

**CURRICULUM
FOR
DIPLOMA PROGRAMME
IN
COMPUTER ENGINEERING
(5th & 6th Semester)
FOR THE STATE OF HIMACHAL PRADESH**



(Implemented w.e.f. Session 2014-15)

Prepared by:-

Composite Curriculum Development Centre
Directorate of Technical Education,
Vocational & Industrial Training, Sundernagar(H.P.)

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PREFACE

India, in last two decades, has made significant progress in all major spheres of activity. Since 1947, the Technical Education System has grown into fairly large sized system, offering opportunities for education and training in wide variety of trades / disciplines at different levels. Needless to say that well trained technical manpower is the backbone of any growing economy in the era of fast industrialization. It has been the endeavor of the Technical Education Department to take decisive steps to enhance the capacities of technical institutions with major emphasis on quality and excellence in technical education .Our country is the only country in the world which has 50% population below the age of 25 years whereas America has 30% and China 40%.Working Age Population (WAP) is increasing in India whereas it is decreasing in other parts in the world. Challenge before us is to train this WAP for the world of work .Updated curriculum is one of the most powerful tools to improve the quality of training.

Curriculum Document is a comprehensive plan or a blue print for developing various curriculum materials and implementing given educational programme to achieve desired and formally pre-stated educational objectives. Moreover it (the document) is the output of exhaustive process of curriculum planning and design, undertaken by the implementers under the expert guidance of curriculum designer.

While working out the detailed contents and study and evaluation scheme, the following important elements have been kept in mind:

- i) Major employment opportunities of the diploma holders.*
- ii) Modified competency profile of the diploma holders with a view to meet the changing needs due to technological advancement and requirements of various employment sectors.*
- iii) Vertical and horizontal mobility of diploma pass outs for their professional growth.*
- iv) Pragmatic approach in implementing all the curricula of diploma programmes in engineering and technology in the state of H.P.*

The document is an outcome of the feedback received from field organizations/ industry of different categories viz. small, medium and large scale which offer wage employment for the diploma pass outs. In every stage of planning and designing of this curriculum, suggestions and advice of experts representing industry, institutions of higher learning, research organizations etc. were sought and incorporated as per the requirement of curriculum . The document contains the study and evaluation scheme and detailed subject/course contents to enable the H.P. Polytechnics to implement revised curriculum and to achieve the desired objectives.

Time has specifically been allocated for undertaking extra-curricular activities. Emphasis has been laid on developing and improving communication skills in the students for which Communication Lab has been introduced during the first year itself.

We hope that this revision will prove useful in producing competent diploma holders in the state of Himachal Pradesh. The success of this curriculum depends upon its effective implementation and it is expected that the managers of polytechnic education system in Himachal Pradesh will make efforts to create better facilities, develop linkages with the world of work and foster conducive and requisite learning environment.

Er. L.R. Rana
Head(CCDC)
Directorate of Technical Education,
Vocational & Industrial Training,
Sundernagar, Himachal Pradesh.

3rdYEAR OF THREE YEAR DIPLOMA PROGRAMME IN COMPUTERENGINEERING

1. SALIENT FEATURES

- | | |
|-------------------------------|---|
| 1) Name of the Programme : | Three year Diploma Programme
Computer Engineering |
| 2) Duration of the Programme: | Three years (06 Semesters) |
| 3) Entry Qualification : | As prescribed by H.P. Takniki
Shiksha Board |
| 4) Intake : | As approved by H.P. Takniki
Shiksha Board |
| 5) Pattern of the Programme : | Semester Pattern |
| 6) Curriculum for : | 3 rd year of Three year Diploma
Programme(Technical Stream) |

7)Student Centred Activities:

A provision of 2-4 hrs per week has been made for organizing Student Centred Activities for overall personality development of students. These activities will comprise of co-curricular & other activities such as expert lectures, games, seminars, declamation contests, educational field visits, NCC, NSS and cultural activities & hobby classes like photography, painting, singing etc.

2. GUIDELINES

2.1 GUIDELINES FOR ASSESSMENT OF STUDENT CENTRED ACTIVITIES (SCA)

Distribution of 25 marks for SCA will be as follows:

- i. 5 Marks shall be given for general behaviour
- ii. 5 Marks for attendance shall be based on the following distribution:
 1. Less than 75% Nil
 2. 75-79.9% 3 Marks
 3. 80-84.9% 4 Marks
 4. Above 85% 5 Marks
- iii. 15 Marks shall be given for the Sports/NCC/Cultural and Co-curricular activities/other activities after due consideration to the following points:
 1. For participation in sports/NCC/Cultural/Co-curricular activities at National or above level, shall be rewarded with minimum of 10 marks
 2. For participation in sports/NCC/Cultural/Co-curricular activities at Inter-polytechnic level, shall be rewarded with minimum of 08 marks
 3. For participation in two or more of the listed activities, 5 extra marks should be rewarded

Note: *Head of Department shall ensure that these marks are conveyed to the H.P. Takniki Shiksha Board, Dharamshala at the end of semester along with sessional record.*

2.2 GUIDELINES FOR SESSIONAL ASSESSMENT

- The distribution of marks for Internal Assessment in theory subjects and drawing shall be made as per the following guidelines:
 - i. 60% of internal assessment shall be based on the performance in the tests. At least three tests shall be conducted during the semester out of which at least one should be house test. 30% weightage shall be given to house test and 30% to class test(One best out of two).
 - ii. 20% marks shall be given to home assignments, class assignments, seminars etc.
 - iii. 20% marks shall be given for attendance/punctuality in the subject concerned.
- The distribution of marks for Internal/External Assessment in practical subjects shall be made as per the following guidelines:
 - i. 60% marks shall be awarded for performance in practical.
 - ii. 20% marks shall be given for Report/Practical book and punctuality in equal proportion.
 - iii. 20% marks shall be for Viva-voce conducted during the practicals.
- The distribution of mark for internal assessment in drawing subjects shall be as per following guidelines:-
 - (i) 60% marks for sheets
 - (ii) 40% for test.

**STUDY AND EVALUATION SCHEME
FIFTH SEMESTER (COMPUTER ENGINEERING)**

SR. NO	SUBJECTS	STUDY SCHEME <i>Hrs/Week</i>		MARKS IN EVALUATION SCHEME								Total Marks of Int. & Ext.
				INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT					
		Th	Pr	Th	Pr	Tot	Th	Hrs	Pr	Hrs	Tot	
5.1	Multimedia Applications	3	4	30	20	50	100	3	50	3	150	200
5.2	Internet Technologies	4	4	30	20	50	100	3	50	3	150	200
5.3	Programming using Java	4	4	30	20	50	100	3	50	3	150	200
5.4	Computer Organization	4	—	50	—	50	100	3	—	—	100	150
5.5	Elective-I											
	5.5.1 Wireless Communication & Mobile Computing											
	5.5.2 Information Security & Cyber Law.	4	-	50	-	50	100	3	-	-	100	150
	5.5.3 Data ware Housing & Data Mining.											
5.6	* Generic skills & Entrepreneurship Development	2	1	50	50	100	50	2	-	-	50	150
5.7	Minor Project	-	4	-	50	50	-	-	50	3	50	100
5.8	Industrial Training	-	-	-	50	50	-	-	50	3	50	100
Student Centred Activities		-	2	-	25	25	-	-	-	-	-	25
Total		21	19	240	235	475	550	-	250	-	800	1275

* Common with other diploma programmes.

SIXTH SEMESTER COMPUTER ENGINEERING

SR. NO	SUBJECTS	STUDY SCHEME <i>Hrs/Week</i>		MARKS IN EVALUATION SCHEME								Total Marks of Int. & Ext.
				INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT					
		Th	Pr	Th	Pr	Tot	Th	Hrs	Pr	Hrs	Tot	
6.1	*Basics of Management	3	-	50	-	50	100	3	-	-	100	150
6.2	Computer Graphics	4	4	30	20	50	100	3	50	3	150	200
6.3	Open Source Software	4	4	30	20	50	100	3	50	3	150	200
6.4	Major Project	-	8	—	100	100	—	-	100	3	100	200
6.5	Elective-II 6.5.1 Cloud Computing 6.5.2 Installation & Troubleshooting of Computer Networks. 6.5.3 Web Programming. 6.5.4 Android Programming	4	2	30	20	50	100	3	50	3	150	200
6.6	*Practice in Communication Skills	-	2	—	50	50	—	-	50	3	50	100
Student Centred Activities		-	3	-	25	25	-	-	-	-	-	25
Total		15	23	140	235	375	400	-	300		700	1075

* Common with other diploma programmes.

5.1 Multimedia Applications

L T P
3 - 4

1. Introduction

(6 hrs.)

What is multimedia, Multimedia Elements, Multimedia Applications, Multimedia Systems Architecture, High Resolution Graphics Display, Network Architecture for Multimedia Systems, Networking Standards, Evolving Technologies for Multimedia Systems.

2. Compression & Decompression

(8 hrs.)

The need for data compression, Compression Standards, Types of compression, Lossless Compression, Lossy Compression, Binary Image Compression Schemes, Pack bits Encoding (Run-length Encoding), JPEG, MPEG, Audio Compression.

3. Data and File Format Standards.

(8 hrs.)

Rich-Text Format. TIFF file format. TIFF structure. Resource Interchange File Format (RIFF), MIDI file format, MIDI communication protocol, WAVE file format, MIDI channel messages and system messages, JPEG DIB file format for still and motion images, AVI Indeo file format, MPEG standards, TWAIN, Twain architecture.

4. Multimedia Input/ Output Technologies.

(7 hrs.)

Multimedia key technology issues, resolution and bandwidth issues, Digital Audio, Digital Voice, Musical Instrument Digital Interface (MIDI), MIDI Specification, MIDI Communication Protocol, Sound Board Architecture, Video Images and Animation, Full-Motion Video, Full-Motion Video Capture Board Architecture, Performance Issues for Full-Motion Video, HDTV & IDTV principles.

5 Animation

(7 hrs.)

Introduction, Uses of animation, Key frames and Tweening, Types of animation, Computer assisted animation, Creating movement, Principle of animation.

6. Multimedia Authoring Tools.

(6 hrs.)

Multimedia Authoring Systems, Design Issues for Multimedia Authoring, Design Approaches to Authoring, Types of Multimedia Authoring Systems, Working with Flash to create the animated object. Working with adobe Photoshop, using various features of adobe Photoshop.

Practical:

1. Using MS PowerPoint to create presentations for the area of interest.(Should include at least 20 slides having sound and video both)
2. Using Adobe Flash to create animations.
3. Using various functions of a digital camera (Focus, Exposure, Macro, Zoom, Flash, Date/Time etc.)
4. Using Image Scanner to scan old photographs, pages and manipulate them using various options under Adobe Photoshop.
5. Using OCR software to translate scanned documents to editable text.
6. Hands on practice on burning CD/DVD, using touch screens, digitizers, multimedia projectors.

Suggested Text/Recommended Books

1. *Multimedia Communications-Applications, Networks, Protocols &Standars* by Fred Halsall, Pearson Education Ltd.
2. *Principles of Multimedia* by Rajan Parekh TMH Publication.
3. *Multimedia Technologies* by Ashok Banerji, Ananda Mohan Ghosh THH Publication
4. *Introduction to Multimedia Systems* by Gaurav Bhatnagar, Shikha Mehta and SujataMitra
5. *Fundamentals of Multimedia* by Ze-Nian Li & Marks S. Drew
6. *Multimedia Information Storage and Retrieval: Techniques and Technologies* by Philip K.C. Tse

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	6	10
2	8	20
3	8	20
4	7	20
5	7	15
6	6	15
Total	42	100

5.2 Internet Technologies

L T P
4 - 4

- 1. Internet and Web Basics (10 hrs.)**
Internet and its applications, World Wide Web and its evolution, WWW vs Internet, web page, web server, HTTP protocol, URL, Browser and its working, Types of browser, Search Engine, Proxy Server.
- 2. Working with HTML (12 hrs.)**
Structure of HTML Documents. Creating a web page using tags. Inserting Links, Comments, Horizontal Rules. Formatting Text, Font, color, size. Creating List, Tables, Images, Form and Frames. Cascaded Style Sheet (CSS), CSS rules, Image maps. Semantic elements in HTML 5.
- 3. Working with JavaScript (12 hrs.)**
What is JavaScript, using variable, lifetime of a variable, operators, using conditional statements (If, if..else, switch) in JavaScript. Using JavaScript Loops (for, while, do. While), Using JavaScript in an HTML document (JavaScript in head element, JavaScript in body element, in an external file), User defined functions, commonly used built-in javascript functions
- 4. Working with PHP & MySQL (12 hrs.)**
Overview of PHP, Identifier, Variables, Data Types, Scope of Variables, Operators, Expressions, Functions, Control Statements, Accessing MySQL from PHP.
- 5. Basics of JSP (10 hrs.)**
Feature of JSP, Working of JSP Technology, SP processing and architecture. JSP Lifecycle, Scriptlets.

Practical:

1. *Using various services of internet (Email, search engine, telnet, ftp etc.)*
2. *Creating web page using HTML.*
3. *Creating a homepage with frames, animation, background sound and hyperlinks.*
4. *Develop hitometer for each client i.e. number of visitors visiting a site.*
5. *Design of Forms using Java Script.*
6. *Validations of user queries and responses in the forms using java script.*
7. *Design shopping cart for e-commerce applications.*

Suggested Text/Recommended Books

1. *The Complete Reference HTML by Thomas A. Powell TMH Publications*
2. *Java Script: The Definitive Guide by David Flanagan, O Reily Media Inc*
3. *Java Server Pages by Hans Bergsten*
4. *PHP and MySQL Development by Luke Welling, Laura Thomson, Addison Wesley*

Suggested Digital Reference

1. <http://www.w3schools.com>
2. <http://www.tutorialspoint.com>

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	10	15
2	12	20
3	12	25
4	12	25
5	10	15
Total	56	100

5.3 Programming Using Java

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4 - 4

1. Introduction

(6 hrs.)

Basic concepts of object-oriented programming – Objects and classes, data abstraction and encapsulation, inheritance, polymorphism, dynamic binding and message communication. Benefits and applications of object-oriented programming. Comparison of Java with C and C++.

3. Overview of Java

(6hrs.)

Need of Java, Java and Internet, Java and www, Java program structure, Java tokens, Java statements, Introduction to JVM, Java constants, variables and data types, Scope of variables.

3. Java operators.

(4 hrs.)

Arithmetic operators, Logical operators, Relational operators, Bit-wise operators, Assignment operator.

4. Java Programming Constructs

(10 hrs.)

Conditional execution – if-else statement, and switch-case construct, Looping statements – for, while, do-while.

5. Classes, Objects and Methods

(10 hrs.)

Class – defining a class, fields declaration, methods declaration. Objects – creating objects, accessing class members, constructors, methods overloading, static members, overriding methods. Final variables and methods, final classes, finalizer methods, abstract methods and classes. Visibility control.

6. Inheritance

(10 hrs.)

Inheritance basics, inheritance types in Java, implementing inheritance in Java, Introduction to interface and its implementation in Java.

7. Exception Handling

(5 hrs.)

Concept of exceptions, Built-in exceptions, implementing exception handling – using try and catch statements, using multiple catch statements, handling the unreachable code problem, using throw statement.

8. Applets and Applications

(5 hrs.)

Applets and applications, applet class, life cycle of an applet. Concept of JDBC.

List of Practical

1. *Programs using java programming constructs.*
2. *Programs using class & object.*
3. *Programs using constructors.*
4. *Programs using method overloading.*
5. *Programs using concept of inheritance.*
6. *Programs using method overriding methods.*
7. *Programs on exception handling.*
8. *Programs on creating Applet.*
9. *Program for java database connectivity.*

Suggested Text/Recommended Books

1. *Programming with Java – A Primer 3e* by E. Balagurusamy, TMH publication.
2. *Java 2: The Complete Reference, Fifth Edition* by Herbert Schildt.
3. *Java How to Program* by Paul J. Deitel, Harvey M Dietel, PHI

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	6	10
2	6	10
3	4	10
4	10	20
5	10	20
6	10	10
7	5	10
8	5	10
Total	56	100

5.4 Computer Organization

L T P
4 - 0

1. Basic Computer Organization and Arithmetic

(10 hrs.)

Stored program concept and Von Neumann Architecture, Registers for basic computer. Addition & Subtraction, Booth's multiplication algorithm. Introduction to Division. Introduction to floating point arithmetic.

2. CPU and Control Unit

(12 hrs.)

Accumulator based CPU, Stack organization – register stack and memory stack, and reverse polish notation. Instruction formats – Three address instructions, two address instructions, one address instructions, zero address instructions and RISC instructions. Addressing modes. Introduction to RISC and CISC. Introduction to hardwired and micro controlled control units.

3. Memory Organization

(12 hrs.)

Memory device characteristics, Memory Hierarchy, Main memory – RAM and ROM chips and memory address map, memory connection to CPU. Introduction to associative memory. Cache memory- associative mapping, direct mapping and set-associative mapping, writing into cache, cache initialization. Introduction to virtual memory.

4. Input Output Organization

(12 hrs.)

Peripheral devices, input-output interfaces, modes of transfer – programmed I/O, interrupt-initiated I/O and DMA, input-output processor.

5. Advance Topics

(10 hrs.)

Parallel processing and Flynn's classification, pipelining, arithmetic pipelining, instruction pipelining, vector processing, array processors. Introduction to multiprocessor system.

Suggested Text/Reference Books:

1. M. Moris Mano , Computer System & Architecture PHI.
2. Hayes J. P "Computer Architecture & Organization" Tata McGraw Hills 2nd edition.
3. Schaum's outline of computer architecture, by Nicholas P. Carter McGraw Hill.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	10	15
2	12	25
3	12	25
4	12	20
5	10	15
Total	56	100

5.5.1 Wireless Communication & Mobile Computing

L T P
4 - 0

- 1. Introduction (10 hrs.)**
Evolution of wireless networks, wireless data networks, WLANs, WPANs, introduction to wireline, wireless and ad-hoc networks, middleware and gateways, application and services, developing mobile computing applications, security.
- 2. Wireless Communication System (10 hrs.)**
Introduction, 2G wireless networks, GSM and CDMA, 2.5 G wireless networks, GPRS, EDGE, HSCSD, 3G wireless networks, UTMS, CDMA 2000, Introduction to 4G wireless networks.
- 3. Wireless Systems and Standards (10 hrs.)**
Bluetooth, RFID, WIMAX, Wi-Fi, Mobile IP, IPV6, JAVA Card, Features of IEEE 802.11 a/b/g/n, WAP.
- 4. Mobile Computing Architecture (10 hrs.)**
mobile computing, its functions and devices, 3-tier architecture, design considerations for mobile computing, mobile computing through internet
- 5. Mobile Computing through Telephony (6 hrs.)**
Evolution, multiple access procedures, mobile computing through telephone, developing an IVR applications, Voice XML, telephony application programming interface (TAPI)
- 6. Operating Systems for Mobile Devices (10 hrs.)**
Design constraints in applications for handheld devices, palm and Symbian OS features and architecture, introduction to J2ME technology, features and architecture of Windows CE.

INSTRUCTIONAL STRATEGIES

Explanation of concepts using real-time examples/case studies.

Suggested Text/Recommended Books

- 1. Mobile Computing : Technology, Applications and Service Creation by AsokeK.Talukdar and Roopa R. Yavagal, TMA, First Reprint – 2006.*
- 2. Wireless Communication: Principles and Practice by Theodor S. Rappaport, Pearson Education Asia, 2nd Edition.*
- 3. Principles of Mobile Computing by Owe Hansman, LotharMerk, Martin S*

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	10	15
2	10	20
3	10	20
4	10	20
5	6	10
6	10	15
Total	56	100

5.5.2 Information Security & Cyber Laws

L T P
4 - -

UNIT-I (14 hrs.)

History of Information Systems and its Importance, basics, Changing Nature of Information Systems, Need of Distributed Information Systems, Role of Internet and Web Services, Information System Threats and attacks, Classification of Threats and Assessing Damages¹⁸ Security in Mobile and Wireless Computing- Security Challenges in Mobile Devices, authentication Service Security, Security Implication for organizations, Laptops Security Basic Principles of Information Security, Confidentiality, Integrity Availability and other terms in Information Security, Information Classification and their Roles.

UNIT-II (14 hrs.)

Security Threats to E Commerce, Virtual Organization, and Business Transactions on Web, E-Governance and EDI, Concepts in Electronics payment systems, E Cash, Credit/Debit Cards. Physical Security- Needs, Disaster and Controls, Basic Tenets of Physical Security and Physical Entry Controls, Access Control- Biometrics, Factors in Biometrics Systems, Benefits, Criteria for selection of biometrics, Design Issues in Biometric Systems, Interoperability Issues, Economic and Social Aspects, Legal Challenges

UNIT-III (14 hrs.)

Model of Cryptographic Systems, Issues in Documents Security, System of Keys, Public Key Cryptography, Digital Signature, Requirement of Digital Signature System, Finger Prints, Firewalls, Design and Implementation Issues, Policies Network Security- Basic Concepts, Dimensions, Perimeter for Network Protection, Network Attacks, Need of Intrusion Monitoring and Detection, Intrusion Detection Virtual Private Networks- Need, Use of Tunneling with VPN, Authentication Mechanisms, Types of VPNs and their Usage, Security Concerns in VPN

UNIT-IV (14 hrs.)

Security metrics- Classification and their benefits Information Security & Law, IPR, Patent Law, Copyright Law, Legal Issues in Data mining Security, Building security into Software Life Cycle Ethics- Ethical Issues, Issues in Data and Software privacy Cyber Crime Types & overview of Cyber Crimes

Suggested Text/Recommended Books

1. Godbole, “*Information Systems Security*”, Willey
2. Merkov, Breithaupt, “*Information Security*”, Pearson Education
3. Yadav, “*Foundations of Information Technology*”, New Age, Delhi
4. Schou, Shoemaker, “*Information Assurance for the Enterprise*”, Tata McGraw Hill
5. Sood, “*Cyber Laws Simplified*”, Mc Graw Hill
6. Furnell, “*Computer Insecurity*”, Springer
7. IT Act 2000

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	14	25
2	14	25
3	14	25
4	14	25
Total	56	100

5.5.3 DATA WAREHOUSING AND DATA MINING

L T P
4 - -

- 1. Introduction to Data mining (6 hrs.)**
What is data mining? Data mining background, Inductive learning, Statistics, Machine Learning, Differences between Data Mining and Machine Learning, Data Mining Models, Verification Model, Discovery Model, Data mining problems/issues.
- 2. Data Mining Functions (10 hrs.)**
Classification, Associations, Sequential/Temporal patterns, Clustering/ Segmentation
- 3. Data Mining Techniques (10 hrs.)**
Cluster Analysis, Induction, decision trees, Rule induction, Neural networks, On-line Analytical processing (OLAP), OLAP Example, Comparison of OLAP and OLTP, Data Visualization
- 4. Introduction to Data Warehousing (8 hrs.)**
Concept and benefits of Data Warehousing, Types of data, Characteristics of a data warehouse, Processes in data warehousing. Data warehousing and (On Line Transaction Processing)OLTP Systems. The Data Warehouse model, Problems with data warehousing, Criteria for a data warehouse
- 5. Architecture of Data Warehousing (8 hrs.)**
Overall architecture, Metadata, Access Tools, Data Marts
- 6. Building a Data Warehouse (8 hrs.)**
Design considerations, Technical considerations, Implementation considerations
- 7. Case Studies on Data Mining Applications and recent trends in data mining (6 hrs.)**

INSTRUCTIONAL STRATEGY

Teacher should take the students to various organizations to show how the large data is stored and retrieved. Case studies should be taken for deeper understanding

Suggested Text/Recommended Books

1. J. Han, M Kamber, *Data Mining Concepts and Techniques*, Morgan Kaufmann, 2001, ISBN 1-55860-489-8.
2. *Data Warehousing, Data Mining and OLAP* by Alex Berson and Stephen J Smith, Tata McGraw Hill.
3. *Introduction to Data Mining*, Hand, Mannila, and Smyth, MIT Press, Cambridge, MA, 2000.
4. *OLAP Solutions: Building Multidimensional Information Systems*, Erik Thomsen, John Wiley & Sons, Inc., 1997. (ISBN 0-471-14931-4).
5. *Data Mining: Technologies, Techniques, Tools, and Trends* by BhavaniThuraisingham ,CRC Press , ISBN: 0849318157 , 1998
6. *Decision Support and Data Warehouse systems-* Efren G. Mallach (Tata McGraw Hill).
7. *Building the Data Warehouse – W.H. Inmon* (Wiley Pub.)
8. *Data Warehousing, Concepts, Technoques, Products and Applications-* CSR. Prabhu (PHI).
9. *Data Mining Concepts and Techniques – JiaweiHanandMichelineKamber.*
10. *Data Warehousing in the Real World-* Sam Anahory and Denmis Murray (Pearson Ed.).

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	6	8
2	10	20
3	10	20
4	8	15
5	8	15
6	8	12
7	6	10
Total	56	100

5.6 GENERIC SKILLS & ENTREPRENEURSHIP DEVELOPMENT

L T P
2 - 1

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 employability or generic 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, "generic skills 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

- 1. Introduction to Generic Skills (02 Hrs)**
 - 1.1 Concept and importance
 - 1.2 Local and global scenario
 - 1.3 Concept of life-long learning (LLL)

- 2. Self Management and Development (07 Hrs)**
 - 2.1 Concept of Personality Development, Ethics and Moral values
 - 2.2 Concept of Intelligence and Multiple intelligence Types viz, linguistic, mathematical & Logical reasoning, emotional, and social intelligence (interpersonal & intrapersonal).
 - 2.3 Concept of Physical Development; significance of health, hygiene, body gestures & kinesics.
 - 2.4 Time Management concept and its importance
 - 2.5 Intellectual Development; reading skills (systematic reading, types and SQ5R), 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).
 - 2.6 Psychological Management; stress, emotions, anxiety and techniques to manage these.
 - 2.7 ICT & Presentation skills; use of IT tools for good and impressive presentations.

- 3. Team Management (03 Hrs)**
 - 3.1 Concept of Team Dynamics. Team related skills such as; sympathy, empathy, leading, coordination, negotiating and synergy. Managing cultural, social and ethnic diversity.
 - 3.2 Effective group communication and conversations.
 - 3.3 Team building and its various stages like forming, storming, norming, performing and adjourning (Bruce Tuckman's five stage Model)

- 4. Project Management (02 Hrs)**
 - 4.1 Concept of Management and features
 - 4.2 Stages of Project Management; initiation, planning, execution, closing and review (through case studies)
 - 4.3 SWOT analysis concept.
- 5. Introduction to Entrepreneurship (02 Hrs)**
 - 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, limited, public limited, PPP mode.
 - 5.3 Types of industries viz, micro, small, medium and large
- 6. Entrepreneurial Support System (features and roles in brief) (03 Hrs)**

District Industry Centres (DIC's), State Financial Corporation's (SFC's), Small Industries Service Institutes(SISI), Commercial Banks, Micro Financing Institutions, SIDBI, NABARD, National Small Industry Corporations (NSIC), Cooperative Societies and Venture Capitalists. Various Consultancy Organizations; HIMCON, Khadi and Gramodyog Board (H.P.) etc.
- 7. Market Study and Opportunity Identification (04 Hrs)**

Types of study; primary and secondary, product or service identification, assessment of demand and supply, type of surveys and important features; qualitative, empirical, schedules, questionnaire, interview.
- 8. Project Report Preparation (05 Hrs)**
 - 8.1 Preliminary Report, Techno-Economic Feasibility Report, Detailed Project Report (DPR) and illustration of these through examples.
 - 8.2 Exercises on writing project reports of micro and small projects.

List of Practical Exercises

1. *Understanding Self Management and Development (Related to Chapter 02); through examples, cases, exercises, panel discussions, seminars, meditation and yoga techniques.*
2. *Team Management (Related to chapter 03); through examples, cases, role plays, group discussions and panel discussions.*
3. *Market Study and Opportunity Identification (Related to Chapter 07); through literature reviewing, making questionnaires, conducting mock interviews and analysing data for product/service identification and demand assessment.*
4. *Project Management and Project Report Preparation (Related to chapter 04 and 08); through exercises on making project reports on micro and small enterprises. Case studies and SWOT analysis of projects can be taken.*

Instructional Strategy

Since the emphasis of present training need and work requirements is on budding entrepreneurs as well as intelligent and multi skilled work force. Therefore skill development and knowledge imparting should be focussed on generic and entrepreneurial skill development. Thus instructional strategy of the subject should be more practical oriented and theories must be taught up to conceptual or informal levels. Different methodologies may be used with inclusive approach and must be supported with different training tools such as group and panel discussions , role plays, case studies, field surveys through questionnaires, schedules and interviews, presentations, seminars and expert talks in practical lectures and through student centred activities. Students may also be provided with extracted study material and handouts too.

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. *Human Learning*, Ormrod
5. *What Work Requires of Schools? SCANS Report*: U.S. Department of Labour
6. *Entrepreneurship Development* by CB Gupta and P Srinivasan: Sultan Chand and sons: New Delhi
7. *Entrepreneurship Development* by S. L. Gupta and Arun Mittal: IBH Publication
8. *A Handbook of Entrepreneurship*, Edited by B S Rathore and Dr. J S Saini
9. *Entrepreneurship Development and Small Business Enterprises* by Poornima M: Pearson Education India
10. *Handbook of Small Scale Industry* by P M Bhandari

Inspirational Books

1. *Stay Hungry stay Foolish* by Rashmi Bansal
2. *An Autobiography* by Lee Iacocca
3. *Steve Jobs: The Biography* by Walter Isaacson

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (hrs.)	Marks Allotted %
1	2	7
2	7	26
3	3	10
4	2	7
5	2	10
6	3	10
7	4	15
8	5	15
Total	28	100

5.7 MINOR PROJECT

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- - 4

Project work gives the students an opportunity to conceive, design, construct and implement their own solution of some real-world problem. A project work also inculcates skills like problem-solving, creative thinking, time-management, planning, teamwork, leadership, presentation, report-writing and communication etc. The confidence and courage of the student also boosts up when the project gets implemented. The students may choose a small project from any of the following areas:

- 1) Build small application with GUI, Database support and Report Generation.
- 2) Develop a website consisting of 20+ pages using HTML, CSS and JavaScript.
- 3) Undertake a hardware project developed from COTS on platforms like arduino
- 4) Work on some real-world software for data-entry (Library, Student Records etc.)
- 5) Projects based on installation, management & troubleshooting of institute's computer network.
- 6) Projects based on installation repair & maintenance of the institute's hardware devices.

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 operations at site 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; each teacher may guide a group of 4 to 5 students.

The teachers along with field supervisors/ engineers will conduct performance assessment of students. Criteria for assessment will be as follows:

Sr.	Criteria	Weightage
(a)	Attendance and Punctuality	15%
(b)	Initiative in performing tasks/creating new things	30%
(c)	Relation with people	15%
(d)	Report Writing	40%

6.1 Basics of Management

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3 - -

RATIONALE:

Diploma holders are expected to take up middle level managerial positions, their exposure to basic management principles is very essential. Some topics like Structure and ownership of Organization, Leadership, Motivation, Customer Relationship Management (CRM), Legal Environment of Business, Environmental Management, Accident and Safety: Total Quality Management (TQM), Intellectual Property Rights (IPR) etc. have been included in the subject.

DETAILED CONTENTS

- 1. Introduction: (12 hrs.)**
Definition and concept of management, functions of management- planning, organizing, staffing, coordinating and controlling. Various areas of management-
 - (a) Human Resource Management(HRM)-Manpower recruitment and selection, induction , training and development and performance appraisal.
 - (b) Financial Management- Meaning of financial management, its importance, various sources of finance- long term and short term. Concept of Internal Rate of Return(IRR), Net Present Value (NPV) and Average Rate of Return.
 - (c) Marketing Management- Product life cycle, concept of pricing, promotion strategies- advertising, sales promotion and market research.
 - (d) Material Management – Inventory management, concept of economic order quantity and waste management.
- 2. Structure and Ownership of Organization: (04 hrs.)**
Concept and structure of an organization, hierarchical management structure (top, middle and lower level management), functional management structure and matrix organizational structure. Types of business ownership (salient features)- Sole Proprietorship, Partnership, Joint Stock Companies and Cooperative Ownership.
- 3. Leadership: (02 hrs.)**
Meaning, importance , types of leadership and qualities of a good leader.
- 4. Motivation: (04 hrs.)**
Concept and importance of motivation-drives and incentives, types of motivation and theories of motivation- Abharam Maslow Theory and Herzberg Two Factor Theory.
- 5. Customer Relationship Management: (04 hrs.)**
Need, various types of customers, customer satisfaction, Customer Satisfaction Index(CSI) and its significance in playing effective role of engineers in changing scenario.
- 6. Legal Environment and Business: (08 hrs.)**
 - a) Various labour laws and its necessity. Salient features of Income Tax Act – computation of income tax on salary income, Sales and Excise Tax Act-VAT & Excise duty and Factory Act. 1948.
 - b) Labour Welfare Schemes including wage payment-types, system of wage payment and incentives.

- c) Intellectual Property Rights(IPR)- Concepts, infringements and remedies related to patents, copy rights, trademarks and designs.
- d) Accident and Safety- Meaning and concept of accident and safety, causes, safety precautions and various measures after accidents.

7. Total Quality Management: (04 hrs.)

Meaning and concept of Total Quality Management(TQM), various factors/measures to achieve TQM in an organization. Standards and Codes-National & International.

8. Environmental Management: (04 hrs.)

Concept of ecology and environment, factors contributing to air pollution, water pollution and noise pollution. Different measures to control pollution. Disaster management- features and measures.

INSTRUCTIONAL STRATEGY:

Generally the diploma holders occupy middle level managerial positions in an organization, therefore, their exposure to basic management principles is very essential. Accordingly students may be given conceptual understanding of different topics related to management. Some of the topics may be taught using question answer, assignment or seminar. The teacher will discuss success stories and case studies with students, which in turn, will develop appropriate managerial qualities in the students. In addition, expert lectures may also be arranged from within the institutions or from management organisations. Appropriate extracted reading material and handouts may be provided.

Suggested/Recommended Books:

1. *Principles of Management by Philip Kotler TEE Publication*
2. *Principles and Practice of Management by ShyamalBannerjee: Oxford and IBM Publishing Co, New Delhi.*
3. *Financial Management by MY Khan and PK Jain, Tata McGraw Hill Publishing Co:: 7, West Patel Nagar , New Delhi.*
4. *Modern Management Techniques by SL Goel: Deep and Deep Publications PvtLimited , Rajouri Garden, New Delhi.*
5. *Management by James AF Stoner, R Edward Freeman and Daniel R Gilbert Jr. : Prentice Hall of India Pvt Ltd, New Delhi.*
6. *Essentials of Management by H Koontz, C O' Daniel , Mc Graw Hill Book Company, New Delhi.*
7. *Marketing Management by Philip Kotler, Prentice Hall of India, New Delhi*
8. *Total Quality Management by Dr DD Sharma, Sultan Chand and Sons, New Delhi.*
9. *Intellectual Property Rights and the Law by Dr. GB Reddy.*
10. *Service Quality Standards, Sales & Marketing Department, MarutiUdyog Ltd.*
11. *Customer Relationship Management: A step-by-step approach, Mohamed &Sagadevan Oscar Publication, Delhi*

12. *Customer Relation Management*, Sugandhi RK, Oscar Publication, Delhi

13. *Environment Engineering* by GN Pandey & GC Pandey, Tata McGraw Hill Publication.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	12	20
2	4	10
3	2	08
4	4	12
5	4	10
6	8	18
7	4	10
8	4	12
TOTAL	42	100

6.2 Computer Graphics

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4 - 4

- 1. Overview of Computer Graphics (10 hrs.)**
Definition and applications of computer graphics, Bit-Mapped Graphics and Vector Graphics, working of CRT, Raster scanning and random scanning, Beam penetration CRT, Shadow mask CRT, Flat-panel displays(Introduction Only), Graphics Software, Co-ordinate representations, Graphics Functions.
- 2. Line and circle Drawing (10 hrs.)**
DDA line drawing algorithm, Bresenham's Line algorithm, Midpoint circle algorithm, Boundary Fill and Flood Fill algorithms.
- 3. Transformations (10 hrs.)**
Basic 2D Transformations - Translation, Rotation, Scaling, Composite Transformations - Translations, Rotations, Scaling, General Pivot-Point Rotation, General Fixed Point Scaling, Other transformations – Reflection and Shear. Basic 3D Transformations – Translation, Rotation and Scaling.
- 4. Two Dimensional Viewing and Clipping (10 hrs.)**
Interior and Exterior Clipping, Point Clipping, Line Clipping – Cohen-Sutherland Line Clipping, Mid-Point subdivision algorithm, Sutherland-Hodgeman Polygon Clipping Algorithm, Text Clipping.
- 5. Visible-Surface Detection Methods (10 hrs.)**
Z-Buffer Algorithm, A-Buffer Algorithm, Scan-Line Algorithm.
- 6. Projection (Introduction Only) (6 hrs.)**
Perspective projection – one point, two point and three point, Parallel projection – Orthographic, Axonometric and Oblique. Perspective anomalies.

List of Practical

1. To move two characters in opposite directions.
2. To draw a line using DDA.
3. To draw a line using Bresenham's Line algorithm.
4. To draw a circle using Midpoint Circle algorithm .
5. To use 2D Transformation Techniques.
6. To make a mini project based on computer graphics.

Suggested Text/Recommended Books

1. Computer Graphics by Donald Hearn and M. Pauline baker, 2nd edition, Pearson.
2. Computer Graphics by Apurva A. Desai, PHI publication.
3. Computer Graphics by Amarendra N Sinha and Arun D Udai, TMH publication.
4. Principals of interactive Computer Graphics by William M. Newman and Robert F. Sproull, TMH publication.
5. Graphics under C by Yashwant Kanitkar, BPB publication.
6. Introduction to Computer Graphics, first edition by Sumit Chauhan, 2011, Himalaya Publishing House.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted	Marks Allotted
1	10	15
2	10	20
3	10	20
4	10	20
5	10	15
6	6	10
Total	56	100

6.3 Open Source Software

L T P
4 - 4

1. Introduction

(5 hrs.)

Definitions of open source software, free software, freeware, public domain software, and free and open-source software. Introduction to GNU Project, FSF. GNU GPL. Legal Issues: Copyrights, Patents, Contracts and Licenses. Recent trends in Open Source Technology.

2. Basics of Linux

(18 hrs.)

History, Features of Linux, Linux Architecture, Linux distributions, Common shells, File system hierarchy, Introduction to GRUB. Command Line Interface – syntax of Linux commands, wild-card characters, types of Linux files, standard files and redirection, piping, filter. Graphical User Interface – Features of GNOME and KDE.

3. Shell Programming using vi(m) Editor

(18 hrs.)

Creating and running shell programs using vi(m) editor. Local and Global variables, Environmental variables, Positional Parameters. Sequential Execution, Conditional Execution and Loops - “if..then..fi” construct, “else” construct, “elif” construct, case, while construct, until, for, break and continue.

4. Basics of Linux Administration

(10 hrs.)

User and group management, compressing and decompressing files. File management. Disk Management. Qualities of good backup, backup medium, backup strategies, backup tools. Installing and removing packages, updating Linux.

5. Linux Servers

(5 hrs.)

Telnet Server, SSH Server, FTP Server, NFS, Samba, web, and Proxy server.

List of Practical

1. Using Linux GUI (GNOME and KDE) for basic tasks.
2. Using various open source software like Open Office, gimp, firefox etc.
3. Using Linux CLI to run basic commands/utilities like:

Basic commands/Utilities- *man, echo, exit, cal, date, time, mkdir, rmdir, cd, pwd, clear, cat, type, bc, expr, test, script, passwd, uname, tty, hostname, chvt, alias, ls, cp, ln, rm, more, less, cmp, comm, diff.*

Process management based - *ps, kill, bg, fg*

Filters - *wc, cut, head, tail, tee, cat and grep*

Networking based - *whoami, who am i, who, finger, users, ifconfig, ping, arp, netstat, route, traceroute, wall, write, and mail.*

4. Writing shell script for performing various tasks like: *factorial of a number, prime number, Fibonacci series, reverse of digits of a number, lower case to upper case conversion.*
5. Using users management under Linux. *(Using commands user add, userdel, id, su, sudo, group add, group mod, group del)*
6. Using file management and ownership under Linux. *(using commands chmod, chown, chgrp, touch, find, head, tail, cut, paste, sort)*

SUGGESTED DISTRIBUTION OF MARKS

Topic No	Time Allotted (Hrs)	Marks Allotted
1	5	10
2	18	30
3	18	30
4	10	20
5	5	10
Total	56Hrs.	100

Suggested Text/Recommended Books

1. Linux: The Complete Reference 6th Edition by Richard Petersen.
2. The official Ubuntu book by Benjamin Mako Hill, Mathew Helmke, Amber Graner and Corey Burger

Digital References

1. www.kernel.org.
2. www.distrowatch.com
3. <http://www.tldp.org/guides.html>
3. <http://tldp.org/LDP/sag/html/sag.html> (*The Linux System Administrator's Guide, version 0.9 by Lars Wirzenius, Stephen Stafford, Stephen Stafford, Stephen Stafford and Alex Weeks*)
4. <http://linux-tutorial.info>
5. <http://www.linux.com>
6. http://ftacademy.org/files/materials/fta-m1-intro_to_FS-v1.pdf

6.4 MAJOR PROJECT

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- - 8

Rationale

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

The project assignments may consist of:

- Programming customer based applications
- Web page designing including database connectivity
- Database applications
- Projects related to Computer Hardware
- Projects related to Computer Networking
- Software Development
- Bringing improvements in the existing systems/equipment
- Projects related to Multimedia
- Projects related to Computer Graphics

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

Sr. No	Performance criteria	Max. marks	Rating Scale				
			Excellent	Very Good	Good	Fair	Poor
1.	Selection of project assignment	10	10	8	6	4	2
2.	Planning and execution of considerations	10	10	8	6	4	2
3.	Quality of performance	20	20	16	12	8	4
4.	Providing solution of the problems or production of final product	20	20	16	12	8	4
5.	Sense of responsibility	10	10	8	6	4	2
6.	Self expression/ communication skills	5	5	4	3	2	1
7.	Interpersonal skills/human relations	5	5	4	3	2	1
8.	Report writing skills	10	10	8	6	4	2
9.	Viva voce	10	10	8	6	4	2
Total marks		100	100	80	60	40	20

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

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

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

Important Notes

1. This criteria must be followed by the internal and external examiner and they should see the daily, weekly and monthly reports while awarding marks as per the above criteria.
2. The criteria for evaluation of the students have been worked out for 100 maximum marks. The internal and external examiners will evaluate students separately and give marks as per the study and evaluation scheme of examination.
3. The external examiner, preferably, a person from industry/organization, who has been associated with the project-oriented professional training of the students, should evaluate the students performance as per the above criteria.

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

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

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

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

6.5.1 Cloud Computing

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4 - 2

Unit –1 (10 hrs.)

Introduction to Cloud Computing, Definition, Characteristics, Components, Cloud provider, SAAS, PAAS, IAAS and Others, Organizational scenarios of clouds, Administering & Monitoring cloud services, benefits and limitations, Deploy application over cloud, Comparison among SAAS, PAAS, IAAS, Cloud computing platforms: Infrastructure as service: Amazon EC2, Platform as Service: Google App Engine, Microsoft Azure, Utility Computing, Elastic Computing

Unit – 2 (12 hrs.)

Introduction to Cloud Technologies, Study of Hypervisors, Compare SOAP and REST, Web services, AJAX and mashups-Web services: SOAP and REST, SOAP versus REST, AJAX: asynchronous 'rich' interfaces, Mashups: user interface services Virtualization Technology: Virtual machine technology, virtualization applications in enterprises, Pitfalls of virtualization, Multitenant software: Multi-entity support, Multi-schema approach, Multi-tenance using cloud data stores, Data access control for enterprise applications.

Unit – 3 (12 hrs.)

Data in the cloud: Relational databases, Cloud file systems: GFS and HDFS, BigTable, HBase and Dynamo.

Map-Reduce and extensions: Parallel computing, The map-Reduce model, Parallel efficiency of Map-Reduce, Relational operations using Map-Reduce, Enterprise batch processing using Map-Reduce, Introduction to cloud development, Example/Application of Mapreduce, Features and comparisons among GFS,HDFS etc, Map-Reduce model, Cloud security fundamentals, Vulnerability assessment tool for cloud, Privacy and Security in cloud

Unit – 4 (12 hrs.)

Cloud computing security architecture: Architectural Considerations- General Issues, Trusted Cloud computing, Secure Execution Environments and Communications, Micro-architectures; Identity Management and Access control-Identity management, Access control, Autonomic Security

Unit – 5 (10 hrs.)

Cloud computing security challenges: Virtualization security management- virtual threats, VM Security Recommendations, VM-Specific Security techniques, Secure Execution Environments and Communications in cloud. Issues in cloud computing, Implementing real time application over cloud platform, Issues in Inter cloud environments, QOS Issues in Cloud, Dependability, data migration, streaming in Cloud. Quality of Service (QoS) monitoring in a Cloud computing environment.

Cloud Middleware. Mobile Cloud Computing. Inter Cloud issues. A grid of clouds, Sky computing, load balancing, resource optimization, resource dynamic reconfiguration, Monitoring in Cloud.

Practical

1. Collaboration on calendars, schedules, and task management
2. Collaboration on event management
3. Collaboration on contact management
4. Collaboration on project management

5. Collaboration on word processing
6. Collaboration on spreadsheets
7. Collaboration on databases
8. Collaboration on presentation
9. Collaboration on file sharing and any other on line content

Suggested Text Books

- i. *Cloud Computing for Dummies* by Judith Hurwitz, R.Bloor, M.Kanfman, F.Halper (Wiley India Edition)
- ii. *Enterprise Cloud Computing* by GautamShroff, Cambridge
- iii. *Cloud Security* by Ronald Krutz and Russell Dean Vines, Wiley-India

Suggested Reference Book:

1. *Google Apps* by Scott Granneman, Pearson
2. *Cloud Security & Privacy* by Tim Malhar, S.Kumaraswammy, S.Latif (SPD, O'REILLY)
3. *Cloud Computing : A Practical Approach*, Antohy T Velte, et.al McGraw Hill,
4. *Cloud Computing Bible* by Barrie Sosinsky, Wiley India
5. Stefano Ferretti et.al., //QoS-aware Clouds", 2010 IEEE 3rd International Conference on Cloud Computing

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	10	10
2	12	25
3	12	25
4	12	20
5	10	20
Total	56	100

6.5.2 Installation and Troubleshooting of Computer Networks

L T P
4 - 2

1. Introduction

(6 hrs.)

Network Administrator, Network Engineer, Network Architecture / Designer, Other Network Related Jobs.

2. Network Design

(8 hrs.)

Network design overview, resolving the need, seeking approval, designing a home or small office network, selecting computer, selecting networking protocols, choosing a network medium, choosing a network speed, expanding the network.

3. Remote Networks

(10 hrs.)

Need of Remote Network Access, remote access GUI based and CLI based tools, web based administration. Network drive mapping. Virtual Private Network – VPN Protocols, Types of VPNs, VPN Clients, SSL VPNs.. Printer sharing and Network Printing Concepts.

4. DHCP and DNS Services

(10 hrs.)

Dynamic Host Configuration Protocol (DHCP) – DHCP Origins, Reverse Address Resolution Protocol (RARP), Bootstrap Protocol (BOOTP), DHCP Objectives, IP address assignment, TCP/IP client configuration, DHCP architecture. DNS Objectives, Domain Naming, Top Level Domains, Second Level Domains, Sub domains, DNS Functions.

5. Network Threats and Firewalls

(10 hrs.)

Active and passive security threats, security services, network security model, Malicious Programs, Taxonomy of malicious programs - trap doors, logic bomb, Trojan horses, viruses, worms and bacteria. Nature of viruses, virus structure. Types of viruses – parasitic, memory resident, boot sector, stealth and polymorphic, macro, spyware and adware. DOS and DDoS attacks. Antivirus approaches. Firewall – characteristics, types of firewall – packet filters, application level gateways, and circuit level gateways. Trusted system (Concept Only). Introduction to VLAN.

6. Art of Network Troubleshooting

(12 hrs.)

Using ISO-OSI model for network troubleshooting. Commonly used software and hardware troubleshooting tools for TCP/IP network, Network management software. Troubleshooting generalized user complaints (*Problems like: Can't connect, Connection that drop, slow performance, IP address conflict, Can't login, failure of network hardware like NIC, Cable, hub, switch and router etc.*)

LIST OF PRACTICALS

1. Sharing and using a printer in a network.
2. Mapping a drive in a network and using it.
3. Using remote login tools in a network. (*both GUI based: webmin, team viewer and CLI based: telnet, ftp and SSH, rlogin has to be covered*)
4. Configuring a simple DHCP server on Linux.
5. Study and installation of Firewall in a network
6. Troubleshooting a network problems (using if config, host name, ping, traceroute, netstat, route, host,arp, NET, etc.)

Suggested /Recommended Books

1. The Complete Reference Networking by Craig Zacker, TMH publication.
2. Network Analysis and Troubleshooting by J. Scott Haugdahl, Addison-Wesley, 2000.
3. Network Troubleshooting Tools by Joseph D. Sloan, O'Reilly Publication
4. Linux Network Administrator's Guide, by Olaf Kirch& Terry Dawson, O'Reilly Publication
5. Computer Viruses and Malware by John Aycock, from Springer

Digital Reference

1. http://portal.aauj.edu/portal_resources/downloads/operating_system/linux_security.pdf
2. <http://tldp.org/LDP/nag/nag.html>

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	6	10
2	8	15
3	10	15
4	10	15
5	10	25
6	12	20
Total	56	100

6.5.3 Web Programming

L T P
4 - 2

1. Designing Dynamic Web Pages using PHP (15 hrs.)

Static vs dynamic web page, CSS - Inline Styles, Embedded and External Style Sheets, CSS Block Model, Selectors, Setting Position, Color, Alignment, Padding, Margins, Cascading Rules, PHP Session Management, Cookies, User Authentication, Sending and Receiving E-mails, Dynamically Generating Images, Magic Quotes, Uploading Files.

2. AJAX &Jquery (15 hrs.)

JQuery fundamentals, using the JQuery library file, JQuery selectors, JQuery methods to access HTML attributes, JQuery methods for traversing, JQuery manipulators, JQuery effects, Including JQuery in a WebPage, Anonymous Functions, Callback Functions, Widgets and Utilities, Introduction to AJAX.

3. Tools for Website Deployment (08 hrs.)

Installation, Configuration and Using Apache, LAMP, WAMP, XAMP, Mozilla Firefox, Google Chrome

4. Introduction to Content Management (08 hrs.)

Content Management, CMS Tools, Joomla: Installation, Configuration and Administration, CAM Model, User and Media Management, Joomla Extensions and Templates.

5. Blogging &Search Engine Optimization (10 hrs.)

Introduction to blogging and wordpress.On-page Optimization Activities, Initial Site Analysis, Keyword Research, Density Analysis and Placement, Title & Meta Tags development, Site Structure Analysis, URL renaming/re-writing, Content Development Check, Brief Keyword Competition Review,H1, H2, H3 Tags, Anchor Text, Existing Web Content Optimization, HTML Validation, Creation of XML / HTML / Text Sitemaps, Submitting sites to Google and Yahoo Webmasters, Canonical / 404 Implementation.

List of Practical:

1. Practicals on creating dynamic web page using PHP.
2. Practicals based on AJAX
3. Practicals based on JQuery.
4. Practicals on Joomla.

Suggested /Recommended Books

1. HTML5 Black Book: CSS3, JavaScript, XML, XHTML, AJAX, PHP and JQuery” by Kogent Learning Solutions, Dreamtech Press
2. “PHP and MySQL Development” by Luke Welling, Laura Thomson, Addison Wesley
3. “Pro PHP and JQuery” by Jason Lenstorf, Apress
4. Web Resource “<http://www.w3schools.com/>” for JavaScript, JQuery and AJAX
5. “Joomla Explained: Your Step by Step Guide” by Stephen Burge, Joomla Press

Suggested Digital Reference

1. <http://www.w3schools.com>
2. <http://www.tutorialspoint.com>

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	15	25
2	15	25
3	8	10
4	8	15
5	10	25
Total	56	100

6.5.4 Android Programming

L T P
4 - 2

1. Introduction to Android

(6 hrs.)

Android overview, Features of Android, Android Applications. Setting up Java Development Kit (JDK), Setting up Android SDK, Setting up Eclipse IDE, Setting up Android Development Tools (ADT) Plugin, Creating Android Virtual Device.

2. Architecture & Application Components

(10 hrs.)

Linux kernel, Libraries, Android Runtime (Dalvik Virtual Machine), Application Framework, Applications. Activities, Services, Broadcast Receivers, Content Providers, Additional Components. Creating Android Application, Anatomy of Android Application - Directories and files in the Android project, The Main Activity File, The Manifest File, The Strings File, The R File, The Layout File, Running the Application,

3. Android Resources Organizing, Access Activities & Services

(10 hrs.)

Organize Resources, Alternative Resources, Accessing Resources, Accessing Resources In Code, Accessing Resources In Xml, Activity, sequence of callback methods, on Create(), on Start(), on Resume(), on Pause(), on Stop(), on Destroy(), on Restart(). Services, its states (Started, Bound), service lifecycle callback methods, important callback methods for Service base class like on Start Command(), on Bind(), on Unbind(), on Rebind(), on Create(), and on Destroy().

4. Android Broadcast Receivers and Android Content Providers

(10 hrs.)

Broadcast Receivers, Creating the Broadcast Receiver, Registering Broadcast Receiver, Broadcasting Custom Intents, Content Providers, Content URIs, Create Content Provider, Fragments, Fragment Life Cycle, using Fragments, Intents and Filters - Intent Objects, Types of Intents, Intent Filters.

5. Android User Interface

(10 hrs.)

View Group subclass of View Layouts types – Linear Layout, Relative Layout, Table Layout, Absolute Layout, Frame Layout, List View, Grid View. Layout Attributes, View Identification, Android UI Controls – Text View, Edit Text, Auto Complete Text View, Button, Image Button, Check Box, Toggle Button, Radio Button, Radio Group, Progress Bar, Spinner, Time Picker, and Date Picker. Creating UI controls. Android event handling - Event Listeners, Event Listeners Registration, Event Handlers (on Click(), on Long Click(), on Focus Change(), on Key(), on Touch(), on MenuItem Click()). Defining and using styles, style inheritance, themes, default style and themes, creating custom component.

6. Advance Android Programming

(10 hrs.)

Drag & drop process, the Drag Event class, Listening for Drag Event, Starting a Drag Event, Android Toast class, Creating and Sending Notifications, The Notification Compat. Builder Class, The Location Object - Get the Current Location, Get the Updated Location, Location Quality of Service, Displaying a Location Address, sending mails and messages, phone calls, Publishing Android Application.

List of Practical:

1. Setting up environment for android programming.
2. Creating a hello world program
3. Creating an interactive user interface for the area of your interest.

Suggested /Recommended Books

1. Hello, Android: Introducing Google's Mobile Development Platform by Ed Burnette
2. Android Application Development for Dummies by Michael Burton
3. Beginning Android 4 Application Development by Wei-Meng Lee
4. Android Programming : the Big Nerd Ranch Guide

Digital Reference

1. <http://www.w3schools.com>
2. <http://www.tutorialspoint.com>

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	6	10
2	10	20
3	10	20
4	10	20
5	10	20
6	10	10
Total	56	100

6.6 PRACTICE IN COMMUNICATION SKILLS

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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 PRACTICAL EXERCISES

1. Exercises on phonetics
2. Group Discussion
3. Exercises on self-assessment using tools like SWOT analysis.
4. Internet communication
5. Correspondence
 - 5.1 Resume writing
 - 5.2 Covering letter
 - 5.3 Follow-up correspondence
 - 5.4 Business Correspondence
- 6 Practice on listening skills.
- 7 Speaking exercises with emphasis on voice modulation (reading and extempore)
- 8 Demonstration and practice on Body language and Dress sense.
- 9 Exercises on etiquettes and mannerism in difficult situations like business meetings, table manners, telephone etiquette and manners related to opposite gender.
- 10 Mock interviews (telephonic/personal)
- 11 Cross-cultural Communication
- 12 Role play for effective Communication.
- 13 Exercises on wit and humour in conversations and creating lively environment.