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			CREDITS	Distribution of Marks						
								Theory Exam	Practical Block	Internal Assessment			Total	
										MST	TW	Total III		
				L	T	P	C	I	II				III	I+II+III
1	DC-24	CS801	Soft Computing	3	1	2	6	100	50	20	30	50		200
2	DC-25	CS/IT802	Web Engineering	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	Major Project	0	0	8	8	-	100	-	200	200		300
6	NECC-11	CS804	Self Study	0	0	2	2	-	-	-	30	30		30
7	NECC-12	CS805	Seminar/Group Discussion etc.	0	0	2	2	-	-	-	30	30		30
			Total	12	4	16	32	**400**	200	80	320	400		1000

MST-Mid Semester Test, TW- Term Work

ELECTIVE-III					
CS8301	Bioinformatics	CS8302	Digital Image Processing	CS8303	Wireless Networks
ELECTIVE-IV					
CS8401	Advance Computing Paradigm	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

W.e.f :- July- 2010   Academic Section-2010-11

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
Departmental Core DC-24	Soft Computing	**CS801**	L	T	P	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, Prepositional 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 C			THEORY PAPER
Departmental Core DC-25	Web Engineering	CS 802	L	T	P	**Max.Marks-100** Min.Marks-35 Duration-3hrs.
			3	1	2	

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
Departmental Elective DCO(E)-III	**BIOINFORMATICS**	**CS-8301**	L	T	P	Max.Marks-100 Min.Marks-35 Duration-3hrs.
			3	1	0	

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
Departmental Elective DCO(E)-III	Digital Image Processing	CS-8302	L	T	P	Max.Marks-100 Min.Marks-35 Duration-3hrs.
			3	1	0	

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 Paper (ES)
Departmental Elective DCO(E)-III	**Wireless Networks**	CS -8303	**L**	**T**	**P**	Max.Marks-100 Min.Marks-35 Duration-3hrs.
			3	**1**	**0**	

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 VISHWAVIDYALAYA, 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
Departmental Electives DCO(E)-IV	Robotics	**CS8402**	L 3	T 1	P 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)
Departmental Elective DCO(E)-IV	MANET & HIGH SPEED NETWORKS	CS 8403	**L**	**T**	**P**	Max.Marks-100 Min.Marks-35 Duration-3hrs.
			3	1	0	

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. Asychronous transfer node, ATM protocol architecture, ATM Logical Connection, ATM Cells, AAL, High Speed LANS, FAST Ethernet, fiber channel wireless LANS.

Books :-
1)   Muthukumaran, 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