

## ELECTIVE-II (GROUP B)

Written by Administrator  
Sunday, 08 November 2009 11:44 -

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### Advanced DBMS

Subject Code

: 06IS751

IA Marks

: 25

No. of Lecture Hours/Week

: 04

Exam Hours

: 03

## ELECTIVE-II (GROUP B)

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Sunday, 08 November 2009 11:44 -

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Total No. of Lecture Hours

: 52

Exam Marks

: 100

### PART - A

#### Unit - 1

**Overview of Storage and Indexing, Disks and File:** Data on external storage; File organizations and indexing; Index data structures; Comparison of file organizations; Indexes and performance tuning. Memory hierarchy; RAID; Disk space management; Buffer manager; Files of records; Page formats and record formats.

**7 Hours**

## ELECTIVE-II (GROUP B)

Written by Administrator  
Sunday, 08 November 2009 11:44 -

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### Unit - 2

**Tree Structured Indexing:** Intuition for tree indexes; Indexed sequential access method; B+ trees, Search, Insert, Delete, Duplicates, B+ trees in practice.

7 Hours

### Unit - 3

**Hash-Based Indexing:** Static hashing; Extendible hashing, Linear hashing, comparisons.

6 Hours

### Unit - 4

**Overview of Query Evaluation, External Sorting:** The system catalog; Introduction to operator evaluation; Algorithms for relational operations; Introduction to query optimization; Alternative plans: A motivating example; What a typical optimizer does.

When does a DBMS sort data? A simple two-way merge sort; External merge sort.

## **ELECTIVE-II (GROUP B)**

Written by Administrator  
Sunday, 08 November 2009 11:44 -

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**6 Hours**

**PART - B**

**Unit - 5**

**Evaluating Relational Operators:** The Selection operation; General selection conditions; The Projection operation; The Join operation; The Set operations; Aggregate operations; The impact of buffering

**6 Hours**

**Unit - 6**

**A Typical Relational Query Optimizer:** Translating SQL queries in to Relational Algebra; Estimating the cost of a plan; Relational algebra equivalences; Enumeration of alternative plans; Nested sub-queries; Other approaches to query optimization.

## **ELECTIVE-II (GROUP B)**

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Sunday, 08 November 2009 11:44 -

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### **7 Hours**

#### **Unit - 7**

**Physical Database Design and Tuning:** Introduction; Guidelines for index selection, examples; Clustering and indexing; Indexes that enable index-only plans; Tools to assist in index selection; Overview of database tuning; Choices in tuning the conceptual schema; Choices in tuning queries and views; Impact of concurrency; DBMS benchmarking.

### **7 Hours**

#### **Unit - 8**

**More Recent Applications:** Mobile databases; Multimedia databases; Geographical Information Systems; Genome data management.

### **6 Hours**

## **ELECTIVE-II (GROUP B)**

Written by Administrator  
Sunday, 08 November 2009 11:44 -

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### **Text Books:**

1. **Database Management Systems** - Raghu Ramakrishnan and Johannes Gehrke, 3<sup>rd</sup> Edition, McGraw-Hill, 2003.
2. **Fundamentals of Database Systems** - Elmasri and Navathe, 5<sup>th</sup> Edition, Addison-Wesley, 2007.

### **Reference Book:**

1. **Database Systems** - Connolly and Begg, 3<sup>th</sup> Edition, Pearson Publications, 2002.

## **Embedded Computing Systems**

Subject Code
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## ELECTIVE-II (GROUP B)

Written by Administrator  
Sunday, 08 November 2009 11:44 -

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:	<b>06IS752</b>	
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IA Marks
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	: 25
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No. of Lecture Hours/Week
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: 04
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Exam Hours
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	: 03
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Total No. of Lecture Hours
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: 52
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Exam Marks
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	: 100
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## **ELECTIVE-II (GROUP B)**

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### **PART - A**

#### **Unit - 1**

**Introduction to Embedded Systems – 1:** Embedded systems; Processor embedded into a system; embedded hardware units and devices in a system; embedded software in a system; Examples of embedded systems; Embedded System-on-Chip (SoC) and use of VLSI circuit design technology; Complex systems design and processors; Design process in embedded system.

**7 Hours**

#### **Unit - 2**

**Introduction to Embedded Systems – 2, Devices – 1:** Formalization of system design; Design process and design examples; Classification of embedded systems; Skills required for an embedded system designer.



## ELECTIVE-II (GROUP B)

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Sunday, 08 November 2009 11:44 -

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I/O types and examples; Serial communication devices; Parallel device ports; Sophisticated interfacing features in device ports.

### 6 Hours

#### Unit - 3

Devices -2, Communication Buses for Device Networks: Wireless devices; Timer and counting devices; Watchdog timer; Real time clock; Networked embedded systems; Serial bus communication protocols; Parallel bus device protocols; Internet enabled systems; Wireless and mobile system protocols.

### 6 Hours

#### Unit - 4

**Device Drivers and Interrupts Service Mechanism:** Device access without interrupts; ISR concept; Interrupt sources; Interrupt servicing

mechanism; Multiple interrupts; Context and the periods for context-switching, interrupt latency and deadline; Classification of processors' interrupt service mechanism from context-saving angle; Direct memory access; Device drivers programming.

## **ELECTIVE-II (GROUP B)**

Written by Administrator  
Sunday, 08 November 2009 11:44 -

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### **7 Hours**

## **PART - B**

### **Unit - 5**

**Program Modeling Concepts, Processes, Threads, and Tasks:** Program models; DFG models; State machine programming models for event controlled program flow; Modeling of multiprocessor systems.

Multiple processes in an application; Multiple threads in an application; Tasks and task states; Task and data; Distinctions between functions, ISRs and tasks.

### **7 Hours**

### **Unit - 6**

**Real-time Operating systems – 1:** Operating System services; Process management; Timer functions; Event functions; Memory management; Device, file and I/O sub-systems

## **ELECTIVE-II (GROUP B)**

Written by Administrator  
Sunday, 08 November 2009 11:44 -

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management; Interrupt routines in RTOS environment and handling of interrupt source calls.

**6 Hours**

### **Unit - 7**

**Real-time Operating systems – 2:** Real-Time Operating Systems; Basic design using an RTOS; RTOS task scheduling models, interrupt latency and response times of the tasks as performance metrics; OS security issues.

**6 Hours**

### **Unit - 8**

**Embedded Software Development, Tools:** Introduction; Host and target machines; Linking and locating software; Getting embedded software in to the target system; Issues in hardware-software design and co-design; Testing on host machine; Simulators; Laboratory tools.

**7 Hours**

**Text Book:**

1. **Embedded Systems Architecture, Programming and Design** - Rajkamal, 2<sup>nd</sup> Edition, Tata McGraw Hill, 2008.

**Reference Books:**

1. **Computers as Components Principles of Embedded Computer System Design** - Wayne Wolf, Elsevier, 2005.
2. **Embedded Systems Architecture** - Tammy Noergaard, Elsevier, 2005.
3. **Embedded Systems Design** - Steve Heath, 2<sup>nd</sup> Edition, Elsevier, 2003.
4. **Embedded/Real-Time Systems: Concepts Design and Programming The Ultimate Reference** - K.V.K.K. Prasad, Dreamtech. Press, 2004. Dr.
5. **Embedded C** - Michael J.Point, Pearson Education, 2002.

## ELECTIVE-II (GROUP B)

Written by Administrator  
Sunday, 08 November 2009 11:44 -

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### Java and J2EE

Subject Code

: **06IS753**

IA Marks

: 25

No. of Lecture Hours/Week

: 04

Exam Hours

: 03

Total No. of Lecture Hours

## ELECTIVE-II (GROUP B)

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Sunday, 08 November 2009 11:44 -

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: 52

Exam Marks

: 100

### Part - A

#### Unit - 1

**Introduction to Java:** Java and Java applications; Java Development Kit (JDK); Java is interpreted, Byte Code, JVM; Object-oriented programming; Simple Java programs.

Data types and other tokens: Boolean variables, int, long, char, operators, arrays, white spaces, literals, assigning values; Creating and destroying objects; Access specifiers.

Operators and Expressions: Arithmetic Operators, Bitwise operators, Relational operators, The Assignment Operator, The ? Operator; Operator Precedence; Logical expression; Type casting; Strings.

## ELECTIVE-II (GROUP B)

Written by Administrator  
Sunday, 08 November 2009 11:44 -

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Control Statements: Selection statements, iteration statements, Jump Statements.

### 6 Hours

### Unit - 2

**Classes, Inheritance, Exceptions, Applets:** Classes: Classes in Java; Declaring a class; Class name; Super classes; Constructors; Creating instances of class; Inner classes.

Inheritance: Simple, multiple, and multilevel inheritance; Overriding, overloading.

Exception handling: Exception handling in Java.

The Applet Class: Two types of Applets; Applet basics; Applet Architecture; An Applet skeleton; Simple Applet display methods; Requesting repainting; Using the Status Window; The HTML APPLET tag; Passing parameters to Applets; getDocumentbase() and getCodebase(); ApletContext and showDocument(); The AudioClip Interface; The AppletStub Interface; Output to the Console.

### 6 Hours

## ELECTIVE-II (GROUP B)

Written by Administrator  
Sunday, 08 November 2009 11:44 -

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### Unit - 3

**Multi Threaded Programming, Event Handling:** Multi Threaded Programming: What are threads? How to make the classes threadable; Extending threads; Implementing runnable; Synchronization; Changing state of the thread; Bounded buffer problems, read-write problem, producer-consumer problems.

**Event Handling:** Two event handling mechanisms; The delegation event model; Event classes; Sources of events; Event listener interfaces; Using the delegation event model; Adapter classes; Inner classes.

**7 Hours**

### Unit - 4

**Swings:** Swings: The origins of Swing; Two key Swing features; Components and Containers; The Swing Packages; A simple Swing Application; Create a Swing Applet; JLabel and ImageIcon; JTextField; The Swing Buttons; JTabbedPane; JScrollPane; JList; JComboBox; JTable.

**7 Hours**

### Part - B



## ELECTIVE-II (GROUP B)

Written by Administrator  
Sunday, 08 November 2009 11:44 -

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### Unit - 5

#### Java 2 Enterprise Edition Overview, Database Access:

Overview of J2EE and J2SE.

The Concept of JDBC; JDBC Driver Types; JDBC Packages; A Brief Overview of the JDBC process; Database Connection; Associating the JDBC/ODBC Bridge with the Database; Statement Objects; ResultSet; Transaction Processing; Metadata, Data types; Exceptions.

**6 Hours**

### Unit - 6

**Servlets:** Background; The Life Cycle of a Servlet; Using Tomcat for Servlet Development; A simple Servlet; The Servlet API; The javax.servlet Package; Reading Servlet Parameter; The javax.servlet.http package; Handling HTTP Requests and Responses; Using Cookies; Session Tracking.

**7 Hours**

## **ELECTIVE-II (GROUP B)**

Written by Administrator  
Sunday, 08 November 2009 11:44 -

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### **Unit - 7**

**JSP, RMI:** Java Server Pages (JSP): JSP, JSP Tags, Tomcat, Request String, User Sessions, Cookies, Session Objects.

Java Remote Method Invocation: Remote Method Invocation concept; Server side, Client side.

**6 Hours**

### **Unit - 8**

**Enterprise Java Beans:** Enterprise java Beans; Deployment Descriptors; Session Java Bean, Entity Java Bean; Message-Driven Bean; The JAR File.

**7 Hours**

### **Text Books:**

1. **Java The Complete Reference** - Herbert Schildt, 7<sup>th</sup> Edition, Tata McGraw Hill,

## ELECTIVE-II (GROUP B)

Written by Administrator  
Sunday, 08 November 2009 11:44 -

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2007.

2. **J2EE The Complete Reference** - Jim Keogh, Tata McGraw Hill, 2007.

### Reference Books:

1. **Introduction to JAVA Programming** - Y. Daniel Liang, 6<sup>th</sup> Edition, Pearson Education, 2007.
2. **The J2EE Tutorial** - Stephanie Bodoff et al, 2<sup>nd</sup> Edition, Pearson Education, 2004.

### Multimedia Computing

Subject Code
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## ELECTIVE-II (GROUP B)

Written by Administrator

Sunday, 08 November 2009 11:44 -

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:	<b>06IS754</b>	
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IA Marks
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	: 25
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No. of Lecture Hours/Week
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: 04
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Exam Hours
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	: 03
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Total No. of Lecture Hours
----------------------------

: 52
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Exam Marks
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	: 100
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## **ELECTIVE-II (GROUP B)**

Written by Administrator  
Sunday, 08 November 2009 11:44 -

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### **PART - A**

#### **Unit - 1**

**Introduction, Media and Data Streams, Audio Technology:** Multimedia Elements; Multimedia Applications; Multimedia Systems Architecture; Evolving Technologies for Multimedia Systems; Defining Objects for Multimedia Systems; Multimedia Data Interface Standards; The need for Data Compression; Multimedia Databases.

Media: Perception Media, Representation Media, Presentation Media, Storage Media; Characterizing Continuous Media Data Streams.

Sound: Frequency, Amplitude, Sound Perception and Psychoacoustics; Audio Representation on Computers; Three Dimensional Sound Projection; Music and MIDI Standards; Speech Signals; Speech Output; Speech Input; Speech Transmission.

**7 Hours**

#### **Unit - 2**

**Graphics and Images, Video Technology, Computer- Based Animation:** Capturing Graphics and Images Computer Assisted Graphics and Image Processing; Reconstructing

## **ELECTIVE-II (GROUP B)**

Written by Administrator  
Sunday, 08 November 2009 11:44 -

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Images; Graphics and Image Output Options.

Basics; Television Systems; Digitalization of Video Signals; Digital Television; Basic Concepts; Specification of Animations; Methods of Controlling Animation; Display of Animation; Transmission of Animation; Virtual Reality Modeling Language.

**7 Hours**

### **Unit - 3**

**Data Compression – 1:** Storage Space; Coding Requirements; Source, Entropy, and Hybrid Coding; Basic Compression Techniques; JPEG: Image Preparation, Lossy Sequential DCT-based Mode, Expanded Lossy DCT-based Mode, Lossless Mode, Hierarchical Mode.

**6 Hours**

### **Unit - 4**

**Data Compression – 2:** H.261 (Px64) and H.263: Image Preparation, Coding Algorithms, Data Stream, H.263+ and H.263L; MPEG: Video Encoding, Audio Coding, Data Stream, MPEG-2, MPEG-4, MPEG-7; Fractal Compression.

## **ELECTIVE-II (GROUP B)**

Written by Administrator  
Sunday, 08 November 2009 11:44 -

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**6 Hours**

**PART - B**

**Unit - 5**

**Optical Storage Media:** History of Optical Storage; Basic Technology; Video Discs and Other WORMs; Compact Disc Digital Audio; Compact Disc Read Only Memory; CD-ROM Extended Architecture; Further CD-ROM-Based Developments; Compact Disc Recordable; Compact Disc Magneto-Optical; Compact Disc Read/Write; Digital Versatile Disc.

**6 Hours**

## ELECTIVE-II (GROUP B)

Written by Administrator  
Sunday, 08 November 2009 11:44 -

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### Unit - 6

**Content Analysis:** Simple Vs. Complex Features; Analysis of Individual Images; Analysis of Image Sequences; Audio Analysis; Applications.

**6 Hours**

### Unit - 7

**Data and File Format Standards:** Rich-Text Format; TIFF File Format; Resource Interchange File Format (RIFF); MIDI File Format; JPEG DIB File Format for Still and Motion Images; AVI Indeo File Format; MPEG Standards; TWAIN.

**7 Hours**

### Unit - 8

**Multimedia Application Design:** Multimedia Application Classes; Types of Multimedia Systems; Virtual Reality Design; Components of Multimedia Systems; Organizing Multimedia Databases; Application Workflow Design Issues; Distributed Application Design Issues.



## **ELECTIVE-II (GROUP B)**

Written by Administrator  
Sunday, 08 November 2009 11:44 -

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### **7 Hours**

#### **Text Books:**

1. **Multimedia Fundamentals: Vol 1- Media Coding and Content Processing** - Ralf Steinmetz, Klara Narstedt, 2<sup>nd</sup> Edition, Pearson Education / PHI, 2003.
2. **Multimedia Systems Design** - Prabhat K. Andleigh, Kiran Thakrar, PHI, 2003.

#### **Reference Books:**

1. **Multimedia Communication Systems: Techniques, Standards, and Networks** - K.R Rao, Zoran S. Bojkovic and Dragorad A. Milovanovic, Pearson Education, 2002.
2. **Multimedia Information Networking** - Nalin K Sharad, PHI, 2002.

## ELECTIVE-II (GROUP B)

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### Advanced Software Engineering

Subject Code

: 06IS755

IA Marks

: 25

No. of Lecture Hours/Week

: 04

Exam Hours

## ELECTIVE-II (GROUP B)

Written by Administrator  
Sunday, 08 November 2009 11:44 -

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: 03

Total No. of Lecture Hours

: 52

Exam Marks

: 100

### PART - A

#### Unit - 1

### **Quality Management: Quality Concepts: Quality, Software quality; The software quality dilemma; Achieving software quality.**

Review techniques: Cost impact of Software defects; Defect amplification and removal; Review metrics and their use; Reviews: A formal spectrum; Informal reviews; Formal technical reviews.

Software Quality Assurance: Background issues, Elements of SQA; SQA tasks, goals and metrics; Formal approaches to SQA; Statistical software quality assurance; Software reliability; The ISO 9000 Quality standards; The SQA plan.

## **7 Hours**

### **Unit - 2**

**Formal Modeling and Verification:** The Cleanroom Strategy; Functional specification; Cleanroom design; Cleanroom testing; Formal methods concepts; Applying mathematical notation for formal specification; Formal specification languages.

### **6 Hours**

## **Unit - 3**

**Process Improvement, Configuration Management: Process and product quality; Process classification; Process measurement; Process analysis and modeling; Process change; The CMMI process improvement framework.**

Configuration management planning; Change management; Version and release management; System building; CASE tools for configuration management.

## **7 Hours**

### **Unit - 4**

**Software Process and Project Metrics:** Metrics in the Process and Project Domains; Software

## **ELECTIVE-II (GROUP B)**

Written by Administrator

Sunday, 08 November 2009 11:44 -

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Measurement; Metrics for software quality; Integrating metrics within the software process; Metrics for small organizations; Establishing a software metrics program.

**6 Hours**

**PART - B**

**Unit - 5**

**Software Reuse, CBSE:** The reuse landscape; Design patterns; Generator-based reuse; Application frameworks; Application system reuse.

Components and component models; The CBSE process; Component composition.

**7 Hours**

## ELECTIVE-II (GROUP B)

Written by Administrator  
Sunday, 08 November 2009 11:44 -

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### Unit - 6

**Critical Systems Development and Validation:** dependable processes; Dependable programming; Fault tolerance; Fault-tolerant architectures.

Reliability validation; Safety assurance; Security assessment; Safety and dependability cases.

**6 Hours**

### Unit - 7

**User Interface Design, Maintenance and Reengineering:** User interface design issues; The UI design process; User analysis; User interface prototyping; Interface evaluation.

Software maintenance; Reengineering; Business process reengineering; Software reengineering; Reverse engineering; Restructuring; Forward engineering; The economics of reengineering.

**7 Hours**

### Unit - 8

## **ELECTIVE-II (GROUP B)**

Written by Administrator  
Sunday, 08 November 2009 11:44 -

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**Service-Oriented Software Engineering, Aspect-Oriented Software Development:** Services as reusable components; Service engineering; Software development with services.

Aspect-Oriented Software Development: The separation of concerns; Aspects, join points and pointcuts; Software engineering with aspects.

**6 Hours**

### **Text Books:**

1. **Software Engineering: A Practitioner's Approach** - Roger S. Pressman, 7<sup>th</sup> Edition, McGraw-Hill, 2007.

2. **Software Engineering** - Sommerville, 8<sup>th</sup> Edition, Addison-Wesley, 2007.

### **Reference Books:**

1. **Software Engineering Theory and Practice** - Pfleeger, 2<sup>nd</sup> Edition, Pearson Education, 2001.

2. **Software Engineering Principles and Practice**- Waman S Jawadekar , Tata McGraw Hill, 2004.

## ELECTIVE-II (GROUP B)

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### Neural Networks

Subject Code

: 06IS756

IA Marks

: 25

No. of Lecture Hours/Week

: 04



## ELECTIVE-II (GROUP B)

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Exam Hours

: 03

Total No. of Lecture Hours

: 52

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### PART - A

#### Unit - 1

**Introduction:** What is a Neural Network?, Human Brain, Models of Neuron, Neural Networks viewed as directed graphs, Feedback, Network Architectures, Knowledge representation, Artificial Intelligence and Neural Networks.

## ELECTIVE-II (GROUP B)

Written by Administrator  
Sunday, 08 November 2009 11:44 -

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### 7 Hours

#### Unit - 2

**Learning Processes – 1:** Introduction, Error-correction learning, Memory-based learning, Hebbian learning, Competitive learning, Boltzmann learning, Credit Assignment problem, Learning with a Teacher, Learning without a Teacher, Learning tasks, Memory, Adaptation.

### 6 Hours

#### Unit - 3

**Learning Processes – 2, Single Layer Perceptrons:** Statistical nature of the learning process, Statistical learning theory, Approximately correct model of learning.

Single Layer Perceptrons: Introduction, Adaptive filtering problem, Unconstrained optimization techniques, Linear least-squares filters, Least-mean square algorithm, Learning curves, Learning rate annealing techniques, Perceptron, Perceptron convergence theorem, Relation between the Perceptron and Bayes classifier for a Gaussian environment.

## ELECTIVE-II (GROUP B)

Written by Administrator  
Sunday, 08 November 2009 11:44 -

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### 7 Hours

#### Unit - 4

**Multilayer Perceptrons – 1:** Introduction, Some preliminaries, Back-propagation Algorithm, Summary of back-propagation algorithm, XOR problem, Heuristics for making the back-propagation algorithm perform better, Output representation and decision rule, Computer experiment, Feature detection, Back-propagation and differentiation.

### 6 Hours

## PART - B

#### Unit - 5

**Multilayer Perceptrons – 2:** Hessian matrix, Generalization, approximation of functions, Cross validation, Network pruning techniques, virtues and limitations of back- propagation learning, Accelerated convergence of back propagation learning, Supervised learning viewed as an optimization problem, Convolution networks.

## ELECTIVE-II (GROUP B)

Written by Administrator  
Sunday, 08 November 2009 11:44 -

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### 7 Hours

#### Unit - 6

**Radial-Basic Function Networks – 1:** Introduction, Cover's theorem on the separability of patterns, Interpolation problem, Supervised learning as an ill-posed Hypersurface reconstruction problem, Regularization theory, Regularization networks, Generalized radial-basis function networks, XOR problem, Estimation of the regularization parameter.

### 6 Hours

#### Unit - 7

**Radial-Basic Function Networks – 2, Optimization – 1:** Approximation properties of RBF networks, Comparison of RBF networks and multilayer Perceptrons, Kernel regression and its relation to RBF networks, Learning strategies, Computer experiment.

Optimization using Hopfield networks: Traveling salesperson problem, Solving simultaneous linear equations, Allocating documents to multiprocessors.

### 6 Hours

## **ELECTIVE-II (GROUP B)**

Written by Administrator  
Sunday, 08 November 2009 11:44 -

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### **Unit - 8**

**Optimization Methods – 2:** Iterated gradient descent, Simulated Annealing, Random Search, Evolutionary computation- Evolutionary algorithms, Initialization, Termination criterion, Reproduction, Operators, Replacement, Schema theorem.

### **7 Hours**

#### **Text Books:**

1. **Neural Networks- A Comprehensive Foundation** - Simon Haykin, 2nd Edition, Pearson Education, 1999.
2. **Artificial Neural Networks** - Kishan Mehrotra, Chilkuri K. Mohan, Sanjay Ranka, Penram International Publishing, 1997.

#### **Reference Book:**

1. **Artificial Neural Networks** - B.Yegnanarayana, PHI, 2001.