ଓଡ଼ିଶା ରାଜ୍ୟ ମୁକ୍ତ ବିଶ୍ୱବିଦ୍ୟାଳୟ, ସମ୍ବଲପୁର, ଓଡ଼ିଶା
Odisha State Open University, Sambalpur, Odisha
Established by an Act of Government of Odisha.

Syllabus for
Diploma in Cyber Security (DCS)
(Effective from Academic Year 2022-23)

Programme Objectives:

This programme aims to provide a foundational platform for Cyber Security Aspirants by providing Cyber Security Awareness and Training that heighten the chances of catching a scam or attack before it is fully enacted, minimizing damage to the resources and ensuring the protection of information technology assets.

- learner will understand key terms and concepts in cyber law, intellectual property and cyber crimes, trademarks and domain theft.
- learner will gain knowledge about securing both clean and corrupted systems, protect personal data, and secure computer networks.
- learner will be able to examine secure software development practices.
- learner will be able to incorporate approaches for incident analysis and response.
- learner will be able to incorporate approaches for risk management and best practices.
- learner will gain an understanding of cryptography, how it has evolved, and some key encryption techniques used today.
- learner will develop an understanding of security policies (such as confidentiality, integrity, and availability), as well as protocols to implement such policies.
- learner will gain familiarity with prevalent network and distributed system attacks, defences against them, and forensics to investigate the aftermath.

Programme Outcomes:

Learner/student will learn security from multiple perspectives. Learning Outcomes: After the completion of the course, the learners will be able to develop basic understanding of security, cryptography, system attacks and defences against their knowledge.

- Analyze and evaluate the cyber security needs of an organization.
- Determine and analyze software vulnerabilities and security solutions to reduce the risk of exploitation.
- Measure the performance and troubleshoot cyber security systems.
- Implement cyber security solutions and use of cyber security, information assurance, and cyber/ computer forensics software/tools.
- Comprehend and execute risk management processes, risk treatment methods, and key risk and performance indicators
- Design and develop security architecture for an organization.
- Design operational and strategic cyber security strategies and policies.

Highlights of the Programme:

Duration of the Course *: Minimum: 01 year, Maximum: 02 years.*
Conduct of Classes: *Weekend for 2 hours of theory and 3 hours of practical (preferably on Sundays)*
Eligibility Criteria*: +2 or Equivalent*
Evaluation Methodology – *Based on Assignments (theory+ practical), Term end Examinations (Theory + practical) and Project work (viva voce + Report) Course Coverage – Theory, Practical and Project Work.*
Target Group: Learners already enrolled in +3 and PG
Pedagogy: OSOU teaching pedagogy includes theory, practical, study material, projects, Online Classes (Both synchronous and asynchronous) etc. to keep the learning experiential and collaborative. Trainees of Diploma in Cyber Security (DCS) course get the opportunity to network with leaders in the industry.

Course Structure

Duration: 01 Year **Total credit: 32**

1st Semester			
Theory			
Course Code	**Course Title**	**(T-L-P)**	**Credit**
CSPC-01	Data Communication & Networking	T	04
CSPC-02	Information Security	T	04
CSPC-03	Operating System Basics	T	02
	Total Theory Credits		**10**
Laboratory			
CSPCL-01	Data Communication & Networking Lab	L	02
CSPCL-02	Information Security Lab	L	02
CSPCL-03	Operating System Basics Lab	L	02
	Total Laboratory Credits		**06**
	TOTAL SEMESTER CREDITS		**16**

2nd Semester			
Theory			
Course Code	**Course Title**	**(T-L-P)**	**Credit**
CSPC-04	Application Cyber Security	T	04
CSPC-05	Network Cyber Security	T	04
	Total Theory Credits		**08**
Laboratory & Project Work			
CSPCL-04	Application Cyber Security Lab	L	02
CSPCL-05	Network Cyber Security Lab	L	02
CSPP-06	Project	P	04
	Total Laboratory Credits		**06**
	TOTAL SEMESTER CREDITS		**16**
	TOTAL CUMULATIVE CREDITS		**32**

1st Semester
Theory Syllabus

CSPC-01 : DATA COMMUNICATION & NETWORKING	
Block-01	**Introduction to Data communication and Networking**
Unit-01	Basic Concepts of Data Communication and Networking
Unit-02	Network topology, Categories of a networks, Protocols, Standards in networking
Unit-03	Network Reference Models: OSI and TCP/IP Models
Unit-04	Transmission media & Network Devices
Block -02	**Physical Layer and its functionalities**
Unit -05	Analog and Digital Signals
Unit -06	Encoding
Unit -07	Multiplexing: FDM,TDM,WDM,SDM
Unit -08	Switching: Message Switching and Circuit Switching and Packet Switching
Block -03	**Data Link & Network Layer**
Unit-09	Data Link Control Protocols: Token Passing, CSMA/CD, CSMA, CSMA/CA
Unit-10	Physical Addressing, Error Detection, Framing. Flow Control, Error Control, Congestion Control
Unit-11	Network Layer, Internetworking
Unit-12	IP addressing, Internet Control Protocols (ARP, RARP, ICMP,IGMP)
Block -04	**Internet Protocols and Services**
Unit-13	Transport Layer protocols: TCP & UDP
Unit-14	Application Layer protocols: HTTP, HTTPs, SMTP, POP, DNS, TELNET, FTP
Unit-15	Internet: Hosts and Domain Names, Addressing Scheme in Internet, Internet Service Providers (ISPs)
Unit-16	Services: www, Intranet, Extranet, Email, Services Provided by Internet, Application of Internet

CSPC-02: INFORMATION SECURITY	
Block-01	**Information Security Concepts and Cryptography**
Unit-01	Information Security Concepts: Information security issues, goals, architecture, Attacks, Security Services and Mechanisms.
Unit-02	Introduction to Cryptography: Network security model, Cryptographic systems, Cryptanalysis, Steganography. Types of Cryptography: Symmetric key and Asymmetric Key Cryptography, Encryption and Decryption Techniques.
Unit-03	Cryptographic Algorithms: Hash Algorithm, Message Digest (MD, Secure Hash algorithm (SHA), Whirlpool, RACE Integrity Primitives Evaluation Message Digest (RIPEMD), Password Hashes
Unit-04	Symmetric & Asymmetric Cryptographic Algorithms: Block Cipher, Data Encryption System (DES), Advance Encryption Standard (AES), RSA Algorithm, File and File System Cryptography, Pretty Good Privacy (PGP/GPG)
Block-02	**Security Threats and Vulnerabilities**
Unit-05	Overview of Security threats and Vulnerability: Types of attacks on confidentiality, Integrity and Availability. Vulnerability and Threats.
Unit-06	Malware: Viruses, Worms, Trojan horses
Unit-07	Security Counter Measures: Insider & Outsider Attack
Unit-08	Intrusion Detection, Antivirus Software
Block-03	**Ethical Issues in Information Security & Privacy**
Unit-09	Information Security, Privacy and Ethics
Unit-10	Cyber Crime and Cyber Terrorism
Unit-11	What is Hacking? Ways of Hacking, Ethical issues, Ethical Hacking
Unit-12	Organized Cyber Crime and IT Act 2002
Block-04	**Security Challenges in E-commerce & e-governance**
Unit-13	Overview of E-commerce
Unit-14	Historical development and regulatory Framework of e-commerce
Unit-15	Security challenges and future of E-commerce
Unit-16	Concept of e-governance

CSPC-03: OPERATING SYSTEM BASICS	
Block-01	**Windows Operating System**
Unit-01	Introduction, Operating System Concept and its Types, Function of OS, Evolution of Operating Systems. Introduction to Windows, Version of Windows, Operating System Administrator, My Computer, Recycle Bin, Desktop, Drives.
Unit-02	Create a directory/folder, rename/change to a directory/folder, creating a file in a directory/folder, Make the file read only, Make the file/directory hidden, editing a file in a directory/folder, Delete a file in a directory/folder. Listing the files in the directory, create a file, copy a file from one directory to the other, deleting all files from a directory/folder, Deleting a director/folder.
Unit-03	Formatting a hard disk, Loading, update and troubleshoot in Windows Operating System.
Unit-04	Domain, workgroup, Active Directory, User Management, Network Setting, Services, IIS Configuration
Block -02	**Linux Operating System**
Unit -05	Introduction, History of Linux, Distributions of Linux, Devices and drivers, File system Hierarchy, The components: Kernel, Distribution, XFree86, Sawfish, Gnome
Unit -06	The command line commands, File, management commands, Working with nano, Working with help (man)
Unit -07	SSH and X-forwarding, managing compressed archives with zip and tar, Working with GNU screen, how to add users and groups
Unit -08	Working with su, working with sudo, changing user password, Printing, installing software with Yum, Yast, Rpm, Installing webmin.

1st Semester

Practical Syllabus

CSPCL-01 : DATA COMMUNICATION & NETWORKING LAB	
Expt-1	To study about different physical equipment's used for networking
Expt-2	To study different internetworking devices in a computer network
Expt-3	To study the working of Basic Networking Commands
Expt-4	To assign IP address to the PC connected to the internet
Expt-5	To connect the computers in Local Area Network
Expt-6	Creating a Network topology using CISCO packet tracer software

CSPCL-02 : INFORMATION SECURITY LAB	
Expt-1	To study the Private Key and Public Key cryptographic systems.
Expt-2	To study the classical encryption techniques: substitution and transposition
Expt-3	To analyze the encryption and decryption of RSA – Public Key Cryptography Algorithm
Expt-4	To study working of Intrusion detection System (IDS) tool
Expt-5	To study the prevention mechanisms to avoid Virus and other Malware in one's PC
Expt-6	To study the prevention mechanisms to protect one's PC from Hackers

CSPCL-03: OPERATING SYSTEM BASICS LAB			
Windows OS			**Linux OS**
1	Windows 7 installation	**16**	Red Hat Linux Installation
2	File and folder management in Windows	**17**	Linux Installation using Ubuntu
3	Create a file in windows	**18**	Linux Installation using Open Suse
4	Create a folder in Windows	**19**	Working with Linux Graphical User Interface
5	Copy a file to a folder	**20**	Working with terminal mode
6	Move a file to a folder	**21**	Basic Linux commands used in terminal Mode
7	Rename a file/ folder	**22**	Creating a file using Nano
8	Delete a file / folder	**23**	Working with the su command
9	Make a file read only	**24**	Working with sudo
10	Hide and unhide the file in Win 7	**25**	User and group management
11	Working with the command prompt	**26**	Working with Permissions
12	Steps to create user accounts	**27**	Installing Software with Rpm
13	Changing Your Password	**28**	Working with Yum
14	Changing Your Picture	**29**	Yast
15	Creating a Password-Reset Disk	**30**	Webmin
		31	Data compression in Linux

2nd Semester

Theory Syllabus

CSPC-04 : APPLICATION CYBER SECURITY	
Block-01	**System Security**
Unit-01	Desktop Security
Unit-02	Programming Bugs and Malicious code
Unit-03	Database Security
Unit-04	Operating System Security: Designing Secure Operating Systems, OS Security Vulnerabilities.
Block -02	**Security Management**
Unit-05	Disaster recovery
Unit-06	Digital Signature
Unit-07	Ethical Hacking, Penetration Testing
Unit-08	Computer Forensics
Block-03	**Fundamentals of cyber law**
Unit-09	Outline of legislative framework for cyber Law
Unit-10	History and emergence of cyber law
Unit-11	Outreach and impact of cyber law
Unit-12	Major amendments in various statutes
Block-04	**Cyber laws and standards**
Unit-13	ISO 27001, Cyber Law (Information Technology Act, 2000)
Unit-14	International Standards maintained for Cyber Security
Unit-15	Security Audit ,Investigation by Investing Agency
Unit-16	Cyber Security Solutions

CSPC-05 : NETWORK CYBER SECURITY	
Block-01	**Network Security**
Unit-01	Network Security Model, Network Security Threats
Unit-02	Firewalls: Overview, Types, Features, User Management
Unit-03	Intrusion Detection System, Intrusion Prevention System
Unit-04	Public Key Infrastructure, Digital Signature Schemes
Block -02	**Internet and Web Application Security**
Unit-05	Email security: PGP and SMIME
Unit-06	Web Security: Web authentication, Injection Flaws, SQL Injection
Unit-07	Web Browser Security
Unit-08	E-Commerce Security
Block-03	**Wireless Network Security**
Unit-09	Wireless Network Components
Unit-10	Security issues in wireless Networks
Unit-11	Securing a wireless network
Unit-12	Mobile security
Block-04	**Digital & Electronic Signature and Related Laws in India**
Unit-13	Digital and Electronic Signature: Concept and Procedure
Unit-14	Digital Signature Certificate
Unit-15	Regulation and Responsibilities of Certifying Authorities and Controller of Certifying Authorities
Unit-16	Addressing Offences: Penalties and Compensation

2nd Semester

Practical Syllabus

CSPCL-04: APPLICATION CYBER SECURITY LAB	
Expt-1	Study of steps to protect your personal computer system by creating User Accounts with Passwords and types of User Accounts for safety and security.
Expt-2	Study the steps to protect a Microsoft Word Document of different version with different operating system.
Expt-3	Study the steps to remove Passwords from Microsoft Word
Expt-4	Study various methods of protecting and securing databases.
Expt-5	Study "How to make strong passwords" and "passwords cracking techniques".
Expt-6	Study the steps to hack a strong password.

CSPCL-05: NETWORK CYBER SECURITY LAB	
Expt-1	Study of different wireless network components and features of any one of the Mobile Security Apps.
Expt-2	Study of the features of firewall in providing network security and to set Firewall Security in windows.
Expt-3	Steps to ensure Security of any one web browser (Mozilla Firefox/Google Chrome)
Expt-4	Study of different types of vulnerabilities for hacking a websites / Web Applications.
Expt-5	Analysis the Security Vulnerabilities of E-commerce services.
Expt-6	Analysis the security vulnerabilities of E-Mail Application.

CSPP-06: PROJECT WORK