Shroff S. R. Rotary Institute of Chemical Technology
Department of Computer Engineering

Ref : UPL University /SRICT/CO/2023-24/03

Date : 31/01/2023

Proposed Teaching Scheme for
Third Year Diploma in Computer Engineering

Semester V (Computer Engineering) Proposed Structure

Sl. No	Category	Code No.	Course Title	Hours per week			Total contact hrs/ week	Credits	E	M	I	V	Total
				L	T	P							
1	Program core course	CO1301	.NET Programming	2	0	2	4	3	70	30	20	30	150
2	Program core course	CO1302	Advance JAVA Programming	3	0	2	5	4	70	30	20	30	150
3	Program core course	CO1303	Programming with Python	2	0	2	4	3	70	30	20	30	150
4	Program Elective course		Program Elective 2	3	0	2	5	4	70	30	20	30	150
5	Open Elective		Open Elective 2	2	0	2	4	3	70	30	20	30	150
6	Humanities and Social Science course	CO1308	Business Information System	3	0	0	3	3	70	30	0	0	100
7	Audit Course -IC	MH1301	Indian Constitution	1	0	0	1	0	50	0	0	0	50
8	Summer Internship-II (6 weeks) after IVth Sem	MH1302	Industrial Internship	0	0	0	0	3	0	0	50	50	100
	Total Credits						26	23		Total			**1000**

Program Elective 2			Open Elective 2		
Sr No	Course Code	Course Name	Sr No	Course Code	Course Name
1	CO1304	Computer Graphics	1	CO1306	Multimedia & Animation Techniques
2	CO1305	Software Testing	2	CO1307	FOSS(Free & Open Source Software)

Semester VI (Computer Engineering) Proposed Structure

Sl. No	Category	Code No.	Course Title	Hours per week			Total contact hrs/week	Credits	E	M	I	V	Total
				L	T	P							
1	Program core course	CO1309	Introduction to e-Governance	2	0	0	2	2	70	30	0	0	100
2	Program core course	CO1310	Mobile Application Development using Android	2	0	2	4	3	70	30	20	30	150
3	Program Elective course		Program Elective 3	2	0	2	4	3	70	30	20	30	150
4	Program Elective course		Program Elective 4	3	0	0	3	3	70	30	0	0	100
5	Open Elective		Open Elective 3	3	0	0	3	3	70	30	0	0	100
6	Major Project	MH1303	Project	0	0	0	0	9	0	0	100	100	200
	Total Credits						**16**	**23**	**Total**				**800**

Program Elective 3			Program Elective 4			Open Elective 3		
Sr No	Course Code	Course Name	Sr No	Course Code	Course Name	Sr No	Course Code	Course Code
1	CO1311	Network Management & Administration	1	CO1313	Fundamentals of Artificial Intelligence	1	CO1315	Internet of Things
2	CO1312	Dynamic Webpage with Scripting Language	2	CO1314	Introduction to Virtual Reality	2	CO1316	Cloud Computing

Course code	Definitions
L	Lecture
T	Tutorial
P	Practical
E	Theory External Examination Marks
M	Theory Internal Examination Marks
I	Practical Internal Examination Marks
V	Practical External Examination Marks

Shroff S.R. Rotary Institute of Chemical Technology

Diploma in Engineering
Subject Code: CO1301
Subject Name: .Net Programming

Semester: - V

Type of course: Program Core

Prerequisite: Knowledge of Computer Programming Languages

Rationale: The .NET platform has evolved quickly to become a robust technology platform for enterprise application development and systems integration. It is a very popular platform these days being used to develop web sites/ web-based applications.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
2	0	2	3	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Overview of Microsoft .NET Framework** Describe Common Language Runtime, Compare the .NET class framework to a language specific class, Library, decide when to use .Net windows forms, identify when to use console applications.	5
2	**ASP.NET** Building a website, server controls, CSS for ASP.Net, creating consistent looking web sites, configuration, security, configuration, MVC Pattern, architecture, ASP.NET MVC vs. Web forms	4
3	**C# Language** CLR Execution Model, Primitive Types, Reference & Value Types, Nullable Types, Constants & Fields, Properties, Methods, Events & Delegates. Generics, Interfaces, Working with Chars, Strings & Text, Enums, Arrays	4
	SECTION-B	
4	**Errors & Exception Handling** The Idea behind Exception, Exceptions & Errors, Types of Exception,	3

Diploma in Engineering
Subject Code: CO1301
Subject Name: .Net Programming

	Control Flow in Exceptions, Use of try, catch, finally, throw, throws in Exception Handling, In-built and User Defined Exceptions	
5	**Windows common controls** Working with Common Tool Box Controls, Label & button (Properties: flatstyle, image, imagealign etc.), Textbox (Properties: autosize, maxlength, multiline, readonly, wordwrap etc.),NumericUpDown (textalign, updownalign, value, interceptarrowkeys, decimalplaces, increment, maximum, minimum etc.) Check Box (autocheck, checked, checkaligned, checkstate, threestate etc.), Radio Button (check aligned, check, autocheck etc.)	6
6	**ADO .NET Programming** Creating a Database Application, Creating Connection to a Databaseusing ADO.NET, Populating Data in ADO.NET, Browsing Records, Datagrid view, Editing, Saving, Adding and Deleting Records using bounded and unbounded	4

Text Book:

1. Asp.Net MVC 5 Recipes: A Practical Solution by Nimit Joshi

Reference Book:

1. A learner's guide to Real world programming with C# and .NET core- 4th edition -Andrnew Stellman and Jennifer Greene.
2. Pro C# 9 with .NET 5: Foundational Principles and Practices in Programming 10th Edition by Andrew Troelsen (Author), Phillip Japikse (Author)

Practical List:

1. Design a simple Login Form and set its various properties, methods and events. Display "Login Successfully" message using MessageBox in Login Form.
2. Design a Form to read two numbers from the user with the help of inputbox and display the greater number in message box.
3. Design a Calculator using Textbox and Button control (Addition, Division,Multiplication, Subtraction).
4. Write a program to change the background colour of form using three radio buttons.
5. Design a Restaurant bill form using Radio Button, Checkbox, Numeric Up down

Diploma in Engineering
Subject Code: CO1301
Subject Name: .Net Programming

   and Group box controls.

6. Write a program on 1D array in C#.NET.
7. Develop a student registration form using label, textbox, button, date time picker,list box, combo box, Group box, picture box.
8. Write a program on windows common controls like NumericUpDown (textalign, Updownalign.
9. Write a program on exception handling.
10. Design and create database using ADO.Net with SQL Server.

Course Outcomes:

Student will be able to:

Sr. No.	CO statement
CO-1	**Understand** the architecture of Dot Net Technology and framework.
CO-2	**Construct** web pages using CSS and ASP.NET.
CO-3	**Learn** C#.NET and try various options.
CO-4	**Analyze** reasons behind exception and use exception handling to solve exception.
CO-5	**Use** various windows control to make GUI application.
CO-6	**Design** small ADO.net based database driven .Net application

Diploma in Engineering
Subject Code: CO1302
Subject Name: Advanced Java Programming

Semester: - V

Type of course: Program Core

Prerequisite: Knowledge of core JAVA, Computer network, SQL query and basic knowledge of spring.

Rationale: To provide the knowledge necessary to understand java and develop dynamic web pages using java server page (JSP). It covers the basic underlying concepts and techniques recently used in the IT industry. After going through this course student will be able to do Web Development and Desktop Application Development.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Multithreading** Life cycle of a Thread, Creating thread and running it, Creating Multiple Threads, Waiting for Threads, Thread group, Thread priorities, Synchronization **Java Applet** Applet Programming: local and remote applets, difference between applet and application, applet life cycle, developing executable applet code	7

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Page 1 of 4

Shroff S.R. Rotary Institute of Chemical Technology

Diploma in Engineering
Subject Code: CO1302
Subject Name: Advanced Java Programming

	Web Page Design: applet tag, adding applet to HTML file, running the applet, passing parameter to applet, various methods and component classes to develop basic applet	
2	**Abstract Window Toolkit (AWT)** classes hierarchy, windows Fundamentals, Frame Windows (creating a frame, window in applet, canvas, creating windows program) **Graphics-AWT Controls** Labels, TextField, Push buttons, Layout Managers (Flow Layout, Border Layout, Grid Layout, Card Layout) **Developing Graphical User Interface using Swing** JApplet, JLabel, JTextField, JButton, JCheckBox, JRadioButton, JComboBox, Menus, Event Classes: MouseEvent Class , ActionEvent Class, WindowEvent Class, Event Listner Interface (MouseListener, ActionListener, WindowListener and KeyListner)	**7**
3	**Java Database Connectivity (JDBC)** JDBC Overview & Architecture, Introduction to JDBC, JDBC Architecture, Database connectivity using JDBC	**6**
SECTION-B		
4	**Servlets** Introduction to Java Servlet, Servlet Interface and the Servlet Life Cycle, Handling HTTP get and post Requests, Session Tracking, Cookies	**7**
5	**Java Server Pages (JSP)** Introduction, Java Server Pages Overview, JSP Architecture & lifecycle, JSP Directives, JSP Scripting Elements, JSP action elements, JSP implicit Objects.	**7**
6	**Introduction to Spring Boot** Spring Boot and Database, Spring Boot Web Application Development, Spring Boot RESTful Web Services.	**5**

Text Book:
1. Java 8 Programming, Black Book, DreamTech Press, Edition 2015.
2. Professional Java Development with the Spring Framework by Rod Johnsonet al.John Wiley & Sons 2005.

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Page 2 of 4

Diploma in Engineering
Subject Code: CO1302
Subject Name: Advanced Java Programming

Reference Book:

1. Java the complete reference, 8th edition by Herbert Schildt.
2. Professional Java Server Programming by Subrahmanyam Allamaraju, Cedric Buest Wiley Publication.
3. "Advanced Java 2 Platform HOW TO PROGRAM" by H. M.Deitel, P. J. Deitel, S. E. Santry – Prentice Hall Java the complete reference , 8th Edition, Herbert Schildt.

Practical List:

1. Develop an applet that draws a circle. The dimension of the applet should be 500 x 300 pixels. The circle should be centered in the applet and have a radius of 100 pixels. Display your name centered in a circle.(using drawOval() method)
2. Develop an applet that contains one button. Initialize the label on the button to "start", when the user presses the button, which changes the label between these two values each time the button is pressed.
3. Develop a program that has only one button in the frame, clicking on the button cycles through the colors: red->green->blue and so on. One color changes per click. (usegetBackGround() method to get the current color)
4. Write a program on to create an application that displays a frame with a menu bar. When a user selects any menu or menu item, display that selection on a text area in the center of the frame.
5. Develop a database application that uses any JDBC driver.
6. Develop a program to present a set of choice for user to select a product and display the price of product.
7. Develop a simple servlet program which maintains a counter for the number of times it has been accessed since its loading, initialize the counter using deployment descriptor.
8. Write a Servlet program to print system date and time.
9. Write a program on to implement cookies to store firstname and lastname using Java server pages.
10. Write a program to create a spring boot application.

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Page 3 of 4

Shroff S.R. Rotary Institute of Chemical Technology

Diploma in Engineering
Subject Code: CO1302
Subject Name: Advanced Java Programming

Course Outcomes:

Student will be able to:

Sr. No.	CO statement
CO-1	**Understand** Multithreading concept and develop Java Applet Programming using various techniques.
CO-2	**Design** and develop GUI based applications using AWT, Swing.
CO-3	**Create** database connectivity in Java for given application.
CO-4	**Develop** server side programs using Servlets.
CO-5	**Implement** webpage with dynamic content and server side web application using Servlet and JSP.
CO-6	**Use** advanced concepts related to Web Services and spring.

List of Open Source Software/learning website:

1. http://docs.oracle.com/javase/tutorial/deployment/applet/index.html
2. http://www.tutorialspoint.com/awt/
3. https://docs.oracle.com/javase/tutorial/uiswing/
4. https://docs.oracle.com/javase/tutorial/jdbc/
5. http://www.oracle.com/technetwork/java/index-jsp-135475.html
6. http://www.oracle.com/technetwork/java/javaee/jsp/index.html

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Page 4 of 4

Shroff S.R. Rotary Institute of Chemical Technology

Diploma in Engineering
Subject Code: CO1303
Subject Name: Programming with Python

Semester: - V

Type of course: Program Core

Prerequisite: Fundamental knowledge about computer systems and positive aptitude to learn programming, basic knowledge of C Programming.

Rationale: Python is general purpose programming language becomes very popular in last decade. In this age, every Electronics, Electrical and Computer engineers must learn Python Programming to build applications in their core domain. Python is becoming popular in artificial intelligence and machine learning. MicroPython is sub-set of Python Programming useful to port in hardware for embedded and IoT applications.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
2	0	2	3	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Introduction, Data Types and Operators** Installation and working with Python, Variables and data types in python, perform computations and create logical statements using Python's operators: Arithmetic, Assignment, Comparison, Logical, Membership, Identity, Bitwise operators, list, tuple and string operations.	3
2	**Python Decision making and Loops** Write conditional statements using If statement, if ...else statement, else..if statement and Boolean expressions, While loop, For loop, Nested	6

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Page 1 of 4

Shroff S.R. Rotary Institute of Chemical Technology

Diploma in Engineering
Subject Code: CO1303
Subject Name: Programming with Python

	Loop, Infinite loop, Break statement, Continue statement, Pass statement, Use for and while loops along with useful built-in functions to iterate over and manipulate lists, sets, and dictionaries. Plotting data, Programs using decision making and loops.	
3	**Python Functions and Modules** Defining custom functions, Organizing Python codes using functions, Create and reference variables using the appropriate scope, Basic skills for working with lists, tuples, work with dates and times, get started with dictionaries, Importing own module as well as external modules, Programming using functions, modules and external packages.	4
	SECTION-B	
4	**Python File Operations** An introduction to file I/O, use text files, use CSV files, use binary files, Handle a single exception, handle multiple exceptions, Illustrative programs, Exercises	3
5	**MicroPython** Introduction, main difference between MicroPython and Python, Installation of MicroPython on Hardware, MicroPython libraries, GPIO programming, Sensor Programming using MicroPython.	6
6	**Web Scraping** Project: MAPIT.PY with the web browser Module, Downloading Files from the Web with the requests Module, Saving Downloaded Files to the Hard Drive, HTML	4

Text Book:

1. Introduction to Python for Engineers and Scientists by Sandeep Nagar.
2. MicroPython for the Internet of Things (A Beginner's guide to programming with Python on microcontrollers) by Charles Bell.

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Page 2 of 4

Shroff S.R. Rotary Institute of Chemical Technology

Diploma in Engineering
Subject Code: CO1303
Subject Name: Programming with Python

Reference Books:

1. Introduction to Computation and Programming Using Python Prentice Hall of India by John V Guttag.
2. Python Programming Fundamentals- A Beginner's Handbook by Nischay kumar Hegde.

Practical List:

1. Write Python programs to understand control structures.
2. Write a program to demonstrate different number datatypes in python.
3. Write a program to perform different arithmetic operations on numbers in python.
4. Write a program to create, concatenate and print a string and accessing substring from a given string.
5. Import module and use it in Python programs.
6. Write a python script to print the current date in following format "Sun May 29 02:26:23 IST 2017".
7. Write a python program to create, append and remove lists in python.
8. Write a python program to find largest of three numbers.
9. Write a python program to convert temperature from Celsius to Fahrenheit.
10. Write a python program that accepts length of three sides of a triangle as inputs. The program should indicate whether or not the triangle is a rightangled triangle (use Pythagorean Theorem).

Course Outcomes:

Students will be able to:

Sr. No.	CO statement
CO-1	**Analyze** the syntax and semantics of Python Programming Language.
CO-2	**Evaluate** the process of structuring the data using lists, tuples and dictionaries.
CO-3	**Apply** Python functions to facilitate code reuse and manipulate strings.
CO-4	**Understand** use of built-in functions to navigate the file system.

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Page 3 of 4

Shroff S.R. Rotary Institute of Chemical Technology

Diploma in Engineering
Subject Code: CO1303
Subject Name: Programming with Python

| CO-5 | **Create** programs for general purpose I/O devices using MicroPython. |
| CO-6 | **Remember** the process of Web scraping. |

List of Open-Source Software/learning website:

- NPTEL Video lecture on Python Programming
- https://www.coursera.org/specializations/python-3-programming#courses
- www.coursera.org

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Page 4 of 4

Shroff S.R. Rotary Institute of Chemical Technology

Diploma in Engineering
Subject Code: CO1304
Subject Name: Computer Graphics

Semester: - V

Type of course: Program Elective

Prerequisite: Basic knowledge of C programming, Basic data structure & Concept of mathematics. (Geometry, Matrix and other field).

Rationale: Understanding of basic principles computer graphics followed by computer vision and its application in various field of engineering.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Basics of Computer Graphics** Display devices, Primitive operations, Text mode and graphics mode, graphics functions, Shapes, colors, Co-ordinate systems; Applications of computer graphics; Raster scan display, Random scan display	6
2	**Generation of Various Geometrical Shapes (Line, circle, and polygon)** Basic concepts in line drawing, Line drawing algorithms (DDA algorithms, Bresenham's algorithm). **Circle Generating Algorithms** DDA circle drawing algorithm, Bresenham's circle drawing algorithm, midpoint circle drawing algorithm. **Polygons**	8

Diploma in Engineering
Subject Code: CO1304
Subject Name: Computer Graphics

	Types of polygons, Polygon representation, inside –outside test. Polygon filling (Flood fill, scan-line algorithm).	
3	**Transformations** **2D transformation** Translation, Rotation, scaling, Reflection, shearing, transformation matrices, Homogeneous co-ordinate system, Rotation about an arbitrary point, scaling about fixed point, Composite transformations. **3D Transformation** scaling, rotation, translation, rotation about arbitrary axis etc.	5
SECTION-B		
4	**Windowing & Clipping** Viewing transformation, Normalization transformation **Line Clipping** Cohen-Sutherland Line clipping algorithm, midpoint subdivision algorithm **Polygon Clipping** Sutherland – Hodgeman Polygon clipping algorithm.	10
5	**Curves** Curve generation, Lagrange Interpolation curves,B-Spline, Bezier curves.	5
6	**Projection** Different Parallel projection, Perspective Projection.	5

Text Book:

1. Computer Graphics through C,5th Pearson by Hearn & Beaker.
2. Computer Graphics Multimedia & Animation, Pakhira, 2nd PHI

Reference Books:
1. Computer Graphics with Virtual Reality System, Maurya, Wiley.
2. Computer Graphics by Udit Agarwal.

Practical List:

1. Implement DDA algorithm for line drawing.
2. Implement Bresennham's algorithm for line drawing.
3. Implement Mid-point circle drawing algorithm.

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Page 2 of 3

Diploma in Engineering
Subject Code: CO1304
Subject Name: Computer Graphics

4. Implement Bresennham's algorithm of circle drawing.
5. Implement Flood fill algorithm for Polygon filling.
6. Implement scan-line algorithm for polygon filling.
7. Write Program for 2-D transformations -> scaling, Rotation.
8. Write Program for 2 D transformations shearing and Translation program.
9. Implement Cohen- Sutherland algorithm for line clipping.
10. Implement Sutherland-Hodgeman algorithm for polygon clipping.

Course Outcomes:

Students will be able to:

Sr. No.	CO statement
CO-1	**Understand** the basic of computer graphics and evaluate the idea how a system can design geometrical shapes in taking basic parameters as input from user.
CO-2	**Apply** the concepts of transformation of an object in real world and use those concepts to develop the transformation using any vehicle language.
CO-3	**Analyze** different algorithm used for developing geometrical shapes.
CO-4	**Prepare** the basics of windowing and clipping of different geometrical shapes.
CO-5	**Create** different curves collecting different parameters from users as input.
CO-6	**Evaluate** the basics of projection and its application.

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Page 3 of 3

UPL

UPL UNIVERSITY
OF
SUSTAINABLE TECHNOLOGY

(Established under Gujarat Private Universities Act, 2009)

Rotary
Ankleshwar

Shroff S.R. Rotary Institute of Chemical Technology

Diploma of Engineering
Subject Code: CO1305
Subject Name: Software Testing

Semester: - V

Type of course: Program Elective

Prerequisite: Basic understanding of the software development life cycle (SDLC).
basic understanding of software programming using any programming language.

Rationale: Understanding of basic principles software testing.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Introduction to Software Testing** Levels of Testing, Integration Testing, Test case Specification, Reliability Assessment, Validation & Verification.	4
2	**Role of Testing in SDLC** Introduction of Software Process, Phases in SDLC, Waterfall Model, Phases of Waterfall Model, Advantages & Disadvantages, Spiral Model, Phases of Spiral Model, Spiral Model Strengths & Weaknesses, When should you use Spiral Model, Prototype Model, Phases Advantages & Disadvantages, Agile Model, Scrum Methodology, Sprints in Scrum, Scrum Roles, Scrum Artifacts & Ceremonies ,V-shaped Model ,Steps in the V-shaped Model, V-shaped Strengths & Weaknesses, Challenges Regarding To Each Development Phases.	9

Diploma of Engineering
Subject Code: CO1305
Subject Name: Software Testing

3	**Types and Levels of Software Testing** Unit Testing, Integration Testing, Various Approaches Of Integration Testing, System Testing, Acceptance Testing **Testing Methodologies** Black Box Testing, Advantages & Disadvantages, White Box Testing, Statement Coverage, Decision Coverage.	6
	SECTION-B	
4	**Introduction to Automation Testing** Benefits of Automation Testing, Basics of automation testing, Procedureto perform automation testing, An overview for the major functional and non-functional testing tools, Overview of Test management and defect tracking tools, Introduction to Automation Tools, Comparison with other tools like QTP/UFT, RET.	7
5	**Testing Tools** Automation of Test Execution, Requirement tracker, High Level Review Types of test Tools, Tools for test management and Control, Test Specification, Static Testing, Dynamic Testing, Selection and Introduction of Test Tools, Cost Effectiveness of Tool Introduction, **Testing Object Oriented Software** Introduction to OO testing concepts, Differences in OO testing	6
6	**Functional and Non-functional Test Management** Introduction To Test Design, Inputs for Test Design, Activity Test Scenarios, Test Cases, Test Case Management, Best Practices of Test Cases, Test Data, Black Box Test Technique, Requirement Traceability Matrix (RTM), Security Testing, Recovery Testing, Configurationtesting, Compatibility Testing, Installation Testing, Performance Testing, Parallel Testing, Volume Testing, Internationalization Testing, Localization Testing.	7

Text Books:

1. Software Testing:, 3rd Edition, CRC Press, 2007 A Craftsman's Approach by Paul C. Jorgensen

Reference Books:

1. Software Testing Techniques by Boris Beizer, Dreamtech, 2009.

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Page 2 of 3

Diploma of Engineering
Subject Code: CO1305
Subject Name: Software Testing

2. Software Testing:, Auerbach Publications, 3rd Edition, 2013 A Craftmen‚‚s Approach by P. C. Jorgenson
3. Effective Methods of Software Testing, 2nd Edition by Perry, John Wiley, 1999.

Practical List:

1. Write programs in C- Language to demonstrate the working of the following a. constructs: i) do.. .while ii) while….do iii) if…else iv) switch v) for.
2. A program written in C- language for Matrix Multiplication fails Introspect the causes for its failure and write down the possible reasons for its failure.
3. A program written in C- language for Matrix Addition 'Introspect the causes for its failure and write down the possible reasons for its failure.
4. Take any system (e.g., ATM system) and study its system specifications and report the various bugs.
5. Write the test cases for any known application (e.g., Banking application).
6. Write the test cases for GMAIL.
7. Write the test cases for FACEBOOK,TWITTER etc.,
8. Study of any web testing tool (e.g., Selenium).
9. Test case for calculator in windows application.
10. Study of any open source-testing tool (e.g., Test Link).

Course Outcomes:

Students will be able to:

Sr. No.	CO statement
CO-1	**Remember** and know the importance of testing and purpose of testing.
CO-2	**Evaluate** software testing experience by applying software testing knowledge and methods to practice-oriented software testing projects.
CO-3	**Create** the integration testing which aims to uncover interaction and compatibility problems as early as possible.
CO-4	**Understand** different software automation testing techniques and strategies and be able to apply specific (automated) unit testing method to the projects.
CO-5	**Apply** the different testing tool techniques.
CO-6	**Analyze** how to write software testing documents and communicate with engineers in various forms.

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Page 3 of 3

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Shroff S.R. Rotary Institute of Chemical Technology

Diploma in Engineering
Subject Code: CO1306
Subject Name: Multimedia & Animation Techniques

Semester: - V

Type of course: Open elective

Prerequisite: Adobe flash is an important and popular tool that is used to design such application suitable for web. In this course student will learn to use adobe flash to develop two dimensional animations.

Rationale: Animation is required to create action oriented phenomena in applications that can be hosted on website. Animation plays a huge role in entertainment (providing action and realism) in advertising, films and gaming industry and also be extremely effective in education (providing visualization and demonstrations of abstract ideas and concepts).

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
2	0	2	3	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**The Elements of Design and Image Basics** Graphics and Color Fundamentals, steps to create documents &optimizing images in Photoshop, Graphics Basics: Bitmap vs. vector- based graphics, Color/bit depth and image resolution, Graphic file formats, Optimizing web graphics.	4
2	**Photoshop Tools for Creating Professional Grade Images** Different Photoshop tools, importance of layers, needs of enhancement of images and color corrections in documents and apply in created documents, text editing tools and create documents on it.	5

3	**Symbols, Animation And Organizing Projects** Importance of layers and detailed steps to create application using layers , frames, timeline and discuss detailed steps to develop applications using it, animation concepts and detailed steps to develop animated applications, detailed steps to include sound and embedding videos	4
	SECTION-B	
4	**Adobe Premier Project** Practice to change Project settings, Preference settings, Asset Management, Sequences & Clips, Offline On-line Clips	4
5	**Animation** Animation basics, Timeline, Frames and Key Frames, Creating a basic text animation, Creating and manipulating animations, Creating a basic frame-by-frame animation, Using Onion Skin to modify an animation, Using shape tweening and hinting, Using motion tweening, Using motion tweening with a guide, Mask Animations	5
6	**Introduction To ActionScript** Importance of ActionScript, steps to create movie using ActionScripts, various ActionScript using loops, variables and arrays, scripts to modify existing objects of the movie, steps to publish flash movie.	4

Text Books:

1. Photoshop CC: The missing manual by Lesa Snider O'Reilly Media
2. Adobe Photoshop CS5 -one-to-one by Deke MCClelland O'Reilly Media
3. Action Script for Flash MX: The Definitive Guide by Colin Moock, 2nd Edition, O'Reilly Media

Reference Books:

1. An Introduction to Database system by C J Date, Addison-Wesley Publishing Company
2. Oracle: The Complete Reference by George Koch, Kevin Loney, TMH /Oracle Press

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Page 2 of 4

Shroff S.R. Rotary Institute of Chemical Technology

Diploma in Engineering
Subject Code: CO1306
Subject Name: Multimedia & Animation Techniques

Practical List:

1. Create graphics – lines, shapes, texture, filling colors using color palates, texturing.
2. Develop a banner of recent activity in your college or any festival.
3. Develop a collage of different images of different sizes and properties.
4. Write test and debug a Photoshop document illustrating the working of different Photoshop drawing and image tools
5. Develop a webpage using complete Photoshop kit.
6. Write, test and debug small applications using Basic Flash concepts using shapes, colors, text and images.
7. Write, test and debug small applications with flash layers.
8. Write, test and debug small applications with Scenes and Frame Labels.
9. Write, test and debug small applications with flash symbols and instances.
10. Write, test and debug small applications with flash animation.

Course Outcomes:

Students will be able to:

Sr. No.	CO statement
CO-1	**Write** relational algebra expressions for that query and optimize the developed expressions
CO-2	**Design** the databases using E-R method and normalization.
CO-3	**Construct** the SQL queries for Open source and Commercial DBMS - MYSQL, ORACLE, and DB2
CO-4	**Execute** using Query optimization algorithms
CO-5	**Optimize** its execution using Query optimization algorithms
CO-6	**Apply** various database constraints on relational databases.

List of Open Source Software/learning website:

1. http://www.codecademy.com/learn
2. www.photoshopessentials.com
3. www.adobeknowhow.com
4. http://www.webdevelopersnotes.com/tutorials/flash/

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Page 3 of 4

Diploma in Engineering
Subject Code: CO1306
Subject Name: Multimedia & Animation Techniques

5. http://www.adobe.com/devnet/flash.html
6. http://www.adobe.com/support/flash/tutorial_index.html
7. http://www.thefreecountry.com/webmaster/flash.shtm

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Page 4 of 4

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Shroff S.R. Rotary Institute of Chemical Technology

Diploma in Engineering
Subject Code: CO1307
Subject Name: Free and Open-Source Software

Semester: - V

Type of course: Open Elective

Prerequisite: Knowledge of Computer

Rationale: Be exposed to the context and operation of free and open-source software

(FOSS), Communities and associated software projects.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
2	0	2	3	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**FOSS Philosophy:** Understanding the FOSS Community and FOSS Philosophy, Benefits of Community based Software Development, Guidelines for working with FOSS community, Requirements for being open, free software, open-source software, FOSS Licensing Models, FOSS examples	**4**
2	**Linux:** Linux Installation and Hardware Configuration, Boot Process, Dual-Booting Linux and other Operating Systems, Kernel Options during Boot, X Windows System Configuration, System Administration (Server Administration, Backup and Restore Procedures, Strategies for keeping a Secure Server)	**5**

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Page 1 of 3

Diploma in Engineering
Subject Code: CO1307
Subject Name: Free and Open-Source Software

3	**Programming Tools and Techniques:** LibreOffice Tools; Samba: Cross platform; Introduction about LAMP; Brief Introduction to Programming using languages like Java /Python / Perl; Database Systems Mysql, PostgreSQL or equivalent	4
	SECTION-B	
4	**Tools:** Open-Source UML Tools, Introduction to Mobile Programming, Version Control Systems like SVN, Git or equivalent, Project Management Tools, Bug Tracking Systems, Package Management System	6
5	**Programming Languages:** Basic concepts of Python and Perl, Data-types, loops, Programming using languages like Python or Perl or Ruby	3
6	**Networking and Firewall Installation** Network installation, Wi-Fi Access point Configuration, Open-Source Firewall Installation, Configuration and Administration, User Creation, Monitoring and Restrictions.	4

Text Books:
1. "Linux in a Nutshell", Sixth Edition, OReilly Media, 2009 by Ellen Siever, Stephen Figgins, Robert Love, Arnold Robbins.

Reference Books:
1. Friends of OpenDocument, Inc., May 2013, ISBN 978-1921320323 by Jean Hollis Weber.

Practical List:
1. Demonstration of Open-source software's installation.
2. Installation of Linux.
3. Install and run various commands on LibreOffice.
4. Write program in java to display reverse of string.
5. Write program in python to print record of 10 students.
6. Design HTML form and retrieve the values in PHP script.

Diploma in Engineering
Subject Code: CO1307
Subject Name: Free and Open-Source Software

7. MySQL connectivity, INSERT, SELECT, DELETE with python.
8. Design UML diagram using open-source tools.
9. Write program using open-source tool for bug tracking.
10. Implement open source firewall installation.

Course Outcomes:
Student will be able to:

Sr. No.	CO statement
CO-1	**Describe** various free and open-source tools used for programming.
CO-2	**Examine** Linux basics, kernel options and system administration in detail.
CO-3	**Implement** various programming tools.
CO-4	**Use** open-source tools to find out Bug Tracking Systems, Package Management System.
CO-5	**Design** code for various languages like Python or Perl or Ruby.
CO-6	**Solve** various case studies of FOSS by practically.

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Page 3 of 3

Diploma of Engineering
Subject Code: CO1308
Subject Name: Business Information Systems

Semester: - V

Type of course: Humanities and Social Science course

Prerequisite: NA

Rationale: Understanding of basics of business and management related to computer and IT engineers.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	0	3	70	30	0	0	100

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Business and Management Information** Business Organization, Business Work Area, Business Information, Levels of Information, Categories of Information, Quality of Information, Management Information, Management Reports, System Theory, Deterministic and Probabilistic Systems, Closed and Open Systems, Regulation in Systems Open-loop Systems, Data systems and Users, User requirements, User/D.P. staff cooperation, User knowledge and training, Personnel- Steering committees	6
2	**Computer in Business** Development of Data Systems, Data transmission and real time D.P., Minicomputers, Characteristics of minicomputers, Microcomputers, Software, Networks, Office automation, Future developments, Structure of computer, Multiprocessing, Backing storage, Terminals, Computer configurations, Reliability of computer configurations, Data representation. Microcomputers, Memory, Processors, Backing storage, Visual display unit (VDU), Printers, Programming, Operation systems, Software, Large microcomputers, Portable microcomputers, Distributed processing, Data switching, Fiber optics, Real time and on line systems, Office automation, Word Processing, Electronic Mail, Videotext,	7

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Page 1 of 3

Diploma of Engineering
Subject Code: CO1308

Subject Name: Business Information Systems

	Electronics fund transfer (EFT)	
3	**Computer Files and Databases** Business Files, Data Storage Media, Direct Access File Organization, Data Modeling: Documenting Information Architecture, User's View of a Computerized Database, Database Management Systems (DBMS), Text Database and Hypertext, Evaluating Information Used in Business Processes, Models as Components of Information Systems	6
SECTION-B		
4	**Systems Investigation** General aspects, Planning the Systems Investigation, User's Information Requirements, Usage and Flow of Data, Current Activities, User Department Staffing, Current System Costs, Entity sets, Fact Finding Methods	6
5	**Systems Design** Design Philosophy, Code Number Systems, Output Subsystem, Logical File Subsystem, Input Subsystem, System Architecture, Security and Audit, Computer Job Scheduling, Costs and Savings of New System, System Documentation	6
6	**Communication, Decision Making and Different Types of Information System** Basic Communication Concepts-Personnel, Impersonal and Anonymous Communication-Time, place and Direction of Communication, Data Communication, Data Transmission, Types of Networks, Basic Decision Making Concepts, Steps for Decision Making Process, Transaction Processing System **Case Study** Account Payable System (ACPAYS) Design, Payroll System (PAYSY) Design, Inventory Management (INMANS) System Design	8

Reference Books:

1. Business Data Systems – H. D. Clifton
2. Business Systems for Microcomputers – William D. Haueisen & James L. Camp
3. System Analysis and Design- James A Semm
4. SADSE with Solved Case Studies by S.Parthasarathy & B.W. Khalkar

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Page 2 of 3

Shroff S.R. Rotary Institute of Chemical Technology

Diploma of Engineering
Subject Code: CO1308
Subject Name: Business Information Systems

Course Outcomes:

Students will be able to:

Sr. No.	CO statement
CO-1	**Understand** basics of Business and Management.
CO-2	**Learn** use of computers in business.
CO-3	**Examine** data capture & how to store in database
CO-4	**Analyze** user requirements and suggest system model.
CO-5	**Understand** how to design & implement system.
CO-6	**Exercise** business information system through different Case studies

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Page 3 of 3

Shroff S.R. Rotary Institute of Chemical Technology

Diploma in Engineering
Subject Code: MH1301
Subject Name: Indian Constitution

Semester: V

Type of course: Mandatory course

Prerequisite: None.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
1	0	0	1	50		0	0	50

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Introduction to Constitution** Meaning and importance of the Constitution, History of Indian Constitution, salient features of Indian Constitution. Preamble of the Constitution.	3
2	**Fundamental Rights** Fundamental rights – meaning and limitations, Right to equality, Right against exploitation, Right of freedom of religion Cultural and educational rights, Right to property, Directive principles of state policy.	7
3	**Fundamental Duties** Fundamental duties -their enforcement and their relevance.	3
	SECTION-B	
4	**Union Government** Union Executive- President, Vice-president, Prime Minister, Council of Ministers. Union Legislature- Parliament and Parliamentary proceedings. Union Judiciary-Supreme Court of India – composition and powers and functions.	5
5	**State Government** State Executive- Governor, Chief Minister, Council of Ministers. State Legislature-State Legislative Assembly and State Legislative Council. State Judiciary-High court.	5
6	**Election provisions, Emergency provisions, Amendment of the constitution**	5

Shroff S.R. Rotary Institute of Chemical Technology

Diploma in Engineering
Subject Code: MH1301
Subject Name: Indian Constitution

	Election Commission of India-composition, powers and functions and electoral process. Types of emergency-grounds, procedure, duration and effects. Amendment of the constitution- meaning, procedure and limitations.	

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
30	**35**	**25**	**5**	**5**	**0**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Textbook:-

1. "Introduction to the Constitution of India",4th Edition, Vikas publication,2005. M.V.Pylee
2. Durga Das Basu (DD Basu) , "Introduction to the constitution of India",(Student Edition),19th edition,Prentice-Hall EEE, 2008.
3. Constitution of India. D. D. Basu. (Prantice Hall of India Pvt. Ltd., New Delhi)
4. Constitution of India. D. K. Singh. (Eastern Book Company, Lucknow)
5. Constitution of India (P M Baxi)
6. Constitutional Law of India, Dr. J.N. Pandey, Central Law Agency
7. Introduction to the Consitution of India, Durga Das Basu, LexisNexis.
8. Indian Constitutional Law, M.P. Jain, LexisNexis
9. V.N.Shukla's Constitution of India, Mahndra Pal Singh, Eastern Book Company
10. Constitutional Law – I Structure, Udai Raj Rai, Eastern Book Company

Reference Book:-

1. Merunandan, "Multiple Choice Questions on Constitution of India", 2nd Edition,Meraga publication,2007.

Diploma in Engineering
Subject Code: MH1301
Subject Name: Indian Constitution

Course Outcomes:

Students should be able to

Sr. No.	CO statement
CO-1	**Understand** and explain the significance of Indian Constitution as the fundamental law of the land.
CO-2	**Exercise** his fundamental rights in proper sense at the same time identifies his responsibilities in national building.
CO-3	**Understand** the Fundamental Duties of the Indian Citizen to instill morality, social values, honesty, dignity of life and their social Responsbilities.
CO-4	**Analyse** the Indian political system, the powers and functions of the Union Governments in detail.
CO-5	**Analyse** the Indian political system, the powers and functions of the State and Local Governments in detail
CO-6	**Understand** Electoral Process, Emergency provisions and Amendment procedure.

Diploma in Engineering
Subject Code: CO1309
Subject Name: Introduction to E-Governance

Semester: - VI

Type of course: Program Core

Prerequisite: NA

Rationale: Understanding of basic principles e-governance and its importance. Basic fundamental of E-Commerce.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
2	0	0	2	70	30	0	0	100

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Introduction to E-Governance** Description of e-governance and its effect. Impact on society and structure of the e-governance.	3
2	**Models of E-Governance** Different models and its flow of information in e-governance. Impact of this model. Advantages and disadvantages of these models.	5
3	**Introduction to E-Commerce** Ideal about the usage of e-Commerce and its importance. Different models of e-commerce and their relationship. Usage of e-commerce and its application in day to day life.	5

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Page 1 of 2

Shroff S.R. Rotary Institute of Chemical Technology

Diploma in Engineering
Subject Code: CO1309
Subject Name: Introduction to E-Governance

	SECTION-B	
4	**Network management** Different network and security issues related in designing and implementing an e-Commerce, Cryptography and its different keys. Different protocols like SET, RSA and DES including the concept of digital signature.	5
5	**Tools** Introductory details and explanation of topics like CRM, E-Cash, supply chain management, reverse auction, digital envelop, E-Auction. Explanation about the web world that includes Multimedia, hypermedia, hypertext PEL, SGML, Introduction of webpage and how internet world works.	4
6	**Cyber Security** Describes about cyber section that includes IT ACT 2000, different cyber laws and its punishment on violation of these laws.	4

Text Books:
1. E-Governance In India Challenges And Strategies by Keerthiraj Orangebooks Publications.
2. E government: the science of the possible by J Satyanarayana PHI Learning.

Reference Books:
1. E-Governance by Pankaj Sharma.
2. E-Governance: Perspective And Challenges by Vishwas Tripathi Publisher: Anmol Publications Pvt. Ltd.

Course Outcomes:
Students will be able to:

Sr. No.	CO statement
CO-1	**Understand** the basic e-governance.
CO-2	**Illustrate** the concepts of models of E-Governance.
CO-3	**Analyze** different network security models applied in E-Governance.
CO-4	**Evaluate** the basics of Cyber Security.
CO-5	**Create** different multimedia file to incorporate into E-Governance system.
CO-6	**Examine** the tools used in modelling E-Governance framework.

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Page 2 of 2

Diploma in Engineering
Subject Code: CO1310
Subject Name: Mobile Application Development using Android

Semester: - V

Type of course: Program Core

Prerequisite: Basic knowledge of Java programming

Rationale: Android has an advantage of being open source. This course will enable the students to develop mobile application using Android.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
2	0	2	3	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Overview of Android** Introducing Android, The Android Application Components,Downloading and Installing Android, Android System with Architecture, Android Architecture, Development with Android – Platforms, Tools, Versions, Setup Android Environment, Developing and Executing thefirst Android Application, Building Blocks of Android Application, Work with Activity, Activity Lifecycle, Intents Fragments, Fragment Lifecycle	5
2	**Android UI And Component using Fragments** Create Android UI, Working with Layout, Create Custom Layouts, Work with UI Components and Events, Material Design Toolbar, Tab Layout, Recycler View and Card View, Android Menus: Custom Vs. System	4

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Page 1 of 4

Diploma in Engineering
Subject Code: CO1310
Subject Name: Mobile Application Development using Android

	Menus, Creating and Using Handset menu Button (Hardware), Android Themes, Dialog, create an Alter Dialog, Toast in Android, List & Adapters, Android Manifest.xml File	
3	**Database Connectivity** Storage in Android, Shared Preferences, Shared Preferences Layout, Android Requesting Permission at run time (Android 6.0), Work with SD Card and Files, Database in Android	3
	SECTION-B	
4	**Advanced Android Development** Google Map, Location Service and GPS, Creating Google Map, Work with Location, Location service with Location Manager, Find Current Location, Geo coding **Graphics and Animation** Work with 2D Graphics, Bitmap, Animation, Frame Animation, Tween Animation, View Animation, Multimedia in Android, Play Audio Files, Play Video Files **Work in Background Services** Notification Services, Broadcast Receiver Introduction to Firebase with simple CRUD Operation	5
5	**Work with android system** Text to Speech, Camera, Taking Picture with Camera, Manage Bluetooth Connection, Monitor and Manage Wi-Fi, Accelerometer Sensor & Gyroscope.	4
6	**Development and Deployment** Delvik Debug Tool, Logcat, Emulator Control, Device Control, Work with ADB, Connect Real Devices, Execute Application on Real Device, Publish your Application.	3

Text Books:

1. Android Application Development Black Book by Pradeep Kothari, DreamTech.
2. Beginning Android 4 Application Development by Wei Meng Lee, Wrox.

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Page 2 of 4

Diploma in Engineering
Subject Code: CO1310
Subject Name: Mobile Application Development using Android

Reference Books:
1. Android Wireless Application Development by Lauren Darcey, Shane Conder, Pearson U.
2. Professional Android 4 Application Development by Reto Meier, John Wiley & Sons, Inc.
3. Android Application Development by Rick Roger, John Lombardo, Zigurd Mednieks and Blake Meike, O'Reilly Media Inc.

Practical List:

1. Create "Hello World" application to "Hello World" in the middle of the screen in the red color with white background.
2. Write an Android application for calculator.
3. Design Login activity and implement control events: Use EditText, Checkbox and Buttons.
4. Write an android application to count library overdue.
5. Create a Recycler View and list the details of student using following fields: Name, Address, Photo (Image), Delete (Button Operation)
6. Write an android application to convert a ball from size of radius 2(colour red) to radius 4(colour blue) to radius 6 (colour green). The ball must rotate in circle for 1 minute before changing size and colour.
7. Design application to Save user data in a database
8. Write an application to mark the daily route of travel in map.
9. Write an application to record video and audio on topic "Intent" and play the audio and video.
10. Demonstrate use of Firebase to perform CRUD operation.

Course Outcomes:

Student will be able to:

Sr. No.	CO statement
CO-1	**Understand** Android architecture, activities and their life cycle.
CO-2	**Apply** the knowledge to design user interface using Android UI And Component

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Page 3 of 4

Shroff S.R. Rotary Institute of Chemical Technology

Diploma in Engineering
Subject Code: CO1310
Subject Name: Mobile Application Development using Android

CO-3	**Implement** system database, remote database operations using web services and Firebase
CO-4	**Create** application using map, location services, Graphics, android system and background services
CO-5	**Design** application which uses images, Bluetooth, WiFi, Sensor and video component.
CO-6	**Develop**, Publish and distribute Android Application.

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Page 4 of 4

Shroff S.R. Rotary Institute of Chemical Technology

Diploma in Engineering
Subject Code: CO1311
Subject Name: Network Management and Administration

Semester: - VI

Type of course: Program Elective

Prerequisite: Knowledge of Computer Network.

Rationale: Students must have fundamental knowledge of computer network, primarily for TCP/IP networks. The students of this course will be able to design, install, configure and experience hands-on management of typical network components. They will also be able to administer and manage the network.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
2	0	2	3	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Directory Services** Define Directory Service, Definition of Novelle Directory, Windows Domain, MS Active Directory, X500 Directory Access Protocol, Active **Directory Architecture:** Object Types, Object Naming, Canonical Names, LDAP Notation, Globally unique identifiers, User Principle Names, Domain, Trees & Forests, Remote Network Access, Virtual Private Network	5
2	**Networking Protocols** DHCP Origins, Reverse Address Resolution Protocol (RARP), The Bootstrap Protocol (BOOTP), IP Address assignments, DHCP Architecture, Introduction to Domain Name Systems (DNS)	5

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Page 1 of 4

Diploma in Engineering
Subject Code: CO1311
Subject Name: Network Management and Administration

	Network Printing Concepts: Locally Connected Print Devices, Setting up local Print Devices, Shared Print Devices, Describe Windows Network Printing and Add print Wizard.	
3	**Designing Network** Accessing Network Needs, Applications, Users, Network Services, Security and Safety, Growth and Capacity Planning, Meeting Network Needs – Choosing Network Type, Choosing Network Structure, Choosing Servers.	3
SECTION-B		
4	**Installing and Configuring Windows Server** Preparing for Installation, Creating windows server boot disk, Installing windows server, Configuring server/ client. 3.3 Setting windows server - Creating Domain controller, Adding the DHCP and WINS roles, Adding file server and print server, Adding Web based Administration	4
5	**Network Configuration** Working With User Accounts - Adding a User, Modifying User Account, Deleting or Disabling a User Account. Working With Windows Security Groups – Creating Group, Maintaining Group Membership. Working with Shares – Understanding Share Security, Cresting Shares	4
6	**Troubleshooting of Networking** Understanding the Problem – Troubleshooting, Segmenting the Problem, and Isolating the Problem, Setting Priorities. Troubleshooting Tools – Hardware Tools, Software Tools, Monitoring and Troubleshooting Tools Internal Security – Account Security, File and Directory permissions, Practices and user education	5

Text Book:

1. Introduction to Networking Bruce Hallberg Tata McGraw-Hill
2. Networking + Certification Training Kit, Microsoft Press by Richard A. McMahon

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Page 2 of 4

Shroff S.R. Rotary Institute of Chemical Technology

Diploma in Engineering
Subject Code: CO1311
Subject Name: Network Management and Administration

Reference Book:

1. The Complete Reference Networking, Tata McGraw Hill by Craig Zacker.
2. The Real World Network Troubleshooting Manual by Alan Sugano, Firewall Media
3. Networking A Beginner's Guide, Tata McGraw-Hill by Bruce Hallberg.

Practical List:

1. Execute Basic TCP /IP utilities and commands. (eg: ping, ipconfig, tracert, arp, tcpdump, whois, host, netsat, nslookup, ftp, telnet etc...).
2. Configure a router (Ethernet & Serial Interface) using router commands including access lists on any network simulator (eg. packet Tracer).
3. Configure VPN components and Set-up VPN.
4. Design and implement small network using actual physical components with IP address scheme.
5. Configuration of the following:
   a) Remote Login Service – TELNET/SSH
   b) Configuration of FTP server and accessing it via FTP Client.
6. Installing and configuring Linux Server.
7. Configure web server and FTP server.
8. Create new Users & assign privileges/ Permission.
9. Identify, Segment Network Faults and troubleshoot.
10. Manage Microsoft Windows Internet Security Services (WINS).

Course Outcomes:
Student will be able to:

Sr. No.	CO statement
CO-1	**Analyze** active Directory Architecture and Virtual Private Network.
CO-2	**Learn** various protocols like, process of IP address assignment and domain name system in detail.
CO-3	**Implement** user network services.
CO-4	**Create** windows server boot disk and Domain controller.
CO-5	**Use** Windows Security Groups and Windows Backup Windows Servers Backup

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Page 3 of 4

Diploma in Engineering
Subject Code: CO1311
Subject Name: Network Management and Administration

	Software.
CO-6	**Remember** Troubleshooting Tools, Troubleshooting Tools Internal Security.

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Diploma in Engineering
Subject Code: CO1312
Subject Name: Dynamic Webpage With Scripting Language

Semester: - VI

Type of course: Program Elective

Prerequisite: Basic knowledge of HTML and CSS.

Rationale: People want to see and interact with webpage on their computer, mobile or even TV sets. To design an application suitable for all kind of devices is a challenge of current technology. This course provides the knowledge necessary to develop dynamic web pages using HTML5, CSS3, javascript, jQuery and AJAX. The students of this course will be able to develop dynamic web based applications with multimedia elements. Hence the industries demand to develop interactive web pages/ web based applications is also satisfied by this course content.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
2	0	2	3	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**HTML 5** Semantic Page Elements (address, article, hgroup, menu, nav section), Inline semantic elements (Command, details, figcaption, figure, summary/details, time), Media elements (canvas, embed, source, svg), Event List (Onabort, Onafterprint, Onplay, Onpause, Onprogress, Onscroll, Onunload, Onvolumechange, Onwaiting) **Working with Canvas**	4

Diploma in Engineering
Subject Code: CO1312
Subject Name: Dynamic Webpage With Scripting Language

	canvas Basic concepts, Controlling file and stroke styles (colors, gradients, patterns), drawing essential shapes (drawing rectangles, drawing text, enhancing shapes with shadows), Drawing more complex shapes (Line-drawing options, Making arcs and circles, making quadratic curves, producing a bezier curve)	
2	**CSS3** **CSS3' new selection tools** attribute selection, not, nth-child, new pseudo-classes (link, visited, active, hover, focus, first-letter, first-line, first-child, before, after, language), @font-face, column support,text-stroke, text-shadow **Flexible Box layout Model** creating a flexible box layout, viewing a flexible box layout **New visual Elements** opacity, box-shadow, border-radius, Key Frames, Color values, gradients, image borders, reflections, rounded corners, shadows, transformations, transition animation, transparency **Medial Query** – Responsive Design/Web page	5
3	**Working with JavaScript** JavaScript concept, Origin of JavaScript, Advantages of java script, Java script syntax, Variables, Data Types, Operators, Literals, Array and Functions, JavaScript Control Statements	4
SECTION-B		
4	**Object Models in JavaScript** **Java script document object model** Learning DOM , Introducing object in Model, Form object, Window object, Document object, Browser object, Navigator object, The String Objects, Date and Math Object, use of Built in object, User defined object **The Document Object** Basic, Writing to Documents, Dynamic Documents **Form Object** Forms and Forms-based Data: The Form Object , Working With Form Elements and Their Properties, Button Object, Text Objects, Text Area Objects, Hidden Objects, Check Box Objects, Radio Button Objects, Selecting Objects	5

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Page 2 of 5

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Diploma in Engineering
Subject Code: CO1312
Subject Name: Dynamic Webpage With Scripting Language

	Form Validation Form Validation: A Process , Testing Data , Preparing Data for Validation and Reporting Results, Trapping Empty Fields, Finding Invalid Values, Intercepting the Submit Button, Validating Non-text Form Objects **Window Object** The window object, Dialog Boxes, Status Bar Messages, Window Manipulations **Dates and Math Objects** The Date Object, Using and manipulating dates, Displaying the date and time, Time Zones, Extracting the Date, Extracting the Hrs., The Math Object and its constants	
5	**Working with jQuery** **jQuery Events** Define events, Mouse Events (Click, dblclick,hover), Keyboard Events (keypress, keydown ,Keyup,Keyrelease), Form Events (submit ,Onload), Document/Window Events (load , resize ,scroll, unload,bind() and Event Helper) Method with Example	4
6	**Working with Ajax** **Ajax Basic** The purpose of basic, The XML Http Web Application, Callback function, Traditional Application, Web page Application, Use of HTML and Xml in Ajax **Passing Data** XML- Creating child function, Dynamic Table, Object Literals – Array, Object, Array in Objects, Objects in Array , JSON Introduction – Syntax, Advantages, Disadvantages **Ajax Application** Login Form, Preloaded Data, Feedback from using validation, Live search, Dynamic Dependable Dropdown using Ajax- Country, state and city Examples. **Jquery in Ajax**	4

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Diploma in Engineering
Subject Code: CO1312
Subject Name: Dynamic Webpage With Scripting Language

Text Book:

1. HTML 5, Black Book, dreamtech Press.
2. Learning jQuery, Jonathon chaffer and Karl Swedberg, O'Reilly Media.

Reference Book:

1. HTML 5 for dummies Quick Reference Inc. 2011, Wiley Publishing by Andy Harris.
2. Head First HTML and CSS 2nd Edition, Elisabeth Robson and Eric Freeman, O'Reilly Media ,2012.
3. Head First jQuery, Ryan Benedetti and Ronan Cranley, O'Reilly Media.

Practical List:

1. Write, test and debug small applications with HTML5 Semantic Page Elements, inline semantic elements, media semantic elements.
2. Write, test and debug small applications Using HTML5 and CSS3 tag.
3. Write, test and debug small applications with CSS3 using flexible box layout model.
4. Write, test and debug small applications with Canvas tag.
5. Write test and debug a JavaScript program illustrating the importance of 1. Document Object Model 2. Window Object Model. 3. Date and math Objects.
6. Write test and debug a jQuery program representing the use of hide(), show() and toggle() functions.
7. Write test and debug a program implementing jQuery fading methods.
8. Create a Registration form with validation using Ajax.
9. To get content of another file, using AJAX with JavaScript and Using JQuery Ajax method.
10. Write a program to creating image slider using javascript and to swap two images using javascript.

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Diploma in Engineering
Subject Code: CO1312
Subject Name: Dynamic Webpage with Scripting Language

Course Outcomes:

Student will be able to:

Sr. No.	CO statement
CO-1	**Create** and modify dynamic web assets using Canvas.
CO-2	**Design** form using HTML 5 and CSS 3.
CO-3	**Prepare** web page using Java script.
CO-4	**Implement** web page using object models in JavaScript.
CO-5	**Apply** jQuery on web based application.
CO-6	**Develop** web based application using AJAX.

Diploma in Engineering
Subject Code: CO1313
Subject Name: Fundamentals of Artificial Intelligence

Semester: - VI

Type of course: Program Elective

Prerequisite: Basic knowledge of computer programming, Algebra, Linear Algebra, Trigonometry, Statistics.

Rationale: Understanding of basic concepts of Artificial Intelligence.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	0	3	70	30	0	0	100

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Introduction** Overview of Artificial intelligence- Problems of AI, AI technique, Tic - Tac - Toe problem. Intelligent Agents, Agents & environment, nature of environment, structure of agents, goal based agents, utility based agents, learning agents. Problem Solving, Problem Space & search: Defining the problem as state space search, production system, problem characteristics, and issues in the design of search programs.	6
2	**Search techniques** Solving problems by searching: problem solving agents, searching for solutions; uniform search strategies: breadth first search, depth first search, depth limited search, bidirectional search, comparing uniform search strategies.	5

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Page 1 of 3

Diploma in Engineering
Subject Code: CO1313
Subject Name: Fundamentals of Artificial Intelligence

3	**Heuristic search strategies** Greedy best-first search, A* search, memory bounded heuristic search: local search algorithms & optimization problems: Hill climbing search, simulated annealing search, local beam search, genetic algorithms; constraint satisfaction problems, local search for constraint satisfaction problems.	8
	SECTION-B	
4	**Adversarial search** Games, optimal decisions & strategies in games, the minimax search procedure, alpha-beta pruning, additional refinements, iterative deepening.	7
5	**Introduction to Neural Network & Machine Learning** Machine Learning Concepts, Supervised, Unsupervised Learning, Applied Statistics, Natural, Face Detection, Sentiment Analyzer, Reinforcement, Object Detection, Tensor Flow and Neural Network, Motion Analysis and Object Tracking.	7
6	**Natural Language processing** Introduction, Syntactic processing, semantic analysis, discourse & pragmatic processing. Learning Forms, Inductive learning, learning decision trees, and explanation based learning, learning using relevance information, neural net learning & genetic learning.	6

Text Book:

1. Artificial Intelligence, , TMH by Ritch & Knight
2. Artificial Intelligence A Modern Approach, Stuart Russel Peter Norvig Pearson

Reference Books:
1. Expert Systems, Giarranto, VIKAS
2. M.C. Trivedi, Artificial Intelligence, Khanna Publishing House, New Delhi (AICTE Recommended Textbook – 2018)

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Page 2 of 3

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Diploma in Engineering
Subject Code: CO1313
Subject Name: Fundamentals of Artificial Intelligence

Course Outcomes:

Students will be able to:

Sr. No.	CO statement
CO-1	**Understand** the basic introductory portion of Artificial Intelligence.
CO-2	**Evaluate** the basics of Search techniques and modelling using AI.
CO-3	**Compare** the concepts of Heuristic search strategies and its application.
CO-4	**Inspect** the basic concepts of adversarial search.
CO-5	**Create** the basic concepts of knowledge & reasoning.
CO-6	**Remember** the basic concepts of NLP and its application.

Diploma in Engineering
Subject Code: CO1314
Subject Name: Introduction to Virtual Reality

Semester: - VI

Type of course: Program Elective

Prerequisite: Basic knowledge of computer graphics and concepts of linear algebra.

Rationale: Understanding of basic principles virtual reality followed by augmented reality and its application in various field of engineering. Thus developing an idea of how to an AR, VR application gets developed.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	0	3	70	30	0	0	100

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Introduction to Psychophysics** Sensation: physiological basis of visual, auditory and touch, Introduction to perception, basics of psychophysics, Psychophysical laws: Weber's law, Fechner's law and Steven's Power law; Psychophysical measurement of thresholds: Absolute Sensitivity, Differential Sensitivity	5
2	**Introduction to AR,VR & XR** Definition of X-R (AR, VR, MR), modern experiences, historical perspective, Hardware, sensors, displays, software, virtual world generator, game engines.	5

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Page 1 of 3

Shroff S.R. Rotary Institute of Chemical Technology

Diploma in Engineering
Subject Code: CO1314
Subject Name: Introduction to Virtual Reality

3	**Geometry of Visual World** Geometric modeling, transforming rigid bodies, yaw, pitch, roll, axisangle representation, quaternions, 3D rotation inverses and conversions, homogeneous transforms, transforms to displays, look-at, and eye transform, canonical view and perspective transform, viewporttransforms.	9
	SECTION-B	
4	**Light and Optics** Interpretation of light, reflection, optical systems, Visual Perception: Photoreceptors, Eye and Vision, Motion, Depth Perception, Frame rates and displays.	10
5	**Tracking** Orientation, Tilt, Drift, Yaw, Lighthouse approach, Head Mounted Display: Optics, Inertial Measurement Units, Orientation Tracking with IMUs, Panoramic Imaging and Cinematic VR, Audio	5
6	**Working with Mobile VR System** Working with Mobile VR in Unity: Unity XR, headset and controller tracking, loss of tracking, Unity core APIs related to XR functionality.	5

Text Books:

1. LaValle, (2016), Virtual Reality, Cambridge University Press.
2. Greengard, Samuel. Virtual reality. Mit Press, 2019.

Reference Books:
1. Jerald,J., (2015), The VR Book: Human-Centered Design for Virtual Reality, Morgan & Claypool

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Page 2 of 3

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Diploma in Engineering
Subject Code: CO1314
Subject Name: Introduction to Virtual Reality

Course Outcomes:

Students will be able to:

Sr. No.	CO statement
CO-1	**Understand** the basic of sensation & perception which is the preparatory requirement of understanding how a VR system is developed.
CO-2	**Inspect** the basics of Psychophysics
CO-3	**Identify** the concepts of transformation of an object in real world and apply those concepts to develop a VR system.
CO-4	**Implement** the basics the geometry of the visual world.
CO-5	**Apply** the basic physical laws to understand the light and optics and how it works in case of VR System.
CO-6	**Evaluate** the basic concepts of mobile VR application.

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Page 3 of 3

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Diploma in Engineering
Subject Code: CO1315
Subject Name: Internet of Things

Semester: - VI

Type of course: Open Elective

Prerequisite: Basic knowledge computer networks and related courses

Rationale: The Internet of Things is a new Eco-system of actual items that are, associated, connected and open through the web in all real time. This course will enable Graduate students to understand the basics building blocks of Internet of things and its related architecture and protocols. It will introduce them and aware them about areas where Internet of Things can be applied. Students will learn about the middleware, hardware for Internet of Things.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	0	3	70	30	0	0	100

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Introduction to Internet of Things** IoT Definition, IoT characteristics, M2M and IoT, End to End IoT Architecture, Physical design of IoT, Logical Design of IoT, Overview of IoT protocols, IoT levels and deployment templates, Challenges for IoT, Interdependencies of IoT and cloud computing, Web of things.	6
2	**Embedded IoT Devices** Sensors and actuators for IoT applications, IoT components and implementation, Programming of Node MCU and Raspberry PI, Implementation of IoT with Edge devices, Reading sensor data and	8

Diploma in Engineering
Subject Code: CO1315
Subject Name: Internet of Things

	transmit to cloud, Controlling devices through cloud using mobile application and web application, Types and configurations of gatways, Specifications of IoT gateways (Practical aspects of this chapter should be covered during lab sessions)	
3	**Communication Protocols used in IoT** Link layer protocols, Network/internet layer protocols, Transport layer protocols, Application layer protocols: Hypertext transfer protocol (HTTP), Systematic HTTP access methodology, Web Socket, Constrained application protocol CoAP), Message Queue Telemetry Transport Protocol (MQTT), XMPP, DDS, AMQP	6
SECTION-B		
4	**IoT Application Development** Solution framework for IoT applications- Implementation of Device integration, Data acquisition and integration, Device data storage-Unstructured data storage on cloud/local server, Authentication, authorization of devices, Road categories of IoT applications, Consumer IoT, Commercial IoT, Industrial IoT, Infrastructure IoT, Military Things (IoMT)	6
5	**IoT Security and Challenges** IOT Security, Dangers, Assigning values to Information, Security Components, Key Management, Update Management, Challenges in IoT security. **IoT Case studies** Home automation with IoT, River water pollution monitoring, Smart city street light control and monitoring, Health care monitoring, Voice Apps on IoT device	7
6	**Ethics in IoT** Characterizing the IoT, Privacy, Control (Disrupting Control, Crowd sourcing), Environment (Physical thing, Electronics, Internet service), Solutions (The IoT as a part of the solution, cautious optimism, The open IoT definition)	6

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Page 2 of 3

Shroff S.R. Rotary Institute of Chemical Technology

Diploma in Engineering
Subject Code: CO1315
Subject Name: Internet of Things

Text Book:

1. Internet of Things – A Hands on Approach, by Arshdeep Bahga and Vijay Madisetti Universities Press, ISBN: 9788173719547.
2. Designing the Internet of Things by Adrian McEwen & Hakim Cassimality Wiley India, ISBN: 9788126556861 (Unit VI)

Reference Books:

1. Internet of Things (A Hands-on Approach) by Vijay Madisetti and Arshdeep Bahga, 1st Edition, VPT, 2014.
2. Rethinking the Internet of Things: A Scalable Approach to Connecting Everything by Francis da Costa, 1stEdition, Apress Publications, 2014
3. Getting Started with the Internet of Things by Cuno Pfister, O Reilly Media, 2011.

Course Outcomes:

Student will be able to:

Sr. No.	CO statement
CO-1	**Create** the vision of IoT from a global context.
CO-2	**Understand** working and implementation of different IoT devices.
CO-3	**Apply** the different protocols and their purposes used to communicate in IoT.
CO-4	**Evaluate** the application development of IoT in various Domains.
CO-5	**Analyze** the different IoT security and challenges.
CO-6	**Remember** the Ethics in IoT.

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Page 3 of 3

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Diploma in Engineering
Subject Code: CO1316
Subject Name: Cloud Computing

Semester: - VI

Type of course: Open Elective

Prerequisite: Basic knowledge of computer programming and familiarity with database.

Rationale: Understanding of basic principles of cloud and their operation. Application of cloud and its features to study.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	0	3	70	30	0	0	100

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Introduction of Cloud Computing** Defining a Cloud, Cloud Types – NIST model, Cloud Cube, model, Deployment models (Public , Private, Hybrid and Community Clouds), Service Platform as a Service, Software as a Service with examples of services/ service providers, models – Infrastructure as a Service, Cloud Reference model.	7
2	**Classification of Cloud Computing:-** Characteristics of Cloud Computing – a shift in paradigm Benefits and advantages of Cloud Computing, A brief introduction on Composability, Infrastructure, Platforms, Virtual Appliances, Communication Protocols, Applications, Connecting to the Cloud by Clients, IaaS – Basic concept,	7

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Diploma in Engineering
Subject Code: CO1316
Subject Name: Cloud Computing

	Workload, partitioning of virtual private server instances, Pods, aggregations, silos PaaS – Basic concept	
3	**Use of Application in Cloud** Use of PaaS Application frameworks, Discussion of Google Applications Portfolio – Indexed search, Dark Web, Aggregation and disintermediation, Productivity applications and service, Adwords, Google Analytics, Google Translate, a brief discussion on Google Toolkit (including introduction of Google APIs in brief).	6
	SECTION-B	
4	**Cloud Infrastructure** Cloud Management: An overview of the features of network management systems and a brief introduction of related products from large cloud vendors, Monitoring of an entire cloud computing deployment stack – an overview with mention of some products.	8
5	**Concepts of Services and Applications** Service Oriented Architecture: Basic concepts of message-based transactions, Protocol stack for an SOA architecture, Event-driven SOA, Enterprise Service Bus, Service catalogs,	5
6	**Applications in the Cloud** Concepts of cloud transactions, functionality mapping, Application attributes, Cloud service attributes, System abstraction and Cloud Bursting, Applications and Cloud APIs Cloud-based Storage: Cloud storage definition – Manned and Unmanned Webmail Services.	6

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Diploma in Engineering
Subject Code: CO1316
Subject Name: Cloud Computing

Text Books:

1. Cloud Computing-Principles and Paradigms-Raj Kumar Buyya Willey Publication.
2. Cloud Computing-by US Pandey-S Chand Publication.

Reference Books:
1. Cloud Computing- New Age International Publication by Dr.Rajiv Chopra.
2. Cloud Computing -Laxmi Publication Chennai by R Ruhin Kouser.

Course Outcomes:

Students will be able to:

Sr. No.	CO statement
CO-1	**Understand** the basic of cloud and its proper application.
CO-2	**Analyze** the concepts of infrastructure used in developing a cloud computing.
CO-3	**Apply** different algorithm used for developing.
CO-4	**Create** the different services and application of cloud.
CO-5	**Evaluate** different services of cloud computing based on the application.
CO-6	**Remember** the basic computational models of cloud.