BCA(System Administration and Cyber Security)

Semester-IV

L-3 T-0 P-0 C-3

25SACS120T: Cyber Crime & Law

Course Objectives

- To introduce the cyber world and cyber law in general.
- To explain the various facets of cyber crimes.
- To enhance the understanding of problems arising out of online transactions and provoke them to find solutions.
- To clarify the Intellectual Property issues in cyberspace and the growth and development of the law in this regard.
- To educate about the regulation of cyber space at national and international levels.

Course Outcomes

1. Understand the architecture of cyberspace, intervention strategies, and legal perspectives on cybercrimes.
2. Comprehend global and Indian regulatory frameworks, including the implications of the Indian IT Act and its amendments.
3. Examine various cybercrimes targeting computer systems.
4. Critically assess regulatory frameworks' effectiveness in addressing cyber threats.
5. Evaluate the impact of cybercrimes on individuals and nations.

Articulation Matrix:-

(Program Articulation Matrix is formed by the strength of the correlation of COs with POs and PSOs. The strength of correlation is indicated as 3 for substantial (high), 2 for moderate (medium) correlation, and 1 for slight (low) correlation)

CO/PO/PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	2	3	1	-	-	-	-	-	-	-	-	-
CO2	-	2	3	1	-	-	-	-	2	-	-	-
CO3	-	1	2	3	-	-	1	-	-	-	-	-
CO4	-	1	2	-	3	-	-	-	-	-	2	1
CO5	-	1	-	2	-	3	-	-	-	-	1	2

High-3 Medium-2 Low-1

Unit I: Introduction-Cyber Security 09 Hours

Introduction-Cyber Security, Issues and Challenges of Cyber Security, Architecture of Cyberspace, Intervention Strategies: Redundancy, Diversity and Autarchy, Cyberspace: Definition, Overview of Communication and Web Technology, Internet, World Wide Web, Advent of Internet, Nature of Internet, Internet Infrastructure for Data Transfer, Internet and

Society, Need of cyber law, Regulation of Cyberspace, Key Regulatory issues in India, Regulation via Software, Regulation via Hardware, Application of Common Law Principles for Internet Regulation, Private Regulation, Human Rights in Cyberspace, Freedom of Expression, Privacy, Anonymity, Harassment and defamation, Economic Rights, IPR, Jurisdiction, Protecting Human Dignity in the Digital Age, Commercialization of the Internet.

Unit II: Legal Perspectives of Cybercrimes and Cyber security 09 Hours

Legal Perspectives of Cybercrimes and Cyber security, Origin and state of cybercrime, Cybercrime and the Legal Landscape around the World, Need Cyber laws, The Indian IT Act and its Amendments, Challenges to Indian Law and Cybercrime Scenario in India, Consequences of IT Act, Weakness in Information Technology Act, Digital Signatures and the Indian IT Act, Cybercrime and Punishment, Data Privacy, Data Security, Big Data Security: issues and challenges, General Data Protection Regulations (GDPR), Personal Data Protection Bill and its Compliance, Data Protection Principles, Data Protection Officer, Incident Management and Business Continuity, Contract Act, Trademark Act, Copyright, Patents.

Unit III:Cybercrime Targeting Computer Systems 09 Hours

Cybercrime Targeting Computer Systems – Data Diddling, Attacks, Spy Ware, Logic Bombs, Email Scam and Phishing, Theft, Obscene Content, Cyber bullying, Cyber grooming, Online job fraud, Online sextortion, Vishing, Sexting, Smshing, Sim Swap scam, Debit/Credit card fraud, Impersonation and identity theft, Data breach, Denial of services /distributed dos, Website defacement, Cyber-squatting, Pharming, Cryptojacking (crypto Currency), Online Drug Trafficking, Espionage Act, Cyber Law in perspective Advanced Technology: IOT, AI, Machine Learning, BlockChain and Social Media & Social Defamation

Unit IV 9 Hours

Law for DarkNet,Cybercrime Against Persons- Child Pornography/ Child Sexually Abusive Material (CSAM), Cyber Stalking and Its Type, Phishing and Its Type, Ethics And Its Important, Legal Developments, Cyber Security In Society, Online Cyber Crime Reporting,

Unit V:Law for DarkNet,Cybercrime Against Persons 09 Hours

Cybercrime Targeting Countries – Cyber Terrorism, International Response to Cybercrime, Digital Evidence and Computer Forensics, Regulation and Jurisdiction for global Cyber security, Copy Right- Source of Risks, Pirates, Internet Infringement, Fair Use, Postings, Criminal Liability, Malware Analysis: -Spamming, SMSware, Malware, Adware, Ransomware, Virus, Worms & Trojans.

Total Hours: 45

Reference Books:

1. Kumar K -Cyber Laws: Intellectual Property & E Commerce, Security, Dominant Publisher
2. Information Security Policy & Implementation Issues, NIIT, PHI

3. Marine R.C.- Cyber Crime Impact in the New Millennium, Author Press

List of e-Learning Resources:

1. https://nptel.ac.in/
2. https://www.coursera.org/

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B. C. A. (Cloud Computing)
Semester-IV

L-3 T-0 P-0 C-3

25SACS130T: Principles of Virtualization

Course Objectives:

- To know about various virtualization technologies, including server, storage, I/O, network, client, application, and desktop virtualization.
- To learn about installing and setting up Windows Virtual PC on different platforms.
- To learn about installing and configuring the server's RD Session Host Role Service.
- To learn about Configuring Remote Desktop Web Access and role-based application provisioning.
- To Learn about the HYPER-V role and create virtual machines.

Course Outcomes:

1. Understand various constraints and challenges in setting up a data center.
2. Apply the Enterprise-level virtualization and access control in virtual machines.
3. Analyze Resource monitoring and execute backup and recovery of virtual machines.
4. Evaluate desktop Web Access and configuring client settings.
5. Create a list of virtualization Software available and monitor.

Articulation Matrix:-

(Program Articulation Matrix is formed by the strength of the correlation of COs with POs and PSOs. The strength of correlation is indicated as 3 for substantial (high), 2 for moderate (medium) correlation, and 1 for slight (low) correlation)

CO/PO /PSO	PO-BCA-01	PO-BCA-02	PO-BCA-03	PO-BCA-04	PO-BCA-05	PO-BCA-06	PO-BCA-07	PO-BCA-08	PO-BCA-09	PO-BCA-10	PSO-1	PSO-2
CO-1	2	3	-	-	-	-	-	-	-	-	-	-
CO-2	-	1	3	-	-	-	-	-	-	-	-	-
CO-3	-	1	3	3	-	1	-	-	-	-	-	-
CO-4	-	-	-	3	-	-	-	-	-	-	-	-
CO-5	-	-	-	-	3	-	-	-	-	-	-	-

High-3 Medium-2 Low-1

Unit-1: Exploring Virtualization Technologies **09 Hours**

Understanding Virtualization, Need of Virtualization and Virtualization Technologies: Server Virtualization, Storage Virtualization, I/O Virtualization, Network Virtualization, Client Virtualization, Application virtualization, Desktop virtualization, Understanding Virtualization Uses: Studying Server Consolidation, Development and Test Environments, Helping with Disaster Recovery.

Unit-II: Hardware Virtualization and Windows Installation **09 Hours**

Configure the BIOS to support hardware virtualization; Install and configure Windows Virtual PC: installing Windows Virtual PC on various platforms (32-bit, 64-bit), creating and managing virtual hard disks, configuring virtual machine resources including network resources, preparing host machines; create, deploy, and maintain images.

Unit-III: Remote App Deployment Management **09 Hours**

Prepare and manage remote applications: configure application sharing, package applications for deployment by using RemoteApp, installing and configuring the RD Session Host Role Service on the server.

Unit-IV: Application Access and Configuration **09 Hours**

Access published applications: configuring Remote Desktop Web Access, configuring role based application provisioning, configuring Remote Desktop client connections. Configure client settings to access virtualized desktops: Configure client settings.

Unit-V: Exploring Virtualization Software Options **09 Hours**

List of virtualization Software available. Vmware- introduction to Vsphere, ESXi, CenterServer, and Vsphere client. Creating Virtual Machine. Introduction to HYPER-V role. Create Virtual Machines. Create Hyper-v virtual networking, Use Virtual Machine Snapshots. Monitor the performance of a Hyper-v server, Citrix XenDesktop fundamentals

Total Hours: 45

Reference Books:

1. Virtualization with Microsoft Virtual Server 2005 by TwanGrotenhuis, RogierDittner, Aaron Tiensivu, Ken Majors, Geoffrey Green, David Rule, Andy Jones, Matthijs ten Seldam, Syngress Publications, 2006
2. Virtualization--the complete cornerstone guide to virtualization best practices, Ivanka Menken, Gerard Blokdijk, Lightning Source Incorporated, 2008
3. Virtualization: From the Desktop to the Enterprise, Chris Wolf, Erick M. Halter, EBook, 2005

List of e-Learning Resources:

1. https://www.classcentral.com/subject/virtualization
2. https://www.classcentral.com/subject/virtualization
3. https://www.slideshare.net/rubalsagwal/principles-of-virtualization-introduction-to-virtualization-software
4. https://www.udemy.com/

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Semester-IV

L-3 T-1 P-0 C-4

25SACS140T: Introduction to Python

Course Objectives

- To learn about the Basics of Python programming.
- To know about Decision Making and Functions in Python.
- To learn about Object Oriented Programming using Python.
- To know about file handling in Python.
- To learn about GUI Programming and database operations in Python.

Course Outcomes

1. Understand the concepts of numbers, math functions, strings, lists, tuples, and dictionaries in Python.
2. Utilize list operations and set operations to manipulate data in Python.
3. Analyze the design and implementation of Python classes and objects in Object-Oriented Programming.
4. Assess the reliability and performance of file-handling operations in Python scripts.
5. Create interactive GUI-based applications with database connectivity using Python frameworks to address specific user needs.

Articulation Matrix:-

(Program Articulation Matrix is formed by the strength of the correlation of COs with POs and PSOs. The strength of correlation is indicated as 3 for substantial (high), 2 for moderate (medium) correlation, and 1 for slight (low) correlation)

CO/PO/PSO	PO1	PO2	PO3	PO4	PO5	PO 6	PO 7	PO 8	PO 9	PO10	PSO1	PSO2
CO1	-	1	-	-	2	-	3	-	2	-	-	-
CO2	2	-	-	-	1	-	-	-	-	2	-	-
CO3	-	-	1	2	-	3	-	-	-	-	-	-
CO4	-	1	-	2	-	-	-	2	-	-	-	-
CO5	-	-	-	-	-	-	-	-	3	-	-	-

High-3 Medium-2 Low-1

Unit I 12 Hours

Introduction: Origin, Comparison, Comments, Operators, Variables and Assignment. Numbers, Strings, Lists, and Tuples. Dictionaries, if Statement, while Loop, for Loop and the range(), String and regular expressions. Module: Importing Module, Math Module, The sys Module, Random Module, and Package.

Unit II **12 Hours**

Functions: Defining a function, calling a function, Types of functions, Function Arguments, Anonymous functions, Built-in functions. Lists and Tuple: Introduction to List and Tuple, Accessing List and Tuple, Operations, working with List and Tuple Function and Methods. Dictionaries: Working with dictionaries, properties, and functions.

Unit III **12 Hours**

Object-Oriented Programming and classes in Python - creating classes, instance objects, accessing members. Data hiding (the double underscore prefix), Built-in class attributes, Garbage collection: the constructor, Overloading methods and operators, Inheritance- implementing a subclass, overriding methods. Exceptions: try Statement, Exception Propagation, Except Clause, Try Finally Clause, User Defined Exception, The raise statement.

Unit IV **12 Hours**

Creating files, Operations on files (open, close, read, write), File object attributes, file positions, Listing Files in a Directory, Testing File Types, Removing Files and Directories, Copying and Renaming Files, Splitting Path names, Creating and Moving to Directories, Traversing Directory Trees. Illustrative programs: word count, copy file.

Unit V **12 Hours**

Tkinter module: widgets and basics, Component layout options, Button, Label, Entry, Listbox, Radio button, Check button, Scrollbar, Container Widgets: Frame. Event handling: Keyboard events, Mouse events. Introduction to MySQL, PYMYSQL Connections using connect, cursor, execute & close functions, reading single & multiple results of query execution, executing different types of statements, and understanding exceptions in database connectivity.

Total Hours:60

Reference Books:

1. Python Essential by David M. Beazly.
2. Python Pocket by Mark Lutz.
3. Barry, Paul, Head First Python, 2nd Edition.
4. Python: The Complete Reference.

List of e-Learning Resources:

1. https://www.coursera.org/learn/python-programming-intro
2. https://www.codecademy.com/catalog/language/python
3. https://learn.microsoft.com/en-us/training/modules/intro-to-python/
4. https://developers.google.com/edu/python
5. https://www.python.org/about/gettingstarted/

6. https://ocw.mit.edu/courses/6-0001-introduction-to-computer-science-and-programming-in-python-fall-2016/

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Semester-IV

L-3 T-1 P-0 C-4

25SACS150T: Web App Pentesting

Course Objectives

- To learn system architecture, network configurations, and security protocols.
- To manage firewalls and intrusion detection systems for system protection.
- To master system administration tasks, including user management and software installation.
- To identify vulnerabilities, assess risks, and devise mitigation strategies.
- To detect, analyze, and resolve security incidents promptly to uphold system integrity.

Course Outcomes

1. Understand system architecture, network configurations, and security protocols.
2. Apply management techniques to operate firewalls and intrusion detection systems effectively for system protection.
3. Implement system administration tasks proficiently, including user management and software installation.
4. Analyze system vulnerabilities, assess associated risks, and develop effective mitigation strategies.
5. Evaluate and respond to security incidents promptly, utilizing detection, analysis, and resolution techniques to maintain system integrity.

Articulation Matrix

(Program Articulation Matrix is formed by the strength of the correlation of COs with POs and PSOs. The strength of correlation is indicated as 3 for substantial (high), 2 for moderate (medium) correlation, and 1 for slight (low) correlation)

CO/PO/PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	2	3	1	-	-	-	-	-	-	-	-	-
CO2	-	2	3	1	-	-	-	-	2	-	-	-
CO3	-	1	2	3	-	-	1	-	-	-	-	-
CO4	-	1	2	-	3	-	-	-	-	-	2	1
CO5	-	1	-	2	-	3	-	-	-	-	1	2

High-3 Medium-2 Low-1

UNIT I: Introduction to Web Applications: 12 Hours

HTTP/S Protocol Basics, HTTP Request HTTP Response, HTTP, Header Field Definitions, HTTPS, Charset, ASCII, Unicode, Charset vs. Charset Encoding, Unicode Encoding, HTML Encoding HTML Entries, URL Encoding (percent-encoding), Base64, Same Origin: Origin definition, what does SOP protect from? How SOP works, Exceptions, Windows. location, Document. domain, Cross window messaging, Cross-Origin Resource Sharing, **Cookies:** Cookies Domain, specified cookie domain, Unspecified cookie domain, Internet Explorer

Exception, Inspecting the Cookie Protocol, Login, Set-Cookie, Cookie, Cookie Installation, Correct cookie installation, Incorrect cookie installation, **Sessions:** Web Application Proxies, Burp Suite, OWASP ZAP

UNIT II: Information Gathering: **12 Hours**

Gathering information on your target,Finding owner, IP, and emails, Whois: Command line, Web-based tool, DNS, Nslookup, Find target ISP, Netcraft, Infrastructure, Fingerprinting the web server, Netcat, What Web, Wappalyzer, Web server modules, Enumerating sub domains, Net craft, Google, Sub brute, Dnsrecon, The Harvester, Zone transfer, Finding virtual hosts, Fingerprinting frameworks and applications, Third party add-ons, Mapping results, Fingerprinting custom applications, Burp target crawler, Creating a functional graph, Mapping the attack surface, Client side validation, Database interaction, Ile uploading and downloading, Display of user-supplied data, Redirections, Access control and login-protected pages, Error messages, Charting, Enumerating resources, Crawling the website, Finding hidden files, Back up and source code, Enumerating users accounts, Map, Relevant information through misconfigurations, Directory listing, Log and configuration files, HTTP verbs and file upload, Google hacking, Search operators, Shodan HQ

UNIT III: Cross-Site Scripting **12 Hours**

Cross-Site Scripting, Basics, Anatomy of an XSS Exploitation, the three types of XSS, Reflected XSS, Persistent XSS,DOM-based XSS, Finding XSS, Finding XSS in PHP code, XSS Exploitation, XSS and Browsers, XSS Attacks, Cookie Stealing through XSS, Defacement, XSS for advanced phishing attacks, BeEF, Mitigation, Input Validation, Context-Aware output encoding, never trust user input

UNIT IV: Penetration Testing **12 Hours**

Principles and concepts, PT work flows and examples, blind tests, ethical hacking techniques, synthetic transactions, interface testing and fuzzing, SDLC phases and security mandates

UNIT V: Authentication and Authorization **12 Hours**

Introduction, Authentication vs. Authorization, Authentication factors, Single-factor authentication, Two-factor authentication, Common Vulnerabilities, Credentials over unencrypted channel, Inadequate password policy, Dictionary attacks, Brute force attacks, Defending from inadequate password policy Strong password policy, Storing hashes Lockout/Blocking requests, User enumeration, Via error messages, Via website behavior, Via timing attacks, Taking advantage of user enumeration, Default or easily-guessable user accounts, The remember me functionality, Cache browser method, Cookie method, Web storage method, Best defensive techniques

Total: 60 Hours

Book Reference(s)

1. The Web Application Hacker's Handbook: Finding and Exploiting Security Flaws 2nd Edition by DafyddStuttard.
2. Penetration Testing: A Hands-On Introduction to Hacking 1st Edition by Georgia Weidman
3. Practical Web Penetration Testing by Gus Khawaja, O'Reilly publications

List of e-Learning Resources:

1.https://www.techtarget.com/searchsecurity/definition/cybersecurity

2.https://www.cisco.com/c/en_in/products/security/what-is-cybersecurity.html

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BCA (System Administration and Cyber Security)

Semester-IV

L-0 T-0 P-4 C-2

25SACS140P - Introduction to Python

Course Objectives

- To gain practical experience with Python programming concepts.
- To develop skills in writing Python scripts and programs.
- To understand the implementation of Python modules and functions.
- To gain hands-on experience with Object-Oriented Programming in Python.
- To learn GUI development and database operations in Python.

Course Outcomes

1. Apply basic Python programming concepts to solve problems.
2. Use Python functions and modules to write efficient code.
3. Implement Object-Oriented Programming concepts in Python.
4. Perform file operations and handle exceptions in Python programs.
5. Develop GUI applications and perform database operations using Python.

Articulation Matrix:-

(Program Articulation Matrix is formed by the strength of the correlation of COs with POs and PSOs. The strength of correlation is indicated as 3 for substantial (high), 2 for moderate (medium) correlation, and 1 for slight (low) correlation)

CO/PO/PSO	PO1	PO2	PO3	PO4	PO5	PO 6	PO 7	PO 8	PO 9	PO10	PSO1	PSO2
CO1	3	2	-	-	-	1	-	-	-	-	-	-
CO2	2	-	3	-	1	-	-	-	-	-	-	-
CO3	-	2	-	3	-	-	1	-	-	-	-	-
CO4	-	-	-	-	3	-	-	1	-	-	2	-
CO5	-	-	-	-	-	-	-	-	3	-	-	-

High-3 Medium-2 Low-1

Units:

Unit I: Basics of Python Programming **12 hours**

Introduction to Python, Dictionaries, Prime Number Check, List Methods, Tuple Methods

Unit II: Functions and Modules **12 hours**

Module Importing, User Defined Functions, Anonymous Functions

Unit III: Object-Oriented Programming **12 hours**

Classes and Objects, Inheritance, Method Overriding, Double Underscore Methods, Exception Handling, User-Defined Exception

Unit IV: File Handling **12 hours**

File Operations, Word count

Unit V: GUI and Database **12 hours**

GUI with Tkinter, Registration Form, Database Operations

Total Hours:60

List of Experiments

1. Write a program to convert temperature from Fahrenheit to Celsius depending upon user choice.
2. Write a program to use dictionary and its functions in Python.
3. Write a program to check whether given no is prime or not.
4. Write a program to implement list and use its methods.
5. Write a program to implement tuple and use its methods.
6. Write a program to import module and use it.
7. Write a user defined function to implement factorial of a given no.
8. Write a program to show the use of anonymous functions.
9. Write a program to calculate area of rectangle and circle using class.
10. Write a program to implement single level inheritance.

11. Write a program to overriding method.
12. Write a program to implement double underscore methods.
13. Write a program to implement Exception Handling.
14. Write a program for user-defined exception.
15. Write a program to copy a file.
16. Write a program to count no. of words in a file.
17. Write a program to make Login GUI in Tkinter.
18. Write a program to make registration form GUI in Tkinter.
19. Write a program to connect with database and perform insert operation.
20. Write a program to perform select operation on database.
21. Write a program to perform delete operation on database.
22. Write a program to perform update operation on database.

Reference Books:

1. Python Essential by David M. Beazly.
2. Python Pocket by Mark Lutz.
3. Barry, Paul, Head First Python, 2nd Edition.
4. Python: The Complete Reference.

List of e-Learning Resources:

1. https://www.coursera.org/learn/python-programming-intro
2. https://www.codecademy.com/catalog/language/python
3. https://learn.microsoft.com/en-us/training/modules/intro-to-python/
4. https://developers.google.com/edu/python
5. https://www.python.org/about/gettingstarted/
6. https://ocw.mit.edu/courses/6-0001-introduction-to-computer-science-and-programming-in-python-fall-2016/

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Semester-IV

L-0 T-0 P-4 C-2

25SACS150P: Web App Pentesting

Course Objectives

- To apply theoretical concepts of web application security in practical scenarios.
- To utilize various tools for penetration testing and vulnerability assessment.
- To understand the process of gathering information and identifying weaknesses in web applications.
- To develop skills in exploiting vulnerabilities and securing web applications.
- To enhance problem-solving skills through hands-on experiments and real-world applications.

Course Outcomes

1. Apply theoretical concepts of web application security in practical scenarios.
2. Utilize various tools for penetration testing and vulnerability assessment.
3. Gather information and identify weaknesses in web applications.
4. Exploit vulnerabilities and secure web applications.
5. Solve practical problems and enhance security skills through hands-on experiments.

Articulation Matrix

(Program Articulation Matrix is formed by the strength of the correlation of COs with POs and PSOs. The strength of correlation is indicated as 3 for substantial (high), 2 for moderate (medium) correlation, and 1 for slight (low) correlation)

CO/PO/PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	2	3	1	-	-	-	-	-	-	-	-	-
CO2	-	2	3	1	-	-	-	-	2	-	-	-
CO3	-	1	2	3	-	-	1	-	-	-	-	-
CO4	-	1	2	-	3	-	-	-	-	-	2	1
CO5	-	1	-	2	-	3	-	-	-	-	1	2

High-3 Medium-2 Low-1

Units:

Unit I: Introduction to Web Protocols and Security 12 hours

HTTP Protocol Basics, HTTPS and Security, Unicode and Charset Encoding, URL Encoding and Base64, Same Origin Policy (SOP), Cross-Origin Resource Sharing (CORS)

Unit II: Information Gathering Techniques **12 hours**

Information Gathering, Web Server Fingerprinting, Subdomain Enumeration, Framework and Application Fingerprinting

Unit III: Cookie and Session Management **12 hours**

Cookies and Sessions, Web Application Proxies, XSS Basics, XSS Mitigation

Unit IV: Vulnerability Assessment and Exploitation **12 hours**

Penetration Testing Principles, Exploitation Techniques

Unit V: Security Tools and Best Practices **12 hours**

Tools for Penetration Testing, Best Practices for Web Security

Total: 60 Hours

List of Experiments

1. HTTP Protocol Basics: Understanding HTTP requests and responses.
2. HTTPS and Security: Exploring HTTPS and its significance in web security.
3. Unicode and Charset Encoding: Understanding Unicode encoding and its differences from Charset encoding.
4. URL Encoding and Base64: Exploring URL encoding and Base64 encoding.
5. Same Origin Policy (SOP): Understanding SOP and its role in web security.
6. Cross-Origin Resource Sharing (CORS): Exploring CORS and its implications.
7. Cookies and Sessions: Implementing cookies and sessions in web applications.
8. Web Application Proxies: Introduction to tools like Burp Suite and OWASP ZAP.
9. Information Gathering Techniques: Utilizing tools like Whois, Nslookup, and Netcraft.

10. Web Server Fingerprinting: Understanding techniques to identify web server details.
11. Subdomain Enumeration: Exploring methods to enumerate subdomains.
12. Framework and Application Fingerprinting: Identifying frameworks and applications used.
13. Cross-Site Scripting (XSS): Understanding XSS vulnerabilities and exploitation techniques.
14. XSS Mitigation: Implementing input validation and output encoding for XSS prevention.
15. Penetration Testing Principles: Learning about PT workflows, ethical hacking techniques, and SDLC phases

Book Reference(s)

1. The Web Application Hacker's Handbook: Finding and Exploiting Security Flaws 2nd Edition by DafyddStuttard.
2. Penetration Testing: A Hands-On Introduction to Hacking 1st Edition by Georgia Weidman
3. Practical Web Penetration Testing by Gus Khawaja, O'Reilly publications

List of e-Learning Resources:

1.https://www.techtarget.com/searchsecurity/definition/cybersecurity

2.https://www.cisco.com/c/en_in/products/security/what-is-cybersecurity.html

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BCA (System Administration and Cyber Security)
Semester-IV

L-0 T-0 P-8 C-4

25SACS160P: Server Operating System - II

Course Objectives

- To know about the plan and implement a Windows Server 2012 and Windows Server 2012 R2 environment.
- To Learn about critical Server Administration tasks for Windows Server 2012 and 2012 R2 environments
- To learn about centrally managing Windows®-based computers.
- To know about configuring core network services and Active Directory on Windows Server.
- To learn about configuring Active Directory.

Course Outcomes

1. Understand the process of configuring Hyper-V for virtual machines and virtual networks.
2. Apply planning strategies for server infrastructure and implementation of Active Directory and Network Infrastructure.
3. Analyze Install and configure Windows Server 2012.
4. Evaluate the configuration of local storage and additional services such as file sharing.
5. Create the configuration process of Active Directory.

Articulation Matrix:-

(Program Articulation Matrix is formed by the strength of the correlation of COs with POs and PSOs. The strength of correlation is indicated as 3 for substantial (high), 2 for moderate (medium) correlation, and 1 for slight (low) correlation)

CO/PO/PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	-	3	1	-	2	-	-	-	-	-	-	-
CO2	-	-	3	1	-	-	-	-	2	-	-	-
CO3	-	-	1	3	-	-	2	-	-	-	-	-
CO4	-	-	1	-	3	-	-	-	-	-	2	-
CO5	-	1	-	2	-	3	-	-	-	-	-	1

Units:

Unit I: Virtualization with Hyper-V **24 Hours**

Creating and Configuring Virtual Machines: Introduction to Hyper-V, creating virtual machines, configuring virtual machine settings, **Virtual Machine Storage:** Configuring virtual hard disks, managing storage, optimizing performance, **Virtual Networks:** Setting up virtual networks, configuring network adapters, managing network settings.

Unit II: High Availability and Disaster Recovery **24 Hours**

Network Load Balancing (NLB): Configuring NLB, managing NLB clusters, **Failover Clustering:** Setting up failover clusters, managing cluster nodes, ensuring high availability, **Virtual Machine Migration:** Managing VM migration, optimizing migration processes.

Unit III: Advanced File Services and Storage **24 Hours**

Dynamic Access Control (DAC): Implementing DAC, managing access policies**, Storage Optimization:** Configuring and optimizing storage, managing disk quotas, implementing storage spaces, **Windows Server Backup and Recovery:** Configuring backup tools, performing bare metal recovery, troubleshooting boot issues**.**

Unit IV: Active Directory Configuration **24 Hours**

Active Directory Trust Relationships: Configuring forest trust relationships, managing trust settings, **Active Directory Sites and Services:** Configuring sites, managing replication, optimizing directory services, **Active Directory Certificate Services (AD CS):** Setting up AD CS, managing certificates, configuring CA backup and recovery**.**

Unit V: Server Deployment and Management **24 Hours**

Automated Server Installation: Designing installation strategies, using Windows Deployment Services (WDS), **Virtual Server Deployment:** Understanding virtual server environments, deploying virtual servers, managing virtual infrastructure, **Server Management Tools:** Utilizing tools for server management, monitoring server performance, applying updates and patches.

Total Hours:120

List of Experiments

1. Hyper-V – Creating and configuring virtual machines
2. Hyper-V – Creating and configuring virtual machine storage
3. Hyper-V – Creating and configuring virtual networks
4. Configure Network Load Balancing (NLB)
5. Configure failover clustering
6. Manage Virtual Machine (VM) migration
7. Configure advanced file services
8. Implement Dynamic Access Control (DAC)
9. Configure and optimize storage
10. Configuring Windows server backup tool
11. Bare metal recovery
12. Understanding Windows booting and troubleshooting booting issues
13. Configuring Hyper-V site-level fault tolerance
14. Active Directory Forest trust relationship
15. Active Directory sites and services
16. Active Directory Certificate services
17. Active Directory Rights Management Services (ADRMS)
18. Configuring CA backup and recovery
19. Design an automated server installation strategy
20. Understanding virtual server deployment

Reference Books:

1. Active Directory Cookbook" by Robbie Allen and Laura E. Hunter
2. Windows Server 2012 Pocket Consultant" by William R. Stanek
3. Windows Server 2012 Inside Out" by William R. Stanek
4. Mastering Windows Server 2012 R2" by Mark Minasi

List of e-Learning Resources:

1. https://www.udemy.com/courses/it-and-software/operating-systems/
2. https://www.udemy.com/topic/windows-server/
3. https://www.coursera.org/courses?query=windows%20server

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