

**V SEMESTER**

COL NO.	SUBJECT CODE	SUBJECT	HOURS PER WEEK		
			THEORY	PRACTICAL	TOTAL
1	4046510	System Administration and Network Services	6	-	6
2	4052510	Python Programming	5	-	5
3		<b>ELECTIVE – I - THEORY</b>			
	4052531	Component Based Technology	5	-	5
	4052532	Artificial Intelligence and Data analytics			
	4046533	Mobile Application Development			
4	4046540	System Administration and Network Services Practical	-	4	4
5	4052540	Python Programming Practical	-	4	4
6		<b>ELECTIVE – I - PRACTICAL</b>			
	4052561	Component Based Technology Practical	-	4	4
	4052562	Data analytics using python Practical			
	4046563	Mobile Application Development Practical			
7	4052570	Entrepreneurship and Startup		4	4
			16	16	32
		Physical Education			2
		Library			1
	<b>TOTAL</b>		16	16	35

**VI SEMESTER**

COL NO.	SUBJECT CODE	SUBJECT	HOURS PER WEEK		
			THEORY	PRACTICAL	TOTAL
1	4052610	Computer Hardware and Servicing	6	-	6
2	4046620	Software Testing	5	-	5
3		<b>ELECTIVE – II - THEORY</b>			
	4046631	Social Networking and Ethical Hacking	5	-	5
	4052632	Multimedia Systems			
	4052633	Data science and Big Data			
4	4052640	Computer Hardware and Networking Practical	-	6	6
5		<b>ELECTIVE – II - PRACTICAL</b>			
	4046651	Social Networking and Ethical Hacking Practical	-	4	4
	4052652	Multimedia Systems Practical			
	4052653	Data science and Big Data Practical			
6	4052660	Project work and Internship		6	6
			16	16	32
		Physical Education			2
		Library			1
	<b>TOTAL</b>				35

**VSEMESTER**

Col No	CODE	SUBJECT	Examination Marks			Minimum for Pass	Duration
			Internal	External *	Total		
1	4046510	System Administration and Network Services	25	100	100	40	3
2	4052510	Python Programming	25	100	100	40	3
3		<b>Elective Theory-I</b>					
	4052531	Component Based Technology	25	100	100	40	3
	4052532	Artificial Intelligence and Data analytics	25	100	100	40	3
	4046533	Mobile Application Development Practical	25	100	100	40	3
4	4046540	System Administration and Network Services Practical	25	100	100	50	3
5	4052540	Python Programming Practical	25	100	100	50	3
6		<b>Elective Practical-I</b>					
	4052561	Component Based Technology Practical	25	100	100	50	3
	4052562	Data analytics using Python Practical	25	100	100	50	3
	4046563	Mobile Application Development Practical	25	100	100	50	3
7	4052570	Entrepreneurship and Startup	25	100	100	50	3

**VI SEMESTER**

Col No	SUBJECT CODE	SUBJECT	Examination Marks			Minimum For pass	Duration
			Internal	External *	Total		
1	4052610	Computer Hardware and Servicing	25	100	100	40	3
2	4046620	Software Testing	25	100	100	40	3
3		<b>Elective Theory-II</b>					
	4046631	Social Networking and Ethical Hacking	25	100	100	40	3
	4052632	Multimedia Systems	25	100	100	40	3
	4052633	Data science and Big Data	25	100	100	40	3
4	4052640	Computer Hardware and Networking Practical	25	100	100	50	3
5		<b>Elective Practical - II</b>					
	4046651	Social Networking and Ethical Hacking Practical	25	100	100	50	3
	4052652	Multimedia Systems Practical	25	100	100	50	3
	4052653	Data Science and Big Data Practical	25	100	100	50	3
6	4052660	Project work and Internship	25	100	100	50	3

\* External Marks are conducted for 100 Marks and converted to 75 Marks

**STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU**  
**DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS**  
**N-SCHEME**

(Implemented from the Academic year 2020 - 2021 onwards)

Course Name : 1046 Diploma in Information Technology  
Subject Code : 4052610  
Semester : VI  
Subject title : COMPUTER HARDWARE AND SERVICING

**TEACHING & SCHEME OF EXAMINATION**

No. of weeks per Semester: 16 Weeks

Subject	Instructions		Examination			Duration
	Hours / Week	Hours / Semester	Marks			
			Internal Assessment	Board Examinations	Total	
COMPUTER HARDWARE AND SERVICING	6 Hrs	96 Hrs	25	100*	100	3 Hrs.

\* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

**Topics and Allocation of Hours**

Unit	Topics	Time ( Hours)
I	MOTHERBOARD COMPONENTS	18
II	MEMORY & I/O DEVICES	18
III	DISPLAY, POWER SUPPLY & BIOS	17
IV	DESKTOP, LAPTOP, MOBILE AND TABLET PC	18
V	FUTURE HARDWARE SYSTEMS	18
TEST AND REVISION		7
TOTAL		96

**RATIONALE:**

A Computer Engineer should be able to install and maintains Keyboard, Printer, Mouse, Monitor, etc. along with the computer system. Additionally (S)he should also be able to maintain and service mobile phones. The course provides the necessary knowledge and skills regarding working, construction and interfacing aspects of peripherals. The students will get to know how various peripherals communicate with central processing unit of the

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computer system and pattern their respective operations. They should also know about the hardware and software installations in Laptop, Notebook, Tablet and Mobile phones. This subject provides the required background knowledge of installation, maintenance and testing of peripheral with Computers and Laptops. The student will also get to know about the future hardware systems like basics Non Volatile Memory (NVM), Remote Direct Memory Access (RDMA) and Embedding hardware.

**OBJECTIVES:**

On completion of the following units of syllabus contents, the students must be able to

- Know the evolution of Personal Computer from PC through Core i and Laptop.
- Know and explain the major components that make up the system unit.
- Know the data process and store them in meaningful information.
- Explain about the principle of operations of Keyboard, Mouse and Displays.
- Understand the components of media system.
- Know the Basics, working principle, specification and modern technology of different types of drives.
- Know the specification of I/O Ports of all I/O devices like Serial, Parallel, USB — Game port.
- Blue tooth and IP Connectors
- Know the operation, working principle and troubleshooting of devices like Dot matrix, Inkjet, Laser, Thermal, MFP Printers.
- Know the aspects related to Power Supply.
- Understand & troubleshoot the common problems in the computer system and the peripherals
- Know and explain the major components & troubleshooting of Laptop.
- Understand the basic components and tools used in servicing of Mobile phones.
- Know to install the software required for mobile phones and to maintain it.
- Understand the basics of Non Volatile Memory(NVM), Remote Direct Memory Access (RDMA) and Embedding hardware.

**DETAILED SYLLABUS**

Contents: Theory

Unit	Name of the Topics	Hours
<b>I</b>	<p><b>MOTHERBOARD COMPONENTS</b></p> <p><b>1.1 Motherboard components:</b> Processor sockets/slots - Memory sockets - Chipsets – Cache - BIOS - Clock generator - RTC - Super I/O Controller - Power connector - Battery - Keyboard/Mouse Connectors - Jumpers - Ports and Headers - Pin Connectors -Motherboard Form factor - Hardware, Software and Firmware.</p> <p><b>1.2 Computer Peripheral devices:</b> Internal and External devices</p> <p><b>1.3 Processors:</b> Introduction - Core2 Duo processor, Quad core processor, Core i3, i5, i7 series, AMD AIO series, Xeon Processor.</p> <p><b>1.4 Chipsets:</b> Chipset basics - North / South Bridge architecture and Hub architecture.</p> <p><b>1.5 Bus Standards:</b> Overview and features of PCI, AGP, USB, &amp; Processor Bus.</p>	<p>6</p> <p>2</p> <p>5</p> <p>3</p> <p>2</p>
<b>II</b>	<p><b>MEMORY AND I/O DEVICES</b></p> <p><b>2.1 Primary and Secondary Memory:</b> Introduction. Main Memory — Types – Organization, Access time, Cycle time, and Memory errors and Error detection Techniques. Hard Disk: Introduction — Construction — Working Principle — File Systems — Formatting and Troubleshooting.</p> <p><b>2.2 Removable Storage and Special Devices:</b> DVD-ROM — Recordable DVD Rewritable DVD. Blu-ray: Introduction - Blu-ray Disc Parameters - Recording and Playback Principles. Special drives: External drives, Memory stick, USB flash drive, Solid state drive. Data Recovery tools - DOS, and Third party tools.</p> <p><b>2.3 Keyboard and Mouse:</b> Keyboard: Interfacing and Signals (USB, Wireless), Types of keys,</p>	<p>4</p> <p>4</p> <p>3</p>

	<p>Keyboard Matrix, Key bouncing, Types of keyboard (Simple, Mechanical). Mouse: Optical mouse operation — Optical mouse cleaning — Troubleshooting flowchart for a mouse.</p> <p><b>2.4 Printers and Scanners:</b></p> <p>Printer: Introduction Types of printers — Dot Matrix, Inkjet, Laser, Thermal, MFP printer (Multi-Function Printer) - Operation and Troubleshooting. Scanner: Introduction, Scanner mechanism, Working principle — Types of Scanners (Barcode, Handheld, Flatbed) — Preventive maintenance, and Troubleshooting tools.</p> <p><b>2.5 Special I/O Devices:</b></p> <p>Trackball, Touch pad, Pointing stick, Joystick, Light pen, Graphic tablet, Camera, Bar-code reader, RFID reader</p>	4
<b>III</b>	<p><b>DISPLAY, POWER SUPPLY and BIOS</b></p> <p><b>3.1 Displays and Graphic Cards:</b></p> <p>Displays: LCD Principles — Plasma Displays — TFT Displays - LED Displays. Graphic Cards: Video capture card - Troubleshoot display and graphics card problems</p> <p><b>3.2 SMPS:</b></p> <p>Block diagram Basic Principles and Operations O/P Voltage — Cable color code — Connectors and PowerGood — Common Failures (No circuit diagram to be discussed)</p> <p><b>3.3 BIOS:</b></p> <p>Bios functions — Cold and Warm booting — BIOS error codes — BIOS interrupts — BIOS advanced setup. Upgrading BIOS, Flash BIOS-setup. Identification of different BIOS (AMI, AWARD BIOS).</p> <p><b>3.4 POST:</b></p> <p>Error, Beep Codes, Error messages, Post — Faults related to Hardware.</p>	5
	<p><b>3.2 SMPS:</b></p> <p>Block diagram Basic Principles and Operations O/P Voltage — Cable color code — Connectors and PowerGood — Common Failures (No circuit diagram to be discussed)</p>	4
	<p><b>3.3 BIOS:</b></p> <p>Bios functions — Cold and Warm booting — BIOS error codes — BIOS interrupts — BIOS advanced setup. Upgrading BIOS, Flash BIOS-setup. Identification of different BIOS (AMI, AWARD BIOS).</p>	5
	<p><b>3.4 POST:</b></p> <p>Error, Beep Codes, Error messages, Post — Faults related to Hardware.</p>	3
<b>IV</b>	<p><b>DESKTOP, LAPTOP, MOBILE AND TABLET PC</b></p> <p><b>4.1 Upgrading of Systems:</b></p> <p>Hardware up-gradation. Updating of System &amp; Application software: Device Driver - OS Update and Firewall Security — Control panel - Installed devices and properties — Install procedure, Rollback or Un-</p>	4

	<p>install procedure, Tests of various device driver software.</p> <p><b>4.2 Installation and Troubleshooting:</b> Formatting, Partitioning and Installation of OS —Trouble Shooting Laptop and Desktop computer problems -.Antivirus and Application Software Installation – Backup and Restore procedure - Recovery software</p> <p><b>4.3 Laptop:</b> Difference between laptop and desktop- Types of laptop — working principles—Configuring laptops and power settings - Upgrade RAM, Hard disk, Replacing battery - Configuration of camera, mic, WLAN, Bluetooth, touchpad Laptop and Keyboard.</p> <p><b>4.4 Mobile phone:</b> Basics of mobile communication, Battery- antenna- ear piece- Microphone - Speaker- Buzzer -LCD- keyboard. Basic circuit board components – Names and functions of different ICs used in mobile phones. Installation &amp; Troubleshooting: Mobile servicing kit, Assembling and disassembling of different types of mobile phones – Installation of OS - Fault finding &amp; troubleshooting.</p> <p><b>4.5 Introduction to Tablet PC:</b> Digitizers Versus Touch-Screen Displays, Merits and Demerits. Comparisons: Laptops, Desktops, Pocket PC, Other PDAs, Other Pen-Based Computers, Differences in Hardware. Windows XP Tablet PC Edition Configuration: Basic Interface Settings, Screen Settings, Display Properties, Other Settings and Options</p>	<p style="text-align: right;">4</p> <p style="text-align: right;">2</p> <p style="text-align: right;">4</p> <p style="text-align: right;">4</p>
<p><b>V</b></p>	<p><b>FUTURE HARDWARE SYSTEMS</b></p> <p><b>5.1 Moore’s law &amp; NVM Technology:</b> Calculating the Hardware Growth using Moore’s Law, Introduction to Non Volatile Memory Technology, - Architecture of NVM technology – Advantages and Scope of NVM Technology</p> <p><b>5.2 Emerging Non Volatile Memory Technologies:</b> (Concepts only)- Magnetic Random Access Memory (MRAM), Spin Transfer Torque Random Access Memory (STT-RAM) - Ferroelectric Random Access Memory (FeRAM), Phase Change Memory (PCM) and</p>	<p style="text-align: right;">4</p> <p style="text-align: right;">5</p>

	Resistive Random-Access Memory (RRAM).	4
	<b>5.3 Introduction to Advanced Network technologies:</b> Remote Direct Memory Access (RDMA) - Working Principle of RDMA – Limitations and Challenges in RDMA technology	
	<b>5.4 Embedded Systems:</b> Basic concepts - Embedded Board and the Von Neumann Model - Basic Electronics of Embedded devices - AC Circuits, DC Circuits and Active Devices - Power supply- Scope, Control and Probes - Advantages and Applications of Embedded devices.	5

**REFERENCES:**

S.No	Title	Author	Publisher	Year of Publishing / Edition
1	Computer Installation and Servicing	D.Balasubramanian	Tata Mc-Graw Hill, New Delhi	Second Edition 2010
2	Troubleshooting, Maintaining and Repairing PCs	Stephen J. Bigelow	TMH, New Delhi	Fifth Edition
3	PC Hardware in a nutshell	Robert Bruce Thompson.	O'Reilly Media	Third India Reprint 2008.
4	The Laptop Repair Workbook: An Introduction to Troubleshooting and Repairing Laptop Computers	Morris Rosenthal	Foner books	First Edition 2008
5	The Cell Phone Handbook	P.J. Stetz and Penelope Stetz	FindTech Ltd	Second Edition
6	Advanced Mobile Repairing	Pandit Sanjib	BPB Publication, New Delhi	First Edition 2010
7	Absolute Beginner's Guide to Tablet PCs	Craig F. Mathews	ToolKits, Inc.	First Edition 2004
8	Embedded Hardware: Know It All	Ganssle J, Noergaard, Eady F, Edwards L Katz DJ, Gentile R, Arnold K, Hyder K, Perrin B	Newnes	1 <sup>st</sup> Edition (2007)





# DIRECTORATE OF TECHNICAL EDUCATION

## DIPLOMA IN INFORMATION TECHNOLOGY

### III YEAR

#### N – SCHEME

#### VI SEMESTER

2020 - 2021 onwards  
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**4046620 – SOFTWARE TESTING**

*CURRICULUM DEVELOPMENT CENTRE*

**STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU**  
**DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS**  
**N-SCHEME**

(Implemented from the Academic year 2020 - 2021 onwards)

Course Name : Diploma in Information Technology  
Subject Code : 4046620  
Semester : VI  
Subject title : SOFTWARE TESTING

**TEACHING & SCHEME OF EXAMINATION**

No. of weeks per Semester: 16 Weeks

Subject	Instructions		Examination			Duration
	Hours / Week	Hours / Semester	Marks			
			Internal Assessment	Board Examinations	Total	
SOFTWARE TESTING	5 Hrs	80 Hrs	25	100*	100	3 Hrs.

\* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

Topics and Allocation of Hours

Unit	Topics	Time ( Hours)
I	INTRODUCTION TO SOFTWARE TESTING	15
II	TEST PLAN AND LEVELS OF TESTING	15
III	TEST MANAGEMENT AND TESTCASE STRATEGIES	15
IV	AUTOMATION TESTING AND ITS TOOLS	15
V	SELENIUM SOFTWARE TESTING TOOL	13
TEST AND REVISION		7
TOTAL		80

**RATIONALE:**

Software Testing is the process of identifying the accuracy and quality of the software product and service under test. It is used to validate whether the product fulfills the prerequisites, needs, and desires of the client. At the end of the day, testing executes a framework or application with a specific end goal to point out bugs, errors or defects.

**OBJECTIVES:**

On completion subject, the students must be able to

- understand Software Testing and its needs.
- Understand the difference between Software Verification and Validation
- Learn about Quality Assurance and Quality Control
- Understand Software Testing Life Cycle
- Understand Different types of Testing Methods
- Understand Manual Testing & Automation testing
- Understand Different types of Testing Levels
- Understand and prepare Test Plans
- Need for Maintaining a Software
- Define Test Case design techniques
- Create and Execute test cases and log results
- Define Test Reports
- Understand Defect and its life Cycle
- Define Automation testing
- Understand Automation Framework
- Choose right automation tool
- Understand various kind of testing tools
- Learn Selenium basics and selenium tool suite
- Understand the concept of Selenium IDE
- Understand the concept Selenium Web Driver basics

**DETAILED SYLLABUS**

Contents: Theory

Unit	Name of the Topics	Hours
<b>I</b>	<p><b>INTRODUCTION TO SOFTWARE TESTING</b></p> <p><b>1.1 Basics of Software Testing:</b> Introduction to testing - Importance of Testing - Benefits of Testing - Testing Strategies - Validation - Verification - Quality Assurance - Quality Control</p> <p><b>1.2 Software Testing Life Cycle:</b> Phases - Requirement Analysis - Test Planning - Test case - Testing Environment Setup - Test Execution - Defect – Failure</p> <p><b>1.3 Testing Methods:</b> Manual Testing vs Automation Testing - Benefits - Comparison - Types - White box Testing - Grey box Testing - Black box Testing - Test Automation</p> <p><b>1.4 Levels of Testing:</b> Importance - Benefits - comparison of Functional vs Non-Functional testing - Types of Functional Testing - Types of Non Functional Testing - Regression Testing</p>	<p>3</p> <p>4</p> <p>4</p> <p>4</p>
<b>II</b>	<p><b>TEST PLAN AND LEVELS OF TESTING</b></p> <p><b>2.1 Test Planning:</b> Prepare Test Plan - Deciding Test Approach - Setting Up Criteria for Testing - Identifying Responsibilities - Staffing - Resource Requirements - Test Deliverables - Testing Tasks</p> <p><b>2.2 Functional Testing:</b> Importance - Benefits - Advantages of Functional Testing - Types of Functional Testing - Entry/Exit Criteria</p> <p><b>2.3 Non Functional Testing:</b> Introduction - Purpose - Advantages - Non-Functional requirement - User/Technical Stories - Acceptance Criteria - Artifact - Non-Functional requirement Checklists - Types of Non-Functional Testing</p> <p><b>2.4 Software Verification:</b> Purpose - Features - Types - Static Verification - Dynamic Verification -</p>	<p>3</p> <p>2</p> <p>3</p> <p>3</p>

	Approaches - Code Review - Walkthrough – Inspection <b>2.5 Maintenance:</b> Overview - Types of maintenance - Cost of Maintenance - Maintenance Activities - Reverse Engineering - Program Restructure – Reusability	4
<b>III</b>	<b>TEST MANAGEMENT AND STRATEGIES</b>	
	<b>3.1 Test Case Strategies:</b> Objectives - Scope of the testing - Test case design techniques - Black-Box techniques - Boundary Value Analysis - Equivalence Partitioning - State Transition Diagrams - Use Case Testing - White-Box techniques - Statement Testing & Coverage - Test Adequacy Criteria - Coverage and Conditional flow	4
	<b>3.2 Test Execution:</b> Implementation & Execution - Setting up environment - Prepare Test Data - Execute test suite - status - pass/fail - Log the results - Compare Actual results vs Expected Results	4
	<b>3.3 Test Reporting:</b> Test Reports - Project Information - Test Cycle - Executive Overview - Summary of testing - Metrics - Defect Report - Defect description - Priority - Status - Types of Test Report	3
	<b>3.4 Defect Management:</b> Defect Life Cycle - Discovery - Categorization - Resolution - Verification - Closure - Reporting - Defect Metrics - Defect Rejection Ratio - Defect Leakage ratio - Bug Report	4
<b>IV</b>	<b>AUTOMATION TESTING AND ITS TOOLS</b>	
	<b>4.1 Automation Test:</b> Introduction - Best Practices - Scope of Automation - Advantages - Challenges in Automation - Automation Testing Lifecycle	3
	<b>4.2 Automation Framework:</b> Purpose - Benefits - Types of Automated Frameworks - Linear - Modular Based - Data-Driven - Keyword Driven - Hybrid - Library Architecture - Layered Architecture - Testcases Layer - Domain Layer - System under test Layer	4
	<b>4.3 Automation Testing Tool:</b> Need of Tool - Types of Tool - Open Source - Commercial - Custom -	4

	<p>Selecting Right Tools - Different testing tools &amp; Usage - Selenium - QTP - Junit - SoapUI - Watir – Appium</p> <p><b>4.4 Non Functional Testing Tool:</b></p> <p>Purpose - When to Use - Different Types of Tools &amp; Usage - JMeter - LoadRunner - Loadster - Loadstorm - Forecast - Load Complete - Loadtracer - Neoload - vPerformer - WebLoad professional - WebServer Stress Tool</p>	4
<b>V</b>	<p><b>SELENIUM SOFTWARE TESTING TOOL</b></p> <p><b>5.1 Selenium Basics:</b></p> <p>Introduction - Features - Limitation - Selenium Tool Suite &amp; Uses - Selenium IDE - WedDriver - Selenium Grid</p>	3
	<p><b>5.2 Selenium IDE Basics:</b></p> <p>Features - Commands - Actions - Accessors - Assertions - Writing Test cases - Test execution</p>	3
	<p><b>5.3 Selenium WebDriver Basics:</b></p> <p>Architecture - Features - Commands - Browser - Navigation - Web Element - Find Element - Checkbox Handling - Radio button Handling - DropDown Handling - Testcase creation - Execute with different browsers</p>	4
	<p><b>5.4 Selenium WebDriver Locators &amp;Xpath:</b></p> <p>Locators - Inspect Elements using Web Inspect - Inspect Element in Chrome - Xpath, Firebugs &amp;Firepath - Write effective Xpath</p>	3

**REFERENCES:**

S. NO	TITLE	AUTHOR	PUBLISHER	YEAR OF PUBLISHING
1	Software Testing	K.Mustafa and R.A.Khan	Narosa Publishing House, New Delhi	Reprint 2009
2	Software Testing Principles and Practices	Srnivasan desikan, Gopalswamy Ramesh	Pearson	First Edition
4	Lessons Learned in Software Testing	CemKaner		2001



# DIRECTORATE OF TECHNICAL EDUCATION

## DIPLOMA IN INFORMATION TECHNOLOGY

### III YEAR

#### N – SCHEME

#### VI SEMESTER

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2020 - 2021 onwards

**4046631 – ELECTIVE THEORY - II  
SOCIAL NETWORKING AND ETHICAL HACKING**

*CURRICULUM DEVELOPMENT CENTRE*

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**STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU**  
**DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS**  
**N-SCHEME**

(Implemented from the Academic year 2020 - 2021 onwards)

Course Name : 1046 Diploma in Information Technology  
Subject Code : 4046631  
Semester : VI  
Subject Title : **ELECTIVE THEORY II** Social Networking and Ethical Hacking

**TEACHING AND SCHEME OF EXAMINATION**

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
Social Networking and Ethical Hacking Theory	5	80	25	100*	100	3 Hrs.

\* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

*Topics and Allocation of Hours*

UNIT	Topic	Hrs.
I	Networks- Concepts	16
II	SNA, Online Social Networks and Network Models	16
III	Introduction to Ethical Hacking, Buffer Overflows, SQL Injection	15
IV	Web Application Security and Technologies	15
V	Attacking Authentication	11
Test & Model Exam		7
<b>Total</b>		<b>80</b>



**RATIONALE:**

This course offers students, a theoretical Understanding of various social media networks. Working and using SNA in their infrastructure and critically evaluate the potential countermeasures to advanced hacking techniques. Analyze and evaluate techniques used to break into an insecure web application and identify relevant countermeasures.

**OBJECTIVES:.**

- to learn about structure and evolution of networks
- to build a framework of network analysis that covers measures such as density, centrality, clustering, centralization, and specialization
- to think like a hacker, providing students with a deep understanding of security issues and concerns.
- also provide the students with specialist knowledge and experience of advanced hacking techniques and their countermeasures.

**DETAILED SYLLABUS**

Contents: Theory

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Unit	Topic	Hours
I	<b>NETWORKS- CONCEPTS</b>	
	<b>1.1 Network Concepts Basics:</b> Networks Concepts – Nodes, edges, adjacency matrix, one and two-mode networks, node degree	4
	<b>1.2 Network centrality Concepts:</b> Betweenness, closeness, eigenvector centrality (+ Page Rank), network centralization	4
	<b>1.3 Community Concepts:</b> Clustering, community structure, modularity, overlapping communities.	3
	<b>1.4 Network models:</b> Small world network models, optimization, strategic network formation and search Concepts	3
	<b>1.5 Geographic Networks:</b> Geographic networks, Decentralized search	2

<b>II</b>	<p><b>SNA, ONLINE SOCIAL NETWORKS AND NETWORK MODELS</b></p> <p><b>2.1 Erdos-Renyi and Barabasi-Albert- Concepts:</b> Erdos-Renyi and Barabasi-Albert- Concepts - connected components, giant component, average shortest path, diameter, breadth-first search, preferential attachment.</p> <p><b>2.2 Watts-Strogatz Model:</b> Watts-Strogatz Model – Network generation.</p> <p><b>2.3 Social Network services:</b> Facebook, LinkedIn, Twitter, Couch Surfing using SNA to understand their users and improve their functionality.</p> <p><b>2.4 Network models:</b> Simple contagion, threshold models, opinion formation, unusual applications of SNA.</p> <p><b>2.5 Strings:</b> String – Declaration and initialization of strings, Reading and writing Strings, String handling functions – String manipulation programs.</p>	4  2  4  3  3
<b>III</b>	<p><b>INTRODUCTION TO ETHICAL HACKING, BUFFER OVERFLOWS, SQL INJECTION</b></p> <p><b>3.1 Introduction to Ethical Hacking:</b> Introduction - Understanding the importance of security, Concept of ethical hacking</p> <p><b>3.2 Essential Terminologies:</b> Threat, Attack, Vulnerabilities, Target of Evaluation, Exploit. Phases involved in hacking, Foot printing, Scanning, System Hacking, Session Hijacking.</p> <p><b>3.3 Buffer Overflows:</b> Significance of Buffer Overflow Vulnerability, Reasons for Buffer Overflow Attacks, Methods of ensuring that buffer overflows are trapped.</p> <p><b>3.4 Sniffers:</b> Active and passive sniffing, ARP poisoning and countermeasures, Man in the middle attacks, Spoofing and Sniffing attacks. Sniffing countermeasures.</p> <p><b>3.5 SQL Injection:</b> SQL Injection - Attacking SQL Servers, Preventive Measures</p>	2  4  3  4  2
<b>IV</b>	<p><b>WEB APPLICATION SECURITY AND TECHNOLOGIES</b></p> <p><b>4.1 Web Application Security:</b> Web Application Security - Core Defence Mechanisms. Handling User</p>	3

	<p>Access</p> <p><b>4.2 Web Application Authentication:</b> Authentication, Session Management, Access Control.</p> <p><b>4.3 Web Application Technologies:</b> Web Application Technologies - HTTP Protocol, Requests, Responses and Methods.</p> <p><b>4.4 Encoding Schemes:</b> Encoding schemes, Server side functionality technologies (Java, ASP, and PHP).</p> <p><b>4.5 Web Application Threats and Hacking:</b> Web Application Threats, Web Application Hacking.</p>	<p>3</p> <p>3</p> <p>4</p> <p>2</p>
<b>V</b>	<p><b>ATTACKING AUTHENTICATION</b></p> <p><b>5.1 Attacking Authentication:</b> Attacking Authentication - Attacking Session Management, Design Flaws in Authentication Mechanisms</p> <p><b>5.2 Password functionality:</b> Attacking Forgotten Password Functionality, Password change functions, Countermeasures to authentication attacks</p> <p><b>5.3 Attacking other users:</b> Attacking other users - Reflected XSS Vulnerabilities, Stored XSS Vulnerabilities, DOM-Based XSS Vulnerabilities, HTTP Header Injection. Countermeasures to XSS.</p>	<p>3</p> <p>4</p> <p>4</p>

**Reference Books:**

1. Patrick Engebretson, The Basics of Hacking and Penetration Testing, Elsevier, 2013.
2. Network Security and Ethical Hacking, Rajat Khare, Luniver Press, 2006.
3. Network intrusion alert: an ethical hacking guide to intrusion detection, Ankit Fadia, Manu Zacharia, Thomson Course Technology PTR, 2007.
4. Patrick Doreian, Frans Stokman, Evolution of Social Networks, Routledge, 2013.
5. David Easley and Jon Kleinberg, Networks, Crowds, and Markets: Reasoning About a Highly Connected World, Cambridge University Press, 2010.



# DIRECTORATE OF TECHNICAL EDUCATION

## DIPLOMA IN INFORMATION TECHNOLOGY

### III YEAR

#### N – SCHEME

#### VI SEMESTER

2020 - 2021 onwards  
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### 4052632 – ELECTIVE THEORY - II MULTIMEDIA SYSTEMS

*CURRICULUM DEVELOPMENT CENTRE*

**STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU**  
**DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS**  
**N-SCHEME**

(Implemented from the Academic year 2020 - 2021 onwards)

Course Name : 1046 Diploma in Information Technology  
 Subject Code : 4052632  
 Semester : VI  
 Subject Title : **ELECTIVE THEORY II** Multimedia Systems

**TEACHING AND SCHEME OF EXAMINATION**

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			Duration
	Hours / Week	Hours / Semester	Marks			
			Internal Assessment	Board Examinations	Total	
Multimedia Systems	5 Hrs	80 Hrs	25	100*	100	3 Hrs.

\* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

*Topics and Allocation of Hours*

Unit	Topics	Time (Hrs)
I	Introduction to Multimedia	11
II	Defining Objects for Multimedia Systems	15
III	Multimedia Data and Standards, Database	16
IV	Multimedia Devices and Making Multimedia	15
V	Multimedia for Internet and Streaming	16
Test & Model Exam		7
<b>Total</b>		<b>80</b>

## **RATIONALE:**

The exponential growth of Engineering and Technology particularly Information and Communications Engineering has benefited the day-today life of entire mankind in all respects. The research and developments are continually happening in this field to fine tune and improve the field particularly in multimedia which directly or indirectly has impact on every man's daily life. As such the introduction of current and future trends and technology of multimedia systems would strengthen the knowledge and skills of Engineering community in taking one-step further the prosperity of mankind.

## **OBJECTIVES:**

On successful completion of the course, the students will be able to

- Understand the relevance and underlining infrastructure of Multimedia system.
- Apply contemporary theories of multimedia learning to the development of multimedia products.
- Analyze instructional and informational media (audio/ visual materials, web based materials, games and simulations etc) applied with multimedia techniques.
- Acquire knowledge about multimedia software tools.
- Understand the multimedia systems components and fundamental elements of any multimedia system.
- Acquire knowledge about compression / decompression and various media file formats.
- Understand the underlying principles of processing various multimedia data.
- Understand the working principles of various multimedia input–output devices.
- Gain knowledge about various multimedia related standards.
- Understand the design and development process of multimedia projects.
- Understand the technologies of multimedia used in Internet and its applications.
- Acquire knowledge about streaming, webcasting and many evolving technologies.

### DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topics	Hours
<b>I</b>	<p><b>INTRODUCTION TO MULTIMEDIA</b></p> <p><b>1.1 Introduction:</b> Definition of Multimedia, Multimedia Basics, Multimedia Elements, Multimedia Applications, Delivering Multimedia.</p> <p><b>1.2 Multimedia Systems Architecture:</b> Multimedia Workstation Architecture, High resolution Graphic displays, The IMA Architectural Framework, Network architecture for Multimedia systems.</p> <p><b>1.3 Evolving Technologies for Multimedia Systems:</b> Hypermedia Documents, Hypertext, Hyper Speech, HDTV and UDTV, 3D Technologies and Holography.</p> <p><b>1.4 Defining Objects for Multimedia System:</b> Text, Images, Audio and Voice, Full-Motion and Live Video, Multimedia Data Interface Standards, Video Processing Standards.</p> <p><b>1.5 Multimedia Software:</b> Overview of Multimedia Software Tools, Open Source Replacements, Multimedia OS, VRML, OpenGL, Windows and Open Source API.</p>	<p>2</p> <p>3</p> <p>2</p> <p>2</p> <p>2</p>
<b>II</b>	<p><b>DEFINING OBJECTS FOR MULTIMEDIA SYSTEMS</b></p> <p><b>2.1 Text:</b> About Fonts and Faces, Using Text in Multimedia, Hypermedia and Hypertext, Using Hypertext, Hypermedia Structures, Hypertext Tools.</p> <p><b>2.2 Images:</b> Making Still Images, Bitmaps, 1 bit images, 8-bit gray level images, 8-bitcolor images, Dithering, 24 bit color images, Vector Drawing, 3-D Drawing and Rendering, Color, Understanding Natural Light and Color, Computerized Color, Color Palettes, Color Look-up table. Image</p>	<p>2</p> <p>4</p>

	<p>Processing, Image acquisition, Image enhancement. Color image processing.</p> <p><b>2.3 Sound:</b> The Power of Sound, Digital Audio, Making Digital Audio Files, MIDI Audio, MIDI vs. Digital Audio, Multimedia System Sounds, Adding Sound to Your Multimedia Project , Audio Recording, Keeping Track of Your Sounds, Audio CDs, Sound for your Mobile, Sound for the Internet.</p> <p><b>2.4 Animation:</b> The Power of Motion, Principles of Animation, Animation by Computer, Animation Techniques. Animation using OpenGL.</p> <p><b>2.5 Video:</b> Using Video, How Video Works and Is Displayed, Analog Video, Digital Video, Displays, Digital Video Containers, Codec, Video Format Converters, Obtaining Video Clips, Shooting and Editing Video.</p>	<p>3</p> <p>3</p> <p>3</p>
<p><b>III</b></p>	<p><b>MULTIMEDIA DATA AND STANDARDS, DATABASE</b></p> <p><b>3.1 Data Compression:</b> Need for Data compression, General Data compression Scheme, Compression standards, Non-lossy compression for images, Lossy compression for Photographs and Video, Hardware Vs Software Compression.</p> <p><b>3.2 Compression Schemes and standards:</b> (Only Concepts of) Binary Image Compression, Color, Gray Scale and Still-Video Image Compression, JPEG, Video Image Compression, Multimedia Standards for Video, Requirements for Full-motion Video Compression, MPEG, Audio compression, Fractal compression, advantages / disadvantages.</p> <p><b>3.3 Data and File Format Standards:</b> Popular File Formats, RTF, RIFF, GIF, PNG, TIFF, MIDI, JPEG, JFIF, AVI, WAV, BMP, WMF, MIX, MPEG standards. TWAIN.</p> <p><b>3.4 Database System:</b> Data Types in Multimedia Databases, Storage and Retrieval, Database Management System, Database Organization and Transaction</p>	<p>3</p> <p>4</p> <p>3</p> <p>3</p>



	<p>Management for Multimedia System.</p> <p><b>3.5 Content Based Retrieval in Digital Libraries(C-BIRD)</b></p> <p>C-BIRD GUI – Color Histogram – Color Density – Color Layout – Texture layout- - Search by Illumination Invariance – Search by Object Model.</p>	3
<b>IV</b>	<p><b>MULTIMEDIA DEVICES AND MAKING MULTIMEDIA</b></p> <p><b>4.1 Multimedia Input/output Technologies:</b></p> <p>Limitations of Traditional input devices, Multimedia input / output devices, PEN input, Working of Electronic Pen, Digitizer, (only the concepts of) Video and Image display systems, Printer, Scanner. Digital voice and video: Voice Recognition system, Digital Camera, Video frame grabber, Video and still image processing, Full – motion video controller, Video Capture Board.</p> <p><b>4.2 Making Multimedia:</b></p> <p>The Stages of a Multimedia Project: Creativity, Organization, Communication, Hardware, Software: Text Editing and Word Processing Tools, OCR Software, Painting and Drawing Tools, 3-D Modeling and Animation Tools, Image-Editing Tools, Sound-Editing Tools, Animation, Video, and Digital Movie Tools, Authoring Systems, Making Instant Multimedia, Types of Authoring Tools.</p> <p><b>4.3 Multimedia Skills:</b></p> <p>The Team, Project Manager, Multimedia Designer, Interface Designer, Writer, Video Specialist, Audio Specialist, Multimedia Programmer, Producer of Multimedia for the Web.</p> <p><b>4.4 Designing and Producing:</b></p> <p>Designing, Designing the Structure, Designing the User Interface, Producing–Tracking, Copyrights.</p>	5
<b>V</b>	<p><b>MULTIMEDIA FOR INTERNET AND STREAMING</b></p> <p><b>5.1 The Internet and Multimedia:</b></p> <p>The Bandwidth Bottleneck, Internet Services, MIME Types, Multimedia on the Web, Web Page Makers and Site Builders, Plug-ins and Delivery Vehicles.</p> <p><b>5.2 Designing for the World Wide Web:</b></p>	3

	Developing for the Web, Small-Device Workspace, text and images for the Web, Clickable Buttons, Client-Side Image Maps, Sound for the Web, Animation for the Web, and Video for the Web, HTML5 Video - Plug-ins and Players.	3
	<p><b>5.3 Multimedia Communication:</b></p> <p>Study of Multimedia networking, Quality of data transmission, Media on demand, Multimedia Over Wireless and Mobile Networks – Media Entertainment, web-based applications, e-learning and education.</p> <p><b>5.4 Streaming:</b></p> <p>Introduction - Applications of Streaming- The Streaming Architecture, Stream Serving: Webcasting – On-Demand Servicing – Voice and Video Conferencing - Internet Telephony - Virtual Reality.</p>	4
	<p>Introduction - Applications of Streaming- The Streaming Architecture, Stream Serving: Webcasting – On-Demand Servicing – Voice and Video Conferencing - Internet Telephony - Virtual Reality.</p>	6

**Reference Books:**

1. “Ze- Nian Li and M.S. Drew”, “Fundamental of Multimedia”, Pearson Education, Second Edition, 2014.
2. “Tay Vaughan”, “Multimedia: Making It Work”, Tata-McGrawHill.
3. “Prabhat, k.Andleigh, Kiran Thakra”, “Multimedia systems Design”, PHI
4. “Ralf Steinmetz, and Klara Nahrstedt”, “Multimedia Computing Communication and Applications”, Pearson Education.
5. “Ranjan Parekh”, “Principles of Multimedia”, TMGH, New Delhi.
6. “John F. Koegel Buford”, “ Multimedia Systems”, Pearson Education.
7. David Austerberry, The Technology of Video and Audio Streaming, Focal Press.



# DIRECTORATE OF TECHNICAL EDUCATION

## DIPLOMA IN INFORMATION TECHNOLOGY

### III YEAR

#### N – SCHEME

#### VI SEMESTER

2020 - 2021 onwards  
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**4052633 – ELECTIVE THEORY II  
DATA SCIENCE AND BIG DATA**

*CURRICULUM DEVELOPMENT CENTRE*

**STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU  
DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS**

**N-SCHEME**

(Implemented from the Academic year 2020 - 2021 onwards)

Course Name : 1046 INFORMATION TECHNOLOGY

Subject Code : 4052633

Semester : VI

Subject Title : **ELECTIVE THEORY II DATA SCIENCE AND BIG DATA**

**TEACHING AND SCHEME OF EXAMINATION**

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
Elective – II DATA SCIENCE AND BIG DATA	5 Hrs	80 Hrs	25	100*	100	3 Hrs.

\* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

**Topics and Allocation of Hours**

UNIT	Topic	Hrs.
I	Introduction to Data Science	15
II	Fundamentals of Data Modelling	15
III	Fundamentals of Big Data	15
IV	Big Data Storage	14
V	Big Data Processing	14
Test & Model Exam		7
<b>Total</b>		<b>80</b>

**RATIONALE:**

This course provides a comprehensive understanding of data science and data modeling. The foundation on data science is laid to understand the core concepts and the techniques that underlie today's big data computing technologies. This course helps the students in identifying and applying appropriate techniques and tools to solve problems in managing huge quantities of data.

**OBJECTIVES:**

This subject has two major divisions. The objectives of these topics are given below.

**Data Science**

- After studying the first two units of this syllabus, students will be able
- To understand the fundamentals of data science, various data types, their sources, problems and issues, various formats of data and their processing steps.
- To apply the Python libraries and Microsoft Excel for Data analysis.
- To work with Microsoft Excel for data analysis and applying various functions for data analysis.
- To familiarize with the basic data representation methods.
- To understand the concepts of samples, attributes and their relationships.
- To develop and implement simple linear regression models.
- To understand the concept of model equation and of fit.
- To understand and differentiate the concepts of predictive models and the classification models.
- To familiarize with the concepts of Neural Networks, Decision Trees and Nearest neighbors techniques.

**Big Data**

- After studying the lessons from Units III to V, the students will be able to
- Get conceptual understanding of Big Data, Web data, classification of data, Big Data characteristics, types, classification and handling techniques.
- Get the conceptual understanding of the impact of ICT developments on Big Data Adoption.
- Understand the Big Data Analytics Life Cycle.
- Get the conceptual understandings of Big Data Storage systems and technologies.





	<p><b>4.2 Big Data Storage Technologies:</b> On-Disk Storage Devices-Distributed File system-RDBMS- NoSQL Databases- Characteristics of NoSQL- Types of NoSQL Storage devices. In-Memory storage devices -Data Grids-Databases</p> <p><b>4.3 Hadoop:</b> Introduction - Hadoop and its Ecosystem: Hadoop core components - Features of Hadoop - Hadoop Ecosystem components - Hadoop streaming - Hadoop pipes - Hadoop distributed File system - HDFS data storage - Hadoop Ecosystem tools.</p>	5
<b>V</b>	<p><b>BIG DATA PROCESSING</b></p> <p><b>5.1 BigData Processing:</b> Parallel data processing - Distributed data processing - Hadoop Framework - Processing workloads - cluster for processing - Batch processing with MapReduce - Map and Reduce Tasks - MapReduce algorithms - Processing in Realtime mode - Real time processing and MapReduce.</p> <p><b>5.2 Big Data Analysis Techniques:</b> Quantitative analysis, Qualitative analysis, Data mining, Statistical analysis: Correlation, regression, Machine Learning: Classification, clustering, outlier detection, filtering. Semantic analysis: Natural language processing, Text Analytics, Sentiment analysis, Visual Analysis</p> <p><b>5.3 Big data Analytics Applications and case studies:</b> Big data in Marketing and sales- Big data and Healthcare- Big data in Medicine- Big Data in Advertising.</p>	5
		4



**Reference books:**

1. Field Cady, "The Data Science Handbook", Wiley, 2017.
2. Jake VanderPlas, "Python Data Science Handbook- Essential tools for working with data", O'REILLY, 2017
3. Davy Cielen, Arno D. B. Meysman, Mohamed Ali, "Introducing Data Science", manning publications, 2016
4. Thomas Erl, Wajid Khattak - Big Data Fundamentals Concepts, Drivers & Techniques-Prentice Hall (2016).
5. Raj kamal, Preeti Saxena, "Big Data Analytics-Introduction to Hadoop, Spark and Machine Learning", McGraw Hill Education(India) Pvt Ltd., 2019.
6. Michael Minelli, Michelle Chambers, and Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley, 2013.
7. Tom White, "Hadoop: The Definitive Guide", Third Edition, O'Reilley, 2012.
8. NPTEL MOOC courses on "Data Science" and "Big Data".

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# DIRECTORATE OF TECHNICAL EDUCATION

## DIPLOMA IN INFORMATION TECHNOLOGY

### III YEAR

#### N – SCHEME

#### VI SEMESTER

2020 - 2021 onwards  
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**4052640 – COMPUTER HARDWARE AND  
SERVICING PRACTICAL**

*CURRICULUM DEVELOPMENT CENTRE*

**STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU**  
**DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS**  
**N-SCHEME**

(Implemented from the Academic year 2020 - 2021 onwards)

Course Name : 1046 DIPLOMA IN INFORMATION TECHNOLOGY  
 Subject Code : 4052640  
 Semester : VI  
 Subject Title : COMPUTER HARDWARE AND NETWORKING PRACTICAL

**TEACHING AND SCHEME OF EXAMINATION**

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
COMPUTER HARDWARE AND SERVICING PRACTICAL	6	96	25	100*	100	3 Hrs.

\* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

**RATIONALE:**

The course aims at making the students familiar with various parts of computers and laptops and how to assemble them along with the different types of peripherals desired. In addition, the course will provide necessary knowledge and skills to the students in computer and laptop software installation and maintenance and also make them to diagnose the software faults. This subject also gives the knowledge and competency to diagnose the problems in computer computer hardware and peripherals and also gives the knowledge for trouble shooting for systematic repair and maintenance of computers and laptops.

## OBJECTIVES

On completion of the following exercises, the students must be able to

- Know the various indicators, switches and connectors used in Computers.
- Familiarize the layout of SMPS, motherboard and various Disk Drives.
- Configure Bios set up options.
- Install various Secondary storage devices with memory partition and formatting.
- Know the various types of Printer installation and to handle the troubleshooting ability.
- Assemble PC system and checking the working condition.
- Installation of Dual OS in a system.
- Identify the problems in Computer systems, Software installation and rectification
- Assembling and disassembling of Laptop to identify the parts and to install OS and configure it.
- Enable to perform different cabling in a network.
- Configure Internet connection and use utilities to debug the network issues.
- Configure router for any topology
- Installation of sever operating system
- Configuring various services in server operating system
- Install various packet sniffing tools in linux



8	a) Transfer files between systems in LAN using FTP Configuration. b) Install a Printer in LAN and share it in the network.
<b>PART B</b>	
1	Installation of Windows 2008 / 2013 Server
2	Installation and configuration of DHCP Server
3	Installation and configuration of Mail Server
4	Installation and configuration of Active directory Services. Create a user and permission using logon script and group permissions.
5	Installation and configuration of DNS Server
6	a) Installation of Red Hat Linux using Graphical mode. b) Installation of Red Hat Linux using VMware.
7	Installation of various open source packet sniffing tools and inspect packets in linux.

**BOARD EXAMINATION**

**SCHEME OF VALUATION**

Procedure Writing – One Question from PART – A	20 Marks
Procedure Writing – One Question from PART - B	25 Marks
Executing Exercise (PART – A)	20 Marks
Executing Exercise (PART – B)	20 Marks
Result(Part – A)	5 Marks
Result(Part – B)	5 Marks
VIVA - VOCE	5 Marks
Total	100 Marks

**REQUIREMENTS**

<b>Hardware Requirements :</b>	<b>Quantity</b>
Desktop Systems	30 Nos
Hard disk drive	06 Nos
DVD, Blu-ray Drive	06 Nos
Blank DVD , Blu-ray Disc	30 Nos
Head Cleaning CD	05 Nos
Dot matrix Printer	02 Nos
Laser Printer	02 Nos
Web Cam, Scanner, Biometric Fingerprint scanner	02 Nos Each
<b>Network Requirements:</b>	
Crimping Tool	06 Nos
Screwdriver set	06 Nos
Network Cables	50 Mtrs
Modem	02 Nos
Hub	01 No
Router	01 No
Switch	02 Nos
<b>Software Requirements:</b>	
Windows Server, Windows / Linux OS DVD and Blue-ray Burning S/W.	



# DIRECTORATE OF TECHNICAL EDUCATION

## DIPLOMA IN INFORMATION TECHNOLOGY

### III YEAR

#### N – SCHEME

#### VI SEMESTER

2020 - 2021 onwards  
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**4046651 – ELECTIVE PRACTICAL – II  
SOCIAL NETWORKING AND ETHICAL HACKING  
PRACTICAL**

*CURRICULUM DEVELOPMENT CENTRE*



**STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU**  
**DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS**  
**N-SCHEME**  
 (Implemented from the Academic year 2020 - 2021 onwards)

Course Name : 1046 Diploma in Information Technology  
 Subject Code : 4046651  
 Semester : VI  
 Subject Title : Elective Practical II Social Networking and Ethical Hacking Practical

**TEACHING AND SCHEME OF EXAMINATION**

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
Social Networking and Ethical Hacking Practical	4	64	25	100*	100	3 Hrs.

\* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

**RATIONALE:**

The course is designed to enable the students to learn networking concepts and Ethical hacking techniques by using various software.

**OBJECTIVES:**

- To help students in conducting network scanning and analyzing
- To help students to monitor a system remotely and to extract hidden files.
- To help students to sniff a network analyze packets for any attack
- To develop programs using python
- To setup the networking and encounter hacking using various software.

**DETAILED SYLLABUS**

**Contents: Practical**

**PART-A**

**Name of the Topics: Networking concepts - programs and tools**

1. Write a Program to create networking nodes using python.
2. Write a program to create networking nodes degree using python.
3. Write a program to create edges using python.
4. Write a program to average birth first search using python.
5. Write a program to perform the port scanning using Nmap software
6. Write a program to monitoring TCP/IP connection using currports tools.
7. Write a program to create simple key logger using python.

**PART-B**

**Name of the Topics: Ethical hacking and Encounter Techniques**

8. Write a program to investigate a particular website details by using who.is software
9. Write a program to encrypt and decrypt password using crypt tool software
10. Write a program to perform the commands for the website analysis in command prompt ping, ifconfig, netstat
11. Write a program to capture network traffic and analysis using wireshark software
12. Write a program to perform SQL injection attack using the XAMPP software
13. Write a program to exploit to attack the host and add the exploit to victims PC using metasploit software
14. Write a program to tamper data add-on for website using firefox

**BOARD EXAMINATION**

**DETAILED ALLOCATION OF MARKS**

<b>SCHEME OF VALUATION</b>	
Write any one program from PART-A	20 Marks
Write any one program from PART-B	25 Marks
Executing program (PART-A)	20 Marks
Executing program (PART-B)	20 Marks
Result with print out(PART-A)	5 Marks
Result with print out(PART-B)	5 Marks
VIVA-VOCE	5 Marks
TOTAL	100 Marks

**Board Examination-Question Paper Pattern**

**MODEL QUESTION PAPER**

Answer the following

**PART A**  
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1. Write a program to perform the port scanning using Nmap software

**PART B**

2. Write a program to perform SQL injection attack using the XAMPP software

**LIST OF EQUIPMENTS**

**Hardware Requirements**

Desktop Computer - 30Nos.

Printer - 1 No.

**Software Requirement:**

Python

Crypt tool

Wireshark

XAMPP

Metasploit

Nmap

Firefox browser

[binils app on Google Play Store](#)



# DIRECTORATE OF TECHNICAL EDUCATION

## DIPLOMA IN INFORMATION TECHNOLOGY

### III YEAR

#### N – SCHEME

#### VI SEMESTER

2020 - 2021 onwards  
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**4052652 – ELECTIVE PRACTICAL II  
MULTIMEDIA SYSTEMS PRACTICAL**

*CURRICULUM DEVELOPMENT CENTRE*

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU  
DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS  
N-SCHEME

(Implemented from the Academic year 2020 - 2021 onwards)

Course Name : 1046 Diploma in Information Technology  
Subject Code : 4052652  
Semester : VI  
Subject Title : Elective Practical II Multimedia Systems Practical

**TEACHING AND SCHEME OF EXAMINATION**

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
Multimedia Systems Practical	4 Hrs	64 Hrs	25	100*	100	3 Hrs.

\* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

**RATIONALE:**

The competencies which form the basis for this practical enable students to develop skills with interactive visual and auditory technology. This lab prepares students to use digital multimedia for communication, creativity, collaboration, critical thinking. This practical is to bring awareness to the students regarding the numerous resources available in the area of multimedia. Students will become a skilled and creative user of current multimedia technology with an increased understanding of multimedia concepts and techniques

## OBJECTIVES:

After the completion of this lab students will be able to

- Create Audio / Video hardware & software applications.
- Record & edit digital audio using sound editing software.
- Learn about video editing.
- Apply various filters & Compression techniques in Multimedia Applications.
- Learn photo editing software.
- Learn about 2D, 3D and cloud animation.
- Learn about chroma key technique.

## DETAILED SYLLABUS

### Contents: Practical

1. Use a audio processing software and perform the audio editing tasks – Import audio, select and edit the sound, create fade-in and fade-out effects, label audio segments, use noise remove filter, mix multiple sound sources, change stereo to mono tracks, export audio to different format and save.
2. Use a video processing software to perform – Trim video clips, rotate video, merge video, split video, add titles, add special effects and edit video dimensions, bit rate, frame rate, sample rate, channel.
3. Create a movie from video clips to demonstrate – Audio-Video mixing, add music, video effects, video transition and titles.
4. Use suitable software and perform a) compress / decompress audio / video files. b) Convert audio/video to different format.
5. Use a scanner to create two or more partial scanned images of large poster/photo. Create a panoramic view of multiple photos by stitching together them using any panorama software.
6. Develop a web page which shows animation with sound effect using any professional HTML editor.
7. Convert the given image into pencil sketch using suitable photo editing software.
8. Design a certificate for sports day with different text effects using suitable software.

9. Import any two pictures, Morph, Merge and Overlap those two pictures.
10. Draw the raindrop that falls on the ground. Show the splash effect and sound effect using suitable software.
11. Create a moving cloud animation using any animation software.
12. Create a 2D animation using motion guide layer and masking.
13. Create a 2D animation of an aeroplane take off using suitable software.
14. Design a metallic text using 3D animation tool
15. Import an image with green screen background. Change the background of the imported image with required image using chroma key technique.

### **BOARD EXAMINATION**

#### **DETAILED ALLOCATION OF MARKS**

Procedure / Program	45 Marks
Execution	40 Marks
Result with printout	10 Marks
VIVA – VOCE	5 Marks
TOTAL	100 Marks

#### **LIST OF HARDWARE SUGGESTED**

- I Desktop PCs with i3 or High end processor, 200 GB HDD, 4 MB RAM – 36 Nos
- II Laser Printer Monochrome, Color – 1 Each
- III Digital (Video) Camera - 2 No.
- IV Flat bed A4 size Scanner - 1 No.

#### **LIST OF SOFTWARE SUGGESTED**

Operating system: Windows 7, Windows 10, Linux

Software tools: Open Source Software or Commercial Software.

The following is the suggestive list of open source software and their commercial replacement. Experiments may be done using either open source software or commercial software.

#### **3D Graphics and Animation**

1. Art of Illusion Replaces: AutoDesk Maya

[binils app on Google Play Store](#)

2. Blender Replaces: AutoDesk Maya

### **Audio Players**

3. aTunes, Audacious, Clementine are Replaces: iTunes

4. CoolPlayer, MPH-HC Replaces: Windows Media Player

5. Zing Replaces: Windows Media Player

### **Audio Recorders and Editors**

6. Audacity Replaces: Sonar X1, Sony ACID, Adobe Audition

7. Frinika Replaces: Sonar X1, Sony ACID

### **Audio Ripping and Conversion**

8. fre:ac, BonkEnc Exact Audio Copy, Audio Converter Studio

9. CUEripper, CDex Exact Audio Copy

10. MMConvert Exact Audio Copy

### **Multimedia Players**

11. VLC Media Player Replaces: Windows Media Player

12. Mplayer Replaces: Windows Media Player

13. KODI Replaces: Windows Media Player

14. MediaPortal Replaces: Windows Media Player

### **Video Editing**

15. Cinelerra Replaces: Adobe Premiere

16. OpenShot Video Editor Replaces: Adobe Premiere Pro CS5

17. Avidemux Replaces: Adobe Premiere

18. Kdenlive Replaces: Adobe Premiere Pro CS5

19. CineFX Replaces: Adobe Premiere Pro CS5



### **Video File Conversion**

- 20. DVDx Replaces: Movavi Video Converter, Zamzar
- 21. DVD Flick Replaces: Movavi Video Converter, Zamzar
- 22. FFDSHOW Replaces: Movavi Video Converter, Zamzar

### **Video Player**

- 23. Miro Replaces: Windows Media Player

### **CD / DVD Burners**

- 24 Infrared Recorder
- 25 CDRDAO

### **DVD Authoring**

- 26. DVD Flick, DVDStyler, Bombono DVD

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# DIRECTORATE OF TECHNICAL EDUCATION

## DIPLOMA IN INFORMATION TECHNOLOGY

### III YEAR

#### N – SCHEME

#### VI SEMESTER

2020 - 2021 onwards  
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**4052653 – ELECTIVE PRACTICAL II  
DATA SCIENCE AND BIG DATA PRACTICAL**

*CURRICULUM DEVELOPMENT CENTRE*

**DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS  
 N-SCHEME**

**(Implemented from the Academic year 2020 - 2021 onwards)**

Course Name : 1046 Diploma in Information Technology  
 Subject Code : 4052653  
 Semester : VI  
 Subject Title : Elective Practical II Data Science and Big Data Practical

**TEACHING AND SCHEME OF EXAMINATION**

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
Data Science and BigData Practical	4	64	25	75	100	3 Hrs.

**RATIONALE:**

The data science process is about analyzing, visualizing, extracting, managing and storing data. It enables companies to efficiently understand large volume of data from multiple sources and derive valuable insights to make smarter data-driven decisions. Data Science is widely used in various industry domains, including marketing, healthcare, finance, banking, policy work, and more. This practical subject helps students understand how they can use Python NumPy, Pandas and Matplotlib to critically examine a dataset with summary statistics and graphs, and extract meaningful insights. Also, the data analysis using Microsoft Excel has been included to familiarize some advanced features like data analysis. Microsoft Excel has been chosen as the software to start with in this subject because many of our students are already be familiar with Excel, so very little

further time will be required for them to learn to apply Excel for Data Processing. Processing unstructured data in the form of text files is also introduced. Basic statistics and data visualization techniques have been introduced as simple exercises.

**OBJECTIVES:**

On Completion of the exercises in this practical subject, the students will be able to

- Install the required packages to set up a data science coding environment
- Load different types of data into a Python Environment.
- Use basic operation with NumPy and Pandas libraries to prepare data
- Preprocess the data by handling missing data, duplicate values
- Aggregate the data
- Create data subsets
- Perform data cleaning operations
- Develop a single dataset by merging various datasets together
- Examine statistical summaries
- Use Matplotlib to create data visualizations
- Find the relationship between the data attributes
- Measure the basic statistical properties of the data
- Fit a regression model and understand the predictive capabilities of the models.
- Understand the basic text processing concepts.

**LAB EXERCISES**

Contents: Practical

1.	<p>Load the data about the exam fee paid by the students of all branches of your college. Perform the following operations on it using Excel.</p> <ol style="list-style-type: none"><li>Arrange the data branch wise within the branch and arrange register numbers. Replace all names with CAPITAL.</li><li>Count the number of students in each branch and semester</li><li>Calculate the total fee paid by students of each branch.</li><li>Find the minimum and the maximum fee paid by the student.</li><li>Find the sum, average, max, min of fee paid in each branch</li></ol>
2.	<p>Load the data collected from all students during online answer paper submission with the following details for each exam. Regno, name, course_code, subject_code, semester, number_of_pages(nop), mode_of_dispatch, email_id, mobile_number.</p> <p>Perform the following operations using Excel.</p> <ol style="list-style-type: none"><li>Check the file for any missing data in the columns.</li><li>Count the number of students appeared for the exam.</li><li>Count the number of papers (subjects) submitted by each student (Using register number)</li><li>Create a new column by concatenating register number and the subject code. Using this column, perform the vlookup function to find the number of pages (nop) written by the students in that subject, and the mode of dispatch.</li><li>Count the number of students appeared (submitted) for each subject.</li><li>Count the number of different (unique) subject_codes that have been submitted.</li></ol>
3.	<p>Read the dataset from the Auto-MPG repository and perform the descriptive statistics on the data using Excel-Data Analysis. Verify the same using the statistical functions of Excel.</p>
4.	<p>Read the dataset from the Auto-MPG repository and</p> <ol style="list-style-type: none"><li>Identify the relationship between the variables using correlation.</li><li>Identify the independent and the dependent variables.</li><li>Perform the linear regression on the related variables and find the</li></ol>

	<p>regression equation.</p> <p>d. Estimate the performance of the regression model.</p>
5.	<p>Load any external csv data file and store it in a Pandas DataFrame.</p> <p>a. Check the shape and column types of the DataFrame (rows and columns). [Note: Use df.info () and df.shape()]</p> <p>b. Subset the data column by names, by index, by range.</p> <p>c. Subset data based on index label, row index, multiple rows.</p> <p>d. Subset based on rows and columns</p>
6.	<p>DESCRIPTIVE STATISTICS using Python-Pandas</p> <p>a. Write a Python script to find basic descriptive statistics on AUTO-MPG dataset.</p> <p>b. Find the values of the descriptive statistics.</p> <p>c. Determine the measures of a central location, such as mean, markers such as quartiles or percentiles, and measures of variability or spread, such as the standard deviation.</p>
7.	<p>READING AND WRITING DIFFERENT TYPES OF DATASETS</p> <p>a. Reading different types of data sets (.txt, .csv) from Web and disk and writing in file in specific disk location.</p> <p>b. Reading Excel data sheet using Pandas</p> <p>c. Export the values from the DataFrame to several other formats.</p>
8.	<p>DATA VISUALIZATION</p> <p>a. Load the Auto-MPG dataset from csv file into pandas.</p> <p>b. Analyze the Behavior of the Number of Cylinders and Horsepower Using a Boxplot</p> <p>c. Find the relationship between horsepower and weight using the scatter plot using the data from Auto-MPG:</p> <p>d. Find the outliers using plot.</p> <p>e. Plot the histogram, bar chart and pie chart on sample data.</p>
9.	<p>COVARIANCE and CORRELATION</p> <p>a. Find the correlation and covariance between two variables.</p> <p>b. Plot the correlation plot on the dataset and visualize giving an overview of relationships among data.</p>

	<p>c. Fit a simple linear regression model using libraries such as Numpy or Scikit-learn. ( <code>importLinearRegression from sklearn.linear_model</code>)</p> <ul style="list-style-type: none"> <li>• Import the packages and classes you need.</li> <li>• Provide data for independent and dependent variables.</li> <li>• Create a regression model and fit it with existing data.</li> <li>• Check the results of model fitting to know whether the model is satisfactory.</li> </ul>
10.	<p><b>OUTLIER Detection</b></p> <p>When analyzing data collected as part of a science experiment it may be desirable to remove the most extreme values before performing other calculations. Write a function that takes a list of values and an non-negative integer, n, as its parameters.</p> <p>The function should create a new copy of the list with the n largest elements and the n smallest elements removed. Then it should return the new copy of the list as the function's only result. The order of the elements in the returned list does not have to match the order of the elements in the original list.</p>
11	<p><b>Text Processing</b></p> <p style="text-align: center; font-size: 2em; color: blue; opacity: 0.5;">www.binils.com</p> <ul style="list-style-type: none"> <li>b. Open a text file and read all the lines of the file.</li> <li>c. Tokenise (separate the words) the text.</li> <li>d. Count the total number of lines, total number of words and unique words</li> <li>e. Sort the words alphabetically.</li> <li>f. Find the most frequent and least frequent words.</li> <li>g. List the words having certain suffixes.</li> </ul> <p>Note: You can open a Tamil text file using 'UTF-16' encoding.</p>
12	<p><b>Text Processing-II</b></p> <p>Load a text file containing a list of words into aDataFrame. Apply the following functions and verify the results.</p> <p>Replace(), repeat(), count(pattern), startswith(pattern), endswith(pattern), find(pattern), findall(pattern).</p>
	<p><b>Mini Project: Develop any data science application using Python / Excel for processing your college data.</b></p>

**BOARD EXAMINATION**

**DETAILED ALLOCATION OF MARKS**

Writing answer for any one program from the list	45 Marks
Executing the program	35 Marks
Result with printout of the Program	10 Marks
Demonstration of Mini Project	5 Marks
VIVA – VOCE	5 Marks
TOTAL	100 Marks

**Hardware Requirements:**

Desktop Computers – 30 Nos

Laser printer - 1 No.

For the optimal student experience, we recommend the following hardware configuration:

- Processor: Intel Core i5 or equivalent
- Memory: 4 GB RAM
- Storage: 35 GB available space

**Software Requirements:**

You'll also need the following software installed

- OS: Windows 7 SP1 64-bit, Windows 8.1 64-bit or Windows 10 64-bit, Ubuntu Linux.
- Browser: Google Chrome/Mozilla Firefox Latest Version
- Notepad++ as IDE (this is optional, as you can practice everything using the Jupyter Notebook on your browser)
- Python 3.4+ (latest is Python 3.9) installed (from <https://python.org>)
- Python libraries as needed (NumPy, Pandas, Matplotlib and so on)
- Microsoft Excel



Install Anaconda by following the instructions at this link: <https://www.anaconda.com/distribution/>

Data Source: Students may use the following data sources from their department

Online examination answer paper uploaded details.

Data about the alumni of your college

Your college result details.

Data collected from students like students' profile, resume etc.

Some other online resources for testing

<https://archive.ics.uci.edu/ml/machine-learning-databases/auto-mpg/>

<https://archive.ics.uci.edu/ml/machine-learning-databases/iris/iris.data>

<https://www.kaggle.com/rohankayan/years-of-experience-and-salary-dataset>

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# DIRECTORATE OF TECHNICAL EDUCATION

## DIPLOMA IN INFORMATION TECHNOLOGY

### III YEAR

#### N – SCHEME

#### VI SEMESTER

2020 - 2021 onwards  
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**4052660 – PROJECT WORK AND INTERNSHIP**

*CURRICULUM DEVELOPMENT CENTRE*

**STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU.**

**DIPLOMA IN ENGINEERING/TECHNOLOGY SYLLABUS**

**N - SCHEME**

**(Implemented from the Academic year 2020-2021 onwards)**

Course Name : 1046 Diploma in Computer Engineering

Subject Code : 4052660

Semester : VI

Subject Title : Project Work and Internship

### TEACHING & SCHEME OF EXAMINATION

No. of weeks per semester: 16Weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
Project Work and Internship	6	96	25	100*	100	3Hrs

\*Examinations will be conducted for 100marks and it will be reduced to 75 marks.

#### RATIONALE:

Project Work aims at developing innovative skills in the students whereby they apply the knowledge and skills gained through the course by undertaking a project. The individual students have different aptitudes and strengths. Project work, therefore, should match the strengths of students. The primary emphasis of the project work is to understand and gain the knowledge of the principles of software engineering practices, so as to participate and manage a large software engineering projects in future

#### OBJECTIVES:

- Implement the theoretical and practical knowledge gained through the curriculum into an application suitable for a real practical working environment preferably in an industrial environment.
- Develop software packages or applications to implement the actual needs of the community.

- Get exposure on industrial environment and its work ethics.
- Learn and understand the gap between the technological knowledge acquired through curriculum and the actual industrial need and to compensate it by acquiring additional knowledge as required
- Carry out cooperative learning through synchronous guided discussions within the class in key dates, asynchronous document sharing and discussions, as well as to prepare collaborative edition of the final project report.
- Expose students to the field of computing and to gain experience in software design.
- Understand and gain knowledge about disaster management.

### **GUIDELINES FOR PROJECT FORMULATION**

The project work constitutes a major component in most of the professional programmers and it is to be carried out with due care and should be executed with seriousness by the candidates. Batch Size : Maximum 6 students per batch

### **TYPE OF PROJECT**

As majority of the students are expected to work out a real life project in some industry / research and development laboratories / educational institutions / software companies, it is suggested that the project is to be chosen which should have some direct relevance in day-to-day activities of the candidates in his/her institution. Students are encouraged to work in the areas listed at the end. However, it is not mandatory for a student to work on a real life project. The student can formulate a project problem with the help of Guide.

### **PROJECT PROPOSAL (SYNOPSIS)**

The students of all the Diploma Courses have to do a Project Work as part of the Curriculum and in partial fulfillment for the award of Diploma by the State Board of Technical Education and Training, Tamil Nadu. In order to encourage students to do worthwhile and innovative projects, every year prizes are awarded for the best three projects i.e. institution wise, region wise and state wise. **The Project work must be reviewed twice in the same semester. The project work is approved during the V semester by the properly constituted committee with guidelines.**

The project proposal should clearly state the project objectives and the environment of the proposed project to be undertaken. The project work should compulsorily include the software development. The project proposal should contain complete details in the following form:

1. Title of the Project.
2. Introduction and Objectives of the Project.
3. Project Category (DBMS / OOPS /Networking / Multimedia / Artificial Intelligence / xpert Systems etc.).
4. Tools / Platform, Hardware and Software Requirement specifications.
5. Analysis (DFDs at least up to second level , ER Diagrams/ Class Diagrams / Database Design etc. as per the project requirements).
6. A complete structure which includes: Number of modules and their description to provide an estimation of the student's effort onVthe project. Data Structures as per the project requirements for all the modules.
  - Process logic of each module.
  - Testing process to be used.
  - Reports generation (Mention tentative content of report).
7. Are you doing this project for any Industry/Client? Mention Yes/No. If Yes, Mention the Name and Address of the Industry or Client.
8. Future scope and further enhancement of the project. Also mention limitation of the project.

#### **SUGGESTIVE AREAS OF PROJECT WORK:**

- Database Management Systems
- Software Engineering and Software Development
- Web page Designing
- Digital Image Processing
- Computer Graphics and Animation
- Multimedia Systems
- Computer Networks
- Artificial Intelligence
- Internet and e-commerce
- Computer Security and Cryptography
- Computer hardware and embedded systems

