DEPARTMENT OF COMPUTER APPLICATION

ADD-ON COURSE SYLLABUS

COURSE: **Programming in c** **DURATION: 16 WEEKS**

Module 1 Basics of Computer Hardware and Software Basics of Computer Architecture: processor, Memory, Input& Output devices - Application Software & System software: Compilers, interpreters, High level and low level languages Introduction to structured approach to programming, Flow chart Algorithms, Pseudocode (bubble sort, linear search - algorithms and pseudocode)

Module 2 Program Basics Basic structure of C program: Character set, Tokens, Identifiers in C, Variables and Data Types, Constants, Console IO Operations, printf and scanf Operators and Expressions: Expressions and Arithmetic Operators, Relational and Logical Operators, Conditional operator, size of operator, Assignment operators and Bitwise Operators. Operators Precedence Control Flow Statements: If Statement, Switch Statement, Unconditional Branching using goto statement, While Loop, Do While Loop, For Loop, Break and Continue statements. (Simple programs covering control flow)

Module 3 Arrays and strings Arrays Declaration and Initialization, 1-Dimensional Array, 2-Dimensional Array String processing: In built String handling functions (strlen, strcpy, strcat and strcmp, puts, gets) Linear search program, bubble sort program, simple programs covering arrays and strings

Module 4 Working with functions Introduction to modular programming, writing functions, formal parameters, actual parameters Pass by Value, Recursion, Arrays as Function Parameters structure, union, Storage Classes, Scope and life time of variables, simple programs using functions

Module 5 Pointers and Files Basics of Pointer: declaring pointers, accessing data though pointers, NULL pointer, array access using pointers, pass by reference effect File Operations: open, close, read, write, append Sequential access and random access to files: In built file handling functions (rewind(), fseek(), ftell(), feof(), fread(), fwrite()), simple programs covering pointers and files.

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ADD-ON COURSE SYLLABUS

COURSE: **Essentials of BIG DATA Analytics** **DURATION: 16 WEEKS**

COURSE OBJECTIVES : • Understand the Big Data Platform and its Use cases • Provide an overview of Apache Hadoop • Provide HDFS Concepts and Interfacing with HDFS • Understand Map Reduce Jobs • Provide hands on Hodoop Eco System • Apply analytics on Structured, Unstructured Data. • Exposure to Data Analytics with R.

COURSE OUTCOMES: The students will be able to: • Identify Big Data and its Business Implications. • List the components of Hadoop and Hadoop Eco-System • Access and Process Data on Distributed File System • Manage Job Execution in Hadoop Environment • Develop Big Data Solutions using Hadoop Eco System • Analyze Infosphere BigInsights Big Data Recommendations. • Apply Machine Learning Techniques using R. Pre- requisites : Should have knowledge of one Programming Language (Java preferably), Practice of SQL (queries and sub queries), exposure to Linux Environment.

UNIT I : INTRODUCTION TO BIG DATA AND HADOOP Types of Digital Data, Introduction to Big Data, Big Data Analytics, History of Hadoop, Apache Hadoop, Analysing Data with Unix tools, Analysing Data with Hadoop, Hadoop Streaming, Hadoop Echo System, IBM Big Data Strategy, Introduction to Infosphere BigInsights and Big Sheets.

UNIT II : HDFS(Hadoop Distributed File System) The Design of HDFS, HDFS Concepts, Command Line Interface, Hadoop file system interfaces, Data flow, Data Ingest with Flume and Scoop and Hadoop archives, Hadoop I/O: Compression, Serialization, Avro and File-Based Data structures.

UNIT III : Map Reduce Anatomy of a Map Reduce Job Run, Failures, Job Scheduling, Shuffle and Sort, Task Execution, Map Reduce Types and Formats, Map Reduce Features.

Unit IV : Hadoop Eco System Pig : Introduction to PIG, Execution Modes of Pig, Comparison of Pig with Databases, Grunt, Pig Latin, User Defined Functions, Data Processing operators. Hive : Hive Shell, Hive Services, Hive Metastore, Comparison with Traditional Databases, HiveQL, Tables, Querying Data and User Defined Functions. Hbase : HBasics, Concepts, Clients, Example, Hbase Versus RDBMS. Big SQL : Introduction

UNIT V : Data Analytics with R Machine Learning : Introduction, Supervised Learning, Unsupervised Learning, Collaborative Filtering. Big Data Analytics with BigR.

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ADD-ON COURSE SYLLABUS

COURSE: **ETHICAL HACKING** **DURATION: 16 WEEKS**

MODULE 1: (Ethical Hacking)

Lecture 1.1: What is Hacking?

Lecture 1.2: Types of Hackers

Lecture 1.3: Google Dorks as Hacking Tools

Lecture 1.4: Phases of Hacking

Lecture 1.5: Passive Reconnaissance

Lecture 1.6: Active Reconnaissance

Lecture 1.7: Port Scanning

Lecture 1.8: NMAP as Seanning Tool

Lecture 1.9: NMAP Scripting Tool

Lecture 1.10: Exploit Searching

Lecture 1.11: Video Password Cracking

MODULE 2: (Websites)

Lecture 1.1: Working of Website

Lecture 1.2: HTML

Lecture 1.3: HTTP

Lecture 1.4: HTTP Methods

Lecture 1.5: Headers & Cookies

MODULE 3: (Web Applications)

Lecture 1.1: Walking a Application

Lecture 1.2: Browser Developer Tools

RESOURCES:

- OWASP Installation - Vulnerable Web Application
- DIRB & Whatweb For Website Identification
- Hydra - Bruteforcing Any Login Page
- Burpsuite Introduction & Configuration
- Command Injection & Target Exploitation
- Combining Our Python Tool With Command Injection Vulnerability
- XSS Attack Theory
- Finding XSS Vulnerability On A Webpage
- Solving XSS Challenges On An Online Lab
- HTML Character Encoding To Exploit an XSS Vulnerability

MODULE 4: (Web Applications Security Risks)

Lecture 1.1: Injection

RESOURCES:

- HTML Code Injection Vulnerability
- What is SQL & SQL Injection Theory
- Stealing Database Passwords With Advance Manual SQL Injection
- Broken Access Control
- Sensitive Data Exposure
- Security Misconfigurations

MODULE 5: (Hacking)

Lecture 1.1: Password Tool John the Ripper

Lecture 1.2: Hacking Video

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ADD-ON COURSE SYLLABUS

COURSE: **CYBER SECURITY** **DURATION: 16 WEEKS**

Course Outcomes:

1. BASICS OF SECURITY
2. WINDOWS & AD FUNDAMENTALS
3. TCP/IP & NETWORK SERVICES
4. BASICS OF ETHICAL HACKING
5. SCANNING OF SYSTEMS/APPLICATIONS 6.

SECURING WEB APPLICATIONS COURSE DESCRIPTION: Build Your Career With the Most In-Demand field. The Cyber Security & Ethical Hacking Program will equip you with the skills needed to become familiar in this rapidly growing domain. You will learn hacking tools, methodologies and techniques and learn how to secure them from these hackers.

COURSE DETAILS

MODULE 1: (Title of the Module) TOPIC 1: (Introduction) Lecture 1.1: Cyber space Lecture 1.2: Encryption Lecture 1.3: Email security Lecture 1.4: Antiviruses Lecture 1.5: Career in cyber sec

MODULE 2: (Microsoft OS) TOPIC 1: (Windows) Lecture 1.1: File System Lecture 1.2: System Configuration Lecture 1.3: Computer Management Lecture 1.4: System Information Lecture 1.5: Resource Monitor Lecture 1.6: Command Prompt Lecture 1.7: Registry Editor TOPIC 2: (Active Directory) Lecture 2.1: Domain Controller Lecture 2.2: Forest Lecture 2.3: Users & Groups Lecture 2.4: Domain Authentication

MODULE 3: (Networking) Lecture 1.1: TCP/IP Lecture 1.2: Layers in TCP/IP Lecture 1.3: Ports & Sockets Lecture 1.4: Firewall MRSPTU ONLINE OPEN COURSE MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY, BATHINDA Page 2 of 2 Lecture 1.5: Network Services Lecture 1.6: DNS, Telnet, SSH Lecture 1.7: Video Forensic