Curriculum for Cyber Security (D.Voc.)

NSQF Level	Code	Educational Component	Credit	Marks
3 (1st Year) Semester I	**Theory**			
	3.GE.01	Language – I	3	50
	3.GE.02	Applied Chemistry	3	50
	3.GE.03	Applied Physics	3	50
	3.GE.04	Applied Mathematics-I	3	50
	Lab / Practical			
	3.GP.01	Applied Chemistry Lab	1.5	50
	3.GP.02	Applied Physics Lab	1.5	50
	On-Job-Training (OJT) / Qualification Packs			
	Domestic Data Entry Operator	(Any one)	15	200
	Domestic IT helpdesk Attendant			
	CRM Domestic IT Attendant			
3 (1st Year) Semester II	**Theory**			
	3.GV.01	General Foundation Course	3	50
	3.GV.02	Basic Electricity and Electronics	3	50
	3.GE.05	Language – II	3	50
	3.GE.06	Applied Mathematics -II	3	50
	Lab / Practical			
	3.VP.01	Basic Electricity and Electronics Lab	1.5	50
	3.GP.03	Language Lab	1.5	50
	On-Job-Training (OJT) / Qualification Packs			
	Any one of the QP's can be opted as offered in Semester I	(Any one)	15	200
4 (2nd Year) Semester I	**Theory**			
	4.GV.01	IT Foundations	3	50
	4.GV.02	Programming for Problem Solving (using C / Python)	3	50
	4.GV.03	Internet & Web Applications	3	50
	4.GV.04	Digital Electronics	3	50
	Lab / Practical			
	4.VP.01	IT-Tools & Programming Lab (using C / Python)	1.5	50
	4.VP.02	Internet & Web Applications Lab	1.5	50
	On-Job-Training (OJT) / Qualification Packs			
	IT Attendant	(Any one)	15	200
	Junior Software Developer			
	Cyber Awareness Instructor			
4 (2nd Year) Semester II	**Theory**			
	4.GV.05	Data Structures & Algorithms	3	50
	4.GV.06	Database Management Systems	3	50
	4.GV.07	Computer Networks	3	50
	4.GV.08	Computer Organization & Architecture	3	50
	Lab / Practical			
	4.VP.03	Data Structure Lab	1.5	50
	4.VP.04	Database Management System Lab	1.5	50
	On-Job-Training (OJT) / Qualification Packs			
	One more QP to be opted from the QPs	(Any one)	15	200

		mentioned in the Level 4 first semester			
5 (3rd Year) Semester I		**Theory**			
	5.GV.01	Operating System		3	50
	5.GV.02	Cryptography & Information Security		3	50
	5.GV.03	Ethical Hacking and Systems Defence		3	50
	5.GV.04	Parallel and Distributed Computing (inc. Cloud computing)		3	50
		Lab / Practical			
	5.VP.01	Cryptography & Information Security Lab		1.5	50
	5.VP.02	Advanced Computer Network & Security Lab		1.5	50
		On-Job-Training (OJT) / Qualification Packs			
	Systems Analysist		(Any one)	15	200
	Cyber Security Auditor				
	Cyber Security Trainer				
5 (3rd Year) Semester II		**Theory**			
	5.GV.05	Cyber Law and Ethics		3	50
	5.GV.06	Cyber Forensics		3	50
	5.GV.07	Penetration Testing		3	50
	5.GV.08	Artificial Intelligence In Cyber security & Industry use cases		3	50
		Lab / Practical			
	5.VP.03	Project Work & Seminar-Presentation		3	100
		On-Job-Training (OJT) / Qualification Packs			
	One more QP to be opted from the QPs mentioned in the Level 5 first semester		(Any one)	15	200

Detailed Curriculum

(Level 3: 1st Year, Semester – I)

(3.GE.01): Language – I
Reading comprehension (prescribed texts) and functional grammar: A variety of genres – short stories, expository pieces, biographies, poems, plays, newspaper and magazine excerpts have been included. Teaching of grammar has been integrated with the reading texts. The emphasis is on functional grammar.
Non prescribed: In this section learners will be exposed to newspaper, articles, tables, diagrams, advertisements etc. which they have to read carefully and interpret. In the examination similar pieces will be used.
Grammar and usage. Functional writing and study skills: Paragraph writing, Letter writing, Note making, Ending (punctuation, spelling, appropriate vocabulary, structures).
Reference Books:
 1. Effective Communication Skills, Kulbhushan Kumar, Khanna Publishing House
 2. Business Communications, Varinder Bhatia, Khanna Publishing House

(3.GE.02): Applied Chemistry
Structure of Atom, Periodic Properties of Elements, Chemical Bonds, Fuel and their Classification, Water, Corrosion, Plastic and Polymers.
Reference Books:
 1. Chemistry, Satyaprakash, Khanna Publishing House
 2. Engineering Chemistry, Saiful Islam, Khanna Publishing House

(3.GE.03): Applied Physics
Units & Dimensions, Surface Tension and Viscosity, Vibrations, Heat, Ultrasonics, Optics.
Reference Books:
 1. Engineering Physics, Malik and Singh, Tata Mc Graw Hill
 2. Engineering Physics, Naidu, Pearson
 3. Modern Physics for Engineers, S.P. Taneja, R. Chand

(3.GE.04): Applied Mathematics-I

Sets, Relations and Functions, Sequences and Series, Algebra-I, Co-ordinate Geometry, Statistics and Probability.

Reference Books:
1. Applied Mathematics-I, J.K. Tyagi, Khanna Publishing House
2. Engineering Mathematics, Reena Garg, Khanna Publishing House

(3.GP.01): Applied Chemistry Lab

1. Proximate analysis of solid fuel.
2. Experiments based on Bomb Calorimeter.
3. Determination of turbidity in a given sample.
4. To determine the flash and fire point of a given lubricating oil.
5. To determine the viscosity of a given lubricating oil by Redwood viscometer.
6. To determine cloud and pour point of a given oil.

(3.GP.02): Applied Physics Lab

1. To determine the surface tension of a liquid by rise in capillary.
2. To determine the viscosity of a given liquid.
3. To determine the frequency of tuning fork using a sonometer.
4. To determine the frequency of AC main using sonometer.
5. Time period of a cantilever.

(Level 3: 1st Year, Semester – II)

(3.GV.01): General Foundation Course

Business Management and Entrepreneurship, Computational Skills, Environmental Education, Rural Development.

Reference Books:
1. Environmental Studies, M.P. Poonia & S.C. Sharma, Khanna Publishing House
2. A Textbook of Environmental Sciences, Rimpi Mehani Ne' Chopra, Khanna Publishing House

(3.GV.02): Basic Electricity and Electronics

Current Electricity, D.C. Circuits, Electric Cells, Lighting Effects of Current, Capacitors, Electromagnetic Effects, A.C Circuits.

Overview of Atom, Sub-Atomic Particles and CRO, Voltage and Current, Basics of Semiconductor, Bipolar Junction Transistor, Transistor Amplifier and Applications.

Reference Books:
1. Basic Electrical Engineering, Ritu Sahdev, Khanna Publishing House
2. Basic Electrical Engineering, Pradeep Kumar, Khanna Publishing
3. Basic Electronics, S. Biswas, Khanna Publishing House
4. All in One Electronics Simplifies, A.K. Maini, Khanna Publishing House

(3.GE.05): Language – II

Listening and speaking skills, English for specific purposes (opt any one):

English for Science: 1. Health and hygiene, 2. Conservation of (nearly extinct) animals, 3. Plant life, 4. Bio gas / solar energy.

English for Receptionist: 1. Receiving messages, making request etc., 2. Supplying information, 3. Giving advice and making suggestions, 4. Dealing with complaints, 5. Making entries in an appointment book, register etc.

English for Office Use: 1. Using the telephone taking and passing messages, 2. Receiving messages, 3. Marking noting on files and circular, 4. Writing office notes, memos, notices, agendas for meetings, 5. Telegrams and fax messages, 6. Writing business letters, application enquires, complaints, 7. Filling in forms, cheques, pay in slips etc.

Reference Books:
1. Effective Communication Skills, Kulbhushan Kumar, Khanna Publishing House
2. Business Communications, Varinder Bhatia, Khanna Publishing House

(3.GE.06): Applied Mathematics – II

Algebra-II, Relations and Functions, Calculus, Vectors and Three Dimensional Geometry, Linear Programming and Mathematical Reasoning.

Reference Books:
1. Applied Mathematics-II, J.K. Tyagi, Khanna Publishing House
2. Elements of Mathematical Analysis, R. Agor, Khanna Publishing House

(3.VP.01): Basic Electricity and Electronics Lab

1. Verify that resistance of conductor is directly proportional to resistivity and length and inversely proportional to cross- sectional area of the conductor.
2. Verification of Ohm's Law.
3. Verification of temperature co-efficient of resistance:
   (i) Positive for Tungsten and Nichrome and
   (ii) Negative for carbon.
4. Study of series resistive circuits.
5. Study of parallel resistive circuits.
6. Study of series and parallel connection of cells in circuits.
7. Preparation of Electrolyte for lead acid battery and its charging and
measurement of Specific gravity with the help of hydrometer.
8. To find heat efficiency of an electric kettle.
9. Charging and Discharging of a capacitor.
10. Verification of magnetic field of a Solenoid with:
    (i) Iron core and
    (ii) Air core.
11. Verification of Faraday's Laws of electromagnetic induction.
12. Verification of Torque development in a current carrying coil in magnetic field.
13. Study of R.L. series circuit and measurement of power and power factor.
14. Study of R.C. series circuit and measurement of power and power factor.
15. Study of R.L.C. series circuit and measurement of power and power factor.
16. Study of R.L.C. series circuit for calculation of inductive reactance, capacitive reactance, impedance and Q- Factor.

1. Study of current and voltage measurement using Ammeter and Voltmeter.
2. Study of current and voltage measurement using Galvanometer.
3. Study of current, voltage and resistance measurement using of Multi-meter
4. Study of Power and Energy measurement using Wattmeter and Energy meter.
5. Study of working principle of Signal Generator and measurement of amplitude, time period and frequency of signal using Oscilloscope.
6. Study of V-I Characteristic of Diode.
7. Study of V-I Characteristic of Zener Diode. And use of Zener Diode as voltage regulator.
8. Study of Half wave rectifier with and without filter circuit.
9. Study of Full wave rectifier with and without filter circuit.
10. Study CE configuration for NPN and PNP transistors and measurement of voltage and current gain.
11. Study CB configuration for NPN and PNP transistors and measurement of voltage and current gain.
12. Study CC configuration for NPN and PNP transistors and measurement of voltage and current gain.
13. Study of working of single layer PCB manufacturing
14. Study of working of double layer PCB manufacturing.
15. Design of 7 segment display using LED and bread board

(3.GP.03): Language Lab

Technical Report Writing, Language Laboratory Practice, Conversation Practice Sessions, Group Discussion Sessions, Presentation, Competitive Examination.

(Level 4: 2nd Year, Semester – I)

(4.GV.01): IT Foundations

Computer Organization & OS: User perspective, Networking and Internet, Office automation tools, Multi Media Design: (Open Source Design Tools), Troubleshooting: Hardware, Software and Networking, Work Integrated Learning IT.
Reference Books:
1. IT Tools, R.K. Jain, Khanna Publishing House
2. Information Security & Cyber Laws, Sarika Gupta, Khanna Publishing House
3. Mastering PC Hardware & Networking, Ajit Mittal, Khanna Publishing House

(4.GV.02): Programming for Problem Solving (using C / Python)

Introduction, Conditional Statements, Control Statements, String Manipulation, Lists, Tuple, Dictionaries, Functions, Modules, Exception Handling.
Reference Books:

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1. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill
2. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India
3. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
4. Python Crash Course, 2Nd Edition: A Hands-On, Project-Based Introduction to Programming, Eric Matthes
5. Python Programming: Using Problem Solving Approach, Reema Thareja
6. Core Python Programming, R. Nageswara Rao
7. Introduction to Computing and Problem Solving with Python, J. Jose, Khanna Publications

(4.GV.03): Internet & Web Applications

Internet: brief history, Protocols and standards, Reference models, Applications and modern day usage, Network of Networks, Intranet, Extranet and Internet, Editing Tools, HTML, Customizing and Embedding Multimedia components in Web Pages, Web Scripting – Java Script, Work Integrated Learning IT.

Reference Books:

1. Internet & Web Development, Soma Das Gupta, Khanna Publishing House
2. Web Designing and Development, Tanweer Alam, Khanna Publishing House

(4.GV.04): Digital Electronics

Number Systems and Boolean Algebra, Logical Circuits, Latches and Flip-Flops, Introduction to Display Devices, Integrated Circuits and Memories.

Reference Books:

1. Fundamentals of Digital Electronics, Aditya Chaturvedi, Khanna Publishing House
2. Digital Electronics by S.Salivahan, Digital Fundamentals by Floyd, Digital Design by Morris Mano
3. Digital Electronics, A. Anand Kumar, PHI
4. Modern Digital Electronics, R.P. Jain, TMH

(4.VP.01): IT-Tools & Programming Lab (using C / Python)

Spreadsheets, Word, Presentation, Multimedia Design, Troubleshooting, Study of computer components, Booting of Computer and its shutdown, Practicing some fundamental DOS Commands, Simple Programs in BASIC to compute Mean, Variance, Correlation and Regression, Creating database in MS-Access, structuring with different types of fields and use of query facility for accessing the information, Project / Practical File, Viva Voce.

Interactive interpreter and Python Script, Indentation Error, decision making and looping, one dimensional and two dimensional arrays, explore string functions, mean, median, mode, find all duplicates in the list, find all unique elements of a list, compute gcd, lcm of two numbers, use of Lists, Dictionaries, implement Turtle, Linear and Binary Search, Exceptions in Python.

(4.VP.02): Internet & Web Applications Lab

Programs / Practical Questions: Audio/Movie Editing Tools, Customizing and Embedding, Multimedia Components in Web Pages, HTML and associated tags, Web Scripting - Java Script, Project / Practical File, Viva Voce.

(Level 4: 2nd Year, Semester – II)

(4.GV.05): Data Structures & Algorithms

Program structures, Variables, Data Types, Declarations, Operators (Arithmetic, Relational, Logical), increment and decrement operators, Assignment operators and expressions, Arithmetic expressions, Functions, external variables, scope rules, header files, Pointers and addresses, pointers and function arguments, pointer and arrays, Data Structures: Arrays, Linked list, Stacks and queues, Trees, Graphs, Hashing, Searching & Sorting.

Reference Books:

1. Fundamentals of Data Structures, Sartaj Sahni, University Press
2. Data Structures through C, Yashwant Kanetkar, BPB Publications
3. Data Structures Through C In Depth, S.K.Srivastava/Deepali Srivastava
4. Data Structures using C & C++, Rajesh K. Shukla
5. Introduction to Algorithms, Thomas H. Cormen

(4.GV.06): Database Management Systems

Database system architecture, Data models, Relational query languages, Relational database design, Query processing and optimization, Storage strategies, Transaction processing, Database Security, Advanced topics.

Reference Books:

1. "Database System Concepts", 6th Edition by Abraham Silberschatz, Henry F. Korth, S. Sudarshan,McGraw-Hill.
2. "Principles of Database and Knowledge – Base Systems", Vol 1 by J. D. Ullman, Computer Science Press.
3. Database Management Systems, R.P. Mahapatra, Khanna Publishing House, New Delhi.

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4. "Fundamentals of Database Systems", 5th Edition by R. Elmasri and S. Navathe.
5. Pearson Education "Foundations of Databases", Reprint by Serge Abiteboul, Richard Hull, Victor Vianu, Addison-Wesley

(4.GV.07): Computer Networks

Data communication Components: Representation of data and its flow Networks, Various Connection Topology, Protocols and Standards, OSI model, Transmission Media, LAN: Wired, Wireless, Connecting LAN and Virtual LAN, Bandwidth utilization: Multiplexing - Frequency division, Time division and Wave division, Concepts on spread spectrum, Data Link Layer and Medium Access Sub Layer: Error Detection and Error Correction - Fundamentals, Network Layer: Switching, Logical addressing – IPV4, IPV6; Address mapping, Transport Layer: Process to Process Communication, User Datagram Protocol (UDP), Transmission Control Protocol (TCP), Application Layer: Domain Name Space (DNS), DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, Bluetooth, Firewalls, Basic concepts of Cryptography.

Reference Books:
1. Behrouz A. Forouzan, "Data Communications Networking", TMH Publication.
2. James F. Kurose & Keith W. Ross, "Computer Networking: A Top-Down Approach", Pearson.
3. Wlliam Stallings, "Data and Computer Communication", Pearson Education.
4. Larry L. Peterson & Bruce S. Davie, "Computer Networks: A Systems Approach", Morgan Kaufmann / Elsevier.
5. A.S. Tanenbaum, D.J. Wetherall, "Computer Networks", Pearson Education.

(4.GV.08): Computer Organization & Architecture

Basic organization of the stored program computer and operation sequence for execution of a program, Role of operating systems and compiler/assembler, Fetch, decode and execute cycle, Concept of operator, operand, registers and storage, Instruction format. Instruction sets and addressing, modes, Commonly used number systems. Fixed and floating point representation of numbers, Overflow and underflow. Design of adders – ripple carry and carry look ahead principles, Design of ALU, Memory unit design with special emphasis on implementation of CPU-memory interfacing, Memory organization, static and dynamic memory, memory hierarchy, associative memory, Cache memory, Virtual memory, Design of control unit - hardwired and microprogrammed control, Introduction to instruction pipelining, Introduction to RISC architectures. RISC vs CISC architectures, I/O operations - Concept of handshaking, interrupt and DMA, Pipelining, Exception handling, Pipeline optimization techniques, Hierarchical memory technology, Instruction-level parallelism, Multiprocessor architecture, Non von Neumann architectures.

Reference Books:
1. Mano, M.M., "Computer System Architecture", PHI.
2. Hayes J. P., "Computer Architecture & Organisation", McGraw Hill.
3. Hamacher, "Computer Organisation", McGraw Hill.
4. Chaudhuri P. Pal, "Computer Organisation & Design", PHI.
5. P N Basu- "Computer Organization & Architecture" ,Vikas Pub.
6. Rajaraman – "Computer Organization & Architecture", PHI.
7. B.Ram – "Computer Organization & Architecture", Newage Publications.
8. J. L. Hennessy and D. A. Patterson, "Computer Architecture A Quantitative Approach", Morgan Kauffman.

(4.VP.03): Data Structure Lab

Implement stack, Write functions like push, pop, Initialize, Empty or Full, Implement concept of queues, Implement queues in a circular array, Implement queues as a circular linked list, Implementing doubly linked list, Binary search tree to sort an array.

(4.VP.04): Database Management System Lab

Programs / Practical Questions, SQL Queries, Creating Database, Table and Record Handling, Retrieving Data from a Database, Clause, Database Management, Cursors in Oracle PL / SQL, Writing Oracle PL / SQL Stored Procedures, Programs, Operating Web Based Application, Project / Practical File, Viva Voce.

(Level 5: 3rd Year, Semester – I)

(5.GV.01): Operating System

System Software: Operating System, Compiler, Interpreter and Assembler, Operating System: Need for Operating System, Functions of Operating System (Processor Management, Memory Management, File Management and Device Management), Types of Operating System-Interactive (GUI based), Time Sharing, Real Time and Distributed, commonly used Operating System: UNIX, LINUX, Windows, Solaris, BOSS (Bharat Operating System Solutions); Mobile OS – Android, Symbian, IOS. Utility Software: Anti-Virus, File Management tools, Compression tools and

Disk Management tools (Disk Cleanup, Disk Defragmenter, Backup). Processes, Thread, Process Scheduling, Inter-process Communication, Deadlocks, Memory Management, Virtual Memory, I/O Hardware, File Management, Disk Management.

Reference Books:
1. Operating Systems, Ekta Walia, Khanna Publishing House.
2. Operating System Concepts Essentials, Avi Silberschatz, Peter Galvin, Greg Gagne, Wiley Asia Student Edition.
3. Operating Systems: Internals and Design Principles, William Stallings, Prentice Hall of India.
4. Operating Systems: A Modern Perspective, Gary J. Nutt, Addison-Wesley.

(5.GV.02): Cryptography & Information Security
Introduction & Number theory, Block ciphers & Public key cryptography, Hash functions and Digital signatures, Security practice & system security, E-mail, IP & Web security.

Reference Books:
1. "Cryptography and Network Security", William Stallings, Pearson Education Asia.
2. "Network Security private communication in a public world", C. Kaufman, R. Perlman and M. Speciner, Pearson.
3. Cryptography & Network Security: Atul Kahate, TMH.
4. "Network Security Essentials: Applications and Standards", William Stallings, Pearson.

(5.GV.03): Ethical Hacking and Systems Defence
Software and System Security, Network Security & Web Security, Security in Mobile Platforms, Introduction to Hardware Security, Supply Chain Security, Issues in Critical Infrastructure and SCADA Security.

Reference Books:
1. Web Application Security: Exploitation and Countermeasures for Modern Web Applications 1st Edition, Andrew Hoffman.
2. Software Security Vulnerability A Complete Guide - 2020 Edition Paperback, Gerardus Blokdyk.
3. Pragmatic Software Security: A Practical Guide to Maturing Software Security One month at a time, Stephen M Dye.
4. Software-Defined Networking and Security 1st Edition by Dijiang Huang, Ankur Chowdhary, Sandeep Pisharody.
5. Hardware Security 1st Edition A Hands-on Learning Approach by Swarup Bhunia Mark Tehranipoor.
6. Supply Chain Security: A Comprehensive Approach 1st Edition by Arthur G. Arway.
7. Industrial Network Security Securing Critical Infrastructure Networks for Smart Grid, SCADA, and Other Industrial Control Systems by Eric D. Knapp, Joel Thomas Langill.
8. Handbook of SCADA/Control Systems Security, Second Edition by Robert Radvanovsky, Jacob Brodsky.

(5.GV.04): Parallel and Distributed Computing (inc. Cloud computing)
Introduction, Parallel Programming Platforms, Principles of Parallel Algorithm Design, CUDA programming model, Analytical Modeling of Parallel Programs, Dense Matrix Algorithms, Graph Algorithms, Cloud Computing.

Reference Books:
1. A Grama, A Gupra, G Karypis, V Kumar. Introduction to Parallel Computing, Addison Wesley.
2. C Lin, L Snyder. Principles of Parallel Programming. USA: Addison-Wesley Publishing Company.
3. J Jeffers, J Reinders. Intel Xeon Phi Coprocessor High-Performance Programming. Morgan Kaufmann Publishing and Elsevier.
4. T Mattson, B Sanders, B Massingill. Patterns for Parallel Programming. Addison-Wesley Professional.
5. Cloud Computing Bible by Barrie Sosinsky, Wiley India Pvt. Ltd, 2013.
6. Mastering Cloud Computing by Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi, McGraw Hill Education (India) Private Limited.
7. Cloud computing: A practical approach, Anthony T. Velte, Tata Mcgraw-Hill.
8. Cloud Computing, Miller, Pearson.
9. Cloud Computing, Kumar Saurabh, Wiley India.

(5.VP.01): Cryptography & Information Security Lab
Experiments with: Ceaser Cipher Encryption/Decryption, Monoalphabetic Encryption/Decryption, Polyalphabetic Cipher, Playfair Cipher, Hill Cipher, Diffie Hellman Key Exchange, RSA Encryption Decryption, Triple-DES Encryption Decryption.
Case Study: Digital Signature, Java Security Features/ Matlab Security Features, Authentication in Kerbos.

(5.VP.02): Advanced Computer Network & Security Lab
1. Configuration and logging to a CISCO Router and introduction to the basic user Interfaces. Introduction to the basic router configuration and basic commands.
2. Configuration of IP addressing for a given scenario for a given set of topologies.
3. Configure a DHCP Server to serve contiguous IP addresses to a pool of four IP devices with a default gateway and a

default DNS address. Integrate the DHCP server with a BOOTP demon to automatically serve Windows and Linux OS Binaries based on client MAC address.

4. Configure, implement and debug the following: Use open source tools for debugging and diagnostics.
- a. ARP/RARP protocols
- b. RIP routing protocols
- c. BGP routing
- d. OSPF routing protocols
- e. Static routes (check using netstat)

5. Configure DNS: Make a caching DNS client, and a DNS Proxy; implement reverse DNS and forward DNS, using TCP dump/Wireshark characterise traffic when the DNS server is up and when it is down.

6. Configure FTP Server on a Linux/Windows machine using a FTP client/SFTP client characterise file transfer rate for a cluster of small files 100k each and a video file of 700mb.Use a TFTP client and repeat the experiment.

7. Configure a mail server for IMAP/POP protocols and write a simple SMTP client in C/C++/Java client to send and receive mails.

8. Implement Open NMS+ SNMPD for checking Device status of devices in community MIB of a Linux PC. Using yellow pages and NIS/NFS protocols implement Network Attached Storage Controller (NAS).Extend this to serve a windows client using SMB. Characterise the NAS traffic using wireshark.

9. Configure wireless network with AP, PC, Mobile Device.

(Level 5: 3rd Year, Semester – II)

(5.GV.05): Cyber Law and Ethics
Introduction of Cybercrime, Category of Cybercrime, Cybercrime Mobile & Wireless devices, Tools and Methods used in Cyber-crime, Phishing & Identity Theft, Cybercrime & Cybersecurity, Ethics.
Reference Books:
1. Cyber security by Nina Gobole & Sunit Belapune; Pub: Wiley India.
2. Mark F Grady, Fransesco Parisi, "The Law and Economics of Cyber Security", Cambridge University Press.

(5.GV.06): Cyber Forensics
Cyber Forensics Science, Cyber Crime Scene Analysis, Evidence Management & Presentation, Computer Forensics, Network Forensics, Mobile Forensics, Legal Aspects of Cyber Forensics, Recent trends in mobile forensic technique and methods to search and seizure electronic evidence.
Reference Books:
1. John Sammons, The Basics of Digital Forensics, Elsevier Model Curriculum of Engineering & Technology PG Courses [Volume-I]
2. John Vacca, Computer Forensics: Computer Crime Scene Investigation, Laxmi Publications

(5.GV.07): Penetration Testing
Comprehensive Pen Test Planning, Scoping, and Recon, In-Depth Scanning, Exploitation, Password Attacks and Merciless Pivoting, Domain Domination and Azure Annihilation, Penetration Test and Capture-the-Flag Workshop.
Reference Books:
1. Michael Sikorski, Andrew Honig "Practical Malware Analysis: The Hands-On Guide to Dissecting Malicious Software" publisher Williampollo.
2. Rafeeq Rehman: "Intrusion Detection with SNORT, Apache, MySQL, PHP and ACID," Prentice Hall.
3. Christopher Kruegel,Fredrik Valeur, Giovanni Vigna: "Intrusion Detection and Correlation Challenges and Solutions".
4. Carl Endorf, Eugene Schultz and Jim Mellander "Intrusion Detection & Prevention", Tata McGraw-Hill.
5. Stephen Northcutt, Judy Novak: "Network Intrusion Detection", New Riders Publishing.
6. T. Fahringer, R. Prodan, "A Text book on Grid Application Development and Computing Environment", Khanna Publishers.

(5.GV.08): Artificial Intelligence in Cyber security & Industry use cases
Introduction, Fathoming Artificial Intelligence, Applying Machine Learning and Deep Learning to Cybersecurity, Trends in Cybersecurity, Industry Use Cases.
Reference Books:
1. Leslie F. Sikos, "AI in Cybersecurity", Springer, 2018.
2. Ted Coombs, "Artificial Intelligence & Cybersecurity", IBM Limited Edition.
3. Alessandro Parisi, "Hands-On Artificial Intelligence for Cybersecurity"
4. Hands-On Artificial Intelligence for Cybersecurity, Implement smart AI systems for preventing cyber-attacks and detecting threats and network anomalies by Alessandro Parisi.

(5.VP.03): Project Work & Seminar-Presentation

On the basis of learning in the Diploma of Vocational, a project to be taken up by the student strengthening his / her vocational skills.

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