



VELS



INSTITUTE OF SCIENCE TECHNOLOGY
& ADVANCED STUDIES (VISTAS)
(Deemed to be University under section 3 of UGC Act, 1956)
NAAC ACCREDITED WITH 'A' GRADE

**B.Sc Computer Science with Specialization
in
Cyber Security**

Curriculum & Syllabus
(Based on Choice Based Credit System)
Effective from the Academic year
2020-2021

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

- PEO 1 :** Graduates will have solid basics in Mathematics, Programming, Computer Network, Network Security, Cyber Security fundamentals and advancements to solve technical problems.
- PEO 2 :** Graduates will have the capability to apply their knowledge and skills acquired to solve the issues in real world network and cyber security areas and to develop feasible and reliable systems to prevent and protect systems from security attack.
- PEO 3 :** Graduates will have the potential to participate in life-long learning through the successful completion of advanced degrees, continuing education, certifications and/or other professional developments.
- PEO 4 :** Graduates will have the ability to apply the gained knowledge to improve the society ensuring ethical and moral values.
- PEO 5 :** Graduates will have exposure to emerging cutting edge technologies and excellent training in the field of Computer network, Network security and Cyber security related issues.

PROGRAMME OUTCOMES (PO)

- PO 1 :** Develop knowledge in the field of cyber security courses necessary to qualify for the degree.
- PO 2 :** Acquire a rich basket of value added courses and soft skill courses instilling self-confidence and moral values.
- PO 3 :** Develop problem solving, decision making and communication skills.
- PO 4 :** Demonstrate social responsibility through Ethics and values and Environmental Studies related activities in the campus and in the society.
- PO 5 :** Strengthen the critical thinking skills and develop professionalism with the state of art ICT facilities.
- PO 6 :** Quality for higher education, government services, industry needs and start up units through continuous practice of preparatory examinations.
- PO 7 :** Gain inter-disciplinary, multi-disciplinary competence as value additions.

PROGRAMME SPECIFIC OUTCOMES (PSO)

- PSO 1 :** Ability to analyze a problem, and identify and define the security related issues appropriate to its solution.
- PSO 2 :** Ability to design, implement, and evaluate a security system that capable of identify, prevent and protect from malware attack
- PSO 3 :** Ability to communicate effectively through oral and written means.
- PSO 4 :** Ability to work in a team to achieve a common goal.
- PSO 5 :** Enhanced communication and leadership abilities and ability to work and learn in team environment.
- PSO 6 :** Understand the needs of society and sensitivity to societal responsibilities.

Board of Studies Members

Chairman : **Dr.P.Swaminathan**, Dean,
School of Computing Sciences,
Vels Institute of Science, Technology and Advanced Studies,
Chennai.

Internal Board Member : 1. **Dr.P.Mayilvahanan**, Professor,
Department of Computer Applications,
School of Computing Sciences,
Vels Institute of Science, Technology and Advanced Studies,
Chennai.
2. **Dr.S.Prasanna**, HOD,
Department of Computer Applications,
School of Computing Sciences,
Vels Institute of Science, Technology and Advanced Studies,
Chennai.
3. **Dr.Kamalakaran**, HOD,
Department of Information Technology,
School of Computing Sciences,
Vels Institute of Science, Technology and Advanced Studies,
Chennai..
4. **Dr.K.Kalaiselvi**, HOD,
Department of Computer Science,
School of Computing Sciences,
Vels Institute of Science, Technology and Advanced Studies,
Chennai.

External Member : **Dr.K.R.Ananthapadmanaban**, Professor & HOD,
Department of Computer Science,
SRM Arts and Science College, Chennai.

Industry Member

: Dr.P.Magesh Kumar,
Calibsoft Technologies Pvt Ltd., Chennai.

Special Invitees

: Dr.Jothi Venkateswaran, HOD,
Department of Computer Science,
Presidency College, Chennai.

Alumni Member

: Mr.R.Balamurugan, SCOPUS Ltd, Chennai.

B.Sc., COMPUTER SCIENCE WITH SPECIALIZATION IN CYBER SECURITY
CURRICULUM

Total number of Credits: 140

Category	Code No.	Course	Hours/Week			Credits
			Lecture	Tutorial	Practical	
SEMESTER I						
Core		Problem Solving and Python Programming	4	0	0	4
Core		Software Engineering	3	0	0	3
Core		Problem Solving and Python Programming Lab	0	0	4	2
Core		Mathematics-I	4	0	0	4
AECC		Language-I	5	0	0	5
AECC		English-I	5	0	0	5
TOTAL			21	0	4	23

Category	Code No.	Course	Hours/Week			Credits
			Lecture	Tutorial	Practical	
SEMESTER II						
Core		Mobile and Web Application security	3	0	0	3
Core		Introduction to Java Programming	4	0	0	4
Core		Java Programming Lab	0	0	4	2
Core		Mathematics-II	4	0	0	4
AECC		Language-II	5	0	0	5
AECC		English-II	5	0	0	5
TOTAL			21	0	4	23

Category	Code No.	Course	Hours/Week			Credits
			Lecture	Tutorial	Practical	
SEMESTER III						
Core		Information Security and Audit Monitoring	4	0	0	4
Core		Graph Theory and its Applications	4	0	0	4
Core		Internet of Things(IOT)	4	0	0	4
Core		Advanced Database Systems	4	0	0	4
Core		Advanced Database Systems Lab	0	0	4	2
Core		Graph Theory and its Applications Lab	0	0	4	2
GE		Generic Elective-I	2	0	0	2
SEC		Skill Enhancement Course-I	2	0	0	2

TOTAL	22	0	8	24
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Category	Code No.	Course	Hours/Week			Credits
			Lecture	Tutorial	Practical	
SEMESTER IV						
Core		Cyber Security	4	0	0	4
Core		Data Communication and Networking	4	0	0	4
Core		Firewall and Internet Security	4	0	0	4
Core		Communication Network Lab	0	0	4	2
Core		Cloud Computing and its Security	4	0	0	4
GE		Generic Elective-IV	2	0	0	2
SEC		Skill Enhancement Course-II	2	0	0	2
AECC		Environmental Science	2	0	0	2
TOTAL			22	0	4	24

Category	Code No.	Course	Hours/Week			Credits
			Lecture	Tutorial	Practical	
SEMESTER V						
Core		Artificial Intelligence	4	0	0	4
Core		Applied Cryptography	4	0	0	4
Core		Intrusion Detection and Prevention System	4	0	0	4
Core		Cryptography Lab	0	0	4	2
DSE		Discipline Specific Elective-I	4	0	0	4
DSE		Discipline Specific Elective-II	4	0	0	4
SEC		Skill Enhancement Course-III	2	0	0	2
TOTAL			22	0	4	24

Category	Code No.	Course	Hours/Week			Credits
			Lecture	Tutorial	Practical	
SEMESTER VI						
Core		Security Architecture	4	0	0	4
Core		Cyber Crime Investigation and Digital Forensics	4	0	0	4
Core		Cyber Crime Investigation and Digital Forensics Lab	0	0	4	2
DSE		Discipline Specific Elective-III	4	0	0	4
DSE		Discipline Specific Elective-IV	4	0	0	4
DSE		Project work	0	0	8	4
TOTAL			18	0	12	22

LIST OF DISCIPLINE SPECIFIC ELECTIVE COURSES

	Cyber Threat & Model
	Biometric Security
	Block Chain & Crypto currency
	Penetration testing
	Big data & IoT security
	Ethical hacking
	Risk management in Cyber Security
	Database security
	Mobile, wireless, VoIP security
	Hardware Security
	Cyber Law in India
	Management Information System
	Software Quality Assurance
	Ecommerce
	System Software
	Multimedia and its Applications

LIST OF GENERIC ELECTIVE COURSES

	Web Designing
	Client side Scripting Language
	Photoshop
	Flash
	Advanced Excel
	Statistical Package for Social Science
	Office Automation Tools
	Desktop Publishing
	MYSQL

LIST OF ABILITY ENHANCEMENT COMPULSORY COURSES

	Tamil Paper – I
	Tamil Paper – II
	French Paper-I
	French Paper-II
	Hindi Paper-I
	Hindi Paper-II
	English Paper-I
	English Paper-II
	Environmental Science

LIST OF SKILL ENHANCEMENT COURSES

	NSS
	Soft skill-I
	Soft skill-II
	Ethics and Values
	NPTEL and SWAYAM

SKILL ENHANCEMENT COURSE-I- Soft skill-I

SKILL ENHANCEMENT COURSE-II- Soft skill-II

SKILL ENHANCEMENT COURSE-III- Ethics and Values

Course Objective:

The course is designed to provide Basic knowledge of Python. Python programming is intended for software engineers, system analysts, program managers and user support personnel who wish to learn the Python programming language. Python is a language with a simple syntax and a powerful set of libraries. It is an interpreted language, with a rich programming environment. Student interested in using computation to enhance their problem solving abilities.

Course Outcomes:

CO-1: To Develop a basic understanding of programming and the Python programming language.

CO-2: To understand why Python is a useful scripting language for developers.

CO-3: To learn how to identify Python object types.

CO-4: To learn how to use indexing and slicing to access data in Python programs.

CO-5: To define the structure and components of a Python program.

CO-6: To learn how to design and program in Python applications.

CO-7: To learn how to write loops and decision statements in Python.

CO-8: To acquire Object Oriented Skills in Python use lists, Tuples and dictionaries.

CO-9: To learn how to build and package Python modules for reusability.

CO-10: To learn how to design object-oriented programs with Python classes.

CO-11: To develop the skill of designing Graphical user Interfaces in Python

CO-12: To develop the ability to write database applications in Python.

UNIT I INTRODUCTION TO PYTHON**12**

Define Python - Advantages of Python - History - Features - Uses - Variable and Data Types - Python Interpreter - Identifiers and keywords - Literals - Operators(Arithmetic operator, Relational operator, Logical or Boolean operator, Assignment, Operator, Ternary operator, Bit wise operator) - Defining Functions.

UNIT II OBJECTS AND DATA STRUCTURE**12**

Structure of a Python Program - Elements of Python Input and Output Statements - Control statements (Branching, Looping, Conditional Statement) - Exit function, Difference between break, continue and pass.) - Default arguments - Multiple assignment - while statement - for statement - A find function - Looping and counting.

UNIT III FUNCTIONS, STRINGS AND LISTS

12

Strings and Lists – String Manipulation - Accessing Strings - Basic Operations with String slices - Function and Methods - Recursion, Stack diagrams for recursive functions. List - Working with list - List values - Accessing elements - List membership - List operations - List deletion - Cloning lists - Nested lists - Using Python as calculator - Python shell - Indentation and Atoms.

UNIT IV OBJECT ORIENTED PROGRAMMING

12

Introduction to Classes - Objects and Methods - Standard Libraries - Tuples - Accessing tuples - Exception handling - Iteration - Conditional execution - Return statement and Operations – Opening and closing file - Reading and writing files - Dictionaries - Working with dictionaries - Exception Handling - Except clause - Try ? Finally clause.

UNIT V CASE STUDY

12

Basic Syntax - Setting up path - Working with Python – CGI – Networking – Multithreading - Generators and closures - Importing module - Math module - Packages - Composition – Sample Programs- Analyze Sales Outcome in Business - Automate the School Details to Analyze Performance.

Total: 60 Hours

Books for References:

1. Paul Barry, Mark Lutz, “Programming Python: Powerful Object-Oriented Programming”, (4th Edition), 2011.
2. Allen Downey, Jeff Elkner and Chris Meyers, “ Learning with Python: How to Think Like a Computer Scientist” ,2016.
3. John Zelle , “Python Programming: An Introduction to Computer Science”, 3rd Edition, January 2016.
4. Michael Urban and Joel Murach,” Python Programming”, Shroff/Murach, 2016.
5. Mark Lutz, “Programming Python”, O’Reilly, 4th Edition, 2010.
6. Guido van Rossum and Fred L. Drake Jr, “An Introduction to Python – Revised and updated for Python 3.2”, Network Theory Ltd., 2011.
7. John V Guttag, “Introduction to Computation and Programming Using Python“, Revised and expanded Edition, MIT Press, 2013.
8. Robert Sedgewick, Kevin Wayne, Robert Dondero, “Introduction to Programming in Python: An Inter-disciplinary Approach”, Pearson India Education Services Pvt. Ltd., 2016.
9. Reference Link: www.py4inf.com
10. Reference Link: www.pythonlearn.com
11. <https://www.tutorialspoint.com/python>

Course Objective:

This course introduces the basic concepts of software Engineering such as Planning, Design, Coding, Quality Assurance, Formal Verification, Code Metrics, Test Plans, Walk through and Distributed database.

Course Outcomes:

CO-1: Identify, formulate, analyze, and solve problems, as well as identify the computing requirements appropriate to their solutions.

CO-2: Ability to Learn Software Requirement Specifications

CO-3: Learn to design software and apply strategies of project management

CO-4: Apply rapid software development methods and decide on appropriate software architecture.

CO-5: To study and practice methods for analysis, design, testing, and implementation of large, Complex software systems

CO-6: Design, implement, and evaluate software-based systems, or programs of varying complexity that meet desired needs, satisfy realistic constraints, and demonstrate accepted design and development principles.

CO-7: To study the various perspectives on software quality and change management

CO-8: Use current techniques, skills, and tools necessary for professional practice.

CO-9: Understand ability to engage in life-long maintenance and continuing Software development.

CO-10: Think critically about ethical and social issues in software engineering for different Applications.

UNIT – I FUNDAMENTAL CONCEPTS OF SOFTWARE ENGINEERING 9

Introduction - Generic view of Software Process- Software Engineering: A Layered Technology - A Process Framework- Software Process Models-Management spectrum- Software project management- Measures and metrics

UNIT II - REQUIREMENT ANALYSIS 9

Software project planning – scope – resources-decomposition techniques- empirical estimation model-cocomo model-Risk analysis- Risk identification-Risk projection-Risk management @Monitoring RMMM plan.

UNIT III- SOFTWARE DESIGN CONCEPTS**9**

Design Concepts- Quality Elements, Quality Attributes- Fundamentals of Software Design Concepts- Design Models- Design Elements -Abstraction-Modularity-Coupling and Cohesion- Data flow diagram-Structured flowchart-Design techniques

UNIT IV- SOFTWARE TESTING**9**

Introduction to Testing-Test Strategies for Conventional Software-Unit Testing- Integration Testing-Test Strategies for Object Oriented Software-Validation Testing-Validation Test Criteria-Configuration Review- Alpha and Beta Testing-System Testing- Testing Tactics -White box Testing- Basis Path Testing -Control Structure Testing- Black Box Testing.

UNIT V - SOFTWARE MANAGEMENT**9**

Change Management- Software Configuration Management- The SCM Repository- The SCM Process- Quality Management- Quality Concepts- Software Quality Assurance- Software Review- Formal Technical Reviews- Formal Approaches to SQA- Software Reliability- The ISO 2000 Quality Standards- The SQA Plan

Total: 45 Hours**Books for References:**

1. Roger Pressman, Software Engineering: A Practitioner's Approach, Sixth Edition, 2005, McGraw Hill. New York.
2. Waman S Jawadekar ,Software Engineering: a Primer, First Edition, 2008, Tata McGraw Hill. New Delhi.
3. Deepak Jain, Software Engineering: Principles and Practices, First Edition, 2009, OxfordUniversity Press.
4. James Peters & Witold Pedrycz, Software Engineering: An engineering Approach, First Edition, 2007, Wiley-India.

PROBLEM SOLVING AND PYTHON PROGRAMMING LAB 0042

Course Objective:

To implement Python programs with conditionals and loops. Also represent compound data using Python lists, tuples, dictionaries and Read and write data from/to files in Python.

LIST OF PROGRAMS:

1. Compute the GCD of two numbers.
2. Find the square root of a number (Newton's method)
3. Exponentiation (power of a number)
4. Find the maximum of a list of numbers
5. Linear search and Binary search
6. Selection sort, Insertion sort
7. First n prime numbers
8. Multiply matrices
9. Programs that take command line arguments (word count)
10. Find the most frequent words in a text read from a file
11. Simulate elliptical orbits in Pygame
12. Simulate bouncing ball using Pygame

Course Objective:

To address the growing threat to mobile devices & web applications, networks and services delivered over the mobile & web application infrastructure. To provide an introduction to mobile and web application security. To explore the unique challenges facing mobile and web security This course also covers the security of mobile and web application services(WAS), such as VoIP, text messaging, WAP and mobile HTML.

Course Outcomes:

CO-1: Detect Mobile and Web application security threats.

CO-2: Classify the threats and develop a Security model to prevent, detect and recover from the attacks.

CO-3: Knowledge and understanding of Basics of Mobile and web application security.

CO-4: To be familiar with Mobile and web app security designs using available secure solutions.

CO-5: To be familiar with advanced security and malware issues.

CO-6: To develop the skills to overcome the security threats.

CO-7: To enable web applications to maintain high performance in the face of numerous users and attackers.

CO-8: To apply computer systems concepts to manage the scalability of the web application, and provide prominent service to large numbers of simultaneous users.

CO-9: To apply computer security concepts to designing a web application which is robust to known and unknown attacks.

CO-10: To enable creating applications that apply aforementioned design, performance, and security concepts.

UNIT I INTRODUCTION TO MOBILE SECURITY**9**

Introduction to Mobile Security – Building Blocks – Basic security and cryptographic techniques. - Security of GSM Networks - Security of UMTS Networks -LTE Security -WiFi and Bluetooth Security -SIM/UICC Security

UNIT II MOBILE SECURITY IMPLEMENTATION**9**

Mobile Malware and App Security- Android Security Model - IOS Security Model -Security Model of the Windows Phone - SMS/MMS, Mobile Geo location and Mobile Web Security-Security of Mobile VoIP Communications - Emerging Trends in Mobile Security

UNIT III SECURITY FUNDAMENTALS 9

Introduction to WWW security-Input Validation-Attack surface Reduction-Classifying and prioritizing threats-Hacking Methodology.

UNIT IV WEB APPLICATION SECURITY PRINCIPLES 9

Authentication-Authorization-Browser Security Principles-Cross site Scripting-Cross site Request Forgery.

UNIT V CASE STUDY 9

Mobile Application Protection Suite (MAPS): Find & Fix Security issues –Evaluate smart phone security issues-Web Applications Security and Vulnerability Analysis Financial Web Applications Security Audit – Securing Web Applications

Total:45 Hours

Books for References:

1. Himanshu Dviwedi, Chris Clark and David Thiel, “Mobile Application Security”, 1st Edition, 2010.
2. Bryan Sullivan,Vincent Liu, “Web Application Security-A Beginner’s Guide”, Mc Graw Hill, 1st edition, 2011.
3. Michael Cross, “Developer’s Guide to Web Application Security”, Syngress Publications, 1st edition, 2007.
4. Nouredine Boudriga, “Security of Mobile Communications”, 2009.

Course Objective:

To understand the concepts of object-oriented, event driven and concurrent programming paradigms and develop skills in Java.

Course Outcomes:

CO-1: Develop an in-depth understanding of functional, logic, and object-oriented Programming.

CO-2: An understanding the concepts of inheritance and polymorphism in Java.

CO-3: An ability to write object-oriented programs of moderate complexity in Java.

CO-4: To Expertise in AWT controls.

CO-5: An ability to incorporate exception handling in object-oriented programs.

CO-6: To gain the knowledge of Layout Management.

CO-7: An ability to write virtual machine programs.

CO-8: An understanding the concepts of Swing components.

CO-9: An ability to write concurrent programming.

CO-10: An ability to create generic programs.

UNIT I OBJECT-ORIENTEDPROGRAMMING – FUNDAMENTALS & INHERITANCE**12**

Review of OOP - Objects and classes in Java – defining classes – methods - access specifiers – static members – constructors – finalize method – Arrays – Strings - Packages – JavaDoc comments. Inheritance – class hierarchy – polymorphism – dynamic binding – final keyword – abstract classes – the Object class – Reflection – interfaces – object cloning – inner classes – proxies.

UNIT II EVENT-DRIVEN PROGRAMMING**12**

Graphics programming – Frame – Components – working with 2D shapes – Using color, fonts, and images - Basics of event handling – event handlers – adapter classes – actions – mouse events – AWT event hierarchy – introduction to Swing – Model-View- Controller design pattern – buttons – layout management – Swing Components

UNIT III GENERIC PROGRAMMING**12**

Motivation for generic programming – generic classes – generic methods – generic code and virtual machine – inheritance and generics – reflection and generics – exceptions – exception hierarchy – throwing and catching exceptions – Stack Trace Elements - assertions – logging

UNIT IV CONCURRENT PROGRAMMING

12

Multi-threaded programming – interrupting threads – thread states – thread properties – thread synchronization – thread-safe Collections – Executors – synchronizers – threads and event-driven programming.

UNIT V CASE STUDY

12

Working with the sample Java programs – Using Inheritance, Multithreading, swings, AWT controls and Layout management, Exception handling.

Total: 60 Hours

Books for References:

1. Cay S. Horstmann and Gary Cornell, “Core Java: Volume I – Fundamentals”, Eighth Edition, Sun Microsystems Press, 2008.
2. H. Schildt, “Java 2 - The Complete Reference”, Seventh Edition, TMH, 2007.
3. K. Arnold and J. Gosling and David Holmes, “The JAVA programming language”, Fourth edition, Addison Wesley, 2005.
4. Timothy Budd, “Understanding Object-oriented programming with Java”, Updated Edition, Pearson Education, 2000.
5. C. Thomas Wu, “An introduction to Object-oriented programming with Java”, Fourth Edition, Tata McGraw-Hill Publishing company Ltd., 2006.
6. <https://sites.google.com/site/herewego2win/home/java>

Course Objective:

The purpose of this course is to introduce the students to write the programs using Java. Be able to use the Java SDK environment to create, debug and run Java programs.

LIST OF PROGRAMS:

1. String Manipulation using Char Array.
2. Determining the order of numbers generated randomly using Random Class
3. Usage of Vector Class
4. Usage of Calendar Class
5. Programs to implement polymorphism and method overriding.
6. Programs implementing exception handling.
7. Programs to illustrate interfaces in java.
8. Programs to create package in java.
9. Working with Frames and Controls
10. Working with Dialogs and Menus
11. Working with Panel and Layout.
12. Working with Colors and Fonts

Course Objective:

To introduce the fundamental concepts and techniques in computer and network security, giving students an overview of information security and auditing, and to expose students to the latest trend of computer attack and defense.

Course Outcomes:

CO-1: Describe various information security issues and encryption principles.

CO-2: Implement symmetric and asymmetric cryptographic methods.

CO-3: Identify IP addresses range owned/used by the organization/systems in target.

CO-4: Describe the role and implementation of digital signatures.

CO-5: Implemented measures such as policies, systems to protect organizations from unauthorized access/transactions.

CO-6: Describe security mechanisms like intrusion detection, auditing and logging.

CO-7: Identify threats within the organization and surrounding the information systems.

CO-8: Inspect the security and controls review of information systems and infrastructure.

CO-9: Verify and ensure compliance with some the legislations and acts.

CO-10: Perform external audit through professional agencies to ensure that organizations security systems.

UNIT I A MODEL FOR INTERNETWORK SECURITY 12

Conventional Encryption Principles & Algorithms (DES, AES, RC4, Blowfish), Block Cipher Modes of Operation, Location of Encryption Devices, Key Distribution, Public key cryptography principles, public key cryptography algorithms (RSA, Diffie-Hellman, ECC), public Key Distribution.

UNIT II APPROACHES OF MESSAGE AUTHENTICATION 12

Secure Hash Functions (SHA-512, MD5) and HMAC, Digital Signatures, Kerberos, X.509 Directory Authentication Service, Email Security: Pretty Good Privacy (PGP) IP Security: Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

UNIT III WEB SECURITY REQUIREMENTS 12

Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).
Firewalls: Firewall Design principles, Trusted Systems, Intrusion Detection Systems.

UNIT IV AUDITING FOR SECURITY**12**

Introduction, Basic Terms Related to Audits, Security audits, The Need for Security Audits in Organization, Organizational Roles and Responsibilities for Security Audit, Auditors responsibility in Security Audits, Types of Security Audits.

UNIT V CASE STUDY**12**

Approaches to Audits, Technology based Audits Vulnerability Scanning and Penetration Testing, Resistance to Security Audits, Phase in security audit, Security audit Engagement Costs and other aspects, Budgeting for security audits, Selecting external Security Consultants, Key Success factors for security audits.

Total: 60 Hours**Books for References:**

1. W.Stalling, "Cryptography and Network Security Principles and Practices", 7th Edition, Pearson of India, 2018.
2. A.J. Elbirt, "Understanding and Applying Cryptography and Data Security", CRC Press, Taylor Francis Group, New York, 2015.
3. M. Merkow and J. Breithaupt," Information Security: Principles and Practices", Pearson Education, 2006.
4. Mark Stamp , "Information Security", Wiley – INDIA, 2006.
5. Robert Bragg, Mark Rhodes, " Network Security: The complete reference", TMH, 2017.
6. Rick Lehtinen, Deborah Russell & G. T. Gangemi Sr., " Computer Security Basics" , SPD O'REILLY 2006.
7. Wenbo Mao, " Modern Cryptography", Pearson Education 2007.
8. Whitman, " Principles of Information Security", CENGAGE Learning Custom Publishing; 4th ed. Edition, 2011.

Course Objective:

To understand fundamentals of graph theory, techniques related to various concepts in graphs and explore modern applications of graph theory.

Course Outcomes:

CO-1: Understand the basic concepts of graphs, and different types of graphs and illustrate fundamentals of cut edges and cut vertices..

CO-2: Identify special graphs like Euler graphs and Hamiltonian graphs.

CO-3: Model problems in different types of basic graphs like trees, bipartite graphs and planar Graphs.

CO-4: Understand the properties, theorems and be able to prove theorems and apply graph model for solving applications.

CO-5: Make use of theoretical knowledge and independent mathematical thinking in graph theory.

CO-6: Able to identify various forms of connectedness in a graph and Matching.

CO-7: Learn about connectivity and paths, explore about Ford-Fulkerson algorithm.

CO-8: Able to solve Network flow problems and learn about line graphs.

CO-9: Discuss about chromatic characteristics and planar graph.

CO-10: Apply different graph-coloring theorems for coloring problems get their solutions.

UNIT I FUNDAMENTAL CONCEPTS 12

Definitions, examples of problems in graph theory, adjacency and incidence matrices, isomorphism, paths, walks, cycles, components, cut-edges, cut-vertices, bipartite graphs, Eulerian graphs, vertex degrees, reconstruction conjecture, external problems, degree sequences, directed graphs, de Bruijn cycles, Orientations and tournaments.

UNIT II TREES 12

Trees and forests, characterizations of trees, spanning trees, radius and diameter, enumeration of trees, Cayley's formula, Prüfer code, counting spanning trees, deletion-contraction, matrix tree theorem, graceful labeling, minimum spanning trees (Kruskal's algorithm), shortest paths (Dijkstra's algorithm).

UNIT III MATCHING AND COVERS 12

Matchings, maximal and maximum matchings, M-augmenting paths, Hall's theorem and consequences,

Min-max theorems, maximum matchings and vertex covers, independent sets and edge covers, Connectivity, vertex cuts, Edge-connectivity.

UNIT IV CONNECTIVITY AND PATHS

12

Blocks, k-connected graphs, Menger's theorem, line graphs, network flow problems, flows and source/sink cuts, Ford-Fulkerson algorithm, Max-flow min-cut theorem.

UNIT V GRAPH COLORING AND CASE STUDY

12

Vertex colorings, bounds on chromatic numbers, Chromatic numbers of graphs constructed from smaller graphs, chromatic polynomials, properties of the chromatic polynomial, the deletion-contraction recurrence. Planar Graphs: Planar graphs, Euler's formula, Kuratowski's theorem, five and four color theorems. Case Study- Core Network Design using Graph Theory Method, Feasible Sanitary Sewer Network Generation Using Graph Theory.

Total: 60 Hours

Books for References:

1. Douglas B West, "Introduction to Graph Theory", II Edition , Pearson, 2017.
2. Gary Chartrand and Ping Zhang, "Introduction to Graph Theory", Tata McGraw Hill 2017.
3. Jonathan L. Gross and Jay Yellen, "Graph Theory and Its Applications", 2nd Edition, Chapman Hall (CRC), 2005.

Course Objective:

To study the game theory that include several topics that cover a diversity of new game theoretic tools.

LIST OF PROGRAMS:

1. Develop a combinatorial Game Theory | Set 3 (Grundy numbers/Nimbers and Mex)
2. Develop a combinatorial Game Theory | Set 4 (Sprague/ Grundy numbers)
3. Develop a Minimax Algorithm in Game Theory | Set 1 (Introduction)
4. Develop a Minimax Algorithm in Game Theory | Set 2 (Introduction to Evaluation Function)
5. Develop a Minimax Algorithm in Game Theory | Set 4 (Alpha-Beta Pruning)
6. Develop a Minimax Algorithm in Game Theory | Set 5 (Zobrist Hashing)
7. Develop the Game check if the game is valid or not.
8. Develop the prisoner's dilemma in Game theory
9. Develop the Game of N stones where each player can remove 1,3 or 4
10. Develop the Game of NIM with removal of one stone allowed
11. Develop the Game of replacing array elements
12. Develop to find the winner in NIM – game.

Course Objective:

This course aims to give students in depth information about system implementation techniques, data storage, representing data elements, database system architecture, the system catalog, query processing and optimization, transaction processing concepts, concurrency control techniques, distributed databases and client server architecture, advanced database concepts, and emerging technologies and applications.

Course Outcomes:

CO-1: Ability to define a problem at the view level & ability to understand the physical structure of the database to handle data.

CO-2: Students would be able to apply the logic in different applications.

CO-3: Ability to normalize the database & understand the internal data structure.

CO-4: Students would clearly understand the transaction system & could extract data efficiently.

CO-5: Define user accounts and associated resources and privileges.

CO-6: Make backup copies and recover the state of the DB after a system failure.

CO-7: Establish and manage audit controls.

CO-8: Understand the notion of transaction and its ACID properties.

CO-9: Have knowledge of concurrency control mechanisms.

CO-10: Define links between databases on different nodes and work with the multiple databases.

UNIT I QUERY EXECUTION**12**

Introduction to Physical-Query-Plan Operators - One-Pass Algorithms for Database – Operations - Nested-Loop Joins - Two-Pass Algorithms Based on Sorting - Two-Pass - Algorithms Based on Hashing - Index-Based Algorithms - Buffer Management - Parallel Algorithms for Relational Operations - Using Heuristics in Query Optimization - Basic Algorithms for Executing Query Operations.

UNIT II CONCURRENCY CONTROL SERIALIZABILITY**12**

Enforcing - Serializability by Locks - Locking Systems With Several - Lock Modes - Architecture for a Locking Scheduler Managing Hierarchies of Database Elements -Concurrency Control by Timestamps - Concurrency Control by Validation - Database recovery management.

UNIT III TRANSACTION PROCESSING**12**

Introduction of transaction processing - advantages and disadvantages of transaction processing system -

online transaction processing system -serializability and recoverability - view serializability - resolving deadlock - distributed locking - Transaction management in multi-database system - long duration transaction - high-performance transaction system.

UNIT IV DISTRIBUTED DATABASE

12

Introduction of DDB - DDBMS architectures - Homogeneous and Heterogeneous databases - Distributed data storage - Advantages of Data Distribution - Disadvantages of Data Distribution Distributed Transactions -Commit protocols – Availability - Concurrency control & recovery in distributed databases - Directory systems - Data Replication - Data Fragmentation - Distributed database transparency features - distribution transparency.

UNIT V DATABASE APPLICATION

12

Active database - starburst, oracle, DB2, chimera - Applications of active database, design principles for active rules - Temporal database, special, text and multimedia database - Video database management: storage management for video - video preprocessing for content representation and indexing, image and semantic- based query processing - real time buffer management.

Total : 60 Hours

Books for References:

1. Date C. J, “An Introduction to Database Systems”, Addison Wesley Longman, 8th Edition, 2003.
2. Catell, R.G.G., Barry, D.K., Berler, M., et al, “The Object Data Standard: ODMG 3.0”, Morgan Kaufmann, 2000.
3. Silberschatz A., Korth H., and Sudarshan S, “Database System Concepts”, McGraw- Hill, 6th Edition, 2010.
4. Charles F. Goldfarb, Paul Prescod, “The XML Handbook, Prentice Hall”, 5th Edition, 2004.
5. Thomas M. Connolly, Carolyn Begg, “Database Systems: Practical approach to Design, Implementation and Management”, Pearson Education Limited, 6th edition, 2012.

Course Objective

The student learns to work in PL/SQL Cursors, Stored Procedures, Collections, Transactions and Error Handling. The students will also be able to implement Timestamp ordering Protocol and Deadlock Avoidance concepts.

1. Learning basic DDL, DML, DCL and TCL commands
2. Working with dual table.
3. PL/SQL-Data types, control structures.
4. Creating Stored Procedures with PL/ SQL.
5. Error handling in PL/ SQL.
6. Cursor Management in PL/ SQL.
7. Writing Programs on Packages & triggers.
8. PL/SQL – Collections
9. PL/SQL- Transactions
10. Embedding PL/SQL in high level language.
11. Implement Timestamp Ordering Protocol in PL/SQL.
12. Implement Deadlock Avoidance in PL/SQL.

Course Objective

To understand the fundamentals of Internet of Things and to apply the concept in Real World Scenario.

Course Outcomes:

CO-1: To assess the vision and introduction of IoT.

CO-2: To Understand IoT Market perspective.

CO-3: To Implement Data and Knowledge Management and use of Devices in IoT technology.

CO-4: To Understand State of the Art - IoT Architecture.

CO-5: To classify Real World IoT Design Constraints, Industrial Automation in IoT.

CO-6: To understand where the IoT concept fits within the broader ICT industry and possible future Trends

CO-7: To Understand and be able to explain the role of big data, cloud computing and data analytics in a typical IoT system

CO-8 : Able to understand building blocks of Internet of Things and characteristics.

CO-9: Able to understand the application areas of IOT.

CO-10: Apply effective techniques to create IoT based projects.

UNIT I OVERVIEW 12

IoT- An Architectural Overview- Building an architecture - Main design principles and needed capabilities - An IoT architecture outline - Standards considerations.

UNIT II M2M AND IOT TECHNOLOGY FUNDAMENTALS 12

Devices and gateways- Local and wide area networking- Data management- Business processes in IoT- Everything as a Service (XaaS) - M2M and IoT Analytics- Knowledge Management.

UNIT III REFERENCE ARCHITECTURE 12

Introduction - IoT reference Model - IoT Reference Architecture-Functional View- Information View- Deployment and Operational View- Other Relevant architectural views.

UNIT IV REAL-WORLD DESIGN CONSTRAINT 12

Introduction- Technical Design constraints - Data representation and visualization, Interaction and remote control. IoT systems management - IoT Design Methodology - specifications - Integration and Application Development.

UNIT V CASE STUDY 12

Various Real time applications of IoT- Connecting IoT to cloud - Cloud Storage for Iot - Data Analytics for IoT - Software & Management Tools for IoT.

Total Hours: 60 hours

Book for References:

1. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Aves and, Stamatis Karnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1st Edition, Academic Press, 2014.
2. Peter Waher, "Learning Internet of Things", PACKT publishing, Birmingham, Mumbai, 2005.
3. Arshdeep Bahga, Vijay Madisetti, "Internet of Things – A hands-on approach", Universities Press, 2012.

Course Objective:

This course provides the foundation for understanding the key issues associated with protecting information assets. The purpose of the course is to provide the student with an overview of the field of information security and assurance.

Course Outcomes:

CO-1: Understand the broad set of technical, social & political aspects of Cyber Security.

CO-2: Appreciate the vulnerabilities and threats posed by criminals, terrorist and nation states to national infrastructure.

CO-6: Understand the importance of ethical hacking tool.

CO-7: Understanding the ethical hacking process.

CO-8: Implementing ethical hacking tools in an organization.

CO-9: Apply security principles to system design.

CO-10: Apply methods for authentication, access control, intrusion detection and prevention and conduct research in Cyber Security

UNIT I INTRODUCTION 12

Introduction to Cyber Security - Importance and challenges in Cyber Security - Cyberspace - Cyber threats - Cyber warfare - CIA Triad - Cyber Terrorism - Cyber Security of Critical Infrastructure - Cyber security -Organizational Implications.

UNIT II HACKERS AND CYBER CRIMES 12

Types of Hackers - Hackers and Crackers - Cyber-Attacks and Vulnerabilities - Malware threats - Sniffing - Gaining Access - Escalating Privileges - Executing Applications - Hiding Files - Covering Tracks - Worms - Trojans - Viruses - Backdoors

UNIT III ETHICAL HACKINGAND SOCIAL ENGINEERING 12

Ethical Hacking Concepts and Scopes - Threats and Attack Vectors - Information Assurance - Threat Modeling - Enterprise Information Security Architecture - Vulnerability Assessment and Penetration

Testing - Types of Social Engineering - Insider Attack - Preventing Insider Threats - Social Engineering Targets and Defence Strategies.

UNIT IV CYBER FORENSICS AND AUDITING

12

Introduction to Cyber Forensics - Computer Equipment and associated storage media - Role of forensics Investigator - Forensics Investigation Process - Collecting Network based Evidence - Writing Computer Forensics Reports - Auditing - Plan an audit against a set of audit criteria - Information Security Management System Management. Introduction to ISO 27001:2013.

UNIT V CYBER ETHICS AND LAWS

12

Introduction to Cyber Laws - E-Commerce and E-Governance - Certifying Authority and Controller - Offences under IT Act- Computer Offences and its penalty under IT Act 2000 - Intellectual Property Rights in Cyberspace.

Total: 60 Hours

Books for References:

1. Donaldson, S., Siegel, S., Williams, C.K., Aslam, A., “Enterprise Cyber security -How to Build a Successful Cyber defense Program against Advanced Threats”, Apress, 1st Edition, 2015.
2. Nina Godbole, Sumit Belapure, “Cyber Security”, Willey, 2011.
3. Roger Grimes, “ Hacking the Hacker” , Willey, 1st Edition, 2017.
4. Cyber Law By Bare Act, Govt of India, It Act 2000

Course Objective:

To familiarize the students with networking concepts, to understand OSI reference model for networking protocols, TCP/IP implementation, LANs/WANs, internetworking technologies, Routing and Addressing.

Course Outcomes:

CO-1: Understand the concept of Computer networks and Data Transmission.

CO-2: Illustrate basic reference models with layers and interfaces.

CO-3: Understand different types of protocols used for transmission of data.

CO-4: Understanding about routing and addressing.

CO-5: Apply Algorithm for congestion control.

CO-6: Analyze media access control techniques and data flow.

CO-7: Distinguish the functionalities of different Layers.

CO-8: Apply error detection and control methods.

CO-9: Model the LAN and WAN configuration using different media.

CO-10: Examine problems of a computer networks.

UNIT I INTRODUCTION TO DATA COMMUNICATION 12

Computer Network- Advantages and Disadvantages of Computer Network- Communication system- Analog and digital data-Network as platform- The Elements of Network- Converged network- The Architecture of Internet- Trends in Networking- Data Transmission- Analog Transmission- Digital Transmission-Transmission impairment- Introduction to LANs, WANs and Internetworks.

UNIT II APPLICATION LAYER AND TRANSPORT LAYER 12

Application Layer Functionality and Protocols- Introduction, making provision for applications and services- Application layer protocols and services- OSI Transport Layer- The TCP protocol – communicating with reliability, Managing TCP sessions-The UDP protocol communicating with low overheads.

UNIT III NETWORK LAYER AND ADDRESSING 12

OSI Network Layer- Introduction, Networks-dividing host into groups, Routing –How our data packets are handled- Routing process- Congestion Control Algorithm-Addressing the Network - IPv4, Introduction-Address for different purpose- Assigning address- Calculating address- testing the Network

layer, Subnetting.

UNIT IV DATA LINK LAYER AND PHYSICAL LAYER

12

Introduction-Data Link Layer-Accessing the media -Media Access Control Techniques-Media Access Control Addressing and Framing Data- Flow Control- Stop and Wait-Sliding Window- Error Detection- Error Control-HDLC Physical Layer-Data Encoding- D

igital data-digital signals-Analog signals- Analog data- Synchronous and Asynchronous transfer- Multiplexing- Frequency division multiplexing- Time division multiplexing Transmission- Twisted pair- Coaxial cable- Optical Fibers- Wireless transmission- Microwaves- Radio waves- Infrared.

UNIT V ETHERNET AND CASE STUDY

12

Overview of Ethernet, Ethernet Communication through the LAN- The Ethernet Frame-Ethernet Media Access Control- Ethernet Physical Layer- Hubs and Switches-Address Resolution Protocol(ARP)- Case Study on Planning and Cabling Networks - LANs-Making the Physical connections- Device Selection Factors- Device Interconnecting.

Total: 60 Hours

Books for References:

1. Behrouz Forouzan, “Data Communications and Networking”, Edition 5, Tata McGraw-Hill., 2012.
2. Andrews S. Tanenbaum, David J Wetherall, “Computer Networks”, Edition 5, Pearson Education, 2012.
3. William Stallings, “Data & Computer Communications”, PHI, Edition 6, 2012.
4. Jerry Fitzgerald, Alan Dennis, “Business Data Communications & Networking” , John Wiley & Sons Inc, 2010.

Course Objective:

This course introduces the basic concept of Firewalls, fundamentals of internet security and security architecture, the different kinds of security threats in networks, databases and their solutions.

Course Outcomes:

CO-1: To understand the fundamentals of firewalls and internet security.

CO-2: To differentiate malicious and non-malicious code.

CO-3: To list and explain various type of threats in networks.

CO-4: To understand the concept of controls against program threat and to find the vulnerabilities in programs.

CO-5: To impart knowledge about file protection mechanism and authentication.

CO-6: To learn about the concept of database security and to write secured transactions in databases.

CO-7: To understand the security requirements and multilevel database.

CO-8: To expose the students to the proposals for multilevel security.

CO-9: To impart knowledge about types of disclosures and wireless security.

CO-10: To understand the concept of Intrusion detection systems and virtual private networks.

UNIT I FIREWALLS AND SECURITY MECHANISM 12

Introduction – Types of Firewalls – Packet filters – Application gate ways – Limitations of firewalls - Internet Security - Email security – PGP - S/MIME - IP security – Overview – IP Security Architecture - Web security - SSL, TLS, SET.

UNIT III PROGRAM SECURITY 12

Secure programs – Non-malicious Program Errors – Viruses – Targeted Malicious code – Controls against Program Threat – Control of Access to General Objects – User Authentication – Good Coding Practices – Open Web Application Security Project Top 10 Flaws – Common Weakness Enumeration Top 25 Most Dangerous Software Errors.

UNIT III OPERATING SYSTEM SECURITY 12

Protected objects and methods of protection- Memory address protection- Control of access to general objects- File protection mechanism-Authentication: Authentication basics- Password- Challenge-response- Biometrics.

UNIT IV SECURITY IN DATABASES**12**

Security requirements of database systems – Reliability and Integrity in databases – Two Phase Update – Redundancy/Internal Consistency – Recovery – Concurrency/Consistency – Monitors – Sensitive Data – Types of disclosures – Inference.

UNIT V SECURITY IN NETWORKS AND CASE STUDY**12**

Threats in networks – Encryption – Virtual Private Networks – PKI – SSH – SSL – IPSec –Content Integrity – Access Controls – Wireless Security – Honeypots – Traffic Flow Security – Firewalls – Intrusion Detection Systems – Secure e-mail.

Total: 60 Hours**Books for References:**

1. Charles P. Pfleeger, Shari Lawrence Pfleeger, “Security in Computing”, Fourth Edition, Pearson Education, 2007.
2. Matt Bishop, “Computer Security: Art and Science”, Pearson Education, 2003.
3. William Stallings, “Cryptography and Network Security: Principles and Practices”, Fifth Edition, Prentice Hall, 2010.
4. Michael Howard, David LeBlanc, John Viega, “24 Deadly Sins of Software Security: Programming Flaws and How to Fix Them”, First Edition, Mc Graw Hill Osborne Media, 2009.
5. Kaufman, Perlman, Speciner, “Network Security”, Prentice Hall, 2nd Edition, 2003.
6. Eric Maiwald, “Network Security: A Beginner’s Guide”, TMH, 1999.
7. Macro Pistoia, Java Network Security, Pearson Education, 2nd Edition, 1999.
8. Whitman, Mattord, Principles of Information Security, Thomson, 2nd Edition, 2005.

Course Objective:

The student learns to work with various Redundancy Check Algorithms, Sliding Window Protocol, Routing Algorithm, Subnetting Procedures.

LIST OF PROGRAMS:

1. To detect Errors using Vertical Redundancy Check (VRC).
2. To detect Errors using Longitudinal Redundancy Check (LRC).
3. To detect Errors using Cyclic Redundancy Check (CRC).
4. Socket programming to implement Asynchronous Communication.
5. Socket programming to implement Isochronous Communication.
6. To implement Stop & Wait Protocol.
7. To implement Sliding Window Protocol.
8. To implement the Shortest Path Routing using Dijkstra algorithm.
9. Socket Programming to Perform file transfer from Server to the Client.
10. To implement Remote Procedure call under Client / Server Environment.
11. Code simulating PING and TRACEROUTE commands
12. Implementing of Subnetting

Course Objective:

The course introduces the fundamental concepts of cloud computing, its services and Tools. It concentrates the basic concepts of security systems and cryptographic protocols, which are widely used in the design of cloud security. The issues related multi tenancy operation, virtualized infrastructure security and methods to improve virtualization security are also dealt with in this course.

Course Outcomes:

CO-1: To provide students the knowledge of fundamentals and essentials of Cloud Computing.

CO-2: Understand the importance of virtualization in distributed computing and how this has enabled the development of Cloud Computing

CO-3: Identify the appropriate cloud services for a given application.

CO-4: Analyze Cloud infrastructure including Google Cloud and Amazon Cloud

CO-5: Compare modern security concepts as they are applied to cloud computing.

CO-6: Assess the security of virtual systems.

CO-7: Evaluate the security issues related to multi-tenancy.

CO-8: Apprise compliance issues that arise from cloud computing.

CO-9: Analyze authentication, confidentiality and privacy issues in cloud computing.

CO-10: Identify security implications in cloud computing.

UNIT 1 CLOUD COMPUTING**12**

History of Cloud Computing – Cloud Architecture – Cloud Storage – Why Cloud Computing Matters – Advantages of Cloud Computing – Disadvantages of Cloud Computing – Companies in the Cloud Today – Cloud Services.

UNIT 2 WEB-BASED APPLICATION**12**

Pros and Cons of Cloud Service Development – Types of Cloud Service Development– Software as a Service – Platform as a Service – Web Services – On-Demand Computing – Discovering Cloud Services Development Services and Tools – Amazon Ec2 – Google App Engine – IBM Clouds.

UNIT III SECURITY CONCEPTS**12**

Confidentiality – Privacy – Integrity – Authentication - Non-repudiation – Availability - Access control - Defence in depth – Least privilege - How these concepts apply in the cloud - Importance in PaaS, IaaS and SaaS. - User authentication in the cloud- Cryptographic Systems: Symmetric cryptography - Stream

ciphers - Block ciphers - Modes of operation - Public-key cryptography – Hashing - Digital signatures - Public-key infrastructures - Key management - X.509 certificates - OpenSSL.

UNIT IV MULTI-TENANCY ISSUES 12

Isolation of users/VMs from each other - Virtualization System Security Issues- ESX and ESXi Security - ESX file system security - Storage considerations - Backup and Recovery - Virtualization System Vulnerabilities - Management console vulnerabilities - Management server vulnerabilities - Administrative VM vulnerabilities - Guest VM vulnerabilities - Hypervisor vulnerabilities - Hypervisor escape vulnerabilities - Configuration issues - Malware.

UNIT V LEGAL, COMPLIANCE ISSUES AND CASE STUDIES 12

Responsibility - Ownership of data - Right to penetration test - Examination of modern Security Standards - How standards deal with cloud services and virtualization - C compliance for the cloud provider vs. compliance for the customer – Case Studies: Cryptography for Remote Access and Support - A Secure Network for a Private Cloud.

Total: 60 Hours

Books for References:

1. Michael Miller, “Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online”, Que Publishing, August 2008.
2. Haley Beard, “Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs”, Emereo Pty Limited, July 2008.
3. Tim Mather, Subra Kumaraswamy, ShahedLatif, “Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance”, O'Reilly Media; 1 edition [ISBN: 0596802765], 2009.
4. Ronald L. Krutz, Russell Dean Vines, “Cloud Security”, [ISBN: 0470589876], 2010.
5. John Rittinghouse, James Ransome, “Cloud Computing” ,CRC Press; 1st Edition [ISBN: 1439806802], 2009.
6. J.R. ("Vic") Winkler, “Securing the Cloud” ,Syngress [ISBN: 1597495921] , 2011.

Course Objective:

The course will address key AI technologies in an attempt to help in understanding their role in cyber security and the implications of these new technologies to the world of politics. AI deficiently will complement and strengthen the cyber security practices and will improve their applications in enhancing our security.

Course Outcomes:

CO-1: Understand the Future of Artificial Intelligence and cyber security.

CO-2: Analyze the different Problem Solving Approaches.

CO-3: Evaluate the security issues of web applications, services and servers.

CO-4: Analyze software agents and applications.

CO-5: Assess different Cyber Security Vulnerabilities.

CO-6: Learn types of safeguard methods.

CO-7: Illustrate the methods and tools used for cybercrime investigation.

CO-8: Design an approach to prevent cybercrime offenses.

CO-9: Apply the knowledge to discuss about existing case studies.

CO-10: Design a method to solve a problem in different perspective.

UNIT I INTRODUCTION TO ARTIFICIAL INTELLIGENCE 12

Introduction–Definition – Future of Artificial Intelligence – Characteristics of Intelligent Agents– Typical Intelligent Agents – Problem Solving Approach to Typical AI problems- Algorithms and Optimization Problems -Searching with Partial Observations – Constraint Satisfaction Problems – Constraint Propagation – Backtracking Search – Game Playing – Optimal Decisions in Games – Alpha – Beta Pruning – Stochastic Games.

UNIT II SOFTWARE AGENTS AND APPLICATIONS 12

Architecture for Intelligent Agents – Agent communication – Negotiation and Bargaining – Argumentation among Agents – Trust and Reputation in Multi-agent systems- AI applications – Language Models – Information Retrieval- Information Extraction – Natural Language Processing – Machine Translation – Speech Recognition – Robot – Hardware – Perception – Planning – Moving.

UNIT III CYBER SECURITY VULNERABILITIES AND SAFEGUARDS 12

Cyber Security Vulnerabilities-Overview- vulnerabilities in software-System administration-Complex Network Architectures- Open Access to Organizational Data-Weak Authentication- Unprotected Broadband communications-Poor Cyber Security Awareness- Cyber Security Safeguards- Access control- Cryptography- Deception-Denial of Service Filters-Ethical Hacking- Firewalls-Intrusion Detection Systems- Threat Management.

UNIT IV SECURING WEB APPLICATION, SERVICES AND SERVERS **12**

Basic security for HTTP Applications and Services- Basic Security for SOAP Services- Identity Management and Web Services- Authorization Patterns- Security Considerations- Challenges - Malware infection, Intrusion detection and Prevention Techniques, Anti-Malware software-Botnet detection-Spam filter applications-Hacking incident forecasting-cyber security ratings.

UNIT V CYBER FORENSICS AND CASE STUDIES **12**

Introduction to Cyber Forensics- Conducting disk-based analysis- Investigating Information-hiding-Scrutinizing E-mail- Tracing Internet access- Tracing memory in real-time-Case study: Cyber Security Regulations- Roles of International Law- Cyber Security Standards-The INDIAN Cyberspace- National Cyber Security Policy 2013.

Total: 60 Hours

Books for References:

1. Stuart Russell and Peter Norvig, “Artificial Intelligence: A Modern Approach”, 3rd Edition, 2010.
2. James Graham, Richar Howard,Ryan Olson, “Cyber Security Essentials”, CRC Press, Tailor and Francis Group, 2011.
3. Nina Godbole, Sunit Belapur, “Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives”, Wiley India Publications, April, 2011.
4. <https://www.cyberralegalservices.com/detail-casestudies.php>.

Course Objective:

To understand the basics of cryptography for learning and to find the vulnerabilities in programs and to overcome them, know the different kinds of security threats in networks and its solution. There are different kinds of security threats in databases and solutions available and to learn about the models and standards for security.

Course Outcomes:

CO-1: Apply cryptographic algorithms for encrypting and decryption for secure data transmission.

CO-2: Understand the importance of Digital signature for secure e-documents exchange.

CO-3: Understand the program threats and apply good programming practice.

CO-4: Get the knowledge about the security services available for internet and web applications.

CO-5: Understand data vulnerability.

CO-6: Gain the knowledge of security models and published standards.

CO-7: Apply security principles to system design.

CO-8: Identify and investigate network security threat.

CO-9: Analyze and design network security protocols.

CO-10: Conduct research in network security.

UNIT I INTRODUCTION TO CRYPTOGRAPHY**12**

Introduction to Cryptography, Security Threats, Vulnerability, Active and Passive attacks, Security services and mechanism, Conventional Encryption Model- Classical Cryptography: Dimensions of Cryptography, Classical Cryptographic Techniques.

UNIT II BLOCK CIPHERS & PUBLIC KEY CRYPTOGRAPHY**12**

Data Encryption Standard-Block cipher principles-block cipher modes of operation-Advanced Encryption Standard (AES). Public key cryptography: Principles of public key cryptosystems-The RSA algorithm-Key management – Diffie-Hellman Key exchange-Elliptic curve cryptosystem.

UNIT III HASH FUNCTIONS AND DIGITAL SIGNATURE**12**

Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC –MD4&MD5 Message Digest Algorithm – SHA – HMAC – CMAC – Digital signature and authentication protocols – DSS – Elgamal – Schnorr signature.

UNIT IV SECURITY PRACTICE AND SYSTEM SECURITY

12

Authentication applications – Kerberos – X.509 Authentication services – Internet Firewalls for Trusted System: Roles of Firewalls – Firewall related terminology- Types of Firewalls – Firewall designs – SET for E-Commerce Transactions.

UNIT V E-MAIL SECURITY AND CASE STUDY

12

E-mail Security: Security Services for E-mail-attacks possible through E-mail – Establishing keys privacy- Authentication of the source-Message Integrity-Non-repudiation-Pretty Good Privacy-S/MIME- Internet Key Exchange Case Studies on Cryptography and security: Secure Multiparty Calculation, Virtual Elections, Single sign On, Secure Inter-branch Payment Transactions, Cross site Scripting Vulnerability.

Total: 60 Hours

Books for References:

1. William Stallings, “Cryptography and Network Security: Principles and Practices”, 6th Edition, Pearson Education Ltd, 2016.
2. Bart Preneel, Christof Paar, Jan Pelzl, “Understanding Cryptography”, Springer-Verlag Berlin Heidelberg, 2010.
3. Atul Kahate, “Cryptography and Network Security”, Mc Graw Hill, 3rd Edition, 2011.
4. Behrouz A.Forouzan, Debdeep Mukhopadhyay, “Cryptography and Network Security”,
5. Tata McGraw Hill Second Edition, 2010.
6. Wenbo Mao, “ Modern Cryptography: Theory and Practice”, Prentice Hall PTR, 1st Edition, 2003.
7. Douglas R. Stinson , “Cryptography: Theory and Practice”, CRC press, 3rd Edition, 2005.

Course Objective:

To prepare students to know regarding the common threats faced today and the necessity of intrusion detection systems for securing the systems. To understand the essential concepts of intrusion detection and prevention. Be familiar with principles and techniques used in intrusion detection and taxonomy of intrusion detection systems. Acquiring knowledge on the state of art of the research in intrusion detection and prevention systems. Enable students to do independent research and be able to model and implement intrusion detection systems.

Course Outcomes:

CO -1: Understand the physical location, the operational characteristics and the various functions performed by the intrusion detection and prevention system.

CO- 2: Describe the detection approaches.

CO-3: Understand the taxonomy of the anomaly detections using fuzzy logic.

CO-4: How to detect network attacks and troubleshoot network problems.

CO-5: To understand the concepts of Prior strong experience in operating system and prior hands-on experience.

CO-6: Understand the tiered architecture and its implementation.

CO-7: Describe how components in different layers inter-operate in the intrusion detection and prevention system.

CO-8: Learn new techniques and to align new security technologies to existing network infrastructure.

CO-9: Understand the current and effective architecture to deal with network security threats.

CO-10: Apply intrusion detection alerts and logs to distinguish attack by using SNORT tool.

UNIT I INTRODUCTION**12**

Understanding Intrusion Detection –Intrusion detection and prevention basics –IDS and IPS analysis schemes, Attacks, Detection approaches –Misuse detection – anomaly detection –specification-based detection – hybrid detection.

UNIT II THEORETICAL FOUNDATIONS OF DETECTION**12**

Taxonomy of anomaly detection system –fuzzy logic –Bayes theory –Artificial Neural networks Support vector machine –Evolutionary computation –Association rules –Clustering.

UNIT III ARCHITECTURE AND IMPLEMENTATION 12

Centralized – Distributed –Cooperative Intrusion Detection -Tiered architecture.

UNIT IV JUSTIFYING INTRUSION DETECTION 12

Intrusion detection in security –Threat Briefing –Quantifying risk –Return on Investment (ROI)

UNIT V CASE STUDY 12

Tool Selection and Acquisition Process - Bro Intrusion Detection – Prelude Intrusion Detection - Cisco Security IDS -Snorts Intrusion Detection –NFR security Legal Issues And Organizations Standards: Law Enforcement / Criminal Prosecutions –Standard of Due Care –Evidentiary Issues, Organizations and Standardizations.

Total: 60 Hours

Books for References:

1. Ali A. Ghorbani, Wei Lu, “Network Intrusion Detection and Prevention: Concepts and Techniques”, Springer, 2010.
2. Carl Enrolf, Eugene Schultz, Jim Mellander, “Intrusion detection and Prevention”, McGraw Hill, 2004.
3. Paul E. Proctor, “The Practical Intrusion Detection Handbook “, Prentice Hall, 2001.
4. Ankit Fadia and Mnu Zacharia, “Intrusion Alert”, Vikas Publishing house Pvt., Ltd, 2007.
5. Earl Carter, Jonathan Hogue, “Intrusion Prevention Fundamentals”, Pearson Education, 2006.

Course Objective:

This course is that to understand the principles of encryption algorithms, conventional and public key cryptography practically with real time applications.

LIST OF PROGRAMS:

1. Write a program to implement Linear Congruential Algorithm to generate 5 pseudo random numbers in C.
2. Write a program to implement Fermat Primality Testing Algorithm in C.
3. Write a program to implement Rabin-Miller Primality Testing Algorithm in C.
4. Write a program to implement the Euclid Algorithm to generate the GCD of an array of 10 integers in C.
5. Write a Java program to perform encryption and decryption using the algorithms:
 - a) Ceaser Cipher
 - b) Substitution Cipher
 - c) Hill Cipher
6. Write a Java program to perform encryption and decryption using the algorithms:
 - a) Playfair Cipher
 - b) Vigenere Cipher
7. Write a Java program to implement the DES algorithm logic
8. Write a JAVA program to implement the BlowFish algorithm logic
9. Write a JAVA program to implement the Rijndael algorithm logic.
10. Using Java Cryptography, encrypt the text “Hello world” using BlowFish. Create your own key using Java keytool.
11. Write a Java program to implement RSA Algorithm
12. Calculate the message digest of a text using the SHA-1 algorithm in JAVA.

Course Objective:

This course introduces the basic concepts of Security and its needs, architecture and models and the students gain knowledge about security, information, components, issues, analysis, architecture, various models, security types and its applications.

Course Outcomes:

CO - 1: To understand the basics of security concepts and its advantages.

CO - 2: Become proficient in concepts like Security components, balancing and Access.

CO - 3: To understand the basics of security needs in business, threats etc.,

CO - 4: Ability to Understand Ethical and Professional issues concepts.

CO – 5: To understand the concepts of logical design and security policy.

CO – 6: Become proficient in various security models.

CO – 7: Become proficient in security technologies like IDS, cryptography.

CO - 8: To understand the concepts of Access control, physical security and personnel.

CO - 9: Become proficient in various Architectures like Low, Mid and High level.

CO - 10: To implement the concepts by using case study.

UNIT I SECURITY INTRODUCTION 12

Introduction: Information Security, Critical Characteristics of Information, Components of an Information System, Securing the Components, Balancing Security and Access,

UNIT II SECURITY ANALYSIS 12

Need for security, Business needs, Threats, Attacks, Legal, Ethical and Professional Issues.

UNIT III LOGICAL DESIGN 12

Blueprint for security, Information Security policy, NIST Models, VISA International security Models, Design of Security Architecture, planning for continuity.

UNIT IV PHYSICAL DESIGN 12

Security Technology, IDS, Cryptography, Access Control Devices, Physical Security, Security and Personnel.

UNIT V ARCHITECTURE TYPES AND CASE STUDY

12

Architecture: Types- Low-level, Mid-level and High-level Architecture, Case study- Business cases for Security.

Total: 60 Hours

Books for References:

1. Matt Bishop, "Computer Security Art and Science", Addison Wesley, 2018.
2. Micki Krause, Harold F. Tipton, " Handbook of Information Security Management", Vol 1-3, CRC Press LLC, 2004.
3. Michael E Whitman and Herbert J Mattord, "Principles of Information Security", Vikas Publishing House, New Delhi, 4th Edition, 2012.

Course Objective:

To understand the basic concepts of cybercrime and forensics, to create the awareness through simple practical tips and tricks. The students to learn how to avoid becoming victims of cybercrimes. They have familiar with forensics tools and learn to analyze and validate forensics data.

Course Outcomes:

CO-1: Understand the types of cybercrime and fundamentals.

CO-2: Illustrate the concepts of Internet theft.

CO-3: Describe the types of cybercrime offenses and attacks.

CO-4: Design an approach to prevent cybercrime offenses.

CO-5: Explain computer forensics and use forensics tools.

CO-6: Analyze and validate forensics data.

CO-7: Demonstrate the Digital Forensics.

CO-8: Assess the methods and tools used in digital forensics..

CO-9: Apply the knowledge to discuss about existing case studies.

CO-10: Design a method to solve a problem in different perspective.

UNIT I INTRODUCTION TO CYBERCRIME**12**

Introduction-Classifications of Cybercrimes: E-Mail Spoofing-Spamming-Cyber defamation- Internet Time Theft-Newsgroup Spam-Crimes from Usenet Newsgroup-Industrial Spying-Industrial Espionage-Hacking-OnlineFrauds-PornographicOffenses-SoftwarePiracy-Password Sniffing-Credit Card Frauds and Identity Theft.

UNIT II CYBER OFFENSES**12**

Cyber offenses: How Criminals Plan that attack-Categories of Cybercrime, Passive Attack, Active Attacks- Scanning/Scrutinizing gathered Information-Attack on Gaining and Maintaining the System Access-Social Engineering-cyber stalking-Cyber cafe and Cybercrimes. Bottleneck: The Fuel for Cybercrime-Attack Vector and Cloud Computing.

UNIT III INTRODUCTION TO COMPUTER FORENSICS**12**

Introduction to Traditional Computer Crime, Traditional problems associated with Computer Crime. Introduction to Identity Theft & Identity Fraud. Types of CF techniques – Incident and incident response methodology – Forensic duplication and investigation. Preparation for IR: Creating response

tool kit and IR team. – Forensics Technology and Systems – Understanding Computer Investigation – Data Acquisition.

UNIT IV DIGITAL FORENSICS 12

Introduction to Digital Forensics □ Forensic Software and Hardware □ Analysis and Advanced Tools □ Forensic Technology and Practices □ Forensic Ballistics and Photography □ Face, Iris and Fingerprint Recognition □ Audio Video Analysis □ Windows System Forensics □ Linux System Forensics □ Network Forensics.

UNIT V LAWS AND CASE STUDY 12

Laws and Ethics □ Digital Evidence Controls □ Evidence Handling Procedures □ Basics of Indian Evidence ACT IPC and CrPC □ Electronic Communication Privacy ACT □ Legal Policies. Case Studies - Cyber Attack on Cosmos Bank- Nasscom Internet fraud- crime using E-Mail in Tamil nadu- call centre fraud- BSNL unauthorized access- SMS fraud- Phishing in people's account-credit card fraud.

Total: 60 Hours

Books for References:

1. Nina Godbole, Sunit Belapur, “Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives”, Wiley India Publications, April, 2011.
2. James Graham, Richar Howard, Ryan Olson, “Cyber Security Essentials”, CRC Press, Taylor and Francis Group, 2011.
3. Robert Jones, “Internet Forensics: Using Digital Evidence to Solve Computer Crime”, O'Reilly Media, October, 2005.
4. Chad Steel, “Windows Forensics: The field guide for conducting corporate computer investigations”, Wiley India Publications, December, 2006.
5. Nelson Phillips and Enfinger Steuart, “Computer Forensics and Investigations”, Cengage Learning, New Delhi, 2009.

Web Resources:

6. <https://www.cyberralegalservices.com/detail-casestudies.php>.
7. <https://rtinagpur.cag.gov.in/uploads/CaseStudies/CaseStudiesonCyberCrimesNOTSENT/CaseStudiesonCyberCrimes.pdf>.

Course Objective:

This Course provides basic insight of Computer Forensics Analysis and to perform E-Mail Investigations. To get deep Knowledge in various Computer Forensic Tools used in Investigation of different Operating System Environments.

LIST OF PROGRAMS:

1. Computer Hacking & Network Intrusion.
2. Survey of Latest developments in Cyber Forensics.
3. Registry Editing and Viewing using native tools of OS.
4. Hex analysis using Hex Editors.
5. Bit level Forensic Analysis of evidential image using FTK, Encase and ProDiscover Tools.
6. Hash code generation, comparison of files using tools like HashCalcetc.
7. File analysis using Sleuthkitetc and Graphical File analysis and Image Analysis.
8. Email Analysis involving Header check, tracing route.
9. Performing a check on Spam mail and Non- Spam mail.
10. Create a file on a USB drive and calculate its hash value like FTK Imager. Change the file and calculate the hash value again to compare the files.
11. Extracting of files that have been deleted.
12. Locate and extract Image (JPEG) files with altered extensions.

Syllabus
Discipline Specific
Electives

Course Objective:

The learner understands the basic concepts of cyber security threats and modeling. Also can learn about email threats, web threats and cyber threat management.

Course Outcomes:

- CO-1:** To gain the knowledge of the cyber threats like email threats, web threats and how to modeling.
- CO-2:** To learn the fundamentals like Worms, Virus, and Spam's, Ad ware, Spy ware, Trojans and covert channels.
- CO-3:** Understand the concept of cyber security threat management.
- CO-4:** Gain experience of security elements and threat analysis.
- CO-5:** To understand the concepts of Security Requirements Specifications.
- CO-6:** To gain knowledge of Access control, Trusted Computing and multilevel security.
- CO-7:** To develop various cyber threat models.
- CO-8:** Analyze and construct the security awareness and Training.
- CO-9:** To understand the concept of threat models.
- CO-10:** To analyze the Email and Internet use policies.

UNIT I INTRODUCTION 12

Security threats - Sources of security threats- Motives - Target Assets and vulnerabilities – Consequences of threats- E-mail threats - Web-threats - Intruders and Hackers, Insider threats, Cybercrimes. Network Threats: Active/ Passive – Interference – Interception –Impersonation – Worms –Virus – Spam's – Ad ware - Spy ware – Trojans and covert channels –Backdoors – Bots – IP, Spoofing - ARP spoofing - Session Hijacking - Sabotage-Internal treats Environmental threats - Threats to Server security.

UNIT II SECURITY THREAT MANAGEMENT 12

Risk Assessment - Forensic Analysis - Security threat correlation –Threat awareness - Vulnerability sources and assessment- Vulnerability assessment tools –Threat identification - Threat Analysis - Threat Modeling - Model for Information Security Planning.

UNIT III SECURITY ELEMENTS 12

Authorization and Authentication - types, policies and techniques – Security certification - Security monitoring and Auditing - Security Requirements Specifications – Security Policies and Procedures – Firewalls – IDS - Log Files - Honey Pots.

UNIT IV SECURITY MODELS

12

Access control, Trusted Computing and multilevel security - Security models - Trusted Systems- Software security issues- Physical and infrastructure security- Human factors – Security awareness - Training - Email and Internet use policies.

UNIT V CASE STUDY

12

Carbank: The Great Bank Robbery - Cyber Security Updates Onboard - Monitoring of Log Files and Alerts – Security analysis of industrial control Systems.

Total: 60 Hours

Books for References:

1. Jocelyn O. Padallan ,” Cyber Security” , Arcler Press Publisher ,2019
2. Swiderski, Frank and Syndex , “Threat Modeling”, Microsoft Press,2004.
3. William Stallings and Lawrie Brown, “ Computer Security: Principles and Practice, Prentice Hall”, 2008.
4. Thomas Calabres and Tom Calabrese, “Information Security Intelligence: Cryptographic Principles & Application”,, Thomson Delmar Learning Publication, 2004.

Course Objective:

To provide students with understanding of biometrics, biometric equipment and standards applied to security.

Course Outcomes:

CO-1: Demonstrate knowledge of the basic physical and biological science and engineering principles underlying biometric systems.

CO-2: Understand the key biometric standards and process.

CO-3: Understand and analyze biometric systems at the component level.

CO-4: To be able to analyze and design basic biometric system applications.

CO-5: To be able to work effectively in teams and express their work and ideas orally and in writing.

CO-6: Design of biometric recognition for the organization.

CO-7: Identify the sociological and acceptance issues associated with the design and implementation of biometric systems.

CO-8: Develop simple applications for privacy.

CO-9: Understand various Biometric security issues.

CO-10: Understand the need of biometric in the society.

UNIT I INTRODUCTION TO BIOMETRICS 12

Biometrics– Introduction- benefits of biometrics over traditional authentication systems –benefits of biometrics in identification systems–selecting a biometric for a system–Applications – Key biometric terms and processes – biometric matching methods – Accuracy in biometric systems.

UNIT II PHYSIOLOGICAL BIOMETRIC TECHNOLOGIES 12

Fingerprints – Technical description –characteristics – Competing technologies – strengths –weaknesses – deployment – Facial scan – Technical description – characteristics – weaknesses–deployment – Iris scan – Technical description – characteristics – strengths – weaknesses – deployment – Retina vascular pattern.

UNIT III BEHAVIORAL BIOMETRIC TECHNOLOGIES 12

Technical description – characteristics – strengths – weaknesses –deployment – Hand scan – Technical description–characteristics – strengths – weaknesses deployment – DNA biometrics. Behavioral

Biometric Technologies: Handprint Biometrics – DNA Biometrics.

UNIT IV FEATURE EXTRACTION

12

Signature and handwriting technology – Technical description –classification – keyboard / keystroke dynamics – Voice – data acquisition – feature extraction – characteristics – strengths –weaknesses– deployment.

UNIT V MULTI BIOMETRICS & CASE STUDY

12

Multi biometrics and multi factor biometrics – two–factor authentication with passwords – tickets and tokens – executive decision – implementation plan. Case study: Biometrics for banking security – Biometric for Education – implementation of multi biometrics system.

Total: 60 hours

Books for References:

1. Samir Nanavathi, Michel Thieme, and Raj Nanavathi: “Biometrics –Identity verification in a network”, 1st Edition, Wiley Eastern, 2002.
2. John Chirillo and Scott Blaul: “Implementing Biometric Security”, 1st Edition, Wiley Eastern Publication, 2005.
3. James wayman, Anil k.Jain, Arun A.Ross, Karthik Nandakumar, —Introduction to Biometrics, Springer, 2011.
4. Khalid saeed with Marcin Adamski, Tapalina Bhattasali, Mohammed K. Nammous, Piotr panasiuk, mariusz Rybnik and soharab H.Sgaikh, —New Directions in Behavioral Biometrics, CRC Press 2017.
5. John Berger: “Biometrics for Network Security”, 1st Edition, Prentice Hall, 2004.
6. Benjamin Muller, Security, Risk and the Biometric State: Governing Borders and Bodies, 1st Edition, Routledge, 2010.

Websites:

7. <https://www.tutorialspoint.com/biometrics/index.htm>.
8. <https://www.javatpoint.com/biometrics-tutorial>.

Course Objective:

To understand how block chain systems work, where they are used, their limitations, and how they affect organizations and society now and in the future.

Course Outcomes:

- CO-1:** Understand that how bitcoin works, when a transaction is created and when it is considered part of the blockchain.
- CO-2:** To understand private and public keys as well as addresses and how exactly they are constructed and used.
- CO-3:** To interact with a blockchain system by sending and reading transactions.
- CO-4:** To learn about different kinds of forking and explain the Bitcoin's network mechanisms for maintaining and upgrading
- CO-5:** Explain about Nakamoto consensus.
- CO-6:** To describe differences between proof-of-work and proof-of-stake consensus.
- CO-7:** To develop of smart contracts, their technical capabilities, practical applications, limitations and security constraints they operate within
- CO-8:** Establishing deep understanding of the Ethereum model, its consensus model, code execution, operation of its network, storage options and main actors that participate on its protocol.
- CO-9:** Expertise various development environments and different approaches and evaluate security, privacy, and efficiency of a given block chain system.
- CO-10:** Design, build, and deploy smart contracts and distributed applications.

UNIT I INTRODUCTION**12**

Data Distributed Database, Two General Problem, Byzantine General problem and Fault Tolerance, Hadoop Distributed File System, Distributed Hash Table, ASIC resistance, Turing Complete. Cryptography: Hash function, Digital Signature - ECDSA, Memory Hard Algorithm, and Zero Knowledge Proof.

UNIT II BLOCKCHAIN**12**

Introduction, Advantage over conventional distributed database, Blockchain Network, Mining Mechanism, Distributed Consensus, Merkle Patricia Tree, Gas Limit, Transactions and Fee, Anonymity, Reward, Chain Policy, Life of Blockchain application, Soft & Hard Fork, Private and Public blockchain

UNIT III DISTRIBUTED CONSENSUS 12

Nakamoto consensus, Proof of Work, Proof of Stake, Proof of Burn, Difficulty Level, Sybil Attack, Energy utilization and alternate.

UNIT IV CRYPTOCURRENCY 12

History, Distributed Ledger, Bitcoin protocols - Mining strategy and rewards, Ethereum -Construction, DAO, Smart Contract, GHOST, Vulnerability, Attacks, Sidechain, Namecoin Cryptocurrency Regulation: Stakeholders, Roots of Bit coin, Legal Aspects-Crypto currency Exchange, Black Market and Global Economy.

UNIT V CASE STUDY 12

Applications: Internet of Things, Medical Record Management System, Domain Name Service and future of Blockchain. Naive Blockchain construction, Memory Hard algorithm – Hashcash implementation, Direct Acyclic Graph, Play with Go-ethereum, Smart Contract Construction, Toy application using Blockchain, Mining puzzles.

Total: 60 Hours

Books for References:

1. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, “Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction”, Princeton University Press, July, 2016.
2. Antonopoulos, “Mastering Bitcoin: Unlocking Digital Cryptocurrencies”, O’Reiley, 1st Edition, 2014.
3. Satoshi Nakamoto, “Bitcoin: A Peer-to-Peer Electronic Cash System”, 2008.
4. Dr. Gavin Wood, “ETHEREUM: A Secure Decentralized Transaction Ledger”, Yellow paper, 2014.
5. Nicola Atzei, Massimo Bartoletti, and Tiziana Cimoli, “A survey of attacks on Ethereum smart contracts”, 2016.

PENETRATION TESTING

4004

Course Objective:

To provide a fundamental knowledge of Network Penetration testing and determines how well the security defences are protecting our IT assets. Network penetration testing helps address the concerns about the actual impact an attack could have on the organization.

Course Outcomes:

- CO-1:** To Defend against the most common attacks to networks.
- CO-2:** Estimate the needs and constraints of a given concern's scenario.
- CO-3:** To determine what type of firewall solution, Intrusion detection and Prevention system is appropriate.
- CO-4:** To Configure Windows and Linux systems for secure operations.
- CO-5:** To Formulate an appropriate strategy to defend against virus attacks, Trojan Horses, Spyware, and Adware.
- CO-6:** To Use point-to-point tunnelling protocol (PPTP), layer 2 tunnelling Protocol (L2TP) as an encryption tool.
- CO-7:** To add security with privacy to a communication using IPSec for VPNs.
- CO-8:** To Assess the system and wireless network security.
- CO-9:** To Expertise in wireless security solutions.
- CO-10:** To gain the knowledge of steganography and steganalysis concepts.

UNIT I INTRODUCTION

12

Basics of a Network, Network Utilities, OSI Model, TCP/IP, IPv4 Addressing, IPv6 Addressing, Assessing Likely Threats to the Network, Classifications of Threats, Likely Attacks, Threat Assessment, Security Terminologies, Choosing a Network Security Approach, Network Security and the Law, Security Resources.

UNIT II NETWORK DEFENCE

12

Denial of Service Attacks, Buffer Overflow Attacks, IP Spoofing, Session Hacking, Virus and Trojan horse Attacks. Firewall – Basic concepts, Implementing Firewalls, Selecting and Using a Firewall, Proxy Servers, Single Machine Firewalls, User Account Control, Windows and Linux Firewalls, Small

Office/Home Office Firewalls, Medium-Sized Network Firewalls, Enterprise Firewalls. IDS – Basic concepts, Implementing IDS Systems, Implementing Honey Pots. Virtual Private Networks - Basic VPN Technology, Using VPN Protocols for VPN Encryption, IPSec, SSL, Implementing VPN Solutions.

UNIT III COMMUNICATION DEFENSE & SYSTEM DEFENSE 12

Basic concepts, Modern Encryption Methods, Identifying Good Encryption, Digital Signatures and Certificates, Decryption, Cracking Passwords, Steganography, Steganalysis, Exploring the Future of Encryption. System Defence: Basic concepts, Configuring Windows, Configuring Linux, Patching the Operating System, Configuring Browsers. Virus - Virus Scanners, Antivirus Policies and Procedures, Additional Methods for Defending the System, Procedure to defend against Virus infected system. Trojan Horses, Spyware, and Adware. Security policies, Assessing system security, Security standards, Physical security, Disaster recovery, Techniques used by attackers.

UNIT IV WIRELESS NETWORK DEFENCE 12

Wireless communication primer, Wireless LAN and their components, Network standards, Secure concerns, Secure WLAN Implementation, Examining wireless security solutions and countermeasures.

UNIT V CASE STUDY 12

Working with the sample Network penetration testing commands – Vulnerability Assessment, Exploitation, Privilege Escalation, Web Applications, Password Attacks, Networking & Shells, Metasploit.

Total: 60 Hours

Books for References:

1. Chuck Easttom, “Network Defense and Countermeasures: Principles and Practices”, Pearson education, Second edition, 2014.
2. Randy Weaver, Dawn Weaver, Dean Farwood, “Guide to Network Defense and Countermeasures”, Cengage Learning, Third edition, 2014.
3. E-council, “Network defence Architect” - <http://www.eccouncil.org/Certification/certifiednetwork-defense-architect>.
4. <https://www.virtualhackinglabs.com/?courses=penetration-testing>

Course Objective:

To explore, design and implement basic concepts of big data & methodologies for analyzing structured and unstructured data with emphasis on the relationship between the Data Scientist and its application to the business needs. To understand the fundamentals of Internet of Things with security and to apply the concept in Real World Scenario.

Course Outcomes:

- CO-1:** To understand the fundamental concepts of big data platform and know about the basic concepts of nature and evolution of big data.
- CO-2:** To work with big data platform learn intelligent data analysis and compare old and modern data tool.
- CO-3:** Understand the framework of Visual data analysis techniques and interaction techniques.
- CO-4:** To explore on Big Data real time analytics platform applications.
- CO-5:** To Learn the fundamental concepts like history and components of Hadoop.
- CO-6:** To extend the security and implement the data with internet.
- CO-7:** To assess the vision and introduction of IoT and IoT Security.
- CO-8:** To Implement Data, Knowledge Management and use of Devices in IoT technology.
- CO-9:** To classify Real World IoT Design Constraints, Industrial Automation in IoT.
- CO-10:** Able to understand the application areas of IoT Security.
- CO-11:** Apply effective techniques to create IoT based projects.
- CO-12:** Able to understand building blocks of Internet of Things and characteristics.

UNIT I INTRODUCTION TO BIG DATA 12

Big data - Introduction to Big Data Platform - Big Data Skills and Sources - Big Data Adoption - Characteristics of Big Data - Key aspects of a Big Data Platform - Challenges of Conventional Systems - Nature of Data - Evolution Of Analytic Scalability Governance for Big Data - definition and taxonomy - Big data value for the enterprise.

UNIT II BIG DATA COMPONENTS 12

Technical Details of Big Data Components - Text Analytics and Streams - Intelligent data analysis- Analytic Processes and Tools - Modern Data Analytic Tools - Cloud and Big Data - Overview of High Value BDUse Cases – Examples - The Big Data and Data Science - Big Data Exploration - Security and Intelligence - Operations Analysis.

UNIT III BIG DATA STREAMS

12

First steps with the Hadoop “ecosystem” – Introduction to Hadoop - Exercises - Hadoop components – Map Reduce/Pig/Hive/HBase - Loading data into Hadoop - Handling files in Hadoop - Getting data from Hadoop - Introduction to the SQL Language - Querying big data with Hive - Big Data & Machine Learning.

UNIT IV OVERVIEW OF IoT AND IoT SECURITY

12

IoT - An Architectural Overview - Main design principles and needed capabilities Devices and gateways - Data management - Business processes in IoT- Everything as a Service (XaaS) - IoT Security Requirements - IoT Privacy Preservation Issues - Cyber-Physical Object Security -Hardware Security - Front-end System Privacy Protection - Networking Function Security.

UNIT V ATTACKS AND SECURITY AND CASE STUDY

12

Attack Models - Attacks to RFIDs in IoTs - Attacks to Network Functions - Attacks to Back-end Systems - Security in Front and back end Sensors and Equipment -Prevent Unauthorized Access to Sensor Data – Case Study - Setting up the demo Environment, IoT and the Industrial Sector, IoT and the Connected Home, IoT and Consumer Wearable.

Total: 60 Hours

Books for References:

1. Stephan Kudyba, “Big Data Mining and Analytics, Components of Strategic Decision Making”, Auerbach Publications, March 12, 2014.
2. Eliot P. Reznor, “Big Data: A Beginner’s Guide to using Data Science for Business”, 2017.
3. Fei HU, “Security and Privacy in Internet of Things (IoT): Models, Algorithms, and Implementations”, CRC Press, 2016.
4. Dirk deRoos , “Hadoop for Dummies”, 2014.
5. Prajapati, “Big Data Analytics with R and Hadoop”, 2014.
6. Dawn E. Holmes, Big Data: A Very Short Introduction, 2017.
7. Ollie Whitehouse, “Security of Things: An Implementers' Guide to Cyber-Security for Internet of Things Devices and Beyond”, NCC Group, 2014.

Course Objective:

This course covers the theory and practices of finding the vulnerabilities through forming the different attacks and then defining the appropriate security policy including the action to detect or prevent the attacks and thus reduce the damages.

Course Outcome:

CO-1: To Describe and understand the basics of the ethical hacking

CO-2: Ability to learn technical foundations of hacking

CO-3: Able to perform the foot printing and scanning

CO-4: Demonstrate the techniques for system hacking

CO-5: Characterize the malware and their attacks and detect and prevent them

CO-6: To understand the basic concepts of sniffers and session hijacking

CO-7: To determine the signature of different attacks and prevent them

CO-8: Able to detect and prevent the security attacks in different environments

CO-9: To Understand the concepts of web server hacking and attacks

CO-10: Able to learn Intrusion Detection Systems and physical security

UNIT I INTRODUCTION TO ETHICAL HACKING 12

Security Fundamental - Security Testing - Hacker and Cracker – Descriptions - Test Plans- keeping it legal - Ethical and Legality-Technical Foundations of Hacking: The Attacker’s Process - The Ethical Hacker’s Process- Security and the Stack.

UNIT II FOOTPRINTING AND SCANNING 12

Information Gathering - Determining the NetworkRange - Identifying Active Machines- Finding Open Ports and Access Points - OS Fingerprinting Services - Mapping the Network Attack Surface - Enumeration and System Hacking : Enumeration - System Hacking.

UNIT III MALWARE THREATS AND SESSION HIJACKING 12

Viruses and Worms- Trojans - Covert Communication - Keystroke Logging and Spyware - Malware Counter Measures- Sniffers - Session Hijacking - Denial of Service - Distributed Denial of Service.

UNIT IV WEB SERVER HACKING AND ATTACKS

12

Web Server Hacking - Web Application Hacking - Database Hacking - Wireless Technologies - Mobile Security and Attacks: Wireless Technologies - Mobile Device Operation and Security – Wireless LANs.

UNIT V CASE STUDY

12

Intrusion Detection Systems - Firewalls - Honeypots - Physical Security - Social Engineering – Case Studies: Intrusion detection Real Secure Tripwire Dragon Snort ,Packet sniffing Leave the sniffer running, Passwords in procedures & documents.

Total: 60 Hours

Books for References:

1. Michael Gregg, "Certified Ethical Hacker", Version 10, Third Edition, Pearson IT Certification, 2019.
2. Roger Grimes, "Hacking the Hacker", 1st Edition, Wiley, 2017.
3. Ankit Fadia, "The Unofficial Guide to Ethical Hacking", Laxmi Publications, 2^{ns} Edition, 2006.

Course Objective:

This course will address the issues faced by management responsible for ensuring the security of organizational technology, communications and data infrastructure. These typically fall under the purview of the chief information officer (CIO). It will address topics in operational risk, project management, cyber security, disaster recovery and protecting intellectual property.

Course Outcomes:

- CO-1:** An organisational asset that has utility, and a value – which may be relative depending on the perspective taken, and therefore can be classified to reflect its importance to an organisation or individual.
- CO-2:** Clear understandability in the field of security threats, vulnerabilities, and consequences are essential in managing cyber security.
- CO-3:** Cyber security lifecycle and strategy for planning are key factors in enterprise security services.
- CO-4:** The security models and management concepts are taken as additional concepts in learning process of risk management in cyber security.
- CO-5:** Information risk management is a term referring to the process of documenting what information is at risk, type and level of risk realised; and the impact of realisation.
- CO-6:** How to classify threats – and example categories system risk – its components and interactions with information risk.
- CO-7:** A lifecycle from creation through to deletion and protection may be required and may change throughout that lifecycle.
- CO-8:** Understand the trade-offs for functionality, usability and security.
- CO-9:** Apply the acquired knowledge in solving the problem in existing case studies.
- CO-10:** Design a method for solving a problem case study with different perspective.

UNIT I INTRODUCTION TO CYBERSECURITY**12**

The Security Environment: Threats, vulnerabilities, and consequences - Advanced persistent threats - The state of security today. Principles of Cybersecurity: The interrelated components of the computing environment - Cybersecurity models - Variations on a theme: computer security, information security, and information assurance. Cybersecurity Management Concepts: Management models, roles, and functions. Enterprise Roles and Structures: Information security roles and positions.

UNIT II STRATEGIC PLANNING AND SECURITY PLANS**12**

Strategy and Strategic Planning: Strategy - Strategic planning and security strategy - The information security lifecycle - Architecting the enterprise. Security Plans and Policies: Levels of planning - Planning misalignment - The System Security Plan (SSP)- Policy development and implementation. Security Standards and Controls: Security standards and controls - Certification and accreditation (C&A).

UNIT III RISK MANAGEMENT 12

Risk Management: Principles of risk - Types of risk - Risk strategies - The Risk Management Framework (RMF). Physical Security and Environmental Events: Physical and environmental threats - Physical and environmental controls. Contingency Planning: Developing a contingency plan - Understanding the different types of contingency plan - Responding to events.

UNIT IV SECURITY AWARENESS 12

Security Education, Training, and Awareness: Human factors in security - Developing and implementing a security training plan - Cross-domain training (IT and other security domains). The future of cyber security: Key future uncertainties - Possible future scenarios - How to apply what you've learned.

UNIT V CASE STUDY 12

Case Study on Pune Citibank MphasiS Call Center Fraud – The Bank NSP Case – UTI Bank hooked in a phishing attack – Mumbai Police can now nail web offenders – Orkut: The new danger.

Total: 60 Hours

Books for References:

1. Rhodes-Ousley, Mark. "Information Security: The Complete Reference, Second Edition, . Information Security Management: Concepts and Practice", New York, McGraw-Hill, 2013.
2. Whitman, Michael E. and Herbert J. Mattord, " Roadmap to Information Security for IT and Infosec Managers", Boston, MA: Course Technology, 2011.
3. Michael E. Whitman and Herbert J. Mattord, "Principles of Information Security", Course Technology, Cengage Learning, Fourth Edition, Nov, 2014.

Web Resources:

1. <file:///C:/Users/admin/Desktop/Online%20work/Course/Risk%20management%20in%20Cyber%20Security/Whitman.pdf>
2. <https://www.cyberralegalservices.com/detail-casestudies.php>.
3. <https://rtinagpur.cag.gov.in/uploads/CaseStudies/CaseStudiesonCyberCrimesNOTSENT/CaseStudiesonCyberCrimes.pdf>.

Course Objective:

To study the different models involved in database security and their applications in real time world to protect the database and information associated with them.

Course Outcomes

- CO-1:** Identify the security issues and solve them using appropriate security models.
- CO-2:** Implement security mechanisms in a database system and provide a secured information flow.
- CO-3:** Design secured software using the methodological approach.
- CO-4:** Identify and discover security attacks through statistical inference and discovery methods.
- CO-5:** Prove that, only authorized user has access to the data and that the data integrity is preserved.
- CO-6:** Identify security threats in database systems.
- CO-7:** Design and Implement secure database systems.
- CO-8:** Solve Complex Problems in a Team of database works.
- CO-9:** Use research based knowledge and research methods including design of experiments, analysis Interpretation of data, and synthesis of the information to provide valid conclusions.
- CO-10:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

UNIT I INTRODUCTION 12

Introduction to Databases Security Problems in Databases Security Controls Conclusions Security Models - Introduction Access Matrix Model Take-Grant Model Acten Model PN Model Hartson and Hsiao's Model Fernandez's Model Bussolati and Martella's Model for Distributed databases

UNIT II SECURITY MODELS 12

Bell and LaPadula's Model Biba's Model Dion's Model Sea View Model Jajodia and Sandhu's Model the Lattice Model for the Flow Control conclusion Security Mechanisms Introduction User Identification/Authentication Memory Protection Resource Protection Control Flow Mechanisms Isolation Security Functionalities in Some Operating Systems Trusted Computer System Evaluation Criteria.

UNIT III SECURITY SOFTWARE DESIGN 12

Introduction A Methodological Approach to Security Software Design Secure Operating System Design Secure DBMS Design Security Packages Database Security Design Statistical Database Protection &

Intrusion Detection Systems Introduction Statistics Concepts and Definitions Types of Attacks Inference Controls evaluation Criteria for Control Comparison .Introduction IDES System RETISS System ASES System Discovery.

UNIT IV MODELS FOR THE PROTECTION OF NEW GENERATION DATABASE 12

SYSTEMS 1- Introduction A Model for the Protection of Frame Based Systems A Model for the Protection of Object Oriented Systems SORION Model for the Protection of Object-Oriented Data.

SYSTEMS 2 - A Model for the Protection of New Generation Database Systems: the Orion Model Jajodia and Kogan's Model a Model for the Protection of Active Databases Conclusions.

UNIT V CASE STUDY

12

Database Watermarking – Basic Watermarking Process - Discrete Data, Multimedia, and Relational Data – Attacks on Watermarking - Single Bit Watermarking, Multi bit Watermarking.

Total: 60 Hours

Books for References:

1. Hassan A. Afyouni, “ Database Security and Auditing” , India Edition, CENGAGE Learning, 2009.
2. Castano ,” Database Security” , Second edition, Pearson Education, 2002.
3. Alfred basta, melissa zgola, “ Database security”, CENGAGE learning, 2014.
4. Michael Gertz and Sushil Jajodia, “ Handbook of Database Security: Applications and Trends”, Springer, 2010.
5. Osama S. Faragallah, El-Sayed M. El-Rabaie, Fathi E. Abd El-Samie, Ahmed I. Sallam, and Hala S. El-Sayed, Multilevel Security for Relational Databases”, ISBN 978-1-4822- 0539-8. CRC Press, 2014.
5. <https://www.techopedia.com/definition/29841/database-security>
6. <https://www.sisense.com/glossary/database-security/>
7. https://www.cs.uct.ac.za/mit_notes/database/pdfs/chp12.pdf

Course Objective :

To study the specifications and functionalities of various protocols/standards of mobile networks, to study about Wireless networks, protocol stack and standards, to focus on the fundamentals the protocols associate with Voice over IP.

Course Outcomes:

CO-1: A wide explanation on Data Communications System and its components.

CO-2: Design and implement wireless network environment for any application using latest wireless protocols and standards.

CO-3: Implement different type of applications for smart phones and mobile devices with latest network strategies.

CO-4: Independently understand basic computer network technology

CO-5: Conversant with the latest 3G/4G and WiMAX networks and its architecture.

CO-6: Identifies the different types of network topologies and protocols, and expore about GSM architecture.

CO-7: Explore about third generation network application and CDMA architecture.

CO-8: Discuss about IEEE protocol standards and learn the uses of wireless LAN advantages.

CO-9 : Understand the Voice and Video Over IP and explore about, How they can be used, and how they can be extended.

CO-10: Understand how SIP can be used to facilitate communications access for users with disabilities.

UNIT I INTRODUCTION**12**

Mobility of Bits and Bytes –Wireless The Beginning – Mobile Computing – Dialogue Control – Networks – Middleware and Gateways – Application and services- Developing Mobile computer Applications – security in mobile computing – Standards _ Why is it necessary – Standard bodies. Mobile Computing Architecture: History of computers and Internet – Architecture for mobile computing – Three-tier architecture – Design considerations for mobile computing – Mobile computing through Internet – Making exiting applications mobile enabled.

UNIT II MOBILE COMPUTING THROUGH TELEPHONY**12**

Evaluation of telephony – Multiple access procedures – Mobile computing through telephone – IVR Application – Voice XML – TAPI.

UNIT III WIRELESS TECHNOLOGIES

12

Blue Tooth – RFID – WiMAX – Mobile IP – IPv6 – Java Card. GSM : Global System for mobile communications – GSM Architecture – GSM Entities – Call routing in GSM – PLMN Interfaces – GSM Addresses and Identifiers – Network Aspects in GSM – GSM Frequency allocations – Authentications and Security, SMS.

UNIT IV CDMA and 3G

12

Spread spectrum technology – Is 95 – CDMA vs GSM – Wireless Data – Third generation networks – Applications on 3G WIRELESS LAN: Wireless LAN advantages – IEEE 802.11 standards – Architecture – Mobile in Wireless LAN – Deploying wireless LAN – Mobile adhoc networks and sensor networks – Wireless LAN Security – WiFi vs 3G.

UNIT V VOIP SECURITY AND CASE STUDY

12

Streaming in 3rd generation mobile architecture, Voice and Video over IP (Media over IP), Session Initiation Protocol (SIP) and its use in Media Over IP, Skype as a case study. Security in VoIP. Attacks against the VOIP network, Challenges against implementing VOIP network, WEP (Wired Equivalent Privacy), Effects of using WEP in VOIP networks, Concepts of WPA and WPA2.

Total: 60 Hours

Books for References:

1. Jochen Schiler, "Mobile Communication", Addison Wesley, 2003..
2. B.A. Forouzan, "Cryptography & Network Security", Tata McGrawHill, 2007.
3. Honeyman P Huston L.B, "Communications and Consistency in Mobile FileSystems", IEEE Personal communication 2(6), 1996.
4. Asoke K Talukder, Roopa R Yavagal, "Mobile Computing", TMH, 2nd Edition, 2017.
5. Biplob k Sikdar, Sipra dasbit, "Mobile Computing", Printice Hall India, 2009.

Course Objective:

To understand the importance of handling different security threats on modern hardware design, manufacturing, installation and operating practices. This course borrows concepts from different fields of cryptography, hardware design, circuit testing, algorithms and machine learning.

Course Outcomes:

CO-1: Knowledge of emerging security and trust issues associated with hardware systems.

CO-2: Identify computer and network security threats.

CO-3: Classify the threats and develop a Security model to prevent, detect and recover from the attacks.

CO-4: Knowledge and understanding of Basics of number theory, Key management, PublicKey cryptosystems, Message authentication, Hash functions and algorithms.

CO-5: To assess vulnerabilities of a hardware device or system.

CO-6: To be familiar with advanced security issues and technologies.

CO-7: To be able to describe attack scenarios that threaten such systems.

CO-8: Enable the students to develop security algorithms in the network.

CO-9: Evaluate the security and trust of hardware systems using different types of system testing.

CO-10: To work in groups to devise security and trust design and evaluation processes.

UNIT I INTRODUCTION TO DIFFERENT ISSUES OF HARDWARE SECURITY 12

Introduction to Cryptography- Basics of Digital Design on Field-programmable Gate Array (FPGA), Classification using Support Vector Machines (SVMs)- Cryptographic Hardware and their Implementation- Optimization of Cryptographic Hardware on FPGA,-Physically Unclonable Functions (PUFs)-PUF Implementations- PUF Quality Evaluation- Design Techniques to Increase PUF Response Quality.

UNIT II ATTACKS ON HARDWARE 12

Side-channel Attacks on Cryptographic Hardware: Basic Idea-Current-measurement based Side-channel Attacks -Design Techniques to Prevent Side-channel Attacks-Improved Side-channel Attack Algorithms (Template Attack, etc.)-Cache Attacks.

UNIT III DESIGN, TESTING AND VERIFICATION 12

Testability and Verification of Cryptographic Hardware: Fault-tolerance of Cryptographic Hardware, Fault Attacks, Verification of Finite-field Arithmetic Circuits-Modern IC Design and Manufacturing Practices and Their Implications: Hardware Intellectual Property (IP) Piracy and IC Piracy-Design Techniques to Prevent IP and IC Piracy-Using PUFs to prevent Hardware Piracy- Model Building Attacks on PUFs.

UNIT IV OVERVIEW OF TROJANS

12

Hardware Trojans: Hardware Trojan Nomenclature and Operating Modes, Countermeasures Such as Design and Manufacturing Techniques to Prevent/Detect Hardware Trojans, Logic Testing and Side-channel Analysis based Techniques for Trojan Detection, Techniques to Increase Testing Sensitivity Infrastructure Security: Impact of Hardware Security Compromise on Public Infrastructure, Defense Techniques x.

UNIT V CASE STUDY

12

Implementation of PUF's-Kocher's Attack on DES)-SVM Modeling of Arbiter PUFs-Genetic Programming based Modeling of Ring Oscillator PUF-Smart-Grid Security

Total: 60 Hours

Books for References:

1. Debdeep Mukhopadhyay and Rajat Subhra Chakraborty, "Hardware Security: Design, Threats, and Safeguards", CRC Press, 1st Edition, 2014.
2. Ahmad-Reza Sadeghi and David Naccache (eds.) ,” Towards Hardware-intrinsic Security: Theory and Practice”, Springer, 2010.
3. Ted Huffmire et al, “Handbook of FPGA Design Security”, Springer, 2010.
4. Stefan Mangard, Elisabeth Oswald, Thomas Popp, “ Power analysis attacks - revealing the secrets of smart cards”, Springer 2007.

Course Objective:

The course intends to inculcate the significance of cyber space and to enlighten the various legal, social and international issues and the various remedies available under the Information Technology Act for the breach and commission of offence in cyber space. The course also outlines international best techniques and the various legal mechanisms to control the various offences in the cyberspace.

Course Outcomes:

CO-1: Define and describe the nature and scope of cybercrime.

CO-2: To introduce the cyber world and cyber law in general.

CO-3: Develop knowledge of major incidents of cybercrime and their resulting impact.

CO-4: Analyze and discuss national and global digital law enforcement efforts.

CO-5: Critically consider specific laws and policies governing cybercrime detection and prosecution. **CO-**

6: Identify and evaluate the specific technology that facilitates cybercrime and digital law enforcement.

CO-7: Critically evaluate the impact of cybercrime on information professions.

CO-8: To enhance the understanding of problems arising out of online transactions and provoke them to find solutions.

CO-9: To clarify the Intellectual Property issues in the cyber space and the growth and development of the law in this regard.

CO-10: To educate about the regulation of cyber space at national and international level.

UNIT I INTRODUCTION**12**

Introduction to cyber space -UNCITRAL Model Law - Information Technology Act, 2000 with recent amendments - Jurisdictional issues - Digital signatures - regulation of - certifying authorities - Cyber Regulation Appellate Tribunal – Human Rights Issues.

UNIT II ONLINE CONTRACTS**12**

Formation of online contracts - E banking transactions, online payment options, online advertising - Electronic and digital signatures - Taxation issues in cyber space- indirect tax, tax evasion, double tax, international tax, permanent establishment - Protection of trade secrets and deceptive trade practices.

UNIT III CYBER CRIMES**12**

Understanding cybercrimes - Identifying Theft and Frauds - Types of crimes in the internet: Against person, against property, against government - Digital evidence- investigation and adjudication of cybercrimes in India- cyber arbitration, cyber conflict investigation- cyber Terrorism.

UNIT IV INTELLECTUAL PROPERTY RIGHTS (IPR) AND CYBER SPACE 12

Copyright issues in the internet- protection of computer software, caching, international regime-OSS, DMCA, Data Protection Directive - Trademark issues in the internet – Domain Name Registration, Domain Name Dispute, ICANN, UDRP policy, linking, framing, tagging - Database issues in the internet.

UNIT V THE INDIAN EVIDENCE ACT OF 1872 V. INFORMATION TECHNOLOGY ACT, 2000 12

Status of Electronic Records as Evidence, Proof and Management of Electronic Records; Relevancy, Admissibility and Probative Value of E-Evidence, Proving Digital Signatures, Proof of Electronic Agreements, Proving Electronic Messages.

CASE STUDY- PROTECTION OF CYBER CONSUMERS IN INDIA:

Are Cyber Consumers Covered Under the Consumer Protection Act? Goods and Services, Consumer Complaint, Defect in Goods and Deficiency in Services, Restrictive and Unfair Trade Practices, Instances of Unfair Trade Practices, Reliefs Under CPA, Beware Consumers, Consumer Foras, Jurisdiction and Implications on cyber Consumers in India, Applicability of CPA to Manufacturers, Distributors, Retailers and Service Providers Based in Foreign Lands Whose Goods are Sold or Services Provided to a Consumer in India.

Total: 60 Hours

Books for References:

1. Karnika Seth, “ Computers, Internet and New Technology Laws” ,Cyber Lawyer and Expert and is The Managing Partner of Seth Associates, Edition 2012.
2. S.K.Verma, Raman mittal , “Legal dimensions of cyber space” ,Indian Law Institute, New Delhi: Indian Institute,2004.
3. Law Relating to Computers Internet & E-commerce – “A Guide to Cyber laws & the Information Technology Act, Rules, Regulations and Notifications along with Latest Case Laws”, 2012.
4. Jeff Kosseff , “Cyber security Law”, Wiley Publications, 2017.
5. Ian. J. Lyod , “Information technology law” , Information Technology Act 2000, its amendment and IT Rules, 2014.
6. Yee fen Lim , “Cyber space law commentaries and Materials”, second edition, Galexia Consulting Pty Ltd, Australia.

Course Objective:

This course introduces the basic concepts of information system, Basics of computers, Software Development Life Cycle.

Course Outcomes:

- CO-1:** Determine key terminologies and concepts including IT, marketing, management, economics, accounting, finance in the major areas of business.
- CO-2:** Evaluate the role of information systems in today's competitive business environment.
- CO-3:** Describe the types of information systems supporting the major functional areas of the business.
- CO-4:** Analyze the relationship between information systems and organizations.
- CO-5:** Identify the hardware components, major software and compare the different types of databases in computer system
- CO-6:** Analysis of computing systems and telecommunication networks for business information systems.
- CO-7:** Identify the core activities in the systems development process.
- CO-8:** Plan projects, work in team settings and deliver project outcomes in time
- CO-9:** Effectively communicate strategic alternatives to facilitate decision making
- CO-10:** Design, develop and implement Information Technology solutions for business problems.

UNIT I MANAGEMENT INFORMATION SYSTEM 12

Definition of Management Information System – MIS support for planning, organizing and controlling –Structure of MIS –Information for decision –making.

UNIT II SYSTEM 12

Concept of system – Characteristics of System – System classification –categories of Information systems – Strategic information system and competitive advantage.

UNIT III COMPUTERS AND INFORMATION PROCESSING 12

Classification of computers- Input devices –Output devices – Storage devices - Batch and online processing-Hardware – Software - Database Management Systems

UNIT IV SYSTEM ANALYSIS AND DESIGN

12

SDLC – Role of System Analyst – Functional Information system – Personnel, production, material marketing.

UNIT V DECISION SUPPORT SYSTEM

12

Definition - Group Decision Support System –Business Process Outsourcing –Definition and function.

Total: 60 Hours

Books for References:

1. Dr. S. P. Rajagopalan, “Management Information System “, Margham Publications, 2012
2. Mudick & Ross, “Management Information System”, Prentice – Hall of India.
3. Gordan B.Davis , “Management Information System”,- Page 46 of 742, 2011.
4. Jame A.Senn ,“Information systems Analysis and Design “, 1989.
5. Sadagopan ,“Management Information System”, Prentice – Hall of India., 2014.
6. CSV Murthy , “Management Information System”, Himalaya publications, 2010.

Course Objective:

This course introduces the basic concepts of Software Quality Control and Assurance with different quality measures and standards for real time software projects as case studies.

Course Outcomes:

CO-1: Learn about Software Quality Management – Quality Factors, components and Plans.

CO-2: To understand Software Quality Metrics and Quality Assurance Standards.

CO-3: To identify the various tools for Testing.

CO-4: To explore the different verification techniques for software development.

CO-5: To understand Software Quality Audits and illustrate Quality frameworks concepts.

CO-6: To highlight the importance of software project management.

CO-7: Learn about Software Quality Assurance Technologies.

CO-8: To gain knowledge about the various Software Testing Coverages.

CO-9: To Understand the Strategic about various quality standards to assess the software.

CO-10: Implement the software tools to improve the quality of the project.

UNIT I INTRODUCTION**12**

Quality and the quality system - standards and procedures technical activities. Software tasks - management responsibility - quality system - contract review - design control - document control - purchasing product identification and traceability.

UNIT II PROCESS CONTROL**12**

Checking - Identification of Testing Tools - Control of Nonconforming Product - Corrective Action- Verification: Verification techniques – Inspections, reviews, walk-throughs – Case studies.

UNIT III QUALITY AUDITS**12**

Handling, Storage, Packing And Delivery - Quality Records - Internal Quality Audits - Training - Servicing - Statistical Techniques-Views On Quality – Cost Of Quality - Quality Models – Quality Frameworks – Verification And Validation – Defect Taxonomy – Defect Management – Statistics And Measurements – IEEE Standards – Quality Assurance And Control Processes.

UNIT IV QUALITY ASSURANCE TECHNOLOGIES**12**

QA And New Technologies - QA and Human - Computer interface - Process Modeling - Standards And Procedures- Coverages: Block, Conditions, Multiple Conditions, MC/DC, Path – Data Flow

Graph – Definition And Use Coverages – C-Use, P-Use, Defclear, Def-Use – Finite State Machines – Transition Coverage.

UNIT V INDIAN STANDARDS

12

ISO –ISO Standards-Development Process-ISO Certification-ISO Consulting Services And Consultants-E-Business- 9001 - Elements Of ISO 9001 - Improving Quality System - Case Study.

Total : 60 hours

Books for References:

1. Claude Y. Laporte, Alain April , “Software Quality Assurance”, Wiley-IEEE Computer Society Press, 2018.
2. Watts S. Humphrey, “Managing the software process”, Addison Wesley, 1999.
3. Tsum S.Chow, “Software Quality Assurance a Practical Approach”, IEEE Computer Society press, 1985.
4. Roger S. Pressman, ” Software Engineering - A Practitioner’s approach”, McGraw Hill, 8th Edition,2019.

Course Objective:

This course provides an introduction to information systems for business and management. It is designed to familiarize students with organizational and managerial foundations of systems, the technical foundation for understanding information systems.

Course Outcomes:

CO - 1: Determine key terminologies and concepts including IT, marketing, management, economics, accounting, finance in the major areas of business.

CO - 2: Design, develop and implement Information Technology solutions for business problems.

CO - 3: Analyze the impact of E-commerce on business models and strategy.

CO - 4: Understand the processes of developing and implementing information systems;

CO -5: Understand ethical issues that occur in business, evaluate alternative courses of actions and evaluate the implications of those actions .

CO- 6: Assess electronic payment systems.

CO- 7: Describe Internet trading relationships including Business to Consumer, Business-to-Business, Intra-organizational.

CO -8: Describe the key features of Internet, Intranets and Extranets and explain how they relate to each other.

CO-9: Analyze real business cases regarding their e-business strategies and transformation processes and choices.

CO -10: Recognize and discuss global E-commerce issues.

UNIT I INTRODUCTION TO ECOMMERCE**12**

E-commerce: The revolution is just beginning, Ecommerce : A Brief History, Understanding E-commerce: organizing Themes.

UNIT II E-COMMERCE BUSINESS MODELS**12**

E-commerce Business Models, Major Business to Consumer (B2C) business models, Major Business to Business (B2B) business models, Business models in emerging E-commerce areas, How the Internet and the web change business: strategy, structure and process, The Internet: Technology Background, The Internet Today, Internet II- The Future Infrastructure, The World Wide Web, The Internet and the Web : Features.

UNIT III BUILDING AN E-COMMERCE WEB SITE

12

A systematic Approach, The e-commerce security environment, Security threats in the e-commerce environment, Technology solution, Management policies, Business procedures, and public laws, Payment system, E-commerce payment system, Electronic billing presentment and payment.

UNIT IV CONSUMER ONLINE

12

The Internet Audience and Consumer Behaviour, Basic Marketing Concepts, Internet Marketing Technologies, B2C and B2B E-commerce marketing and business strategies, The Retail sector, Analyzing the viability of online firms, E-commerce in action: E-tailing Business Models, Common Themes in online retailing, The service sector: offline and online, Online financial services, Online Travel Services, Online career services

UNIT V SOCIAL NETWORKS

12

Social networks and online communities, Online auctions, E-commerce portals.

Total : 60 hours

Books for References:

1. Kenneth C. Laudon, “E-Commerce : Business, Technology, Society”, 15th Edition, Pearson, 2019.
2. S. J Joseph,” E-Commerce: an Indian perspective”, PHI. 5th Edition, 2010.
3. Daniel Minoli & Emma Minoli, “Web Commerce Technology Handbook”. Tata McGraw Hill – 2017.

Course Objective:

This course introduces the basic concepts of system software, Compilers, Assemblers, Linkers and Loaders.

Course Outcomes:

CO-1: Analyze and synthesize system software

CO-2: Understand about the different kind of processors available in the market.

CO-3: Understand fundamentals of language processing and grammar

CO-4: Understand the internals of language translators.

CO-5: Apply knowledge of compilation and code optimization steps to mimic a simple compiler

CO-6: Understand about code optimization techniques and tools for writing compiler.

CO-7: Demonstrate the working of various system software like assembler, loader, linker, editor and device driver.

CO-8: To gain knowledge about the task of linker program.

CO-9: Explore about various text editors and use of Utility programs.

CO-10: Learn about device driver and implement various device driver software.

UNIT I INTRODUCTION**12**

System Software - Components of System Software Evolution by System Software – Model of Computer System; Introduction to Software Processors.

UNIT II ASSEMBLERS**12**

Elements of Assembly Language Programming - Over View of the Assembly Process - Design of Two Pass Assembler - A Single Pass Assembler for the IBM PC - Macros And Macro Processors.

UNIT III COMPILERS**12**

Aspects of Compilation - Overview of the Compilation Process - Programming Languages Grammars – Scanning:- Parsing - Storage Allocation - Compilation of Expressions and Control Structures - Code Optimization – Compiler Writing Tools, Software Process for Interactive Environment

UNIT IV LOADERS AND LINKAGE EDITORS**12**

Loading. Linking and Relocation – Program – Relocatability - Overview of the Editing - A Linkage Editor for the IBM PC - Linking for Program over-lays

UNIT V SOFTWARE TOOLS

12

Spectrum of software tools - Text editors - Interpreters and program generators - Debug monitors - Programming environments. Device Drivers: Introduction to the Device Driver, Requirements of Device Driver, Types of Device Driver.

Total :60 hours

Books for References:

1. Dhamdhere , “System software”, McGraw Hill, 1st Edition, 2011.
2. Leland L.Beck, D.Manjula , “System Software, An Introduction to System Programming”.- Pearson, 3rd Edition, 2002.
3. Aho. A.V. Sethi R. and Ulman J.D, “Compilers, Principles, Techniques and Tools”, Pearson., 2nd Edition, 2006.

Course Objective:

This course introduces the basic concepts of multimedia and its components such as text, Image, Video, Graphics and Animation.

Course Outcomes:

CO-1: Understand fundamentals of multimedia, media and data streams, sound/audio, image, graphics, video and animation.

CO-2: Know about the data compression techniques including coding requirements, source, entropy, and hybrid coding, JPEG, H.261 (px64), MPEG, MP3 and etc.

CO-3: Able to solve computer technology issues such as communication architecture, multimedia workstations, cache systems, storage systems and optical storage.

CO-4: Study about Multimedia operating system issues such as real-time operation, resource management, process management, file systems, and Multimedia networking.

CO-5: Multimedia synchronization, presentation requirements, reference model, and synchronization techniques.

CO-6: Able to learn Latest Web technologies, such as XML, X3D and Semantic Web

CO-7: Gain knowledge about Multimedia database issues such as data organization, indexing and retrieval.

CO-7: Explore about Multimedia applications including digital libraries, system software, toolkits

CO-9: Implement multimedia games and communicate between multimedia applications.

CO-10: Implement conferencing paradigms, structured interaction support, and know about examples from video/audio/graphics conferencing

UNIT I INTRODUCTORY CONCEPTS**12**

Multimedia – Definitions, CD-ROM and the Multimedia Highway, Uses of Multimedia, Introduction to making multimedia – The Stages of project, the requirements to make good multimedia, Multimedia skills and training, Training opportunities in Multimedia. Motivation for multimedia usage, Frequency domain analysis, Application Domain.

UNIT II MULTIMEDIA**12**

Hardware and Software: Multimedia Hardware – Macintosh and Windows production Platforms, Hardware peripherals – Connections, Memory and storage devices, Media software – Basic tools, making instant multimedia, Multimedia software and Authoring tools, Production Standards.

UNIT III MULTIMEDIA MAKING IT WORK**12**

Multimedia building blocks – Text, Sound, Images, Animation and Video, Digitization of Audio and Video objects, Data Compression: Different algorithms concern to text, audio, video and images etc., Working Exposure on Tools like Dream Weaver, Flash, Photoshop Etc.,

UNIT IV MULTIMEDIA AND THE INTERNET:**12**

History, Internet working, Connections, Internet Services, The World Wide Web, Tools for the WWW – Web Servers, Web Browsers, Web page makers and editors, Plug-Ins and Delivery Vehicles, HTML, VRML, Designing for the WWW – Working on the Web, Multimedia Applications – Media Communication, Media Consumption, Media Entertainment, Media games.

UNIT V MULTIMEDIA-LOOKING TOWARDS FUTURE:**12**

Digital Communication and New Media, Interactive Television, Digital Broadcasting, Digital Radio, Multimedia Conferencing, Assembling and delivering a project-planning and costing, Designing and Producing, content and talent, Delivering, CD-ROM technology.

Total :60 hours**Books for References:**

1. S. Heath, “Multimedia & Communication Systems”, Focal Press, UK., 1999.
2. R. Steinmetz and K. Naharstedt, “Multimedia: Computing, Communications & Applications”, Pearson, Delhi, 2014.
3. T. Vaughan, “ Multimedia: Making it work”, 9th Edition, Tata McGraw Hill, New Delhi, 2014.
4. K. Andleigh and K. Thakkar, “ Multimedia System Design”, PHI, New Delhi, 2000
5. Keyes, “Multimedia Handbook”, TMH, 2000.
6. S. Rimmer, “Advanced Multimedia Programming”, PHI, New Delhi, 2000.

Syllabus

Generic Electives

Course Objective:

To build web applications using HTML and client side script technologies use with Microsoft's IIS. To build web applications with style sheets and Data object in order to provide secure web design.

Course Outcomes:

CO-1: To execute HTML basic commands for programming.

CO-2: To explore different web server scripting techniques

CO-3: To explore functions of HTML

CO-4: To understand the Scripting functions.

CO-5: To understand the concepts of web designing

CO-6: To understand the web application programs

CO-7: To create a web page

CO-8: To work with multiple applications

CO-9: To understand the concepts of connecting and MySQL.

CO-10: To be well versed in creating a web application using HTML

UNIT I INTRODUCTION**6**

Internet Basic - Introduction To HTML - List - Creating Table - Linking Document Frames - Graphics To HTML Doc - Style Sheet - Style Sheet Basic - Add Style To Document - Creating Style Sheet Rules - Style Sheet Properties - Font - Text - List - Color And Background Color - Box - Display Properties.

UNIT II JAVASCRIPT FUNDAMENTALS**6**

Introduction To Javascript - Advantage Of Javascript Javascript Syntax – Data type - Variable - Array - Operator And Expression - Looping Constructor - Function - Dialog Box.

UNIT III OBJECTS IN JAVASCRIPT**6**

Javascript Document Object Model - Introduction - Object In HTML - Event Handling - Window Object - Document Object - Browser Object - Form Object - Navigator Object Screen Object - Build In Object - User Defined Object - Cookies.

UNIT IV A SP.NET FUNDAMENTALS**6**

Asp. Net Language Structure - Page Structure - Page Event, Properties & Compiler Directives. Html Server Controls - Anchor, Tables, Forms, Files. Basic Web Server Controls- L.Able, Textbox, Button,

Image, Links, Check & Radio Button, Hyperlink. Data List Web Server Controls - Check Box List, Radio Button List, Drop down List, List Box, Data Grid, Repeater.

UNIT V NETWORK & SECURITY

6

Request And Response Objects, Cookies, Working With Data - OLEDB Connection Class, Command Class, Transaction Class, Data Adaptor Class, Data Set Class. Advanced Issues - Email, Application Issues, Working with IIS and Page Directives, Error Handling. Security - Authentication, IP Address, Secure By SSL & Client Certificates.

TOTAL: 30 Hours

Books for References:

1. P. I. Bayross, “ Web Enable Commercial Application Development Using HTML, DHTML, Javascript” , en CGI, BPB Publications, 2000.
2. Eric A. Smith , “ASP 3 Programming Bible”, Wiley-Dreamtech India (P) Ltd, 2003.
3. Dave Mercer , “ASP3.0 Beginners Guide”, TataMcGraw-Hill Edition, Sixthreprint, 2004.
4. J. Jaworski , “Mastering Javascript”, BPB Publications, 1999.
5. T. A. Powell, “ Complete Reference HTML (Third Edition)”, TMH, 2002.

Course Objective:

This course gives introduction to the concepts of ASP, VB Script and Java Script, Working with ASP.NET to enhance communication and security and to develop web page.

Course Outcomes:

- CO-1:** To understand client side scripting language.
- CO-2:** To program and debug applications using a variety of client side and server side Technologies.
- CO-3:** To exhibit the knowledge of programming with basic building blocks of scripting language.
- CO-4:** To develop applications by using scripting concepts.
- CO-5:** To gain deep knowledge in different controls using client server.
- CO-6:** To apply validation controls in developing client side scripting language.
- CO-7:** To apply the features of all objects, caching and session management for every client.
- CO-8:** To authenticate web pages and to know how to develop event related with error free applications.
- CO-9:** To compare the functionalities of connected and disconnected architectures .
- CO-10:** To develop applications which connects client servers using scripting language.

UNIT I INTRODUCTION**6**

Introduction To` Vbscript - Adding Vbscript Code To An Html Page - Vb Script Basics - Vbscript Data Types - Vbscript Variables - Vbscript Constants -Vbscript Operators – Mathematical- Comparison- Logical - Using Conditional Statements - Looping Through Code - Vbscript Procedures – Type Casting Variables - Math Functions – Date Functions – String Functions – Other Functions - Vbscript Coding Conventions - Dictionary Object In Vbscript - Err Object.

UNIT II JAVA SCRIPT**6**

Introduction To Javascript – Advantages Of Javascript – Javascript Syntax - Data Type –Variable - Array – Operator &Expression – Looping – Control Structures - Constructor Function – User Defined Function Dialog Box .

UNIT III OBJECT MODEL**6**

Javascript Document Object Model – Introduction – Object In HTML – Event Handling – Window Object – Document Object – Browser Object – Form Object – Navigator Object – Screen Object – Build In Object – User Defined Object – Cookies.

UNIT IV ASP.NET

6

ASP.NET Language Structure – Page Structure – Page Event, Properties & Compiler Directives. HTML Server Controls – Anchor, Tables, Forms, Files. Basic Web Server Controls – Label, Text Box, Button, Image Links, Check & Radio Button, Hyperlink, Data List Web Server Controls – Check Box List. Radio Button List, Drop down List, List Box, Data Grid, Repeater.

UNIT V SECURITY

6

Request And Response Objects, Cookies, Working With Data – OLEDB Connection Class, Command Class, Transaction Class, Data Adaptor Class, Data Set Class. Advanced Issues – Email, Application Issues, Working with IIS and Page Directives, Error Handling. Security – Authentication, IP Address, Secure By SSL & Client Certificates.

TOTAL: 60 Hours

Books for References:

1. I.Bayross, "Web Enable Commercial Application Development using HTML, DHTML, Javascript", Perl CGI, BPB Publications, 2000.
2. A.Russell Jones, "Mastering Active Server Pages 3", BPB Publications, 2000.
3. Hathleen, Kalata, "Internet Programming with VBScript and JavaScript", Thomson Learning, 2000.
4. Mike McGrath, "XML Harness the Power of XML in easy steps", Dreamtech Publications.
5. T.A. Powell, "Complete Reference HTML", TMH, 2002.
6. J.Jaworski, "Mastering Javascript", BPB Publications, 1999.

Course Objective:

To understand the fundamentals of Photoshop & can able to retouch & repair, Work with multiple layers, Slice & clone, Design basic web templates, and create animations.

Course Outcomes:

CO - 1: To understand the basics of Photoshop concepts and its advantages.

CO - 2: To understand the designing concepts

CO - 3: To implement the basics of Photoshop

CO - 4: Ability to Understand Photoshop concepts.

CO – 5: To build the designing structure of photoshop concepts of Relational Algebra.

CO – 6: Become proficient in concepts and its anomalies.

CO – 7: Gain necessary knowledge in photoshop development

CO - 8: Acquire necessary knowledge about Case study in various areas.

CO - 9: Become proficient in using Photoshop

CO - 10: To be able to design using Photoshop

UNIT I BASICS OF ADOBE PHOTOSHOP

6

Learn The Tools And What They Do-- Basic Workflow- Creating Effective Storing- Batch Renaming- How To Save Your Photos- Digital Asset Management- File Types- File Sizes- Color Types.

UNIT II LAYERS

6

Layer Styles-Layers Palette-Working With Layers-New Layers via Cut-New Layers Via Copy-Hiding/Showing Layers-Repositioning Layers-Flattening Images-Working With Adjustment Layers-Layer Effects-Opacity- Adjustment Layers.

UNIT III BASIC RETOUCHING

6

Color Manipulations- Levels- Curves- Seeing Color Accurately- Patch Tool- Cropping- Reading Your Palettes- Dust and Scratches.

UNIT IV ADVANCED RETOUCHING

6

Smoothing Skin-Strategy for Retouching-Resolution and Image Size-Cropping and Image-Adjusting the tonal image-Removing a Color Cast- Smoothing Wrinkles- Special Color Effects: Black And White, Sepia, Grainy.

UNIT V WORKING WITH A LOT OF IMAGES

6

Cataloging Your Images- Editing Our Photo shoot- Naming Your Shoot- Automating Your Shoot- Batch Processing- Introduction to Action.

TOTAL: 54 Hours

Books for References:

1. Greenberg, "Fundamental Photoshop", Tata McGraw- Hill, 1995
2. Laurie Ann Ulrich, "Photoshop 7, The Ultimate Reference", Dream Tech Press, 2002
3. Shalini Gupta, Adity Gupta, "Photoshop CS2 in Simple Steps", Dreamtech Press, 2006.
4. Lisa Danae Dayley, Brad Dayley, "Adobe Photoshop CS6 Bible", Wiley India, 2012.

Course Objective:

This course provides hands-on experience with Adobe Flash, a Web-authoring and animation tool. Students gain understanding of fundamental Flash paradigms (Stage, Symbols, Library and Timeline) and Create simple, tasteful animation effects. Students use Buttons and ActionScript to enable basic user interaction.

Course Outcomes:

CO - 1: To understand the basics of Flash

CO - 2: To understand the designing concepts

CO - 3: To implement the basics of Drawing and Coloring

CO - 4: Ability to Understand Working with text and Modifying Objects

CO – 5: To build the designing structure of Working with Layers and Symbols

CO – 6: Become proficient in working with Sound and Video

CO – 7: Gain necessary knowledge in Export keyboard shortcuts as HTML

CO - 8: Acquire necessary knowledge about Filters, Effects And Layer Types

CO - 9: Become proficient in using Flash

CO - 10: To be able to Publish Profiles using animation techniques

UNIT I SYMBOLS, INSTANCES, AND THE LIBRARY**6**

Understanding the Document Library - Defining Content Types- Editing Symbols- Modifying Instance Properties -Slice Scaling for Movie Clip Backgrounds - Color Basics - Working in the Swatches Panel - Using the Color Panel - Working with Droppers, Paint Bucket, and Ink Bottles.

UNIT II WORKING WITH TEXT AND GRAPHICS**6**

Text Field Types in Flash - The Text Tool and the Property Inspector - Font Export and Display - Sampling and Switching Fills and Strokes - Transforming Gradients and Bitmap Fills - Gradient Transform Used for Lighting Effects - Applying Modify Shape Menu Commands - Free Transform Commands and Options - Modifying Item Types - Using the History Pane.

UNIT III ANIMATION STRATEGIES**6**

Establishing Ground Rules -Defining Variables - Adding Personality - Manipulating Perceptions and Illusion - Understanding the Laws of Nature -Timeline Animation - Basic methods of Flash Animation - Frame-by-Frame Animation - Modifying Multiframe Sequence -Using Tweens for Animation -

Integrating Multiple Animation Sequence -Organizing Symbol Instances on the Main Timeline -Reusing and Modifying Symbol Instances - Duplicating Tweened Animation Properties with the Copy Motion Command.

UNIT IV APPLYING FILTERS, EFFECTS AND LAYER TYPES

6

Applying Filters in Flash -Controlling Color -Layering Graphics with Blend Mode -Using Timeline Effects for Graphics and Animation - Motion Guides -Mask Layers - Motion Guides and Movie Clip Masks -Using Distribute to Layers.

UNIT V CHARACTER ANIMATION TECHNIQUES

6

Working with Large File Sizes -Some Cartoon Animation Basics - Animator's Keys and Inbetweening - Coloring the Art -Flash Tweening-. Adding- Sound Identifying- Sound File Import and Export Formats -Importing Sounds into Flash -Assigning a Sound to a Button -Adding Sound to the Timeline.

TOTAL: 30 Hours

Books for References:

1. Robert Reinhardt, "Flash CS3 Professional" Snow Dowd, 2007
2. Sami Ben-Yahia, "Flash 5 for PC/MAC", ENI, 2001.
3. Anushka Wirasinha, "Flash in a Flash Web Development", PHI, 2002.
4. Lott, Joey, "Flash 8 Action Script Bible", John Wiley & Sons, 2006.

Course Objective:

This course provides concepts of Advance Excel such as Financial Functions, Date and Time Functions, VLookup, Analysis Tool Pack.

Course Outcomes:

- CO-1:** To learn to modify Excel options
- CO-2:** To protect data in worksheets and workbooks
- CO-3:** To import data into Excel and export data from Excel
- CO-4:** To use data linking to create more efficient workbooks
- CO-5:** To group cells and use outlines to manipulate the worksheet
- CO-6:** To create summaries in your spreadsheets using subtotals
- CO-7:** To use the Data Consolidation feature to combine data from several workbooks into one
- CO-8:** To create, use and modify data tables
- CO-9:** Ability to use data linking to create more efficient workbooks
- CO-10:** To create recorded macros in Excel

UNIT I INTRODUCTION 6

Understanding Excel’s Files, Ribbon and Shortcut: CreateA Workbook - Enter Data In A Worksheet - Format A Worksheet - Format Numbers In A Worksheet - Create An Excel Table -Filter Data By Using An Autofilter - Sort Data By Using An Autofilter.

UNIT II DATE AND TIME 6

Working With Dates And Times &Text: Working With Dates &Time, Creating Formulas That Manipulate Text – Upper, Proper, Lower, Concatenate, Text To Column- Creating Formulas That Count, Sum, SubTOTAL: CreateA Formula - Use A Function In A Formula - Creating Formulas That Look Up Values: Vlookup, Hlookup, Match &Index .

UNIT III FINANCIAL FUNCTIONS 6

Creating Formulas For FINANCIAL Applications: Introduction To Formulas E.G. PV, PMT, NPER, RATE, Creating Balance Sheet, Investment Calculations, Depreciation Calculations- Creating Charts And Graphics: Chart Your Data, Creating Sparkline Graphics, Using Insert Tab Utilities.

UNIT IV FORMATTING 6

Using Custom Number Formats: Right Click, Format Cells Window - Using Data Tab And Data Validation: Getting External Data, Remove Duplicates, Apply Data Validation & Using Utilities From Data Tab - Protecting Your Work: Using Review Tab Utilities - Performing Spreadsheet What-Lf Analysis: Create A Macro - Activate And Use An Add-In.

UNIT V ANALYSIS

6

Analyzing Data With The Analysis Tool Pack: Anova, Correlation, Covariance, Descriptive Statistics, Histogram, Random Number Generation, Rank And Percentile, Regression, T-Test, Z Test - Using Pivot Tables For Data Analysis: Create Data Base For Pivot, Analyzing Data With Pivot Tables, Producing Report With A Pivot.

TOTAL: 30 Hours

Books for References:

1. John Walkenbach ,”Excel 2010 Bible [With CDROM]”, John Wiley & Sons, 2010.
2. Day, Alastair, “ Materng Financial modeling in Microsoft excel”, Pearson Education, 2nd Edition, 2007.
3. Greg Harvey ,”Excel 2007 for Dummies”, John Wiley & Sons, 2006.
4. June Jamrich Parsons , Dan Oja , Roy,Ageloff , Patrick Carey , “New Perspectives on Microsoft Office Excel 2007”, Course Technology; 1st edition, 2013.

STATISTICAL PACKAGE FOR SOCIAL SCIENCE 2002

Course Objective:

This course introduces concepts of Statistical Package for Social Sciences and also working with it.

Course Outcomes:

CO-1: To learn concepts of statistical population and sample, variables and attributes.

CO-2: To evaluate Tabular and graphical representation of data based on variables.

CO-3: To learn Conditions for the consistency' and criteria for the independence of data based on attributes.

CO-4: To learn Measures of central tendency, Dispersion, Skewness and Kurtosis.

CO-5: To review Moments and their use in studying various characteristics of data.

CO-6: To learn Different approaches to the theory of probability.

CO-7: To learn Important theorems on probability and their use in solving problem

CO-8: To learn Concept of correlation, various correlation coefficients

CO-9: To learn Concept of Principle of least squares for curve fitting and regression lines.

CO-10: To learn the theory of Comparison test

UNIT I INTRODUCTION

6

Brief Description And History Of SPSS - Running SPSS And The Initial Window(S) - Running SPSS - The Initial SPSS Window(S) Overview The Title Bar The Menu Bar The (Power) Tool Bar The Data Editor (Data View And Variable View) The Status Bar.

UNIT II OVERVIEW

6

Sample SPSS Session Overview Of This Exercise -Open File - List Cases - Frequencies - Explore - Graphics - Non Parametric Wilcoxon Test - Correlation –Regression.

UNIT III COMPUTATION

6

Creation Of A Small Data File And Computation Of New Variables Overview- Preliminary Considerations About Data Structures -Creation Of A Data Dictionary -Entering Data - Moving Around The Data - Editing Data - Computation Of New (Or Existing Variables) .

UNIT IV COMPARATIVE STATISTICS

6

Data Entry - Descriptive Statistics-. Examining Assumptions Of Parametric Statistics - Test For Normality- Test For Homogeneity Of Variances- Transformations-Comparative Statistics: Comparing Means Among Groups.

UNIT V COMPARISON TEST

6

Comparing Two Groups Using Parametric Statistics -Two-Sample T-Test -Paired T-Test -Comparing Two Groups Using Non-Parametric Statistics - Mann Whitney U Test - Comparing Three Or More Groups Using Parametric Statistics - One-Way ANOVA And Post-Hoc Tests - Comparing Three Or More Groups Using Non-Parametric Statistics - Kruskal-Wallis Test - For Studies With Two Independent Variables.

TOTAL: 30 Hours

Books for References:

1. Andy Field , “Discovering Statistics Using IBM SPSS Statistics”, SAGE Publications Ltd, 4th edition, 2013.
2. Sidney Tyrrell, “SPSS: Stats Practically Short and Simple”, Bookboon, 2009
3. Rajathi. A , “SPSS for you”, MJP Publishers 2010.
4. Griffith, Arthur , “SPSS for Dummies” , John Wiley, 2007.

Course Objective:

This course introduces the basic computer concepts and various problem solving methods, including word processing, Calculations using Spreadsheet applications and Data storage using Database management.

Course Outcomes:

CO-1: Understand the Evolution of Computers.

CO-2: Analyze the Classification of Computers.

CO-3: Understand different types of Soft wares.

CO-4: Apply Knowledge of converting Doc into WWW pages.

CO-5: Apply formatting features, editing text & paragraphs.

CO-6: Automating your work and Printing documents.

CO-7: Working and editing in workbook.

CO-8: Creating formats and links.

CO-9: Finding Information in Databases and importing data from other databases.

CO-10: Creating Presentation using MS PowerPoint.

UNIT I FUNDAMENTALS OF COMPUTER**6**

Evolution Of Computers - Classification Of Computers – Definition Of Hardware- CPU – Inputs/Outputs – Storage Devices - Types Of Software - Overview of Operating System – Multitasking OS –Overview Of Modern Digital Computer.

UNIT II MS WORD**6**

Word Processing Programs And Their Uses – Word Basics – Formatting Features -Editing Text &Paragraphs- Automatic Formatting And Styles –Mail Merge–Working With Tables-Graphics And Frames – Macro - Special Features Of Word – Automating Your Work And Printing Documents- Desktop Publishing Service – Converting Doc Into Www Pages.

UNIT III MS EXCEL**6**

Spreadsheet Programs – Applications – Menus-Commands-Toolbars – Working &Editing In Workbook – Creating Formats &Links – Formatting A Worksheet &Creating Graphic Objects – Calculations – Working With Formula - Organizing Data, Importing Data, Functions – Data Handling – Working With Graphs - Creating Charts - Managing Workbooks.

UNIT IV MS ACCESS

6

Introduction - Planning A Database - Starting Access - Data Types And Properties - Creating A New Database - Creating Tables - Working With Forms - Creating Queries - Finding Information In Databases - Creating Reports - Types Of Reports - Printing & Print Preview – Importing Data From Other Databases Viz. MS Excel Etc.

UNIT V MS POWERPOINT

6

Getting Started In Powerpoint – Creating A Presentation - Setting Presentation Style - Adding Text To The Presentation - Formatting A Presentation - Adding Style, Color - Arranging Objects - Adding Header & Footer - Creating And Editing Slides – Slide Layout – Adding Picture And Graph – Adding Sound And Video – Adding Auto Shape - Custom Animation - Previewing A Slide Show.

TOTAL: 30 Hours

Books for References:

1. E.Balagurusamy, “ Computing Fundamentals & C Programming”, Tata McGraw hill, 2017.
2. Sanjay Saxena , “MS office 2000”, Vikas publication house pvt.ltd, 2000.
3. Jennifer Ackerman Kettell, Guy Hart-Davis, Curt Simmons, Microsoft Office 2003: The Complete Reference, McGraw-Hill Osborne, 2nd edition, 2003.
4. Balaguruswamy , “Office Automation & Word Processing” , TMH, 1987.

Course Objective:

This course introduces the basic concepts of desk top publishing with document setup, fonts, composing machines, graphics, tones, book preparation and file maintenance.

Course Outcomes:

CO-1: Understand the basics of computers, Hardware and Software.

CO-2: Learn DOS commands and Tools.

CO-3: Understand File Downloading and Uploading.

CO-4: Apply formatting for document creation.

CO-5: Inserting special effects and images for the document.

CO-6: Learning typography.

CO-7: Designing page using graphics.

CO-8: Apply knowledge for seminar presentation.

CO-9: Understand different types of printers and file formats.

CO-10: Apply knowledge for project work preparation.

UNIT I FUNDAMENTALS OF COMPUTERS**6**

Introduction To Computers, Hardware And Software – Applications Of Computers – Input Devices – Output Devices – Storage Media – Types Of Software- Operating Systems – Introduction To DOS – DOS Commands And Tools – MS-Windows – Using The Desktop – Setup Using Control Panel – Windows Accessories – Files & Folder Management - Introduction To Internet – Browsers – Sending And Receiving E-Mail – File Downloading And Uploading.

UNIT II DOCUMENT SET UP**6**

History Of Printing – Types Of Printing - Desktop Publishing: Introduction – Merits & Demerits – DTP And Traditional Composing – Cost & Estimation Of DTP Unit – Word Processing Using MS-Word: Basics – Text Formatting – Setting Header And Footer – Tables, Borders And Shading –Special Effects And Image Insertion.

UNIT III TYPING AND COMPOSING PAGES**6**

Typography – Managing Fonts – Measurement Types For Fonts, Pages, Lines – Proof Reading – Page Setup – House Styles – Page Maker Case Study - Page Composing - Different Composing Methods And Processes – Composing Machines – Output Devices – Qwark Express Case Study

UNIT IV DOCUMENT DESIGNING

6

Graphic Reproduction – Setting Tones, Shadowing, Highlight, Contrast For Images - Scanning Principles – Types Of Scanners And Their Use – Setting Resolution – Page Design – Color Types – Color Selection - Preparation Of Graphics – Book Preparation – Seminar Presentation – Imposition Techniques

UNIT V FILE & PRINT MANAGEMENT

6

Printing – Types of Printers – Different Types of File Formats – Icc Based Color Management – Preparation Of Project Work – Binding Techniques – Coreldraw Case Study.

TOTAL: 30 Hours

Books for References:

1. Shirish Chavan , “Rapidex DTP Course”, UNICORN Books Pvt. Ltd., 2007
2. Sanjay Saxena , “A First Course in Computers” , Vikas Publishing House, 2005.
3. Pete Yeo, “ DTP Manual” , Chapman Hall, 1994.
4. Shirih Chauan , “Rapidex DTP Course: Coreldraw “, Unicorn Books, 2005,

Course Objective:

This course introduces the basic concepts, various queries, triggers and stored routine of Mysql. It also gives the Cursor management, event management and user management of Mysql.

Course Outcomes:

- CO-1:** Understand the Basics of SQL.
- CO-2:** Analyze the difference between Relational and Non-Relational Database System.
- CO-3:** Apply validity checking using CONSTRAINTS.
- CO-4:** Understand the types of queries.
- CO-5:** Apply sub queries & joins for the statements.
- CO-6:** Understanding Simple Transaction using Commit & Rollback.
- CO-7:** Create And Drop a Trigger.
- CO-8:** Create And Invoke a Stored Routine.
- CO-9:** Understand MySQL cursor management and Events.
- CO-10:** Apply knowledge to recover from crashes.

UNIT I INTRODUCTION TO SQL BASICS 6

Introduction: To Databases, Relational and Non-Relational Database System Mysql As A Non-Procedural Language. View of Data. SQL Basics: Statements, Names (Table & Column Names), Data Types, Creating Database, Inserting Data, Updating Data, Deleting Data, Expressions, Built-In-Functions, Missing Data CREATE, USE, ALTER, RENAME, SHOW, DESCRIBE And DROP, PRIMARY KEY FOREIGN KEY (One And More Columns) Simple Validity Checking Using CONSTRAINTS.

UNIT II SIMPLE, NESTED, SUBQUERIES 6

Simple Queries: The SELECT Statement Multi-Table Queries: Simple Joins (INNER JOIN), SQL Considerations For Multitable Queries (Table Aliases, Qualified Column Names, All Column Selections Self Joins). Nested Queries: Using Sub Queries, Sub Query Search Conditions, Sub Queries & Joins, Nested Sub Queries, Correlated Sub Queries, Sub Queries In The HAVING Clause. Simple Transaction Illustrating START, COMMIT, and ROLLBACK.

UNIT III MYSQL TRIGGERS AND STORED ROUTINE 6

Mysql Triggers: Basics of Trigger, Create and Drop A Trigger, Find All Triggers in Database. Mysql Stored Routine: Stored Routine, Create and Invoke A Stored Routine, Alter A Stored Routine, Drop A Stored Routine.

UNIT IV MYSQL CURSOR MANAGEMENT AND EVENTS

6

Utilize Functionalities Of Mysql Cursor: Basics Of Cursor, Defining The Cursor, Retrieve Values From Cursor, Close The Cursor. Mysql Events: Events, Turning Event Scheduler On Create The Event, Find All Events In Database, Chang The Event And Drop The Event.

UNIT V USER MANAGEMENT, BACKUP AND RECOVERY

6

User Management in MySQL: Basics of MySQL User, Access Control List, Manage User Accounts, GRANT And REVOKE Command, Reset Root Password. Backup and Recovery: Back Up Mysql, Uses for Backup, Backup Frequency, Copy Database into another Machine, Recovery from Crashes.

TOTAL: 30 Hours

Books for References:

1. Alexis Leon & Mathews Leon , “SQL a complete reference “ , TMG, 2008
2. Seyed M. M. and Hugh Williams, “ Learning MySQL “, O’REILLY, 2006.
3. MCGrath, MIKE , “PHP & MYSQL in easy steps,”, MGH, 2012.
4. Sheeri Cabral , “MySQL Administrator”, 2011.

List of Ability Enhancement Compulsory Courses

VISTAS
HINDI SYLLABUS(2020-21)
I YEAR

I year-I Sem (Prose,Letter writing& Technical words)

- Unit I - 'Mamta', letter writing, Technical words.
Aim - Through the story students will be familiar with the writing style of great writer "sri Jayashankar Prasad", & can understand the situation of country during Mughal period .
- Unit II - 'Yogyata aur vyavasaya kaa chunaav', letter writing, Technical words.
Aim - To make the children understand the importance of selecting a profession according to one's own interest.
- Unit III - 'Rajnithi kaa bantwara', letter writing, Technical words.
Aim - To describe the present situation; politician's behaviour & their self-oriented activities.
- Unit IV - 'computer: nayi kranthi ki dastak', letter writing, Technical words
Aim - To explain the importance of computer in daily life in all the fields.
- Unit V - Raspriya, letter writing, Technical words
Aim - This story helps the students to understand the Writing style of writer "Fanishwarnath renu" who is well known for his village type Stories .

Training the students regarding different types of letters & technical words, this will help the students to understand the official work in Hindi.

Text Book Gadya our prayojanmulak Hindi ; Edited by Dr.N.Lavanya, Mayur Publishers
Edition :2011

VISTAS
HINDI SYLLABUS(2020-21)
I year-II Sem (kahani,Ekanki&Translation)

- Unit I** - **'Pus ki raath'(kahani), Translation**
Aim This story explains the problems faced by the farmers
'Upanyas samrat Premchand' describes the life of a poor farmer who represents present day's situation
Aim **'Das hazar'(ekanki), Translation**
Author 'Uday Shankar bhatt' criticized the rich&stingy person's behaviour and explains the importance of human values in a humorous manner
By translating the English passage into Hindi, students learn the rules which should be followed while translation.
- Unit II** - **'vaapasi'(kahani), Translation**
Aim Female writer 'Usha priyamvada' describes the mentality of a retired person in a beautiful manner
Aim **'Akhbaari vijnapan'(ekanki), Translation**
This humorous story written by 'chiranchith' points out the problems occur due to Carelessness&lack of communication.
- Unit III** - **'Akeli'(kahani), Translation**
Aim Writer 'Mannu bhandari' describes the condition of middle aged woman left lonely who longs only for love &affection¬hing else.
Aim **'Raat ke raahi', (ekanki), Translation**
'Vrajabhushan' shows the clear picture of cunning woman and creates Awareness
- Unit IV** - **'Parda'(kahani), Translation**
Aim Written by 'Yashpal', this story brings the clear picture of problems Faced by a poor muslim family.
Aim **'Maim bhi maanav huum'(ekanki), Translation**
Author 'vishnu prabhakar' describes the kalinga war&reasons behind samrat Ashok's change of mind.
- Unit V - **'Sharandata'(kahani), Translation**
Aim This story written by 'Anjeya explains the situation of Indian people who lived in Pakistan region after separation .
Aim **'Yah meri janma bhumi hai''(ekanki), Translation**
'Harikrishna premi' points out the patriotism of a british girl who Was born in India &also the country's condition at that time.

Text book : sankalan kahani our ekaanki ; Edited by Dr,N.Lavanya ,
Mayur Publishers- Edition :2010

**VELS INSTITUTE SCIENCE, TECHNOLOGY & ADVANCED STUDIES
VELS UNIVERSITY
PALLAVARAM-CHENNAI-600117**

**SYLLABUS
FOR THE I YEAR & I SEMESTER COMMON TO ALL UG PROGRAMMES
EFFECTIVE FROM ACADEMIC YEAR
2017-2018.**

SUB CODE:15LFR001 FRENCH I

5004

OBJECTIVE:

To introduce French language.

To enable the students to understand and to acquire the basic knowledge of French language with elementary grammar.

UNIT:I INTRODUCTION

12

Introduction-Alphabet-comment prononcer, écrire et lire les mots-base: les prénoms personnel de 1er , 2eme et 3eme personnes-conjugaisons les verbes être et avoir en forme affirmative, négative

Et interrogative.

UNIT II- LECON 1-3

12

Leçon 1 :Premiers mots en français- 2.Les hommes sont difficiles 3.Vive la liberté-Réponses aux questions tirées de la leçon-Grammaire: Les adjectives masculines ou féminines-Les article définies et indéfinis-Singuliers et pluriels.

UNIT III-LECON 4-6

12

Leçons 4. L'heure c'est l'heure 5.Elle va revoir sa Normandie 6.Mettez-vous d'accord groupe de nom-Réponses aux questions tirées de la leçon-Grammaire :A placer et accorder l'adjectif en groupe de nom-Préposition de lieu-A écrire les nombres et l'heure en français

UNIT :IV-LECON 7-9

12

Leçon 7.Trois visages de l'aventure , 8. A moi Auvergne 9.Recit de voyage-Réponses aux questions tirées de la leçon- Grammaire : Adjectif processif- Les phrases au présent de l'indicatif-Les phrases avec les verbes pronominaux au présent.

UNIT :V- COMPOSITION :

12

A écrire une lettre à un ami l'invitant à une célébration différente ex :mariage-A faire le dialogue- A lire le passage et répondre aux questions.

TEXTBOOK :

Jack GIRARDER & Jean Marie GRIDLIG, <<Méthode de Français PANORAMA>>, Clé Internationale, Goyal Publication, New Delhi Edition 2014.

REFERENCE BOOKS:

DONDO Mathurin, "Modern French Course", Oxford University Press, New Delhi Edition 2014.

Nithya Vijayakumar get ready French grammar-Elementary Goyal publications, New Delhi Edition 2014.

**VELS INSTITUTE SCIENCE, TECHNOLOGY & ADVANCED STUDIES
VELS UNIVERSITY
PALLAVARAM-CHENNAI-600117**

**SYLLABUS
FOR THE I YEAR & II SEMESTER COMMON TO ALL UG PROGRAMMES
EFFECTIVE FROM ACADEMIC YEAR
2017-2018.**

SUB CODE:15LFR002 FRENCH II

5004

OBJECTIVE:

To fortify the grammar and vocabulary skills of the students.

To enable the students have an idea of the French culture and civilization

UNIT:I LECON 10-11

12

Leçons :10 Les affaires marchent,11 un repas midi a problèmes- Réponses aux questions tires de la leçon-grammaire ;présent progressif passe récent ou future proche-complément d'Object directe-complément d'objet

UNIT II- LECON 12-13

12

Leçons 12 :tout est bien qui fini bien,-13 aux armes citoyens-réponses aux questions tires de la leçon-grammaire :les pronoms<<en ou y>> rapporter des paroles-Les pronoms relatifs que, qui ou ou.

UNIT III-LECON 14-15

12

Leçons 14.Qui ne risque rien n'a rien-15.la fortune sourit aux audacieux-réponses aux questions tires de la leçon-grammaire : comparaison-les phrases au passe compose.

UNIT :IV-LECON 16-18

12

Leçons 16 la publicité et nos rêves 17 la France la monde 18 campagne publicitaire réponses aux questions tires de la leçon-grammaire :les phrases a l'imparfait-les phrases au future

UNIT :V- COMPOSITION :

12

A écrire une lettre de regret//refus a un ami concernant l'invitation d'une célébration reçue-a écrire un essaie sur un sujet générale-a lire le passage et répondre aux questions.

TEXTBOOK :

Jack GIRARDER & Jean Marie GRIDLIG,<<Méthode de Français PANORAMA>>, Clé Internationale, Goyal Publication ,New Delhi Edition 2014.

REFERENCE BOOKS:

DONDO Mathurin, "Modern French Course", Oxford University Press, New Delhi Edition 2014.

Nithya Vijayakumar get ready French grammar-Elementary Goyal publications ,New Delhi Edition 2014.

ENGLISH- I

5 0 0 5

COURSE OBJECTIVE:

- To enable students to develop their communication skills effectively. To make students familiar with the English Language.
- To enrich their vocabulary in English
- To develop communicative competency

12

UNIT I - Preparatory Lesson

1. Competition Matters
Suzanne Sievert
2. A Personal Crisis May Change History
Dr. A.P.J. Abdul Kalam
3. Why Preserve Biodiversity
Prof. D. Balasubramanian

UNIT II –Prose

12

1. The Unexpected
Robert Lynd
2. My Greatest Olympic
Prize Jesse Owens
3. If You are wrong, admit it
Dale Carnegie

UNIT III –Poetry

12

1. The Night of the Scorpion
Nissim Ezekiel
2. Pulley or The Gift of
God George Herbert
3. La Bella Dame Sans Merci
John Keats

UNIT IV- Short Story

12

1. The Gift of
Magi O Henry
2. Three Questions
Leo Tolstoy

UNIT V – One Act Play

12

1. The Shirt
Francis Dilion
2. The Pie and the Tart
Hugh Chester man

Total: 60 Hours

Books Prescribed:

Confluence - Anu Chithra Publications

COURSE OBJECTIVE:

- To enable students to develop their communication skills effectively
- To make students familiar with various sentence patterns of the English Language
- To enrich their vocabulary in English
- To develop communicative competency

Credit Hours**UNIT-I Prose****12**

1. The Words of Wisdom
Chetan Bhagat
2. Forgetting
Robert Lynd
3. My Early Days
Dr. A.P.J. Abdul Kalam

UNIT II –Poetry**12**

1. Ozymandias
Percy Bysshe Shelley
2. Mending Wall
Robert Frost
3. Where the Mind is Without
Fear Rabindranath Tagore

UNIT III –Short Story**12**

1. Am I Blue?
Alice Walker
2. The Last Leaf
O' Henry
3. The Selfish Giant
Oscar Wilde

UNIT IV – One Act Play**12**

1. Soul Gone Home
Langston Hughes

UNIT V**12**

1. Lexical Skills
2. Vocabulary
3. Communication and Grammar at the end of all lessons

Total: 60 Hours**Books Prescribed:**

Radiance - Emerald Publications

UNIT I INTRODUCTION 6

The multidisciplinary nature of Environment of studies – Definition - Scope and Importance - Need for Public Awareness.

UNIT II NATURAL RESOURCES 6

Natural resources and associated problem - Renewable and Non- Renewable resources:-Forest Resources-Mineral Resources-Food Resources - Energy Resources-Land Resources; Role of an individual in conservation of natural resources- Equitable use of resources of sustainable lifestyles.

UNIT III ECO SYSTEM 6

Concepts of an Ecosystem - Structure and Functions of an Ecosystem - Procedures, Consumers and Decomposers - Energy flow in the ecosystem - Food chains, Food webs and ecological pyramids - Introduction, types, Characteristics features - Structures and functions of the following ecosystem :Forest ecosystem, Grass land ecosystem, Desert ecosystem, Aquatic ecosystem.

UNIT IV BIODIVERSITY AND ITS CONSERVATION 6

Introduction - Definition, genetic, species and ecosystem diversity - Bio-geographical classification of India - Value of Bio-diversity - Bio-diversity at global, National and Local levels - India s a mega-diversity nation - Hot-Spots of diversity - Threats to diversity: Habitats loss, poaching of Wild life, man wild life conflicts - Endangered and Endemic species of India In-Situ conversation of Bio-diversity.

UNIT V ENVIRONMENTAL POLLUTION AND HUMAN RIGHTS 6

Definition - Causes, effects and control measures of : Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear pollution - Soil pollution management: Causes, effects and control measures of urban and industrial wastes - Role of an individual in prevention of pollution - Pollution – Case studies -Disaster Management – Flood, earthquakes, cyclone of landslidesEnvironment and human health - Human rights - Value education - HIV/AIDS - Women and child welfare - Role of information technology in Environment and Human health - Case study

TOTAL: 30 Hours**Text Book:**

1. Text Book Of Environmental Engineering, R. Venugopala Rao, Eastern Economy Edition.

Reference Books:

1. Environmental studies, Dr. N. Arumugam, Prof.V. Kumaresan.
2. Environmental studies, Thangamani & Shyamala Thangamani.

List of Skill Enhancement Courses

UG SOFT SKILLS – II

1. Presentation Skills

Elements of an effective presentation – structure of presentation – voice modulation – Audience analysis – Body language

2. Soft Skills

Time Management – Articulateness – Assertiveness – Stress management

3. Resume / Report preparation / Letter Writing

Structuring the resume / Report – Business letters – E-Mail Communication

4. Interview Skills

Kinds of Interviews – Required by Skills – Corporate Culture – Mock Interviews

5. 30 Frequently asked questions

BOOKS RECOMMENDED

1. Barun K.Mitra. Personality Development and soft skills. Oxford University Press. New Delhi. 2011.
2. S P Sharma. Personality Development. Pustaq Mahal. New Delhi. 2010.
3. Meenakshi Raman and Sangeetha Sharma. Technical Communication. Oxford University Press. New Delhi. 2009.

UNIT I INTRODUCTION	6
Why Value Education – Ethical Reflections – What is Ethics? Swami Vivekananda	
UNIT II APPROACH TO LIFE	6
Approach to Life - Happiness as Goal - Historical Perspective – Life in the Past and Present	
UNIT III KINDS OF VALUES	6
Kinds of Values S.Ignacimuthu S.J – Living Excellence Anthony Robbins – Concern for Others – Student’s Definition why Concern.	
UNIT IV GOALS AND HUMAN RIGHTS	6
Use Goals to help you grow David J.Schwartz – essential Characteristics of Human Rights.	
UNIT V INFLUENCE OF SCIENCE AND TECHNOLOGY IN HUMAN’S SOCIAL LIFE	6
Social Relevance of Science and Technology – Economic Awareness – Economic Features – Status of Women – Mass Media and Values.	

TOTAL: 30 Hours**Text Book:**

1. Touchstone: Synergy of Values – University of Madras.

Reference Book:

1. In harmony- Value Education at College Level- Dept. of Ethics and Religious Studies Loyolla College, Madras.