Syllabus

IV Year							II Semester
S.No.	**Course Type**	**Course Code**	**Course Title**	**Periods Per Week**			**Credits**
				L	**T**	**P**	
1	HSMC	SM801MS	Organizational Behaviour	3	0	0	3
			Professional Elective – VI				
2	PEC	CS811PE	Computational Complexity	3	0	0	3
		CS812PE	Distributed Systems				
		CS813PE	Neural Networks & Deep Learning				
		CS814PE	Human Computer Interaction				
		CS815PE	Cyber Forensics				
3	OEC		Open Elective – III	3	0	0	3
4	PROJ	CS801PC	Project Stage - II	0	0	14	7
Total				**9**	**0**	**14**	**16**

***Open Elective** – Students should take Open Electives from List of Open Electives Offered by Other Departments/Branches Only. These are the list of open electives offered by our branch to other branches.

Course Code	**Open Elective – III**
CS800OE	Machine Learning
CS801OE	Mobile Application Development
CS802OE	Scripting Languages
CS803OE	Database Management Systems

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SM801MS: ORGANIZATIONAL BEHAVIOUR (PC)

B.Tech. IV Year II Semester

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
SM801MS	HSMC	3	0	0	3	30	70	100
Contact Classes:50	Tutorial Classes:	Practical Classes: Nil				Total Classes:50		

Prerequisite:

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Course Objectives:

- The objective of the course is to provide the students with the conceptual framework and the theories underlying Organizational Behaviour.

Course Outcomes:

Unit - 1	Introduction to OB	No. of Classes: 09

Introduction to OB - Definition, Nature and Scope – Environmental and organizational context – Impact of IT, globalization, Diversity, Ethics, culture, reward systems and organizational design on Organizational Behaviour. Cognitive Processes-I: Perception and Attribution: Nature and importance of Perception – Perceptual selectivity and organization – Social perception – Attribution Theories – Locus of control –Attribution Errors –Impression Management.

Unit - 2	Cognitive Processes-II	No. of Classes: 09

Cognitive Processes-II: Personality and Attitudes – Personality as a continuum – Meaning of personality - Johari Window and Transactional Analysis - Nature and Dimension of Attitudes – Job satisfaction and organizational commitment-Motivational needs and processes- Work-Motivation Approaches Theories of Motivation- Motivation across cultures - Positive organizational behaviour: Optimism – Emotional intelligence – Self-Efficacy.

Unit - 3	Dynamics of OB-I	No. of Classes: 10

Dynamics of OB-I: Communication – types – interactive communication in organizations – barriers to communication and strategies to improve the follow of communication - Decision Making: Participative decision-making techniques – creativity and group decision making. Dynamics of OB –II Stress and Conflict: Meaning and types of stress –Meaning and types of conflict - Effect of stress and intraindividual conflict - strategies to cope with stress and conflict.

Unit - 4	Dynamics of OB –III Power and Politics	No. of Classes: 10

Dynamics of OB –III Power and Politics: Meaning and types of power – empowerment - Groups Vs. Teams – Nature of groups – dynamics of informal groups – dysfunctions of groups and teams – teams in modern work place.

Unit - 5	Leading High performance	No. of Classes: 12

Leading High performance: Job design and Goal setting for High performance- Quality of Work Life- Socio technical Design and High-performance work practices -

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Behavioural performance management: reinforcement and punishment as principles of Learning –Process of Behavioural modification - Leadership theories - Styles, Activities and skills of Great leaders.

Text Books:

Reference Books:

1. Luthans, Fred: Organizational Behaviour 10/e, McGraw-Hill, 2009
2. McShane: Organizational Behaviour, 3e, TMH, 2008
3. Nelson: Organizational Behaviour, 3/e, Thomson, 2008.
4. Newstrom W. John & Davis Keith, Organisational Behaviour-- Human Behaviour at Work, 12/e, TMH, New Delhi, 2009.
5. Pierce and Gardner: Management and Organisational Behaviour: An Integrated perspective, Thomson, 2009.
6. Robbins, P. Stephen, Timothy A. Judge: Organisational Behaviour, 12/e, PHI/Pearson, New Delhi, 2009.
7. Pareek Udai: Behavioural Process at Work: Oxford & IBH, New Delhi, 2009.
8. Schermerhorn: Organizational Behaviour 9/e, Wiley, 2008.
9. Hitt: Organizational Behaviour, Wiley, 2008
10. Aswathappa: Organisational Behaviour, 7/e, Himalaya, 2009
11. Mullins: Management and Organisational Behaviour, Pearson, 2008.
12. McShane, Glinow: Organisational Behaviour--Essentials, TMH, 2009.
13. Ivancevich: Organisational Behaviour and Management, 7/e, TMH, 2008.

Web References:

https://nptel.ac.in/courses/110/106/110106145/

https://onlinecourses.nptel.ac.in/noc20_mg51/preview

E-Text Books:

http://192.168.8.214/ACE%20INTRANET/E-Books/CSE%20BOOKS/

http://www.tmv.edu.in/pdf/Distance_education/BCA%20Books/BCA%20VI%20SEM/BCA-629%20OB.pdf

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CS811PE: COMPUTATIONAL COMPLEXITY (Professional Elective - VI)

B.Tech. IV Year II Semester

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
CS811PE	PCC	3	0	0	3	30	70	100
Contact Classes:50	Tutorial Classes:	Practical Classes: Nil				Total Classes:50		

Prerequisite:

- A course on "Computer Programming and Data Structures"
- A course on "Discrete Structures and Graph Theory"

Course Objectives:

- Introduces to theory of computational complexity classes
- Discuss about algorithmic techniques and application of these techniques to problems.
- Introduce to randomized algorithms and discuss how effective they are in reducing time and space complexity.
- Discuss about Graph based algorithms and approximation algorithms
- Discuss about search trees

Course Outcomes:

- Ability to classify decision problems into appropriate complexity classes
- Ability to specify what it means to reduce one problem to another, and construct reductions for simple examples.
- Ability to classify optimization problems into appropriate approximation complexity classes
- Ability to choose appropriate data structure for the given problem
- Ability to choose and apply appropriate design method for the given problem

Unit - 1	Computational Complexity	No. of Classes: 09

Computational Complexity: Polynomial time and its justification, Nontrivial examples of polynomial-time algorithms, the concept of reduction (reducibility), Class P Class NP and NP- Completeness, The P versus NP problem and why it's hard.

Unit - 2	Algorithmic paradigms	No. of Classes: 09

Algorithmic paradigms: Dynamic Programming – Longest common subsequence, matrix chain multiplication, knapsack problem, Greedy – 0-1 knapsack, fractional knapsack, scheduling problem, Huffman coding, MST, Branch-and-bound – travelling sales person problem, 0/1 knapsack problem, Divide and Conquer – Merge sort, binary search, quick sort.

Unit - 3	Randomized Algorithms	No. of Classes: 10

Randomized Algorithms: Finger Printing, Pattern Matching, Graph Problems, Algebraic Methods, Probabilistic Primality Testing, De-Randomization Advanced Algorithms.

Unit - 4	Graph Algorithms	No. of Classes: 10

Graph Algorithms: Shortest paths, Flow networks, Spanning Trees;

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Approximation algorithms, Randomized algorithms. Approximation algorithms: Polynomial Time Approximation Schemes.

Unit - 5	Advanced Data Structures and applications	No. of Classes: 12

Advanced Data Structures and applications: Decision Trees and Circuits, B-Trees, AVL Trees, Red and Black trees, Dictionaries and tries, Maps, Binomial Heaps, Fibonacci Heaps, Disjoint sets, Union by Rank and Path Compression.

Text Books:

1. T. Cormen, C. Leiserson, R. Rivest and C. Stein, Introduction to Algorithms, Third Edition, McGraw-Hill, 2009.
2. R. Motwani and P. Raghavan, Randomized Algorithms, Cambridge University Press, 1995.
3. J. J. McConnell, Analysis of Algorithms: An Active Learning Approach, Jones & Bartlett Publishers, 2001.
4. D. E. Knuth, Art of Computer Programming, Volume 3, Sorting and Searching, Second Edition, Addison-Wesley Professional, 1998.
5. S. Dasgupta, C. H. Papadimitriou and U. V. Vazirani, Algorithms, McGraw-Hill, 2008.

Reference Books:

Web References:

https://nptel.ac.in/courses/106/106/106106229/

https://nptel.ac.in/noc/courses/noc21/SEM2/noc21-cs90/

E-Text Books:

http://192.168.8.214/ACE%20INTRANET/E-Books/CSE%20BOOKS/

https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.297.6224&rep=rep1&type=pdf

https://users.cs.duke.edu/~reif/courses/complectures/books/AB/ABbook.pdf

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CS812PE: DISTRIBUTED SYSTEMS (Professional Elective - VI)

B.Tech. IV Year II Semester

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
CS812PE	PCC	3	0	0	3	30	70	100
Contact Classes:50	Tutorial Classes:	Practical Classes: Nil				Total Classes:50		

Prerequisite:

- A course on "Operating Systems"
- A course on "Computer Organization & Architecture"

Course Objectives:

- This course provides an insight into Distributed systems.
- Topics include- Peer to Peer Systems, Transactions and Concurrency control, Security and Distributed shared memory

Course Outcomes:

- Ability to understand Transactions and Concurrency control.
- Ability to understand Security issues.
- Understanding Distributed shared memory.
  Ability to design distributed systems for basic level applications

Unit - 1	Characterization of Distributed Systems	No. of Classes: 09

Characterization of Distributed Systems-Introduction, Examples of Distributed systems, Resource sharing and web, challenges, System models -Introduction, Architectural and Fundamental models, Networking and Internetworking, Interprocess Communication, Distributed objects and Remote Invocation-Introduction, Communication between distributed objects, RPC, Events and notifications, Case study-Java RMI.

Unit - 2	Operating System Support	No. of Classes: 09

Operating System Support- Introduction, OS layer, Protection, Processes and Threads, Communication and Invocation, Operating system architecture, Distributed File Systems-Introduction, File Service architecture.

Unit - 3	Peer to Peer Systems	No. of Classes: 10

Peer to Peer Systems–Introduction, Napster and its legacy, Peer to Peer middleware, Routing overlays, Overlay case studies-Pastry, Tapestry, Application case studies-Squirrel, OceanStore.

Time and Global States-Introduction, Clocks, events and Process states, Synchronizing physical clocks, logical time and logical clocks, global states, distributed debugging.

Coordination and Agreement-Introduction, Distributed mutual exclusion, Elections, Multicast communication, consensus and related problems.

Unit - 4	Transactions and Concurrency Control	No. of Classes: 10

Transactions and Concurrency Control-Introduction, Transactions, Nested Transactions, Locks, Optimistic concurrency control, Timestamp ordering. Distributed Transactions-Introduction, Flat and Nested Distributed

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Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery.

Unit - 5	**Replication**	No. of Classes: 12

Replication-Introduction, System model and group communication, Fault tolerant services, Transactions with replicated data. Distributed shared memory, Design and Implementation issues, Consistency models.

Text Books:

1. Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kindberg, Fourth Edition, Pearson Education.

2. Distributed Systems, S.Ghosh, Chapman & Hall/CRC, Taylor & Francis Group, 2010.

Reference Books:

1. Distributed Systems – Principles and Paradigms, A.S. Tanenbaum and M.V. Steen, Pearson Education.

2. Distributed Computing, Principles, Algorithms and Systems, Ajay D. Kshemakalyani and Mukesh Singhal, Cambridge, rp 2010.

Web References:

https://onlinecourses.nptel.ac.in/noc21_cs87/preview

https://nptel.ac.in/courses/106/106/106106107/

E-Text Books:

http://192.168.8.214/ACE%20INTRANET/E-Books/CSE%20BOOKS/

https://vowi.fsinf.at/images/b/bc/TU_Wien-Verteilte_Systeme_VO_%28G%C3%B6schka%29_-_Tannenbaum-distributed_systems_principles_and_paradigms_2nd_edition.pdf

https://cse.iitkgp.ac.in/~pallab/Distributed_Systems_2016_17/ds_spr16.html

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CS813PE: NEURAL NETWORKS & DEEP LEARNING (Professional Elective - VI)

B.Tech. IV Year II Semester

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
CS813PE	PCC	3	0	0	3	30	70	100
Contact Classes:50	Tutorial Classes:	Practical Classes: Nil				Total Classes:50		

Prerequisite:

Course Objectives:

- To introduce the foundations of Artificial Neural Networks
- To acquire the knowledge on Deep Learning Concepts
- To learn various types of Artificial Neural Networks
- To gain knowledge to apply optimization strategies

Course Outcomes:

- Ability to understand the concepts of Neural Networks
- Ability to select the Learning Networks in modeling real world systems
- Ability to use an efficient algorithm for Deep Models
- Ability to apply optimization strategies for large scale applications

Unit - 1	Artificial Neural Networks	No. of Classes: 09

Artificial Neural Networks Introduction, Basic models of ANN, important terminologies, Supervised Learning Networks, Perceptron Networks, Adaptive Linear Neuron, Back-propagation Network. Associative Memory Networks. Training Algorithms for pattern association, BAM and Hopfield Networks.

Unit - 2	Unsupervised Learning Network	No. of Classes: 09

Unsupervised Learning Network- Introduction, Fixed Weight Competitive Nets, Maxnet, Hamming Network, Kohonen Self-Organizing Feature Maps, Learning Vector Quantization, Counter Propagation Networks, Adaptive Resonance Theory Networks. Special Networks-Introduction to various networks.

Unit - 3	Introduction to Deep Learning	No. of Classes: 10

Introduction to Deep Learning, Historical Trends in Deep learning, Deep Feed - forward networks, Gradient-Based learning, Hidden Units, Architecture Design, Back-Propagation and Other Differentiation Algorithms.

Unit - 4	Regularization for Deep Learning	No. of Classes: 10

Regularization for Deep Learning: Parameter norm Penalties, Norm Penalties as Constrained Optimization, Regularization and Under-Constrained Problems, Dataset Augmentation, Noise Robustness, Semi-Supervised learning, Multi-task learning, Early Stopping, Parameter Typing and Parameter Sharing, Sparse Representations, Bagging and other Ensemble Methods, Dropout, Adversarial Training, Tangent Distance, tangent Prop and Manifold, Tangent Classifier.

Unit - 5	Optimization for Train Deep Models	No. of Classes: 12

Optimization for Train Deep Models: Challenges in Neural Network Optimization, Basic Algorithms, Parameter Initialization Strategies, Algorithms with Adaptive

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Learning Rates, Approximate SecondOrder Methods, Optimization Strategies and Meta-Algorithms Applications: Large-Scale Deep Learning, Computer Vision, Speech Recognition, Natural Language Processing.
Text Books: 1. Deep Learning: An MIT Press Book By Ian Goodfellow and Yoshua Bengio and Aaron Courville 2. Neural Networks and Learning Machines, Simon Haykin, 3rd Edition, Pearson Prentice Hall.
Reference Books:
Web References: https://nptel.ac.in/courses/106/106/106106184/ https://onlinecourses.nptel.ac.in/noc20_cs62/preview
E-Text Books: http://192.168.8.214/ACE%20INTRANET/E-Books/CSE%20BOOKS/ http://www.iitp.ac.in/~shad.pcs15/data/NN-DL.pdf https://www.cse.iitk.ac.in/users/sigml/lec/DeepLearningLib.pdf

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CS814PE: HUMAN COMPUTER INTERACTION (Professional Elective - VI)

B.Tech. IV Year II Semester

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
CS814PE	PCC	3	0	0	3	30	70	100
Contact Classes:50	Tutorial Classes:	Practical Classes: Nil				Total Classes:50		

Prerequisite:

Course Objectives:

To gain an overview of Human-Computer Interaction (HCI), with an understanding of user interface design in general, and alternatives to traditional "keyboard and mouse" computing; become familiar with the vocabulary associated with sensory and cognitive systems as relevant to task performance by humans; be able to apply models from cognitive psychology to predicting user performance in various human-computer interaction tasks and recognize the limits of human performance as they apply to computer operation; appreciate the importance of a design and evaluation methodology that begins with and maintains a focus on the user; be familiar with a variety of both conventional and non-traditional user interface paradigms, the latter including virtual and augmented reality, mobile and wearable computing, and ubiquitous computing; and understand the social implications of technology and their ethical responsibilities as engineers in the design of technological systems. Finally, working in small groups on a product design from start to finish will provide you with invaluable team-work experience

Course Outcomes:

1. Ability to apply HCI and principles to interaction design.
2. Ability to design certain tools for blind or PH people.

Unit - 1	Introduction	No. of Classes: 09

Introduction: Importance of user Interface – definition, importance of good design. Benefits of good design. A brief history of Screen design.

The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

Unit - 2	Design process	No. of Classes: 09

Design process – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions. Screen Designing: Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

Unit - 3	Windows	No. of Classes: 10

Windows – New and Navigation schemes selection of window, selection of devices based and screenbased controls. Components – text and messages, Icons and

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increases – Multimedia, colors, uses problems, choosing colors.		
Unit - 4	**HCI in the software process**	No. of Classes: 10
HCI in the software process, The software life cycle Usability engineering Iterative design and prototyping Design Focus: Prototyping in practice Design rationale Design rules Principles to support usability Standards Golden rules and heuristics HCI patterns Evaluation techniques, Goals of evaluation, Evaluation through expert analysis, Evaluation through user participation, Choosing an evaluation method. Universal design, Universal design principles Multi-modal interaction.		
Unit - 5	**Cognitive models Goal and task hierarchies Design Focus**	No. of Classes: 12
Cognitive models Goal and task hierarchies Design Focus: GOMS saves money Linguistic models The challenge of display-based systems Physical and device models Cognitive architectures Ubiquitous computing and augmented realities Ubiquitous computing applications research Design Focus: Ambient. **Wood** – augmenting the physical Virtual and augmented reality Design Focus: Shared experience Design Focus: Applications of augmented reality Information and data visualization Design Focus: Getting the size right.		

Text Books:

1. The essential guide to user interface design, Wilbert O Galitz, Wiley Dream Tech. Units 1, 2, 3
2. Human – Computer Interaction. Alan Dix, Janet Fincay, Gre Goryd, Abowd, Russell Bealg, Pearson Education Units 4,5

Reference Books:

1. Designing the user interface. 3rd Edition Ben Shneidermann, Pearson Education Asia.
2. Interaction Design Prece, Rogers, Sharps. Wiley Dreamtech.
3. User Interface Design, Soren Lauesen , Pearson Education.
4. Human –Computer Interaction, D. R. Olsen, Cengage Learning.
5. Human –Computer Interaction, Smith - Atakan, Cengage Learning.

Web References:

https://nptel.ac.in/courses/106/103/106103115/

https://nptel.ac.in/courses/106/106/106106177/

E-Text Books:

http://192.168.8.214/ACE%20INTRANET/E-Books/CSE%20BOOKS/

http://www.ittoday.info/Excerpts/HCI.pdf

https://paragnachaliya.in/wp-content/uploads/2017/08/HCI_Alan_Dix.pdf

https://cse.iitkgp.ac.in/~dsamanta/courses/archive/hci/LectureSlides/01_HCIcourseOverview.pdf

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CS815PE: CYBER FORENSICS (Professional Elective - VI)

B.Tech. IV Year II Semester

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
CS815PE	PCC	3	0	0	3	30	70	100
Contact Classes:50	Tutorial Classes:	Practical Classes: Nil				Total Classes:50		

Prerequisite:

- Network Security

Course Objectives:

- A brief explanation of the objective is to provide digital evidences which are obtained from digital media.
- In order to understand the objectives of computer forensics, first of all, people have to recognize the different roles computer plays in a certain crime.
- According to a snippet from the United States Security Service, the functions computer has in different kinds of crimes.

Course Outcomes:

1. Students will understand the usage of computers in forensic, and how to use various forensic tools for a wide variety of investigations.
2. It gives an opportunity to students to continue their zeal in research in computer forensics

Unit - 1	Introduction of Cybercrime	No. of Classes: 09

Introduction of Cybercrime: Types, The Internet spawns crime, Worms versus viruses, Computers' roles in crimes, Introduction to digital forensics, Introduction to Incident - Incident Response Methodology –
Steps - Activities in Initial Response, Phase after detection of an incident.

Unit - 2	Initial Response and forensic duplication	No. of Classes: 09

Initial Response and forensic duplication, Initial Response & Volatile Data Collection from Windows system -Initial Response & Volatile Data Collection from Unix system – Forensic Duplication: Forensic duplication: Forensic Duplicates as Admissible Evidence, Forensic Duplication Tool Requirements, Creating a Forensic. Duplicate/Qualified Forensic Duplicate of a Hard Drive.

Unit - 3	Forensics analysis and validation	No. of Classes: 10

Forensics analysis and validation: Determining what data to collect and analyze, validating forensic data, addressing data-hiding techniques, performing remote acquisitions

Network Forensics: Network forensics overview, performing live acquisitions, developing standard procedures for network forensics, using network tools, examining the honeynet project.

Unit - 4	Current Forensic tools	No. of Classes: 10

Current Forensic tools: evaluating computer forensic tool needs, computer forensics software tools, computer forensics hardware tools, validating and testing forensics software E-Mail Investigations: Exploring the role of e-mail in investigation, exploring the roles of the client and server in e-mail, investigating

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e-mail crimes and violations, understanding e-mail servers, using specialized e-mail forensic tools.
Cell phone and mobile device forensics: Understanding mobile device forensics, understanding acquisition procedures for cell phones and mobile devices.

Unit - 5	Working with Windows and DOS Systems	No. of Classes: 12

Working with Windows and DOS Systems: understanding file systems, exploring Microsoft File Structures, Examining NTFS disks, Understanding whole disk encryption, windows registry, Microsoft startup tasks, MS-DOS startup tasks, virtual machines.

Text Books:

1. Kevin Mandia, Chris Prosise, "Incident Response and computer forensics", Tata McGraw Hill, 2006
2. Computer Forensics, Computer Crime Investigation by John R. Vacca, Firewall Media, New Delhi.
3. Computer Forensics and Investigations by Nelson, Phillips Enfinger, Steuart, CENGAGE Learning

Reference Books:

1. Real Digital Forensics by Keith J. Jones, Richard Bejtiich, Curtis W. Rose, Addison-Wesley Pearson Education
2. Forensic Compiling, A Tractitioneris Guide by Tony Sammes and Brian Jenkinson, Springer International edition.

Web References:

https://onlinecourses.swayam2.ac.in/cec21_ge10/preview

http://www.cyberforensics.in/?AspxAutoDetectCookieSupport=1

E-Text Books:

http://192.168.8.214/ACE%20INTRANET/E-Books/CSE%20BOOKS/

https://us-cert.cisa.gov/sites/default/files/publications/forensics.pdf

http://index-of.es/Varios-2/Computer%20Forensics%20and%20Cyber%20Crime%20An%20Introduction.pdf

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