Jabalpur Engineering College, Jabalpur

Semester VIII Credit Based Grading System (CBGS) w.e.f. July 2018
Scheme of Examination
Bachelor of Engineering B.E. (Computer Science and Engineering)
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			L	T	P	
			End. Sem.	Mid Sem. MST	Quiz, Assignment	End Sem.	Lab Work					
1	CS8001	Machine Learning	70	20	10	30	20	150	3	1	2	6
2	CS8002	Computer Vision	70	20	10	30	20	150	3	1	2	6
3	CS8003	Elective-V	70	20	10	-	-	100	3	1	-	4
4	CS8004	Elective-VI	70	20	10	-	-	100	3	1	-	4
5	CS8005	Project-II	-	-	-	120	80	200	-	-	8	8
6	CS8006	Departmental Lab IV (WEKA)	-	-	-	-	50	50	-	-	2	2
7	CS8007	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 (Three Subjects)			Department Elective-VI (Three Subjects)	
S.No.	Subject Code	Subject Name	Subject Code	Subject Name
1	CS8003A	Distributed System & Cloud Computing	CS8004A	Data Centre Management
2	CS8003B	Optimization Techniques	CS8004B	Web Mining
3	CS8003C	Natural Language Processing	CS8004C	Ethical Hacking

Principal
Jabalpur Engineering College
Jabalpur - 482 011 (M.P.)

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		Theory			Practical		Total Marks	L	T	P	
		End Sem	Mid Sem MST	Quiz, Assignment	End Sem	Lab Work					
CS8001	Machine Learning	70	20	10	30	20	150	3	1	2	6

Unit I: Introduction: Basic Concepts, Understand and Formalize the Learning Problem, Model and Parameters, Training, Validation and Test Data. Types of Learning: Supervised learning, Unsupervised Learning, Semi-Supervised Learning Reinforcement Learning and Deep Learning. Machine Learning Application Areas, Present and Future

Unit II: Supervised Learning: Classification, Linear Regression, Linear Regression of One Variable using Gradient Descent Algorithm, Linear Regressions of Multiple Variables using Gradient Descent Algorithm. Logistic Regression. Decision Trees, Ensemble Learning – Boosting – Bagging, Naive Bayes Classifier, k-Nearest Neighbors Classifier.

Unit III: Unsupervised Learning: Hierarchical Clustering, k-Means Clustering, Mixture Models, Density-Based Spatial Clustering of Applications with Noise (DBSCAN), Ordering Points to Identify the Clustering Structure (OPTICS)

Unit IV: Introduction to Deep Learning: Perceptrons, Basic Neural Network Structure, Simple Examples and Motivation for Deep Networks, Forward Propagation, Cost Functions, Error Backpropagation Algorithm, Training by Gradient Descent, Fundamental concepts of Kohonen and Grossberg Network, Convolution Neural Network, Recurrent Neural Networks, Long/Short Term Memory

Unit V: Evaluation and Practical Issues in Machine Learning: High Dimensionality, Importance of Good Features, Irrelevant and Relevant Features, Feature Pruning and Normalization, Evaluating Model Performance, Hypothesis Testing and Statistical Significance, Accuracy, Precision, Recall, Confusion Matrix, Bias Variance Ttradeoffs, Overfitting, Underfitting.

Lab Work: Students will be given a few machine learning problems. They need to solve the given problems by applying the appropriate machine learning techniques studied in this course (or subject)

Suggested books:

1) Stephen Marsland, —Machine Learning – An Algorithmic Perspective, Second Edition, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series, 2014.
2) Tom M Mitchell, —Machine Learning, First Edition, McGraw Hill Education, 2013.
3) Peter Flach, —Machine Learning: The Art and Science of Algorithms that Make Sense of Data, First Edition, Cambridge University Press, 2012.
4) Jason Bell, —Machine learning – Hands on for Developers and Technical Professionals, First Edition, Wiley, 2014
5) Ethem Alpaydin, —Introduction to Machine Learning 3e (Adaptive Computation and Machine Learning Series), Third Edition, MIT Press, 2014
6) Ian Goodfellow, Yoshua Bengio, Aaron Courville. – Deep Learning, MIT Press, MIT Press, 2016

Course Outcomes:

Upon completion of the course, the students will be able to

CO 1) Explain fundamental concepts of machine learning
CO 2) Apply an appropriate machine learning strategy for solving a given problem.
CO 3) Compare different machine learning approaches for the given data.
CO 4) Create a machine learning model for basic real world problems.
CO 5) Evaluate the performance of a machine learning model

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		End Sem	Mid Sem MST	Quiz, Assignment	End Sem	Lab Work					
CS8002	Computer Vision	70	20	10	30	20	150	3	1	2	6

UNITI:Introduction to Computer Vision: Human Vision, Image Formation and understanding, pixel and color transform, classical filtering operations, histogram operations, thresholding techniques, edge detection techniques, corner and interest point, Introduction to computer vision.

UNIT II:Feature Detection and Matching: Introduction to Feature Representation, colorhistogram analysis, colormoments, texture analysis, Harris detector, Feature descriptors, SIFT, Image Matching, Feature distance, euclidean distance, feature and dimensionality reduction, principal component analysis.

UNIT III:Shape and Region Analysis: Binary shape analysis, connectedness, object labeling and counting, size filtering, skeletons and thinning, deformable shape analysis, boundary tracking procedures, shape models and shape recognition, boundary length measures, boundary descriptors, chain codes, Fourier descriptors, region descriptors.

UNIT IV:Image Retrieval: Introduction to Classification and learning techniques, k nearest neighbour, support vector machines, use in Image Retrieval for applications. Accuracy Measurements (Precision, Recall, Sensitivity and Specificity) and Cross Validation Models. Introduction to 3D Vision and Motion.

UNIT V:Application and Research in Computer Vision: Object Detection, Photo album, Face detection, Face recognition, Eigen faces, Active appearance and 3D shape models of faces Application: Surveillance, foreground-background separation, particle filters, combining views from multiple cameras, human gait analysis Application: In-vehicle vision system: locating roadwayroad markings – identifying road signs – locating pedestrians.

Lab Work

Students will be given a few computer vision problems. They need to solve the given problems by applying the appropriate techniques studied in this subject.

Text Books:

1. E. R. Davies, "Computer & Machine Vision", Fourth Edition, Academic Press, 2012.
2. R. Szeliski, "Computer Vision: Algorithms and Applications", Springer 2011.

ReferenceBooks:

1. Simon J. D. Prince, "Computer Vision: Models, Learning, and Inference", Cambridge University Press, 2012.
2. 4. Mark Nixon and Alberto S. Aquado, "Feature Extraction & Image Processing for Computer Vision", Third Edition, Academic Press, 2012.
3. 5. D. L. Baggio et al., "Mastering OpenCV with Practical Computer Vision Projects", Packt Publishing, 2012.
4. 6. Jan Erik Solem, "Programming Computer Vision with Python: Tools and algorithms for analyzing images", O'Reilly Media, 2012.

Course Outcomes:

Upon completion of the course, the students will be able to

CO1. Discuss fundamental image processing techniques required for computer vision
CO2. Examine various feature extraction techniques and experiment texture analysis.

3. Implement shape analysis and various boundary tracking techniques
4. Apply classification and other learning techniques for image retrieval.
5. Design a basic content-based image retrieval system and develop applications using computer vision techniques.

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		End Sem	Mid Sem MST	Quiz, Assignment	End Sem	Lab Work					
ELECTIVE-V CS8003A	Distributed System & Cloud Computing	70	20	10	-	-	100	3	1	-	4

UnitI:Characterization of Distributed Systems: Introduction, Examples of distributed Systems.Resource sharing and the Web Challenges. Architectural models, Fundamental Models. **Distributed File Systems**: Desirable features of good Distributed file system. File service architecture, file models, File access models.

Unit II:Distributed Mutual Exclusion: Classification of distributed mutual exclusion, requirement of mutual exclusion theorem, Token based and non-token based algorithms. Election Algorithms: Ring and Bully method.

Distributed Deadlock Detection: system model, resource Vs communication deadlocks, deadlock prevention, avoidance, detection & resolution, centralized dead lock detection, distributed dead lock detection, path pushing algorithms, edge chasing algorithms.

Unit III:Distributed Scheduling: load distribution, different types of load distribution algorithms, Task migration and its issues.

Agreement Protocols: Introduction, System models, classification of Agreement Problem, Byzantine agreement problem, Consensus problem, Interactive consistency Problem, Solution to Byzantine Agreement problem, Application of Agreement problem.

UnitIV: Communication in Distributed Systems. Communication between distributed objects,RPC-Implementing RPC mechanism, stub generation, Java RMI , Event Programming. Case study-CORBA. Causal ordering of messages , Clock synchronization: Logical clocks, Lamport's&vectors logical clocks.

Unit V:Cloud Computing definition: Cloud types: private, public and hybrid cloud. Cloud computing Services: IaaS, PaaS, SaaS. Introduction to cloud Virtualization concepts. Types of Virtualization & its benefits. Benefits and challenges of cloud computing,Next generation Cloud Applications.

TextBooks:

1. Coulouris, Dollimore, Kindberg, "Distributed System: Concepts and Design", 5th edition, Pearson Education, 2005.
2. P K Sinha, "Distributed operating systems; Concepts and design", PHI Learning, 1998.
3. Tanenbaum and steen, "Distributed systems: Principles and paradigms", 2nd edition, PHI Learning, 2007.

Reference Books:

1. Gerald Tel, "Introduction to Distributed Algorithms", Cambridge University Press, 2000.
2. Velte, "Cloud Computing- A Practical Approach" ,TMH Pub, 2010.

Course Outcomes:

Upon completion of the course, the students will be able to,

CO1. Explain fundamental concepts of Distributed systems & cloud computing

CO2. Classify ~~and describe~~ various architectural and fundamental models of distributed system design.

CO3 Apply the election algorithms in a given scenario to select the coordinator.

CO4 Analyse different agreement protocols and communication protocols like RPC, RMI etc in distributed systems.

CO5 Examine various deadlock handling mechanisms in distributed environment.

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ELECTIVE-V CS8003B	Optimization Techniques	70	20	10	-	-	100	3	1	-	4

Unit 1:Introduction to Operation Research: Operation Research approach, scientific methods, introduction to models and modeling techniques, general methods for Operation Research models, methodology and advantages of Operation Research, history of Operation Research.

Unit 2:Linear Programming (LP): Introduction to LP and formulation of Linear Programming problems, Graphical solution method, alternative or multiple optimal solutions, Unbounded solutions, Infeasible solutions, Maximization – Simplex Algorithm, Minimization – Simplex Algorithm using Big-M method, Two phase method, Duality in linear programming, Integer linear programming.

Unit 3:Transportation & Assignment Problems: Introduction to Transportation problems, various methods of Transportation problem, Variations in Transportation problem, introduction to Assignment problems, variations in Assignment problems.
Network Analysis: Network definition and Network diagram, probability in PERT analysis, project time cost trade off, introduction to resource smoothing and allocation.

Unit 4:Sequencing: Introduction, processing N jobs through two machines, processing N jobs through three machines, processing N jobs through m machines.
Inventory Model: Introduction to inventory control, deterministic inventory model, EOQ model with quantity discount.
Queuing Models: Concepts relating to queuing systems, basic elements of queuing model, role of Poison & exponential distribution, concepts of birth and death process.

Unit 5:Replacement & Maintenance Models: Replacement of items, subject to deterioration of items subject to random failure group vs. individual replacement policies.
Simulation: Introduction & steps of simulation method, distribution functions and random number generation.

Text Books:

1. J K Sharma, Operations Research Theory and Applications, MacMillan India Ltd.
2. N D Vohra, Quantitative Techniques in management, Tata McGraw Hill.
3. Handy A Taha, Operations Research – An Introduction, Prentice Hall of India, New Delhi.

Reference Books:

1. Wagner H M, Principles of Operations Research: With Applications to Management Decisions, Prentice-Hall of India, New Delhi.
2. Hillier F S and Lieberman G J, Operations Research, Holden Day Inc., San Francisco.

Course Outcomes:

Upon completion of the course, the students will be able to

CO1. ~~Describe~~ Identify and explain importance of optimization of industrial process management
CO2. Apply basic concepts of mathematics to formulate an optimization problem
CO3. Analyse and ~~appreciate~~ apply variety of performance measures for various optimization problems
CO4. Design maxima/minima problem as optimization problems.
CO5. Develop a simulation model based on distribution functions.

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ELECTIVE-V CS8003C	Natural Language Processing	70	20	10	-	-	100	3	1	-	4

UNIT I:Introduction: Origins and challenges of NLP – Language Modeling: Grammar-based LM, Statistical LM – Regular Expressions, Finite-State Automata – English Morphology, Transducers for lexicon and rules, Tokenization, Detecting and Correcting Spelling Errors, Minimum Edit Distance

UNIT II:Word Level Analysis: Unsmoothed N-grams, Evaluating N-grams, Smoothing, Interpolation and Backoff – Word Classes, Part-of-Speech Tagging, Rule-based, Stochastic and Transformation-based tagging, Issues in PoS tagging – Hidden Markov and Maximum Entropy models.

UNIT III:Syntactic Analysis: Context-Free Grammars, Grammar rules for English, Treebanks, Normal Forms for grammar – Dependency Grammar – Syntactic Parsing, Ambiguity, Dynamic Programming parsing – Shallow parsing – Probabilistic CFG, Probabilistic CYK, Probabilistic Lexicalized CFGs – Feature structures, Unification of feature structures.

UNIT IV:Semantics and Pragmatics: Requirements for representation, First-Order Logic, Description Logics – Syntax-Driven Semantic analysis, Semantic attachments – Word Senses, Relations between Senses, Thematic Roles, selectional restrictions – Word Sense Disambiguation, WSD using Supervised, Dictionary & Thesaurus, Bootstrapping methods – Word Similarity using Thesaurus and Distributional methods.

UNIT V:Application of NLP: intelligent work processors: Machine translation, user interfaces,Man-Machine interfaces, natural language querying, tutoring and authoring systems, speechrecognition, commercial use of NLP.

Text Books:

3. Daniel Jurafsky, James H. Martin—Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech, Pearson Publication, 2014.
4. Steven Bird, Ewan Klein and Edward Loper, —Natural Language Processing with Python, First Edition, OReilly Media, 2009.

Reference Books:

1. Breck Baldwin, —Language Processing with Java and LingPipe Cookbook, Atlantic Publisher, 2015.
2. Richard M Reese, —Natural Language Processing with Java, OReilly Media, 2015.
3. Nitin Indurkhya and Fred J. Damerau, —Handbook of Natural Language Processing, Second Edition, Chapman and Hall/CRC Press, 2010.
4. Tanveer Siddiqui, U.S. Tiwary, —Natural Language Processing and Information Retrieval, Oxford University Press, 2008.

Course Outcomes:

Upon completion of the course, the students will be able to

CO1. Define basic Language features and modelling using NLP.
CO2. Implement a rule based system to tackle morphology/syntax of a language
CO3. Compare and contrast the use of different statistical approaches for different types of NLP applications.
CO4. Design a tag set to be used for statistical processing for real-time applications
CO5. Construct an innovative application using NLP components.

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ELECTIVE-VI CS8004A	Data Centre Management	70	20	10	-	-	100	3	1	-	4

UNIT I:INTRODUCTION TO DATA CENTER
History of data centre,Role of data center in digitalization, Carbon footprints of data center, Energy optimization in data center, Policies resulting into need of localization(Data centers to be hosted in the country), Design for: flexibility, scalability, environmental control, network infrastructure, Modern data centers: high availability and Service Oriented Infrastructure(SOI).

UNIT II:DATA CENTRE ARCHITECTURES:
Network connectivity optimization evolution: Top of rack (TOR), end of ~~rack~~ low (EOR), solutions that reduce power and cabling. Data Centre standards; TIA/EIA-942. Structured cabling standards, fibre and copper cabling characteristics, cable management, bandwidth requirements, I/O connectivity.

UNIT III:SERVER ARCHITECTURES

Stand-alone, blades, stateless, clustering, scaling, optimization, virtualization. Limitation of traditional server deployments; modern solutions. Applications; database, finance etc. Redundant Layer 2 and Layer 3 designs. Case studies.

UNIT IV:ENTERPRISE-LEVEL VIRTUALIZATION
Provision, monitoring and management of a virtual data center and multiple enterprise-level virtual servers and virtual machines through software management interfaces; Networking and Storage in Enterprise Virtualized Environments - Connectivity to storage area and IP networks from within virtualized environments using industry standard protocols. Virtual machine deployment, modification, management; monitoring and migration methodologies.

UNIT V:RESOURCE MONITORING
Physical and virtual machine memory, CPU management and abstraction techniques using a hypervisor. NIS, DNS, LDAP, Load balancing, Terminology, Advantages, Types of load balancing, Implementing a Network with Load-Balancing Switches. Case Studies: Linux (Kali/Fedora), Network Simulators, VMWare Workstation.

Suggested Books:

1. Administering Data Centers: Servers, Storage and Voice over IP, Kailash Jayaswal
2. Mickey Iqbal, "IT Virtualization Best Practices: A Lean, Green Virtualized Data Center Approach", MC Press [ISBN: 978-1583473542] 2010.
3. Mike Laverick, "VMware vSphere 4 Implementation" Tata McGraw-Hill Osborne Media; 1 edition [ISBN: 978-0071664523], 2010.
4. Jason W. McCarty, Scott Lowe, Matthew K. Johnson, "VMware vSphere 4 Administration Instant Reference" Sybex; 1 edition [ISBN: 978- 0470520727],2009
5. Brian Perry, Chris Huss, Jeantet Fields, "VCP VMware Certified Professional on vSphere 4 Study Guide" Sybex; 1 edition [ISBN: 978-0470569610], 2009.
6. Jason Kappel, Anthony Velte, Toby Velte, "Microsoft Virtualization with Hyper-V: Manage Your Datacenter with Hyper-V, Virtual PC, Virtual Server, and Application Virtualization" McGraw-Hill Osborne [ISBN: 978-0071614030],2009

Upon completion of the course, students will be able to:

CO1. Explain data centre, carbon footprint of data center, energy optimization and Understand virtual data centre, enterprise virtual environment and virtual machine deployments.

CO2 Evaluate load balancing, virtual memory management and resource monitoring.

CO3 Examine various server architecture, blade, stand-alone, stateless architectures, data centre standards.

CO4 Create a basic plan for establishing virtual data centre and virtual machines.

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ELECTIVE-VI CS8004B	**Web Mining**	70	20	10	-	-	100	3	1	-	4

UNIT I: Introduction: World Wide Web, History of the Web and the Internet, What is Data Mining? What is Web Mining? Introduction to Association Rule Mining, SupervisedLearning & Unsupervised Learning.Information Retrieval and Web Search: Basic Concepts of Information Retrieval,Information Retrieval Models, Relevance Feedback, Evaluation Measures, Text andWeb Page Pre-Processing, Inverted Index and Its Compression, Latent SemanticIndexing, Web Search, Meta-Search: Combining Multiple Rankings, WebSpamming.

UNIT II: Social Network Analysis: Introduction, Co-Citation and Bibliographic Coupling, PageRank, HITS Algorithm, Community Discovery.Web Crawling: A Basic Crawler Algorithm, Implementation Issues, UniversalCrawlers, Focused Crawlers, Topical Crawlers, Evaluation, Crawler Ethics andConflicts.

UNIT III: Structured Data Extraction: Wrapper Generation, Preliminaries, WrapperInduction, Instance-Based Wrapper Learning, Automatic Wrapper Generation:Problems, String Matching and Tree Matching, Building DOM Trees, ExtractionBased on a Single List Page, Extraction Based on Multiple Pages,

UNIT IV: Information Integration: Introduction to Schema Matching, Pre-Processing forSchema Matching, Schema -Level Matching, Domain and Instance-LevelMatching, Combining Similarities, 1: m Match, Integration of Web QueryInterfaces, Constructing a Unified Global Query Interface.Opinion Mining and Sentiment Analysis: The Problem of Opinion Mining,Document Sentiment Classification, Sentence Subjectivity and SentimentClassification, Opinion Lexicon Expansion, Aspect-Based Opinion Mining, OpinionSearch and Retrieval, Opinion Spam Detection.

UNIT V: Web Usage Mining: Data Collection and Pre-Processing, Data Modeling for Web Usage Mining, Discovery and Analysis of Web Usage Patterns, RecommenderSystems and Collaborative Filtering, Query Log Mining, Computational Advertising.

Text Books:

1. Wilbert Liu, Bing., "Web Data Mining", 2nd Edition., Elseiver, 2011.
2. Soumen Chakrabarti, "Mining the Web", Morgan-Kaufmann Publishers,Elseiver, 2002.

Course Outcomes:

Upon completion of the course, the students will be able to

CO1. Understand the characteristics of the Internet and data mining
CO2. Discuss about the web crawling algorithm implementation
CO3. Apply web data extraction and mining algorithms on web log files.
CO4. Examine the web data collection and analysis of web data for new patterns
CO5. Investigate structured data extraction based on single list and multiple pages.

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ELECTIVE-VI CS8004C	Ethical Hacking	70	20	10	-	-	100	3	1	-	4

UNIT I:Ethical Hacking: Types of Data Stolen From the Organizations, Elements of Information Security,Authenticity and Non-Repudiation, Security Challenges, Effects of Hacking,Hacker – Types of Hacker, Ethical Hacker, Hacktivism - Role of Security andPenetration Tester, Penetration Testing Methodology, Networking & ComputerAttacks – Malicious Software (Malware), Protection Against Malware, Intruder Attacks on Networks and Computers, Addressing Physical Security – KeyLoggers and Back Doors.

UNIT II:Foot Printing And Social Engineering: Web Tools for Foot Printing, Conducting Competitive Intelligence, Google Hacking, Scanning, Enumeration, Trojans & Backdoors, Virus & Worms, Proxy & PacketFiltering, Denial of Service, Sniffer, Social Engineering – shoulder surfing,Dumpster Diving, Piggybacking.

UNIT III:Data Security: Physical Security – Attacks and Protection, Steganography – Methods, Attacksand Measures, Cryptography – Methods and Types of Attacks, Wireless Hacking,Windows Hacking, Linux Hacking.

UNIT IV:Network Protection System & Hacking Web Servers: Routers, Firewall & Honeypots, IDS & IPS, Web Filtering, Vulnerability, Penetration Testing, Session Hijacking, Web Server, SQL Injection, Cross Site Scripting,Exploit Writing, Buffer Overflow, Reverse Engineering, Email Hacking, IncidentHandling & Response, Bluetooth Hacking, Mobiles Phone Hacking.

UNIT V:Ethical Hacking Laws And Tests: An introduction to the particular legal, professional and ethical issues likely to facethe domain of ethical hacking, ethical responsibilities, professional integrity andmaking appropriate use of the tools and techniques associated with ethicalhacking – Social Engineering, Host Reconnaissance, Session Hijacking, Hacking -Web Server, Database, Password Cracking, Network and Wireless, Trojan,Backdoor, UNIX, LINUX, Microsoft, NOVEL Server, Buffer Overflow, Denial of Service Attack, Methodical Penetration Testing.

Text Book:

1. Michael T. Simpson, Kent Backman, James E. "Corley, Hands On EthicalHacking and Network Defense", Second Edition, CENGAGE Learning, 2010.

Reference Books:

1. Steven DeFino, Barry Kaufman, Nick Valenteen, "Official Certified EthicalHacker Review Guide", CENGAGE Learning, 2009-11-01.

2. Patrick Engebretson, "The Basics of Hacking and Penetration Testing: EthicalHacking and Penetration Testing Made Easy", Syngress Basics Series –Elsevier, August 4, 2011.

3. Whitaker & Newman, "Penetration Testing and Network Defense" , CiscoPress, Indianapolis, IN, 2006.

Course Outcomes:

Upon completion of the course, the students will be able to

CO1. Describe how intruders escalate privileges in the computer networks.
CO2. Demonstrate Intrusion Detection, Policy Creation, Social Engineering, Buffer.

CO3. Examine between different types of Attacks and their protection mechanism
CO4. Investigate about ethical laws and tests associated with ethical hacking.
CO5. Design data security system using steganography and cryptography.