurada, Jaico Publication House.
8. Fuzzy Sets, Uncertainty and Information, G. J. Klir and T.A. Folger, PHI learning private limited .



9. Fuzzy sets and Fuzzy Logic: Theory and Applications, George J. Klir and Bo Yuan, PHI learning private limited .
10. Fuzzy Logic and Fuzzy Decision Making: Concepts and Applications, G. Kannan, Galgotia Publication.
11. Intelligent hybrid System : Neural Network, Fuzzy Logic and Genetic Algorithm by Da Ruan, Kluwer Academics publisher.  
Introduction to Neural Networks using MATLAB 6.0, S.N. Shivanandan, S. Sumathi and S.N Deepa, Mc Graw Hill Education( India) Pvt. Limited, 22<sup>nd</sup> Edition, 2015.
12. Genetic Algorithms: In search, Optimization and Machine Learning, David E. Goldberg, Pearson education, 15<sup>th</sup> Edition.
13. Multi Objective Optimization Using Evolutionary Algorithms, Kalyanmoy Deb, Wiley Publication, Wiley student Edition, 2013.



## MCS-803 Advanced Database Management System

### Unit-I

**Basic Concepts:-** Definition of database, Schema and instance, Database architecture, File system Vs Database system, Types of Database system, Database languages, Basic SQL query statement, Triggers and Assertion.

### Unit-II

**Database File Organization-** Introduction, Secondary storage devices, Buffering of blocks, Operation on files, Heap file, Sorted File, Hashing Techniques, RAID, B Tree, B+ Tree.

### Unit-III

**Query processing and Optimization-** Translation of SQL queries to relational algebra, merge-sort algorithm for external sorting, Algorithm for select, Join, Project and set operation, Implementing aggregate function and Outer joins, Combining operation using pipelining, Heuristics in query optimization, Selectivity and cost estimates in query optimization.

### Unit-IV

**Transaction-** Introduction, Desirable properties of transaction, Recoverability, Serializability, Locking, Two Phase locking, Timestamp Ordering.

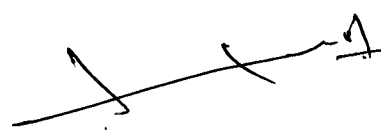
**Recovery-** Concept, Recovery based on deferred update and immediate update, Shadow paging, ARIES recovery algorithm.

### Unit-V

**Distributed Database-** Concepts, Types of Distributed Database, Advantages of Distributed Database, Architecture of Distributed Database, Data fragmentation, Replication, and Allocation techniques in Distributed Database.

### Text /Reference Books:

1. R. Elmasri & S. Navathe, "Database Systems :Model, Language, Design and Application Programming", Pearson, 6<sup>th</sup> edition 2014,
2. Henry F. Korth & Abraham Silberschats , "Data Base Management System", TMH, 1991.
3. Date C.J., "An Introduction to Database Management System", Vol I &II, Addison Wesley, 1981, 1983
4. S. Ceri and G. Pelagati , "Distributed Database Principles and System" , TMH, 1984



## MCS-804 Advanced Operating System

### Unit-I

**Operating System Concepts:** Definition, Types of operating system, operating system services, system call, process concept, process synchronization, deadlock, necessary conditions for deadlock, deadlock avoidance, file system.

### Unit -II

**Introduction to Distributed Systems:** Definition, goal, disadvantages of distributed system; hardware concepts: bus-based multiprocessor, switched multiprocessor, bus-based multicomputer, switched multicomputer; software concepts: network operating system, true distributed system, multiprocessor timesharing system; design issues.

### Unit -III

**Communication in Distributed Systems:** Layered protocols, asynchronous transfer mode networks: Definition, ATM Physical layer, ATM Adaptation layer, ATM switching; Client-Server model: Clients and servers, addressing, blocking versus nonblocking primitives, buffered versus unbuffered primitives, reliable versus unreliable primitives; remote procedure call, group communication.

### Unit -IV

**Synchronization in Distributed Systems:** Clock synchronization: logical clocks, physical clocks, clock synchronization algorithms; Mutual exclusion: centralized algorithm, distributed algorithm, token ring algorithm; Election Algorithm: Bully algorithm, ring algorithm; atomic transactions, deadlock in distributed system: detection and prevention.

### Unit -V

**Processes and processors in Distributed Systems:** threads, system models, processor allocation, scheduling in distributed systems, fault tolerance.

**Distributed Shared memory:** Introduction, Shared memory: On-chip memory, bus-based multiprocessor, ring based multiprocessor, switched multiprocessor, NUMA multiprocessor.

**Case study:** Amoeba, MACH.

### Text /Reference Books:

1. Andrew S. Tanenbaum, "Distributed Operating Systems", Pearson Education, 1995.
2. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, "Operating System Principles", John Wiley & Sons Inc., 2006.
3. Mukesh Singhal, Niranjana Shivaratri, "Advanced Concepts in Operating Systems", TMH, 2001
4. William Stallings, "Operating Systems – Operating System: Internals and Design Principles", Prentice Hall, 2005.

