1. Peter Kim, The Hacker Playbook 3: Practical Guide to Penetration Testing, Zaccheus Entertainment, 2018.
2. Jon Erickson, Hacking: The Art of Exploitation, No Starch Press, 2008.
3. Online Resources:

https://www.sans.org/cyberaces/

https://skillsforall.com/

https://www.hackingloops.com/ethical-hacking/

Suggested Practical List (If any): (30 Hours)

Perform the following activities, record and report in standard form.

(NOTE: Exercise extra caution while performing these exercises and codes)

1. Perform various Virtual Machine based exercises on https://vulnhub.com/
2. Perform Capture the Flag (CTF) exercises from https://www.hacker101.com/
3. Follow the lessons and activities from https://www.hackingloops.com/ethical-hacking/
4. Google site for hacking https://google-gruyere.appspot.com/
5. OWASP WebGoat https://github.com/WebGoat/WebGoat

GE8d/DSE: CYBER FORENSICS

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course
		Lecture	Tutorial	Practical/ Practice		

Cyber Forensics	**4**	**3**	**0**	**1**	**Pass in Class XII**	**NIL**

Course Objective:

This course is to equip students with the knowledge and skills necessary to identify, collect, analyze and present digital evidence in a manner that is admissible in legal proceedings. Students will be able to conduct a thorough investigation of cybercrime incidents, preserve digital evidence, and report findings to relevant stakeholders.

Course Learning Outcomes:

- Students will be able to demonstrate an understanding of the principles of digital forensics, including legal considerations, recognition, collection, and preservation of digital evidence.
- Students will develop skills in using digital forensics tools and techniques, such as creating disk images, conducting keyword and grep searches, and examining Windows registry.
- Students will learn evidence recovery methods, including deleted file recovery, formatted partition recovery, and data recovery procedures, and ethical considerations.
- Students will gain knowledge of cyber forensic investigation tools and techniques, including digital evidence collection, preservation, and password cracking.
- Students will understand cyber laws and crimes, including hacking, viruses, intellectual property, and e-commerce, and the legal system of information technology, including jurisdiction issues and security and evidence in e-commerce.

Unit 1 – Digital Forensics: Introduction to digital forensics, legal considerations, recognising and collecting digital evidence, preservation of evidence, hash values and file hashing, creating disk images, keyword and grep searches, network basics, reporting and peer review, digital forensics report.

Unit 2 – Windows OS Forensics: Bits, bytes, Endieness, Disk partition schema, File systems – FAT, NTFS, ex-FAT, windows registry forensics, examining windows registry, NTUser.Dat Hive File Analysis, SAM Hive file, Software Hive file, System Hive File, USRClass.dat Hive File, AmCache Hive File.

Unit 3 – Evidence Recovery: Introduction to Deleted File Recovery, Formatted Partition Recovery, Data Recovery Tools, Data Recovery Procedures and Ethics, Complete time line analysis of computer files based on file creation, File modification and file access, Recover Internet Usage Data, Recover Swap Files/Temporary Files/Cache Files, Introduction to Encase Forensic Edition, Forensic Tool Kit (FTK), Use computer forensics software tools to cross validate findings in computer evidence.

Unit 4 – Investigation: Introduction to Cyber Forensic Investigation, Investigation Tools, Digital Evidence Collection, Evidence Preservation, E-Mail Investigation, E-Mail Tracking, IP Tracking, E-Mail Recovery, Encryption and Decryption methods, Search and Seizure of Computers, Recovering deleted evidences, Password Cracking.

Unit 5 – Cyber Crimes and Cyber Laws: Introduction to IT laws & Cyber Crimes, Internet, Hacking, Cracking, Viruses, Software Piracy, Intellectual property, Legal System of Information Technology, Understanding Cyber Crimes in context of Internet, Indian Penal Law & Cyber Crimes Fraud Hacking Mischief, International law, E-Commerce-Salient Features On-Line contracts Mail Box rule Privities of, Contracts Jurisdiction issues in E-Commerce Electronic Data Interchange, Security and Evidence in E-Commerce Dual Key encryption Digital signatures security issues.

References:

1. Marjee T. Britz, Computer Forensics and Cyber Crime: An Introduction, Pearson Education, 2013.

2. C. Altheide& H. Carvey Digital Forensics with Open Source Tools, Syngress, 2011. ISBN: 9781597495868.

Additional References:

1. Computer Forensics: Investigating Network Intrusions and Cybercrime" by Cameron H. Malin, Eoghan Casey, and James M. Aquilina

2. Online Course management System: https://esu.desire2learn.com/

3. Computer Forensics, Computer Crime Investigation by John R,Vacca, Firewall Media, New Delhi.

4. Computer Forensics and Investigations by Nelson, Phillips Enfinger, Steuart, CENGAGE Learning

5. Real Digital Forensics by Keith j.Jones, Richard Bejitlich,Curtis W.Rose ,AddisonWesley Pearson Education

Suggested Practicals

It is suggested that the following tools/e-resources can be explored during the practical sessions • Wireshark • COFEE Tool • Magnet RAM Capture • RAM Capture • NFI Defragger • Toolsley • Volatility

1. Study of Network Related Commands (Windows)
2. Study of Network related Commands(Linux)
3. Analysis of windows registry
4. Capture and analyze network packets using Wireshark. Analyze the packets captured.
5. Creating a Forensic image using FTK Imager/ Encase Imager: creating forensic image, check integrity of data, analyze forensic image
6. Using System internal tools for network tracking and process monitoring do the following:
    a. Monitor live processes
    b. Capture RAM
    c. Capture TCP/UDP packets
    d. Monitor Hard disk
    e. Monitor Virtual Memory
    f. Monitor Cache Memory

DSC20/DSC08/GE8a: INFORMATION SECURITY

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course
		Lecture	Tutorial	Practical/ Practice		