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		**ELECTIVE – I - THEORY**			
	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		**ELECTIVE – I - PRACTICAL**			
	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
	TOTAL		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		**ELECTIVE – II - THEORY**			
	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		**ELECTIVE – II - PRACTICAL**			
	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
	TOTAL				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		**Elective Theory-I**					
	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		**Elective Practical-I**					
	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	Duration
			Internal	External *	Total	For pass	
1	4052610	Computer Hardware and Servicing	25	100	100	40	3
2	4046620	Software Testing	25	100	100	40	3
3		**Elective Theory-II**					
	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		**Elective Practical - II**					
	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 INFORMATION TECHNOLOGY
Subject Code : 4046510
Semester : V
Subject Title : SYSTEM ADMINISTRATION AND NETWORK SERVICES

TEACHING AND SCHEME OF EXAMINATION

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
			Marks			Duration
	Hours / Week	Hours / Semester	Internal Assessment	Board Examinations	Total	
SYSTEM ADMINISTRATION AND NETWORK SERVICES	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	Topic	Hrs.
I	INTRODUCTION	19
II	FILE SYSTEM, ACCOUNT AND MEMORY MANAGEMENT	18
III	WINDOWS ADMINISTRATION	18
IV	LINUX/UNIX ADMINISTRATION	17
V	NETWORKING AND PERFORMANCE MONITORING	17
Test & Model Exam		7
Total		**96**

RATIONALE

The main objective of the subject is to enable the students to understand the concept of System Administration and importance of managing IT assets. This subject will impart basic knowledge about the two major operating systems used in the industry, preparing the PC hardware with operating systems from scratch with the newly available capabilities. It also helps the students to understand the concept of networking of computers, sharing of resources across the network and user management. This subject also prepares the student to get it certified in the industry to perform the role in System Administration related tasks.

OBJECTIVES:

On completion subject, the students must be able to

- Understand the importance of System Administration
- To know the role of workstation, servers, file system, disk administration in Windows, Linux
- Understand the Windows/Linux processes, schedulers
- Prepare the hardware to work with Windows Client, Server Operating Systems and Linux
- Understand the hardware virtualization and virtual machines
- To know about the Active Directory, Domain Controller and User management
- To know networking of computers and configuration of Exchange Server
- Understand the importance of Firewalls, Security Management
- To know about different tools in Windows/Linux for system administration
- Understand the performance monitoring

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topics	Hours
I	**INTRODUCTION** **1.1 Introduction:** System Administration - Importance of System Administration Life Cycle – Role of System Administrator – Workstation – Server – Services – Data center **1.2 Windows Operating Systems :** History – Architecture -Client OS Flavours & Features – Server OS Flavours & Features **1.3 Linux/Unix Operating Systems:** Linux / Unix History – Architecture - Distributions – Kernel **1.4 Virtualization:** concept behind the Virtualization - Types of Virtualization: Hardware Virtualization - operating system Virtualization - Server Virtualization - Storage Virtualization. - Virtualization Benefits - Virtualization Security Hardware Virtualization Technology – Windows Hyper Visors (HyperV) - How to Use Hyper-V Virtualization Technology - Virtualization Tools	7 3 3 6
II	**FILE SYSTEM, ACCOUNT AND MEMORY MANAGEMENT** **2.1 File System:** Windows File and Directory Layout – NTFS – FAT - Disk Partitions – Defragmentation – Registry - Linux File and Directory Layout – EXT4– FreeBSD – EXT3 – VFAT – Disk Partitions **2.2 Account Management:** User management in Windows- creating and managing local users and groups – User and group management in Linux - related commands - superuser - relevant files **2.3 Memory:** Windows Memory Architecture, memory management – Linux Memory Architecture, management	7 5 6

III	**WINDOWS ADMINISTRATION** **3.1 Introduction:** Windows boot process – computer management – disk management – system process – process identifier - user mode process – kernel mode process - managing start-up process **3.2 Windows Services:** Active Directory – Domain – Tree – Forests - Groups – Objects – Task Scheduler **3.3 Windows Performance:** Understanding Physical and Virtual memory – Paging File – Task Manager - Performance Monitor – Resource Monitor **3.4 Windows Security:** Windows Defender – Firewall – Firewall Inbound/Outbound rules – Group Policy – Windows Services **3.5 Maintenance:** WSUS (Windows Server Update Service) – Windows Backup & Recovery mechanisms – Windows Error Reporting (WER)	3 4 4 3 4
IV	**LINUX/UNIX ADMINISTRATION** **4.1 Introduction:** Boot process overview – Daemons – Boot Loaders GRUB – systemd – start-up scripts – process life cycle – process monitoring **4.2:Access Control:** Introduction – File system access control – process ownership – management of root account – user management - ACL- types **4.3 Software Management:** Package management tools – rpm – dpkg – apt - yum	6 5 6
V	**NETWORK SERVICES** **5.1 Introduction:** Network Service - common services - Domain Name System - Dynamic Host Configuration - Authentication servers -Directory services - e-Mail - File sharing - Instant messaging - Online game - Printing - File server - Voice over IP - Video on demand - Video telephony - World Wide Web -	8

	Simple Network Management - Time service - Wireless sensor network **5.2 Protocols Used:** TCP/IP, Ipv4, Ipv6 address format – MAC address – LAN - WAN- DHCP – ICMP – SMTP – POP3 – DNS -SNMP **5.3 Networking requisites and tools:** Pre-requisites to connect the computers to access the shared resources – exchange server configuration - network monitoring tools. (wireshark)	5 4

Reference Books

1. "Thomas A. Limoncelli, Christina J.Hogan, Strata R.Chalup", "The practice of System and Network Administration", Addison Wesley (2nd Edition).

2. "Evi Nemeth, Garth Snyder, Trent R.Hein, Ben Whaley, Dan Mackin", "Unix and Linux System Administration Handbook", Addison Wesley Inc.

3. "Windows Server Administration Fundamentals" from Microsoft

4. www.microsoft.com

5. wikipedia

DIRECTORATE OF TECHNICAL EDUCATION

DIPLOMA IN INFORMATION TECHNOLOGY

III YEAR

N – SCHEME

V SEMESTER

2020 - 2021 onwards

4052510 – PYTHON PROGRAMMING

CURRICULUM DEVELOPMENT CENTRE

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU.

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N - SCHEME

(To be implemented to the Students admitted from the Year 2020-2021 on wards)

Course Name : **1046** Diploma in Information Technology
Subject Code : 4052510
Semester : V
Subject title : PYTHON PROGRAMMING

TEACHING & SCHEME OF EXAMINATION

No. of weeks per Semester: 16 Weeks

Subject	Instructions		Examination			Duration
	Hours/ Week	Hours / semester	Internal Assessment	Board Examination	Total	
PYTHON PROGRAMMING	5	80	25	100*	100	3

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

Topics and Allocation of Hours

Unit	Topic	Hours
I	INTRODUCTION	14
II	CONTROL STRUCTURE AND FUNCTIONS	15
III	STRINGS AND LISTS	14
IV	TUPLE, SET,DICTONARIES	15
V	FILES AND EXCEPTION HANDLING	15
TEST & MODEL EXAM		7
TOTAL		80

RATIONALE:

To introduce the student to the basic features of industry standard programming language and impart skills to develop industry standard solutions to the problems. The python language is one of the most accessible programming languages available because it has simplified syntax and not complicated, which gives more emphasis on natural language. Due to its ease of learning and usage, python codes can be easily written and executed much faster than other programming languages. Python has several modules to write programs to solve Artificial Intelligence, Machine Learning, Data Analysis problems. Python is a cross-platform language used by many leading organizations such as Google and NASA.

OBJECTIVES:

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

- To read and write simple Python programs.
- To develop Python programs with conditionals and loops
- To define Strings in Python and operations on String.
- To define Python functions and call them.
- To Decompose a Python program into functions.
- To Represent compound data using Python lists, tuples, dictionaries.
- To use Python data structures –- lists, tuples, dictionaries.
- To do input/output with files in Python.
- To do exception handling in Python

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DETAILED SYLLABUS

Content: Theory

Unit	Name of the Topics	Hours
I	**INTRODUCTION TO PYTHON** **1.1 Features of Python:** Installing and running Python - interpreter and Interactive mode - Identifiers - Reserved Keywords - Variables - Comments in Python **1.2 Data Types:** Numeric, String, List, Sets, Tuple, Dictionary, Boolean; Operators – Arithmetic, Relational, Assignment, Logical, Bitwise, Membership operator, identity operator. **1.3 Statements and Expressions:** String Operations; Boolean Expressions, Data Type Conversion, Type coercion; Input from keyboard - input function, raw_input function, Mutable and immutable Objects; Illustrative programs.	4 4 5
II	**DECISION MAKING, CONTROL STRUCTURE AND FUNCTIONS** **2.1 Decision Making:** Simple if, if…else and if … elif statement; Control Statement - for loop, range(), while, break , continue, pass **2.2 Functions:** Built in functions-Mathematical functions, Date and Time, dir(), help() Functions; User defined functions-Return values, parameters and arguments, function calls, local and global scope, function composition, recursion, anonymous functions. **2.3 Writing Scripts in Python:** Illustrative programs.	5 5 5
III	**STRINGS AND LISTS** **3.1 Strings in python:** String functions and methods, string slicing, immutable property, string Traversal, Escape Characters, string formatting operators and functions.	5

	3.2 Lists: Creation of List, values and accessing elements, mutable property, Traversing a List, copying the list, altering values, deleting elements from list. **3.3 Built-in List operators and built-in methods:** Illustrative Programs	5 4
IV	**TUPLES AND DICTIONARIES** **4.1 Tuples:** creating, accessing values, immutable property, assignment of tuples, returning tuples, tuples as arguments - variable length arguments - basic tuple operations, Built-in tuple functions. **4.2 Dictionaries:** Creating a Dictionary, accessing values, updating dictionary, deleting elements from dictionary; dictionary keys - Properties, operations in Dictionary, Built-in dictionary methods.- Illustrative Programs	8 7
V	**FILES AND EXCEPTIONHANDLING** **5.1 File Handling:** Text files, opening a file, closing a file, reading from a file and writing into a file, file opening modes, closing a file, File Object Attributes, File positions, renaming, deleting a file and files related methods. **5.2 Directory methods:** mkdir(), chdir(), getcwd(), rmdir(). **5.3 Exceptions in Python:** Definition - Built-in exceptions, Handling Exceptions-try…except, except with No Exception, except with Multiple Exceptions, try…finally; User defined exceptions. - Illustrative programs	7 2 6

REFERENCES

S.No	Title	Author	Publisher	Year of Publishing I Edition
1	Introduction to Computing and Problem Solving using Python	E.Balagurusamy	McGraw Hill Education(India) Pvt. Ltd.	1st Edition / 2016
2.	Learning Python Programming	Jeffrey Elkner, Allan B. Downey, Chris Meyers	Samurai Media Limited.	2016
3.	Taming Python By Programming	Jeeva Jose	Khanna Book Publishing Co(P) Ltd	2017 Reprinted 2019
4.	Python Programming	Ashok Namdev Kamthane and Amit Ashok Kamthane	McGraw HillEducation(India) Pvt. Ltd.	2018
5.	Learn and Practice Python programming	Swapnil Saurav	Eka Publishers	2nd Edition/ 2020
6.	Programming in Python	Dr.Pooja Sharma	BPB Publications	2017

Python Online Learning Resources:

https://www.learnpython.org

www.python.org ,

https://www.tutorialspoint.com/python

DIRECTORATE OF TECHNICAL EDUCATION

DIPLOMA IN INFORMATION TECHNOLOGY

III YEAR

N – SCHEME

V SEMESTER

2020 - 2021 onwards

4052531 – ELECTIVE THEORY I
COMPONENT BASED TECHNOLOGY

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 : 4052531

Semester : V

Subject Title : **Elective Theory – I** COMPONENT BASED TECHNOLOGY

TEACHING AND SCHEME OF EXAMINATION

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
			Marks			Duration
	Hours / Week	Hours / Semester	Internal Assessment	Board Examinations	Total	
COMPONENT BASED TECHNOLOGY	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	INTRODUCTION TO .NET FRAMEWORK AND C#.NET	15
II	APPLICATION DEVELOPMENT USING C#.NET	15
III	APPLICATION DEVELOPMENT USING ADO.NET	15
IV	INTRODUCTION TO ASP.NET	14
V	XML	14
Test & Model Exam		7
Total		80

RATIONALE:

.NET Framework is changing the way developers write applications. .NET Framework provides a number of components to create many types of applications including those for consoles, Windows, mobile units and the web. Using .NET framework the data can be made available anytime, anywhere and on any device.

This subject introduces the basics of .NET Framework. Writing applications on C#.Net is covered in this course. Concepts of developing Window applications using C#.NET. Concepts of developing web applications using ASP.NET are discussed. This course helps to use ADO.NET to write the applications to connect with the back end database. The subject also enables the users to know the concepts of XML and the XML web services.

OBJECTIVES:

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

- List the major elements of the .NET Framework and describe some of the major enhancements to the new version of C#.
- Describe the basic structure of a C#.NET project and use the main features of the integrated development environment (IDE).
- Use the new language features and syntax in C# .NET.
- Explain the basic concepts and terminology of object-oriented design specifically for C#.NET.
- Use the basic concepts and terminology of object-oriented programming in C# .NET.
- Create applications by using Microsoft Windows Forms.
- Create applications that use ADO.NET.
- List down the features of ASP.NET.
- Create web controls using ASP.NET.
- Learn about server controls and events in ASP.NET.
- Set up and deploy various types of C# .NET-based applications.
- Develop Window applications using XML as back end database

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topics	Hours
I	**INTRODUCTION TO .NET FRAMEWORK and C#.NET**	
	1.1 Introduction to .NET framework: Features of .NET framework, Dot Net Architecture – Managed Code and the CLR – Intermediate Language, Metadata and JIT Compilation–Automatic Memory Management. – Assembly, .NET objects, .NET web services	3
	1.2 Visual Studio .NET: Features, Using the .NET Framework, Exploring the Visual Studio Integrated Development Environment – System requirements – Versions	3
	1.3 Introduction to C#.NET: Variables and constants – data types – declaration. Operators – types – precedence – Expressions – Program flow – Decision statements – if .. then, if..then..else, switch..case, Loop statements – while, do...while, for..next, for..each..next.	4
	1.4 Types: Value data types – Structures, Enumerations. Reference data types – Single dimensional– Multi-dimensional arrays–Jagged arrays– Dynamic arrays	3
	1.5 Classes & objects: Creating and using your own classes – Data members and member methods – Instantiate an object	2
II	**APPLICATION DEVELOPMENT USING C#.NET**	
	2.1 Windows programming: Creating windows Forms–Working with Toolbox Controls– Button, Check Box, Combo Box, Label, List Box, Radio Button, Text Box, Group Boxes, Picture Box	4
	2.2 Advanced Controls & Events: Timer , Progress Bar, Month Calendar , ToolTips, Tab Controls, Panels -Events–Click, Close, Deactivate, Load, MouseMove,	3

	MouseDown, MouseUp, Keypress ,KeyDown, KeyUp. **2.3: Multiple Document Interface (MDI) Forms:** Creating MDI Applications – Creating MDI Child Windows – Arranging MDI Child Windows **2.4 Menus and Dialog Boxes:** Creating menus – Menu items – Creating Submenus , Menu Shortcuts, Context menu – Using dialog boxes – show Dialog() method.	4 4
III	**APPLICATION DEVELOPMENT USING ADO.NET** **3.1 Features of ADO.NET:** Architecture of ADO.NET – ADO.NET providers – Connection – Command – Data Adapter – Dataset. **3.2 Accessing Data with ADO.NET:** Connecting to Data Source, Accessing Data with Data set and Data Reader – Modifying Table data using Command Objects – Understanding Data Set and working with Data Column and DataRow – Data Tables - Working with Data GridView **3.3 Create an ADO.NET application:** Using Stored Procedures	5 5 5
IV	**INTRODUCTION TO ASP.NET** **4.1 ASP.NET Features:** Change the Home Directory in IIS – Add a Virtual Directory in IIS Set a Default Document for IIS – Change Log File Properties for IIS – Stop, Start, or Pause a Web Site – Global. asax file **4.2 Creating Web Controls:** Web Controls – HTML Controls, Using Intrinsic Controls, Using Input Validation Controls, Selecting Controls for Applications – Adding web controls to a Page. **4.3 Creating Web Forms:** Server Controls – Types of Server Controls – Adding ASP.NET Code to a Page. **4.4: .NET CORE WEB API :** What's web API?, Web API features, Restful services, Method of REST	4 4 3 **3**

V	**XML** **5.1 Introduction:** Advantages – HTML Vs XML – Browsing and parsing XML – Creating a XML file – Data island – Well formed XML document – XML components: elements – Entities – Comments – Processing instructions – Attributes **5.2 DTD:** Declarations in DTD: Element, Attribute, Entity and Notation – Construction of an XML document – XML Namespaces – Declaring namespaces – Default namespaces – XML schema – Need and use of Schema – Building blocks – Simple elements – Defining attributes – Complex elements **5.3 XML with .NET:** XML Serialization in the .NET Framework – SOAP Fundamentals- Using SOAP with the .NET Framework.	5 5 4

Reference Books

S.No	Author Name	Title	Publisher
1.	Douglas J. Reilly	Designing Microsoft ASP.NET Applications	Microsoft Press
2.	ISRD Group	Applicationsof.NET Technology	TMGH Education PvtLtd.,New Delhi
3.	E. Balagurusamy	Programming In C#, 3E	Tata McGraw-Hill Education,
3.	Rebecca M. Riordan	ADO NET 2 0 Step by Step	Microsoft Press
5.	David S. Platt	Introducing Microsoft .NET	Microsoft Press
6.	-	Introduction to Microsoft ASP.NET - Work Book	Microsoft Press

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DIRECTORATE OF TECHNICAL EDUCATION

DIPLOMA IN INFORMATION TECHNOLOGY

III YEAR

N – SCHEME

V SEMESTER

2020 - 2021 onwards

4052532 – ELECTIVE THEORY I
ARTIFICIAL INTELLIGENCE AND DATA ANALYTICS

CURRICULUM DEVELOPMENT CENTRE

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU.

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N - SCHEME

(to be implemented to the student Admitted from the Year 2020-2021 onwards)

Course Name : 1046 Diploma in Information Technology

Subject Code : 4052532

Semester : V

Subject title : **Elective Theory I** Artificial Intelligence and Data Analytics

TEACHING & SCHEME OF EXAMINATION

No. of weeks per Semester 16 Weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Board Examinations	Total	
AI and Data Analytics	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 No.	Topic	No. of Hours
I	Artificial Intelligence	15
II	Introduction to Machine Learning	14
III	Data Analytics and NumPy Library	15
IV	Data Analysis with Pandas	15
V	Visualization with Matplotlib	14
Test and Revision		7
Total		80

RATIONALE:

This course provides the foundations for AI problem solving techniques and data analytics and articulates the different dimensions of these areas. The syllabus is designed to provide exposure to the theory as well as practical systems and software used in data analysis. This course explains fundamental data science techniques and the various Python programming packages required for data science.

OBJECTIVES:

After studying this subject students will be able

- To understand the fundamentals of Artificial Intelligence and its importance.
- To understand the techniques used in AI.
- To understand how the knowledge is represented, and the characteristics of intelligent agents.
- To Identify and formulate appropriate AI methods for solving a problem.
- To understand some of the search strategies and the constraint satisfaction problems.
- To understand the principles of Machine Learning.
- To explore some of the real-world applications of Machine learning techniques.
- To understand a range of topics and concepts related to data analytics.
- To familiarize with the Python NumPy library for array processing.
- To utilize the Pandas packages in Python for exploratory data analytics.
- To create informative visualizations with matplotlib to identify patterns.

DETAILED SYLLABUS

Content: Practical

Unit	Name of the Topics	Hours
I	**ARTIFICIAL INTELLIGENCE** **1.1 Artificial Intelligence:** What is AI?-Types of AI-History of AI-Turing Test- Structure of AI-Goals of AI-Importance of AI-Techniques used in AI-Perception, Understanding and Action- Technological drivers of modern AI. **1.2 Knowledge**: Definition-Knowledge Representation-objectives and requirements-practical aspects of representation-Components **Intelligent Agents**: Agents and Environments-Properties of environments-characteristics of agents- classification of agents. **1.3 Problem Solving:** Problem Formulation-Goal Formulation-State Space Search-Search Problem-Basic search algorithm-Search Tree-Search strategies – Uninformed and informed search-Breadth First Search, Depth First Search, Best First Search- Constraint Satisfaction Problem (CSP)-Backtracking Search. Problem Definitions: N Queen Problem, 8 Puzzle Problem, Tic-Tac-Toe.	4 4 7
II	**INTRODUCTION TO MACHINE LEARNING** **2.1 Learning:** Strategies of Learning- Learning Model- Classes of Learning (Supervised, Unsupervised, Reinforcement)- Process of ML-Common types of ML algorithms. **2.2 Neural Network:** Biological and Artificial, Mathematical model of a neuron **2.3 Machine Learning Applications:** Learning Associations, Regression, Classification, Prediction-Natural Language Processing (NLP) - Automatic Speech Recognition (ASR) - Machine Vision-Robotics.	5 3 6

III	**DATA ANALYTICS AND COMPUTING WITH NumPy** **3.1 Data Analytics:** Data-Types of Data- Importance of Data- Data Analysis Vs Data Analytics-Types of Data Analytics- Elements of Analytics- Data Analysis Process- Qualitative and Quantitative analyses- Open-Source Data. **3.2 Introduction to Python:** Features of Python-Installing Python- Python IDEs- PyPI Python Package Index- Pip Python package manager- Importing Libraries and Functions- Python data structures (list, set, tuple, dict)- Functional programming (map, filter, reduce, lamda, list comprehension). **3.3 NumPy Library:** Introduction- Installation- Ndarray: creating an array, intrinsic creation of an array, Data types- basic operations- aggregate functions- Indexing, slicing, Iterating- Conditions and Boolean arrays- Array manipulation: Joining, splitting, shape changing, sorting- Structured arrays- Reading and Writing array data on a File.	4 5 6
IV	**DATA ANALYSIS WITH PANDAS** **4.1 Introduction**: Pandas data structures: **Series** - Declaration, selecting elements, assigning values, Filtering values, operations, mathematical functions, evaluating values, Handling missing data, creating series from dictionaries, adding two series. **4.2 Data Frame:** Defining, Selecting elements, assigning values, membership, deleting a column, filtering. **Index Objects**: Indexing, Re-indexing, Dropping- sorting and ranking- Descriptive Statistics **4.3 Data Loading:** Reading and Writing csv, xls, text data files- **Data Cleaning and Preparation**: Handling missing data, Removing duplicates,	5 4 6

	replacing values- Vectorized String Methods- Hierarchical Indexing- Merging and Combining- Data aggregation and Grouping.	
V	**VISUALIZATION WITH MATPLOTLIB** **5.1 Data Visualization:** Introduction to Matplotlib-PyPlot package- Figures and Subplots- showing plots and images **5.2 Customizing Plots:** Colors, Markers, Line Styles, Limits, Tics, Labels, Legends, Grids - Annotating with text-Matplotlib configuration **5.3 Chart types:** Line, Bar, stacked bar, Box plots, pie chart - Histogram and Density plots- Scatter plot- Saving Plots to a file- Close and clear plots.	4 4 6

Reference books

1. Tom Taulli - Artificial Intelligence Basics. A Non-Technical Introduction-Apress (2019)
2. Chowdhary K.R - Fundamentals of artificial intelligence-Springer (2020)
3. Stuart J.Russell,PeterNorvig- Artificial Intelligence A Modern Approach- (Prentice Hall- 2010, Edition 3)
6. NPTEL Web Content-Artificial Intelligence, Prof.P.Mitra, Prof.S.Sarkar, IIT Kharagpur(Link: https://nptel.ac.in/courses/106/105/106105078/)
7. Fabio Nelli, Python Data Analytics, APRESS, 2015
8. Wes McKinney, Python for Data Analysis: Data Wrangling with Pandas, NumPy,andIPython, O'REILLY 2018, Second Edition

DIRECTORATE OF TECHNICAL EDUCATION

DIPLOMA IN INFORMATION TECHNOLOGY

III YEAR

N – SCHEME

V SEMESTER

2020 - 2021 onwards

4046533 – ELECTIVE THEORY I
MOBILE APPLICATION DEVELOPMENT

CURRICULUM DEVELOPMENT CENTRE

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU.

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N - SCHEME

(to be implemented to the student Admitted from the Year 2020-2021 onwards)

Course Name : 1046 Diploma in Information Technology

Subject Code : 4046533

Semester : V

Subject title : **Elective Theory I** Mobile Application Development

TEACHING & SCHEME OF EXAMINATION

No. of weeks per Semester 16 Weeks

Subject	Instructions		Examination			
			Marks			Duration
	Hours / Week	Hours / Semester	Internal Assessment	Board Examinations	Total	
Mobile Application Development	6	96	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 No.	Topic	No. of Hours
I	Introduction to Mobile Computing	17
II	Mobile and Smart TV OS	18
III	Android Development Environment	18
IV	Basic and Advanced Views	18
V	Location Based Services and SQLite	18
Test and Revision		7
Total		96

RATIONALE:

Mobile Application development is the very hot business domain. Majority of the corporate have a separate division for the development of mobile applications. It is imperative that students must know the way to apply advanced data communicating methods and networking protocols for wireless and mobile devices.

Students must utilize and employ application frameworks for developing mobile applications including under disconnected and weakly connected environment. They should be in a position to select components and networks for particular application , creatively analyze mobile and wireless networks and critically analyze security issues of mobile and wireless computing systems.

OBJECTIVES:

After studying this subject students will be able

- To understand the characteristics, basic concepts and systems issues in mobile Computing
- To understand architecture and protocols in Mobile computing and to identify the trends and latest development of the technologies in the area
- To understand the network protocols governing the mobile communication
- To know the different kinds of mobile OS prevailing in the market
- To know Android OS in detail
- To know Apple iOS and Smart TV OS
- To understand the components of a Mobile App.
- To have practical experience in the area through the development of Mobile apps
- To design successful mobile computing applications and services
- To evaluate critical design tradeoffs associated with different mobile technologies, architectures, interfaces and business models and how they impact the usability, security, privacy and commercial viability of mobile and pervasive computing services and applications
- To know the development of Mobile apps using SQLite database
- To know the cross platform application development tools

DETAILED SYLLABUS

Unit	Name of the Topics	Hours
I	**INTRODUCTION TO MOBILE COMPUTING**	5
	1.1 Introduction to Mobile Computing : Evolution of Mobile Computing - Important terminologies	
	1.2 Wireless LAN and Protocols: WI-FI and WI-MAX , Bluetooth ,RFID, Wi-Fi-Direct, Li-Fi, LTE, and 6LoWPAN , VoLTE	6
	1.3 Cellular Network Generations: Features of 1G,2G ,3G ,4G ,5G	6
II	**MOBILE AND SMART TV OPERATING SYSTEM**	
	2.1 Mobile Operating Systems : Evaluation of Mobile Operating System-Handset Manufactures and their Mobile OS- Mobile OS and their features. Linux Kernel based Mobile OS	5
	2.2 Apple Mobile Operating Systems : History and features of Apple Operating Systems - iPadOS, tvOS, and watchOS	4
	2.3 Smart TV operating systems: Smart TV Operating System development History - versions and their features	4
	2.4 Android Operating System : Android Operating System development History - versions and its feature - The various Android devices on the market , The Android Market application store	5

III	**ANDROID DEVELOPMENT ENVIRONMENT** **3.1 Android Development Environment:** System Requirements, Android SDK, Installing Java, and ADT bundle - Eclipse Integrated Development Environment (IDE), Creating Android Virtual Devices (AVDs) – Android Studio **3.2 Android Architecture:** Android Architecture - The Linux Kernel, Android Runtime - Dalvik Virtual Machine, Android Runtime – Core Libraries, Dalvik VM Specific Libraries, Java Interoperability Libraries, Android Libraries, Application Framework **3.3 Creating a New Android Project:** Defining the Project Name and SDK Settings, Project Configuration Settings, Configuring the Launcher Icon **3.4 Activity:** Creating an Activity, Running the Application in the AVD, Stopping a Running Application, Modifying the Example Application, Reviewing the Layout and Resource Files.	4 4 5 5
IV	**BASIC AND ADVANCED VIEWS** **4.1 Basic Views :** Text View, Button, Image Button, EditText, CheckBox, ToggleButton, RadioButton and RadioGroup Views, ProgressBar View, Auto Complete Text View **4.2 Advanced Views :** Time Picker View and Date Picker View – List Views – Image View – Menus – Analog and Digital View – Dialog Boxes **4.3 Displaying Pictures & Menus with Views:** Image View – Gallery View – ImageSwitcher – GridView - Creating	5 5 5

	the Helper Methods – Options Menu – Context Menu **4.4 SMS and Dialer :** Sending SMS – Receiving SMS – Making phone call	3
V	**LOCATION BASED SERVICES AND SQLITE** **5.1 Location Based Services :** Obtaining the Maps API Key- Displaying the Map – Zoom Control – Navigating to a specific location – Adding Marker – Geo Coding and reverse Geo coding **5.2 Content Provider and Storage:** Sharing data – view contacts – Add contacts – Modify contacts – Delete Contacts - Store and Retire data's in Internal and External Storage – SQLite - Creating and using databases **5.3 Android Service** : Consuming Web service using HTTP , downloading binary Data – Downloading Text Content – Accessing Web Service **5.4 Cross Platform App Development :** Cross platform application development tools and their features	5 5 5 3

REFERENCE BOOK:

1. J. F. DiMarzio (Author) -Beginning Android Programming with Android Studio, 4th Edition (2016) - Wiley
2. Wei-MengLee -Beginning Android 4 Application Development,2012 - Wiley India Edition
2. Asoke K Talukder,Hasan Ahmed, Roopa R Yavagal Mobile Computing,2005 - TMGH

DIRECTORATE OF TECHNICAL EDUCATION

DIPLOMA IN INFORMATION TECHNOLOGY

III YEAR

N – SCHEME

V SEMESTER

2020 - 2021 onwards

4046540 – SYSTEM ADMINISTRATION AND NETWORK SERVICES 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 : 4046540
Semester : V
Subject Title : System Administration and Network Services Practical

TEACHING AND SCHEME OF EXAMINATION

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
			Marks			Duration
	Hours / Week	Hours / Semester	Internal Assessment	Board Examination	Total	
SYSTEM ADMINISTRATION AND NETWORK SERVICES 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 main objective of this practical course is to enable the students to prepare computer system from scratch with different operating systems (Windows and Linux). It also includes administration of computers in the domain controller and understands user management, security management and firewall policies in Windows operating system environment. It also covers preparation of computer systems using hardware virtualization technology with the help of virtualization tools.

This practical includes topics related to configuration of exchange server in Windows Server environment, backup and restore procedures, Microsoft Security, Windows Defender and Active Directory management.

OBJECTIVES:

On Completion of the following exercise, the students must be able to

- How to install operating system in the computer and connect to the server computer.
- Understand basic concepts of Active Directory Management
- Understand Firewall concepts and learn to write firewall rules.
- Learn how to configure the Exchange Server in the domain environment.
- Understand different virtualization software tools to prepare computer system using hardware virtualization technology.
- Understand the different backup and restore tools, Windows backup and restore.
- Learn how to use Windows Hyper-V and inter networking of virtualized computers and sharing of hardware resources.
- Learn how to use windows scheduler, write small system administration tasks.

DETAILED SYLLABUS

Contents: Practical

PART - A

1. Installation of Windows 10 in the Hyper Visor environment and configure the network adapter. Assign the static IP address for the computer.

   Hint : Before installing the Windows 10 in the Hyper Visor environment, ensure that Hyper V feature enabled in the system where Hyper V is hosted and VTx feature is enabled in the BIOS.

2. Installation of Windows 10 in the Virtual Box environment and configure the network adapter and enable sharing the resources (folders, usb devices etc.,) between host computer and guest computer.

Hint : Before installing Virtual Box in the host computer, ensure that Hyper V feature is disabled in the system and VT x is enabled in the BIOS.

3. Installation of any Linux distribution in the Hyper Visor environment, configure the network adapter and assign the IP address. Enable the sharing of file folders from host machine.
4. Enable the local networking of two computers.
5. Install the Server Operating System and configure the AD, DNS and connect the client computer to the server computer.
6. Install the Server Operating System and configure the AD, DNS and connect the client computer to the server computer. Create specific user in the Server computer and login from the client computer.
7. Create firewall rule in windows to disable the specific port for incoming and outgoing traffic. (e.g., block the HTTP and HTTPS port)
8. Create FTP Server in the Windows 10 computer, and retrieve the contents from FTP server via FTP protocol.

PART - B

1. Install the Server Operating System and configure the DNS and connect the client computer to the server computer. Configure the static IP in the client computer and verify.

2. Install the Server Operating System and configure the DNS and connect the client computer to the server computer. Do not Configure the static IP in the client computer and verify the client computer is assigned with automatic IP.

3. Create automatic task in windows and demonstrate the task is executed in a timely manner. [Hint : Using Windows Task Scheduler]

4. Note down, physical memory and virtual memory of the running process in Windows / Linux along with priority of the process.

5. Configure sendmail / MailEnable (free Windows email software) in the Server system and create email id. Demonstrate the email messages are reached to specific recipient.

6. Restoring the Windows Operating System to pre-defined known state after the installation of new software. [Hint: Using Windows System Restore point]

BOARD EXAMINATION

Note:

Students should write one program from **PART A** and one program from **PART B.**

DETAILED ALLOCATION OF MARKS

SCHEME OF VALUATION		
1.	Procedure writing one from PART - A	20 Marks
2.	Executing Exercise PART - A	20 Marks
3.	Result with Print out PART - A	5 Marks
4.	Procedure writing one from PART - B	25 Marks
5.	Executing Exercise PART - B	20 Marks
6.	Result with Print out PART - B	5 Marks
7.	Viva voce	5 Marks
TOTAL		**100 Marks**

LIST OF EQUIPMENTS

HARDWARE:

1. Desktop Computers - 30 Nos.
2. Server - 1 No.
3. Printer – 1 No.

SOFTWARE:

1. Windows 10 Operating System
2. Linux Operating System
3. sendmail / MailEnable (free Windows email software)

DIRECTORATE OF TECHNICAL EDUCATION

DIPLOMA IN INFORMATION TECHNOLOGY

III YEAR

N – SCHEME

V SEMESTER

2020 - 2021 onwards

4052540 – PYTHON PROGRAMMING PRACTICAL

CURRICULUM DEVELOPMENT CENTRE

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TAMILNADU

DIPLOMA IN ENGINEERING / TECHNOLOGY SYLLABUS

N – SCHEME

(to be implemented to the student Admitted from the Year 2020-2021 onwards)

Course Name : 1046 Diploma in Information Technology

Subject Code : 4052540

Semester : V

Subject : PYTHON PROGRAMMING PRACTICAL

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16week

Subject	Instructions		Examination			Duration
	Hours/ Week	Hours / semester	Internal Assessment	Board Examination	Total	
PYTHON PROGRAMMING PRACTICAL	4	64	25	100*	100	3 Hrs

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

RATIONALE:

To write, debug and run programs in Python to understand the basic concepts of industry standard modern programming language.

OBJECTIVES:

- To write, test and debug simple Python programs
- To Implement Python Programs with conditionals and Loops
- To use functions for structuring Python Programs
- To implement string manipulation functions using Python Program
- To implement List and its built-in functions and methods
- To implement Tuples and passing tuple as arguments
- To create Python Dictionaries and updating Dictionaries
- To develop programs to read and write data from or to files in Python
- To Develop programs with Exception Handling

DETAILED SYLLABUS

Contents: Practical

PART – A

1. i) Write a Python program to compute GCD of two numbers
   ii) Write a Python Program to print prime numbers in the given range.

2. i) Write a Python Program to check the given year is leap year or not.
   ii) Write a Python Program to print Armstrong numbers between given range.

3. i) Write a Python Program to do basic trim and slice operations on String.
   ii) Write a Python Program to accept line of text and find the number of characters, vowels and blank spaces on it.

4. i) Write a Python Program using function to display all such numbers which is divisible by 3 but are not multiple of 5 in a given range.
   ii) Write a Python Program using recursion to print 'n' terms in Fibonacci series.

5. Write a Python Program to add 'ing' at the end of a given string if the string has 3 or more characters . If the given string is already ends with 'ing' then add 'ly' instead. If the string has less than 3 characters, leave it unchanged.

6. Write a Python program to find minimum and maximum of a list of numbers
7. Write a Python program to display a list in reverse order.

8. Write a Python Program to print the first half values of tuple in one line and last half values in next line.

PART – B

9. Write a Python Program to take a list of words and return the length of the longest one using string.

10. Write a Python Program to find an element in a given set of elements using Linear Search

11. Write a Python Program to sort a set of elements using Selection sort.

12. Write a Python Program to multiply two matrices.

13. Write a Python program to demonstrate different operations on Tuple.

14. Write a Python Program to demonstrate to use Dictionary and related functions.

15. Write a Python Program to copy file contents from one file to another and display number of words copied.

BOARD EXAMINATION

Note:

Students should write one program from **PART A** and one program from **PART B.**

DETAILED ALLOCATION OF MARKS

SCHEME OF VALUATION		
1.	Any one program from PART - A	20 Marks
2.	Execution PART - A	20 Marks
3.	Result and Print out PART - A	5 Marks
4.	Any one program from PART - B	25 Marks
5.	Execution PART - B	20 Marks
6.	Result and Print out PART - B	5 Marks
7.	Viva voce	5 Marks
TOTAL		**100 Marks**

LIST OF EQUIPMENTS

HARDWARE:

1. Desktop Computers - 30 Nos.
2. Printer – 1 No

SOFTWARE:

1. Windows / Linux Operating System
2. Python (to run as interactive mode and IDLE mode)

DIRECTORATE OF TECHNICAL EDUCATION

DIPLOMA IN INFORMATION TECHNOLOGY

III YEAR

N – SCHEME

V SEMESTER

2020 - 2021 onwards

4052561 – ELECTIVE PRACTICAL - I
COMPONENT BASED TECHNOLOGY 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 : 4052561

Semester : V

Subject Title : **ELECTIVE PRACTICAL I** - COMPONENT BASED TECHNOLOGY PRACTICAL

TEACHING AND SCHEME OF EXAMINATION

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
			Marks			Duration
	Hours / Week	Hours / Semester	Internal Assessment	Board Examinations	Total	
COMPONENT BASED TECHNOLOGY PRACTICAL	4	64	25	100*	100	3 Hrs.

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

RATIONALE:

This subject imparts the key concepts of component .based technology, programming skill set and the knowledge and techniques of writing programs in widely used C#,NET , create web pages in ASP.NET and learn ADO.NET to access database.

OBJECTIVES:

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

- Develop and execute simple programs using C#.NET
- Understand the concepts of event handlers.
- Know the usage of various C#.Net controls
- Create C#.NET applications using menus.
- Access SQL database by using ADO.NET
- Use Form controls.
- Create Window applications using C#.NET form controls

- Use web controls.
- Create web pages using ASP.NET
- Develop XML database handling methodologies

DETAILED SYLLABUS

Contents: Practical

PART- A

1. Accept a character from console and check the case of the character.
2. Write a program to accept any character from keyboard and display whether it is vowel or not.
3. Write a program to implement a calculator with memory and recall operations.
4. Develop a form in to pick a date from Calendar control and display the day, month, and year details in separate text boxes.
5. Develop a application using the File and Directory controls to implement a common dialog box.

6. Develop a database application to store the details of students using ADO.NET
7. Create a simple ASP.NET page to Output Text with a form, two HTML text boxes, an HTML button, and an HTML element. Create an event procedure for the button.

PART B

1. Develop a menu based application to implement a text editor with cut, copy, paste, save and close operations with accessing and shortcut keys.
2. Develop an application to perform timer based quiz of 5 questions.
3. Develop a database application using ADO.NET to insert, modify, update and delete operations.
4. Develop a application using Datagrid to add, edit and modify records.
5. Develop a web application to input data through a web form to a database and validate the data. Use the Required Field Validator and RangeValidator Controls.
6. Develop a Window application to read an XML document containing subject, mark scored, year of passing into a Dataset

7. Develop a Window application to read students records from Database using ADO.NET and generate XML document containing students records

BOARD EXAMINATION

Note:

One from PART-A and one from PART-B

DETAILLED ALLOCATION OF MARKS

Writing answer for any one program from PART - A	20 Marks
Writing answer for any one program from PART - B	25 Marks
Executing program (PART – A)	20 Marks
Executing program (PART – B)	20 Marks
Result (PART – A)	5 Marks
Result (PART – B)	5 Marks
VIVA - VOCE	5 Marks
TOTAL	**100 Marks**

LIST OF EQUIPMENTS

HARDWARE REQUIREMENT

1.Desktop Computers – 30 Nos

2. Printer – 1 No

SOFTWARE REQUIREMENT

1.Visual Studio 2008/2012/2013/2015

2.Microsoft SQL Server 2005/2008 or above

DIRECTORATE OF TECHNICAL EDUCATION

DIPLOMA IN INFORMATION TECHNOLOGY

III YEAR

N – SCHEME

V SEMESTER

2020 - 2021 onwards

4052562 – ELECTIVE PRACTICAL I
DATA ANALYTICS USING PYTHON 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 : 452562

Semester : V

Subject Title : **Elective Practical I** - Data Analytics Using Python Practical

TEACHING AND SCHEME OF EXAMINATION

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
			Marks			Duration
	Hours / Week	Hours / Semester	Internal Assessment	Board Examinations	Total	
Data Analytics Using Python Practical	4	64	25	100*	100	3 Hrs.

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

RATIONALE:

This course provides the students the foundations for data analytics with python. The syllabus is designed to provide exposure to practical systems and software used in data analysis. The course explains data science techniques and the various Python programming packages required to prepare data for analysis, perform data analytics and create meaningful data visualization.

OBJECTIVES:

- To familiarize with the Python NumPy library for array processing.
- To utilize the Pandas packages in Python for exploratory data analytics.
- To explore some of the real world applications of Machine learning techniques.
- To create informative visualizations with matplotlib to identify patterns.

DETAILED SYLLABUS

Contents: Practical

Prerequisite:

- Python: Install Python IDE and important Python Libraries. Install Anaconda and find the features of Jupyter Notebook.

- Data Source:
  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/arshid/iris-flower-dataset
  https://www.kaggle.com/rohankayan/years-of-experience-and-salary-dataset

PART A

Perform the exercises in PART A using NumPy

1. **Basic data structures in NumPy**
   a. Create a List, set, tuple and dictionary which stores the details of a student (rollno, name, dept, branch, percentage of mark) in Python and print the values.
   b. Convert the list and tuple as NumPy array.
2. **Arrays in NumPy**
   a. Create arrays using different intrinsic methods (ones, zeros, arange, linspace, indice) and print their values.
   b. Check the results of arithmetic operations like add(), subtract(), multiply() and divide() with arrays created using arange and ones intrinsic method.
   c. Check the results of mathematical operations like exp(), sqrt(), sin(), cos(), log(), dot() on an array created using arange intrinsic method.
3. **Built-in functions in NumPy.**
   a. Load your class Mark list data from a csv (comma separated value) file into an array. Perform the following operations to inspect your array. Len(), ndim, size, dtype, shape, info()
   b. Apply the aggregate functions on this data and print the results.

   (Functions like min(), max(), cumsum(), mean(), median(), corrcoef(), std())

4. **Handling Multiple Arrays**

   a. Create two python NumPy arrays (boys, girls) each with the age of n students in the class.
   b. Get the common items between two python NumPy arrays.
   c. Get the positions where elements of two arrays match.
   d. Remove from one array those items that exist in another.
   e. Extract all numbers between a given range from a NumPy array.

5. Array Slicing in NumPy

   a. Load your class Marklist data into an array called "**marks"** to store students roll_num, subject marks and result.
   b. Split all rows and all columns except the last column into an array called "features".
   c. Split the marks array into 3 equal-sized sub-arrays each for 3 different subject marks.
   d. Split the last column into an array "label".
   e. Delete the roll_num column from the marks array and insert a new column student name in its place.

6. Indexing & Sorting in NumPy

   a. Load your class Marklist data from a csv file into an array.
   b. Access the mark of a student in a particular subject using indexing techniques.
   c. Sort the student details based on Total mark.
   d. Select a subset of 2D array using fancy indexing (indexing using integer arrays)
   e. Print student details whose total marks is greater than 250 using Boolean indexing.

7. **Handing Two dimensional array in NumPy**

   a. Import iris dataset with numbers and texts keeping the text intact into python NumPy.
   b. Convert the 1D iris to 2D array (iris2d) by omitting the species text field.
   c. Find the number and position of missing values in iris2d's sepal_length
   d. Insert np.nan values at 20 random positions in iris 2d dataset
   e. Filter the rows of iris2d that has petal_length > 1.5 and sepal_length < 5.0

PART-B

Perform the exercises in PART B using Pandas

8. **Working with a Series**
   a. Create a series using list and dictionary.
   b. Create a series using NumPy functions in Pandas.
   c. Print the index and values of series.
   d. Print the first and last few rows from the series.
9. **Working with DataFrame Columns**
   a. Create and print a DataFrame.
   b. Find the descriptive statistics for each column.
   c. Group the data by the values in a specified column, values in the index.
   d. Set Index and columns in a DataFrame.
   e. Rename columns and drop columns
   f. Select or filter rows based on values in columns.
   g. Select single and multiple columns with specific names
10. **Working with DataFrame Rows**
   a. Slicing DataFrame using *loc* and *iloc*.
   b. Filter multiple rows using *isin*.
   c. Select first n rows and last n rows
   d. Select rows randomly n rows and fractions of rows (use *df.sample* method)
   e. Count the number of rows with each unique value of variables
   f. Select *nlargest* and *nsmallest* values.
   g. Order/sort the rows
11. **Handling missing data and duplicates**
   a. Identify rows with missing data (isnull(), notnull()) and replace NA/Null data with a given value.
   b. Drop rows and columns with any missing data (dropna(), dropna(1))
   c. Find duplicate values and drop duplicates.
   d. Fill the missing values using forward filling and backward filling.
   e. Replace the missing value with new value and write the dataframe to a CSV file in the local directory.

12. Merge and combine data

a. Perform the *append, concat* and *combine_first* operations on DataFrames.
b. Apply different types of merge on data.
c. Use a *query* method to filter DataFrame with multiple conditions.

Perform the following exercises using Pandas matplotlib

13. Consider the Salary dataset, which contains 30 observations consisting of years of working experience and the annual wage (in dollars).

a. Create a linear plot to identify the relationship between years of working experience and the annual wages with suitable title , legend and labels.
b. Create a scatter plot to identify the relationship between years of working experience and the annual wages with title , legend and labels.
c. Also distinguish between observations that have more than 5 years of working experience and observations that have less than 5 years of working experience by using different colors in one single plot.

14. Consider the Iris dataset, where observations belong to either one of three iris flower classes.

a. Visualize the average value for each feature of the Setosa iris class using a bar chart.
b. Format the obtained bar graph by Changing the color of each bar, Change the Edge color, Line width and Line style.

15. Consider the Iris dataset, where observations belong to either one of three iris flower classes.

a. Visualize the Histogram for each feature (Sepal Length, Sepal Width,petal Length & petal Width) separately with suitable bin size and color.
b. Plot the histograms for all features using subplots to visualize all histograms in one single plot. Save the plot as JPEG file.
c. Plot the boxplots for all features next to each other in one single plot.

BOARD EXAMINATION

DETAILLED ALLOCATION OF MARKS

SCHEME OF VALUATION	
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

LIST OF EQUIPMENTS

Hardware Requirements

Desktop Computers – 30 Nos

Printer - 1 No.

Software Requirement:

Python , Microsoft Excel

DIRECTORATE OF TECHNICAL EDUCATION

DIPLOMA IN INFORMATION TECHNOLOGY

III YEAR

N – SCHEME

V SEMESTER

2020 - 2021 onwards

4046563 – ELECTIVE PRACTICAL- I
MOBILE APPLICATION DEVELOPMENT 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 : 4046563

Semester : V

Subject Title : **ELECTIVE PRACTICAL 1** -Mobile Application Development Practical

TEACHING AND SCHEME OF EXAMINATION

No of weeks per semester: 16 weeks

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

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

RATIONALAE:

The primary intention of the Mobile Application development practical is to impart knowledge in data handling and service management, security and other aspects in mobile computing environments n user perspective.

OBJECTIVES:

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

- acquire a solid foundation of skills to program and to create applications for Mobile Devices
- Install, configure and use Android development environment.
- To Learn about Basic Mobile Application Development tools
- To learn How to create interactive applications in android with multiple activities
- Create Mobile Application using SQLite Database

LISTOFEXPERIMENTS

PART-A

1.	Develop an App to demonstrate activity(Application Life Cycle) (example metric conversion - metre to Km, grams to Kg, litres to Kilo litre)
2.	Write an App to demonstrate different types of layouts
3.	Write an App to implement simple calculator using text view, edit view, option button and button
4.	Write an App to demonstrate list view (student particulars)
5	Write a program to display Text in Text View using different Font Style
6	Write a program to demonstrate Auto Complete Text View
7	Write a program to demonstrate Image Button View
8	Write a program to change the Background and Foreground Color of Text View

PART-B

1	Write a program to demonstrate Date picker and time picker
2.	Develop an simple application with context menu and option menu
3.	Develop an application to send SMS
4.	Write a program to view, edit contact
5.	Write a program to send e-mail
6.	Write a program to display map of given location / position using map view
7.	Write a program to demonstrate the application of intentclass
8.	Write a program to demonstrate SQLite (Create Database , Table , Insert ,Update, Delete and view records)

LIST OF EQUIPMENTS

HARDWARE REQUIREMENTS:

Desktop Computers - 30 Nos
Printer - 1 No

SOFTWARE REQUIREMENTS:

1. Android Studio / Net beans /Eclipse 2.Android ATD 3. Android SDK
4. JDK6.0or above

4046563 Mobile Application Development Practical

BOARD PRACTICAL EXAMINATION

Note:

1. The student should be given proper training in all the exercises. All the exercises should be completed before the examinations.
2. The student should maintain observation note book / manual and record notebook. The record note book should be submitted during the Board Practical Examinations. Common printout for the record note book should not be allowed. Individual student output for every exercise should be kept in the record note book.
3. All exercises should be given in the question paper and student is allowed to select any one by lot. All exercises with the hard copy of the template related to the exercise should be provided by the external examiner for the examination. Template can be varied for every batch.
4. The external examiner should verify the availability of the infrastructure for the batch strength before the commencement of Practical Examination.

DETAILED ALLOCATION OF MARKS	
User interface design diagram and XML in Part-A	05 Marks
Writing program in Part-A	15 Marks
Execution of program Part-A	20 Marks
Printed Output (Part –A)	5 Marks
User interface design diagram and XML in Part-B	05 Marks
Writing program in Part-B	20 Marks
Execution of program in Part-B	20 Marks
Printed Output (Part –B)	5 Marks
VIVA – VOCE	5 Marks
TOTAL	**100 Marks**

DIRECTORATE OF TECHNICAL EDUCATION

DIPLOMA IN INFORMATION TECHNOLOGY

III YEAR

N – SCHEME

V SEMESTER

2020 - 2021 onwards

4052570 – ENTREPRENEURSHIP AND STARTUP

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 : 4052570
Semester : V
Subject Title : ENTREPRENERUSHIP AND STARTSUPS

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	
Entrepreneurship and startups	4	64	25	75	100	3 Hrs.

Topics and Allocation of Hours

UNIT	Topic	Hours
1	Entrepreneurship – Introduction and Process	12
2	Business Idea and Banking	12
3	Start ups, E-cell and Success Stories	12
4	Pricing and Cost Analysis	12
5	Business Plan Preparation	12
Revision		4
Total		64

RATIONALE:

Development of a diploma curriculum is a dynamic process responsive to the society and reflecting the needs and aspiration of its learners. Fast changing society deserves changes in educational curriculum particularly to establish relevance to emerging socio-economic environments; to ensure equity of opportunity and participation and finally promoting concern for excellence. In this context the course on entrepreneurship and start ups aims at instilling and stimulating human urge for excellence by realizing individual potential for generating and putting to use the inputs, relevant to social prosperity and thereby ensure good means of living for every individual, provides jobs and develop Indian economy.

OBJECTIVES:

At the end of the study of5th semester the students will be able to

- excite the students about entrepreneurship
- acquire Entrepreneurial spirit and resourcefulness
- Understand the concept and process of entrepreneurship
- Acquire entrepreneurial quality, competency and motivation
- Learn the process and skills of creation and management of entrepreneurial venture
- Familiarize with various uses of human resource for earning dignified means of living
- Know its contribution in and role in the growth and development of individual and the nation
- Understand the formation of E-cell
- Survey and analyze the market to understand customer needs
- Understand the importance of generation of ideas and product selection
- Learn the preparation of project feasibility report
- Understand the importance of sales and turnover
- be familiar wth various financial and non financial schemes
- be aware of the concept of incubation and starts ups

DETAILED SYLLABUS

Unit	Name of the Topics	Hours
1	**Entrepreneurship – Introduction and Process** ➢ Concept, Functions and Importance ➢ Myths about Entrepreneurship ➢ Pros and Cons of Entrepreneurship ➢ Process of Entrepreneurship ➢ Benefits of Entrepreneur ➢ Competencies and characteristics ➢ Ethical Entrepreneurship ➢ Entrepreneurial Values and Attitudes ➢ Motivation ➢ Creativity ➢ Innovation ➢ Entrepreneurs - as problem solvers ➢ Mindset of an employee and an entrepreneur ➢ Business Failure – causes and remedies ➢ Role of Networking in entrepreneurship	12
2	**Business Idea and Banking** ➢ Types of Business: Manufacturing, Trading and Services. ➢ Stakeholders: sellers, vendors and consumers and Competitors ➢ E- commerce Business Models ➢ Types of Resources - Human, Capital and Entrepreneurial tools and resources ➢ Selection and utilization of human resources and professionals, etc. ➢ Goals of Business; Goal Setting ➢ Patent, copyright and *Intellectual property* rights ➢ Negotiations - Importance and methods ➢ Customer Relations and Vendor Management ➢ Size and capital based classification of business enterprises ➢ Various sources of Information	12

	➢ Role of financial institutions ➢ Role of Government policy ➢ Entrepreneurial support systems ➢ Incentive schemes for state government ➢ Incentive schemes for Central governments	
3	**Start ups, E-cell and Success Stories** ➢ Concept of Incubation centre's ➢ Visit and report of DIC, financial institutions and other relevance institutions ➢ Success stories of Indian and global business legends ➢ Field Visit to MSME's ➢ Study visit to Incubation centers and start ups ➢ Learn to earn ➢ Startup and its stages ➢ Role of Technology – E-commerce and Social Media ➢ Role of E-Cell ➢ E-Cell to Entrepreneurship	**12**
4	**Pricing and Cost Analysis** ➢ Unit of Sale, Unit Price and Unit Cost - for single product or service ➢ Types of Costs - Start up, Variable and Fixed ➢ Income Statement ➢ Cashflow Projections ➢ Break Even Analysis - for single product or service ➢ Taxes ➢ Financial Business Case Study ➢ Understand the meaning and concept of the term Cash Inflow and Cash Outflow ➢ Price ➢ Calculate Per Unit Cost of a single product ➢ Operational Costs ➢ Understand the importance and preparation ofIncome Statement ➢ Prepare a Cash Flow Projection	**12**

	➢ Projections ➢ Pricing and Factors affecting pricing. ➢ Launch Strategies after pricing and proof of concept	
5	**Business Plan Preparation** ➢ Generation of Ideas. ➢ Business Ideas vs. Business Opportunities ➢ Opportunity Assessment – Factors, Micro and Macro Market Environment ➢ Selecting the Right Opportunity ➢ Product selection ➢ New product development and analysis ➢ Feasibility Study Report – Technical analysis, financial analysis and commercial analysis ➢ Market Research - Concept, Importance and Process ➢ Market Sensing and Testing ➢ Marketing and Sales strategy ➢ Digital marketing ➢ Branding - Business name, logo, tag line ➢ Promotion strategy ➢ Business Plan Preparation ➢ Social Entrepreneurship as Problem ➢ Solving - Concept and Importance ➢ Risk Taking-Concept ➢ Types of business risks ➢ Execution of Business Plan	**12**

REFERENCEBOOKS:

1. Dr. G.K. Varshney, Fundamentals of Entrepreneurship, Sahitya Bhawan Publications, Agra - 282002
2. Dr. G.K. Varshney, Business Regulatory Framework , Sahitya Bhawan Publications, Agra - 282002
3. Robert D. Hisrich, Michael P. Peters, Dean A. Shepherd, Entrepreneurship , McGraw Hill (India) Private Limited, Noida - 201301

4. M.Scarborough, R.Cornwell, Essentials of Entrepreneurship and small business management, Pearson Education India, Noida - 201301
5. Charantimath Poornima M. Entrepreneurship Development and Small Business Enterprises, Pearson Education, Noida - 201301
6. Trott, Innovation Management and New Product Development, Pearson Education, Noida - 201301
7. M N Arora, A Textbook of Cost and Management Accounting, Vikas Publishing House Pvt. Ltd., New Delhi-110044
8. Prasanna Chandra, Financial Management, Tata McGraw Hill education private limited, New Delhi
9. I. V. Trivedi, Renu Jatana, Indian Banking System, RBSA Publishers, Rajasthan
10. Simon Daniel, HOW TO START A BUSINESS IN INDIA, BUUKS, Chennai - 600018
11. Ramani Sarada, The Business Plan Write-Up Simplified - A practitioners guide to writing the Business Plan, Notion Press Media Pvt. Ltd., Chennai 600095.

Board Examination – Evaluation Pattern

Internal Mark Allocation

Assignment (Theory portion)*	– 10
Seminar Presentation	– 10
Attendance	– 5
Total	**- 25**

Note: * Two assignments should be submitted. The same must be evaluated and converted to 10 marks.

Guidelines for assignment:

First assignment – Unit I

Second assignment – Unit II

Guidelines for Seminar Presentation – Unit III

Each assignment should have five three marks questions and two five marks questions.

BOARD EXAMINATION

Note

1. The students should be taught all units and proper exposure and field visit also arranged. All the portions should be completed be for examinations.

2. The students should maintain theory assignment and seminar presentation. The assignment and seminar presentation should be submitted during the Board Practical Examinations.

3. The question paper consists of theory and practical portions. All students should write the answers for theory questions (40 Marks) and practical portions (60 Marks)should be completed for board examinations.

4. All exercises should be given in the question paper and students are allowed to select by lot. If required the dimensions of the exercises may be varied for every batch. No fixed time allotted for each portion and students have liberty to do the examination for 3Hrs.

5. **For Written Examination theory question and answer: 45Marks**

   Ten questions will be asked for 3 marks each. Five questions from each unit 1 & 2.(10 X 3 = 30).

   Three questions will be asked for 5 marks each. One question from each unit 1, 2 & 3. (3 X 5 =15)

6. For Practical Examination: The business plan/Feasibility report or Report on Unit 4 & 5 should be submitted during the board practical examinations. The same have to be evaluated for the report submission (40 marks).

DETAILED ALLOCATION OF MARKS

Sl. No	Description	Marks
Part A	Written Examination - Theory Question and answer (10 questions x 3 marks:30 marks & (3 questions x 5 marks: 15 marks)	45
Part B	Practical Examination –Submission on Business Plan/Feasibility Report or Report on Unit 4 & 5	40
Part C	Viva voce	15
	Total	100

MODEL QUESTION PAPER

ENTREPRENEURSHIP AND START UPS

PART - A

Time: 1 hour **Max. Marks:45**

I. Answer ten questions in brief **(10x3=30)**

1. Define entrepreneurship.
2. State the process of entrepreneurship
3. What are the benefits of being an entrepreneur?
4. How do entrepreneurs act as problem solvers?
5. Outline the role of networking in entrepreneurship.
6. List the various types of business
7. Outline the business model.
8. Suggest the various goals of business.
9. How selection of human resources is carried out?
10. Specify the role of government policy on entrepreneurship.

II. Answer three questions in details (3x5=15)

11. Describe the importance of innovation on entrepreneurship.
12. Enumerate the various incentive schemes for the central government.
13. How technology will play a major role in E- commerce?

PART – B

Practical Examination – Submission on Business Plan / Feasibility Report or Report on Unit 4 & 5 **(40)**

PART- C

Viva Voce **(15)**