National Institute of Electronics & Information Technology Gorakhpur

(Under Ministry of Electronics and Information Technology, Govt. of India)
MMMUT Campus, Deoria Road, Gorakhpur-273010
http://www.nielit.gov.in/gorakhpur/

Cyber Security using Python

Cyber Security using Python

4 Weeks Online Course

4 Weeks / 60 Hrs. (3 Hrs. per day)
Batch Size: 20 (Limited Seats)
Medium of Instruction: Bilingual (English & Hindi)

Objective

This course is designed with the aim to gain the knowledge of Python Programming and its applications in cyber security. Students will gain hands-on experience in writing Python scripts to automate security tools, conduct ethical hacking tasks, and simulate cyber defence mechanisms.

Eligibility

Graduation*(in Any Stream), Diploma*, NIELIT O/ A Level* having basic knowledge of programming (*pursuing candidate may also apply)

Course Fees

Rs. 1800/- incl. GST & all other charges.

Prerequisite

- ✓ Candidate must have latest computer/laptop with at least 4 GB RAM.
- ✓ Internet connection with good speed (preferably 2 Mbps or higher)
- ✓ Candidate must have basic knowledge of Programming & Networks.

Certificate

Certificate will be provided to the participants, based on minimum 75% attendance and on performance (minimum 50% marks) in the online test, conducted by NIELIT Gorakhpur, at the end of the course.

How to Apply?

Step-1: Read the course structure & course requirements carefully.

Step-2: Visit the Registration portal and click on apply button.

Step-3: Create your login credentials and fill up all the details, see the preview and submit the form.

Step-4: Login with your credentials to verify the mobile number, email ID and then upload the documents, Lock the profile and Pay the Fees online, using ATM-Debit Card / Credit Card / Internet Banking / UPI etc.

Salient Features

- Instructor Led Online Training
- E-Learning Contents
- Hands on Lab
- Self-Assessment
- Real World Demo

Course Content

Day	Topic	Day	Topic	Day	Topic
Day #01	Cyber Security, Importance, Common Threats, CIA Triad, Ethical Hacking, Legal & Ethical Aspects	Day #02	Python in Cyber Security, Installing Python, VS Code Setup, Virtual Environment, Jupyter Notebook Installation	Day #03	First Python Script, Installing Cyber Security Libraries with pip
Day #04	Variables, Data Types, Input/Output, Conditions, Loops	Day #05	Functions, Exception Handling, Working with Modules, math, random, sys	Day #06	File Handling, Directory Traversal, OS Commands, Log Parsing, OS Libraries
Day #07	Basic Networking Concepts, IP Addressing, Subnetting & CIDR, Routing vs Switching, NAT, DHCP, DNS	Day #08	Networking Tools (ping, traceroute, etc.), Protocol Layers (TCP/IP model), ipaddress, socket, netifaces	Day #09	TCP and UDP Sockets, Server & Client Programs, IP Scanning, Simple Chat App
Day #10	Packet Structure & Sniffing, Real-time Capture, Parsing & Export, scapy tools	Day #11	Hashing & Encryption (MD5, SHA-256, AES, RSA), Password Security, cryptography libs	Day #12	HTTP Basics, Sending Requests, HTML Parsing, Form & Login Automation, requests, BeautifulSoup, selenium
Day #13	WHOIS Lookups, DNS Records, IP Geolocation, Subdomain Enumeration, whois, dnspython, ipwhois, shodan	Day #14	TCP Port Scanning, UDP Scan Basics, Banner Grabbing, Integration with Nmap, socket, nmap, masscan	Day #15	Dictionary Attacks, Login Form Automation, SSH/FTP Login Scripts, paramiko, ftplib, selenium
Day #16	Capturing Keystrokes, Saving Logs, Demo & Prevention Awareness, pynput, keyboard	Day #17	Monitoring Logs/Packets, Pattern Detection, Alert Mechanisms, scapy, os, re, time	Day #18	Secure Coding, Malware Analysis, Input Validation, XSS & SQLi Demos, flask, sqlite3
Day #19	Social Media OSINT, Tweet/Reddit Data, No-API Scraping, Sentiment & Hashtag Analysis, Visualization Tools	Day #20	Final Project Implementation, Debugging, Presentation and Demonstration		

COURSE COORDINATOR

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Course Details

S.No	Topic to be Covered
1	**Introduction to Cyber Security and Python** • What is Cyber Security • Importance of Cyber Security in the Digital Age • Common Threats in Cyber Security o Malware o Phishing o Ransomware o Denial-of-Service (DoS) o Man-in-the-Middle (MitM) • CIA Triad – Confidentiality, Integrity, Availability • Ethical Hacking Overview • Legal and Ethical Aspects • Role of Python in Cyber Security o Automation o Scripting for Attacks and Defense o Real-World Use Cases o Examples of Capabilities (e.g., file handling, system interaction, network scanning)
2	**Setting up Python Environment** • Installing Python (latest version recommended: Python 3.10+) • Installing and Customizing Visual Studio Code (VS Code) o Python Extension o Code Runner o Terminal access o Folder/project management o Git integration (for version control) • Installing Python via Windows Store / python.org • Creating Virtual Environment (using venv) • Installing Jupyter Notebook (via pip) • Writing and Running First Python Script • Installing Key Python Libraries Using pip • **Common libraries to install for Cyber Security:** - requests – Web interaction - beautifulsoup4 – Web scraping - scapy – Packet manipulation/sniffing - nmap / python-nmap – Network scanning - paramiko – SSH automation - pwntools – Exploit development - dnspython – DNS queries - flask – Web app (e.g., phishing simulation) - mitmproxy – Interception proxy for HTTP/HTTPS - cryptography – Hashing and encryption - argparse – Command-line interfaces

3	**Python Programming Essentials** • Variables, Data Types, Input/Output • Conditions, Loops, Functions • Exception Handling • Working with Modules • **Python Libraries:** math, random, sys
4	**File Handling and OS Interaction** • Reading/Writing Files • Directory Traversal • OS-level Commands Execution • Log File Parsing • **Python Libraries:** os, shutil, pathlib, subprocess
5	**Network Primer** • Basic Networking Concepts • IP Addressing (IPv4 vs IPv6) • Subnetting & CIDR • Routing vs Switching • NAT, DHCP, DNS • Networking Tools: - ping, traceroute, ipconfig, ifconfig, netstat, nslookup, dig • Understanding Protocol Layers (TCP/IP model) • **Python Libraries:** ipaddress, socket, subprocess, netifaces
6	**Networking with Python** • Sockets (TCP, UDP) • Server & Client Programs • IP Scanning **Python Libraries:** socket, ipaddress
7	**Packet Sniffing & Wireshark-like Implementation** • Understanding Packets (Ethernet, IP, TCP/UDP, HTTP) • Real-time Packet Capture • Packet Parsing • Displaying Headers like Wireshark • Exporting to .pcap or readable formats • **Python Libraries:** scapy, socket, dpkt (optional advanced parsing)
8	**Cryptography & Hashing** • Hashing (MD5, SHA-256) • Symmetric Encryption (AES) • Asymmetric Encryption (RSA) • Password Hashing & Salting • **Python Libraries:** hashlib, cryptography, pycryptodome, bcrypt
9	**Web Scraping & Automation** • HTTP Basics • Sending Requests • Parsing HTML • Auto-filling Forms / Login Automation • **Python Libraries:** requests, BeautifulSoup, selenium

10	**OSINT & Reconnaissance** • WHOIS Lookups • DNS Records • IP Geolocation • Subdomain Enumeration • **Python Libraries:** whois, dnspython, ipwhois, shodan (optional)
11	**Port Scanning & Vulnerability Detection** • TCP Port Scanning • UDP Scan Basics • Banner Grabbing • Integration with Nmap • **Python Libraries:** socket, nmap (with python-nmap), masscan (via subprocess)
12	**Brute Force & Credential Testing** • Dictionary Attacks • Login Form Automation • SSH/FTP Login Scripts • **Python Libraries:** paramiko (for SSH), ftplib, selenium
13	**Keylogging (Awareness Only)** • Capturing Keystrokes • Saving Logs • Demo & Prevention Awareness • **Python Libraries:** pynput, keyboard
14	**Intrusion Detection Basics** • Monitoring Logs/Packets • Pattern Detection (Rule-based) • Alert Mechanisms • **Python Libraries:** scapy, os, re, time
15	**Secure Coding & Malware Awareness** • Secure Input Handling • Avoiding Common Attacks • Static Malware Analysis • File Integrity Verification • **Python Libraries:** hashlib, os, re
16	**Web Application Security** • XSS and SQL Injection Demos • Securing Forms • Preventing Code Injection • **Python Libraries:** flask (for demo apps), html (escaping), sqlite3

17	**Social Media Analysis for OSINT** • Social Media in Cyber Threats • Collecting Tweets using tweepy • Reddit Data via praw • No-API Scraping using snscrape • Sentiment Analysis • Hashtag Alerting • Visualization • **Python Libraries:** tweepy, praw, snscrape, TextBlob, nltk, vaderSentiment, matplotlib, seaborn, wordcloud
18	**Project Development** • Planning & Designing • Testing & Documentation • Presentation Preparation **Project ideas:** • Packet Sniffer / Wireshark Clone • Port Scanner • Twitter T v hreat Monitor • IDS System • Simple Vulnerability Scanner