CURRICULUM

For

DIPLOMA PROGRAMME

In

COMPUTER ENGINEERING

3rd Year (5rd & 6th Semester)

FOR THE STATE OF HIMACHAL PRADESH

June, 2019

Study and Evaluation Scheme

5th Semester Computer Engineering

Sr. No.	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	Programming using Java	4	4	30	20	50	100	3	50	3	150	200
5.3	Computer Hardware and Peripherals	4	4	30	20	50	100	3	50	3	150	200
5.4	Elective-I 5.4.1- Cloud Computing** 5.4.2- Cyber Security 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**	**24**	**160**	**215**	**375**	**400**	**-**	**250**	**-**	**650**	**1025**

Common with all diploma programmes
*** Common with diploma in Information Technology*

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 Computer Engineering

Sr. No.	Subject	Th	Pr	Internal Assessment			External Assessment					Total Marks
				Th	Pr	Total	Th	Hrs	Pr	Hrs	Total	
6.1	Linux Operating System	4	4	30	20	50	100	3	50	3	150	200
6.2	Wireless Communication & Mobile Computing*	4	4	30	20	50	100	3	50	3	150	200
6.3	Internet of Things**	-	4	-	50	50	-	-	50	3	50	100
6.4	Elective-II 6.4.1- Digital Marketing Techniques 6.4.2- Python Programming 6.4.3- Android Application Development***	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
		12	28	90	285	375	300	-	350	-	650	1025

Common with Diploma in Information Technology
*** Common with Diploma in Information Technology, ECE, Instrumentation Engineering*
**** Common with Diploma in ECE*
***** Common with all 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 Preparation `08 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.orf)
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

5.2 PROGRAMMING USING JAVA

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RATIONALE

All modern computer programming languages support Object Oriented Programming (OOP) paradigm. This course is aimed at providing students with the insight of object oriented programming using Java language. This course will help the students to improve analytical skills of object oriented programming.

DETAILED CONTENTS

Unit-1 : Introduction to Object-Oriented Programming | 04 Hrs | 10 Marks

Limitations of procedure-oriented programming paradigm, object-oriented programming (OOP) – advantages of OOP, objects and classes; Essential characteristics of OOP languages – data abstraction, encapsulation, inheritance, polymorphism, dynamic binding.

Unit-2 : Overview of Java Language | 06 Hrs | 10 Marks

Brief history of Java, features of Java language, Java editions, Java programming terminology – JVM, JRE, JDK, JNI, WORA, Java compiler, Java interpreter, source code, bytecode; Setting CLASSPATH, JAVA_HOME and PATH environment variables, coding conventions.

Unit-3 : Fundamentals of Java Programming | 08 Hrs | 20 Marks

Structure of a typical Java program, comments – single-line, multi-line and documenation; role of main() method, Java tokens – identifiers, operators, keywords, constants, strings, special symbols; Java statements, variables – local, instance and static; scope and lifetime of variables, data types, literals, type casting – widening and narrowing;

Unit-4 : Operators and Java I/O | 04 Hrs | 10 Marks

Operators - Arithmetic, Logical, Relational, Bit-wise, Assignment and Conditional Operators, Special Operators, Operator precedence and associativity, Console based IO using System.in and System.out objects.

Unit-5 : Control Statements | 08 Hrs | 10 Marks

Selection control structures – if, if...else, if...else if ladder, nested if, switch...case; Looping control structures – while loop, do...while loop, for loop, for each loop; Jump statements – break, labelled break, continue, return.

Unit-6 : Arrays and Strings | 06 Hrs | 10 Marks

Array definition, one dimensional array – declaring, initializing and accessing its elements; Multi-dimensional arrays, irregular arrays, String, string literals, escape sequence, String methods – charAt(), indexOf(), length(), substring(), toLowerCase(), toUpperCase(), replace(), trim().

Unit-7 Object-oriented Programming in Java | 08 Hrs | 10 Marks

Basic OOP concepts – class, instance variables, methods, object, constructor; creating objects, static members, final variables and methods, final classes, garbage collection, finalizer method, packages, access modifiers, wrapper classes.

Unit-8 : Polymorphism and Inheritance | 08 Hrs | 12 Marks

Compile time versus runtime polymorphism, method overloading, inheritance, method overriding, abstract methods, abstract class, multiple inheritance using interfaces.

Unit-9 : Exception Handling and Multithreading   04 Hrs   08 Marks

Concept of exceptions, checked and unchecked exceptions, built-in exceptions, implementing exception handling – try, catch and finally blocks, using multiple catch statements, user-defined exceptions, throw statement, throws clause, multithreading: thread lifecycle, creating threads by extending Thread class and implimenting Runnable interface.

LIST OF PRACTICALS

Write programs in Java

1. To install and configure JDK on a Wndows/ Linux based computer system.
2. To display a simple message like "Hello Java !" on the computer monitor.
3. To demonstrate the use of various operators.
4. To demonstrate the use of different control statements:
   (a) To display the grade of a student based on the marks obtained using 'if...else if' ladder.
   (b) To compute the factorial of a given number using while loop.
   (c) To implement a menu-driven calculator using do...while and switch...case statements.
   (d) To determine the largest element in a 1-dimensional array using 'for each' loop.
   (e) To compute the sum of two matrices using nested for loops.
5. To demonstrate the use of various string functions.
6. To define a class and create its objects.
7. To demonstrate the use of constructor and finalizer methods of a class.
8. To create a hierarchy of packages.
9. To inherit new classes from existing Java classes.
10. To demonstrate the use of different access modifiers.
11. To demonstrate method overloading and overriding.
12. To demonstrate the exception handling mechanism of Java.
13. To create and manage threads in Java.

Recommended Books

1. Programming with Java: A Primer by E. Balaguruswamy, Tata McGraw Hill Publication
2. Java How to Program by Paul Deitel, Harvey Deitel, Pearson Education

Reference Books

1. Java, the Complete Reference by Herbert Shildt, McGraw-Hill Education

5.3 COMPUTER HARDWARE AND PERIPHERALS

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RATIONALE

This course is designed to aquaint students with computer hardware, peripherals and networking devices. After completing this course, the students will be able to identify and use various hardware devices, prepare the specification of required computer hardware for home / office use and perform basic troubleshooting.

DETAILED CONTENTS

Unit-1 : Computer Hardware Devices | 10 Hrs | 15 Marks

PC components, features and system design, processor types and their features, processor specification, overview of motherboards, Bus system – data I/O bus, address bus, Internal Data bus, comparing processor performance, BIOS, BIOS setup menus, Limitation of BIOS, UEFI, overview of Mobile devices hardware.

Unit-2 : Input/ Output Devices and Ports | 10 Hrs | 20 Marks

Objective of I/O Devices, Types of input devices, Different printing devices and their use, Display types– CRT Monitor, LCD, LED, Plasma, OLED, HDTV, data projector; Video connector types – VGA, DVI, HDMI, S-Video Characteristics of display devices – Resolution , refresh rate, response time, color quality, USB port.

Unit-3 : Memory | 10 Hrs | 15 Marks

Memory basics – ROM, RAM, Types of RAM, Differentiate between DDR and GDDR, Memory Module – Registered Modules, SDR DIMM, DDR DIMM, DDR2 DIMM, DDR3 DIMM, DDR4 DIMM, Concept of cache – internal cache, External Cache (L1, L2, L3 cache);

Unit-4 : Storage Devices | 10 Hrs | 20 Marks

Type of storage devices, benefits and features of storage devices, Principle and operation of HDD, Basic HDD components, HDD cables and connectors, Optical Storage – CD/DVD construction technology, DVD format and standards, Concept of HD-DVD, Optical drive performance specifications – data transfer rate, drive speed, access time; Flash and removable devices – USB flash drive, SSD, Flash card readers; Concept of cloud based storage.

Unit-5 : Power Supply | 06 Hrs | 10 Marks

Power supply rating, form factors, power supply connectors, Block diagram and working of SMPS, UPS – online and offline UPS, UPS Rating, comparison of UPS and inverter.

Unit-6 : Networking Devices | 10 Hrs | 20 Marks

Different types of networking devices – NIC, Repeaters, Switch, Hub, router, gateways, bridge, modem, Access point, Bluetooth, Firewall; Internet connectivity technologies – Dial-up, ISDN, broadband, Wi-Max, leased line, Networking cables and their comparison, Networking tools.

LIST OF PRACTICALS

1. To identify various external components, ports and cables of a PC / Laptop.
2. To identify various internal components (Processor, RAM, SMPS, HDD) and connectors of a PC.
3. To prepare the specifications alongwith justification for PC / Laptop for home and office use.
4. To connect and install various peripheral devices like printers, webcams, projectors, scanners.

5. To partition / format hard disks and make a PC dual bootable in Windows and Linux.
6. To burn data and images on CD / DVD in Windows/Linux environment.
7. To configure network interface card and verify network connectivity using ping command.
8. To share a printer among PCs connected to LAN.
9. To understand CMOS settings and configure boot order, date and time, enable / disable ports.
10. To identify common hardware/networking faults and troubleshoot them.

Recommended Books

1. CompTIA A+ Certification Guide, Mark Edward Soper et al., Pearson Publisher.

Reference Books

1. The Complete PC Upgrade and Maintenance Guide, Mark Minasi, John Willey & Sons Inc.
2. Upgrading and Repairing PCs, Scott Mueller, Que Publication

5.4.1 CLOUD COMPUTING

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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. Essensial characteristics: on-demand self-service, broad network access, resource pooling, rapid elsaticity, 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, Sevice 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. Chandersekaran, 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

5.4.2 CYBER SECURITY

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RATIONALE

Cyber security 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 Security   12 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 Security   10 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 Acts   08 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.

5.4.3 DATA WAREHOUSING AND DATA MINING   L T P

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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 Models   10 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 Process   10 Hrs   20 Marks

Data Mining, Importance of data mining, KDD process: Data prepocessing, 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 Warehouse   10 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 Patterns   10 Hrs   20 Marks

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

Unit-6 : Applications & Trends in Data Mining   10 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

1. Data Mining – Concepts & Techniques by Jiawei Han and Micheline Kamber, Elsevier
2. 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

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 JavaScipt 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

INDUSTRIAL TRAINING

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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, based on his/her performance in external assessment . 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 begining 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).

6.1 LINUX OPERATING SYSTEM

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RATIONALE

Linux is the open source operating system best known for its efficiency and security. Today, Linux OS runs on a variety of hardware platforms ranging from resource-scarced embedded systems to high-end servers. This course introduces the Linux OS to the students and covers all the basic aspects of working on Linux operating system.

DETAILED CONTENTS

Unit-1 : Open Source Software   04 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   08 Hrs   10 Marks

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

Unit-3 : Managing Files and Directories   10 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 and filters

Unit-4 : Linux Networking   08 Hrs   10 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   14 Hrs   30 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   12 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. Using file management commands : chmod, chown, chgrp, touch, find, cut.
6. To study various features of any Linux desktop environment.
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 fibbonacci 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

6.2 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 Communication   08 Hrs   10 Marks

Wireless communication and its applications, advantages and disadvantages of wireless communication, Types of Services : broadcast, paging, celluar 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 Communication   10 Hrs   20 Marks

Concept of banwidth, analog and digital signals, data rate, signal strength, SNR, RSSI, electromagnetic wave propagarion: 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 Systems   10 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 Bluetooth   08 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 Introduction   08 Hrs   10 Marks

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

Unit-6 : Mobile Computing Architecture   08 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 Device   04 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 sysytem.

Recommended Books

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

6.3 INTERNET OF THINGS   L T P

                                                   - - 4

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.

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

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

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

6.4.1 DIGITAL MARKETING TECHNIQUES

L T P
4 - 4

RATIONALE

The aim of the Digital Marketing Course is to provide students with the knowledge about business advantages of the digital marketing and its importance for marketing success; to develop a digital marketing plan; to define a target group; to get introduced to various digital channels, their advantages and ways of integration; how to integrate different digital media and create marketing content; how to optimize a Web site and SEO optimization; how to create Google AdWords campaigns; social media planning; to get basic knowledge of Google Analytics for measuring effects of digital marketing and getting insight of future trends that will affect the future development of the digital marketing. The application of the gained knowledge, skills and competences will help future managers in forming digital marketing plan in order to manage a digital marketing performance efficiently.

DETAILED CONTENTS

Unit-1 : Principles of Digital Marketing | 10 Hrs | 15 Marks

Definition, introduction to Digital marketing, Real vs Digital Marketing, Digital Marketing Models, advantages and disadvantages of digital marketing, factors for shifting from traditional marketing to digital marketing, types of Digital marketing, Set of activities of digital marketing

Unit-2 : Search Engine Optimization | 14 Hrs | 25 Marks

Introduction to SEO : What is SEO, How Search Engines Work, What it Takes to Rank, Long-Tail Concept & Theory, Content management, How to Approach Your SEO, Strategy, Techniques: On-Page SEO: Website Content, URL Structure, Pictures, Title Tags & Meta Tags, Headline Tags, Internal Linking, Off-Page SEO: Who's Linking to You? How are they Linking to You? Using Social Media to Spread Content, Using Email to Spread Content, Identifying Keywords: How to Identify Long-Tail Keywords, Check Your Web Analytics, Keyword Research Tools, Search for Keywords, Measuring Success: Traffic, Introduction to Search Engine Optimization Leads/ROI, Indexed Pages, Inbound Links, Keywords, Rankings, Making a List of Keywords, Build a Keyword-Focused Webpage, Set Up a Blog.

Unit-3 : Google AddWords | 10 Hrs | 20 Marks

Setting up Google AdWords Campaigns – that avails high ranking at low cost, Content Structuring, Understanding Quality Score, Finding and selecting the right Keywords, Keywords Matching Options, Campaign Setup procedure, Ads and Ad Groups, Organizing Ad Groups, Creating Effective Ads, Optimizing Landing Pages, Bid Management, Negative Keywords, Analytics – Measure and fine-tune, Remarketing Campaigns – How to configure, Setup and Monitor them?, YouTube Video Ad Campaigns.

Unit-4 : Google Analytics | 10 Hrs | 15 Marks

Getting Started with Google Analytics, Understanding Dashboard – Audience Advertising Traffic Source Content| Conversions, Taking decisions based on Analytics Reporting, Defining Business Goals and Objectives, Tracking Social Media Traffic, Tracking SEO Traffic, Integrating your Google AdWords campaigns into Google Analytics, Measuring Tools and Methods, Measuring your Site's ROI, Introduction to Goal Conversion – Tracking the Conversions, Configuring UTMs (Custom URLs), Google Tag Manager – a brief overview.

Unit-5 : Social Media Marketing .... **12 Hrs** **25 Marks**

Introduction to Social Media marketing, Introduction to Blogging: create a blog, include headline, imagery links and post, introduction to Facebook and channel advertising and campaigns, create a Facebook outline, introduction to Twitter and channel advertising and campaigns, introduction to Google+ and LinkedIn, an overview on LinkedIn advertising, introduction to Instagram and Pinterest, channel advertising and campaigns, creative campaign examples across social channels, KnowEm, TweetDeck, UTMs..

LIST OF PRACTICALS

1. To create SEO Friendly Web Pages
2. To submit Website in various search Engines.
3. To develop a Facebook Customized Page Tab
4. To create and write a blog on some free blogging website.
5. To write an email newsletter
6. To make a video and Youtube Channel
7. Create infographics
8. Create Google Adword Account and make use of Keyword Planner
9. Create and Use Google Analytics Account
10. Create "refer-a-friend" or "bookmark this page" links on your site
11. Create Google Map on Places for Business
12. Understanding various SEO Tools like woorank, seositecheckup, seoquake, similarweb, siteliner

Recommended Books

1. Digital Marketing by Vandana Ahuja, published by Oxford Publication
2. Fundamentals of Digital Marketing by Puneet Bhatia, published by Pearson.

Reference Books

1. Programming in Python 3: A Complete Introduction to the Python Language by Mark Summerfield, Atlantic Publishers and Distributors

6.4.2 PYTHON PROGRAMMING

L T P
4 - 4

RATIONALE

Python is a popular, widely used, general-purpose, high-level programming language. The goal of Python is to make programming easy to learn, hence making it the ideal programming language for entry-level programmers. Its design philosophy emphasizes code readability, and its syntax allows programmers to express concepts in fewer lines of code than other counterparts. Python is supported by all major operating systems and platforms. It is also open-source and is free to use and distribute. The objective of this course is to steadily expose the students to the world of programming.

DETAILED CONTENTS

Unit-1 : Introduction to Python `06 Hrs` `10 Marks`

Python language – need, features and advantages; Python versions, structure of a typical Python program, code indentation, application areas of Python.

Unit-2 : Basics of Python Language `10 Hrs` `20 Marks`

Python tokens - identifiers, keywords, operators, delimiters, and literals; variables, naming conventions in Python, Python statements - simple and compound; comments, reading from standard input using input(), writing to standard output using print(), Data types - numbers, strings, tuples, lists, dictionaries, ranges, and sets; mutable and immutable data types, Python numbers: integers, floating-point and complex numbers; numeric literals; String literals - quoted and triple quoted strings, multiline strings, escape sequence, type() function.

Unit-3 : Python Data Structures `10 Hrs` `20 Marks`

Sequence types - list, tuple, range, string; dictionary, set, list comprehension, set comprehension, dictionary comprehension. String methods - capitalize(), count(), find(), format(), replace(), lower(), upper(), title(); List methods - count(), index(), append(), insert(), remove(), pop(), reverse(), sort(); Set methods - add(), clear(), remove(), discard(), intersect(), copy(), difference(), union(); Dictionary methods - keys(), values(), pop(), items(), clear().

Unit-4 : Operators and Expressions `10 Hrs` `20 Marks`

Arithmetic operators - addition, subtraction, multiplication, division, truncated division, modulus, exponentiation; arithmetic expressions, comparison operators, logical operators, comparison chaining, bitwise operators, operations on sequences - concatenation, repetition, membership testing, indexing, slicing.

Unit-5 : Flow Control `10 Hrs` `10 Marks`

if statement and its variants - if, if...else, if...elif...else; loops - while, for; use of else in loops, jump statements - break, continue, pass; with statement, exception handling.

Unit-6 : Modules, Packages and Functions `05 Hrs` `10 Marks`

Python modules and packages, functions, def statement, parameters, named parameters, default values of parameters, function signatures, variable number of arguments, return statement, lambda expression.

Unit-7 : Handling Files in Python `05 Hrs` `10 Marks`

Opening a file, file opening modes, read from a file - read(), readline(); writing to a file - write(), writelines(), truncate(), flush(); navigating in a file - seek(), tell(), use of with statement

LIST OF PRACTICALS

1. To install and configure Python and IDLE on Windows/ Linux platforms.
2. To practice arithmetic expressions on Python interactive shell.
3. To read data from standard input and print information on standard output.
4. To create variables of various data types and verify them using type() function.
5. To demonstrate various operations on strings.
6. To demonstrate list comprehension and various operations on lists.
7. To demonstrate set comprehension and various operations on sets.
8. To demonstrate dictionary comprehension and various operations on dictionaries.
9. To demonstrate various operations on ranges.
10. To demonstrate the working of if statement and its variants.
11. To compute the factorial of a given number using while loop.
12. To generate first n terms of a fibonacci series using for loop.
13. To use for loop to manipulate lists.
14. To demonstrate exception handling mechanism of Python.
15. To write a function to compute greatest of two numbers.
16. To practice continue, break and pass statements.
17. To demonstrate named parameters and default parameter values of a Python function.
18. To demonstrate lambda functions.
19. To copy the contents of one file into another.
20. To demonstrate the use of with statement.

Recommended Books

1. Introduction to Computer Science using Python by Charles Dierbach, Wiley Publishers
2. Python For Dummies by by Stef Maruch and Aahz Maruch, Pearson Education

Reference Books

1. Programming in Python 3: A Complete Introduction to the Python Language by Mark Summerfield, Atlantic Publishers and Distributors
2. Python in a Nutshell: A Desktop Quick Reference by Alex Martelli et al, O'Reilly Media

6.4.3 ANDROID APPLICATION DEVELOPMENT

L T P

4 - 4

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

Intoduction 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 the 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.htm
3. https://www.javatpoint.com/android-tutorial

6.5 MAJOR PROJECT

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.

G U I D E L I N E S

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 JavaScipt 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

6.6 PRACTICES IN COMMUNICATION SKILLS   L T P

                                                           -   -   2

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)**