

Diploma in Computer Engineering
Revision 2015
Syllabus
Semester - V

semester V										
S. No	Code	Course	Course Category	Periods per week			Credits	Type	Evaluation	
				Theory	Practical	Total			CA	External
1	5132	Project Management & Software Engineering	C	4	0	4	4	T	50	100
2	5133	Web Programming	A	4	0	4	4	T	50	100
3	5131	Microprocessor and Interfacing	A	4	0	4	4	T	50	100
4	5136	Information Security	E	4	0	4	4	T	50	100
	5135	Ethical Hacking	E	4	0	4	4	T	50	100
	5134	Cloud Computing	E	4	0	4	4	T	50	100
5	5139	Web Programming Lab	A	0	4	4	2	P	50	50
6	5138	Microprocessor Lab	A	0	4	4	2	P	50	50
7	5009	Industrial Training/Industrial Visit/Collaborative work	A	2 Week			2	P	50	0
8	5137	Computer Network Engineering Lab	A	0	5	5	3	P	50	50
9	6009	Project & Seminar	A	0	6	6	0	Pr	0	0
				16	19	35	25			

COURSE TITLE : **PROJECT MANAGEMENT AND SOFTWARE ENGINEERING**
COURSE CODE : **5132**
COURSE CATEGORY : **C**
PERIODS/WEEK : **4**
PERIODS/SEMESTER : **52**
CREDITS : **4**

TIME SCHEDULE

MODULE	TOPICS	PERIODS
1	Phases of Software Development	13
2	Requirements Analysis and Design	13
3	Software Implementation and Testing	13
4	Software Project Management	13

Course General Outcomes:

Sl.	G.O	On completion of this course the student will be able :
1	1	To understand the need of software engineering
	2	To know the phases of Software Development
	3	To understand various Lifecycle models
2	1	To understand requirement analysis and specifications
	2	To understand preparation of SRS document
	3	To understand Design Concepts
3	1	To understand software coding guidelines
	2	To understand software testing
4	1	To know Software Project Management
	2	To understand CMMI

Specific Outcomes:

MODULE – I Phases of Software Development

1. To Understand Phases and Life cycle models of Software Development
 1. Define software engineering and its importance
 2. Explain emergence of software engineering
 3. Describe Software Process
 4. State Phases of software development
 5. Describe Feasibility study
 6. Describe Requirement Analysis
 7. Describe Design phase
 8. Describe Implementation phase
 9. Describe testing phase
 10. Describe Maintenance phase
 11. Describe Life Cycle Models- Classical waterfall, Iterative, prototyping, Spiral and Agile
 12. Compare Life cycle models

MODULE – II Requirements Analysis and Design

1. To Comprehend the Requirements Analysis and Design
 1. Describe Software Requirement Analysis and its need
 2. Describe Requirements specification
 3. Describe the desirable characteristics of an SRS
 4. Explain structure of an SRS document
 5. Explain Data Flow Diagrams
 6. Explain the role of Software Architecture
 7. Describe how to plan for a Software Project
 8. Define Software Design
 9. Describe software design concepts
 10. Explain Function Oriented Design and its Complexity Metrics
 11. Explain Object Oriented Design and its Complexity Metrics
 12. Describe Detailed Design

MODULE III Software Implementation and Testing

1. To Understand Software Implementation and Testing
 1. Explain Programming principles and coding guidelines
 2. Describe the method of incrementally developing code
 3. Explain how to manage the evolving code
 4. Define Software Testing
 5. Explain unit testing and Code Inspection
 6. Explain the testing concepts and testing process
 7. Design Test case and Test plan
 8. Describe Black-box testing
 9. Describe White box testing

MODULE – IV Software Project Management

1.1 To Understand the importance of Software Project Management

- 1.1.1 Explain Software Project Management Framework
- 1.1.2 Describe methods to Estimate project time and cost
- 1.1.3 Describe about Resource Management
- 1.1.4 Describe how Project Risks can be identified, analyzed, mitigated, and monitored
- 1.1.5 Describe how project quality can be ensured and managed
- 1.1.6 Describe about Configuration Management
- 1.1.7 Describe change management
- 1.1.8 Explain about CMMI, different levels and need of accreditation

CONTENT DETAILS

Module I: Phases and Life cycle models of Software Development

Software Engineering – importance – emergence - Phases of software development - Feasibility study, Requirement Analysis, Design, Implementation, Testing, and Maintenance phases
Software Life Cycle Models - Classical waterfall, Iterative, prototyping, Spiral, and Agile - Compare Life cycle models

Module II: Requirements Analysis and Design

Requirement Analysis – Analysis process, Requirements specification, desirable characteristics of an SRS, structure of an SRS document, Data Flow Diagrams - Role of Software Architecture and Architecture Views - Planning for a Software Project
Software Design - Software design concepts - Function Oriented Design and its Complexity Metrics - Object Oriented Design and its Complexity Metrics - Detailed Design.

MODULE III: Software Implementation and Testing

Software Coding - Programming principles and coding guidelines - method of incrementally developing code - managing the evolving code
Testing - Unit testing and Code Inspection - Testing concepts and testing process - Design of Test case and Test plan - Black-box testing - White box testing

MODULE IV: Software Project Management

Software Project Management Framework - methods to estimate project time and cost, Resource Management, Identification, Analysis, mitigation, and monitoring of Project Risks - Ensuring Project quality and quality management, Configuration Management, Change management, CMMI, different levels and need of accreditation

TEXT BOOK(S):

1. Software Engineering, A Precise Approach: Pankaj Jalote, Wiley India-2010
2. Software Project Management : Saikat Dutt /S. Chandramouli, Pearson-Second Edition

REFERENCE :

1. Software Engineering : [Ian Sommerville](#), Pearson,Nineth Edition
2. Software Engineering a practitioners approach – Roger S Pressman,Seventh Edition
3. Project Management Absolute Beginner's Guide : Greg Horine , Pearson, Second Edition

COURSE TITLE : **WEB PROGRAMMING**
COURSE CODE : **5133**
COURSE CATEGORY : **A/E**
PERIODS/WEEK : **4**
PERIODS/SEMESTER : **52**
CREDITS : **4**

TIME SCHEDULE

MODULE	TOPICS	PERIODS
1	Internet Fundamentals and HTML	13
2	CSS & JAVASCRIPT	13
3	Server Side Scripting – PHP	13
4	Database Handling, Content Management System	13

Course General Outcomes:

Sl.	G.O	On completion of this course the student will be able :
1	1	To Understand Internet Fundamentals and HTML
2	1	To Understand CSS & JAVASCRIPT
3	1	To Server Side Scripting – PHP
4	1	To Understand Database Handling, Content Management System

Specific Outcomes:

MODULE – I Internet Fundamentals and HTML

1.1 To Understand Internet Fundamentals and HTML

- 1.1.1. Define Internet, Internet Protocol Address, Domain Names
- 1.1.2. Explain World Wide Web
- 1.1.3. Differentiate between World Wide Web and Internet
- 1.1.4. Define Web Browsers, Web Servers with examples
- 1.1.5. Describe URL, MIME
- 1.1.6. Illustrate HTTP
- 1.1.7. Explain HTML & XHTML
- 1.1.8. Explain the format of a HTML page
- 1.1.9. Describe Elements and Attributes
- 1.1.10. Explain Basic tags, heading tags, paragraph tags, formatting tags
- 1.1.11. Define HTML List
- 1.1.12. Describe Hyperlink and anchor tag.
- 1.1.13. Describe how to use Table tags and its attributes
- 1.1.14. Describe how to use Frames and IFrames tags
- 1.1.15. Describe Form tag with all of its attributes
- 1.1.16. Differentiate between get and post methods
- 1.1.17. Describe how to use control tags in a Form
- 1.1.18. Describe how to Embed Multimedia objects into HTML pages
- 1.1.19. Design simple web pages containing using HTML tags

MODULE – II CSS & JAVASCRIPT

2.1 Understand CSS & JAVASCRIPT

- 2.1.1 Explain the use of Cascading Style Sheets (CSS)
- 2.1.2 Describe CSS syntax
- 2.1.3 Explain CSS selectors
- 2.1.4 Illustrate how to insert CSS in a web page - Inline, Embedded and External Style Sheets
- 2.1.5 Explain basic CSS properties – font, colour, background, list, link, text
- 2.1.6 Implement CSS in web pages
- 2.1.7 State the need for scripting languages
- 2.1.8 Define server side scripting and client side scripting
- 2.1.9 List client side scripting languages
- 2.1.10 Illustrate how JavaScript is used in an HTML page
- 2.1.11 Describe Programming elements in JavaScript
- 2.1.12 Describe Document Object Model
- 2.1.13 Explain how Event Handling is done using JavaScript
- 2.1.14 Explain how input data validations are done using JavaScript
- 2.1.15 Describe Dynamic Documents with JavaScript
- 2.1.16 Design web pages implementing event handling and input validations and dynamic elements

MODULE – III Server Side Scripting – PHP

3.1 Understand Server Side Scripting – PHP

- 3.1.1 Describe Server Side Scripting
- 3.1.2 List Server side scripting languages
- 3.1.3 State advantages of PHP
- 3.1.4 Describe how Apache, MySQL, and PHP are installed and configured
- 3.1.5 Describe how a PHP script is embedded in a webpage and executed
- 3.1.6 Describe PHP language elements
- 3.1.7 Describe Form Handling
- 3.1.8 Implement Session & Cookie Handling in PHP
- 3.1.9 Describe how Page Redirection and file uploading in PHP Implement File Uploading from a webpage
- 3.1.10 Describe File Handling in PHP
- 3.1.11 Implement file, form, cookie and session handling programs

MODULE – IV Database Handling and Content Management System

4.1 Understand Database Handling, Content Management System

- 4.1.1 Describe how Databases are used
- 4.1.2 Describe how database connection is implemented
- 4.1.3 Describe how SQL Statements are executed from PHP script
- 4.1.4 Implement of database related applications in PHP
- 4.1.5 Implement simple websites using HTML, CSS, JavaScript, PHP & MySQL
- 4.1.6 Define Domain name Registration
- 4.1.7 Describe Server space hiring
- 4.1.8 Explain File Uploading procedure
- 4.1.9 Explain Web Hosting
- 4.1.10 List different Content Management tools
- 4.1.11 List advantages of Content management System
- 4.1.12 Case Study of CMS : Joomla
- 4.1.13 Explain the features of Joomla - The content structure, Templates, Menu Links, Components, Modules, Text editors, Permissions

CONTENT DETAILS

MODULE – I Internet Fundamentals and HTML

Internet - Internet Protocol Address - Domain Names - World Wide Web - Web Browsers - Web Servers
– URL – MIME – HTTP

HTML- tags- attributes - table – form – frame - format tags- image tags - embedding multimedia

MODULE – II CSS & JAVASCRIPT

CSS - Java script – programming - event handling - data validation - dynamic documents – positioning elements, moving elements, element visibility, font and colour changing, dynamic content

MODULE – III Server Side Scripting – PHP

Server Side Scripting – Advantages of PHP – Installation & Configuration – PHP language elements - Data Types - Variables – Constants – Operators – Expressions - Control Structures - Arrays – Functions - Form Handling – Session – Cookie – page redirection – file uploading – file handling

MODULE – IV Database Handling and Content Management System

PHP Database Interface - Web Hosting - Content Management System - Case Study of CMS : Joomla - The content structure – Templates - Menu links – Components - Modules -Text editors – Permissions

TEXT BOOK(S)

1. Programming the World Wide Web -Robert W.Sebesta (Pearson Education) (Second Edition)

REFERENCE:

1. Beginning Web Programming with HTML, XHTML, CSS & JavaScript – John Duckett (Wiley DreamTech)-Second Edition
2. PHP and MySQL Web Development - Welling – (Pearson Education)-Fourth Edition
3. Sams teach Yourself PHP in 24 hours – Zandstra – (Pearson Education)-Third Edition
4. Joomla! 3 Explained: Your Step-by-Step Guide– Stephen Burge -(Pearson Education)- (2nd Edition)

COURSE TITLE : **MICROPROCESSORS AND INTERFACING**
COURSE CODE : **5131**
COURSE CATEGORY : **A**
PERIODS/WEEK : **4**
PERIODS/SEMESTER : **52**
CREDITS : **4**

TIME SCHEDULE

MODULE	TOPICS	PERIODS
1	Basic 80x86 Architecture	13
2	Programming of x86 processor	13
3	Interrupt mechanism of x86 & Interfacing of chips	13
4	Advanced Processor Technologies	13

Course General Outcomes:

Sl.	G.O	On completion of this course the student will be able :
1	1	To understand Microprocessors
	2	To know the architecture of 8086 Microprocessor
2	1	To understand the Programming of 8086
	2	To understand The Instruction set of x86 Processor
3	1	To understand the Interrupt mechanism of x86
	2	Interfacing with PPI & Keyboard and Display Controllers
4	1	To understand the operating Modes of 80386
	2	To study Pentium Processor and modern technologies

Specific Outcomes:

MODULE –I Basic 80x86 Architecture

1.1 To understand Microprocessors

- 1.1.1 To describe the role of Microprocessor in Micro Computer
- 1.1.2 To list the features of 8086

1.2 To know the architecture of 8086 Microprocessor

- 1.2.1 To Explain the architecture of 8086
- 1.2.2 To describe the software architecture of 8086
- 1.2.3 To describe the Hardware structure of 8086

MODULE – II Programming of x86 processor

2.1 To understand the Programming of 8086

- 2.1.1 To Describe Assembly language programming

2.2 To understand The Instruction set of x86 Processor

- 2.2.1 To describe data transfer, branch, and arithmetic instructions
- 2.2.2 To describe logical, shift , and rotate instruction
- 2.2.3 To describe string instructions and procedures

MODULE – III Interrupt mechanism of x86 & Interfacing of chips

3.1 To understand the Interrupt mechanism of x86

- 3.1.1 To describe interrupts of 8086
- 3.1.2 To explain the different types of interrupts

3.2 To Understand different Interfacing Chips

- 3.2.1 To describe Programmable Peripheral Interfacing Chip and Interfacing with x86 processor
- 3.2.2 To explain the importance, organisation, and interfacing of Programmable Interrupt Controller
- 3.2.3 To describe Keyboard and Display Interface chip and Interfacing with x86 processor

MODULE –IV Advanced Processor Technologies

4.1 To understand the operating Modes of 80386

- 4.0.1 To list the features of 80386
- 4.1.2 To describe Real Mode & Protected Virtual Addressing Mode

4.1 To Explain Pentium Processor

- 4.1.1 To list the features of Pentium
- 4.1.2 To describe pipelining

4.2 To know the advanced technologies of modern Intel processors

- 4.2.1 To define Super scalar Architecture
- 4.2.2 To define Multicore processing
- 4.2.3 To define MMX Technology
- 4.2.4 To define Hyperthreading

CONTENT DETAILS

MODULE –I Basic 80x86 Architecture

Role of Microprocessor in Micro Computer – Brief history of Microprocessors (with specific insight into x86 family) - Features of 8086

Internal Block Diagram of 8086 – Execution Unit – Bus Interface Unit – Addressing Modes

Hardware structure of 8086- Pin Configuration-Clock- Processor activities (Interrupt, DMA, etc.)-

Maximum mode- Instruction cycle

Assembly process – Assemblers for x86 – Instruction Design

MODULE – II Programming of x86 processor

Data transfer Instructions- Branch instructions- Arithmetic instructions- Shift and Rotate Instructions- String Instructions- Procedures- Macros-Number Format Conversions- ASCII operations

MODULE – III Interrupt mechanism of x86 & Interfacing of chips

Interrupts of 8086- Dedicated Interrupt types- Software interrupts-Hardware interrupts- Priority of interrupts-Programmable Interrupt Controller (8259)

Organisation and Interfacing of PPI (8255), and Keyboard and display Interface (8279)

MODULE –IV Advanced Processor technologies

Features of 80386- Real Mode - Protected Virtual Addressing Mode

Features of Pentium- pipelining- Stages of pipelining- Speedup due to pipelining- Pipeline Hazards

Super scalar Processors- Multiple Execution units

Multicore processing – Major issues in Multicore Processing (interconnects- cache coherence-snooping protocol- Directory based protocol) MMX- SSE- Hyperthreading

Note: The programming should be covered irrespective of Assembler.

TEXT BOOK(S):

1. The x86 Microprocessors- Architecture, Programming and Interfacing – Lyla B Das – Pearson- Second edition.
2. Microprocessor and Microcontroller - R. Theagarajan – SCITECH-2010

REFERENCES:

1. The 8088 and 8086 Microprocessors – Programming, Interfacing, Software and Hardware Applications by Walter A. Triebel & Avatar Singh, Pearson Fourth Edition,
2. Microprocessor 8086 Architecture, Programming and Interfacing by Sunil Mathur, PHI,2011
3. The Intel Microprocessors : Architecture, Programming and Interfacing- Barry B. Brey Pearson -8 Edition

COURSE TITLE : **INFORMATION SECURITY**
COURSE CODE : **5136**
COURSE CATEGORY : **ELECTIVE**
PERIODS/WEEK : **4**
PERIODS/SEMESTER : **52**
CREDITS : **4**

TIME SCHEDULE

MODULE	TOPICS	PERIODS
1	Introduction to Computer Security & Cryptography	13
2	User Authentication & Access Control	13
3	Intrusion Detection and Malicious Software	13
4	Denial of Service and Firewall	13

Course General Outcomes:

Sl.	G.O	On completion of this course the student will be able :
1	1	Understand concepts of computer security
	2	Understand cryptographic tools
2	1	Understand user authentication
	2	Study authentication methods
	3	Understand access control in computer security
3	1	Understand intrusion and its detection methods
	2	Understand malicious software
4	1	Understand Denial of service
	2	Understand Firewall

Specific Outcome:

MODULE I: Introduction to computer Security & Cryptography

- 1.1 To understand the concept of Computer Security
 - 1.1.1 Define computer Security.
 - 1.1.2 Explain Computer Security triad: Confidentiality, Integrity, Availability.
 - 1.1.3 Explain the terminologies: Authenticity, accountability.
 - 1.1.4. Explain the Model of Computer Security, Security concepts and relationships.
 - 1.1.4. Differentiate Threats and Attacks & Threats and Assets.
 - 1.1.5 Explain various Security aspects in Communication Lines and Networks.
 - 1.1.6 List security functional requirements.
 - 1.1.7 Explain Security architecture for OSI.
 - 1.1.8 Explain the Scope of Computer and Network Security with block diagram.
 - 1.1.9. Discuss three aspects of computer security strategy.
- 1.2 To Comprehend Cryptographic Tools
 - 1.2.1 Explain simplified model of symmetric encryption with block diagram.
 - 1.2.3 Explain Symmetric block encryption algorithms.
 - 1.2.3 Explain block and Stream Cipher encryption.
 - 1.2.4 Explain message authentication with symmetric encryption
 - 1.2.5 Describe message authentication without message encryption.
 - 1.2.6 Explain message authentication with message authentication code (MAC) using figure.
 - 1.2.7 Describe message authentication with one way hash functions
 - 1.2.8 Explain Public key cryptography
 - 1.2.9. Explain digital signature, public key certificates and Symmetric key exchange using public key encryption
 - 1.2.10 Explain the use of Random numbers in encryption
 - 1.2.11 Define pseudorandom numbers

MODULE II: User Authentication and Access Control

- 2.1 To understand User Authentication
 - 2.1.1 Define User Authentication
 - 2.1.2 Explain the means of authentication
 - 2.1.3 Describe Password based Authentication
 - 2.1.4 Explain Password attack strategies and countermeasures
 - 2.1.5 Explain the use of hashed passwords
 - 2.1.5 Explain the password cracking approaches and user password choices
 - 2.1.6 Explain password File access control
 - 2.1.7 Illustrate various password selection strategies
- 2.2 To Understand Various Authentication Methods
 - 2.2.1 Explain Token based authentication
 - 2.2.2 Explain Biometric Authentication
 - 2.2.3 Explain various physical characteristics used in biometric applications
 - 2.2.4 Explain the operation of a biometric authentication system
 - 2.2.5 Explain the biometric accuracy
 - 2.2.6 Discuss Remote User Authentication
 - 2.2.7 Explain various security issues for user authentication
- 2.3 To understand Access control in computer security
 - 2.3.1 Discuss Access Control Principles – Relationship among other security functions
 - 2.3.2 Explain various access control policies

- 2.3.3 Discuss various access control requirements
- 2.3.4 Explain the various basic elements of Access control: subject, object and Access right
- 2.3.5 Illustrate the UNIX File Access Control

MODULE III: Intrusion Detection & Malicious Software

3.1 To Know Intrusion and Detection

- 3.1.1 List various classes of intruders and the intruder behavior patterns.
- 3.1.2 Explain the Intrusion Detection System classification and the requirements of IDS.
- 3.1.3 Explain Host based Intrusion detection
- 3.1.4 Explain the relevance of audit records, anomaly detection, and signature detection
- 3.1.5 Explain Distributed host based intrusion detection
- 3.1.6 Discuss Network based intrusion detection
- 3.1.7 Discuss Intrusion Detection Exchange Format
- 3.1.8 Explain the functioning of Honey pots
- 3.1.9 Explain the functioning of SNORT IDS – Architecture and rules

3.2 To Study about Malicious Software

- 3.2.1 Explain various types of Malicious Software
- 3.2.2 Discuss Viruses – The nature of viruses, Virus structure, Virus classification
- 3.2.3 Explain various Antivirus approaches & Antivirus techniques
- 3.2.4 Describe Study Worms- Worm propagation model, requirements for Worm Countermeasures
- 3.2.5 Discuss BOT and RCF
- 3.2.6 Discuss about Constructing the Attack Network
- 3.2.7 Explain ROOTKIT functions, classifications, installation

MODULE IV: Denial of Service and Firewall

4.1 To Understand Denial of Service

- 4.1.1 Define a Denial of Service (DoS)
- 4.1.2 Explain the effect of DoS on Network bandwidth, System resources and Application resources
- 4.1.3 Explain classic Denial of Service Attacks
- 4.1.4 Discuss about Source Address Spoofing
- 4.1.5 Explain the SYN Spoofing
- 4.1.6 Explain Flooding Attacks- ICMP Flood, UDP Flood, TCP SYN Flood
- 4.1.7 Explain the Distributed Denial of Service Attacks, and DDoS attack architecture
- 4.1.8 Discuss the Reflector and Amplifier attacks
- 4.1.9 Explain defenses against DoS Attacks, and how to respond to DoS Attacks

4.2. To Understand Firewall

- 4.2.1 List the need for firewall
- 4.2.2 List various characteristics of a Firewall
- 4.2.3 Discuss various types of firewalls:
- 4.2.4 Illustrate Bastion Host, Host based firewalls and Personal firewalls
- 4.2.5 Explain Internal and external Firewall Configuration
- 4.2.6 Explain Distributed Firewalls

CONTENT DETAILS

MODULE I : Introduction to Computer Security & Cryptography

Computer Security : Definition –Triad – Authenticity, Accountability – Model – Security concepts – relationships – Threats , Attack, Assets – Security aspects in communication lines and networks – Security requirements – OSI architecture – Scope – Strategy.

Cryptography : Symmetric encryption – Algorithms – Block and Stream Cipher encryption – Message authentication – MAC – One way Hash Function – Public key cryptography – digital signature – public key exchange – symmetric key exchange – Random numbers in encryption – pseudorandom numbers

MODULE II : User Authentication and Access Control

User Authentication: means of authentication - Password based Authentication - Password attack strategies and countermeasures - hashed passwords - password cracking - user password choices - password File access control - password selection.

Authentication Methods: Token based authentication -Biometric Authentication - physical characteristics in biometric applications - operation – accuracy - Remote User Authentication - security issues

Access control: Principles – Relationship among other security functions - access control policies - access control requirements - basic elements of Access control: subject, object and Access right - UNIX File Access Control

MODULE III : Intrusion Detection & Malicious Software

Intrusion and Detection: Classes of intruders - Intruder behavior patterns - classification - requirements of IDS - Host based Intrusion detection - audit records - anomaly detection - signature detection - Distributed host based intrusion detection - Network based intrusion detection - Intrusion Detection Exchange Format - Honey pots - SNORT IDS – Architecture and rules

Malicious Software: Different types - Viruses – nature - Virus structure – Classification - Antivirus approaches - Antivirus techniques – Worms - Propagation model - Worm Countermeasures - BOT – Uses - RCF, Attack Network - ROOTKIT – functions – classifications – installation.

MODULE IV : Denial of Service and Firewall

Denial of Service: Definition - Effect of DoS on Network bandwidth - System resources - Application resources -Classic Denial of Service Attacks - Source Address Spoofing - SYN Spoofing - Flooding Attacks - ICMP Flood - UDP Flood - TCP SYN Flood - Distributed Denial of Service Attacks - DoS attack architecture - Reflector and Amplifier attacks - Defenses against DoS Attacks – Response to DoS Attacks

Firewall: Need - Characteristics - Packet filtering - Stateful inspection - Application level - Circuit level gateway - Bastion Host - Host based firewalls - Personal firewalls - Internal and external Firewall Configuration - Distributed Firewalls

TEXT BOOK:

1. Computer Security- Principles and Practice - Author: William Stallings & Lawrie Brown
Publisher: Pearson Prentice Hall 2010

REFERENCE BOOKS:

1. Cryptography and Security - Author: C K Chyamala, N Harini & Dr T R Padmanabhan
Publisher: Wiley – India 2010
2. Network Security – [M.V. Arun Kumar](#), USP2011 First Edition

COURSE TITLE : **ETHICAL HACKING**
COURSE CODE : **5135**
COURSE CATEGORY : **ELECTIVE**
PERIODS/WEEK : **4**
PERIODS/SEMESTER : **52**
CREDITS : **4**

TIME SCHEDULE

MODULE	TOPICS	PERIODS
1	Vulnerabilities and Attacks	13
2	Hacking Techniques	13
3	Operating System Vulnerabilities	13
4	Hacking Web Servers and Wireless Networks	13

Course General Outcomes:

Sl.	G.O	On completion of this course the student will be able :
1	1	Understand ethical hacking concepts
2	1	Understand the hacking techniques and tools
3	1	Understand the various vulnerabilities of Windows and Linux OSs
4	1	Understand the techniques to hack web servers and tools for it.

Specific outcomes:

MODULE – I: Vulnerabilities and attacks

- 1.1 Understand ethical hacking concepts
 - 1.1.1 Explain the definition of ethical hacking
 - 1.1.2 List any five malicious software
 - 1.1.3 Explain any five malicious software
 - 1.1.4 Explain how to protect against malware attacks
 - 1.1.5 List any six network and system attacks
 - 1.1.6 Explain any six network and system attacks

MODULE – II: Hacking Techniques

- 2.1 Understand the hacking techniques and tools
 - 2.1.1 Describe how web tools are used for footprinting
 - 2.1.2 Explain competitive intelligence
 - 2.1.3 Describe the use of other footprinting tools
 - 2.1.4 Explain the method of DNS zone transfer
 - 2.1.5 Explain the art of shoulder surfing
 - 2.1.6 Explain the art of dumpster diving

- 2.1.7 Explain the art of piggy backing
- 2.1.8 Describe various types of port scans
- 2.1.9 Explain the use of port scanning tools such as Nmap, Unicornscan, Nessus and OpenVAS
- 2.1.10 Explain how to conduct ping sweeps
- 2.1.11 Describe about crafting IP packets

MODULE – III: Operating System Vulnerabilities

- 3.1 Understand various vulnerabilities of Windows and Linux
 - 3.1.1 Explain Windows file system
 - 3.1.2 Explain Windows RPC
 - 3.1.3 Explain NetBIOS
 - 3.1.4 Explain Server Message Block
 - 3.1.5 Explain common Internet File System
 - 3.1.6 Explain null sessions
 - 3.1.7 Explain Web Services
 - 3.1.8 Explain Buffer overflows
 - 3.1.9 Explain Windows passwords and authentication
 - 3.1.10 Explain the tools for identifying Windows vulnerabilities
 - 3.1.11 Explain the best practices for hardening Windows systems
 - 3.1.12 Explain Linux OS vulnerabilities
 - 3.1.13 Explain the tools for identifying Linux vulnerabilities
 - 3.1.14 Explain the countermeasures against Linux attacks

MODULE – IV: Hacking Web Servers and Wireless Networks

- 4.1 Understand the techniques to hack web servers and tools for it.
 - 4.1.1 Explain web server hacking
 - 4.1.2 Explain about web applications and their components
 - 4.1.3 Describe web application vulnerabilities and countermeasures
 - 4.1.4 Identify the tools used by web attackers and hackers
 - 4.1.5 Explain wireless hacking
 - 4.1.6 Describe the components of a wireless network
 - 4.1.7 Explain the working of wardriving
 - 4.1.8 Explain the tools for wireless hacking
 - 4.1.9 Explain the countermeasures against wireless attacks

CONTENT DETAILS:

MODULE – I: Vulnerabilities and attacks

Definition of ethical hacking, Malicious software – Viruses, Worms, Trojans programs, Spyware, Adware, protection methods, Network and system attacks - Denial of Service (DoS), Distributed Denial of Service (DDoS), Buffer overflow, Ping of death, Session Hijacking, Brute force attack, Man-in-the-middle, Dictionary attack, Replay attack

MODULE – II: Hacking Techniques

Footprinting - Web tools are used for footprinting, Competitive intelligence, Other footprinting tools, DNS zone transfer - Social engineering - Shoulder surfing, Dumpster diving, Piggy backing - Port scanning - Types of port scans, Port scanning tools - Nmap, Unicornscan, Nessus and OpenVAS - Ping sweeps - Crafting IP packets

MODULE – III: Operating System Vulnerabilities

Windows OS vulnerabilities - Windows file system, Windows RPC, NetBIOS, Server Message Block, common Internet File System, Null sessions, Web Services, Buffer overflows, Windows passwords and authentication, Tools for identifying Windows vulnerabilities, Hardening Windows systems

Linux OS vulnerabilities - Tools for identifying Linux vulnerabilities, Countermeasures against Linux attacks

MODULE – IV: Hacking Web Servers and Wireless Networks

Web server hacking - Web applications and their components - Web application vulnerabilities and countermeasures - Tools for web attackers and hackers

Wireless hacking - Wireless network technology - Components of a wireless network – Wardriving - Tools for wireless hacking - Countermeasures against wireless attacks

TEXT BOOK:

1. Hands-On Ethical Hacking and Network Defence - Simpson Michael, Backman Kent, Corley James-2010

REFERENCES:

1. Official Certified Ethical Hacker Review Guide - DeFino Steven, Kaufman Barry, Valenteen Nick-Cengage Learning--2009

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COURSE TITLE : **CLOUD COMPUTING**
COURSE CODE : **5134**
COURSE CATEGORY : **ELECTIVE**
PERIODS/WEEK : **4**
PERIODS/SEMESTER : **52**
CREDITS : **4**

TIME SCHEDULE

MODULE	TOPICS	PERIODS
1	UNDERSTANDING CLOUD COMPUTING	13
2	CLOUD SERVICES FOR COLLABORATION	13
3	USAGE OF CLOUD SERVICES	13
4	ONLINE COLLABORATION METHODS	13

Course General Outcomes:

Sl.	G.O	On completion of this course the student will be able :
1	1	To Understand Cloud Computing concepts
	2	To Understand Cloud Services
2	1	To Explore various Cloud Services for Collaboration
3	1	To Explore different Cloud Services
4	1	To Explore different ways to Collaborate online

Specific Outcomes

Module I Cloud Computing concepts

- 1.1 To Understand Cloud Computing concepts
 - 1.1.1 Define Cloud Computing
 - 1.1.2 To discuss History of Cloud Computing
 - 1.1.3 To Describe Cloud Architecture
 - 1.1.3 To Discuss Cloud Storage
 - 1.1.4 To Discuss need of Cloud Computing
 - 1.1.5 Compare Advantages & Disadvantages of Cloud Computing
 - 1.1.6 To List Cloud Services

- 1.2 To Understand Cloud Services
 - 1.2.1 To Discuss Web-Based Application
 - 1.2.2 To discuss Pros and Cons of Cloud Service Development
 - 1.2.3 To discuss Types of Cloud Service Development
 - 1.2.4 To discuss Software as a Service
 - 1.2.5 To discuss Platform as a Service
 - 1.2.6 To discuss Web Services
 - 1.2.7 To discuss On-Demand Computing

- 1.2.8 To discuss Discovering Cloud Services Development Services and Tools
- 1.2.9 To know Amazon EC2, Google App Engine, IBM Smart Clouds

Module II Cloud Services for Collaboration

- 2.1 To Explore various Cloud Services for Collaboration
 - 2.1.1 To discuss Centralizing Email Communications
 - 2.1.2 To discuss Collaborating on Schedules
 - 2.1.3 To discuss Collaborating on To-Do Lists
 - 2.1.4 To discuss Collaborating Contact Lists
 - 2.1.5 To discuss Cloud Computing for the Community
 - 2.1.6 To discuss Collaborating on Group Projects and Events
 - 2.1.7 To discuss Cloud Computing for the Corporation

Module III Cloud Services

- 3.1 To Explore different Cloud Services
 - 3.1.1 To discuss Collaborate on Calendars , Schedules and Task Management
 - 3.1.2 To Explore Online Scheduling Applications
 - 3.1.3 To Explore Online Planning and Task Management
 - 3.1.4 To discuss Collaborating on Event Management
 - 3.1.5 To discuss Collaborating on Contact Management
 - 3.1.6 To discuss Collaborating on Project Management
 - 3.1.7 To discuss Collaborating on Word Processing
 - 3.1.8 To discuss Collaborating on Databases Storing and Sharing Files

Module IV Online Collaboration Methods

- 4.1 To Explore different ways to Collaborate online
 - 4.1.1 To discuss Collaborating via Web-Based Communication Tools
 - 4.1.2 To discuss Web Mail Services
 - 4.1.3 To discuss Web Conference Tools
 - 4.1.4 To discuss Collaborating via Social Networks and Groupware
 - 4.1.5 To discuss Collaborating via Blogs and Wikis

CONTENT DETAILS

Module I UNDERSTANDING CLOUD COMPUTING

Cloud Computing – 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

DEVELOPING CLOUD SERVICES

Web-Based Application – 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 Smart Clouds

Module II CLOUD SERVICES FOR COLLABORATION

Centralizing Email Communications – Collaborating on Schedules – Collaborating on To-Do Lists – Collaborating Contact Lists – Cloud Computing for the Community – Collaborating on Group Projects and Events – Cloud Computing for the Corporation

Module III USAGE OF CLOUD SERVICES

Collaborating on Calendars, Schedules and Task Management – Exploring Online Scheduling Applications – Exploring Online Planning and Task Management – Collaborating on Event Management – Collaborating on Contact Management – Collaborating on Project Management – Collaborating on Word Processing - Collaborating on Databases – Storing and Sharing Files

Module IV ONLINE COLLABORATION METHODS

Collaborating via Web-Based Communication Tools – Evaluating Web Mail Services – valuating Web Conference Tools – Collaborating via Social Networks and Groupware – Collaborating via Blogs and Wikis

TEXT BOOK(S)

1. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.

REFERENCES:

1. 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
2. Cloud computing a practical approach Anthony T.Velte Toby J. Velte Robert Elsenpeter-TATA McGraw-2010

COURSE TITLE : **WEB PROGRAMMING LAB**
COURSE CODE : **5139**
COURSE CATEGORY : **A**
PERIODS/WEEK : **4**
PERIODS/SEMESTER : **52**
CREDITS : **2**

TIME SCHEDULE

MODULE	TOPICS	PERIODS
1	Internet Fundamentals and HTML, CSS	13
2	JAVASCRIPT	13
3	Server Side Scripting – PHP	13
4	Database Handling, Content Management System	13
	TOTAL	52

General Outcomes :

- To understand Internet, tools used in Internet etc
- To understand web page design tools like HTML, CSS
- To know client side scripting language
- To know Server side scripting and database connectivity
- To Understand Web site development using Content Management System

Specific Outcomes:

Cycle 1

- 1.1. Practice Internet applications
- 1.2. Explore Web browsers , search engines
- 1.3. Familiarise with web portals, e-commerce sites, blogs etc
- 1.4. Develop simple HTML pages using Basic HTML Markup, HTML lists, Links and images, Data Table, frames
- 1.5. Develop web pages with user interface using CSS

Cycle 2

- 2.1. Develop web pages with Forms and its controls
- 2.2. Implement functions with JavaScript
- 2.3. Implement Event Handling using JavaScript
- 2.4. Implement form validation using JavaScript

Cycle 3

- 3.1 Familiarise LAMP environment
- 3.2 Design and develop simple php applications
- 3.3 Illustrate Form Data Retrieval using PHP
- 3.4 Implement session & cookie management using PHP
- 3.5 Demonstrate how to send a mail, generate PDF in a PHP page

Cycle 4

- 4.1 Illustrate database and table creation using web based database administration tools
- 4.2 Develop web pages for data handling using PHP (Insert, Delete and Update)
- 4.3 Develop reports (pdf & html data table) using data from database in PHP
- 4.4 Familiarize content Management System Joomla
- 4.5 Design and develop CMS supported web application using Joomla

COURSE TITLE : **MICROPROCESSOR LAB**
COURSE CODE : **5138**
COURSE CATEGORY : **A**
PERIODS/WEEK : **4**
PERIODS/SEMESTER : **52**
CREDITS : **2**

General Outcomes :

Sl.	G.O	Student will be able
1	1	To understand the Programming environment of 8086
2	1	To understand The Instruction set and Programming Concepts of x86 Processor- Data transfer Instructions- Branch instructions- Arithmetic instructions
3	1	To understand The Instruction set and Programming Concepts of x86 Processor- Shift and Rotate Instructions- String Instructions
4	1	To understand The Instruction set and Programming Concepts of x86 Processor- Procedures, Macros and Number Format Conversions

Specific Outcomes:

Module I

- 1.0 To understand the Programming environment of 8086
- 1.1 Explore the Assembler, its different directives, and its different system interrupts

Module II

- 2.0 To understand The Instruction set and Programming Concepts of x86 Processor
- 2.1 Write small programs to implement the instructions and their usage in programs (Data transfer Instructions- Branch instructions- Arithmetic instructions)

Module III

- 3.1 To understand The Instruction set and Programming Concepts of x86 Processor
- 3.1 Write small programs to implement the instructions and their usage in programs (Shift and Rotate Instructions- String Instructions)

Module IV

- 4.1 To understand The Instruction set and Programming Concepts of x86 Processor
- 4.1 Rewrite the programs done above to implement the ideas of Procedures, Macros and Number Format Conversions

Hardware Requirement : 8086 Trainer Kit
 Software Requirement: Assembler

COURSE TITLE : INDUSTRIAL TRAINING/ INDUSTRIAL VISIT / COLLABORATIVE WORK /SPOKEN TUTORIAL
COURSE CODE : 5009
COURSE CATEGORY : P
DAYS / SEMESTER : 14
CREDITS : 2

General Outcome:

GO	On completion of the study of this course the students will be able:
1	To provide an industrial exposure in tune with the curriculum.
2	To familiarize industrial standards, safety aspects, organizational structure.
3	To improve employability of students.
4	To provide training on industrial relevant topics.

Guidelines:

The students need to undergo any of the four options mentioned in the course title for successful award of credit for the program, subject to the evaluation criteria mentioned below.

Industrial Training:

The students need to undergo 10 days full time industrial training on Government, Quasi Government or Public limited industries. Students of Diploma in Biomedical Engineering can opt for Super/multi specialty hospitals in addition to the above mentioned industries. On successful completion of the training students need to submit certificate of completion mentioning days of their attendance to the Head of the Department. It is required to submit bonafide report of the training at the end of the course and shall be evaluated internally.

Evaluation criteria:

1. Attendance (based on feedback from the industry) : 30%
2. Involvement (based on feedback from the industry) : 30%
3. Viva (as part of internal evaluation at the institute) : 20%
4. Bonafide record : 20%

Industrial Visit:

The concept of industrial visit is to encourage students to interact with nearby industries. The students need to be assigned with specific task that need interaction with the industry. For example, students of Diploma in Chemical Engineering in batches of five can be sent to the nearby industry to collect details regarding effluent treatment. Industrial visit to Small, medium or large scale industries accompanied by faculty members can also be encouraged. In such case one faculty from each branch can be assigned as advisor for the visit. The advisor can identify appropriate industry and co-ordinate the visit. At least four

industries should to be visited for successful completion of the course. The visit can be spanned conveniently within the semester. Evaluation is based on the report submitted by the accompanied faculty along with the evaluation criteria mentioned below. It is required to submit bonafide report of the visit at the end of the course and shall be evaluated internally.

Evaluation criteria:

- | | | |
|--------------------|---|-------|
| 1. Attendance | ((evaluated by the advisor) | : 30% |
| 2. Involvement | (evaluated by the advisor) | : 30% |
| 3. Viva | (as part of internal evaluation at the institute) | : 20% |
| 4. Bonafide record | | : 20% |

Collaborative Work:

Academic departments can collaborate with industries of repute by way of taking up consultancy, testing or assembling work. One faculty can be assigned as coordinator. The students need to consult or visit the collaborative industry as part of the course. It is required to submit bonafide report at the end of the collaborative work and shall be evaluated internally. It is to be ensured that the collaborating industry is selected based on their repute in the segment. Collaborative works are not allowed with academic or industrial training providers.

Evaluation criteria:

- | | | |
|--------------------|---|-------|
| 1. Attendance | (evaluated by the advisor) | : 30% |
| 2. Involvement | (evaluated by the advisor) | : 30% |
| 3. Viva | (as part of internal evaluation at the institute) | : 20% |
| 4. Bonafide record | | : 20% |

Spoken Tutorial

Students can optionally go for spoken tutorial provided Ministry of Human Resource Development, Govt. of India for successful completion of the course. Students can go for at least one course provided as part of spoken tutorial. The students need to submit completion certificate with mention of their grade.

Evaluation criteria:

Evaluation shall be made based on certification of the programme.

COURSE TITLE : **COMPUTER NETWORK ENGINEERING LAB**
COURSE CODE : **5137**
COURSE CATEGORY : **A**
PERIODS/WEEK : **5**
PERIODS/SEMESTER : **65**
CREDITS : **5**

TIME SCHEDULE

MODULE	TOPICS	PERIODS
1	Installation and Configuration of Network Hardware Components	17
2	Installation and Configuration of TCP/IP Protocol	17
3	Network Operating System Administration	17
4	Network Security Administration	14

Course General Outcomes:

Sl.	G.O	Student will be able
1	1	Installation and Configuration of Network Hardware Components
2	1	Installation and Configuration of TCP/IP Protocol
3	1	Network Operating System Administration
4	1	Network Security Administration

Specific Outcomes:

Module I. Installation and Configuration of *Network Hardware Components*

- 1.Study of Hardware Component used in Networking.
- 2.Crimping of UTP Cable, Patch Panel Punching, Junction I/O Boxes.
- 3.Installation of Network Interface Card (NIC).
- 4.Peer-to-Peer Networking & Working in Peer-to-Peer Environment.
- 5.Sharing Resources, Accessing Shares and Share Level Security.
- 6.Troubleshooting (Cable Connectivity, Upgrading NIC Driver,Software).

Module II. Installation and Configuration of TCP/IP Protocol

- 1.Installation of Wireless Devices -LAN Card, Router, Access Point.
- 2.Identifying valid IP Addresses, Defining Subnet Ids and Host Ids.
- 3.Using TCP/IP Utilities& Commands (PING, IPCONFIG, HOSTNAME, ROUTE, TRACERT, ARP, FTP, Telnet).
- 4.Study of TCP/IP

Module III. Network Operating System Administration

1. Installation of Operating Systems.
2. Configuring Hardware Profile.
3. Creating Users and Groups and setting their properties.
4. Configuring Roaming and Mandatory User Profiles.
5. Creating and Managing Shares.
6. Study of AGP Process.
7. Study of Permissions.
8. Study of Encrypted File System.
9. Study of File Compression.
10. Study of Event Viewer, Task Manager.
11. Study of System Monitor & Performance Log.
12. Installing Local and Network Printer and set priority.
13. Installation of Server

Module IV. Network Security Administration

1. Study of Disk Management & Implementing Disk Quotas.
2. Study of Backup, Restore and Automated System Recovery.
3. Installing and Configuring Terminal Services & RDP.

COURSE TITLE : PROJECT WORK AND SEMINAR
COURSE CODE : 6009
COURSE CATEGORY : A
PERIODS / WEEK : 6
CREDITS : 10

PART 1 - SEMINAR

General outcome:

GO	On completion of this course the students will be able:
1	To get an exposure to innovations in Technology/Information.
2	To develop presentation skills.
3	To develop creative interaction among listeners.
4	To appreciate peers and to give feedback.

Guidelines:

1. Seminar presentation shall be of individual nature rather than group work and shall be coordinated by a guide allotted among the faculty members.
2. Topics shall be constrained to those related to Technology and allied area, but not part of the curriculum.
3. The guide shall provide necessary guidance as to arrive on to the final topic from the area of student's interest and based on the relevance.
4. The topic selected shall help students in acquiring necessary technical knowledge so as to help them in performing better in job interviews or to help them in developing entrepreneurship skills.
5. Presentation shall be for 15 minutes at the minimum.
6. Audio visual aids shall be utilized. Students shall be encouraged to use open source documentation tools like Latex for preparing presentation, posters and seminar reports.
7. Synopsis of the seminar should be submitted at least 3 working days before presentation.
8. Bonafide report containing abstract, content and the reference should be submitted for final evaluation.

9. Seminar evaluation for both continuous assessment and external examination shall be performed in such a way that seminar accounts for 2/10 weightage in terms of total credit for Project work and Seminar.

Seminar evaluation (1/ 5 th of total weightage for the course)				
Topic selection (20%)	Presentation (30%)	Interaction (20%)	Slides and presentation aids (15%)	Report (15%)

PART 2 – PROJECT WORK

General outcome

GO	On completion of this course the students will be able:
1	To utilize theoretical and practical knowledge acquired for developing an industry standard product or prototype.
2	To learn financial planning.
3	To enhance team spirit and creative talents for achieving goal.
4	To promote entrepreneurship.
5	To serve industry or community by way of technology transfer.

Guide lines

1. Project selection shall be based on social and technological relevance.
2. Preference shall be given to topics that uphold service to community by way of providing direct technology transfer to society.

To elaborate the point, technologies such as those provide low cost housing to the society, mechanizing agricultural sector, developing tools that aid in productivity in traditional employment sector are be few examples that may be considered while selecting the topic for Project work. The whole idea is that project work should be utilized as an effective tool as for the community or industry to walk into institutions for materializing innovative ideas irrespective of the sector. In such cases inter disciplinary project works shall also be encouraged.

3. The selected topic should uphold entrepreneurship values. Collaboration with Startup villages or incubation centers shall be used for effective implementation of ideas.
4. Each project team can have a maximum of five members. But in case of projects that demand more human resources, responsibilities can be suitably divided among different team.

5. Every project team shall be allotted with a project guide among faculty members. The project guide shall provide all necessary guidance and maintain a detailed record of individual students involvement in the work and do continuous assessment of the project. Project work holds 8/10 weightage of the total credit.
6. Evaluation shall be done on weekly, monthly and end semester basis.
7. Out sourcing of academic projects are not allowed. If the projects are found to be outsourced, credits shall be forfeited at any point of time.
8. Teaming up with startup village, business incubation centers are highly appreciated.
9. It is required to submit bonafide report of the project for final evaluation.

Project work evaluation (4/ 5 th of total weightage for the course)						
Topic selection (20%)	Innovation (10%)	Selection of Tools (20%)	Interface to community/ Industry (10%)	Quality of Work (20%)	Safety aspects (10%)	Report (10%)