JABALPUR ENGINEERING COLLEGE, JABALPUR (MP)
(An Autonomous Institute of Govt. of M.P.)
Affiliated to Rajiv Gandhi Technological University, Bhopal (MP)
Scheme of Study and Examination (w.e.f. July 2010)
B.E. Fourth Year Branch: Information Technology SEM: Eighth

Course Code	Subject	Periods			EVALUATION SCHEME					Credits
		L	T	P	SESSIONAL EXAM			ESE	SUB TOTAL	
					TA	CT	TOTAL			
IT-32	Information Security	3	1	-	10	20	30	70	100	4
IT-34	Data Mining & Warehousing	3	1	-	10	20	30	70	100	4
IT-36	Network Management	3	1	-	10	20	30	70	100	4
Refer Table	Elective-II	3	1	-	10	20	30	70	100	4
(PRACTICAL/DRAWING/DESIGN)										
IT-33L	Information Security Lab	-	-	2	20	-	20	30	50	2
IT-35L	Data Mining & Warehousing	-	-	2	20	-	20	30	50	2
IT-37L	Network Management Lab	-	-	2	20	-	20	30	50	2
IT-46L	Major Project	-	-	08	80	-	80	120	200	8
IT-47L	Seminar / Group Discussion			2	50	-	50	-	50	2
	Total	12	4	16	230	80	310	490	800	32

T.A. = Teachers Assessment, CT= Class Test, ESE= End Semester Examination
Total Marks= 800, Total Periods= 32, Total Credits= 32

Elective-II					
IT-045A	1. Sensor Network	IT-045B	2. Digital Signal & Image Processing	CS-051B	3. Software Project Management

COURSE CONTENT & GRADE (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	**INFORMATION SECURITY**	IT-32	Min "D"	Min "D"	5.0

INFORMATION SECURITY

Unit I: Basic of Cryptography, secret key cryptography, Types of attack, Substitution ciphers, Transposition ciphers, block ciphers and steam ciphers, Confusion and Diffusion, Data encryption standard, round function, modes of operation, cryptanalysis, brute force attack, Security Goals (Confidentiality, Integrity, Availability).

Unit II: Public key Cryptography, Modulo arithmetic, Greatest common divisor, Euclidean algorithm, RSA algorithm, hash function, attack on collision resistance, Diffie hellman key exchange, Digital signature standard, elliptic curve cryptography.

Unit III: Authentication: One way Authentication, password based, certificate based, Mutual Authentication ,shared secret based, Asymmetric based, Authentication and key agreement, centralized Authentication, eavesdropping, Kerberos, IP security overview:- security association & Encapsulating security payload ,tunnel and transfer modes, internet key exchange protocol, Secure Socket Layer(SSL), Transport Layer Security (TLS).

Unit IV: Software vulnerabilities: Phishing Attacks, buffer overflow vulnerability, Format String attack, Cross Site Scripting, SQL injection Attacks, Email security:- Security services of E-mail ,Establishing keys, Privacy ,Authentication of the source, Message integrity ,Non-Repudiation, Viruses, Worms, Malware.

Unit V: Web Issue: Introduction, Uniform Resource Locator/uniform resource identify, HTTP, Cookies, Web security problem, Penetration Testing, Firewalls:- functionality, Polices and Access Control, Packet filters, Application level gateway, Encrypted tunnel, Security architecture, Introduction to intrusion detection system.

References:-

- Bernard Menezes, " Network Security and Cryptography", CENGAGE Learning.
- Charlie Kaufman, " Network Security", PHI.
- Forouzan, "Cryptography & Network Security",
- TMH Randy Weaver, " Network Infrastructure Security", Cengage Learning.
- Atual Kahate, " Cryptography and Network Security", TMH.
- William Stalling, " Cryptography and Network security", Pearson.

COURSE CONTENT & GRADE (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	**DATA MINING & WAREHOUSING**	IT-34	Min "D"	Min "D"	5.0

DATA MINING & WAREHOUSING

UNIT I- DATA WAREHOUSING: Data warehousing Components –Building a Data warehouse –- Mapping the Data Warehouse to a Multiprocessor Architecture – DBMS Schemas for Decision Support – Data Extraction, Cleanup, and Transformation Tools –Metadata.

UNIT II-BUSINESS ANALYSIS: Reporting and Query tools and Applications – Tool Categories – The Need for Applications – Cognos Impromptu – Online Analytical Processing (OLAP) – Need – Multidimensional Data Model – OLAP Guidelines – Multidimensional versus Multirelational OLAP – Categories of Tools – OLAP Tools and the Internet.

UNIT III -DATA MINING: Introduction – Data – Types of Data – Data Mining Functionalities – Interestingness of Patterns – Classification of Data Mining Systems – Data Mining Task Primitives – Integration of a Data Mining System with a Data Warehouse – Issues –Data Preprocessing.

UNIT IV -ASSOCIATION RULE MINING AND CLASSIFICATION: Mining Frequent Patterns, Associations and Correlations – Mining Methods – Mining Various Kinds of Association Rules – Correlation Analysis – Constraint Based Association Mining – Classification and Prediction - Basic Concepts - Decision Tree Induction - Bayesian Classification – Rule Based Classification – Classification by Backpropagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods - Prediction

UNIT V -CLUSTERING AND APPLICATIONS AND TRENDS IN DATA MINING:
Cluster Analysis - Types of Data – Categorization of Major Clustering Methods – Kmeans – Partitioning Methods – Hierarchical Methods - Density-Based Methods –Grid Based Methods – Model-Based Clustering Methods – Clustering High Dimensional Data - Constraint – Based Cluster Analysis – Outlier Analysis – Data Mining Applications.

TEXT BOOKS:

1. Alex Berson and Stephen J. Smith, " Data Warehousing, Data Mining & OLAP", Tata McGraw – Hill Edition, Tenth Reprint 2007.
2. Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques", Second Edition, Elsevier, 2007.

REFERENCES:

1. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, " Introduction To Data Mining", Person Education, 2007.
2. K.P. Soman, Shyam Diwakar and V. Ajay ", Insight into Data mining Theory and Practice", Easter Economy Edition, Prentice Hall of India, 2006.
3. G. K. Gupta, " Introduction to Data Mining with Case Studies", Easter Economy Edition, Prentice Hall of India, 2006
4. Daniel T.Larose, "Data Mining Methods and Models", Wile-Interscience, 2006.

COURSE CONTENT & GRADE (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	**NETWORK MANAGEMENT**	IT-36	Min "D"	Min "D"	5.0

NETWORK MANAGEMENT

Unit-I : Protocols and architecture, Protocols, Characteristics, Functions, Need for multiple protocols, Conceptual layers of multiple protocol software, Protocol layering principles, Multiplexing and Demultiplexing.

Unit-II : Internet Protocol , Virtual network , Internet architecture and philosophy , Purpose of the internet protocol , Internet diagram , Routing in an internet , table driven IP internet , IP routing algorithm , Internet control message protocols (ICMP) , Internet protocol version 6 , Features , Format , Source routing , Options , address space assignment , User data gram protocol , Format of UDP messages , UDP encapsulation and protocol layering.

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 : Configuration management, Configuration management functions, Inventory managements, Network topology services, Order processing and provisioning, Charge management directory services. Fault management, Processes and procedure, Fault management functions, Performance management, Security management, accuracy management, Network capacity planning.

References :

1 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
- Uyless Black, "TCP/IP and related protocols," McGraw Hill.
- Doughals E. Comer," Internetworking with TCP/IP Vol. I, Principles, Protocols, and Architecture", PHI, India

COURSE CONTENT & GRADE (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	**SENSOR NETWORK**	IT-045A	Min "D"	-	5.0

SENSOR NETWORK

UNIT I : Basics of Wireless Sensors and Applications, The Mica Mote, Sensing and Communication Range, Design Issues, Energy consumption, Clustering of Sensors, Applications

UNIT II : Data Retrieval in Sensor Networks, Classification of WSNs, MAC Layer, Routing Layer, High-Level Application Layer Support, Adapting to the Inherent Dynamic Nature of WSNs.

UNIT III : Sensor Network Platforms and Tools, Sensor Network Hardware, Sensor Network Programming
Challenges, Node-Level Software Platforms.

UNIT IV : Operating System: TinyOS, Imperative Language: nesC, Dataflow Style Language: Tiny GALS, Node-Level Simulators, ns-2 and its Sensor Network Extension, TOSSIM.

UNIT V : Sensor Network Databases : Challenges ,Query Interfaces, High level Database Organization, In-Network Aggregation, Data-centric Storage, Temporal Data.

TEXT BOOKS:

1. Wireless Sensor Networks: An Information Processing Approach, Feng Zhao, Leonidas Guibas, Elsevier Science Imprint, Morgan Kauffman Publishers, 2005, rp2009.

REFERENCES:

1. Adhoc Wireless Networks: Architectures and Protocols, C.Siva Ram Murthy, B.S.Murthy, Pearson Education, 2004
2. Wireless Sensor Networks: Principles and Practice, Fei Hu, Xiaojun Cao, An Auerbach Book, CRC Press, Taylor & Francis Group, 2010
3. Wireless Ad hoc Mobile Wireless Networks: Principles, Protocols and Applications, Subir Kumar Sarkar et al., Auerbach Publications, Taylor & Francis Group, 2008.
4. Wireless Sensor Networks: Signal Processing and Communications Perspectives, Ananthram Swami et al., Wiley India, 2007, rp2009.

COURSE CONTENT & GRADE (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	**DIGITAL SIGNAL & IMAGE PROCESSING**	IT-045B	Min "D"	-	5.0

DIGITAL SIGNAL & IMAGE PROCESSING

UNIT-I : Introduction and Fundamentals : Motivation and Perspective, Applications, Components of Image Processing System, Element of Visual Perception, A Simple Image Model, Sampling and Quantization.

Image Enhancement in Spatial Domain : Introduction; Basic Gray Level Functions – Piecewise-Linear Transformation Functions: Contrast Stretching; Histogram Specification; Histogram Equalization; Local Enhancement; Enhancement using Arithmetic/Logic Operations – Image Subtraction, Image Averaging; Basics of Spatial Filtering; Smoothing - Mean filter, Ordered Statistic Filter; Sharpening – The Laplacian.

UNIT-II : Image Enhancement in Frequency Domain : Fourier Transform and the Frequency Domain, Basis of Filtering in Frequency Domain, Filters – Low-pass, High-pass; Correspondence Between Filtering in Spatial and Frequency Domain; Smoothing Frequency Domain Filters – Gaussian Lowpass Filters; Sharpening Frequency Domain Filters – Gaussian Highpass Filters; Homomorphic Filtering.

Image Restoration : A Model of Restoration Process, Noise Models, Restoration in the presence of Noise only-Spatial Filtering – Mean Filters: Arithmetic Mean filter, Geometric Mean Filter, Order Statistic Filters – Median Filter, Max and Min filters; Periodic Noise Reduction by Frequency Domain Filtering – Bandpass Filters; Minimum Mean-square Error Restoration.

UNIT-III : Color Image Processing : Color Fundamentals, Color Models, Converting Colors to different models, Color Transformation, Smoothing and Sharpening, Color Segmentation.

Morphological Image Processing : Introduction, Logic Operations involving Binary Images, Dilation and Erosion, Opening and Closing, Morphological Algorithms – Boundary Extraction, Region Filling, Extraction of Connected Components, Convex Hull, Thinning, Thickening

UNIT-IV : Registration : Introduction, Geometric Transformation – Plane to Plane transformation, Mapping, Stereo Imaging– Algorithms to Establish Correspondence, Algorithms to Recover Depth

Segmentation

Introduction, Region Extraction, Pixel-Based Approach, Multi-level Thresholding, Local Thresholding, Region-based Approach, Edge and Line Detection: Edge Detection, Edge Operators, Pattern Fitting Approach, Edge Linking and Edge Following, Edge Elements Extraction by Thresholding, Edge Detector Performance, Line Detection, Corner Detection.

UNIT-V : Feature Extraction : Representation, Topological Attributes, Geometric Attributes

Description : Boundary-based Description, Region-based Description, Relationship.

Object Recognition : Deterministic Methods, Clustering, Statistical Classification, Syntactic Recognition, Tree Search, Graph Matching

Books:

1. Digital Image Processing 2nd Edition, Rafael C. Gonzalvez and Richard E. Woods. Published by: Pearson Education.
2. Digital Image Processing and Computer Vision, R.J. Schalk off. Published by: John Wiley and Sons, NY.
3. Fundamentals of Digital Image Processing, A.K. Jain. Published by Prentice Hall, Upper Saddle River, NJ.
4. Digital Image Processing by A.K. Jain, 1995,-PHI

COURSE CONTENT & GRADE (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	**SOFTWARE PROJECT MANAGEMENT**	CS-051B	Min "D"	-	5.0

SOFTWARE PROJECT MANAGEMENT

UNIT-I: Introduction and Software Project Planning : Fundamentals of Software Project Management (SPM), Need Identification, Vision and Scope document, Project Management Cycle, SPM Objectives, Management Spectrum, SPM Framework, Software Project Planning, Planning Objectives, Project Plan, Types of project plan, Structure of a Software Project Management Plan, Software project estimation, Estimation methods, Estimation models, Decision process.

UNIT-II: Project Organization and Scheduling : Project Elements, Work Breakdown Structure (WBS), Types of WBS, Functions, Activities and Tasks, Project Life Cycle and Product Life Cycle, Ways to Organize Personnel, Project schedule, Scheduling Objectives, Building the project schedule, Scheduling terminology and techniques, Network Diagrams: PERT, CPM, Bar Charts: Milestone Charts, Gantt Charts.

UNIT-III: Project Monitoring and Control : Dimensions of Project Monitoring & Control, Earned Value Analysis, Earned Value Indicators: Budgeted Cost for Work Scheduled (BCWS), Cost Variance (CV), Schedule Variance (SV), Cost Performance Index (CPI), Schedule Performance Index (SPI), Interpretation of Earned Value Indicators, Error Tracking, Software Reviews, Types of Review: Inspections, Deskchecks, Walkthroughs, Code Reviews, Pair Programming.

UNIT-IV: Software Quality Assurance and Testing : Testing Objectives, Testing Principles, Test Plans, Test Cases, Types of Testing, Levels of Testing, Test Strategies, Program Correctness, Program Verification & validation, Testing Automation & Testing Tools, Concept of Software Quality, Software Quality Attributes, Software Quality Metrics and Indicators, The SEI Capability Maturity Model CMM), SQA Activities, Formal SQA Approaches: Proof of correctness, Statistical quality assurance, Cleanroom process.

UNIT-V: Project Management and Project Management Tools : Software Configuration Management: Software Configuration Items and tasks, Baselines, Plan for Change, Change Control, Change Requests Management, Version Control, Risk Management: Risks and risk types, Risk Breakdown Structure (RBS), Risk Management Process: Risk identification, Risk analysis, Risk planning, Risk monitoring, Cost Benefit Analysis, Software Project Management Tools: CASE Tools, Planning and Scheduling Tools, MS-Project.

Books:

1. Software Project Management by M. Cotterell
2. Information Technology Project Management
3. Management Information and Control by
4. Software Engineering – A Practitioner's approach, Roger S. Pressman (5^{th} edi), 2001, MGH
5. Software Project Management, Walker Royce, 1998, Addison Wesley.
6. Project Management 2/c. Maylor
7. Managing Global software Projects, Ramesh, 2001, TMH.
8. Software Project Managemnet by S. A. Kelkar

COURSE CONTENT & GRADE (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	**INFORMATION SECURITY LAB**	IT-33L	Min "D "	Min "D"	5.0

INFORMATION SECURITY LAB

List of experiments (please expand it):

1. Study of Network Security fundamentals - Ethical Hacking, Social Engineering practices.
2. System threat attacks - Denial of Services.
3. Sniffing and Spoofing.
4. Web Based Password Capturing.
5. Virus and Trojans.
6. Anti-Intrusion Technique – Honey pot.
7. Symmetric Encryption Scheme – RC4.
8. Block Cipher – S-DES, 3-DES.
9. Asymmetric Encryption Scheme – RSA.
10. IP based Authentication.

COURSE CONTENT & GRADE (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	**DATA MINING & WAREHOUSING LAB**	IT-35L	Min "D	Min "D"	5.0

DATA MINING & WAREHOUSING LAB

List of experiments (please expand it):

1. Evolution of data management technologies, introduction to data warehousing concepts.
2. Develop an application to implement defining subject area, design of fact dimension table, data mart.
3. Develop an application to implement OLAP, roll up, drill down, slice and dice operation
4. Develop an application to construct a multidimensional data.
5. Develop an application to implement data generalization and summarization technique.
6. Develop an application to extract association rule of data mining.
7. Develop an application for classification of data.
8. Develop an application for one clustering technique
9. Develop an application for Naïve Bayes classifier.
10. Develop an application for decision tree.

COURSE CONTENT & GRADE (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	**NETWORK MANAGEMENT LAB**	IT-37L	Min "D"	Min "D"	5.0

NETWORK MANAGEMENT LAB

List of experiments (please expand it):

1. To implement date and time display from local host to server using TCP
2. To write a client-server application for chat using TCP
3. To implementation of echo client server using TCP/IP
4. To write a C program to develop a DNS client server to resolve the given Hostname.
5. To write a client-server application for chat using UDP
6. To implement programs using raw sockets (like packet capturing and filtering)
7. To write a C program to perform sliding window.
8. To get the MAC or Physical address of the system using Address Resolution Protocol.
9. To simulate the Implementing Routing Protocols using border gateway protocol(BGP)
10. To simulate the OPEN SHORTEST PATH FIRST routing protocol based On the cost assigned to the path.

COURSE CONTENT & GRADE (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	**MAJOR PROJECT**	IT-46L	-	Min "D"	5.0

COURSE CONTENT & GRADE (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	**SEMINAR /GROUP DISCUSSION**	IT-47L	-	Min "D"	5.0