

Ethical Hacker Course. Module 1

Learning goals are to get acquainted with the basic concepts and practical approaches of information security and profession of cybersecurity specialist; to get a basic understanding of the Python, JavaScript and SQL languages and their applications in applied tasks of ethical hacking.

Course Syllabus:

Day one

Ethical hacking concept. Role of information security specialist

- Tasks of ethical hacking;
- Basic concepts of information security;
- Protection of personal and corporate information;
- Getting to know the role of an ethical hacker.

Learning outcome: studied the basic concepts of professions related to information security.

Practical task: discussion and consolidation of the rules of safe internet access.

Day two

Basic concepts of information security. Online threats, types of cyber attacks

- Introduction to data confidentiality, integrity, and accessibility concepts;
- Channels of information leakage.
- Classification of Internet threats and types of network attacks.
- Information security and cybersecurity.

Learning outcome: got acquainted with the basic properties of information, learned how to model information leakage channels and learned the main types of network attacks.

Practical task: cyber threats analysis and assigning them to the studied types.

Day three

How to provide information security?

- The concept of a cybersecurity incident;
- Rules for the protection of personal information.
- Practice: a game to consolidate theoretical knowledge.

Learning outcome: got acquainted with new concepts of ethical hacking, got acquainted with the process of responding to security incidents in information system monitoring systems.

Practical task: a business game aimed at consolidating the acquired theoretical knowledge.

Day four

Consolidating theoretical knowledge about cybersecurity

- Learning the rules of the game "Taking over the office of black hackers or the power of knowledge of white hackers."
- Round 1. Team up and take the office over.
- Round 2. Choose the best team of white hackers.

Learning outcome: consolidated the knowledge of module 1.

Practical task: consolidating the acquired knowledge in a team game.



Ethical Hacker Course. Module 2

Learning goals are to get acquainted with the basic concepts and practical approaches of information security and profession of cybersecurity specialist; to get a basic understanding of the Python, JavaScript and SQL languages and their applications in applied tasks of ethical hacking.

Course Syllabus:

Day one

Introduction to Python. Cryptography

- Authentication and encryption;
- Introduction to the concept of "Cryptography";
- Basics of the Python programming language;
- Practice: solving problems in Python.

Learning outcome: got acquainted with the cryptography concepts, created and saved our first program in Python.

Practical task: write your first program on Python.

Day two

Introduction to Python operators and various encryption methods

- Introduction to message encryption approaches;
- Practice encryption using the Caesar cipher;
- Arithmetic, logical, and comparison operators in Python;
- Practice: writing programs using operators.

Learning outcome: learned simple encryption methods, how to use operators in Python programs, and how to use message encryption algorithms.

Practical task: writing a program using operators, encrypting messages manually.

Day three

Introduction to Python's if/else constructs and sophisticated encryption methods

- More sophisticated message encryption methods;
- Multi-alphanumeric substitution and the Vigenère cipher;
- if/else and if/elif/else constructs in Python;
- Practice: programming in Python.

Learning outcome: wrote programs with conditions in Python, and learned how to use message encryption algorithms.

Practical task: writing a program with a conditional operators in Python.

Day four

Introduction to the for loop in Python. Writing an encoder/ decryptor program

- The for loop in Python and solving problems in Python;
- Learning the concepts of "strings" and "arrays" in Python;
- Writing a message encryption and decryption program.

Learning outcome: consolidated the practice of programming in Python, including using the for loop, lists and arrays, and wrote the encryptor/decryptor Python program.

Practical task: creating a Python program for encrypting messages using learned language constructs.

Ethical Hacker Course. Module 3

Learning goals are to get acquainted with the basic concepts and practical approaches of information security and profession of cybersecurity specialist; to get a basic understanding of the Python, JavaScript and SQL languages and their applications in applied tasks of ethical hacking.

Course Syllabus:

Day one

While loop and functions in Python

- The while loop in Python;
- Break and continue operators;
- Functions in Python;
- Problem solving practice.

Learning outcome: studied working with functions in Python and consolidated it with programming practice.

Practical task: solving problems in Python using the while loop and functions.

Day two

Encrypting a message using an image. Steganography

- Introduction to steganography;
- Ways to encrypt message using an image;
- Writing a message encryption/ decryption program using an image.

Learning outcome: studied while loop in Python, and improved our programming skills by creating a program for encrypting/ decrypting messages using images.

Practical task: creating an encoder/ decryptor program using steganography.

Day three

The basics of OOP. Classes in Python. Password Hashing

- Introduction to the OOP. Classes and objects in Python;
- Introduction to hashing, properties of cryptographic hash functions;
- Practice: writing a password hashing program.

Learning outcome: studied classes in Python, wrote a program for hashing passwords.

Practical task: writing a password hashing program using classes.

Day four

Working with files. Creating a database for storing passwords

- Basics of working with files in Python;
- File reading and writing modes in Python;
- Registration and authorization of the user.

Learning outcome: studied the principles of working with files in Python, wrote a program for storing and verifying logins and passwords.

Practical task: creating a program for storing and verifying usernames and passwords using the studied Python language features.



Ethical Hacker Course. Module 4

Learning goals are to get acquainted with the basic concepts and practical approaches of information security and profession of cybersecurity specialist; to get a basic understanding of the Python, JavaScript and SQL languages and their applications in applied tasks of ethical hacking.

Course Syllabus:

Day one

Network attacks. Creating a Dos Attack program

- Types of network cyber attacks;
- Learning how a denial-of-service network attack works;
- The study of DoS and DDoS attacks.

Learning outcome: studied, in theory and in practice, network DOS attacks.

Practical task: creating a program based on the denial-of-service attack principle.

Day two

HTML. Network attacks. Brute force

- Learning the HTML hyper text markup language;
- Creating a simple website using HTML;
- Studying the principles of the Brute force attack;
- Checking and eliminating vulnerabilities in the site code.

Learning outcome: deepened our knowledge of the HTML language, got acquainted with the Brute force attack.

Practical task: writing your first small website and identify vulnerabilities in the site code.

Day three

Cascading CSS tables. Brute force project

- Learning the basics of Cascading Style Sheets (CSS);
- Approaches to password guessing;
- Practice: writing a program for password attack using Brute force technique.

Learning outcome: studied the theory and practice of CSS, wrote a Brute force password guessing program.

Practical task: creating a Brute force program.

Day four

Writing a full-fledged website page. Phishing sites

- Introduction to phishing;
- Practice: how to determine phishing site?
- Practice: creating websites using the acquired knowledge;
- Phishing site creation.

Learning outcome: consolidated our knowledge, created a phishing site.

Practical task: writing your own phishing site.



Ethical Hacker Course. Module 5

Learning goals are to get acquainted with the basic concepts and practical approaches of information security and profession of cybersecurity specialist; to get a basic understanding of the Python, JavaScript and SQL languages and their applications in applied tasks of ethical hacking.

Course Syllabus:

Day one

NIST Cybersecurity Framework. Basics of the JavaScript programming language

- NIST Cybersecurity Framework and Small Business Cybersecurity Help;
- Introduction to JavaScript programming language;
- Input and output operators, arithmetic operators;
- Variables in JavaScript, the if and else operators;
- Solving problems in JavaScript programming language..

Learning outcome: learned the basics of the JS programming language, consolidated the skills of writing programs in JavaScript.

Practical task: solving practical problems in JavaScript.

Day two

Conditional constructions and loops in JavaScript

- If/else construction;
- Loops in JavaScript and how to work with them;
- While and for loops;
- Finite loops and infinite loops, break and continue operators;
- Solving problems in the JS programming language.

Learning outcome: studied the work of loops and learned how to program repetitive actions using loops.

Practical task: writing a small website using JS.

Day three

JavaScript Functions and events

- The principle of writing JavaScript functions;
- Writing programs using functions;
- The study of the "event" concept.

Learning outcome: studied the work with JavaScript functions, got acquainted with "event" concept, wrote a program using functions and event handlers.

Practical task: creating JS program using functions and event handlers.

Day four

Network vulnerabilities. XSS vulnerabilities

- What is a network attack? What is the difference from a cyberattack?
- Introduction to cross-site scripting;
- Writing a site with an XSS vulnerability;
- XSS vulnerability correction techniques.

Learning outcome: studied the concept of cross-site scripting, learned how to find and fix the XSS vulnerability.

Practical task: write a full-fledged working website with forms, eliminating XSS vulnerabilities.

Ethical Hacker Course. Module 6

Learning goals are to get acquainted with the basic concepts and practical approaches of information security and profession of cybersecurity specialist; to get a basic understanding of the Python, JavaScript and SQL languages and their applications in applied tasks of ethical hacking.

Course Syllabus:

Day one

Creating the first database

- Introduction to database concept;
- Learning the first SQL commands;
- Writing the first database.

Learning outcome: got acquainted with databases and create your first database using SQL language.

Practical task: creating your first database using SQL language.

Day two

Databases. Commands for working with the database

- Learning SQL language and DBMS MySQL;
- Learning commands for interacting with the database;
- Creation of a database of site users.

Learning outcome: learned how to change, delete, and add data to the database.

Practical task: creating a user database for further work.

Day three

Database interaction with the site. Sing up page

- Study of the basic methods of interaction with the database using Python programming language and Flask framework;
- Creating a sign up page and interface for the website.

Learning outcome: studied the basic techniques of interaction between the database and the site.

Practical task: writing sign up and authorization interface for the website.

Day four

Database interaction with the site. Finalizing the project. SQL injection

- User authentication;
- Introduction to SQL injection concept;
- Study of methods of protection against SQL injections;
- Practice: learning and refactoring code to protect against SQL injections.

Learning outcome: studied the principle of SQL injection and got acquainted with the methods of dealing with vulnerabilities of this type.

Practical task: refactoring the code to protect against SQL injections.

Ethical Hacker Course. Module 7

Learning goals are to get acquainted with the basic concepts and practical approaches of information security and profession of cybersecurity specialist; to get a basic understanding of the Python, JavaScript and SQL languages and their applications in applied tasks of ethical hacking.

Course Syllabus:

Day one

Windows operating system. Basic commands

- Introduction to Windows OS;
- Learning how to work with cmd (command line);
- Writing the first scripts.

Learning outcome: learned how Windows operating system works.

Practical task: creating the first script using command line.

Day two

Windows operating system. System administration

- Familiarization with more complex scripts;
- Study of the AAA principle (Authentication, Authorization, Audit);
- Getting to know Windows logs.

Learning outcome: we studied the principle of computer protection using administration systems.

Practical task: create your own script and fix the rules for working with Windows logs.

Day three

Linux operating system. Basic commands

- Introduction to Linux OS;
- Learning the basic commands;
- Writing the first bash scripts;
- Creating your first virtual machine.

Learning outcome: we studied the operating principle of the Linux OS.

Practical task: writing your first bash script.

Day four

Linux operating system. System administration

- Familiarization with more complex bash script designs;
- Differences between Windows and Linux OS;
- Linux OS administration.

Learning outcome: we learned the principles of Linux OS administration, we learned the differences between Linux OS and Windows OS.

Practical task: create your own bash script to protect your Linux computer.

Ethical Hacker Course. Module 8

Learning goals are to get acquainted with the basic concepts and practical approaches of information security and profession of cybersecurity specialist; to get a basic understanding of the Python, JavaScript and SQL languages and their applications in applied tasks of ethical hacking.

Course Syllabus:

Day one

Introduction to the OSI model. Electrical diagram

- Internet connection, OSI network model;
- Physical layer, principles of building an electrical circuit;
- Familiarization with the elements AND, OR, XOR;
- Concepts of "Electricity", "Voltage";
- Building your first electrical circuit on the simulator;
- Familiarization with more complex elements of the electrical circuit.

Learning outcome: we studied the principles of building electrical circuits.

Practical task: building your own electrical circuit.

Day two

Channel layer. Data transmission and routing

- Learn how the channel layer works;
- Concepts of "MAC address", "Protocol", "Port";
- Building your first computer network.

Learning outcome: we learned how the Channel Layer of the OSI model works.

Practical task: building a model of the first computer network using switches.

Day three

Network layer. Security methods. ACLs Lists

- Learn how the network layer works;
- Concepts of "IP address", "Router";
- Study of protection methods at the network level;
- Study of the principle of ACLs operation;
- Using ACL lists to create a local network of allowed data transfer addresses.

Learning outcome: we learned how to work with network security methods.

Practical task: creating your own network with routers and ACLs lists.

Day four

Network layer. Security methods. VPN

- Subnet mask operation, network address detection;
- Learning how VPN works;
- Building a network with VPN technology.

Learning outcome: we studied the work of the network layer, learned how to identify the addressee on the network.

Practical task: building a computer network using VPN technology.



Ethical Hacker Course. Module 9

Learning goals are to get acquainted with the basic concepts and practical approaches of information security and profession of cybersecurity specialist; to get a basic understanding of the Python, JavaScript and SQL languages and their applications in applied tasks of ethical hacking.

Course Syllabus:

Day one

Transport layer: Basics of data transmission

- The transport layer of the OSI model and its functions;
- Familiarization with TCP, UDP, SCTP, SSL/TLS protocols;
- The beginning of creating a simple client-server application that sends a message to the server and receives a response.

Learning outcome: studied the principles of operation of the transport layer OSI model.

Practical task: we have created a simple client-server application with sending requests and responses.

Day two

Session Level: communication Management

- Session layer and its role in communication management;
- The concept of sessions, their creation and termination;
- Implement session management functions in a client-server application.

Learning outcome: got acquainted with the operating principle of the session layer of the OSI model.

Practical task: we have added a client-server application with the creation of sessions.

Day three

Application Layer: Protocols and interactions

- The OSI application layer and its protocols (HTTP, FTP, SMTP, etc.).
- Explain how applications interact through the application layer.
- Implementation of the basic logic of the data exchange application.

Learning outcome: studied the principle of operation of the application layer of the OSI model.

Practical task: adding functions for processing requests from the client on the server to our program.

Day four

Data representation: Encoding and decoding

- Representation of data at the OSI level, including encoding and decoding of information;
- Consider data formats (JSON, XML) and their use in applications;
- Implementation of encoding and decoding functions in a client-server application;
- Presentation of course projects. Prospects for development and training in the field of information technology and information security.

Learning outcome: got acquainted with the principle of operation of the OSI model representation layer.

Practical task: completing work on the Client-Server Application project.