# Computer Engineering
## (Academic Year :2023-2024)

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|---|---|
| **Course Code: HCSC501** | |
| **Course Name: Ethical Hacking** | |
| **Course Teacher: Dr. B. S. Daga** | |
| **Course Outcomes (CO):** *At the End of the course students will be able to* | |
| HCSC501.1 | Demonstrate comprehension of foundational concepts in Computer Networks, IP Routing, and ethical hacking in real-world scenarios. (Understanding) |
| HCSC501.2 | Apply acquired knowledge of information gathering techniques to execute penetration testing and social engineering attacks. (Applying) |
| HCSC501.3 | Evaluate core principles of Cryptography, cryptographic checksums, and diverse biometric authentication mechanisms. (Evaluating) |
| HCSC501.4 | Utilize network reconnaissance expertise to perform attacks on networks and web applications. (Applying) |
| HCSC501.5 | Implement hardware elements and endpoint security concepts to ensure the protection of physical devices. (Applying) |
| HCSC501.6 | Analyze and assess outcomes from simulated attack scenarios. (Evaluating) |

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**Fr. Agnel Ashram, Bandstand, Bandra (W), Mumbai - 400 050.**

Phone : (022) 6711 4000, 6711 4101, 6711 4104

Website : www.frcrce.ac.in • Email : crce@fragnel.edu.in

# Course Lesson Plan

| Sr. No. | Proposed Date | Actual Date | Topics | CO | Teacher's Remark | HoD's Remark |
|---|---|---|---|---|---|---|
| **Module 1:** | **Introduction to Ethical Hacking** | | | | | |
| 1 | 11-07-23 | | Fundamentals of Computer Networks/IP protocol stack | CO1 | | |
| 2 | 11-07-23 | | Fundamentals of Computer Networks/IP protocol stack | CO1 | | |
| 3 | 12-07-23 | | IPaddressing and routing, Routing protocol | CO1 | | |
| 4 | 13-07-23 | | IPaddressing and routing, Routing protocol | CO1 | | |
| 5 | 17-07-23 | | Protocol vulnerabilities, | CO1 | | |
| 6 | 18-07-23 | | Steps of ethical hacking | CO1 | | |
| 7 | 19-07-23 | | Steps of ethical hacking | CO1 | | |
| 8 | 20-07-23 | | Demonstration ofRouting Protocols using Cisco Packet Tracer | CO1 | | |
| 9 | 24-07-23 | | Demonstration ofRouting Protocols using Cisco Packet Tracer | CO1 | | |
| 10 | 25-07-23 | | Demonstration ofRouting Protocols using Cisco Packet Tracer | CO1 | Assignment 1 | |
| **Module 2: Introduction to Cryptography** | | | | | | |
| 11 | 28-07-23 | | Private-key encryption, public key-encryption, | CO3 | | |
| 12 | 28-07-23 | | Private-key encryption, public key-encryption, | CO3 | | |
| 13 | 31-07-23 | | key Exchange Protocols, | CO3 | Quiz 1 on Modules 1-2 | |
| 14 | 01-08-23 | | Cryptographic Hash Functions & applications, | CO3 | | |
| 15 | 04-08-23 | | steganography, biometric authentication | CO3 | | |
| 16 | 04-08-23 | | lightweight cryptographic algorithms | CO3 | | |
| 17 | 07-08-23 | | Demonstration of various cryptographic tools and hashing algorithms | CO3 | | |
| 18 | 08-08-23 | | Demonstration of various cryptographic tools and hashing algorithms | CO3 | | |
| **Module 3: Introduction to network security** | | | | | | |

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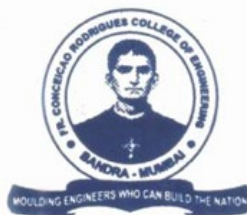**FR. CONCEICAO RODRIGUES COLLEGE OF ENGINEERING**

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| 19 | 11-08-23 | | Information gathering | CO2 | | |
|----|----------|--|----------------------|-----|--|--|
| 20 | 14-08-23 | | reconnaissance, scanning | CO2 | | |
| | 15-08-23 | | **Independence Day** | | | |
| | 16-08-23 | | **Parsi New Year** | | | |
| 21 | 18-08-23 | | vulnerability assessment | CO2 | Quiz 2 on Modules 3-4 | |
| 22 | 18-08-23 | | vulnerability assessment | CO2 | | |
| 23 | 21-08-23 | | Open VAS, Nessus | CO2 | | |
| 24 | 22-08-23 | | Open VAS, Nessus | CO2 | | |
| 25 | 25-08-23 | | Systemhacking: Password cracking, penetration testing, | CO2 | | |
| 26 | 25-08-23 | | , Social engineering attacks, Malware threats, | CO2 | | |
| 27 | 28-08-23 | | hacking wirelessnetworks (WEP, WPA, WPA- 2), Proxy network, | CO2 | | |
| 28 | 29-08-23 | | Proxy network, VPN security, | CO2 | | |
| | 29-08-23 to 31-08-23 | | **Unit Test-1** | | | |
| 29 | 01-09-23 | | Study of various tools for Network Security such as Wireshark, John the Ripper, Metasploit, etc. | CO2 | | |
| 30 | 01-09-23 | | Study of various tools for Network Security such as Wireshark, John the Ripper, Metasploit, etc. | CO2 | | |

*Module 4: Introduction to web security and Attacks*

| 31 | 04-09-23 | | OWASP, Web Security Considerations, | CO4 | | |
|----|----------|--|----------------------|-----|--|--|
| 32 | 05-09-23 | | User Authentication, Cookies, SSL, HTTPS, Privacy on Web, | CO4 | | |
| 33 | 08-09-23 | | Account Harvesting, Web Bugs, Sniffing, | CO4 | Quiz 3 on Modules 5-6 | |
| 34 | 08-09-23 | | ARP poisoning, Denial of service attacks, | CO4 | | |
| 35 | 11-09-23 | | Hacking Web Applications, Clickjacking, Cross-Site scripting and Request Forgery, Session | CO4 | | |
| 36 | 12-09-23 | | Hijacking and Management, Phishing andPharming Techniques, SSO, | CO4 | | |
| 37 | 15-09-23 | | Vulnerability assessments, SQLinjection, Web Service Security, OAuth 2.0, | CO4 | | |
| 38 | 15-09-23 | | Demonstration of hacking tools on Kali Linux such as SQLMap, HTTrack, hping, burp suite, Wireshark etc. | CO4 | | |

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*Module 5: Elements of Hardware Security*

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|---|---|---|---|---|---|---|
| 39 | 18-09-23 | | Side channel attacks, | CO5 | | |
| | 19-09-23 to 22-09-23 | | Shri Ganesh Festival | | | |
| 40 | 25-09-23 | | physical unclonable functions | CO5 | | |
| | 28-09-23 | | Anant Chaturdashi | | | |
| 41 | 03-10-23 | | Firewalls, Backdoors and trapdoors | CO5 | | |
| 42 | 06-10-23 | | Firewalls, Backdoors and trapdoors | CO5 | | |
| 43 | 06-10-23 | | Demonstration of SideChannel Attacks on RSA, IDS and Honeypots | CO5 | | |
| 44 | 09-10-23 | | Demonstration of SideChannel Attacks on RSA, IDS and Honeypots | CO5 | | |
| | 09-10-23 to 13-10-23 | | Unit Test-2 | | | |
| 45 | 10-10-23 | | Demonstration of SideChannel Attacks on RSA, IDS and Honeypots | CO5 | | |

*Module 6: Case Studies*

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|---|---|---|---|---|---|---|
| 46 | 13-10-23 | | Various attacks scenarios and their remedies. | CO6 | | |
| 47 | 13-10-23 | | Various attacks scenarios and their remedies. | CO6 | | |
| 48 | 16-10-23 | | Demonstration of attacks using DVWA. | CO6 | | |
| 49 | 17-10-23 | | Demonstration of attacks using DVWA. | CO6 | | |
| 50 | 17-10-23 | | Remedial Session | | | |
| | | | **University ESE Examination** | | | |

**Text books:**
1. Computer Security Principles and Practice --William Stallings, Seventh Edition, Pearson Education, 2017
2. Security in Computing -- Charles P. Pfleeger, Fifth Edition, Pearson Education, 2015
3. Network Security and Cryptography -- Bernard Menezes, Cengage Learning, 2014
4. Network Security Bible -- Eric Cole, Second Edition, Wiley, 2011
5. Mark Stamp's Information Security: Principles and Practice --Deven Shah, Wiley, 2009

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**Reference Books:**

1. UNIX Network Programming –Richard Steven, Addison Wesley, 2003
2. Cryptography and Network Security -- Atul Kahate, 3rd edition, Tata Mc Graw Hill, 2013
3. TCP/IP Protocol Suite -- B. A. Forouzan, 4th Edition, Tata Mc Graw Hill, 2017
4. Applied Cryptography, Protocols Algorithms and Source Code in C -- Bruce Schneier, 2nd Edition / 20th Anniversary Edition, Wiley, 2015

**Online Resources:**

1. https://www.owasp.org/index.php/Category:OWASP_Top_Ten_Project
2. https://dvwa.co.uk/
3. http://testphp.vulnweb.com/

**Course Instructor: Dr. B. S. Daga**