राष्ट्रीय प्रौद्योगिकी संस्थान रायपुर

NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR
(Institute of National Importance)
G.E. Road, Raipur – 492010 (CG)

Phone: (0771) 225 42 00
Fax: (0771) 225 46 00
Email:
director.nitrr@rediffmail.com
Website: www.nitrr.ac.in

DEPARTMENT OF COMPUTER APPLICATIONS (MCA)
SYLLABUS

Name of the Subject	Advance Programming In Java	Subject Code	CA40511(CA)
Semester	V^th	Board of Studies	
Maximum Marks	100	Minimum Marks	40
Lecture Periods/Week	Tutorial Periods/Week	Practical Periods/Week	Credits
04	01		05

Unit 1: Overview of Java: Features of Java, Byte-code & JVM, data-types, Variables & Arrays, Control-statements, Introduction to Java class & object, main () function, garbage collection & finalize () method, this, Inheritance, method overriding, Dynamic method dispatching, super, final, package, Interface, Abstract class, Class path, String Class.

Unit 2: Exception and Multithreads: Exception-type, Uncaught Exception, Using trycatch, throw, throws, finally, Throwable class and object, Exception classes, Create own exception subclass. Creating multiple threads, isAlive(), join(), Thread priorities, synchronization, - Deadlock, wait(), notify(), notify All() methods, Inter-Thread Communication, suspend, resume & stop the threads.

Unit 3 : Stream and Socket : I/O classes & Interfaces, File, The Stream Classes, The Byte stream (InputStream, OutputStream, FileInputStream, File Output Stream), Serialization, Network basics, Networking classes and Interfaces, InetAddress, TCP/IP Client/Server socket, URL, URL Connection, Datagram , RMI.

Unit 4 : Event handling & working with windows : Delegation event model, event classes, Event listener interface, AWT Classes, Window fundamental, AWT Controls, Layout managers, Menus, Swings:- benefits of swing over AWT , Frames panels and borders ,labels and buttons , tabbed panes , scrolling panes, split panes , combo boxes , list boxes , text component, menu, toolbar and actions , progress bars, sliders and scrollbars , dialogs.

Unit 5 : Web development ; The Applet class, Applet Architecture, Applet skeleton, HTML APPLET Tag, Passing parameter to Applet, get Document Base (), get Code Base (), Applet Context, show Document(). A simple servlet, Javax. servlet package, Reading servlet parameter, web/application server, javax.servlet.http pakage, using cookies, session tracking.

Text Books
(1) *Herbert Schildt (2006), "The Complete Reference Java 2 (Updated to Cover J2SE 1.4)", Ed. 05, Tata McGraw-Hill publishing company Ltd. New Delhi, India.*
(2) *Cay S. Horstmann Gary Cornell, " Core Java 2 Volume-I Fundamentals", Ed-07, PEARSON Education, Singapore Pte. Ltd., Indian Branch, New Delhi, India 2005.*

Reference Books
(1) *Michael Morgan, "Java 2 for Professionals Developers", Ed. 01, SAMS, Techmedia, New Delhi, India 2000.*
(2) *Bruce Echel, " Thinking in Java, The Definitive Introduction to Object-Oriented Programming in the Language of World-Wide-Web", Ed-03, PEARSON Education, Singapore Pte. Ltd., Indian Branch, New Delhi, India 2005.*
(3) *Philip Heller and Simon Roberts, "Java 2 Developer's Hand Book", BPB Publication, New Delhi.*

राष्ट्रीय प्रौद्योगिकी संस्थान रायपुर

NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR
(Institute of National Importance)
G.E. Road, Raipur – 492010 (CG)

Phone: (0771) 225 42 00
Fax: (0771) 225 46 00
Email:
director.nitrr@rediffmail.com
Website: www.nitrr.ac.in

DEPARTMENT OF COMPUTER APPLICATIONS (MCA)
SYLLABUS

Name of the Subject	Distributed Computer System	Subject Code	CA40512(CA)
Semester	Vth	Board of Studies	
Maximum Marks	100	Minimum Marks	40
Lecture Periods/Week	Tutorial Periods/Week	Practical Periods/Week	Credits
04	01		05

UNIT – 1:
Introduction: Motivation, objectives, characterization & classification of distributed systems. Distributed system architecture. Hardware & software issues. Communication: Layered protocols, Client server protocols, RPC, group communication. Coordination, synchronization & consistency: Logical clocks, Physical clocks, mutual exclusion, election algorithms, atomic broadcast, sequential consistency transaction distributed consensus, Threads: Thread synchronization, implementation issues, and threads vs. RPC

UNIT – 2:
Models of distributed computing: Client server and RPC, RPC architecture, exceptions, underlying protocols, IDL, marshalling etc. Group models and peer to peer: Groups for service replication/ reliability, groups for parallelism / performance, client/ server vs. peer-to-peer, multicast, atomic broadcast. Interprocess Communication: API for Internet protocols. External data representation and Marshalling. Client-Server communication and Group communication.
Distributed Objects and Remote Invocation- Communication between distributed objects, Remote procedure call, Events and notifications.

UNIT – 3:
Distributed file system: Security, Naming/ location transparency, R/W semantics, cache coherence, replication. Distributed shared memory: DSM architecture, consistency models and relation to caching, release consistency, comparison with message passing and RPC. Advanced Distributed Computing Paradigms: Message Queuing, Mobile agents, Network services, Object spaces

UNIT – 4:
Fault tolerant distributed systems: Introduction, dependability, faults vs. errors vs. failure, space time and value redundancy, fault tolerant architecture, failure detection algorithms, partitioning, FT consensus. Distributed multimedia system: Introduction, characteristics, and resource management stream adaptation

UNIT – 5:
Security: Introduction, security techniques, cryptographic algorithms, authentication and access control.
Case study: CORBA, RMI MACH

Text Books:-
1. Jean Dollimore, Tim Kindberg, George Coulouris, Distributed Systems: Concepts and Design, 4th Edition, Addison Wesley, 2005.
2. A. Taunenbaum, Distributed Systems: Principles and Paradigms
3. G. Coulouris, J. Dollimore, and T. Kindberg, Distributed Systems: Concepts and Design, Pearson Education

References:
1) Distributed systems, concepts and design, 3rd Edition, Addison Wesley by George Colouris, Jean Dollimore and Tim Kinder berg.
2) Distributed system, 2nd Edition, Addison Wesley by Sape Mull ender.

राष्ट्रीय प्रौद्योगिकी संस्थान रायपुर

NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR
(Institute of National Importance)
G.E. Road, Raipur – 492010 (CG)

Phone: (0771) 225 42 00
Fax: (0771) 225 46 00
Email:
director.nitrr@rediffmail.com
Website: www.nitrr.ac.in

DEPARTMENT OF COMPUTER APPLICATIONS (MCA)
SYLLABUS

Name of the Subject	Mobile Computing	Subject Code	CA40513(CA)
Semester	Vth	Board of Studies	
Maximum Marks	100	Minimum Marks	40
Lecture Periods/Week	Tutorial Periods/Week	Practical Periods/Week	Credits
04	01		05

Unit 1 : Introduction to telecommunication systems
Introduction: Current Wireless Systems: Overview of Paging Systems, Cordless Phones, Cellular Telephone Systems, Satellite Communication, Wireless LANs, Blue tooth. Medium access control, Telecommunication Systems – SDMA, TDMA, CDMA, GSM
Satellite Systems - Basics, Routing Localization, Handover. Broadcast Systems Overview, Cyclic Repetition of Data, Digital Audio Broadcasting, Digital Video Broadcasting,

Unit 2 : Wireless Standards
Wireless LAN – IEEE 802.11 – Infrared vs Radio Transmission, Infrastructure Networks, Ad-hoc Networks, HIPERLAN, Bluetooth Wireless ATM – Working group, Services, Reference Model, Functions, Radio Access Layer, Handover, Location Management, Addressing Mobile Quality of Service, Access Point Control Protocol.

Unit 3 : Mobile Network Layer
Mobile IP Goals, Assumptions and Requirements, Entities, IP packet Delivery Agent Advertisement and Discovery, Registration. Tunneling and Encapsulation, Optimization Reverse Tunneling, IPv6, DHCP. Ad-hoc Networks - Characteristics, Performance Issues, Routing in mobile hosts.

Unit 4: Mobile Transport Layer & Wireless Application Protocol
Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Transmission / Timeout Freezing Selective Retransmission, Transaction oriented TCP. Architecture, Datagram Protocol, Transport Layer Security , Transaction Protocol, Session Protocol , Application Environment , Wireless Telephony.
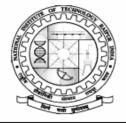
Unit 5 : Application Issues
Dynamic DNS File System, Synchronization Protocol, Context aware applications, Security, Analysis of existing wireless network, GSM Systems Overview: Architecture, Location tracking, and call setup. Security, Data Services N/W Signaling, GSM mobility management, Operations, Administration and maintenance.

Text Books
1. J Schiller ,'Mobile Communication' , Addison Wesley, 2000
2. John Wiley,' Mobile Communication Design Fundamentals', 1993.

Reference Books
1 Wireless Communication and Networks, Pearson Education, 2003.
2. WAP-Wireless Application Protocol, Pearson Education, 2003

राष्ट्रीय प्रौद्योगिकी संस्थान रायपुर

NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR
(Institute of National Importance)
G.E. Road, Raipur – 492010 (CG)

Phone: (0771) 225 42 00
Fax: (0771) 225 46 00
Email:
director.nitrr@rediffmail.com
Website: www.nitrr.ac.in

DEPARTMENT OF COMPUTER APPLICATIONS (MCA)
SYLLABUS

Name of the Subject	Parallel Processing	Subject Code	CA40536(CA)
Semester	Vth	Board of Studies	
Maximum Marks	100	Minimum Marks	40
Lecture Periods/Week	Tutorial Periods/Week	Practical Periods/Week	Credits
04	01		05

UNIT – 1:
Overview of modern processor architectures. Memory Hierarchy . Introduction to Parallel Processing: Flynn's classification, SIMD and MIMD operations, Shared Memory vs. message passing multiprocessors, Distributed shared memory, Hybrid multiprocessors, Overview of modern processor architectures. Memory Hierarchy, Cache and Cache Coherence Caches: associatively, allocation and replacement policies, sub-block placement. Multilevel caches, multilevel inclusion. Cache performance issues.

UNIT – 2:
Bus Architecture Implementations of shared memory: the cache coherency problem. Update vs. invalidation. The bus-based 'snooping' protocol design space. Scalable-shared memory using directory-based cache coherency. MESI protocol.

UNIT – 3:
Types of parallel machine: Vector Pipeline Architectures Pipelined CPU architecture. Instruction set design and pipeline structure, instruction Pipeline Design, Arithmetic pipeline design, Super scalar and Super pipeline design. Dynamic scheduling using score boarding and Tomasulo's algorithm. Software instruction scheduling and software pipelining. Super-scalar and long-instruction-word architectures. Branch prediction and speculative execution.Replicated Architectures: SIMD/MIMD.Shared Memory and Distributed Memory.RISC, CISC Scalar processors, super Scalar and VLIW Computers .Multi-vector Computers.

UNIT – 4:
Connectivity: Interconnection networks: topology, routing, flow control, deadlock avoidance, static and dynamic interconnection networks. Virtual channels, wormhole routing and vertical cut-through. Program and Network Properties,Conditions of parallelism , Program Partitioning and Scheduling ,Program flow mechanisms ,Principles of Scalable Performance ,Performance Metrics and Measures , Parallel processing Applications ,Speedup Performance laws.

UNIT – 5:
Parallel Algorithms: [a] Design Methodology and Analysis Techniques: Foster's Design Methodology, Time Complexity (computation and communication complexities), Speedup, Efficiency, Cost Optimality, Amdahl's Law, Brent's Scheduling Principle. [b]. Simple PRAM Algorithms: Boolean Operations, Max Finding in O (1) time, Reduction, Prefix-Sum, etc. [c]. Basic Algorithms and Techniques: (i) Prime Numbers using Sieve Method; Monte Carlo Methods (e.g., Calculating Pi), (ii) Matrix Multiplication (Row and Column-based on a Ring Topology, and Block-based on a Mesh Topology - Cannon's algorithm), (iii) Sorting (Odd-Even transposition, Merge sort, Bitonic Merging and Sorting, Hyper Quicksort, Parallel Sorting with Random Sampling, etc.)

Text Books:
1. Kai hwang. "Advanced Computer Architecture", McGraw Hill International, 1993.
2. M .J. Quinn," Designing Efficient Algorithms for Parallel Computers", McGraw Hill International, 1994.

References:
1. Andrew S: Tanenbaum, Modern Operating Systems, 2nd Edition, Prentice Hall, 2001.

2.   John Hennessy and David Patterson, Computer organization and Design: The hardware/Software interface, 2nd Edition, Morgan Kaufman Publishers.
.

राष्ट्रीय प्रौद्योगिकी संस्थान रायपुर
NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR
(Institute of National Importance)
G.E. Road, Raipur – 492010 (CG)

Phone: (0771) 225 42 00
Fax: (0771) 225 46 00
Email:
director.nitrr@rediffmail.com
Website: www.nitrr.ac.in

DEPARTMENT OF COMPUTER APPLICATIONS (MCA)
SYLLABUS

Name of the Subject	DIGITAL IMAGE PROCESSING	Subject Code	CA40545(CA)
Semester	V^{th}	Board of Studies	
Maximum Marks	100	Minimum Marks	40
Lecture Periods/Week	Tutorial Periods/Week	Practical Periods/Week	Credits
04	01		05

UNIT-1: INTRODUCTION & FUNDAMENTALS: Origin of DIP, examples of fields that use DIP, fundamentals of DIP, components of an DIP system, Image formation model, Spatial & Gray level resolution, Image enhancement in special domain: Piecewise transformation functions, Histogram equalization, Histogram specification, image averaging, spatial filters- smoothing and sharpening, Laplacian filter, Canny edge detector., image sampling and quantization, some basic relationships between pixels.

UNIT 2: IMAGE ENHANCEMENT AND SEGMENTATION: **Image Enhancement in Spatial Domain:** Background, some basic gray level transformations, Histogram processing, enhancement using arithmetic and logic operations, basic of spatial filtering, smoothing spatial filters, sharpening spatial filters. **Image Enhancement in the Frequency Domain:** Background, Introduction to FT and frequency domain, smoothing frequency domain filters, sharpening frequency domain filters, additional properties of the 2-D FT, convolution, line detection, Edge Detection, Edge Linking and boundary detection, Global Thresholding, Ostu's method, multiple threshold, variable threshold, multivariant threshold, Region based Segmentation., Corner Detection, segmentation using Morphological watersheds.

UNIT 3: IMAGE COMPRESSION: Fundamentals, image compression models, elements of information theory, error free Compression, run length coding, Huffman coding, LZW coding, Arithmetic coding, LZW coding, symbol based coding, bit plane coding, predictive coding, wavelet coding, loss less predictive coding, lossy predictive coding, image compression standards, DCT, JPEG, MPEG video compression standards, watermarking.

UNIT 4: MORPHOLOGICAL IMAGE PROCESSING: Erosion, dilation, opening, closing, Basic Morphological Algorithms: hole filling, connected components, thinning, skeletons, some basic morphological algorithms, Gray scale Morphology.

UNIT 5: IMAGE REPRESENTATION, DESCRIPTION & RECOGNITION: Representation, Boundary descriptors, Regional descriptors, Principal component analysis, Recognition based on decision theoretic & structural methods. Optimum statistical classifiers, neural network, string matching, matching shape numbers. Small project work for DIP.
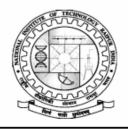
Text Books:
1. Digital Image Processing by Rafael .C .Gonzalez and Richard. E.
2. Digital Image Processing – by William K. Pratt 3rd Edition John Wiley and Sons Inc.
3. P. Suetens, Fundamentals of image processing, Cambridge University Press, 2002.
4. R. C. Gonzalez, R. E. Woods, S. L. Eddins , Digital Image Processing Using MATLAB(R) ,Course Technology, 1 edition, 2004
5. A. K Jain, Fundamentals of image processing, prentice hall, Eagle cliffs, New Jersey, 1989
6.Chanda & Majumdar, Digital image processing and analysis, PHI, 2003

राष्ट्रीय प्रौद्योगिकी संस्थान रायपुर
NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR
(Institute of National Importance)
G.E. Road, Raipur – 492010 (CG)

Phone: (0771) 225 42 00
Fax: (0771) 225 46 00
Email:
director.nitrr@rediffmail.com
Website: www.nitrr.ac.in

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS

Name of the Subject	Java Programming Lab		Subject Code	CA40521(CA)
Semester	Vth		Board of Studies	
Maximum Marks	75		Minimum Marks	
Lecture Periods/Week	Tutorial Periods/Week		Practical Periods/Week	Credits
			04	02

List of Experiments:

(i)   Write a program to create a class called **PassObjectDemo** with two variables **a** and **b** of type integer and method with following prototype-
Pass Object Demo get Parameter To Sum (Pass Object Demo p, Pass Object Demo q) Which will accept two parameter of object of same class two add the individual member variable **a** and **b** of both the objects and returns the same class object in the called area. Store this retired object in the called area and display the value of variables of this object by using **void getDisplay()** method.
[*Passing object as a parameters and returning object*]

(ii)   Create two classes called **A** and **B**. the class has two variables a, b and two function **void getData()**, **void getSum()**. Similarly class B has two variable c, d and two method **void getData()**, **void getSum()**. Now pass reference of class A into B, and reference of class B into class A to access members.
[Note: Program for two way communication within the classes]

(iii)   Write a program to create two classes called **A** and **B.** Class A has two variable **'a'** and **'b'** with two methods **void getData()** used to get values of **'a'** and **'b'** and **void getDisplay()** used to display the sum of relevant variables. Similarly class **B** has two variables **'c'** and **'d'** of type integer with two function **void getData()** used to get values of **'c'** and **'d'** and **void getDiv()** used to divide corresponding variables. Extend **A** by **B** and call methods of **B** in the class **A** by **dynamically**. Use **super()** to call constructor of B if require.
[Use of super]

(iv)   Write a program to generate own exception class called **MyException** used to generate exception during **execution**. Create **ExceptionDemo** class; inside this define one method named **void getAge (int a)** which will **throws MyException** if negative age is entered. Create another class **UsingMyException** used to call this method with an integer parameter for age.

(v)   Write a program to define a method called **void call ()** in class **CallMe**. Create another class **Caller** which implements **Runnable** interface, to create multiple threads. These threads will call **void call ()** method of **CallMe** class synchronously by using **synchronized block or synchronized statement**. Create another class **Synch** in which main () method will start execution of these threads as chilled threads.
[Synchronization]

(vi)   Write a program to demonstrate **Inter-thread communication** for two threads consider thread 1 generating one integer number & thread 2 accepting it via two method **wait ()** and

notify ().

(vii)   Write a program to create I / O stream to read and write content of disc file.

(viii)   Write a program to create Client/Server socket to establish communication in bi-directional.

(ix)   Write a program to create URL connection to current find out status of a web site.

(x)   Write a program to show all the AWT Components of the Java.

(xi)   Write a program to show all the Swing Components of the Java.

(xii)   Write a program to demonstrate Swing/AWT components with is corresponding event and istener interfaces, event registration, and called relevant event methods.

(xiii)   Create an Applet for accepting parameters through **getParameter()** method of Applet class which is coming from **param** tag of relevant **HTML** file and display the gathered parameter through **public void paint(Graphics g) method** in the Applet. Also find out the location of applet & path by using **getDocumentBase(), getCodeBase()** methods of **Applet** class. And also use Applet Context interface and showDocument() method to context another applet.

(xiv)   Write a program to create simple servlet and deploy by using tomcat server.

(xv)   Write a program to implement session tracking and cookies in the servelet.

List of Equipments/Machine required :
(i)   Software: The Java Development Kit version 1.3 (JDK 1.3 or more) and Java Servlets Development Kit.
(ii)   Operating System: Win32 Release for Windows 98 and Windows NT on Intel hardware. For Windows NT, only version 4.0 is supported.
(iii)   RAM / Processor: A 486/DX or faster processor and at least 64 megabytes of RAM are recommended.

Recommended Books:
(i)   "Head First Java" by Kathy Sierra & Bert Bates O'Reilly Publication.
(ii)   "Head First Servlets and JSP " Bryan Basham , Kathy Sierra & Bert Bates.

राष्ट्रीय प्रौद्योगिकी संस्थान रायपुर

NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR
(Institute of National Importance)
G.E. Road, Raipur – 492010 (CG)

Phone: (0771) 225 42 00
Fax: (0771) 225 46 00
Email:
director.nitrr@rediffmail.com
Website: www.nitrr.ac.in

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS

Name of the Subject	Project Lab - Ii	Subject Code	CA40522(CA)
Semester	Vth	Board of Studies	
Maximum Marks	75	Minimum Marks	
Lecture Periods/Week	Tutorial Periods/Week	Practical Periods/Week	Credits
		04	02

1. Out of 40 periods allocated, in 10 periods of Introduction to ASP / JSP, connectivity to database must be taught.

2. Students are supposed to make a web based project.

राष्ट्रीय प्रौद्योगिकी संस्थान रायपुर
NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR
(Institute of National Importance)
G.E. Road, Raipur – 492010 (CG)

Phone: (0771) 225 42 00
Fax: (0771) 225 46 00
Email:
director.nitrr@rediffmail.com
Website: www.nitrr.ac.in

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS

Name of the Subject	Project Lab – I		Subject Code	CA40423(CA)
Semester	Vth		Board of Studies	
Maximum Marks	50		Minimum Marks	25
Lecture Periods/Week	Tutorial Periods/Week		Practical Periods/Week	Credits
			04	02

Instructions:

1. Project should be made using front-end tools with database.
2. Database should be normalized up to 3 NF.
3. The concept of System Analysis and design should be implemented.
4. Project report should be submitted.

राष्ट्रीय प्रौद्योगिकी संस्थान रायपुर

NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR

(Institute of National Importance)

G.E. Road, Raipur – 492010 (CG)

Phone: (0771) 225 42 00
Fax: (0771) 225 46 00
Email:
director.nitrr@rediffmail.com
Website: www.nitrr.ac.in

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS

Name of the Subject	Report Writing & Seminar		Subject Code	HS40424(CA)
Semester	Vth		Board of Studies	
Maximum Marks			Minimum Marks	
Lecture Periods/Week	Tutorial Periods/Week		Practical Periods/Week	Credits
			02	01

Unit I - Introduction to Technical Writing
How differs from other types of written communication Purpose of technical writing, Correspondence: prewriting, writing and rewriting Objectives of Technical Writing. Audience Recognition: High-tech audience, Low tech audience, Lay audience, Multiple Audience.

Unit II – Correspondence
Memos, Letters, E-mails, Its differentiation, types of letters, Document Design, its importance, Electronic Communication: Internet, Intranet, extranet, Writing effective e-mail.

Unit III - Summary
Report Strategies, Effective style of technical report writing: Structures: content, introduction, conclusions, references, etc., Presentation, Writing first draft, revising first draft, diagrams, graphs, tables etc. report lay-out.

Unit IV - Report Writing
Criteria for report writing, Types of Report: Trip report, Progress report, lab report, Feasibility report, project report, incident report, etc. Case Studies.

Unit V - Proposals & Presentation
Title page, Cover letter, Table of Content, list of illustrations, summary, discussion, conclusion, references, glossary, appendix, Case Studies. Oral Presentation/ Seminar:

Text Books:
1. Sharon J. Gerson & Steven M. Gerson "Technical Writing - Process& Product", Pearson Education.

Reference Books:
1. Sunita Mishra, "Communication Skills for Engineers" Pearson Education
2. Davies J.W. "Communication for engineering students", Longman
3. Eisenberg, "Effective Technical Communication", Mc. Graw Hill.