

CURRICULUM

For

DIPLOMA PROGRAMME

In

Information Technology

3rd Year (5th & 6th Semester)

FOR THE STATE OF HIMACHAL PRADESH



June, 2019

Study and Evaluation Scheme (N-2017)

5th Semester Information Technology

Sr. No.	Name of the Subject	Th	Pr	Internal Assessment			External Assessment					Total Marks
				Th	Pr	Total	Th	Hrs	Pr	Hrs	Total	
5.1	Basics of Management & Entrepreneurship Development *	4	-	50	-	50	100	3	-	-	100	150
5.2	Internet of Things**	4	2	30	20	50	100	3	50	3	150	200
5.3	Advanced Web Programming	4	4	30	20	50	100	3	50	3	150	200
5.4	Elective-I 5.4.1- Cloud Computing*** 5.4.2- E-Commerce 5.4.3- Data Warehousing and Data Mining***	4	-	50	-	50	100	3	-	-	100	150
5.5	Graphics and Animation***	-	4	-	50	50	-	-	50	3	50	100
5.6	Minor Project	-	8	-	50	50	-	-	50	3	50	100
Industrial Training		-	-	-	50	50	-	-	50	-	50	100
#Student Centred Activities		-	4	-	25	25	-	-	-	-	-	25
Total		16	22	160	215	375	400	-	250	-	650	1025

* Common with all other diploma programmes

** Common with Diploma in Computer Engineering, ECE, Instrumentation Engineering

*** Common with Diploma in Computer Engineering

Note: Apart from the above mentioned number of hours for each subject (Theory & Practical), at least **TWO** hours/week for each class should be allocated for Library to motivate the students to attend library compulsory. The attendance of library period should be added in master attendance.

Study and Evaluation Scheme

6th Semester Information Technology

Sr. No.	Name of the Subject	Th	Pr	Internal Assessment			External Assessment					Total Marks
				Th	Pr	Total	Th	Hrs	Pr	Hrs	Total	
6.1	Android Programming	4	4	30	20	50	100	3	50	3	150	200
6.2	Information Security & Cyber Laws	4	-	50	-	50	100	3	-	-	100	150
6.3	Linux System Administration	4	4	30	20	50	100	3	50	3	150	200
6.4	Wireless Communication & Mobile Computing*	4	4	30	20	50	100	3	50	3	150	200
6.5	Major Project	-	8	-	100	100	-	-	100	3	100	200
6.6	Practices in Communication Skills**	-	2	-	50	50	-	-	50	3	50	100
	#Student Centred Activities	-	2	-	25	25	-	-	-	-	-	25
		16	24	140	235	375	400	-	300	-	700	1075

* Common with Diploma in Computer Engineering

** Common with all other diploma programmes

Note: Apart from the above mentioned number of hours for each subject (Theory & Practical), at least **TWO** hours/week for each class should be allocated for Library to motivate the students to attend library compulsory. The attendance of library period should be added in master attendance.

5.1 BASICS OF MANAGEMENT AND ENTREPRENEURSHIP DEVELOPMENT

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RATIONALE

In present scenario, there is an urgent need to develop right kind of attitude, knowledge and skills amongst the Diploma Engineers leading them to achieve gainful wage/ self-employment. There is a huge gap in perceptions of employers and employees regarding meeting the job requirements. Also the dual challenges of competing in global working environment and keeping pace with the rapid technological advancements call for re-design of curricula and thus enabling the importance of generic and managerial skills. Entrepreneurship development aim at developing conceptual understanding for setting up owns' business/enterprise to cope up with the problem of unemployment and also to promote the socio- economic development of our country. Both the subject areas, "Basics of Management and entrepreneurship development" are supplementary to each other. Knowledge and skills of these must be imparted to diploma engineering students for enhancing their employability and confidence in their personal and professional life.

DETAILED CONTENTS

Unit-1 : Introduction to Management **07 Hrs** **10 Marks**

- 1.1 Definitions and concept of Management
- 1.2 Functions of management- planning, organizing, staffing, coordinating and controlling
- 1.3 Various areas of management
- 1.4 Structure of an Organization

Unit-2 : Self-Management and Development **10 Hrs** **15 Marks**

- 2.1 Life Long Learning Skills, Concept of Personality Development, Ethics and Moral values
- 2.2 Concept of Physical Development; Significance of health, hygiene, body gestures
- 2.3 Time Management Concept and its importance
- 2.4 Intellectual Development: Reading skills, speaking, listening skills, writing skills (Note taking, rough draft, revision, editing and final drafting), Concept of Critical Thinking and Problem Solving (approaches, steps and cases).
- 2.5 Psychological Management: stress, emotions, anxiety and techniques to manage these.
- 2.6 ICT & Presentation skills; use of IT tools for good and impressive presentations.

Unit-3 : Team Management **10 Hrs** **15 Marks**

- 3.1 Concept of Team Dynamics. Team related skills, managing cultural, social and ethnic diversity in a team.
- 3.2 Effective group communication and conversations.
- 3.3 Team building and its various stages like forming, storming, norming, performing and adjourning
- 3.4 Leadership, Qualities of a good leader
- 3.5 Motivation, Need of Motivation, Maslow's theory of Motivation

Unit-4 : Project Management **05 Hrs** **10 Marks**

- 4.1 Stages of Project Management; initiation, planning, execution, closing and review (through case studies), SWOT analysis concept.

Unit-5 : Introduction to Entrepreneurship.....10 Hrs 15 Marks

- 5.1 Entrepreneurship, Need of entrepreneurship, and its concept, Qualities of a good entrepreneur
- 5.2 Business ownerships and its features; sole proprietorship, partnership, joint stock companies, cooperative, private limited, public limited, PPP mode.
- 5.3 Types of industries: micro, small, medium and large.

Unit-6 : Entrepreneurial Support System (Brief Introduction).....07 Hrs 10 Marks

- 6.1 District Industry Centers (DICs), State Financial Corporations (SFCs), NABARD
- 6.2 MSME (Micro, Small, Medium Enterprises) – its objectives & list of schemes

Unit-7 Market Study and Opportunity Identification.....07 Hrs 10 Marks

- 7.1 Types of market study: primary and secondary, product or service identification, assessment of demand and supply, types of survey and their important features

Unit-8 : Project Report Preparation08 Hrs 15 Marks

- 8.1 Preliminary Report, Techno-Economic Feasibility Report, Detailed Project Report (DPR).

LIST OF TUTORIAL EXERCISES

1. Understanding Self-Management and Development (Related to Chapter 02); through examples, cases, exercises, panel discussions, seminars, meditation and yoga techniques.
2. SWOT Analysis
3. Team Management (Related to chapter 03); through examples, cases, role plays, group discussions and panel discussions.
4. Market Study and Opportunity Identification (Related to Chapter 07); through literature reviewing, making questionnaires, conducting mock interviews and analyzing data for product/service identification and demand assessment.
5. Project Management and Project Report Preparation through exercises on making project reports on micro and small enterprises. Case studies and SWOT analysis of projects can be taken.

RECOMMENDED BOOKS

1. Generic Skill Development Manual, MSBTE, Mumbai
2. Lifelong Learning, Policy Brief(www.oecd.org)
3. Towards Knowledge Society, UNESCO Publication, Paris
4. Entrepreneurship Development by CB Gupta and P Srinivasan: Sultan Chand and sons: New Delhi
5. Essentials of Management by H Koontz, C O' Daniel , McGraw Hill
6. Principles and Practice of Management by Shyamal Bannerjee: Oxford and IBM Publishing Co, New Delhi
7. Management by James AF Stoner, R Edward Freeman and Daniel R Gilbert Jr., Prentice Hall of India Pvt. Ltd, New Delhi
8. Entrepreneurship Development by S. L. Gupta and Arun Mittal: IBH Publication
9. A Handbook of Entrepreneurship, Edited by B S Rathore and Dr. J S Saini
10. Entrepreneurship Development and Small Business Enterprises by Poornima M: Pearson Education India
11. Handbook of Small Scale Industry by P M Bhandari

RATIONALE

Internet of Things (IoT) is all about connecting physical objects to the Internet to enable same level of interaction with rest of the world as any other computing device. Applications of IoT include homes, buildings, environment, transport, education, logistics, security and many more. Raspberry Pi is a single-board computers made by the Raspberry Pi Foundation that aims to educate people in computing. People use Raspberry Pi to learn programming skills, build hardware projects, do home automation, and even use them in industrial applications. This practical-only course is designed to promote creativity and innovation in the students by designing and implementing IoT based projects. The students may choose either a Raspberry Pi or Arduino board to implement small projects.

DETAILED CONTENTS**Unit-1 : Introduction to Internet of Things 10 Hrs 20 Marks**

Internet of Things (IoT), Characteristics of IoT, Key features of IOT, Advantages and Disadvantages of IOT, IoT Applications, Physical Design of IoT, logical design of IoT, Generic block diagram of an IoT Device.

Unit-2 : IoT Architecture 14 Hrs 25 Marks

Architecture of IoA, SOA based Architecture, API-Oriented Architecture, Resource management-resource partitioning, computation offloading, communication model, IoT levels and deployment templates.

Unit-3 : Communication Technologies 12 Hrs 25 Marks

Protocol standardization for IoT – ZigBee architecture, BLE protocol , Wifi, LTE, IEEE 802.11, 802.15.4 – LR-WPAN, RFID protocols, NFC

Unit-4 : IoT Physical Devices and End points 12 Hrs 20 Marks

Introduction to embedded electronics, introduction to Arduino, Arduino UNO, fundamentals of Arduino programming, introduction to Raspberry Pi. Building IoT with any platform.

Unit-5 : IoT Security 08 Hrs 10 Marks

IoT security issues, IoT security threats, security requirements – IP protocol based IoT, heterogeneous IoT, light weight security.

List of Practicals

1. To setup development environment for Raspberry Pi or Arduino.
2. To understand the logical board layout of Raspberry Pi or Arduino.
3. To interface basic sensors and actuators with development board.
4. To interface various communication modules (Bluetooth, WiFi) with development board
5. To design a project using sensors, actuators, communication modules (at least one each), draw the circuit diagram and prepare the list of required parts.
6. To develop, test and implement the designed project.

List of Parts

1.	Development Board : Raspberry Pi or Arduino with Power Supply and Case	12.	PIR Motion Sensor
2.	Bluetooth module: HC05	13.	Ultrasonic Sensor : HC-SR04
3.	MicroSD Card	14.	Infrared distance meter : GP2Y0A02YK
4.	HDMI – HDMI cable	15.	Inductive RFID card reader : RFID-RC522
5.	Jumper Wires : M-M, M-F, F-F	16.	Gyroscope : MPU-6050
6.	Red, Green, Blue, White LEDs	17.	Realtime clock : DS1307 RTC
7.	Bread Boards	18.	Servo Motor
8.	LCD Module	19.	Stepper Motor
9.	Push Buttons	20.	Servo Board : PCA9685
10.	Humidity / Temperature Sensor : DHT11, DHT22, DS18B20 and DS18S20	21.	Relays
11.	Gas Sensor : MQ-2	22.	Photoresistors

Recommended Books

1. Internet of Things with Raspberry Pi 3 By Maneesh Rao, Packt Publication
2. Raspberry Pi IoT Projects By John C. Shovic, Apress Publication
3. Programming Arduino : Getting Started with Sketches By Simon Monk, McGraw Hill.

Reference Digital Resources

1. <https://www.electronicsforu.com>
2. <https://projects.raspberrypi.org>
3. <https://create.arduino.cc>

RATIONALE

Recent trend in web application development leverage the power of popular frameworks at server-side as well as client side to develop modern, consistent and reliable web applications quickly. PHP is one of the most popular server-side scripting language used to develop web applications. This course is designed to expose students to CodeIgniter - a popular PHP framework and Twitter Bootstrap 4 as client-side framework. After pursuing this course, the students will be able to develop fully-functional web applications with consistent user interfaces.

DETAILED CONTENTS**Unit-1 : Bootstrap 4.006 Hrs 20 Marks**

Bootstrap: history, features, advantages, environment setup; file structure, layout, grid system, content, components and utilities.

Unit-2 : CodeIgniter PHP Framework12 Hrs 20 Marks

Framework, various php frameworks, codeigniter: overview, installation, mvc framework, application architecture, directory structure; basic concepts: controllers, views, models, helpers, routing.

Unit-3 : Configuration and Database Handling in CodeIgniter12 Hrs 20 Marks

Configuration: autoload configuration, configuring base url, database configuration; database handling: connecting to a database, inserting a record, updating a record, deleting a record, selecting a record, closing a connection.

Unit-4 : Libraries and Error Handling12 Hrs 20 Marks

Libraries: library classes, creating libraries, loading custom libraries, extending and replacing native library; error handling methods: show_error() , show_404(), log_message()

Unit-5 : Session and Cookie Management in CodeIgniter08 Hrs 10 Marks

Initializing a session, adding, fetching, and removing session data, adding and retrieving flashdata, adding, removing, and retrieving tempdata, destroying a session, cookies: setting a cookie, getting cookie value, deleting a cookie.

Unit-6 : Miscellaneous Operations in CodeIgniter06 Hrs 10 Marks

File uploading, sending email, form validation, page caching, page redirection, application profiling, benchmarking, internationalization, security: XSS prevention, SQL injection prevention, CSRF prevention, hiding php errors.

List of Practicals

1. To download and use bootstrap library on Windows/Linux platforms.
2. To use bootstrap layout and grid systems.
3. To use bootstrap components and utilities.
4. To download, install and configure Codeigniter web framework platforms.
5. To manage users in Codeigniter web framework.
6. To manage HTML table, and text libraries in Codeigniter web framework.
7. To manage files in Codeigniter web framework.

8. To manage database in Codeigniter web framework.

Recommended Books

1. Mastering Bootstrap 4 By Benjamin Jakobus, Jason Marah
2. Professional CodeIgniter, by Thomas Myer, Wrox Publication
3. CodeIgniter for Rapid PHP Application Development by David Upton

Reference Digital Resources

1. www.w3schools.com
2. www.tutorialpoints.com

Rationale

Cloud Computing is the delivery of computing services including servers, storage, databases, networking, software, analytics, and intelligence over the Internet (“the cloud”) to offer faster innovation, flexible resources, and economies of scale. It will enable students to understand key terms and concepts in cloud computing world. Students will also learn strategies and techniques regarding the cloud services use, helping lower their operating costs, run their infrastructure more efficiently and scale as their business needs change.

DETAILED CONTENTS**Unit-1 : Overview of Cloud Computing.....08 Hrs 15 Marks**

Computing paradigms: personal computing, distributed computing, cluster computing, grid computing, utility computing, cloud computing and their comparison; cloud computing architecture.

Unit-2 : Introduction to Cloud Computing.....08 Hrs 20 Marks

The NIST definition of cloud computing. Essential characteristics: on-demand self-service, broad network access, resource pooling, rapid elasticity, measured service; advantages, disadvantages, and applications of cloud computing; challenges in cloud computing.

Unit-3 : Service models and Deployment Models.....15 Hrs 25 Marks

Service models: Software as a Service (SaaS), Platform as a Service (PaaS), Infrastructure as a Service (IaaS), characteristics, benefits, applications and vendors for SaaS, PaaS, and IaaS; Deployment Models: private cloud, community cloud, public cloud, hybrid cloud; advantages and disadvantages of private cloud, community cloud, public cloud, hybrid cloud.

Unit-4 : Virtualization Concepts.....15 Hrs 20 Marks

Virtualization and its benefits, types of virtualization: full virtualization, para-virtualization, OS-level virtualization, Type I and Type II hypervisors, pitfalls of virtualization, Live Vs. Cold VM migration.

Unit-5 : Scheduling and SLA.....06 Hrs 10 Marks

Scheduling: Static Scheduling – Min-Min, Max-Min, and Sufferage algorithm, Service Level Agreements (SLA): Need & types of SLA, Lifecycle of SLA.

Unit-6 : Amazon EC2 & S3.....04 Hrs 10 Marks

Amazon EC2: Benefits and features, Amazon S3: Features and uses of Amazon S3 storage classes.

Recommended Books

1. Essentials of Cloud Computing By K. Chandrasekaran, CRC Press.
2. Cloud Computing : Principles and Paradigm By Rajkumar Buyya, Wiley

Digital Reference

1. <https://www.nist.gov>
2. <https://aws.amazon.com>
3. NPTEL course on cloud computing

RATIONALE

With the growing popularity of the Internet and technological advancement, it has become much quicker and easier to buy and sell online now than ever. Internet users are no longer limited to sitting at desktop computers in order to do research or send emails. People are now using their laptops, tablets and even mobile phones to do more things including making purchases and even selling products via the Internet. People can now enjoy shopping and even running their own business from the comfort of their own homes. This course is meant to acquaint students with the very concept of E-Commerce.

DETAILED CONTENTS

Unit-1 : Introduction to E-Commerce	08 Hrs	15 Marks
E-Commerce overview, Features of E-Commerce, Traditional Commerce v/s E-Commerce, Need of E-Commerce, advantages and disadvantages of E-Commerce, Role of Internet in E-Commerce..		
Unit-2 : E-Commerce Models	08 Hrs	15 Marks
Business-to-Business (B2B), Business-to-Consumer (B2C), Consumer-to-Consumer (C2C), Consumer-to-Business (C2B), Business-to-Government (B2G), Government-to-Business (G2B), Government-to-Citizen (G2C).		
Unit-3 : Framework of E-Commerce	10 Hrs	20 Marks
E-Commerce Information Providers, Functions of E-Commerce, Generic Framework of E-Commerce, E-commerce Building Blocks : Objects and Object Classes, E-Compatible Legal And Financial Framework : An Indian Approach.		
Unit-4 : Electronic Payment Systems	12 Hrs	20 Marks
Types of Electronic Payment Systems, Traditional Payment Systems vs Electronic Payment Systems, Electronic Payments and Protocols, Security Requirements in Electronic Payment Systems, Prospects of Electronic Payment Systems, Managerial Issues in Electronic Payment Systems.		
Unit-5 : E-Commerce in Banking Industry	10 Hrs	20 Marks
Introduction to Electronic Commerce and Banking, Changing Dynamics in the Banking Industry, Home Banking Implementation Approaches, Open versus Closed System.		
Unit-6 : E-Commerce in Retail Industry	08 Hrs	10 Marks
Introduction to E-Commerce and Retail Industry, Online Retailing, Buying Process in Online Retailing Environment, Management Challenges in Online Retailing		

Recommended Books

1. Concepts of E-Commerce, A. K. Panday, Katson Publications.
2. E-Commerce: An Indian Perspective, P.T. Joseph, PHI

Reference Books

1. E-Commerce, Mamta Bhusry, Laxmi Publication (Firewall Media)
2. Introduction to E-Commerce, Martin Kutz

RATIONALE

This course will introduce the concepts, techniques, design and applications of data warehousing and data mining. The course is expected to enable students to understand and implement classical algorithms in data mining and data warehousing. Students will learn how to analyze the data, identify the problems, and choose the relevant algorithms to apply. Then, they will be able to assess the strengths and weaknesses of the algorithms and analyze their behavior on real datasets.

DETAILED CONTENTS**Unit-1 : Introduction to Data Warehousing.....06 Hrs 10 Marks**

Data Warehouse, OLTP, OLAP, comparison of OLTP and OLAP systems, three-tier data warehouse architecture, Data Warehouse Models: Enterprise warehouse, Data mart, Virtual warehouse, Types of OLAP Servers: Relational OLAP (ROLAP), Multidimensional OLAP (MOLAP), Hybrid OLAP (HOLAP).

Unit-2 : Multidimensional Data Models10 Hrs 20 Marks

Multidimensional database, data cube, concept hierarchy, OLAP Operations: Roll-up, Drill-down, Slice and dice, Pivot (rotate), Schemas for multidimensional databases: Stars, Snowflakes, and Fact Constellations.

Unit-3 : Data Mining & KDD Process10 Hrs 20 Marks

Data Mining, Importance of data mining, KDD process: Data preprocessing, Data cleaning, Data integration, Data selection, Data transformation, Data mining, Pattern evaluation, Knowledge presentation. Kind of data for data mining, Interestingness of patterns, Classification of data mining systems, Technologies used in data mining, Major issues in Data Mining.

Unit-4 : Building Data Warehouse10 Hrs 20 Marks

Top-down approach, Bottom-up approach, Steps for Data warehouse design : choosing a business process to model, choosing the grain of the business process, choosing the dimensions, choosing the measures, Recommended approach for data warehouse development.

Unit-5 : Mining Frequent Patterns10 Hrs 20 Marks

Frequent patterns: itemsets, sub-sequences, sub-structures; Finding frequent itemsets using candidate generation (Apriori algorithm).

Unit-6 : Applications & Trends in Data Mining10 Hrs 10 Marks

Data Mining Applications: Data Mining for Financial Data Analysis, Retails and Telecommunication Industries, Science and Engineering, Intrusion Detection and Protection, Recommendation System, recent trends in data mining.

Recommended Books

- (i) Data Mining – Concepts & Techniques by Jiawei Han and Micheline Kamber, Elsevier
- (ii) Data Warehousing, Data Mining & OLAP, Alex Berson and S. Smith, TMH.

5.5 GRAPHICS AND ANIMATION

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RATIONALE

Computer graphics and animation course is designed to engage students in the creative activity of designing digital visual art by using Adobe Photoshop, Adobe Illustrator and Blender.

LIST OF PRACTICALS

1. Identify and understand the functions of major regions of the Photoshop workspace : Menu bar and context menus, Options bar, Tools panel, panels, and document window(s).
2. Open and navigate a Photoshop document with menu commands, the Zoom Tool, the Hand Tool, and the Navigator Panel.
3. Create a layered Photoshop document from a provided starting image.
4. Differentiate among monitor, document, and printer resolutions, and understand when to use each measurement.
5. Exploring Adobe Illustrator (selection tool, direct selection tool, pen tool, knife, scissors and eraser, brush tool, blob brush tool, basic shape tools such as ellipse, rectangle, rounded rectangle, layers and art-boards, live paint bucket, gradient mesh tool, toolbox, menus, application bar & panels.)
6. To set up a new document using rulers, guides & grids.
7. To draw & transform objects: rectangles, squares, ovals, circles, polygons, stars.
8. To make & save selections: using the selection tool, lasso tool, magic wand tool.
9. To design a Printer Icon using Adobe Illustrator
10. To design a USB Stick Icon using Adobe Illustrator.
11. To design a logo using Adobe Illustrator
12. To explore the features of blender animation tool and create a character animation.

5.6 MINOR PROJECT

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RATIONALE

Main objective of this project work is to provide the students with an opportunity to showcase their ability to develop a complete project by applying the principles of Software Engineering and the experience gained during their industrial training. Project work inculcates skills like problem-solving, creative thinking, time-management, planning, teamwork, leadership, presentation, report-writing, communication etc.

GUIDELINES

The students may be encouraged to choose a project from any of the following identified areas:

1. To build a basic desktop application with GUI, database support and report generation.
2. To develop websites using HTML, CSS and JavaScript and server side scripting language like PHP/ASP.NET/JSP.
3. To develop web applications using popular frameworks like CodeIgnitor, Laravel, Magento, Django etc.
4. Undertake a hardware project using commercially available platforms (Arduino or Raspberry Pi).

The students should be encouraged to undertake projects to solve some real-world problems like library management, hostel management, student record maintenance, institute management system, employee leave record system, payroll system, timetable preparation etc. The preference should be given to such minor projects which could be continued as major projects during 6th semester. The list of project areas given above are tentative only, the students are free to select any project of their choice based on technologies relevant to their diploma stream.

Note: The teachers must guide/help students to identify their minor project work and chalk out their plan of action well in advance. As a minor project activity each student is supposed to study the project clearly and prepare a detail project report of the observations/ processes/ activities observed by him/ her. The students should be guided by the respective subject teachers. The teachers will conduct performance/ assessment of the students.

Criteria for Minor Project Evaluation (Internal Assessment)

SN.	Criteria	Weightage
1	Synopsis and Project Title Selection	10%
2	Initiative in performing tasks during project work	30%
3	Report Writing	15%
4	Attendance and punctuality	10%
5	Final outcome as per objectives set by student(s)	20%
6	Viva	15%

Criteria for Minor Project Evaluation (External Assessment)

SN.	Criteria	Weightage
1	Seminar through Power Point Presentation	50%
2	Report	25%
3	Viva	25%

After completion of the project work, every student will submit a project report which should contain the following:

1. Cover Page (as per perscribed format)
2. Title page (as per perscribed format)
3. Declaration by the Student (as per perscribed format)
4. Certificate by the Guide (as per perscribed format)
5. Acknowledgments
6. Abstract
7. Table of Contents
8. Detailed description of the project (This should be split in various chapters/sections with each chapter/section describing a project activity in totality). This portion of report should contain all relevant diagrams, tables, flow charts, software programme, print outs, photographs etc., which are properly labeled.
9. Conclusion & Recommendations
10. References

GUIDELINES

The students will undergo a 4-weeks industrial training after the 4th semester in the semester break. The assessment of industrial training will be held in next semester i.e. 5th semester. The students will be checked by departmental faculty members by performing surprise visits to the training institutes during their industrial training programme.

Evaluation Criteria (100 Marks)

The assessment criteria of industrial training is divided into two parts. First part of assessment is the internal assessment by the industry or training institute where students have undertaken the industrial training and which of 50 marks. The Internal Assessment done by the industry or training institute may be rationalised by the Department, if needed. The second part of assessment is the external assessment by the department where the students are studying and which of 50 marks. The department shall conduct external assessment within a month of the beginning of the 5th semester. The students will have to prepare a presentable good report on what they have learned/practised during their industrial training. The report will be submitted during the external assessment of the students. The students will also have to prepare a detailed Power Point Presentation file of the Industrial Training which has to be presented before the Departmental Team constituted for the said purpose.

For the assessment of Industrial Training undertaken by students, the weightage of different components shall be considered as under:-

- (a) The assessment criteria (Internal Assessment) by the industry or training institute where students have undertaken the industrial training (50 marks) is as follows:
 - Attendance and general behavior (10 marks).
 - Daily diary maintenance (10 marks).
 - Initiative and participative attitude during training (10 marks).
 - Assessment of training by the industrial trainer (20 marks).
- (b) The assessment criteria (External Assessment) by the institute where the students are studying (50 marks) is as follows:
 - Seminar through Power Point Presentation (20 marks).
 - Report (10 marks).
 - Viva (20 marks).

RATIONALE

Android Application Development enables students to successfully apply core Java programming languages features & software patterns needed to the design and implementation of Android applications for mobile devices. Students will develop an application from scratch, assuming a basic knowledge of Java, and learn how to set up Android Studio, work with various Activities and create simple user interfaces to make their apps run smoothly.

DETAILED CONTENTS**Unit-1 : Android Platform and Development Environment.....06 Hrs 10 Marks**

Introduction to Android OS and its versions, Android Platform, Linux kernel, libraries, Android Runtime : core libraries and Dalvik Virtual Machine, Application Framework and Applications; Android Development Environment: Android SDK and JDK, Android Studio IDE, Android Emulator, Debugging Android applications.

Unit-2 : Fundamentals of Android Application.....10 Hrs 20 Marks

Components of android application: activity, service, broadcast receiver and content provider, fragments, views, layouts and intents; Manifest : role, declaring components and component capabilities; Creating Android application: define resources, implement application classes, package application and install & run application.

Unit-3 : The Activity Class.....10 Hrs 20 Marks

Activity class, task backstack; activity states and life cycle, activity callback methods: onCreate, onStart(), onResume(), onPause(), onRestart(), onStop() and onDestroy(); Starting Activities; Handling Configuration Changes; Configuring the Manifest: declaring activities, intent filters and permissions.

Unit-4 : Intents, Permissions and Fragments.....10 Hrs 15 Marks

Use of intent, Intent class, intent types, building an intent, intent filter, intent resolution; Android permissions, defining & using application permissions, Component permissions; fragment, fragment life cycle and its states, fragment callback methods, adding fragments to activities.

Unit-5 : Android User Interface.....10 Hrs 20 Marks

Views: TextView, EditText, AutoCompleteTextView, Button, ImageButton, CheckBox, ToggleButton, RadioButton, RatingBar; View Groups: RadioGroup, TimePicker, DatePicker, WebView, MapView, Gallery, Spinner; AdapterViews: ListView, Spinner, Gallery; View Events : view event sources, handling view events, common view operations; Layouts: Constrained Layout, Linear Layout, Relative Layout, Table Layout, Absolute Layout, Frame Layout, Grid View.

Unit-6 : Android User Notification and Broadcast Receiver.....10 Hrs 15 Marks

Toast, creating toast notification, notification area, broadcast receiver, create and register broadcast receiver, broadcasting custom intents, broadcast receiver event handling.

LIST OF PRACTICALS

1. To install the Java Development Kit (Latest Version) and Android Studio (Latest Version).
2. To explore the Android Studio (Toolbar, Navigation Bar, Editor Window, Editor Tabs, Project Explorer, Tool Window Bar, Tool Windows, Status Bar etc.)
3. To create an Android project to display the message “Hello World!”, run it on Android Virtual Device (AVD) and deploy the application on a real Android device.
4. To develop an Android application CapQuiz that tests the user’s knowledge of country’s capital. The name of a random country, a capital and TRUE/FALSE buttons should be displayed on the screen. The application should evaluate the user response and provide the instant pop-up message.
5. To modify the application developed in experiment-4 to add the provision of navigation to ‘Next’ and ‘Previous’ questions and evaluate the response only after user presses the ‘Submit’ image button.
6. To develop an Android application to implement a basic arithmetic calculator.
7. To develop an Android application to demonstrate the working of BroadcastReceiver.

Recommended Books

1. Android Application Development for Dummies By Donn Felker, Wiley Publishing Inc.
2. Android Programming: the Big Nerd Ranch Guide By Bill Phillips et al., Pearson Publication

Reference Books / Websites

1. <https://developer.android.com/guide/>
2. <https://www.tutorialspoint.com/android/index.html>
3. <https://www.javatpoint.com/android-tutorial>

RATIONALE

Cybersecurity enables students to understand key terms and concepts in cyber world. Students will learn strategy, policy, and standards regarding the security of operations in cyberspace, encompassing the full range of threat reduction, vulnerability reduction, deterrence, international engagement, incident response, resiliency, and recovery policies and activities, including computer network operations, information assurance, law enforcement, diplomacy, military, and intelligence missions as they relate to the security and stability of the global information and communications infrastructure.

DETAILED CONTENTS**Unit-1 : Introduction to Cyber Security.....08 Hrs 15 Marks**

Basic Security Concepts: confidentiality, integrity, availability, authentication, authorization, and nonrepudiation; need for cyber security; cyber security terminology: asset, threat, vulnerability, hacking, hackers, attacker, intruder, virus, worm, trojan horse, backdoor, logic bomb, eavesdropping, phishing, spamming, keylogger and spyware; cyber crime, cryptocurrency.

Unit-2 : Cyber Security Threats, Vulnerabilities, and Risks.....08 Hrs 15 Marks

Adversarial Threats: fraud and theft, insider threat, malicious hacker, malicious code, espionage; Non-Adversarial Threats: errors and omissions, loss of physical and infrastructure support, impact of information sharing on personal privacy.

Unit-3 : Cyber Defense : Physical and System Security.....10 Hrs 20 Marks

Physical Security: protection of secure area, controlling visitors, physical security of facilities, fire-proof safes & containers, physical security using cables, locks and biometrics controls.

System Security: OS patches and updates; protection against ransomware, malware, rootkits and botnets; handling denial-of-service attack, cyberbullies, identity theft, hoaxes, spyware, social engineering and phishing attacks; recovering from viruses, worms, and trojan horses.

Unit-4 : Cyber Defense : Network Security12 Hrs 20 Marks

Network Classification: trusted, semi-trusted, untrusted & unknown networks; Network attacks classification : interruption, interception, modification & fabrication; Network attacks : password stealing, packet sniffers, IP spoofing, denial-of-service, man-in-middle, session hijacking; security of network infrastructure devices; Defense against network attacks : configuration management, encryption, firewall, VPN.

Unit-5 : Cyber Defense : Internet Security10 Hrs 20 Marks

Internet security threats : privacy breach, DNS spoofing, email spam, cross-site scripting (XSS); IP Security (IPSec) and SSL, Web browser security settings: cookies, website certificates, browsing history, plugins, parental control, form autofill, CAPTCHA; strong passwords; Handling email attachments, spams; use of bcc

Unit-6 : Introduction to Cyber Laws and IT Acts08 Hrs 10 Marks

Major provisions under Indian IT Act-2000; Intellectual Property Rights, Patent Law, Copyright Law, Digital Signatures

Recommended Books

1. Information Security: The Complete Reference By Mark Rhodes-Ousley, McGraw-Hill.
2. Cyber Security By Nina Godbole, Wiley.

Reference Books

1. An Introduction to Information Security, NIST Publication (<https://www.us-cert.gov/ncas/tips>)
2. Cryptography and Network Security : Principles and Practice By William Stallings, Pearson.

RATIONALE

Linux is the open source operating system best known for its efficiency and security. Linux distributions could be fitted to a range of systems (low-end or high-end). Most of the servers across the world prefer to run on Linux than on a Windows hosting environment. Linux system administration deals with installing, configuring and tuning Linux OS to meet the requirements of particular application. This course introduces the Linux OS to the students and covers all the basic aspects of Linux system administration.

DETAILED CONTENTS**Unit-1 : Open Source Software** **06 Hrs** **10 Marks**

Open Source Software (OSS), OSS advantages, free software, freeware, free and open source software (FOSS), public domain software, FSF, GPL, LGPL.

Unit-2 : Linux Operating System **10 Hrs** **15 Marks**

History, features, applications, distributions, kernel, desktop environments : GNOME and KDE; architecture, file system hierarchy, boot loaders, bash shell

Unit-3 : Managing Files and Directories **12 Hrs** **20 Marks**

Rules for naming files and directories, FHS, file types, file permissions, Linux file management commands: cat, touch, head, tail, cp, rm, mv, more, less, pwd, mkdir, rmdir, ls, cd, chmod; use of wild card characters, standard input, output and error files; pipes, filters and redirection.

Unit-4 : Linux Networking **08 Hrs** **15 Marks**

Networking terminology (basic concept only) : TCP/IP, IPv4 and IPv6 addresses, netmask, gateway, DNS, DHCP, ports; Linux networking commands : ifconfig, finger, ping, arp, netstat, host, traceroute, nmap, ssh, telnet, ftp

Unit-5 : Linux Administration **10 Hrs** **20 Marks**

User management : users, groups, primary and secondary groups, Linux commands for user management : useradd, usermod, userdel, passwd, groupadd, groupmod, groupdel, groups, chown, chgrp; Disk management : manage disk partitions, format partitions, mount and unmount file systems; package management, configuration files: hosts, fstab, passwd, group, resolv.conf; Linux Servers : Telnet server, SSH server, FTP server, NFS server, proxy server, DHCP server, SAMBA.

Unit-6 : Shell Programming **10 Hrs** **20 Marks**

Linux shells, bash shell script, echo, read, variables : naming rules, readonly variable, unset variables, special variables (\$*, \$\$, \$#, \$?, \$n), environment variables, positional parameters, command substitution, flow control constructs - “if.then.fi” construct, “else” construct, “elif” construct, case, while construct, until, for, break and continue.

LIST OF PRACTICALS

1. To install Linux operating system (e.g. Ubuntu Distribution).
2. Using basic Linux commands/utilities : man, echo, exit, cal, date, time, mkdir, rmdir, cd, pwd, clear, cat, type, bc, expr, test, script, passwd, uname, , hostname, alias, ls, cp, ln, rm, more, less, cmp, comm, diff, kill, sudo, su, sort.

3. Using filter Linux commands : wc, cut, head, tail, tee, cat and grep.
4. Using networking based Linux commands : finger, ifconfig, ping, arp, netstat, route, traceroute.
5. To manage users and groups.
6. Using file management commands : chmod, chown, chgrp, touch, find, cut.
7. To view and change file access permission of files in Linux.
8. To implement various types of redirections.
9. To write shell scripts that implements the various condition and loop constructs e.g.
 - (a) To print the grade of marks obtained in a subject.
 - (b) To find factorial of any number using for and while loops.
 - (c) To check whether the number is prime or not.
 - (d) To generate fibonacci series.
 - (e) To reverse of digits of a number.
 - (f) To check whether a file exist or not, if yes then show the contents of the file.
10. To create and delete users in Linux operating system.

Recommended Books

1. Linux: The Complete Reference 6th Edition by Richard Petersen.
2. The official Ubuntu book by Benjamin Mako Hill et al.
3. NIIT, Linux Operating Systems, Prentice-Hall Of India Pvt. Limited.

Digital References

1. <https://www.kernel.org>.
2. <https://www.distrowatch.com>
3. <http://www.tldp.org/guides.html>
4. <http://linux-tutorial.info>
5. <http://www.linux.com>

6.4 WIRELESS COMMUNICATION AND MOBILE COMPUTING

L T P

4 - 4

RATIONALE

This course provides a comprehensive overview and advanced knowledge of modern mobile and wireless communication systems. Building on the prior knowledge on digital communications, students develop further develop understanding on the challenges and opportunities brought by the wireless medium.

DETAILED CONTENTS

Unit-1 : Introduction to Wireless Communication08 Hrs 10 Marks

Wireless communication and its applications, advantages and disadvantages of wireless communication, Types of Services : broadcast, paging, cellular telephony, trunking radio, cordless telephony, WLAN, PAN, adhoc & sensor networks, fixed wireless access; challenges in wireless communication, electromagnetic spectrum, licensed/unlicensed spectrum bands, ISM band, terrestrial and satellite microwave communication, broadcast radio, infrared and lightwave communication, wireless transmission impairments – attenuation, distortion, noise, interference, pathloss, shadowing and fading.

Unit-2 : Fundamentals of Wireless Communication10 Hrs 20 Marks

Concept of bandwidth, analog and digital signals, data rate, signal strength, SNR, RSSI, electromagnetic wave propagation: ground waves, sky waves and line-of-sight propagation; radio waves, microwaves, infrared; Overview of Propagation Mechanisms: reflection, diffraction and scattering; outdoor and indoor propagation.

Unit-3 : Wireless Communication Systems10 Hrs 20 Marks

Cellular Communication: cellular concept, cellular system architecture, cells, clusters, frequency reuse, cell splitting, handoff, Digital Cellular System : TDMA, ETDM, PCS, CDMA, Global System for Mobile Communication (GSM), GSM network : switching system, BSS, operation and support system, Generations of cellular networks and their features (1G – 5G).

Unit-4 : Wireless LAN Technology and Bluetooth08 Hrs 15 Marks

Wireless LAN (WLAN), IEEE-802.11, WLAN applications, WLAN types, WLAN problems – hidden station and exposed station problems; Bluetooth technology, Direct Sequence Spectrum Scheme, Frequency Hopping Spread Spectrum, Personal Area Networks.

Unit-5 : Mobile Computing Introduction08 Hrs 10 Marks

Mobile computing, Mobile computing functions, Mobile Computing Devices, Middleware and Gateways, Mobile computing environment, Applications and services.

Unit-6 : Mobile Computing Architecture08 Hrs 15 Marks

Three tier architecture for Mobile Computing, design considerations for mobile computing, client context manager, introduction to CC/PP, Policy manager, semantic web, security manager, context aware systems, GPS, Mobile computing through Internet.

Unit-7 : Operating System for Mobile Device04 Hrs 10 Marks

An overview of Android Operating System, Architecture, Features of Android OS.

LIST OF PRACTICALS

1. To identify various wireless networking devices and to recognise physical topology in the lab.
2. To create WLAN of at least five wireless devices using any simulation tool (e.g. packettracer).
3. To setup a WLAN using access point.
4. To transfer data between two wireless devices (e.g.PC-PC, PC-Smart phone)
5. Data sharing using bluetooth.
6. Case study of Android operating system.

Recommended Books

1. Wireless Communication: Principles and Practice by Theodor S. Rappaport, Pearson Education
2. Mobile Computing: Technology, Applications and Service Creation by Asoke Talukdar and Roopa R. Yavagal, TMA.

6.5 MAJOR PROJECT

L T P

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RATIONALE

Main objective of this project work is to provide the students with an opportunity to showcase their ability to develop a complete project by applying the principles of Software Engineering and the experience gained during their industrial training. Project work inculcates skills like problem-solving, creative thinking, time-management, planning, teamwork, leadership, presentation, report-writing, communication etc.

GUIDELINES

The students may be encouraged to choose a project from any of the following identified areas:

1. To build a basic desktop application with GUI, database support and report generation.
2. To develop websites using HTML, CSS and JavaScript and server side scripting language like PHP/ASP.NET/JSP.
3. To develop web applications using popular frameworks like CodeIgnitor, Laravel, Magento, Django etc.
4. Undertake a hardware project using commercially available platforms (Arduino or Raspberry Pi).
5. To develop applications for mobile platforms like Android.

The students should be encouraged to undertake projects to solve some real-world problems like library management, hostel management, student record maintenance, institute management system, employee leave record system, payroll system, timetable preparation etc. The preference should be given to such major projects which extend the work of minor projects carried out by the students during 5th semester. The list of project areas given above are tentative only, the students are free to select any project of their choice based on technologies relevant to their diploma stream.

Note: The teachers must guide/help students to identify their minor project work and chalk out their plan of action well in advance. As a minor project activity each student is supposed to study the project clearly and prepare a detail project report of the observations/ processes/ activities observed by him/ her. The students should be guided by the respective subject teachers. The teachers will conduct performance/ assessment of the students.

Criteria for Major Project Evaluation (Internal Assessment)

SN.	Criteria	Weightage
1	Synopsis and Project Title Selection	10%
2	Initiative in performing tasks during project work	30%
3	Report Writing	15%
4	Attendance and punctuality	10%
5	Final outcome as per objectives set by student(s)	20%
6	Viva	15%

Criteria for Major Project Evaluation (External Assessment)

SN.	Criteria	Weightage
1	Seminar through Power Point Presentation	50%
2	Report	25%
3	Viva	25%

After completion of the project work, every student will submit a project report which should contain the following:

1. Cover Page (as per perscribed format)
2. Title page (as per perscribed format)
3. Declaration by the Student (as per perscribed format)
4. Certificate by the Guide (as per perscribed format)
5. Acknowledgments
6. Abstract
7. Table of Contents
8. Detailed description of the project (This should be split in various chapters/sections with each chapter/section describing a project activity in totality). This portion of report should contain all relevant diagrams, tables, flow charts, software programme, print outs, photographs etc., which are properly labeled.
9. Conclusion & Recommendations
10. References

RATIONALE

For successful completion of diploma programme, the students should possess adequate command on language and communication skills so that they are able to express themselves with ease and felicity. The language used by the students should be appropriate to objectives and occasion. The contents of this subject shall provide them practical training through language laboratory.

LIST OF PRACTICALS

- | | |
|---|----------------|
| 1. Exercises on phonetics | (8 hrs) |
| 1.1 Identifications of English phonemes | |
| 1.2 Stress and Intonation | |
| 1.3 Speaking exercises with emphasis on voice modulation (reading and extempore) | |
| 2. Group Discussion | (4 hrs) |
| 3. Exercises on | (4 hrs) |
| - Self-assessment using tools like SWOT analysis | |
| - Listening skills | |
| 4. Internet communication and Correspondence | (4 hrs) |
| 4.1 Resume writing | |
| 4.2 Covering letter | |
| 4.3 Agenda and Minutes of meeting | |
| 4.4 Business Correspondence | |
| 5. Exercises on | (4 hrs) |
| 5.1 Body language and Dress sense | |
| 5.2 Etiquettes and mannerism in difficult situations like business meetings, table manners, Telephone etiquette | |
| 5.3 Manners related to opposite gender | |
| 5.4 Cross-cultural Communication | |
| 6. Mock interviews (telephonic/personal) | (4 hrs) |
| 7. Role plays for effective Communication | (4 hrs) |