Jabalpur Engineering College, Jabalpur

Semester VIII Credit Based Grading System (CBGS) w.e.f. July 2018
Scheme of Examination
Bachelor of Engineering B.E. (Information Technology)
Subject Wise Distribution of Marks and Corresponding Credits
Scheme of Examination w.e.f. July 2018 Academic Session 2018-19

S.No.	Subject Code	Subject Name & Title	Maximum Marks Allotted					Total Marks	Hours/Week			Total Credits
			Theory			Practical						
			End. Sem.	Mid Sem. MST	Quiz, Assignment	End Sem.	Lab Work		L	T	P	
1	IT8001	Information & Cyber Security	70	20	10	30	20	150	3	1	2	6
2	IT8002	Data Mining	70	20	10	30	20	150	3	1	2	6
3	IT8003	Elective-V	70	20	10	-	-	100	3	1	-	4
4	IT8004	Elective-VI	70	20	10	-	-	100	3	1	-	4
5	IT8005	Project-II	-	-	-	120	80	200	-	-	8	8
6	IT8006	Expert Lecture On Cutting Edge Technology	-	-	-	-	50	50	-	-	2	2
7	IT8007	Case Study/Group Discussion/Seminar (Internal Assesment)	-	-	-	-	50	50	-	-	2	2
		Total	**280**	**80**	**40**	**180**	**220**	**800**	**12**	**4**	**16**	**32**

MST: Minimum of two mid semester tests to be conducted.

L: Lecture **T: Tutorial** **P: Practical**

Department Elective-V (Four Subjects)			Department Elective-VI (Four Subjects)	
S.No.	Subject Code	Subject Name	Subject Code	Subject Name
1	IT8003A	Network Management	IT8004A	Software Project Management
2	IT8003B	Sensor Network	IT8004B	Image Processing & GIS
3	IT8003C	Data Analytics and Data Science	IT8004C	Big Data Technology
4	IT8003D	Natural Language Processing	IT8004D	Information Storage Management

Principal
Jabalpur Engineering College

Jabalpur Engineering College, Jabalpur
(Credit Based Grading System Based Scheme)
Bachelor of Engineering (CBGS) Semester: VIII (Information Technology)

(w.e.f. July 2018)

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		Theory			Practical		Total Marks	L	T	P	
		End Sem	Mid Sem MST	Quiz, Assignment	End Sem	Lab Work					
IT8001	Information & Cyber Security	70	20	10	30	20	150	3	1	2	6

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), O-Day(Zero Day) Attack.

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.

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BE VIII Semester (INFORMATION TECHNOLOGY)						
COURSE CONTENT						
SUB. CODE	SUB. NAME	L	T	P	MAX. MARKS	CREDITS
IT8001	INFORMATION SECURITY LAB	3	1	2	150	6

INFORMATION SECURITY LAB

List of experiments

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.

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Jabalpur Engineering College Jabalpur, Jabalpur

Department of Information Technology

Semester: VIII SEM

Information and Cyber Security (IT-8001)

Course Objectives

CO1. To give overview of cryptography and DES.
CO2. To understand various cryptography algorithms.
CO3. To familiarize with the different authentication techniques.
CO4. To introduce various software vulnerabilities.

CEO\PEO	1	2	3	4	5	6
1	*					*
2	*	*				
3	*		*			
4	*			*		

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		Theory			Practical		Total Marks	L	T	P	
		End Sem	Mid Sem MST	Quiz, Assignment	End Sem	Lab Work					
IT8002	Data Mining	70	20	10	30	20	150	3	1	2	6

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 Too's 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 Back propagation – 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.

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Department of Information Technology

Semester: VIII SEM

Data Mining and Warehousing (IT-8002)

Course Objectives

CO1. To introduce with data warehousing components.
CO2. To familiarize with data mining and integration with a data warehousing.
CO3. To understand association rules and its classifications.
CO4. To introduce various software vulnerabilities.

CEO\PEO	1	2	3	4	5	6
1	*					
2	*					
3	*	*		*		
4	*		*	*		

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		End Sem	Mid Sem MST	Quiz, Assignment	End Sem	Lab Work					
ELECTIVE-V IT8003A	Network Management	70	20	10	-	-	100	3	1	-	4

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 :

- 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

Jabalpur Engineering College Jabalpur, Jabalpur

Department of Information Technology

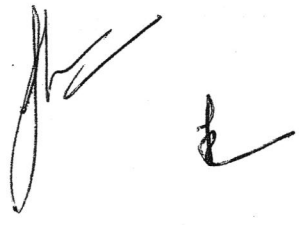
Semester: VIII SEM

Network Management (IT-8003A)

Course Objectives

CO1. To discuss protocol layering principle and various standard architectures.
CO2. To understand TCP/IP supportive various protocols.
CO3. To compare various routing methods.
CO4. To give overview of configuration management, performance management, accuracy and security management..

CEO\PEO	1	2	3	4	5	6
1	*					
2	*	*				
3			*			
4				*		



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ELECTIVE-V IT8003B	Sensor Network	70	20	10	-	-	100	3	1	-	4

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, Internet On Things based Case Study.

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.

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ELECTIVE-VI IT8004A	Software Project Management	70	20	10	-	-	100	3	1	-	4

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 (5th edi), 2001, MGH
5. Software Project Management, Walker Royce, 1998, Addison Wesley.
6. Project Management 2/e. Maylor
7. Managing Global software Projects, Ramesh, 2001, TMH.
8. Software Project Managemnat by S. A. Kelkar

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Department of Information Technology

Semester: VIIISEM

Software Project Management (IT-8004 A)

Course Objectives

CO1. To study project management cycle and SPM objectives.
CO2. To understand the project organization and scheduling.
CO3. To familiarize with the project monitoring and control.
CO4. To analyze various testing and software quality assurance approaches.
CO5. To understand the software management and project management tools.

CEO\PEO	1	2	3	4	5	6
1	*					
2	*		*			
3				*		
4	*	*	*			*
5	*		*			*

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ELECTIVE-VI IT8004B	Image Processing & GIS	70	20	10	-	-	100	3	1	-	4

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

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