Curriculum for

POST GRADUATE DIPLOMA COURSE
In WEB DESIGNING
For the State of Uttar Pradesh

Prepared by:

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Approved By:

BTE,UP,LUCKNOW

APPROVED IN CDC MEETING DATED 26-09-2021

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FIRST SEMESTER

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PREFACE

An important issue generally debated amongst the planners and academicians world over is how technical education can contribute to sustainable development of the societies struggling hard to come in the same bracket as that of the developed nations. The rapid industrialization and globalization have created an environment for free flow of information and technology through fast and efficient means. This has led to shrinking of the world, bringing people from different culture and environment together and giving rise to the concept of world turning into a global village. In India, a shift has taken place from the forgettable years of closed economy to knowledge based and open economy in the last few decades. In order to cope with the challenges of handling new technologies, materials and methods, we have to develop human resources having appropriate professional knowledge, skills and attitude. Technical education system is one of the significant components of the human resource development and has grown phenomenally during all these years. Now it is time to consolidate and infuse quality aspect through developing human resources, in the delivery system. Polytechnics play an important role in meeting the requirements of trained technical manpower for industries and field organizations. The initiatives being taken by the State Board of Technical Education, UP to revise the existing curricula of diploma programmes as per the needs of the industry and making them NSQF compliant, are laudable.

In order to meet the requirements of future technical manpower, we will have to revamp our existing technical education system and one of the most important requirements is to develop outcome-based curricula of diploma programmes. The curricula for diploma programmes have been revised by adopting time-tested and nationally acclaimed scientific method, laying emphasis on the identification of learning outcomes of diploma programme.

The real success of the diploma programme depends upon its effective implementation. However best the curriculum document is designed, if that is not implemented properly, the output will not be as expected. In addition to acquisition of appropriate physical resources, the availability of motivated, competent and qualified faculty is essential for effective implementation of the curricula.

It is expected from the polytechnics to carry out job market research on a continuous basis to identify the new skill requirements, reduce or remove outdated and redundant courses, develop innovative methods of course offering and thereby infuse the much needed dynamism in the system.

Manoj Kumar
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Kanpur, U.P.

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5. All the participants from industry/field organizations, engineering colleges, polytechnics and other technical institutions for their professional inputs during curriculum workshops.

6. Faculty/Subject Experts from U.P. Government polytechnics

Coordinator
Institute of Research Development & Training,
Kanpur, U.P.

1. SALIENT FEATURES OF Post Graduate DIPLOMA in Web Designing

1)	Name of the Programme	:	P.G. Diploma in Web Designing
2)	Duration of the Programme	:	One year (Two Semesters)
3)	Entry Qualification	:	Graduation or equivalent NSQF Level as Prescribed by State Board of Technical Education, UP
4)	Intake	:	60 (or as prescribed by the Board)
5)	Pattern of the Programme	:	Semester Pattern
6)	NSQF Level	:	Level - 8
7)	Ratio between theory and Practice	:	1 : 2 (Approx.)

8) Industrial Training

Two weeks of industrial training is included after Ist semester during summer vacation. Total marks allotted to industrial training will be 50.

9) Student Centred Activities

A provision of 3-6 hrs. per week has been made for organizing Student Centred Activities for overall personality development of students. Such activities will comprise of co–curricular activities such as expert lectures, self study, games, hobby classes like photography, painting, singing etc. seminars, declamation contests, educational field visits, NCC, NSS and other cultural activities, disaster management and environmental safety etc.

10) Project work

A project work in the 2nd semester has been included in the curriculum to enable the students to get familiar with the practices and procedures being followed in the industries and provide an opportunity to work on some live projects in the industry.

2. EMPLOYMENT OPPORTUNITIES FOR PG DIPLOMA HOLDERS IN WEB DESIGNING

PG Diploma holders in Web Designing can find employment in following sectors:

(1) Service Division (IT enabled services, maintenance service and installation of computer services)
(2) Assembly and Quality Control Division
(3) Software Development and Testing Industries
(4) Web Development Industries
(5) Mobile Applications Development
(6) Junior Level Data Analytics
(7) Industry Automation
(8) E-Commerce Support Engineer
(9) News and Newspaper/Agencies, Magazines
(10) Data Entry and MIS/ERP Operator
(11) Lab. Assistant/Technician
(12) Hospitals/Healthcare/Institutions/Schools
(13) Cloud Services Support Engineer
(14) Publishing Industry
(15) Animation Industry
(16) Data Processing Industry
(17) Marketing Division (Corporate Handling, SME, Institutional Segment, Government Tender Business)
(18) Telecommunication Sector
(19) Teaching Organizations (Polytechnics, Vocational Institutions etc)
(20) Networking (LAN, WAN etc)
(21) Defense Services/Police Services/Cyber Services/Forensic Services
(22) Call Centres, BPO etc.

While in employment, the following areas of activity in different organisations (industry and service sector) are visualized for PG diploma holders in Web Designing:

- Programming customer based applications including web page designing
- Testing and maintenance of web applications
- Marketing of software and hardware
- Teaching and training at educational institutions
- Self employment – call centres, BPO, EPO etc.
- Cyber Cafés

Various Designations for PG diploma holders in Web Designing:

(1) Service engineer/customer support engineer/maintenance engineer in installation, maintenance and service of computer systems and networking
(2) Assembly supervisor in manufacturing and production activity
(3) Data entry operator, computer operator, DTP operator, technician
(4) Technical Assistant/junior engineer in quality control and testing activities of computer systems manufacturing
(5) Junior marketing executive/junior sales executive/sales engineer in marketing activities
(6) Junior/senior technical assistant in R&D laboratories and educational institutions to help in maintaining computers and networks
(7) Test engineers in process industry
(8) Web Server administrator

3. LEARNING OUTCOMES OF PG DIPLOMA HOLDERS IN WEB DESIGNING:

After undergoing this programme, students will be able to:

1.	Work on different software for PowerPoint presentation and communicate ideas electronically
2.	Write, compile and debug program using different programming constructs
3.	Create, manage and secure database
4.	Design, develop and host websites using internet technologies
5.	Communicate effectively in English with others
6.	Writing CV/ Resume
7.	Facing a Mock Interview
8.	Set-up, diagnose problems, troubleshoot computer, servers & networks and implementing security measures for web development.
9.	Write and debug simple as well as complex program in Python/PHP
10.	Apply the acquired knowledge and skills in solving live problems in the Computer and I.T. industry
11.	Installation & administration of Web Server
12.	Perform data backups
13.	Use open source tools and software
14.	Handle malware and viruses
15.	Install and manage operating system and application softwares
16.	Implementing security measures for web-based applications.

4. DERIVING CURRICULUM AREAS FROM LEARNING OUTCOMES OF THE PROGRAMME

The following curriculum area subjects have been derived from learning outcomes:

1.	Work on different Web Designing Tools for manipulating images, creating web graphics, animation etc.	Web Designing Tools
2.	Write, compile and debug program using different programming constructs	Computer Programming Using Python
3.	Create, manage and secure database	Database Management System
4.	Design, develop and host websites using internet technologies	Internet And Web Technology
5.	Communicate effectively in English with others	Soft Skills, Student Centered Activities
6.	Writing CV/ Resume	Soft Skills
7.	Facing a Mock Interview	Soft Skills
8.	Set-up, diagnose problems, troubleshoot computers, servers & networks andimplementing security measures for web development.	Information Security And IT Laws, Web Server Administration
9.	Write and debug simple as well as complex program in Python/PHP	Computer Programming Using Python, Web Development Using PHP
10.	Apply the acquired knowledge and skills in solving live problems in the Computer and I.T. industry	Project
11.	Installation and administration of Web Server	Web Server Administration
12.	Perform data backups	Database Management System
13.	Use open source tools and software	Computer Programming Using Python, Web Designing Tools, Database Management System, Web Development Using PHP, Web Server Administration
14.	Handle malware and viruses	Information Security and IT Laws
15.	Install and manage operating system and application software	Basics of Computer and Information Technology
16.	Implementing security measure for web based applications	Web Server Administration, Information Security And IT Laws

5. ABSTRACT OF CURRICULUM AREAS

a) General Studies

1. Soft Skills

b) Basic Courses in Engineering/Technology

2. Basics of Computer and Information Technology

c) Applied Courses in Engineering/Technology

3. Internet and Web Technology
4. Database Management System
5. Computer Programming using Python
6. Web Designing Tools
7. Web Development using PHP
8. Web Server Administration
9. Information Security & IT Laws

d) Industrial Training

10. Project Work

6. HORIZONTAL AND VERTICAL ORGANISATION OF THE SUBJECTS

Sr. No.	Subjects	Distribution in Periods per week in Various Semesters	
		I	II
1.	Basics of Computer And Information Technology	8	-
2.	Internet And Web Technology	10	-
3.	Database Management System	10	-
4.	Computer Programming Using Python	10	-
5.	Web Designing Tools	8	-
6.	Web Development Using PHP	-	10
7.	Web Server Administration	-	10
8.	Information Security And IT Laws	-	8
9.	Soft Skills	-	6
10.	Project	-	8
11.	Student Centered Activities	2	2
Total		**48**	**44**

7. STUDY AND EVALUATION SCHEME FOR PG DIPLOMA PROGRAMME IN WEB DESIGNING

FIRST SEMESTER

Sr. No.	SUBJECTS	STUDY SCHEME Periods/Week			Credits	MARKS IN EVALUATION					
						INTERNAL ASSESSMENT			EXT ASSE		
		L	**T**	**P**		*Th*	**Pr**	**Tot**	**Th**	**Hrs**	
1.1	BASICS OF COMPUTER AND INFORMATION TECHNOLOGY	4	-	4	5	20	10	30	50	2 ½	
1.2	*INTERNET AND WEB TECHNOLOGY	4	-	6	5	20	30	50	50	2 ½	
1.3	*DATABASE MANAGEMENT SYSTEM	5	-	5	6	20	30	50	50	2 ½	
1.4	*COMPUTER PROGRAMMING USING PYTHON	4	-	6	5	20	30	50	50	2 ½	
1.5	WEB DESIGNING TOOLS	4	-	4	3	20	30	50	50	2 ½	
#Student Centered Activities		-	-	2	1		35	35	-	-	
Total		**21**		**27**	**25**	**100**	**165**	**265**	**250**	**-**	

* Common course Content with CS/IT diploma programmes

\# Student Centered Activities will comprise of co-curricular activities like extension lectures, games, hobby clubs declamation contests, educational field visits, N.C.C., NSS, Cultural Activities, self study etc.

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SECOND SEMESTER (PG DIPLOMA PROGRAMME IN WEB DESIGNING)

Sr. No.	SUBJECTS	STUDY SCHEME Periods/Week			Credits	MARKS IN EVALUATION SCHEME								Total Marks of Internal & External
						INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT					
		L	T	P		*Th*	Pr	Tot	Th	Hrs	Pr	Hrs	Tot	
2.1	*WEB DEVELOPMENT USING PHP	4	-	6	6	20	30	50	50	2 ½	50	3	100	150
2.2	WEB SERVER ADMINISTRATION	4	-	6	6	20	30	50	50	2 ½	50	3	100	150
2.3	*INFORMATION SECURITY AND IT LAWS	4	-	4	5	20	30	50	50	2 ½	50	3	100	150
2.4	^SOFT SKILLS	2	-	4	4	20	10	30	50	2 ½	20	3	70	100
2.5	PROJECT I: Industrial Training II: Project	 - -	 - -	 - 8	 2 4	-	 50 50	 50 50	-	-	 100	 4	 100	 200
#Student Centred Activities		-	-	2	1		35	35	-	-	-	-	-	35
Total		**14**	**-**	**30**	**28**	**80**	**235**	**315**	**200**	**-**	**270**	**-**	**470**	**785**

*Common course Content with CS/IT diploma programme.

^Common course content with Computer Hardware & Networking diploma programme.

Student Centred Activities will comprise of co-curricular activities like extension lectures, games, hobby clubs e.g. photography etc., seminars, declamation contests, educational field visits, N.C.C., NSS, Cultural Activities and self study etc.

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8. GUIDELINES FOR ASSESSMENT OF STUDENT CENTRED ACTIVITIES (SCA)

It was discussed and decided that the maximum marks for SCA should be 35 as it involves a lot of subjectivity in the evaluation. The marks may be distributed as follows:

A) i. 10 Marks for general behavior and discipline
(by HODs in consultation with all the teachers of the department)

ii. 5 Marks for attendance as per following:
(by HODs in consultation with all the teachers of the department)

a)	75 - 80%	2 Marks
b)	80 - 85%	4 Marks
c)	Above 85%	5 Marks

iii. 15 Marks maximum for Sports/NCC/Cultural/Co-curricular/ NSS activities as per following:
(by In-charge Sports/NCC/Cultural/Co-curricular/NSS)

a)	15	-	State/National Level participation
b)	10	-	Participation in two of above activities
c)	5	-	Inter-Polytechnic level participation

iv. *5 Marks for completing Min. 3 hrs. duration Online Course (Open Source)/Workshop related to Computer/IT domain.*

Note: There should be no marks for attendance in the internal sessional of different subjects.

1.1 BASICS OF COMPUTER AND INFORMATION TECHNOLOGY

L	T	P
4	-	4

RATIONALE

The PG diploma holders in Web Designing needs to understand computer fundamentals and concepts of information technology. They should be able to operate basic software related to computer. Hence this subject is introduced in the curriculum.

LEARNING OUTCOMES

After undergoing the subject, the students will be able to:

- Understand the components of a computer system i.e. hardware and software components, which are essential for working with computer system.
- Understand the operating system as the interface to the computer system.
- Outline various application of IT.
- Differentiate between assembly language and high-level language.
- Identify various web browser.
- Use the Internet to send mail and surf the World Wide Web.

DETAILED CONTENTS

1. Fundamentals of Computer (12 Periods)

   Historical evolution of computers, Generations of computers, Classification of computers – based on size, processor, Usefulness of Computers. Applications of computers, Block Diagram along its components and characteristics, Interaction between the CPU, Memory Input/output devices, function of CPU and major functional parts of CPU. State the relevance of speed and word length for CPU Performance, Recognize the current family of CPUs used in Computers, Types of Memory- RAM ROM, Monitor, Mouse, Keyboard, Disk, joysticks, Storage Devices, floppy disk, CD, DVD, Pen drive, trackballs, Printers Types of printers, Scanner, Modem, Video, Sound cards, Speakers

2. Data Representation (08 Periods)

   Definition Of Information, difference between data and information ,importance of Binary Number System, various number systems, Conversion from Decimal to Binary, Conversion from Binary to Decimal, binary number into hexadecimal number, hexadecimal number into binary number System, Memory Addressing and its Importance, ASCII and EBCDIC coding System

3. DOS & Windows Operating Systems (12 Periods)

   Hardware and Software, Types of Softwares, Introduction and need of operating system, Types of operating system, dos operating system, Types of dos Commands, operating system as a resource manager; BIOS; System utilities – Editor, Loader, Linker, File Manager. Concept of GUI and CUI standards. Directories and files , wild cards, autoexec.bat, config.sys, features of

Window desktop, components of Window, function of each component of Window, method of starting a program using start button, Understand maximize, minimize, restore down and close button, uses of file and folder, method of viewing the contents of hard disk drive using explore option, control panel,disk defragmentation installation and un installation of the application software.

4. Linux (12 Periods)

Structure, Kernel and Shell, Basic command, File system, VI editor, LINUX Installation

5. Fundamentals of Internet (12 Periods)

Concepts of computer Network, Client Server Model, Peer to Peer Model, Networking Devices: Switch, Router, Hub, Bridge, Gateway, LAN, MAN, WAN, Topology, Internet, Intranet, Extranet, internet service provider and its relevance, role of the modem in accessing the internet, installation procedure of a modem using control panel, purpose of web browser software, URL,URI, URN, WWW, FTP, HTTP, RDC(Remote Desktop Connection), Telnet, Email, process of sending and receiving e-mail, transmission modes, IP address and its format, MAC Address, DNS, search engines, social network sites, internet security, Firewall, Cloud Computing and its services.

LIST OF PRACTICALS

1. Familiarization with Computer System and its peripheral devices
2. Familiarization with Operating System
3. Practice of internal and external commands of DOS
4. Working practice on windows operating system : creating file, folder. Copying, moving, deleting file, folder
5. Installing and uninstalling of new software using control panel.
6. Installation and uninstallation of new hardware drivers using control panel.
7. Disk defragmentation using system tool
8. Procedure of disk partition and its operation (Shrinking, Extending, Delete, Format).
9. Installation of Operating Systems
10. Practice of Basic Linux Commands
11. Changing System Date and Time.
12. User Account creation and its feature on Windows Operating System
13. Email Account creation, reading, writing and sending emails with attachments.
14. Internet browsing using browsers.
15. Using of Search Engine to get information from internet

INSTRUCTIONAL STRATEGY

Since this subject is practice oriented, the teacher should demonstrate the capabilities of computers to students while doing practical exercises. The students should be made familiar with computer parts, peripherals, connectors etc. and proficient in making use of operating system functionalities in addition to working on internet. The student should be made capable of working on computers independently

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Actual laboratory and practical work, exercises and viva-voce
- Software installation, operation, development and viva-voce

RECOMMENDED BOOKS

1. Fundamentals of Computer by E Balagurusamy, Tata McGraw Hill Education Pvt. Ltd, New Delhi
2. Fundamentals of Computer by V Rajaraman; Prentice Hall of India Pvt. Ltd., New Delhi
3. Computer Fundamentals by RS Salaria; Khanna Book Publishing Co. (P) Ltd., New Delhi
4. Computers Today by SK Basandara, Galgotia publication Pvtltd. Daryaganj, New Delhi.
5. Computer Fundamentals and Programming in C by ReemaThareja; Oxford University Press, New Delhi
6. Computer Fundamentals by PK Sinha; BPB Publication, New Delhi
7. e-books/e-tools/relevant software to be used as recommended by AICTE/UPBTE/NITTTR.

Websites for Reference:

http://swayam.gov.in
http://spoken-tutorial.orgs

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1	12	20
2	08	20
3	12	20
4	12	20
5	12	20
Total	**56**	**100**

1.2 INTERNET AND WEB TECHNOLOGY

L	T	P
4	-	6

RATIONALE

The P.G. diploma holders in Web Designing needs to understand about Internet, Web Space and how to develop static website. They should be able to develop basic static websites by using different front-end Technologies which can run on mobile browsers as well. Hence this subject is introduced in the curriculum.

LEARNING OUTCOMES

After undergoing the subject, the students will be able to:

- understand working of Internet/ Websites, Client Server Model and Internet Tools.
- understand and develop HTML Web pages.
- provide logics on the web pages by using JavaScript
- use Bootstrapto develop responsive website
- control the Look and feel of web pages by using CSS
- use JQuery for developing the Web Pages
- develop Static webpage/web portal

DETAILED CONTENTS

1. Web Development Introduction (04 Periods)

   Internet, WWW, Browser, Search engine Client Server Model, URL, Web Pages, Website and Web Services, Types of Websites (Static, Dynamic and Responsive), Developer options of Browser (View page source, Developer Tools, Inspect Element etc)

2. HTML (10 Periods)

   Basics:
   HTML Document, Basic Structure of HTML, Syntax, HTML Tags and Attributes, Types of HTML Tags, Rules of nesting, Basic Tags (HTML Tag. Head Tag, Title Tag, Body Tags).
   Page Formatting:
   Adding a new Paragraph, Adding a line break, Inserting a blank space , changing page background , Divand Span tags
   Text Formatting:
   Html Headings, Formatting elements (<b> Bold text , Important text ,<i> Italic text , Emphasized text , <mark> Marked text, <small> Small text, <del> Deleted text, <ins> Inserted text, <sub> Subscript text, <sup> Superscript text), Comments, Horizontal Lines
   Creating Lists:Ordered List, Unordered Lists, Definition Lists
   Others:
   Images, Text Links, Image Links, opening a page in New Window or Tab, Linking to an area of same page, Introduction to Table Tags, Advantages and limitations of tables, Frames & IFrame, HTML Forms , XHTML

3. Cascading Style Sheets (08 Periods)

Introduction, Benefits of CSS, CSS Syntax, CSS Implementation (inline, internal and external), CSS Selectors (ID Selectors, Class Selectors, Grouping Selectors, Universal Selectors, CSS Pseudo-classes), CSS properties (background-color, background-image, border-style, height, width, color, text-align, font-family, font-style, font-size, font-weight), Box Model in CSS(margin, border, padding)

4. Java Scripts (10Periods)
   Java Script Introduction , variables , data types , operators, control flow (if-else, for loop , while loop , do-while loop) , Declaring Functions , Calling functions with parameters, Adding JavaScript to Web Documents, JavaScript Objects , Document Object Models, HTML Events and calling Java Script functions on Events.

5. JQUERY (09 Periods)
   JQuery Concept, Adding JQuery to Web Page, JQuery Selectors, JQuery Event Methods, JQuery Effects (Hide/Show, Fade, Slide), Insertion of header /footer in HTML Pages using JQuery

6. Bootstrap (09 Periods)
   Color Management, Buttons, Table, drop-down, navigation-bar, images, pagination, jumbotron, alerts, forms, progress bar, grid, utilities & filters

7. XML & JSON (06 Periods)
   Introduction and use of XML, Difference between XML and HTML, XML Elements, Attribute, Name space, Syntax Rules, XML DTD and XML Schema, RSS FEED, JSON Introduction and uses, JSON v/s XML, JSON Syntax.

LIST OF PRACTICALS

1. Install, configure and start using developer tools /Code Editor/Browser
2. Creating Web Pages using different HTML tags
3. Control the look and feel of Web Page Styling by using CSS.
4. Write JavaScript functions and control the different companonets of Web page by predeifned javascript objects
5. Validation of Form fields using Java Script
6. Use jQuery library to apply different features on web pages.
7. Use Bootstrap library and icons to develop a responsive websites

INSTRUCTIONAL STRATEGY

Since this subject is practice oriented, the teacher should demonstrate the capabilities of websites/WebPages to students while doing practical exercises. The students should be made familiar with developing web pages by code editor/browsers, working on internet. The student should be made capable of developing static websites by using HTML, JavaScript, CSS and jQuery and Bootstrap

MEANS OF ASSESSMENT

– Assignments and quiz/class tests, mid-term and end-term written tests

- Actual laboratory and practical work, exercises and viva-voce
- Software installation, operation, development and viva-voce

RECOMMENDED BOOKS

1. Head First HTML and CSS: A Learner's Guide to Creating Standards-Based Web Pages , O Reilly Publications by Elisabeth Robson Eric Freeman
2. Head First JavaScriptProgramming, O Reilly Publications by Eric FREEMAN
3. Head First jQuery, O Reilly by Ryan Benedetti, Ronan Cranley
4. Web Technologies, Black Book, Kogent Learning Solutions Inc
5. Developing Web Applications, 2ed ,WileyPublications, M.T.Savaliya
6. Mastering Bootstrap 4, by Benjamin Jakobus and Jason Marah, Packt Publishing
7. e-books/e-tools/relevant software to be used as recommended by AICTE/UPBTE/NITTTR, Chandigarh.

Websites for Reference:

1. http://swayam.gov.in
2. http://spoken-tutorial.org

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1	04	7
2	10	18
3	08	15
4	10	18
5	09	16
6	09	16
7	06	10
Total	**56**	**100**

1.3 DATABASE MANAGEMENT SYSTEM

L	T	P
5	-	5

RATIONALE

The PG. diploma holders in Web Designing need to understand about Relational Data base to manage the data at backend for different applications. They should be able to develop basic table and write query to fetch the required data. Hence this subject will remain the part of this curriculum.

LEARNING OUTCOMES

After undergoing the subject, the students will be able to:

- understand the concept of Database system and Client Server Architecture
- understand and develop the concepts of Data Modeling, Security and Integrity.
- convert and compare the designs and differentiate between the keys
- understand and execute different SQL queries and PL / SQL programs
- convert database in the form of table
- normalize the database using normal forms.
- understand the concept of query processing and Transaction processing

DETAILED CONTENTS

1. Database System Concept & Data Modeling (10 Periods)

   Basic concepts, Advantages of a DBMS over file processing system, Data Abstraction, Database Languages, Data Independence. , Components of a DBMS and overall structure of a DBMS. ,Three views of Data (External View, Conceptual View, Internal View), Three level architecture of DBMS, Data Independence, , Client Server Architecture

2. Data Model (10 Periods)

   Define data model, Data Models : Network Model Hierarchical Model, E-R Model, Advantage & Disadvantages of each Data Model

   ER Model :

   Entity sets and relationship sets- Attributes - Keys in entity and relationship sets : (a) Super Key (b) Candidate Key (c) Primary Key (e) Unique Key - Mapping constraints, Participation Constraint, E-R diagram, Notations. Strong Entity Set and Weak Entity Set

3. Relation Model (10 Periods)

Advantages, Disadvantages, Codd's 12 rules , Definition of Relations, Schema, Sub schema. Relational Model Constraints (Domain, Tuple Uniqueness, Key Constraints, Integrity Constraints, Entity constraints).
Relations algebra (Basic operation: Union intersection difference and Cartesian product), Additional Relational Algebraic Operations (Projection, Selection rows, Division, rename and join) , Converting ER Model to Relational Model.

4. Relational Database Design (11 Periods)

Purpose of Normalization, Data redundancy and updating anomalies, Functional Dependencies and Decomposition, Process of Normalization using 1NF, 2NF, 3NF, multivalued dependencies and BCNF , Forth Normal Form, Fifth Normal Form,

5. MYSQL/SQL (11 Periods)

Data definition language, Data manipulation language, SQL, Object naming conventions, Object naming guidelines, Data types, Tables (Creating , Inserting, Updating and deleting tables and using constraints), Views, Indexes,

SQL Command :- DESCRIBE, SELECT, WHERE CLAUSE, DISTINCT CLAUSE, ORDER BY,HAVING, LOGICAL OPERATIONS, SQL OPERATORS, JOIN

Aggregate functions, String functions and date time functions, Null values

6. PL-SQL (10 Periods)

User defined function, Control of flow statement of PL/SQL, Procedures/Stored procedures, transaction, triggers, cursors, granting and revoking.

7. NO-SQL: Inroducton ,Usages,And Application. (03 Periods)

8. SECURITY (05 Periods)

Authorization and View- Security constraints - Integrity Constraints- Encryption

LIST OF PRACTICALS

1.Installation of MYSQL

STRUCTURED QUERY LANGUAGE

2. Creating Database
   - Creating a database
   - Creating a table
   - Specifying relational data types

- Specifying constraints
- Creating indexes

3. Table and Record Handling
   - INSERT statement
   - Using SELECT and INSERT together
   - DELETE, UPDATE, TRUNCATE Statement.
   - DROP, ALTER statement
4. Retrieving Data From a Database
   The SELECT statement
   - Using the WHERE clause
   - Using Logical Operators in the WHERE clause
   - Using In, BETWEEN, LIKE, ORDER BY, GROUP BY & HAVING clause
   - Using Aggregate Functions
   - Combining Tables Using JOINS
6. Design of database for any application.

INSTRUCTIONAL STRATEGY

Explanation of concepts using real time examples, diagrams etc. For practical sessions books along with CDs or learning materials with specified activities are required. Various exercises and small applications should be given along with theoretical explanation of concepts.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Actual laboratory and practical work, exercises and viva-voce
- Software installation, operation, development and viva-voce

RECOMMENDED BOOKS

1. An Introduction to Database System - C. J. Date
2. Database System Concepts - A. Silberschatz, S. Sudarshan& H. F. Korth
3. Database Concepts and Systems - LvanBayroos/SPD
4. Fundamental of Database System - R. Elmashri& S. B. Navathee-books/e-tools/relevant software to be used as recommended by AICTE/UPBTE/NITTTR.

Websites for Reference:

http://swayam.gov.in
http://spoken-tutorial.orgs

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1	10	15
2	10	15
3	10	15
4	11	17

5	11	17
6	10	10
7	03	04
8	05	07
Total	**70**	**100**

1.4 COMPUTER PROGRAMMING USING PYTHON

L T P
4 - 6

RATIONALE

This course introduces to the students the Python language. Upon completion of this course, the student will be able to write non trivial Python programs dealing with a wide variety of subject matter domains. Topics include language components, the IDLE/IDE environment, control flow constructs, strings, I/O, collections, classes, modules, and regular expressions.

LEARNING OUTCOMES

After undergoing the course, the students will be able to:

- execute Python code in a variety of environments
- use correct Python syntax in Python programs
- use the correct Python control flow construct
- write Python programs using various collection data types
- write home grown Python functions
- use standard Python modules such as os, sys, math, and time
- trap various errors via the Python Exception Handling model
- use the IO model in Python to read and write disk files
- create their own classes and use existing Python classes.
- understand and use the Object Oriented paradigm in Python programs
- use the Python Regular Expression capabilities for data verification

DETAILED CONTENTS

1. Introduction (04 Periods)

    - Brief History of Python
    - Python Versions
    - Installing Python
    - Environment Variables
    - Executing Python from the Command Line
    - IDLE
    - Editing Python Files
    - Python Documentation
    - Getting Help

- Dynamic Types
- Python Reserved Words
- Naming Conventions

2. Basic Python Syntax (04 Periods)

- Basic Syntax
- Comments
- String Values
- String Methods
- The format Method
- String Operators
- Numeric Data Types
- Conversion Functions
- Simple Output
- Simple Input
- The % Method
- The print Function

3. Language Components (06 Periods)

- Indenting Requirements
- The if Statement
- Relational and Logical Operators
- Bit Wise Operators
- The while Loop
- break and continue
- The for Loop

4. Collections (10 Periods)

- Introduction
- Lists
- Tuples
- Sets
- Dictionaries
- Sorting Dictionaries
- Copying Collections
- Summary

5. Functions (08 Periods)

- Introduction
- Defining Your Own Functions

- Parameters
- Function Documentation
- Keyword and Optional Parameters
- Passing Collections to a Function
- Variable Number of Arguments
- Scope
- Functions - "First Class Citizens"
- Passing Functions to a Function
- map
- filter
- Mapping Functions in a Dictionary
- Lambda
- Inner Functions
- Closures

6. Modules (04 Periods)

- Modules
- Standard Modules - sys
- Standard Modules - math
- Standard Modules - time
- The dir Function

7. Exceptions (04 Periods)

- Errors
- Runtime Errors
- The Exception Model
- Exception Hierarchy
- Handling Multiple Exceptions
- Raise
- assert

8. Input and Output (04 Periods)

- Introduction
- Data Streams
- Creating Your Own Data Streams
- Access Modes
- Writing Data to a File
- Reading Data From a File
- Additional File Methods
- Using Pipes as Data Streams

- Handling IO Exceptions

9. Classes in Python (06 Periods)

- Classes in Python
- Principles of Object Orientation
- Creating Classes
- Instance Methods
- File Organization
- Special Methods
- Class Variables
- Inheritance
- Polymorphism

10. Regular Expressions (06 Periods)

- Introduction
- Simple Character Matches
- Special Characters
- Character Classes
- Quantifiers
- The Dot Character
- Greedy Matches
- Grouping
- Matching at Beginning or End
- Match Objects
- Substituting
- Splitting a String
- Compiling Regular Expressions
- Flags

LIST OF PRACTICALS

1. Getting started with Python and IDLE in interactive and batch modes
2. What do the following string methods do?
   - lower
   - count
   - replace
3. Write instructions to perform each of the steps below
   (a) Create a string containing at least five words and store it in a variable.
   (b) Print out the string.
   (c) Convert the string to a list of words using the string split method.
   (d) Sort the list into reverse alphabetical order using some of the list methods (you might need to use dir(list) or help(list) to find appropriate methods).
   (e) Print out the sorted, reversed list of words.

4. Write a program that determines whether the number is prime.
   What is your favorite number? 24
   24 is not prime
   What is your favorite number? 31
   31 is prime
5. Find all numbers which are multiple of 17, but not the multiple of 5, between 2000 and 2500?
6. Swap two integer numbers using a temporary variable. Repeat the exercise using the code format: a, b = b, a. Verify your results in both the cases.
7. Find the largest of n numbers, using a user defined function largest().
8. Write a function myReverse() which receives a string as an input and returns the reverse of the string.
9. Check if a given string is palindrome or not.
10. WAP to convert Celsius to Fahrenheit
11. Find the ASCII value of charades
12. WAP for simple calculator

INSTRUCTIONAL STRATEGY

Teachers should lay emphasis on practicals and experts from industries may be invited to deliver lectures and share experiences with the students.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Software installation, operation, development
- Actual laboratory and practical work exercises
- Viva-voce

RECOMMENDED BOOKS

1. Learning Python by Mark Lutz; Pratham Books, Bangalore
2. Foundations of Python Network Programming by John Goerzen and Brandeu Rhodes; Apress-eBook distributed by Springer Science and Business Media, New York
3. Dive Into Python by Mark Pilgrim; Pratham Books, Bangalore
4. Think Python by Allen B. Downey; O'Reily Media
5. Python Programming For Beginners: A Must Read Introduction to Python Programming by Robert Richards; Pratham Books, Bangalore
6. e-books/e-tools/relevant software to be used as recommended by AICTE/NITTTR, Chandigarh.

Websites for Reference:

http://swayam.gov.in

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1.	04	06
2.	04	06
3.	06	10

4.	10	20
5.	08	14
6.	04	06
7.	04	06
8.	04	08
9.	06	12
10.	06	12
Total	**56**	**100**

1.5 WEB DESIGNING TOOLS

L	T	P
4	-	4

RATIONALE

This subject aims to cover the study of various tools related to development of websites and blogs with adequate knowledge of web development technology. Student can work on tools related to content management or learning management system to develop/build website with focus on designing aspects of websites.

LEARNING OUTCOMES

After undergoing the subject, the students will be able to:

- Use Image editing tools for editing and enhancing the images
- Use Animation tools for creating 2D & 3D Animation.
- Differentiate various type of websites
- Prepare presentation for explaining/ demonstrating the required topic.
- Differentiate between CMS and LMS
- Develop Content Management & Learning Management websites.

DETAILED CONTENTS

1. Image Editing Tools (16 Periods)

File formats, Raster Vs. Vector images, an overview of menus, work area, tool bars, tool box usages, Starting and opening document, getting image, Exploring basic features of like palettes, using context menu, using rulers and guidelines, closing files and quitting color modes of images, working with layers, transparency.

2. Animation Tools (06 Periods)

Concept of Timeline, 2D & 3D animation, morphing, text effects, creating giff animation. Creating slideshows for websites.

3. Blogging & Social Networking Web designing (08 Periods)

Introduction, Advantages, creating a blog using different open source tools like Wordpress, Ghost, Anchor CMS etc., Adobe Spark, Google sites, Principles for designing a social networking website.

4. Presentation Tools (10 Periods)

4.1 Presentation Concept : Creating, Opening and Saving Presentations, Working in Different Views, Working with Slides, Adding and Formatting Text, Formatting Paragraphs, Checking Spelling and Correcting Typing Mistakes, Making Notes Pages and Handouts, Drawing and Working with Objects, Adding Clip Art and other pictures, Designing Slide Shows using templates, Rehearse

timing, Narration, Multimedia effects- Apply Transitions between Slides, Animate Slide Content, Set Timing for Transitions and Animations, Insert and Format Media, Encrypting presentations with a password, Running and Controlling a Slide Show, Printing Presentations

4.2 Designing slides: Web-based slides (such as Google Slides), Prezi or other open source tools.

5. CMS & LMS (16 Periods)

5.1 Introduction, difference between CMS & LMS

5.2 Applications and Advantages of using CMS & LMS

5.3 Drupal-An Open source Content Management System: Installation, Architecture, User interface, Themes management, creating a sub-theme, Activate & Deactivate default modules, Install & configure new modules, Get familiar with blocks, Manage existing blocks, create new blocks, Menu management, User management, Setting up the Home page, working with CSS in Drupal, Website backup & upgradation.

5.4 Moodle- An Open Source Learning Management System: Installation, Architecture, User interface, Themes management, managing courses & categories, Activities, Resources & blocks, User Management: Authentication & Enrollment, File management, Setting up the Home page, Roles & Permissions, Security, Performance & backup, Server settings.

LIST OF PRACTICALS

1. Designing a Webpage using photoshop/gimp
2. Design a Website logo and header image.
3. Create a slideshow for your website.
4. Create an animated giff. file.
5. Create a presentation with animation and zoom-in effects.
6. Create a blog using any open source tool.
7. Create a website using Drupal.
8. Create a website using Moodle.

INSTRUCTIONAL STRATEGY

Since this subject is practice oriented, the teacher should demonstrate the capabilities of tools mentioned in detailed contents of syllabus to students while doing practical exercises. The students should be made familiar with developing web pages by using these tools, working on internet.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Actual laboratory and practical work, exercises and viva-voce
- Software installation, operation, development and viva-voce

RECOMMENDED BOOKS

1. Drupal-7 First look by Mark Noble (http://www.allitebooks.org/drupal-7-first-look/)

2. Moodle 3 Administration, Third Edition By Alex Buchner (http://www.allitebooks.org/moodle-3-administration-third-edition/)
3. GIMP 2.6 cookbook by Juan Manuel Ferreyra (http://www.allitebooks.org/gimp-2-6-cookbook/)

Websites for Reference

- http://office.microsoft.com/en-us/training/CR010047968.aspx
- https://gsuite.google.com/learning-center
- http://spoken-tutorial.org

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1	16	20
2	06	10
3	08	10
4	10	25
5	16	35
Total	**56**	**100**

2.1 WEB DEVELOPMENT USING PHP

L	T	P
4	-	6

RATIONALE

This course will enable the students to understand and develop competency amongst the students to design professional database backed dynamic and feature based web sites. The course covers the use of programming with PHP and the concepts of database with MySQL Students will be introduced to popular web application frameworks for building scalable web applications. The main objective for this course is to motivate student's interest in learning Web-app development by giving them an insight into its possibilities through practical applications. In addition, the course also provides a sufficiently broad but practical introduction to Server-side web technologies. Hence this paper is introduced in this curriculum.

LEARNING OUTCOMES

After undergoing the subject, the students will be able to:

- perform various logical operations in PHP
- create simple program to validate forms in PHP
- perform database connectivity using PHP
- apply the basic concepts, principles and practices of Web-site development using server-side technologies (PHP &MySQL)
- install Word Press
- create and manage Blogs, Websites using WordPress

DETAILED CONTENTS

1. PHP Introduction (20 Periods)

   Introduction to PHP: How PHP Works , The php.ini File, Basic PHP Syntax, PHP variables, statements, operators, decision making, loops, arrays, strings, PHP OOPs concept, PHP forms (form handling , validation) , get and post methods, functions.
   Introduction to cookies, storage of cookies at client side, Using information of cookies. Creating single or multiple server side sessions. Timeout in sessions.

2. PHP and MySQL (10 Periods)

   Introduction to MySQL, connecting to MySQL, database, creation, insertion, deletion and retrieval of MySQL data using PHP.

3. Ajax (08 Periods)

AJAX Introduction, XMLHttp, Request object, server response, AJAX events, Validation, Interaction with API

4. WordPress (CMS) (18 Periods)

WordPress Basics:
Introduction to content management systems based on PHP, Introduction to WordPress, How WordPress Works ,Installation of WordPress

Posts & Pages:
Introduction to Blogging, Creating Blogs, Using Images, Wrapping Text Around Images, Comments, Post Formats, Linking to Posts, Pages, and Categories, Using Smilies, Links Manager, WordPress Feeds, Using Password Protection,

Customizing Site Appearance and Themes:
Developing a Color Scheme, Designing Headers, CSS Horizontal Menus, Dynamic Menu Highlighting, Navigation Links, Next and Previous Links, Styling for Print, Designing Your Post Meta Data Section, Separating Categories in your Post Meta Data Section, Customizing the Read More, Formatting Date and Time, Finding CSS Styles, Creating Individual Pages, Uploading Files using WordPress Themes, Templates, Template Tags, Template Hierarchy, Validating a Website, Know Your Sources, WordPress Site Maintenance

LIST OF PRACTICALS

1. Design PHP based web pages using correct PHP, CSS, and XHTML syntax, structure.
2. Create Web forms and pages that properly use HTTP GET and POST protocol as appropriate.
3 Design SQL language within MySQL and PHP to access and manipulate databases.
4. Install and configure both PHP and MySQL.
5 Create PHP code that utilizes the commonly used API library functions built in to PHP.
6. Design and create a complete web site that demonstrates good PHP/MySQL client/server design using ajax
7. To store a cookie using PHP on client side.
8. To save the user session on server side.
9. Design website using WordPress
10. Creation of basic Blogging website

INSTRUCTIONAL STRATEGY

Since this subject is practice oriented, the teacher should demonstrate the capabilities of websites/WebPages to students while doing practical exercises. Since the entire course content is web based, students can practice it online. The teachers should have practice on this framework. Entire course is hands-on based so practicals should be conducted in the laboratory.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Actual laboratory and practical work, exercises and viva-voce
- Software installation, operation, development and viva-voce

RECOMMENDED BOOKS

1. Head First PHP & MySQL , O'Reilly Media, Inc , Michael Morrison, Lynn Beighley
2. Sams Teach Yourself PHP, MySQL, and Apache All in One" by Julie C. Meloni, Publisher: SAMS ,ISBN 0-672-32976-X
3. Web enabled development application by Ivan Byross: Commercial; TMH
4. PHP: The Complete Reference , by Steven Holzner Mcgraw Higher Ed
5. PHP and MySQL Web Development , by Luke Welling , Pearson Education india
6. WordPress 3.5 Complete , Packt Publishing , by karol krol , Aaron hodge Silver
7. WordPress Web Application Development , Packt Publishing
8. Professional WordPress: Design and Development, by Brad Williams, David Damstra, and Hal Stern, Wrox Publication
9. Building Web Apps with WordPress: WordPress as an Application Framework , by Brian Messenlehner and Jason Coleman , O'Reilly Media
10. e-books/e-tools/relevant software to be used as recommended by AICTE/UPBTE/NITTTR.

Websites for Reference:

http://swayam.gov.in
http://spoken-tutorial.org

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1	20	36
2	10	18
3	08	14
4	18	32
Total	**56**	**100**

2.2 Web Server Administration

L	T	P
4	-	6

RATIONALE

The primary objective of this course is to give students a comprehensive overview of the tools and techniques needed to successfully administer Web servers. The course is designed to cover topics that are relevant to the role of a Web server administrator. Topics include installation, configuration, and administration of Web servers on common hardware/software platforms. Hence this course is introduced in the curriculum.

LEARNING OUTCOMES

After undergoing this course, the students must be able to:

- To become familiar with the role of Web servers in mission-critical, Internet-based information systems.
- To become proficient in tasks performed by Web server administrator.
- To acquire an appreciation for issues relevant to Web server administration in a global business environment.
- To acquire the communication, leadership and teamwork skills necessary to work in teams, or in charge of teams, that are responsible for operating Web server environment.

DETAILED CONTENTS

1. The basics of server and Web server administration (06 Periods)
   - 1.1. Basics of server and Web server administration
   - 1.2. Common tasks performed by administrators
   - 1.3. Compare Web server platforms

2. Managing websites in a Webserver (16 Periods)
   - 2.1. Identify server categories and evaluate server components
   - 2.2. Planning for system disasters and recovery
   - 2.3. Understand the installation process
   - 2.4. IIS Server: Document root, Adding website details
   - 2.5. Apache Server: Document root, Adding Website details
   - 2.6. Nginx Server: Document root, Adding Website details
   - 2.7. Publishing a website

3. File Sharing (08 Periods)
   - 3.1. Using FTP server in IIS
   - 3.2. Using FTP server in Apache
   - 3.3. Putty

4. WAMP/XAMPP and LAMP Server (16 Periods)
   a. WAMP/XAMPP: Introduction, Downloading & Installation of WAMP Server, Configuration of WAMP Server, Testing WAMP Server, Troubleshooting, Saving PHP Files, Launching PHP Scripts.
   b. LAMP: Concepts, Technologies used in LAMP, Usefulness of LAMP, Architecture of LAMP, advantages, Installation of LAMP, Configuration of LAMP.

5. Website Monitoring & Maintenance Tools (10 Periods)
   Finding broken links in a website, database connection, Storage used, page speed score, performance monitoring, eg. GTmetrix, Pingdom, Sortsite, W3C Validation Tool, Wave Accessibility Tool.

LIST OF PRACTICALS

1. Installation & configuration of WAMP/XAMPP Server

2. Installation & configuration of LAMP Server

3. Connecting database with LAMP, WAMP/XAMPP Server

4. File transfer using FTP

5. File transfer using PUTTY

6. Website deployment on Apache Web server

7. Website deployment on Nginx Web Server

8. Website deployment on IIS Web Server

9. Study of web-site monitoring tools.

10. Using Website testing tools.

INSTRUCTIONAL STATREGY

The Faculty will make use of state-of-the art multimedia projection equipment and software. These are used to project slides and Web-based content relevant to Web server administration and to demonstrate various tasks involved in successfully installing, configuring, and managing a Web server.

MEANS OF ASSEMENTS

- Assignment & Quiz,
- Mid-Term and End-Term written test,
- Actual Lab & Practical Work,
- VivaVoice

RECOMMENDED BOOKS

- Steve Silva, Web Server Administration, Course Technology.
- Nginx 1 web server administration Cook book By Dipanker sarkar (http://www.allitebooks.org/nginx-1-web-server-implementation-cookbook/)
- Developing Web Applications with Apache, MySQL, memcached, and Perl By Patrick Galbraith (http://www.allitebooks.org/developing-web-applications-with-apache-mysql-memcached-and-perl/)
- Professional LAMP By Elizabeth Naramore, Jason Gerner, Matt Warden, Morgan Owens (http://www.allitebooks.org/professional-lamp/)
- Make an E-commerce Site in a Weekend: Using PHP By Bintu Harwani (http://www.allitebooks.org/make-an-e-commerce-site-in-a-weekend-using-php/)

Websites for Reference:

1. http://swayam.gov.in
2. http://spoken-tutorial.org

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1	06	15
2	18	30
3	10	15
4	08	15
5	06	10
Total	**56**	**100**

2.3 INFORMATION SECURITY AND IT LAWS

L	T	P
4	-	4

RATIONALE

Contents of this course provide understanding of Information Security & theirs measures. Content of this course will enable students to use techniques like Cryptography, VPNs, IDS etc. and IT Laws in the field of Information Technology. Hence this course is introduced in this curriculum.

LEARNING OUTCOMES

After undergoing this course, the students will be able to:

- Understand the need for security, Security principles related to Information Management.
- Understand the various computer related attacks.
- Apply different types of cryptography techniques to encrypt/decrypt data or information.
- Understand the network security measures and the concept of VPNs.
- Understand concept of IDS, Operating system security and web security
- Understand the IT Laws and latest amendments applicable in India as well as Intellectual property laws

DETAILED CONTENTS

1. **INTRODUCTION AND SECURITY TRENDS :** (08 Periods)

1.1 Need for security, Security principles, Authentication, Access control.
1.2 Threats to security : Viruses and Worms, Intruders, Insiders, Criminal organization, Terrorist, Information Warfare (IW), Avenues of attack, Steps in Attack.
1.3 Types of attack : Active and Passive attacks, Denial of service, backdoors and trapdoors, sniffing, spoofing, man in the middle, replay, TCP/IP Hacking, Encryption attacks, Malware : Viruses, Logic bombs.

2. **ORGANIZATIONAL/ OPERATIONAL SECURITY :** (08 Periods)

2.1 Role of people in security : Password selection, Piggybacking, Shoulder surfing, Dumpster diving, Installing unauthorized software/hardware, Access by non-employees, Security awareness, Individual users responsibilities.
2.2 Physical security : Access controls Biometrics : Fingerprints, hand prints, retina, patterns, voice patterns, signature and writing patterns, keystrokes and physical barriers.
2.3 Network security basics, model for network security.

3. **CRYPTOGRAPHY AND PUBLIC KEY INFRASTRUCTURE :** (16 Periods)

3.1 Introduction: Cryptography, Cryptanalysis, Cryptology, Substitution techniques; Caesar's cipher, monoalphabetic and polyalphabetic transposition techniques- Rail fence technique, simple columnar, steganography.

3.2 Hashing - Concept

3.3 Symmetric and asymmetric cryptography : Introduction Symmetric encryption: DES (Data Encryption Standard) algorithm, Diffle-Hellman algorithm, Problem of key distribution, Asymmetric key cryptography : Digital signature, key escrow.

3.4 Public key encryption : Basics, digital certificates, certificate authorities, registration authorities, steps for obtaining a digital certificate, steps for verifying authenticity and integrity of a certificate.

4. NETWORK SECURITY : (08 Periods)

4.1 Firewalls : Concept, design, principles, limitations, trusted system, Kerberos- concept.

4.2 Security topologies - Security zones, DMZ, Internet, Intranet, VLAN, Security implication, Tunnelling.

4.3 IP security : Overview, architecture, IPSec, IPSec configuration, IPSec security.

4.4 Virtual Private Network.

4.5 Email security : Email security standards : Working principles of SMTP, PEM, PGP, S/MINE, spam.

5. **WEB SECURITY :** **(**08 Periods)

6.1 Application hardening, application patches, Web servers, Active director.

6.2 Web security threats, Web traffic security approaches, Secure socket layer and transport layer security, secure electronic transaction software development : secure code techniques, buffer overflow, code injection, least privilege, good practices, Testing.

6. **IT LAWS :** (08 Periods)

7.1 Information Security Standards - ISO, IT Act, Copyright Act, Patent Law, IPR, Cyber Laws in India. IT Act 2000 Provisions and latest amendments.

7.2 Intellectual property law : Copy Right Law, Software License, Semiconductor Law and Patent Law.

LIST OF PRACTICAL

1. Knowledge the security provided with windows operating system.
2. Recovery the password of window machines using password recover utility (John the ripper) or any other utility.
3. Tracing of email origin using email trace pro utility.
4. Use of Keylogger and anti-keylogger to secure yours system.
5. Encrypt and decrypt the message using simple transposition - Permutation (Cryptool)
6. Encrypt and decrypt the message using Caesar Cipher With variable key (Cryptool)
7. Encrypt and decrypt the message using 3 X 3 Hill Ciper (Cryptool)
8. Create Digital Signature document using (Cryptool)
9. Send and receive secret message using stenography techniques using steghide.
10. Recover the data from formatted Pen Drive and Hard Disk using Power Data Recovery Utility or any other utility.

INSTRUCTONAL STRATEGY

The content of this course is to be taught on conceptual basis with real world examples. Since this subject is practice oriented, the teacher should demonstrate the capabilities of websites/Webpages to students while doing practical exercises for information security. The students should be made familiar with preventive measures for information and computer security.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Actual laboratory and practical work, exercises and viva-voce
- Software installation, operation, development and viva-voce

RECOMMENDED BOOKS

1. Information Security Handbook by Darren Death ,Packt Publishing
2. Principles of Information Security by Whitman , Cengage Publisher
3. Cyber Security by Nina Godbole, Wiley Publisher
4. Introduction to Information Security And Cyber Laws by Dr. Surya Prakash Tripathi
5. Information Systems Security: Security Management, Metrics, Frameworks and Best Practices by Nina Godbole, Wiley Publisher
6. Cryptography and Network Security - Principles and Practice by Stallings William, Pearson Education Publisher.
7. Cyber Law & Cyber Crimes Simplified ,by Cyber Infomedia Publisher
8. Information Technology Act, 2000 Along with Rules & Regulations by Universal Law Publishing
9. e-books/e-tools/relevant software to be used as recommended by AICTE/UPBTE/NITTTR, Chandigarh.

Websites for Reference:

3. http://swayam.gov.in
4. http://spoken-tutorial.org

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1	08	15
2	08	15
3	16	20
4	08	15
5	08	15
6	08	20
Total	**56**	**100**

2.4 Soft Skills

L	T	P
2	-	4

RATIONALE

Soft Skills plays an important role in career development. This subject aims at introducing basic concepts of communication besides laying emphasis on developing listening, speaking, reading and writing skills as parts of Communication Skill and focuses on learning various interview techniques.

LEARNING OUTCOMES

After undergoing the subject, the students will be able to:

.

- Understand the importance of effective communication
- Describe the process of communication
- Communicate effectively in different contexts
- Reproduce and match words and sentences in a paragraph
- Write various types of paragraphs, notices for different purposes and composition on picture with appropriate format
- Read unseen texts with comprehension
- Acquiring skills to prepare CV/Resume
- Acquiring skills to face an interview

DETAILED CONTENTS

1. Basics of Communication (04 periods)

   1.1 Definition and process of communication
   1.2 Types of communication - formal and informal, oral and written, verbal and non-verbal
   1.3 Communications barriers and how to overcome them
   1.4 Barriers to Communication, Tools of Communication

2. Reading Skill (06 periods)
   Unseen passage for comprehension (one-word substitution, prefixes, suffixes, antonyms, synonyms etc. based upon the passage to be covered under this topic)

3. Writing Skill (04 periods)
   Picture composition, Writing paragraph, Notice writing

4. Curriculum Vitae and Resume: Overview, types of CV, Covering Letter, Resume, Types of Resume, Difference between CV and Resume. (08 periods)

5. Interview Techniques & Interview Preparation Preparing for an interview, Interview Formats, Types of Interview Questions, Mock Interviews, the benefits of mock interviews. (06 periods)

LIST OF PRACTICALS

Note: Teaching Learning Process should be focused on the use of the language in writing reports and making presentations.

Topics such as Effective listening, effective note taking, group discussions and regular presentations by the students need to be taught in a project oriented manner where the learning happens as a by product.

Listening and Speaking Exercises

1. Self and peer introduction
2. Newspaper reading
3. Just a minute session-Extempore
4. Greeting and starting a conversation
5. Leave taking
6. Thanking
7. Wishing well
8. Talking about likes and dislikes
9. Group Discussion
10. Listening Exercises.
11. Mock Interview

INSTRUCTIONAL STRATEGY

Student should be encouraged to participate in role play and other student centred activities in class room and actively participate in listening exercises

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-semester and end-semester written tests
- Actual practical work, exercises and viva-voce
- Presentation and viva-voce

RECOMMENDED BOOKS

1. Communicating Effectively in English, Book-I by RevathiSrinivas; Abhishek Publications, Chandigarh.
2. Communication Techniques and Skills by R. K. Chadha; DhanpatRai Publications, New Delhi.
3. High School English Grammar and Composition by Wren & Martin; S. Chand & Company Ltd., Delhi.
4. Excellent General English-R.B.Varshnay, R.K. Bansal, Mittal Book Depot, Malhotra
5. The Functional aspects of Communication Skills – Dr. P. Prsad, S.K. Katria & Sons, New Delhi
6. Q. Skills for success – Level & Margaret Books, Oxford University Press.
7. e-books/e-tools/relevant software to be used as recommended by AICTE/ NITTTR, Chandigarh.

Websites for Reference:

1. http://www.mindtools.com/ page 8.html – 99k
2. http://www.letstalk.com.in

3. http://www.englishlearning.com
4. http://learnenglish.britishcouncil.org/en/
5. http://swayam.gov.in

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1	04	20
2	06	15
3	04	15
4	08	30
5	06	20
Total	**28**	**100**

2.5 PROJECT WORK

L	T	P
-	-	8

RATIONALE

Project Work aims at developing innovative skills in the students whereby they apply in totality the knowledge and skills gained through the course work in the solution of particular problem or by undertaking a project. The individual students have different aptitudes and strengths. Project work, therefore, should match the strengths of students. For this purpose, students should be asked to identify the type of project work, they would like to execute. It is also essential that the faculty of the respective department may have a brainstorming to identify suitable project assignments for their students. The project assignment can be individual assignment or a group assignment. There should not be more than 3 students if the project work is given to a group. The students should identify themselves or accept the given project assignment at least two to three months in advance. The project work identified in collaboration with industry should be preferred. Each teacher is expected to guide the project work of 5–6 students.
The project assignments may consist of:

- Programming customer-based applications
- Web page designing (Only dynamic)
- Database applications
- Software Development

LEARNING OUTCOMES

After undergoing this subject, the student will be able to:

- Use effectively oral, written and visual communication
- Demonstrate skill and knowledge of current information and technological tools and techniques specific to the professional field of study.
- Identify, analyse and solve problems creatively through sustainment critical investigation.
- Develop, leadership abilities.
- Apply fundamental and disciplinary concepts and methods in ways appropriate to their areas of study.

A suggestive criterion for assessing student performance by the external (personnel from industry) and internal (teacher) examiner is given in table below:

Sr. No	Performance criteria	Max.** marks	Rating Scale				
			Excellent	Very Good	Good	Fair	Poor
1.	Selection of project assignment	10	10	8	6	4	2
2.	Planning and execution of considerations	10	10	8	6	4	2

3.	Quality of performance	20	20	16	12	8	4
4.	Providing solution of the problems or production of final product	20	20	16	12	8	4
5.	Sense of responsibility	10	10	8	6	4	2
6.	Self-expression/ communication skills	5	5	4	3	2	1
7.	Interpersonal skills/human relations	5	5	4	3	2	1
8.	Report writing skills	10	10	8	6	4	2
9.	Viva voce	10	10	8	6	4	2
Total marks		**100**	**100**	**80**	**60**	**40**	**20**

The overall grading of the practical training shall be made as per following table

	Range of maximum marks	**Overall grade**
i)	More than 80	Excellent
ii)	79 <> 65	Very good
iii)	64 <> 50	Good
iv)	49 <> 40	Fair
v)	Less than 40	Poor

In order to qualify for the diploma, students must get "Overall Good grade" failing which the students may be given one more chance of undergoing 8 -10 weeks of project oriented professional training in the same industry and re-evaluated before being disqualified and declared "not eligible to receive diploma". It is also important to note that the students must get more than six "goods" or above "good" grade in different performance criteria items in order to get "Overall Good" grade.

Important Notes

1. **These criteria must be followed by the internal and external examiner and they should see the daily, weekly and monthly reports while awarding marks as per the above criteria.**

2. **The criteria for evaluation of the students have been worked out for 100 maximum marks. The internal and external examiners will evaluate students separately and give marks as per the study and evaluation scheme of examination.**

3. **The external examiner, preferably, a person from industry/organization, who has been associated with the project-oriented professional training of the students, should evaluate the students performance as per the above criteria.**

4. **It is also proposed that two students or two projects which are rated best be given merit certificate at the time of annual day of the institute. It would be better if specific nearby industries are approached for instituting such awards.**

The teachers are free to evolve another criterion of assessment, depending upon the type of project work.

The students must submit a project report of not less than 50 pages (excluding coding). The report must follow the steps of Software Engineering Concepts

It is proposed that the institute may organize an annual exhibition of the project work done by the students and invite leading Industrial organizations in such an exhibition. It is also proposed that two students or two projects which are rated best be given merit certificate at the time of annual day of the institute. It would be better if specific industries are approached for instituting such awards.

10. RESOURCE REQUIREMENT

10.1 Physical Resources

10.1.1 Space Requirement:

Norms and standards laid down by All India Council for Technical Education (AICTE) may be followed to work out space requirement in respect of class rooms, tutorial rooms, drawing halls, laboratories, space required for faculty, student amenities and residential area for staff and students.

10.1.2 Laboratoires/Shops

- Communication Skill Lab
- Programming Lab
- Hardware and Networking Lab

LIST OF EQUIPMENT FOR PG DIPLOMA IN WEB DESIGNING

Sr. No.	Description	Qty	Total Price (Rs)
COMMUNICATION SKILL LABORATORY			
1.	Stools	40	10,000
2.	Display Board/Screen	2	6,000
3.	Sound recording and playing system	1	6,000
4.	Audio cassettes	60	2,000
5.	Overhead Projector	1	5,000
6.	Transparencies slides	100	500
7.	TV, VCR and camera for video recording	1 each	20,000
8.	English spoken course	1	2,000
9.	A Quiz room equipped with two way audio system, back projection system and slide projector	1	30,000
10.	Miscellaneous	LS	1,500

PROGRAMMING LAB for WEB DESIGNING Course			
Sr. No.	**Description**	**Qty**	**Approx. Price (Rs)**
1.	Computer Server (Quad core, intel processor 32 GB RAM)	1	5,00,000/-
2.	Computer Desktop (i7,8th Generation, 1TB Hard disk, 8Gb RAM, Pre loaded window with 5 year warranty)	60	48,00,000/-
3.	Switch with 24 port speed 10/100/1000 (Manageable)	3	1,50,000/-
4.	Multifunctional Laser/Ink tank Printer	3	90,000/-
5.	Laptop	1	75,000/-
6.	Online UPS, 6KVA with battery	2	2,00,000/-
7.	Internet Connectivity	60 Nodes	3,00,000/-
8.	LCD/DLP Projector with Screen (HD/Full HD/4K)	1	60,000/-
9.	Linux Operating System (Open Source)	-	-
10.	Visual Studio Community Edition (Freeware, Open Source)	-	-
11.	Visual Studio Code (Open Source)	-	-
12.	Multimedia Tools – Software - Blender (Freeware) - Gimp Animation Tool (Freeware)	-	-
13.	Mongo DB (Freeware)	-	-
14.	Python IDE (PyCharm/Eclipse with PyDev/VS Code etc) – Freeware	-	-

15.	HTML & CSS, Java Script, Ajax (Open Source)	-	-
16.	PHP IDE XAMPP/WAMPP/VS Code (Freeware)	-	-
17.	Word press (Open Source)	-	-
18.	Oracle XE (Freeware)/MySql (Open Source)	-	-
19.	Rstudio (Open Source)	-	-
20.	Java for Internet Environment (latest version) – software	-	-
21.	MS Office latest or equivalent FOSS - Libre Office/Open Office (Freeware)	1 -	20,000/- Per year -
22.	Compiler Turbo C, C++ or equivalent FOSS	1	10,000/-
23.	Web camera, Mike and speakers	LS	20,000/-
24.	Air Conditioner 2 ton	2	70,000/-
25.	STARUML (Open Source)	-	-
26.	J-Meter (Performance Testing)- Open Source	-	-
27.	Lucid Chart (Developing DFD Model)- Open Source	-	-
28.	Selenium (functional Testing and Web Application)- Open Source	-	-
29.	J Unit (Java Testing) Open Source	-	-
30.	Cross browser Testing (Compatibility Testing) - Open Source	-	-
31.	Gantt Project (Project Plan)- Open Source	-	-
32.	Video Editing Tools (Open Source)	-	-
33.	- Eclipse IDE for Java programming/JDK (Open Source) - Apache Tomcat Web Server for Advanced Java Web Applications	- -	- -
34.	Antivirus Software	5 Users	10,000/-
35.	Miscellaneous- cables and connectors, computer stationery, printer consumables (inks), toner etc.	LS	30,000/-
Total Approx. Price			63,35,000/-

HARDWARE AND NETWORKING LAB for WEB DESIGNING Course			
1.	Computer Server (Quad core, intel processor 32 GB RAM)	1	5,00,000/-
2.	Computer Desktop (i7,8th Generation, 1TB Hard disk, 8Gb RAM, Pre loaded window with 5 year warranty)	20	16,00,000/-
3.	Online UPS, 6KVA with battery	1	1,00,000/-
4.	Switch with 24 port speed 10/100/1000 (Manageable)	1	50,000/-
5.	Connectors (RJ-45, RJ-11, BNC, SC, ST)	LS	10,000/-
6.	Cables: (UTP,STP,OFC) - 25 m each	LS	10,000/-

7.	Multifunctional Laser/Ink tank Printer	1	30,000/-
8.	Router	1	40,000/-
9.	Modem cum Router	2	10,000/-
10.	Compact Disk/DVD R/W	100	2000/-
11.	Hardware kit (for computer Assembling/de-assembling)	8	1,50,000/-
12.	External Hard Disk	4	30,000/-
13.	Networking Printer	1	1,25,000/-
14.	Internet Connectivity	20 Nodes	1,00,000/-
15.	Computer System Demonstration Kit	1	1,50,000/-
16.	Printer Demonstration Kit	1	1,00,000/-
17.	SMPS Demonstration Kit	1	20,000/-
18.	LAN Trainer	4	10.000/-
19.	Antivirus Software	5 Users	10,000/-
20.	Unmanaged Switch	4	60,000/-
21.	Hub	2	20,000/-
22.	Air Conditioner 2 ton	2	70,000/-
23.	Miscellaneous- cables and connectors, computer stationery, printer consumables (inks), toner etc.	LS	30,000/-
Total Approx. Price			32,27,000/-

NOTE:

In addition to above laboratories, computer centre will be required for effective implementation of the course.

10.1.3 Furniture Requirement

Norms and standards laid down by AICTE be followed for working out furniture requirement for this course.

- Furniture for laboratories/Computer Centre 15 lacs

10.2 Human Resources

Weekly work schedule, annual work schedule, student teacher ratio for various group and class size, staffing pattern, work load norms, qualifications, experience and job description of teaching staff workshop staff and other administrative and supporting staff be worked out as per norms and standards laid down by the AICTE. The website www.aicte.ernet.in may be referred for downloading current norms and standards pertaining to technician courses.

11. EVALUATION STRATEGY

11.1 INTRODUCTION

Evaluation plays an important role in the teaching-learning process. The major objective of any teaching-learning endeavour is to ensure the quality of the product which can be accessed through learner's evaluation.

The purpose of student evaluation is to determine the extent to which the general and the specific objectives of curriculum have been achieved. Student evaluation is also important from the point of view of ascertaining the quality of instructional processes and to get feedback for curriculum improvement. It helps the teachers in determining the level of appropriateness of teaching experiences provided to learners to meet their individual and professional needs. Evaluation also helps in diagnosing learning difficulties of the students. Evaluation is of two types: Formative and Summative (Internal and External Evaluation)

Formative Evaluation

It is an on-going evaluation process. Its purpose is to provide continuous and comprehensive feedback to students and teachers concerning teaching-learning process. It provides corrective steps to be taken to account for curricular as well as co-curricular aspects.

Summative Evaluation

It is carried out at the end of a unit of instruction like topic, subject, semester or year. The main purpose of summative evaluation is to measure achievement for assigning course grades, certification of students and ascertaining accountability of instructional process. The student evaluation has to be done in a comprehensive and systematic manner since any mistake or lacuna is likely to affect the future of students.

In the present educational scenario in India, where summative evaluation plays an important role in educational process, there is a need to improve the standard of summative evaluation with a view to bring validity and reliability in the end-term examination system for achieving objectivity and efficiency in evaluation.

11.2 STUDENTS' EVALUATION AREAS

The student evaluation is carried out for the following areas:

- Theory
- Practical Work (Laboratory, Workshop, Field Exercises)
- Project Work
- Professional Industrial Training

A. Theory

Evaluation in theory aims at assessing students' understanding of concepts, principles and procedures related to a course/subject, and their ability to apply learnt principles and solve problems. The formative evaluation for theory subjects may be caused

through sessional /class-tests, home-assignments, tutorial-work, seminars, and group discussions etc. For end-term evaluation of theory, the question paper may comprise of three sections.

Section-I

It should contain objective type items e.g. multiple choice, matching and completion type. Total weightage to Section-1 should be of the order of 20 percent of the total marks and no choice should be given in this section. The objective type items should be used to evaluate students' performance in knowledge, comprehension and at the most application domains only.

Section-II

It should contain short answer/completion items. The weightage to this section should be of the order of 40 percent of the total marks. Again, no choice should be given in section-II

Section-III

It may contain two to three essay type questions. Total weightage to this section should be of the order of 40 percent of the total marks. Some built-in, internal choice of about 50 percent of the questions set, can be given in this section

Table II : Suggested Weightage to be given to different ability levels

Abilities	Weightage to be assigned
Knowledge	10-30 percent
Comprehension	40-60 percent
Application	20-30 percent
Higher than application i.e. Analysis, Synthesis and Evaluation	Upto 10 percent

B. Practical Work

Evaluation of students performance in practical work (Laboratory experiments, Workshop practicals/field exercises) aims at assessing students ability to apply or practice learnt concepts, principles and procedures, manipulative skills, ability to observe and record, ability to interpret and draw conclusions and work related attitudes. Formative and summative evaluation may comprise of weightages to performance on task, quality of product, general behaviour and it should be followed by viva-voce.

C. Project

The purpose of evaluation of project work is to assess students ability to apply, in an integrated manner, learnt knowledge and skills in solving real life problems, manipulative skills, ability to observe, record, creativity and communication skills. The formative and summative evaluation may comprise of weightage to nature of

project, quality of product, quality of report and quality of presentation followed by viva-voce.

D. Professional Industrial Training

Evaluation of professional industrial training report and viva-voce/ presentation aims at assessing students' understanding of materials, industrial processes, practices in the industry/field and their ability to engage in activities related to problem-solving in industrial setting as well as understanding of application of learnt knowledge and skills in real life situation. The formative and summative evaluation may comprise of weightages to performance in testing, general behaviour, quality of report and presentation during viva-voce.

11.3 ASPECTS OF QUESTION PAPER SETTING

Validity and reliability are the most important considerations in the selection and construction of evaluation procedures. First and foremost are the evaluation tools to measure the specific outcomes for which they are intended to measure. Next in importance is reliability, and following that is a host of practical features that can be classified under the heading of usability.

For weightage of marks assigned to formative (internal) and summative (external) evaluation and duration of evaluation has been given in the study and evaluation scheme of the curriculum document. Teachers/Paper-setters/Examiners may use Manual for Students' Evaluation developed by Institute of Research Development & Training, U.P. Kanpur to bring objectivity in the evaluation system. The working group found it very difficult to detail out precisely the contents of subject on languages and therefore teachers may send guidelines to respective examiners for paper setting to maintain objectivity in evaluation.

12. RECOMMENDATIONS FOR EFFECTIVE CURRICULUM IMPLEMENTATION

This curriculum document is a Plan of Action (POA) and has been prepared based on exhaustive exercise of curriculum planning and design. The representative sample comprising selected senior personnel (lecturers and HODs) from various institutions and experts from industry/field have been involved in curriculum design process.

The document so prepared is now ready for its implementation. It is the faculty of polytechnics who have to play a vital role in planning instructional experiences for the courses in four different environments viz. class-room, laboratory, library and field and execute them in right perspective. It is emphasized that a proper mix of different teaching methods in all these places of instruction only can bring the changes in stipulated students behaviour as in the curriculum document. It is important for the teachers to understand curriculum document holistically and further be aware of intricacies of teaching-learning process (T-L) for achieving curriculum objectives. Given below are certain suggestions which may help the teachers in planning and designing learning experiences effectively. These are indicative in nature and teachers using their creativity can further develop/refine them. The designers of the programme suggest every course teacher to read them carefully, comprehend and start using them.

(A) Broad Suggestions:

1. Curriculum implementation takes place at programme, course and class-room level respectively and synchronization among them is required for its success. The first step towards achieving synchronization is to read curriculum document holistically and understand its rationale and philosophy.

2. Uttar Pradesh State Board of Technical Education (BTE U.P.) may make the academic plan available to all polytechnics well in advance. The Principals have a great role to play in its dissemination and, percolation upto grass-root level. Polytechnics in turn are supposed to prepare institutional academic plan by referring state level BTE plan.

3. HOD of every Programme Department along with HODs and in-charges of other departments are required to prepare academic plan at department level referring institutional academic plan.

5. All lecturers/Senior lecturers are required to prepare course level and class level lesson plans referring departmental academic plan.

(B) Course Level Suggestions

Teachers are educational managers at class room level and their success in achieving course level objectives lies in using course plan and their judicious execution which is very important for the success of programme by achieving its objectives.

Polytechnic teachers are required to plan various instructional experiences viz. theory lecture, expert lectures, lab/workshop practicals, guided library exercises, field visits, study tours, camps etc. In addition, they have to carry out progressive assessment of theory, assignments, library, practicals and field experiences. Teachers are also required to do all these activities within a stipulated period of 16 weeks which is made available to them in the academic plan at BTE level. With the amount of time to their credit, it is essential for them to use it

judiciously by planning all above activities properly and ensure execution of the plan effectively.

Following is the gist of suggestions for subject teachers to carry out T-L process effectively:

1. Teachers are required to prepare a course plan, taking into account departmental academic plan, number of weeks available, course to be taught, different learning experiences required to be developed etc.

2. Teachers are required to prepare lesson plan for every theory class. This plan may comprise of content to be covered, learning material (transparencies, VCDs, Models etc.) for execution of a lesson plan. They may follow steps for preparing lesson plan e.g. drawing attention, state instructional objectives, help in recalling pre-requisite knowledge, deliver planned subject content, check desired learning outcome and reinforce learning etc.

3. Teachers are required to plan for expert lectures from field/industry. Necessary steps are to plan in advance, identify field experts, make correspondence to invite them, take necessary budgetary approval etc.

4. Teachers are required to plan for guided library exercises by identification of course specific experience requirement, setting time, assessment, etc. The tutorial, assignment and seminar can be thought of as terminal outcome of library experiences.

5. Concept and content based field visits with appropriate releases (day-block) may be planned and executed for such content of course which otherwise is abstract in nature and no other requisite resources are readily available in institute to impart them effectively.

6. There is a dire need for planning practical experiences in right perspective. These slots in a course are the avenues to use problem based learning/activity learning/ experiential learning approach effectively. The development of lab instruction sheets for the course is a good beginning to provide lab experiences effectively.

7. Planning of progressive assessment encompasses periodical assessment in semester, preparation of proper quality question paper, assessment of answer sheets immediately and giving constructive explicit feedback to every student. It has to be planned properly; otherwise very purpose of the same is lost.

8. The co-curricular activities like camp, social gathering, study tour, hobby club etc. may be used to develop generic skills like task management, problem solving, managing self, collaborating with others etc.

9. Where ever possible, it is essential to use activity based learning rather than relying on delivery based conventional teaching all the time.

10. While imparting instructions, emphasis may be laid on the development of cognitive, psychomotor, reactive and interactive skills in the students.

11. Teachers may take working drawings from the industry/field and provide practices in reading these drawings.

12. Considerable emphasis should be laid in discipline specific contracting and repair and maintenance of machines, tools and installations.

13. Teachers may take initiative in establishing liaison with industries and field organizations for imparting field experiences to their students.

14. Case studies and assignments may be given to students for understanding of Enterprise Resource Management (ERM).

15. Students be made aware about issues related to ecology and environment, safety, concern for wastage of energy and other resources etc.

16. Students may be given relevant and well thought out minor and major project assignments, which are purposeful and develop practical skills. This will help students in developing creativity and confidence for their gainful employment (wage and self).

17. A Project bank may be developed by the concerned department of the polytechnics in consultation with related Industry, Research Institutes and other relevant field organizations in the state.

13. LIST OF PARTICIPANTS

The following experts have participated in workshop for Developing Curriculum Contents of PG diploma courses in Web Designing for UP State on 18th October, 2019 at IRDT Kanpur , 30th January, 2020 at GP Ghaziabad and on 8th July, 2021 at IRDT Kanpur:

1. Sh. Ashish Kanaujiya, Founder & Director, NXG Ventures, Ahmedabad.
2. Sh. Kural Srivastava, Sr. Scientist, CSIR-CDRI Lucknow.
3. Ms. Mugdha Tripathi, Team Lead, Accenture India, Noida.
4. Sh. Harsh Jaiswal, Sr. iOS Developer, Docquity PTE Ltd, New Delhi.
5. Sh. Brijesh Kushwaha, Sr. Software Engineer, S&P Global , Gurugram.
6. Sh. Ankit Kumar, Consultant, Genpact India Pvt Ltd, Noida.
7. Sh. L.S. Yadav, Principal, Government Girls Polytechnic, Jhansi .
8. Sh. Ashok Kushwaha, HOD Computer/ Text Book Officer, IRDT, U.P. Kanpur.
9. Sh. Shyam Lal Chaudhary, HOD Computer, Government Polytechnic, Kanpur.
10. Sh. Neeraj Kumar, HOD IT /Assistant Director, Directorate of Technical Education, U.P. Kanpur.
11. Sh. P.C. Sonkar, Lecturer, Electronics, Government Polytechnic, Kanpur.
12. Sh. Sumit Babu, Lecturer, CS, Government Polytechnic, Kanpur.
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17. Sh. Saurabh Sachan, Lecturer, CS, Government Polytechnic, Unnao.
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Curriculum Design by
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