

**Rajiv Gandhi Proudyogiki Vishwavidyalaya, Bhopal**  
**Course of Study and Scheme of Examination**  
**B.E. Computer Science and Engineering**  
**SEMESTER – VII**  
**Scheme: BE (CS)**

S. No	Course Category	Course Code (New)	Name of Course	Hours Per week			C R E D I T S	Distribution of Marks						
				L	T	P		C	Theory Exam	Practical Block	Internal Assessment			Total
											MST	TW	Total	
								I	II	III			I+II+III	
1	DC-19	CS701	<a href="#">Compiler Design</a>	3	1	2	6	100	50	20	30	50	200	
2	DC-20	CS702	<a href="#">Distributed Systems</a>	3	1	0	4	100	-	20	-	20	120	
3	DC-21	CS703	<a href="#">Simulation &amp; Modeling</a>	3	1	2	6	100	50	20	30	50	200	
4	DCO(E)-I	Refer table below	<a href="#">Elective-I</a>	3	1	0	4	100	-	20	-	20	120	
5	DCO(E)-II	Refer table below	<a href="#">Elective - II</a>	3	1	0	4	100	-	20	-	20	120	
6	DC-22	CS704	<a href="#">Industrial Training* (Six Weeks)</a>	0	0	0	4	-	50	-	50	50	100	
7	DC-23	CS705	<a href="#">Major Project (Planning &amp; Literature Survey)</a>	0	0	4	4	-	50	-	30	30	80	
8	NECC-9	CS706	Self Study	0	0	1	1	-	-	-	30	30	30	
9	NECC-10	CS707	Seminar/Group Discussion etc.	0	0	1	1	-	-	-	30	30	30	
<b>Total</b>				<b>15</b>	<b>5</b>	<b>10</b>	<b>34</b>	<b>500</b>	<b>200</b>	<b>100</b>	<b>200</b>	<b>300</b>	<b>1000</b>	

\* Student will undertake industrial training in the summer break, after VI semester and assessed in VII semester,

MST-Mid Semester Test, TW- Term

ELECTIVE-I					
CS7101	<a href="#">N/W Management</a>	CS 7102	<a href="#">Real Time Fault Tolerant Systems</a>	CS7103	<a href="#">Embedded Computer System</a>
ELECTIVE-II					
CS7201	<a href="#">CS 7201 Network &amp; Web Security</a>	CS7202	<a href="#">Randomized Algorithms</a>	CS7203	<a href="#">Data Mining &amp; Knowledge Discovery</a>

Work

- Note :-** 1. Minimum strength of **Ten Students** is required to offer an Elective in the College in a particular Academic Session.  
2. Choice of Elective Course ones made for an examination cannot be changed for future examinations.  
3. Elective Courses for B.E. programme in IT & CS are common, but certain elective courses, which have been given as core courses in any scheme cannot be offered by students of that branch as an elective.

W.e.f :- July- 2010

Academic Section-2010-11

**PROGRAMME: B.E. Computer Science and Engineering VII Semester**

Course: CS701 Compiler Design (Proposed)

<b>CATEGORY OF COURSE</b>	<b>COURSE TITLE</b>	<b>COURSE CODE</b>	<b>CREDITS - 6C</b>			<b>THEORY PAPERS</b>
Departmental Core DC-19	<b>Compiler Design</b>	CS701	L	T	P	Max.Marks-100 Min.Marks-35 Duration-3hrs.
			3	1	2	

**COURSE CONTENTS**

**Unit-I Introduction to compiling & Lexical Analysis**

Introduction of Compiler, Major data Structure in compiler, BOOT Strapping & Porting, Compiler structure: analysis-synthesis model of compilation, various phases of a compiler, Lexical analysis: Input buffering , Specification & Recognition of Tokens, LEX.

**Unit-II Syntax Analysis & Syntax Directed Translation**

Syntax analysis: CFGs, Top down parsing, Brute force approach, recursive descent parsing, transformation on the grammars, predictive parsing, bottom up parsing, operator precedence parsing, LR parsers (SLR, LALR, LR), Parser generation.

Syntax directed definitions: Construction of Syntax trees, Bottom up evaluation of S-attributed definition, L-attribute definition, Top down translation, Bottom Up evaluation of inherited attributes ,Recursive Evaluation, Analysis of Syntax directed definition.

**Unit-III Type Checking & Run Time Environment**

Type checking: type system, specification of simple type checker, equivalence of expression, types, type conversion, overloading of functions and operations, polymorphic functions.

Run time Environment: storage organization, Storage allocation strategies, parameter passing, dynamic storage allocation , Symbol table

**Unit –IV Code Generation**

Intermediate code generation: Declarations, Assignment statements, Boolean expressions, Case statements, Back patching, Procedure calls

Code Generation: Issues in the design of code generator, Basic block and flow graphs, Register allocation and assignment, DAG representation of basic blocks, peephole optimization, generating code from DAG.

**Unit –V Code Optimization**

Introduction to Code optimization: sources of optimization of basic blocks, loops in flow graphs, dead code elimination, loop optimization, Introduction to global data flow analysis, Code Improving transformations ,Data flow analysis of structure flow graph ,Symbolic debugging of optimized code.

## List of Experiments:

- Develop a lexical analyzer to recognize a few patterns.
- Write a programme to parse using Brute force technique of Topdown parsing.
- Develop LL (1) parser (Construct parse table also).
- Develop an operator precedence parser (Construct parse table also)
- Develop a recursive descent parser
- Write a program for generating for various intermediate code forms
  - i) Three address code
  - ii) Polish notation
- Write a program to simulate Heap storage allocation strategy
- Generate Lexical analyzer using LEX
- Generate YACC specification for a few syntactic categories.
- Given any intermediate code form implement code optimization techniques
- Study of an Object Oriented Compiler.

## References:

1. A. V. Aho, R. Sethi, and J. D. Ullman. Compilers: Principles, Techniques and Tools , Pearson Education
- 2 Raghavan, Compiler Design, TMH Pub.
3. Louden. Compiler Construction: Principles and Practice, Cengage Learning
4. A. C. Holub. Compiler Design in C , Prentice-Hall Inc., 1993.
5. Mak, writing compiler & Interpreters, Willey Pub.

**PROGRAMME: B.E. Computer Science and Engineering, VII Semester**  
 Course: CS702 Distributed System (Proposed)

CATEGORY OF COURSE	COURSE TITLE	COURSE CODE	CREDIT-4C			THEORY PAPER
			L	T	P	
Departmental Core DC-20	CS702 Distributed System	CS702	3	1	0	<b>Max.Marks-100</b> Min.Marks-35 Duration-3hrs.

**COURSE CONTENTS**

**Unit-I**

**Introduction to distributed systems**

Architecture for Distributed System, Goals of Distributed system, Hardware and Software concepts, Distributed Computing Model, Advantages & Disadvantage distributed system, Issues in designing Distributed System,

**Unit-II**

**Distributed Share Memory And Distributed File System**

Basic Concept of Distributed Share Memory (DSM), DSM Architecture & its Types, Design & Implementations issues In DSM System, Structure of Share Memory Space, Consistency Model, and Thrashing.

Desirable features of good Distributed File System, File Model, File Service Architecture, File Accessing Model, File Sharing Semantics, File Caching Scheme, File Application & Fault tolerance. Naming: - Features, System Oriented Names, Object Locating Mechanism, Human Oriented Name.

**Unit-III**

**Inter Process Communication And Synchronization**

API for Internet Protocol, Data Representation & Marshaling, Group Communication, Client Server Communication, RPC- Implementing RPC Mechanism, Stub Generation, RPC Messages. Synchronization: - Clock Synchronization, Mutual Exclusion, Election Algorithms:- Bully & Ring Algorithms.

**Unit-IV**

**Distributed Scheduling And Deadlock**

Distributed Scheduling-Issues in Load Distributing, Components for Load Distributing Algorithms, Different Types of Load Distributing Algorithms, Task Migration and its issues.

Deadlock-Issues in deadlock detection & Resolutions, Deadlock Handling Strategy, Distributed Deadlock Algorithms,

**Unit-V**

**Distributed Multimedia & Database system**

Distributed Data Base Management System(DDBMS), Types of Distributed Database, Distributed Multimedia:- Characteristics of multimedia Data, Quality of Service Managements. Case Study of Distributed System:- Amoeba, Mach, Chorus

**References:**

- Sinha, Distributed Operating System Concept & Design, PHI
- Coulouris & Dollimore, Distributed System Concepts and Design, Pearson Pub
- Singhal & Shivratri, Advance Concept in Operating System, McGraw Hill
- Attiya & Welch, Distributed Computing, Wiley Pub.

# RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

PROGRAMME: B.E. Computer Science & Engineering, VII Semester

Course: CS 703 Simulation and Modeling (Proposed)

## Course Contents

CATEGORY OF COURSE	COURSE TITLE	COURSE CODE	CREDIT- 6 C			THEORY PAPER
			L	T	P	
Departmental Core DC-21	Simulation and Modeling	CS 703	3	1	2	<b>Max.Marks-100</b> Min.Marks-35 Duration-3hrs.

### Unit-I

#### Introduction to Modeling and Simulation

Nature of Simulation. Systems , Models and Simulation, Continuous and Discrete Systems, system modeling, concept of simulation, Components of a simulation study, Principles used in modeling ,Static and Dynamic physical models, Static and Dynamic Mathematical models Introduction to Static and Dynamic System simulation , Advantages ,Disadvantages and pitfalls of Simulation.

### Unit-II

#### System Simulation and Continuous System Simulation

Types of System Simulation, Monte Carlo Method, Comparison of analytical and Simulation methods, Numerical Computation techniques for Continuous and Discrete Models, Distributed Lag Models, Cobweb Model.

Continuous System models, Analog and Hybrid computers, Digital-Analog Simulators, Continuous system simulation languages ,Hybrid simulation ,Real Time simulations.

### Unit –III

#### System Dynamics & Probability concepts in Simulation

Exponential growth and decay models, logistic curves ,Generalization of growth models , System dynamics diagrams, Multi segment models , Representation of Time Delays.

Discrete and Continuous probability functions, Continuous Uniformly Distributed Random Numbers, Generation of a Random numbers, Generating Discrete distributions, Non-Uniform Continuously Distributed Random Numbers, Rejection Method.

### Unit-IV

#### Simulation of Queueing Systems and Discrete System Simulation

Poisson arrival patterns, Exponential distribution, Service times, Normal Distribution Queuing Disciplines, Simulation of single and two server queue. Application of queuing theory in computer system .

Discrete Events ,Generation of arrival patterns ,Simulation programming tasks , Gathering statistics, Measuring occupancy and Utilization , Recording Distributions and Transit times .

## Unit-V

### Introduction to Simulation languages and Analysis of Simulation output

GPSS: Action times, Succession of events, Choice of paths, Conditional transfers ,program control statements .

SIMSCRIPT: Organization of SIMSCRIPT Program, Names & Labels, SIMSCRIPT statements .

Estimation methods , Relication of Runs , Batch Means , Regenerative techniques , Time Series Analysis , Spectral Analysis and Autoregressive Processes.

### List of Experiments:-

1. Simulate CPU scheduling algorithm using queueing system
  - a) FCFS
  - b) SJF
  - c) Priority Algo
2. Simulate multiplexer/concentrator using queueing system
3. Simulate congestion control algorithms.
4. Simulate disk scheduling algorithms.
5. Simulate a Manufacturing shop and write a program in GPSS.
6. Simulate Telephone system model and write a program in SIMSCRIPT.

### References:

- Gorden G., System simulation, Prentice Hall.
- Seila, Simulation Modeling, Cengage Learning
- Law .,Simulation Modeling And Analysis, McGraw Hill
- Deo, System Simulation with Digital Computer, PHI
- Harrington, Simulation Modeling methods, McGraw Hill
- Severance, “ System Modeling & Simulation, Willey Pub

**Course Contents**

CATEGORY OF COURSE	COURSE TITLE	COURSE CODE	CREDIT-4C			THEORY PAPER
			L	T	P	
Departmental Elective DCO(E)-I	Network Management	CS 7101	3	1	0	<b>Max.Marks-100</b> Min.Marks-35 Duration-3hrs.

**Unit-I**

Introduction to Network Managements, Network Management Framework, Network Based Managements, Evolution of Network Management: SGMP, CMIP, SNMP. Network Implementation and Management Strategies, Network Management Categories: Performance Management, Fault Management, Configuration Management, Security Managements, Accounting Managements. Network Management Configuration: Centralized Configuration, Distributed Configuration. Selected Management Strategy.

**Unit –II**

Management Information Base (MIB), Structure of Management Information, NMS Presentation of the SMI, NMS Meter-ware Network View. Remote Monitoring (RMON), RMON Group. Desktop Management: Desktop Management Interface(DMI), DMI Architecture, DMI Browser, DMI/SNMP Mapping, Desktop SNMP Extension Agents. Setting up LAN Access, SNMP Configuration.

**Unit-III**

Introduction, layering, OSI Layering, TCP/IP Layering, Protocols & Standards, Internet standards, Internet administration, Internet Addresses, Internet protocol: introduction, IP header, IP routing, subnet addressing, subnet mask, special case of IP addresses, Comparative Study of IPV4 & IPV6, port numbers  
Address Resolution Protocol, ARP packet format, Proxy ARP, ARP command, ARP Example, Reverse Address Resolution Protocol (RARP): Introduction, RARP Packet format, RARP Examples, RARP server design

**Unit-IV**

Delivery and Routing of IP Packets, Routing Methods, Static versus Dynamic Routing, Routing table and Routing Module, Classless Addressing: CIDR. Internet Protocol (IP), Datagram, Fragmentation, Options, IP Package. Interior and Exterior Routing, Routing information protocol (RIP), Open shortest path first protocol (OSPF), BGP, GGP. Private Networks. Virtual Private Network (VPN), Network Address Translation (NAT).

**Unit –V**

Internet Control Message Protocols (ICMP):- Types of message, message format, error reporting, query, checksum, ICMP Package. IGMP, IGMP Message and its Operation, IGMP Package. Transmission control protocol, Process-to-Process Communication, TCP Services Flow Control, TCP Timers. TCP Operation, TCP Package.. Application layers protocol, Telnet Protocol, File Transfer Protocol (FTP), Simple Mail Transfer Protocol (SMTP), X-Window system protocol, Remote procedure call, and Network file system.



**References:**

- Forouzan, TCP/IP Protocol Suite 4th edition, TMH
- J.Richard Burkey, Network Management Concept and Practice, PHI
- Stevens, TCP/IP Illustrated Volume-I, Pearson
- Tittel: TCP/IP, Cenage Learning
- Uyles Black, TCP/IP and related protocols, McGraw Hill.
- Doughals E. Comer, Internetworking with TCP/IP Vol. I, Principles, Protocols, and Architecture, Prentice Hall, India.

# RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

**PROGRAMME:** B.E. Computer Science & Engineering, VII Semester

**Course:** CS 7102 Real Time Fault Tolerant Systems(Proposed)

## Course Contents

CATEGORY OF COURSE	COURSE TITLE	COURSE CODE	CREDIT-4C			THEORY PAPER
			L	T	P	
Departmental Elective DCO(E)-I	Real Time Fault Tolerant Systems	CS 7102	3	1	0	<b>Max.Marks-100</b> Min.Marks-35 Duration-3hrs.

### Unit-I

Structure of Real Time System, Performance Measure for real time system, Task Assignments, Fault Tolerant Scheduling, Real Time Vs General purpose Data Bases, Data Bases for Hard Real Time System, Real Time Communication

### Unit-II

Fault Tolerance, Fault-Error-Failure. Redundancy, Error Detection, Damage Confinement, Error Recovery, Fault Treatment, Fault Prevention, anticipated and unanticipated Faults.

Error models: General coding scheme Error detection techniques: Watchdog processors, Heartbeats, consistency and capability checking, Data audits, Assertions, Control-flow checking, Error control coding. Application: DHCP

### Unit-III

Fault tolerance: Coding technique-fault tolerant self checking and fail safe circuits-fault tolerance in combinatorial and sequential circuits- synchronous and asynchronous fail safe circuits. Software fault tolerance: Process pairs, robust data structures, N version programming, Recovery blocks, Replica consistency & reintegration, multithreaded programs Application: VAX. Network fault tolerance: Reliable communication protocols, Agreement protocols, Database commit protocols -Application: Distributed SQL server Check pointing & Recovery - Application: Micro check pointing, IRIX Checkpoints

### Unit-IV

Experimental Evaluation: Modelling and simulation based, Fault injection based - Application: NFTAPE fault injector . Modelling for performance, dependability and perform ability: dependability-specific methods (fault trees, reliability block diagrams), queues, stochastic Petri nets and stochastic activity networks - Application: Ultra SAN

### Unit-V

Practical Systems for Fault Tolerance: - Application: Ad-hoc wireless network - Application: NASA Remote Exploration & Experimentation System Architecture: Fault tolerant computers - general purpose commercial systems-fault tolerant multiprocessor and VLSI based communication architecture. Fault tolerant software: Design-N-version programming recovery block - acceptance tests-fault trees- validation of fault tolerant systems.

## REFERENCES :-

1. K.K.Pradhan, "Fault Tolerant computing theory and techniques" volume III. Prentice Hall, 1989.
2. Krishna, Real Time System, TMH
3. Anderson and Lee, "Fault Tolerant principles and practice" ,PHI 1989.
4. Siewert, Real Time Embedded System, Cengage Learning.
5. Rajiv Mall, Real Time System, Pearson Edu.
6. Parag K. Lala, "Fault Tolerant and Fault Testable, Hardware design" PHI 1985.
7. Shem , toy Levei , Ashok K.Agarwala , "Fault Tolerant System design", Tata McGraw Hill

# RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

PROGRAMME : B.E. Computer Science & Engineering, VII semester

Course : CS7103 Embedded Computer Systems(Proposed)

CATEGORY OF COURSE	COURSE TITLE	COURSE CODE	Credit-4C			THEORY PAPER
			L	T	P	
Departmental Elective DCO(E)-I	Embedded  Computer  Systems	CS7103	3	1	0	Max.Marks-100 Min.Marks-35 Duration-3hrs.

**Branch:** Computer Science & Engineering VII Semester

**Course:** CS7103 Embedded Computer Systems

## Unit – I

### Introduction to Embedded systems

Embedded Systems Vs General Computing Systems, Classification of Embedded Systems,

Major application areas of Embedded Systems, Purpose of Embedded systems ,Core of the Embedded system, Memory, Sensors and Actuators, Communication Interface, Embedded firmware, PCB and Passive Components, Characteristics and Quality attributes of a Embedded System .

## Unit – II

### Design of Embedded Systems with 8bit Microcontrollers-8051

Factors for considering in selecting a Controller ,Designing with 8051 microcontroller ,Different addressing modes supported by 8051 , Instruction set for 8051 microcontroller .Fundamental issues in Hardware Software Co-Design , Computational models in Embedded Design .

## Unit – III

### Embedded Hardware & Firmware Design and Development

Analog &Digital Electronic components, VLSI & Integrated circuit design, Electronic Design Automation tools , PCB layout Design and its fabrication .Embedded firmware design approaches , Embedded firmware Development Languages ,Programming in Embedded C .

Integration and testing of Embedded Hardware and Firmware , Safe & robust Design, Reliability, Faults, errors & Failure, Functional Design, Architecture Design, Prototyping.

## Unit -IV

### Embedded System Development Environment

Integrated Development Environment (IDE) , Types of files Generated on Cross-Compilation ,

Disassembler/Decompiler, Simulators, Emulators and Debugging, Boundary Scan

## Unit – V

### **Embedded Product Development Lifecycle(EDLC) and Trends in Embedded Industry**

What is EDLC ,Objectives of EDLC , Different phases of EDLC , EDLC Approaches-Linear or waterfall model , Iterative Model , Prototyping/Evolutionary Model, Spiral Model .

Processor trends in Industry , Embedded OS Trends , Development Language trends ,Open Standards, Frameworks and Alliances , Bottlenecks.

### **References:**

1. Shibu, Introduction to Embedded System:, TMH
2. Barrett ,Embedded Systems :Design and Applications ,Pearson Education
3. Rajkamal, Embedded System, TMH
4. Vahid ,Givargis ,Embedded System Design ,Wiley
5. Balbno, Embedded Micro Computer System Cengage Learning
6. Siewert, Real Time Embedded System & Components, Cengage Learning
7. Peckol, Embedded System, Willey India

**PROGRAMME : B.E. Computer Science & Engineering, VII semester**

**Course : CS 7201 Network & Web Security(Proposed)**

CATEGORY OF COURSE	COURSE TITLE	COURSE CODE	CREDIT-4C			THEORY PAPER
			L	T	P	
Departmental Elective DCO(E)-II	Network &	CS 7201				Max.Marks-100 Min.Marks-35 Duration-3hrs.
	Web Security		3	1	0	

**UNIT I**

Introduction to Network Security, Computer Security and Cyber Security. Security Terminologies and Principle, Security Threats, Types of attacks (Operating System, application level, Shrink Wrap code, Misconfiguration attacks etc.).

Introduction to Intrusion, Terminologies, Intrusion Detection System (IDS), Types of Intrusion Detection Systems, System Integrity Verifiers (SIVS).Indication of Intrusion: System Indications, File System Indications Network Indications. Intrusion Detection Tools ,Post attack IDS Measures & Evading IDS Systems. Penetration Testing, Categories of security assessments, Vulnerability Assessment, Types of Penetration Testing. Risk Management.

**UNIT II**

Cryptography, Classical Cryptographic Techniques, Encryption, Decryption, Code Breaking: Methodologies, Cryptanalysis, Cryptography Attacks, Brute-Force Attack, Use of Cryptography. Public key cryptography, Principles of Public key Cryptosystems, Cryptographic Algorithms RSA, Data Encryption Standard (DES), RC4, RC5, RC6, Blowfish, Key Management, Diffie-Hellman key exchange, elliptic curve cryptography.

**UNIT III**

Hash Functions, One-way Hash Functions, SHA (Secure Hash Algorithm), Authentication Requirements, Authentication Functions, Kerberos. Message Authentication codes ,Message Digest Functions, MD5, SSL (Secure Sockets Layer), SSH (Secure Shell), Algorithms and Security, Disk Encryption, Government Access to Keys (GAK)

**Digital Signature:** Analysis, Components, Method, Applications, Standard, Algorithm: Signature Generation/Verification, ECDSA, ElGamal Signature Scheme, Digital Certificates.

**UNIT IV**

**Trojans and Backdoors:** Overt and Covert Channels, Working, Types (Remote Access Trojans, Data-Sending Trojans, Destructive Trojans, Trojans, Proxy Trojans, FTP Trojans, Security Software Disablers).

**Viruses and Worms:** Characteristics, Working, Infection Phase, Attack Phase. Sniffers: Definition, spoofing, Sniffing, Vulnerable Protocols, Types.

**Phishing:** Methods, Process, Attacks Types (Man-in-the-Middle Attacks, URL Obfuscation Attacks, , Hidden Attacks, Client-side Vulnerabilities, Deceptive Phishing, Malware-Based Phishing, DNS-Based Phishing, Content-Injection Phishing, Search Engine Phishing).

**Web Application Security-** Secured authentication mechanism, secured session management, Cross-site Scripting, SQL Injection and other vulnerabilities

**Denial-of Service Attacks:** Types of Attacks (Smurf Attack, Buffer Overflow Attack, Ping of Death Attack, Teardrop Attack, SYN Attack, SYN Flooding), DDoS Attack(Distributed DoS Attack.), Session Hijacking, Spoofing v Hijacking, TCP/IP hijacking, CAPTCHA Protection

## **UNIT V**

IP Security, Web Security, Firewalls: Types, Operation, Design Principles, Trusted Systems. Computer Forensics, Need, Objectives, Stages & Steps of Forensic Investigation in Tracking Cyber Criminals, Incident Handling.

Hacking, Classes of Hacker (Black hats, grey hats, white hats, suicide hackers), Footprinting, Scanning (Types-Port, Network, Vulnerability), E-Mail Spiders, Overview of System Hacking Cycle.

### **List of Experiments:**

1. Footprinting using footprinting tools(Open Source & Free)(ex-nslookup, ARIN, Whois, Google Earth etc..)
2. Scanning for vulnerabilities using (Angry IP, HPing2, IPScanner, Global Network Inventory Scanner, Net Tools Suite Pack.)
3. NetBIOS Enumeration Using NetView Tool, Nbtstat Enumeration Tool (Open Source).
4. Steganography using tools: Tool: Merge Streams, Image Hide, Stealth Files, Blindside, S-Tools, Steghide, Steganos, Pretty Good Envelop, Stegdetect,.
5. Steganalysis - Stego Watch- Stego Detection Tool, StegSpy.
6. How to Detect Trojans by using – Netstat, fPort, TCPView, CurrPorts Tool, Process Viewer.
7. Lan Scanner using look@LAN, Wireshark.
8. Understanding DoS Attack Tools- Jolt2 , Bubonic.c, Land and LaTierra, Targa, Nemesis Blast, Panther2, Crazy Pinger, SomeTrouble, UDP Flood, FSMax.

### **Suggested Reading:**

1. William Stallings, “Cryptography and Network Security: Principles and Practice” Pearson
2. Charlie Kaufman, Radia Perlman, Mike Speciner, Michael Speciner, “ Network Security - Private communication in a public world” TMH
3. Fourozon, “Cryptography & Network Security” TMH
4. Joseph Migga Kizza, Computer Network Security, , Springer International Edition
5. Atul Kahate, ”Cryptography and Network Security” Mc Graw Hill
6. Carl Endorf, Eugene Schultz, Jim Mellander “INTRUSION DETECTION & PREVENION” TMH
7. Neal, Krawetz, Introduction to Network Security, Cengage Learning

**PROGRAMME : B.E. Computer Science & Engineering, VII semester**  
**Course : CS 7202 Randomized Algorithms(Proposed)**

CATEGORY OF COURSE	COURSE TITLE	COURSE CODE	CREDIT-4C			THEORY PAPER
Departmental Elective DCO(E)-II	Randomized Algorithms	CS 7202	L 3	T 1	P 0	Max.Marks-100 Min.Marks-35 Duration-3hrs.

**Unit -1**

Introduction, A min-cut algorithm, Las Vegas and Monte Carlo, Binary planar partition, A probabilistic recurrence, Computational models and time complexity.

**Unit -2**

Markov Chains and Random Walks: A 2-sat example, Markov chains, Random Walks on graphs, Cover times, Graph connectivity.

**Unit -3**

Random Data Structure : The fundamental data structure problem, Treaps, skip lists, Hash tables, Hashing with  $O(1)$  time.

**Unit -4**

Geometric algorithms and linear programming: Randomized incremental construction, Convex Hulls in the plane, Duality, Half space Intersection, Delanuy triangulation, Trapeziodal decomposition, Binary Space partition, The diameter of point set, Random sampling, Linear programming. Graph algorithms: All pairs shortest paths, The min cut problem, Minimum Spanning tree,

**Unit -5**

Parallel and Distributed Computing: The PRAM Model, Sorting on a PRAM, Maximal independent sets, Perfect Matching, The choice coordinate problem, Byzantine Agreement.

**References:-**

1. Randomized Algorithms by R. Motwani and Raghavan, Cambridge press.



**PROGRAMME: B.E. Computer Science & Engineering, VII semester**  
**Course: CS 7203 Data Mining & Knowledge Discovery(Proposed)**

CATEGORY OF COURSE	COURSE TITLE	COURSE CODE	Credit-4C			THEORY PAPER
			L	T	P	
Departmental Elective DCO (E)-II	Data Mining &	<b>CS7203</b>	L	T	P	Max.Marks-100 Min.Marks-35 Duration-3hrs.
	Knowledge Discovery		3	1	0	

**Unit-I**

Introduction, to Data warehousing, needs for developing data Warehouse, Data warehouse systems and its Components, Design of Data Warehouse, Dimension and Measures, Data Marts:-Dependent Data Marts, Independents Data Marts & Distributed Data Marts, Conceptual Modeling of Data Warehouses:-Star Schema, Snowflake Schema, Fact Constellations. Multidimensional Data Model & Aggregates.

**Unit-II**

OLAP, Characteristics of OLAP System, Motivation for using OLAP, Multidimensional View and Data Cube, Data Cube Implementations, Data Cube Operations, Guidelines for OLAP Implementation, Difference between OLAP & OLTP, OLAP Servers:-ROLAP, MOLAP, HOLAP Queries.

**UNIT-III**

Introduction to Data Mining, Knowledge Discovery, Data Mining Functionalities, Data Mining System categorization and its Issues. Data Processing :- Data Cleaning, Data Integration and Transformation. Data Reduction, Data Mining Statistics. Guidelines for Successful Data Mining.

**Unit-IV**

Association Rule Mining:-Introduction, Basic, The Task and a Naïve Algorithm, Apriori Algorithms, Improving the efficiency of the Apriori Algorithm, Apriori-Tid, Direct Hasing and Pruning(DHP),Dynamic Itemset Counting (DIC), Mining Frequent Patterns without Candidate Generation(FP-Growth),Performance Evaluation of Algorithms,.

**Unit-V**

Classification:-Introduction, Decision Tree, The Tree Induction Algorithm, Split Algorithms Based on Information Theory, Split Algorithm Based on the Gini Index, Overfitting and Pruning, Decision Trees Rules, Naïve Bayes Method.

Cluster Analysis:- Introduction, Desired Features of Cluster Analysis, Types of Cluster Analysis Methods:- Partitional Methods, Hierarchical Methods, Density-Based Methods, Dealing with Large Databases. Quality and Validity of Cluster Analysis Methods.

## References:

1. Berson: Data Warehousing & Data Mining &OLAP , TMH
2. Jiawei Han and Micheline Kamber, Data Mining Concepts & Techniques, Elsevier Pub.
3. Arun.K.Pujari, Data Mining Techniques, University Press.
4. N.P Gopalan: Data Mining Technique & Trend, PHI
5. Hand, Mannila & Smith: Principle of Data Mining, PHI
6. Tan, Introduction to Data Mining, Pearson Pub.

**PROGRAMME: B.E. Computer Science & Engg., VII semester**  
**Course : CS704- Industrial Training**

CATEGORY OF COURSE	COURSE TITLE	COURSE CODE	CREDITS-4C			Practical examn
			L	T	P	
Departmental Core DC-22	Industrial Training (Six Weeks)	CS704	L	T	P	Max. Marks-50 Min. Marks-25 Duration-3 Hrs
			0	0	4	

**SCHEME OF STUDIES**

Duration: 6 weeks after the VI semester in the summer break, Assessment in VII semester.

**SCHEME OF EXAMINATION**

For the assessment of industrial training undertaken by the students, following components are considered with their weightage.

**(a) Term work**

In Industry

	Marks allotted
1. Attendance and General Discipline	10
2. Daily diary Maintenance	10
3. Initiative and participative attitude during training	10
4. Assessment of training by Industrial Supervisor	20

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TOTAL 50

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**(b) Practical/Oral Examination (Viva-Voce)**

In Institution

	Marks allotted
1. Training Report	25
2. Seminar and cross questioning (defense)	25

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TOTAL 50

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Marks of various components in industry should be awarded to the students, in consultations with the Training and Placement Officer/Faculty of Institute and I/c of training from Industry. During training students will prepare a first draft of training report in consultation with section in-charge. After training they will prepare final draft with the help of T.P.O./Faculty of the institute. Then they will present a seminar on their training and they will face viva-voce on training in the institute.

## **1.1 OBJECTIVE OF INDUSTRIAL TRAINING**

**The objective of undertaking industrial training is to provide work experience so that student's engineering knowledge is enhanced and employment prospects are improved. The student should take this course as a window to the real World of Work and should try to learn as much as possible from real life experiences by involving and interacting with industry staff. Industrial training also provides an opportunity to students to select an engineering problem and possibly an industry guide for their Major Project in final semester.**

Industrial training of the students is essential to bridge the wide gap between the classroom and industrial environment. This will enrich their practical learning and they will be better equipped to integrate the practical experiences with the classroom learning process.

## **1.2 LEARNING THROUGH INDUSTRIAL TRAINING**

During industrial training students must observe following to enrich their learning:

- Industrial environment and work culture.
- Organisational structure and inter personal communication.
- Machines/ equipment/ instruments - their working and specifications.
- Product development procedures and phases.
- Project planning, monitoring and control.
- Quality control and assurance.
- Maintenance system.
- Costing system.
- Stores and purchase systems.
- Layout of Computer/ EDP/MIS centres.
- Roles and responsibilities of different categories of personnel.
- Customer services.
- Problems related to various areas of Work etc.

Faculty and TPO are supposed to plan industrial training in such a manner that students get exposure on most of the above arena in the field (world of work). Students are supposed to acquire the knowledge on above by -

1. Observation,
2. Interaction with officials at the workplace
3. Study of Literature at the workplace (e.g. User Manual, standards, maintenance schedules, etc.)
4. "Hand's on" experience
5. Undertaking / assisting project work.
6. Solving problems at the work place.
7. Presenting a seminar.
8. Participating in-group meeting/ discussion.
9. Gathering primary and secondary data/ information through various sources, Storage, retrieval and analysis of the gathered data.
10. Assisting officials and managers in their working.
11. Undertaking a short action research work.
12. Consulting current technical journals and periodicals in the library.
13. Discussions with peers.

**PROGRAMME: B.E. Computer Science & Engg., VII semester**  
**Course : CS704- Industrial Training**

1.3 GUIDANCE TO THE FACULTY/TPO FOR PLANNING AND IMPLEMENTING THE INDUSTRIAL TRAINING

The industrial training programme, which is spread to 6 weeks' duration, has to be designed in consultation with the authorities of the work place, keeping in view the need of the contents. Following are some of the salient points:

- Spelling out the objectives of the industrial training in behavioral terms and same is informed in advance to the 1) students, 2) authorities of the work place and 3) supervising faculty members.
- Discussing and preparing students for the training for which meetings with the students has to be planned.
- Meeting with industrial personnel and orienting them regarding the objective of the training and the expectations of the programme.
- Correspondence with the authorities of the work place.
- Orientation classes for students on how to make the training most beneficial - monitoring daily diary, writing weekly reports, how to interact with various categories of industrial personnel, how to behave and undertake responsibilities, how to gather information from the workplace, ethics etc.
- Guiding students to make individual plans (week wise/ day wise) to undertake industrial training
- Developing a system of maintaining training records, by teachers for every batch of students for convenient retrieval.
- Inviting industrial personnel to deliver lectures on some aspects of training.

**1.4 ACTION PLAN FOR PLANNING STAGES AT THE INSTITUTION LEVEL**

S.No.	Activity	Commencing Week	Finishing week	Remarks
1.	Meeting with Principal			
2.	Meeting with Colleagues			
3.	Correspondence with work place (Industries concerned)			
4.	Meeting with authorities of work place			
5.	Orientation of students for industrial training			
6.	Scrutinizing individual training plan of students			
7.	Commencement of industrial training			
8.	First monitoring of industrial training			
9.	Second monitoring of industrial training			
10.	Finalization of Training report			
11.	Evaluation of performance at Industry level			
12.	Evaluation of industrial programme in the institution.			

**1.5 INDUSTRIAL TRAINING**

**DAILY DIARY**

Name of the Trainee:.....College:.....  
Industry/Work place:.....Week No.:.....  
Department/Section:.....Date:.....

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Dates	Brief of observations made, work done, problem/project undertaken, discussion held, literature-consulted etc.
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Signature of Supervisor  
(TPO/Faculty)

Signature of Trainee

Signature of Official In-charge for  
Training in Industry

**1.6 SUPERVISION OF INDUSTRIAL TRAINING**

- One faculty member or TPO will plan Industrial training of students in consultation with training manager of the industry (work place) as per the predefined objectives of training.
- During training students will maintain a proper daily diary (format enclosed). Main purpose of daily diary is to inculcate the habit of systematic recording of learning experiences and events etc. Section in-charge of the industry is requested to sign the daily diary at the end of the week and offer his comments about the initiative and participative attitude of trainee during training. Details about how to write daily diary will be provided by the institute.
- Attendance record of each trainee may please be kept in the industry. Absence without permission may please be communicated to the concerned college.
- Monitoring visits will be made by training and placement officer/faculty in-charge for the group of students, of the College during training.

**Rajiv Gandhi Proudyogiki Vishwavidyalaya, Bhopal**  
**Course of Study and Scheme of Examination**  
**B.E. Computer Science and Engineering**  
**SEMESTER – VIII ( Proposed)**  
 Scheme: BE (CS)

S. No	Course Category	Course Code (New)	Name of Course	Hours Per week			C R E D I T S	Distribution of Marks						
				L	T	P		C	Theory Exam	Practical Block	Internal Assessment			Total
											MST	TW	Total	
							I	II	III			I+II+III		
1	DC-24	CS801	<a href="#">Soft Computing</a>	3	1	2	6	100	50	20	30	50	200	
2	DC-25	CS/IT802	<a href="#">Web Engineering</a>	3	1	2	6	100	50	20	30	50	200	
3	DCO(E)-III	Refer table below	Elective-III	3	1	0	4	100	-	20	-	20	120	
4	DCO(E)-IV	Refer table below	Elective-IV	3	1	0	4	100	-	20	-	20	120	
5	DC-26	CS803	<a href="#">Major Project</a>	0	0	8	8	-	100	-	200	200	300	
6	NECC-11	CS804	<a href="#">Self Study</a>	0	0	2	2	-	-	-	30	30	30	
7	NECC-12	CS805	<a href="#">Seminar/Group Discussion etc.</a>	0	0	2	2	-	-	-	30	30	30	
<b>Total</b>				<b>12</b>	<b>4</b>	<b>16</b>	<b>32</b>	<b>400</b>	<b>200</b>	<b>80</b>	<b>320</b>	<b>400</b>	<b>1000</b>	

MST-Mid Semester Test, TW- Term Work

ELECTIVE-III					
CS8301	Bioinformatics	CS8302	<a href="#">Digital Image Processing</a>	CS8303	Wireless Networks
ELECTIVE-IV					
CS8401	<a href="#">Advance Computing Paradigm</a>	CS8402	Robotics	CS8403	MANET & High Speed Network

- Note:-** 1. Minimum strength of **Ten Students** is required to offer an Elective in the College in a particular Academic Session.  
 2. Choice of Elective Course ones made for an examination cannot be changed for future examinations.  
 3. Elective Courses for B.E. programme in IT & CS are common, but certain elective courses, which have been given as core courses in any scheme cannot be offered by students of that branch as an elective

# RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

PROGRAMME: B.E. Computer Science & Engineering, VIII semester

Course: CS801 Soft Computing (Proposed)

CATEGORY OF COURSE	COURSE TITLE	COURSE CODE	Credit-6C			THEORY PAPER
			L	T	P	
Departmental Core DC-24	Soft Computing	CS801				Max.Marks-100 Min.Marks-35 Duration-3hrs.
			3	1	2	

## Unit – I

Soft Computing : Introduction of soft computing, soft computing vs. hard computing, various types of soft computing techniques, applications of soft computing.

Artificial Intelligence : Introduction, Various types of production systems, characteristics of production systems, breadth first search, depth first search techniques, other Search Techniques like hill Climbing, Best first Search, A\* algorithm, AO\* Algorithms and various types of control strategies. Knowledge representation issues, Propositional and predicate logic, monotonic and non monotonic reasoning, forward Reasoning, backward reasoning, Weak & Strong Slot & filler structures, NLP.

## Unit – II

Neural Network : Structure and Function of a single neuron: Biological neuron, artificial neuron, definition of ANN, Taxonomy of neural net, Difference between ANN and human brain, characteristics and applications of ANN, single layer network, Perceptron training algorithm, Linear separability, Widrow & Hebb's learning rule/Delta rule, ADALINE, MADALINE, AI v/s ANN. Introduction of MLP, different activation functions, Error back propagation algorithm, derivation of BBPA, momentum, limitation, characteristics and application of EBPA,

## Unit – III

Counter propagation network, architecture, functioning & characteristics of counter Propagation network, Hopfield/ Recurrent network, configuration, stability constraints, associative memory, and characteristics, limitations and applications. Hopfield v/s Boltzman machine. Adaptive Resonance Theory: Architecture, classifications, Implementation and training. Associative Memory.

## Unit – IV

Fuzzy Logic: Fuzzy set theory, Fuzzy set versus crisp set, Crisp relation & fuzzy relations, Fuzzy systems: crisp logic, fuzzy logic, introduction & features of membership functions, Fuzzy rule base system : fuzzy propositions, formation, decomposition & aggregation of fuzzy rules, fuzzy reasoning, fuzzy inference systems, fuzzy decision making & Applications of fuzzy logic.

## Unit – V

Genetic algorithm : Fundamentals, basic concepts, working principle, encoding, fitness function, reproduction, Genetic modeling: Inheritance operator, cross over, inversion & deletion, mutation operator, Bitwise operator, Generational Cycle, Convergence of GA, Applications & advances in GA, Differences & similarities between GA & other traditional methods.



## References :

- S, Rajasekaran & G.A. Vijayalakshmi Pai, Neural Networks, Fuzzy Logic & Genetic Algorithms, Synthesis & applications, PHI Publication.
- S.N. Sivanandam & S.N. Deepa, Principles of Soft Computing, Wiley Publications
- Rich E and Knight K, Artificial Intelligence, TMH, New Delhi.
- Bose, Neural Network fundamental with Graph , Algo.& Appl, TMH
- Kosko: Neural Network & Fuzzy System, PHI Publication
- Klir & Yuan ,Fuzzy sets & Fuzzy Logic: Theory & Appli.,PHI Pub.
- Hagen, Neural Network Design, Cengage Learning

**PROGRAMME: B.E. Computer Science & Engineering, VIII Semester.**

**Course: CS 802 Web Engineering( Proposed)**

**Course Contents**

CATEGORY OF COURSE	COURSE TITLE	COURSE CODE	CREDIT- 6			THEORY PAPER
			L	T	P	
Departmental Core DC-25	Web Engineering	CS 802	3	1	2	<b>Max.Marks- 100</b> Min.Marks-35 Duration-3hrs.

**UNIT-1**

An Introduction to Web Engineering, History of web Development, Time line, Motivation, Categories of Web Applications, Characteristics of Web Applications. Evolution and Need for Web Engineering, Web Engineering Models, Software Engineering v/s Web Engineering . World Wide Web: Introduction to TCP/IP and WAP, DNS, Email, TelNet, HTTP and FTP. Introduction to Browser and search engines, Search fundamentals, Search strategies, Directories search engines and Meta search engines, Working of the search engines , Miscellaneous Web Browser details, Introduction to Web Servers: Features of web servers, caching, case study-IIS, Apache, Configuring web servers.

**UNIT- 2**

Information Architecture: The role of the Information Architect, Collaboration and Communication, Organizing Information, Organizational Challenges, Organizing Web sites parameters and Intranets

Creating Cohesive Websites: Conceptual Overview Website Development, Website Design issues, Conceptual Design, High-Level Design, Indexing the Right Stuff, Grouping Content. Architectural Page Mockups, Design Sketches, Navigation Systems. Searching Systems Good & bad web design, Process of Web Publishing. Phases of Web Site development, enhancing your web-site, submission of website to search engines

Web security issues, security audit of websites, Web effort estimation, Productivity, Measurement, Quality usability and reliability.

Requirements Engineering for Web Applications: Introduction, Fundamentals, Requirement Source, Type, ,Notations Tools. Principles Requirements Engineering Activities , Adapting RE Methods to Web Application.

**UNIT- 3**

Technologies for Web Applications: HTML and DHTML, HTML Basic Concepts, Static and dynamic HTML, Structure of HTML documents, HTML Elements, Linking in HTML, Anchor Attributes, Image Maps, Meta Information, Image Preliminaries, Layouts, Backgrounds, Colors and Text, Fonts, Tables, Frames and layers, Audio and Video Support with HTML

Database integration, CSS, Positioning with Style sheets, Forms Control, Form. Elements. Introduction to CGI PERL, JAVA SCRIPT, PHP, ASP , Cookies Creating and Reading Cookies

#### **UNIT-4**

Technologies for Web Applications: Introduction of XML, Validation of XML documents, DTD, Ways to use XML, XML for data files, HTML Vs XML, Embedding XML into HTML documents, Converting XML to HTML for Display, Displaying XML using CSS and XSL, Rewriting HTML as XML, Relationship between HTML, SGML and XML, web personalization , Semantic web, Semantic Web Services, Ontology.

#### **UNIT- 5**

E- Commerce, E-commerce Business Models, The Internet and World Wide Web: E-commerce Infrastructure, Building an E-commerce Web Site , Electronic Commerce environment and opportunities. Modes of Electronic Commerce, Approaches to safe Electronic Commerce ,Electronic Cash and Electronic Payment Schemes ,Online Security and Payment Systems, E-commerce Marketing Concepts, Advertising on the Internet: issues an Technologies, E-commerce Marketing Concepts Electronic Publishing issues, approaches, legalities and technologies ,Privacy and Security Topics: Introduction, Web Security , Encryption schemes, Secure Web document, Digital Signatures and Firewalls, Cyber crime and laws, IT Act.

#### **TERM WORK**

1. At least ten practical experiments based on above syllabus and a mini project is desirable to be completed by a group of three that cover following tools.

- HTML
- DHTML
- PHP
- XML
- Java Script, CGI, PERL
- ASP

#### **Recommended Books:**

1. Roger S.Pressman, David Lowe, "Web Engineering", Tata Mcgraw Hill Publication, 2007
2. Achyut S Godbole and Atul Kahate, "Web Technologies", Tata McGraw Hill
3. Gopalan N P ,Akilandeswari "Web Technology: A Developer s Perspective" , PHI
4. NEIL GRAY "Web server Programming" Wiley
5. CHRIS BATES Web Programming :Building Internet applications Wiley
6. Moller, "An Introduction to XML and Web Technologies" , Pearson Education New Delhi, 2009
7. Beginning XML 4th Edition Hnter, Refter, Fawset Wiley India
8. Internet & World Wide Web How to Program, Pearson education, 3rd edition, by: H.M. Deitel, P.J. Deitel, A.B. Goldberg.
9. C. Xavier, "Web Technology & Design ", Tata McGraw Hill.
- 10 Ivan Bay Ross, "HTML,DHTML,Java script,Perl CGI" , BPB

**PROGRAMME: B.E. Computer Science and Engineering, VIII Semester**  
**Course: CS-8301 BIOINFORMATICS**

CATEGORY OF COURSE	COURSE TITLE	COURSE CODE	CREDIT-4C			THEORY PAPER
			L	T	P	
Departmental Elective DCO(E)-III	<b>BIOINFORMATICS</b>	<b>CS-8301</b>	3	1	0	Max.Marks-100 Min.Marks-35 Duration-3hrs.

**COURSE CONTENTS**

**Unit-I Introduction**

Introduction to bioinformatics, objectives of bioinformatics, Basic chemistry of nucleic acids, structure of DNA & RNA, Genes, structure of bacterial chromosome, cloning methodology, Data maintenance and Integrity Tasks.

**Unit-II Bioinformatics Databases & Image Processing**

Types of databases, Nucleotide sequence databases, Protein sequence databases, Protein structure databases, Normalization, Data cleaning and transformation, Protein folding, protein function, protein-purification and characterization, Introduction to Java clients, CORBA, Using MYSQL, Feature Extraction.

**Unit-III Sequence Alignment and database searching**

Introduction to sequence analysis, Models for sequence analysis, Methods of optimal alignment, Tools for sequence alignment, Dynamics Programming, Heuristic Methods, Multiple sequence Alignment

**Unit-IV Gene Finding and Expression**

Cracking the Genome, Biological decoder ring, finding genes through mathematics & learning, Genes prediction tools, Gene Mapping, Application of Mapping, Modes of Gene Expression data, Mining the Gene Expression Data

**Unit-V Proteomics & Problem solving in Bioinformatics**

Proteome analysis, tools for proteome analysis, Genetic networks, Network properties and analysis, complete pathway simulation: E-cell, Genomic analysis for DNA & Protein sequences , Strategies and options for similarity search , flowcharts for protein structure prediction .

**List of References**

- 1.Gopal & Jones, BIOINFORMATICS with fundamentals of Genomics & Proteomics ,TMH Pub
- 2.Rastogi , Bioinformatics –Concepts , skills & Applications , CBS Pub
- 3.Bergeron , Bioinformatics computing , PHI
- 4.Claverie , Bioinformatics , Wiley pub
- 5.Baxevanis , Bioinformatics , Wiley Pub
- 6.Stekel , Micrarray BioInformatics , Cambridge

**PROGRAMME: B.E. Computer Science & Engineering, VIII semester**  
**Course: CS8302 Digital Image Processing**

CATEGORY OF COURSE	COURSE TITLE	COURSE CODE	CREDIT-4C			THEORY PAPER
			L	T	P	
Departmental Elective DCO(E)-III	Digital Image Processing	CS-8302	3	1	0	Max.Marks-100 Min.Marks-35 Duration-3hrs.

**COURSE CONTENTS**

**Unit-I**

Digital Image fundamentals, A simple image model, Sampling and Quantization. Relationship between pixels. Imaging geometry. Image acquisition systems, Different types of digital images

**Unit-II**

Image transformations, Introduction to Fourier transforms, Discrete Fourier transforms, Fast Fourier transform, Walsh transformation, Hadmord transformation, Discrete Cosine Transformation.

**Unit-III**

Image enhancement, Filters in spatial and frequency domains, Histogram based processing. Image subtraction, Averaging, Image smoothing, Nedion filtering, Low pass filtering, Image sharpening by High pass filtering.

**Unit-IV**

Image encoding and segmentation, Encoding: Mapping, Quantizer, Coder. Error free compression, Lossy Compression schemes. JPEG Compression standard. Detection of discontinuation by point detection, Line detection, edge detection, Edge linking and boundary detection, Local analysis, Global processing via Hough transforms and graph theoretic techniques

**Unit-V**

Mathematical morphology- Binary, Dilation, crosses, Opening and closing, Simple methods of representation, Signatures, Boundary segments, Skeleton of a region, Polynomial approximation

**References:**

1. Rafael C Gonzalez, Richard E Woods 3rd Edition, Digital Image Processing Pearson.
2. Rafael C Gonzalez, Richard E Woods 3rd Edition, Digital Image Processing using Matlab – TMH.
3. Sonka, Digital Image Processing & Computer Vision , Cengage Learning
4. Jayaraman, Digital Image Processing, TMH.
5. Pratt, Digital Image Processing, Wiley India
6. Annadurai, Fundamentals of Digital Image Processing ,Pearson Education .

# RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

PROGRAMME: B.E. Computer Science & Engg., VIII Semester

Course : CS 8303 Wireless Network (Proposed)

Category of Course	Course Title	Course Code	Credit – 4C			Theory (ES)	Paper
			L	T	P		
Departmental Elective DCO(E)-III	<b>Wireless Networks</b>	CS -8303	3	1	0	Max.Marks-100 Min.Marks-35 Duration-3hrs.	

## Unit 1

Introduction of Wireless Networks, Different Generations of Wireless Networks.

Characteristics of the Wireless Medium: Radio Propagation Mechanisms, Path Loss Modelling and Signal Coverage, Effect of Multipath and Doppler, Channel Measurement and Modelling Techniques.

## Unit 2

Network Planning: Introduction, Wireless Network Topologies, Cellular Topology, Cell Fundamentals, Signal to Interferences Radio Calculations, Network Planning for CDMA Systems.

Wireless Network Operations: Mobility Management, Radio Resources and Power Management

## Unit 3

Multiple Division Techniques: FDMA, TDMA, CDMA, OFDM, SDMA. Comparison of Multiple Division Techniques, Modulation Techniques – AM, FM, FSK, PSK, QPSK, QAM, 16QAM

Mobile Data Networks: Introduction, Data Oriented CDPD Network, GPRS, EDGE and High Data Rates, SMS in GSM, Mobile Application Protocols.

## Unit 4

Introduction to Wireless LAN, Evolution of WLAN, Wireless Home Networking, Technologies for Home Area Network (HAN), Overview of IEEE 802.11, Reference Architecture, PHY and MAC Layer, Wireless ATM, HIPERLAN.

## UNIT 5

IEEE 802.15 WPAN, HomeRF, Bluetooth, Interference between Bluetooth and 802.11, Adhoc Networks, Introduction to 2.5 G and 3 G Networks.

## References

1. Kaveh Pahlavan, Prashant Krishnamurthy “principles of Wireless Networks”, PHI.
2. Qing- An Zeng, Dharma Prakash Agrawal “Introduction to Wireless and Mobile Systems” CENGAGE Learning.
3. Sumit Kasera, Nishit Narang, A P Priyanka “2.5 G Mobile Networks: GPRS and EDGE”, TMH
4. Dr. KAMILO FEHER “Wireless Digital Communications”, PHI
5. Jochen Schiller “ Mobile Communications”, PEARSON

# RAJIV GANDHI PROUDYOGIKI VISHWA VIDYALAYA, BHOPAL

PROGRAMME: B.E. Computer Science & Engineering, VIII Semester

Course : CS 8401 Advance Computing Paradigm (Proposed)

Category of Course	Course Title	Course Code	Credit – 4C			Theory Paper (ES)
Departmental Elective DCO(E)-IV	Advance Computing Paradigm	CS -8401	L	T	P	Max.Marks-100 Min.Marks-35 Duration-3hrs.
			3	1	0	

## Course Contents

**Branch: Computer Science and Engineering VIII Semester**

**Course: Advanced Computing Paradigms**

### Unit-I Grid and Cluster Computing

Introduction to Grid Computing , Types of grids ,Grid Activities , e governance , Grid Applications , Grid Computing Organizations and their roles , Grid Architecture ,Grid computing Applications.

Cluster Computing-Definition and Architecture of a cluster ,Cluster Programming Environment and Tools .

### Unit-II Quantum Computing

History of molecular electronics , Molecular scale electronic , Quantum mechanic ,Quantum Gates and Circuits , Implementation of Quantum Computer , Quantum Algorithms .

### Unit-III Nano Computing

Introduction to Nano Computing, Nano Computing Technology, Nano Information Processing, Physics of Nano Computing, Introduction to Molecular & Optical Computing.

### Unit-IV Mobile and Pervasive Computing

Mobile computing , Adaptability , Mobility Management ,Context –Aware Computing and its applications , Introduction to Ad Hoc and Sensor Networks , Approaches to Security .

### Unit-V Cloud Computing

Overview of Cloud Computing, Cloud Components , Applications ,Hardware and Infrastructure , Accessing the cloud , Cloud Storage ,Future of Cloud Computing .

## LIST OF REFERENCES

- 1.Janakiram , Grid Computing ,TMH Pub
- 2.Prabhu , Grid and Cluster Computing , PHI Pub
- 3 Vishal Sahani & Goswami, Nano Computing, TMH Pub
- 4.Bhunia , Introduction to Quantum Computing , New Age Int. Pub
- 5.Adelstein & Gupta , Fundamentals of Mobile and Pervasive Computing , TMH Pub
- 6.Velte , Cloud Computing , McGraw Hill Pub

# RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

PROGRAMME: B.E. Computer Science & Engineering, VIII Semester

Course: CS8402 Robotics

CATEGORY OF COURSE	COURSE TITLE	COURSE CODE	CREDITS - 4C			THEORY PAPERS
			L	T	P	
Departmental Electives DCO(E)-IV	Robotics	CS8402	3	1	0	Max.Marks-100 Min.Marks-35 Duration-3hrs.

## Unit-I Introduction

Introduction to robotics ,Robot Usage , Robot subsystems, Robot Classification , Technology of Robots , Basic Principles in robotics

## Unit-II Spatial Descriptions , Transformation and Sensors

Robot Architecture , Descriptions: Positions , Orientations and Frames , Mappings :Changing descriptions from Frame to Frame ,Operators: Translations ,Rotations , and Transformations , Transform Equations , Coordinate Transformations , Sensor Classification , Internal Sensors ,External sensors , Vision system , sensor selection .

## Unit-III Kinematics

Link- Connection Description , Forward and Inverse Positional Analysis , Velocity Analysis: Jacobian Matrix ,Link Velocities , Acceleration analysis , Statics: Forces and Moment Balance , Recursive Calculation , Equivalent Joint Torques , Force Ellipsoid, Dynamics : Inertia Properties , Dynamics Algorithms .

## Unit-IV Control

Control Techniques , Second order Linear systems , Feedback Control , Performance of feedback control systems , Joint controller , Non linear Trajectory Control , State space Representation and control , Stability , Cartesian and force controls

## Unit-V Motion Planning and Computer for Robots

Joint space Planning ,Cartesian space planning ,Position and orientation Trajectories , Point to Point Planning , Continuous path Generation , Computational speed , Hardware requirements , Control considerations , Robot Programming , Hardware architecture .

A case study for Autonomous Mobile Robot .

## List of References

- 1.Saha , Introduction to Robotics , TMH Pub.
- 2.Craig , Introduction to Robotics ,Mechanics and control , Pearson Pub
- 3.Ghosal , Robotics –Fundamental Concepts and Analysis , Oxford Pub.
- 4.Niku , Introduction to Robotics:Analysis , System & Applications , PHI
- 5.Fu , Robotics ,TMH Pub



# RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

PROGRAMME : B.E. Computer Science & Engineering, VIII semester

Course : CS 8403 MANET & HIGH SPEED NETWORKS (Proposed)

## Course Contents

Category of Course	Course Title	Course Code	Credit – 4C			Theory Paper (ES)
			L	T	P	
Departmental Elective DCO(E)-IV	MANET & HIGH SPEED NETWORKS	CS 8403	3	1	0	Max.Marks-100 Min.Marks-35 Duration-3hrs.

### Unit – I

Adhoc – Wireless N/WS : Introduction, Cellular vs Adhoc wireless Networks, Applications of Adhoc wireless Networks, Issues in Adhoc wireless N/WS. Heterogeneity in Mobile devices, Wireless Sensor N/WS, traffic Profiles, Types of Adhoc Mobile Communications, Types of Mobile Host movements, Challenges facing Ad hoc mobile N/WS.

### Unit –II

Adhoc Wireless Media Access Protocols :- Introduction Synchronous MAC Protocol & asynchronous MAC protocol, Problems in Adhoc channel Access Receiver Initiated MAC protocols, Sender. Initiated MAC Protocol, Existing Adhoc MAC Protocol.

### Unit – III

Overview of Adhoc Routing Protocols :- Table Driver Approaches :- DSDV, WRP, CSGR, Source Initiated On demand Approaches : AODV, DSR, TORA, SSR, LAR, PAR, ZRP, RDMAR.

### Unit – IV

Communication Performance of Adhoc Networks , Route discovery time, End to End Delay Performance, Communication throughput performance, Packet loss performance, Route reconfiguration time, Energy Conservation & Power life issues.

### Unit – V

High Speed Networks Frame relays, Packet Switching Vs frame relay N/WS. Asynchronous transfer node, ATM protocol architecture, ATM Logical Connection, ATM Cells, AAL, High Speed LANS, FAST Ethernet, fiber channel wireless LANS.

### Books :-

- 1) Muthukumar, Intorduction to high Performance Network, TMH
- 2) CK Toh, Adhoc Mobile Wireless Networks Protocols & Systems, Pearson.Pearson Publication
- 3) C-Siva Ram Murthy & B S Majo , Adhoc Wireless Networks, Architectures Protocols Pearson.Pearson Publication
- 4) High speed N/WS & Internals, Performance & QOS William Stalling., IInd Edition. Pearson Publication
- 5) Computer System& Network, Bluldell, Cengage Learning