

CURRICULUM
FOR
DIPLOMA PROGRAMME

IN

INFORMATION TECHNOLOGY

(5th & 6th Semester)

FOR THE STATE OF HIMACHAL PRADESH



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

Prepared by:-

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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
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**3rd YEAR OF THREE YEAR DIPLOMA PROGRAMME IN
INFORMATIONTECNOLOGY**

1. SALIENT FEATURES

- | | |
|-------------------------------|---------------------------------------------------------------------------|
| 1) Name of the Programme : | Three year Diploma Programme
Information Technology |
| 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 (Information Technology)

S.No.	Subject	Load Hrs/Week		Marks Distribution								
				Internal Assessment			External Assessment					TOTAL
		Th	Pr	Th	Pr	Total	Th	Hrs.	Pr	Hrs.	Total	
5.1	Object-Oriented Programming using Java	4	4	30	20	50	100	3	50	3	150	200
5.2	Web Designing	4	4	30	20	50	100	3	50	3	150	200
5.3	Network Operating Systems	4	4	30	20	50	100	3	50	3	150	200
5.4	Software Engineering	4	0	50	-	50	100	3	-	-	100	150
5.5	Elective – I 5.5.1 Mobile Computing 5.5.2 Wireless Communication 5.5.3 Cloud Computing	3	0	50	-	50	100	3	-	-	100	150
5.6	* Generic skills & Entrepreneurship Development	2	1	50	50	100	50	2	-	-	50	150
5.7	Minor Project Work	0	4	-	50	50	-	-	50	3	50	100
5.8	Industrial Training [#]	-	-	-	50	50	-	-	50	3	50	100
Student Centered Activities		-	2	-	25	25	-	-	-	-	-	25
Total		21	19	240	235	475	550	-	250	-	800	1275

* The subject is common with other diploma programmes.

Four weeks industrial training will be scheduled after 4th semester during summer vacations.

Sixth Semester (Information Technology)

S.No.	Subject	Load Hrs/Week		Marks Distribution								
		Internal Assessment			External Assessment					TOTAL		
		Th	Pr	Th	Pr	Total	Th	Hrs	Pr		Hrs	Total
6.1	Multimedia Technologies	4	4	30	20	50	100	3	50	3	150	200
6.2	Information and Network Security	4	-	50	-	50	100	3	-	-	100	150
6.3	Elective – II 6.3.1 Advanced Java 6.3.2 Advanced Web Designing 6.3.3 Programming in C++	4	4	30	20	50	100	3	50	3	150	200
6.4	Major Project	-	10	-	100	100	-	-	100	3	100	200
6.5	*Basics of Management*	3	-	50	-	50	100	3	-	-	100	150
6.6	*Practices in Communication Skills*	-	2	-	50	50	-	-	50	3	50	100
Student Centered Activities		-	4	-	25	25	-	-	-	-	-	25
Total		15	24	160	215	375	400	-	250	-	650	1025

* The subject is common with other diploma programmes.

5.1 Object-oriented Programming using Java

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Rationale

Object-oriented programming paradigm has become the de-facto standard for all modern programming languages. Java language has taken the world of computer programming by storm. Portability, robustness and its suitability to a wide spectrum of programming scenarios, are a few of its features attributing to its wide acceptance. Java is currently at the top of popularity index as the programming language of choice for application developers (Tiobe Index). With the acquisition of Sun Microsystems by Oracle Inc., the future of Java language looks even brighter. This course is specifically designed to make students appreciate the object-oriented programming paradigm using Javalanguage.

Detailed Contents

- 1. Overview of Java language (5hrs)**
History of Java language, Comparison with C and C++, Features of Java, Java Virtual Machine (JVM), Bytecode, Java Development Kit (JDK), Java Editions, Just-in-Time (JIT) compiler.
- 2. Programming fundamentals (5hrs)**
Identifiers, Keywords, Variable, Constant, Method, Built-in data types, Type casting, Comments, Indentation, Naming conventions.
- 3. Operators (6hrs)**
Arithmetic operators, Logical operators, Relational operators, Bit-wise operators, Assignment operator, Compound assignment, Expression, Mixed-mode expression.
- 4. Control Statements (7hrs)**
if and its variants (if...else, nested if, if...else if ladder), switch...case, for, while, do...while, continue, break, labeled break, return, recursion.
- 5. Object Oriented Programming (OOP) in Java (8hrs)**
OOP, essential characteristics of an OOP language (Encapsulation, Polymorphism, Inheritance), Class, Object, Instance variable, Method, Symbolic constant, Static class members, Enumerations, Constructor, Garbage collection, Finalizer.
- 6. Access specifiers and Packages (8hrs)**
Access specifiers for class members and classes, package, user-defined package, importing a package, using CLASSPATH and -cp option with java, creating archive with jar, Java API packages: java.lang, java.util, java.net, java.sql, java.io, java.awt
- 7. Inheritance and Polymorphism (5hrs)**
Method overloading, Inheritance, Interfaces, Multiple inheritance, Method overriding, final methods and classes, abstract methods and classes, Run-time polymorphism

8. Error-handling and Multithreading (6hrs)

Exception, Checked and unchecked exceptions, try...catch, nested try, finally block, throws, throw, Thread, Creating thread by extending Thread class and by implementing Runnable interface, Thread life-cycle, Thread control (run(), sleep(), wait(), join(), yield(), notify(), suspend(), resume(), start(), stop())

9. I/O and Applets (6hrs)

I/O streams, Byte streams, Character streams, File I/O, Applet, Life-cycle of an applet, Passing parameters to an applet

Recommended Books

1. "Java: How to Program" by Deitel and Deitel, Pearson Higher Education
2. "Java: The Complete Reference" by Herbert Schildt, McGraw Hill
3. "Programming with Java: A Primer" by Balaguruswami, TMG

List of Experiments

Write programs in Java to

- 1) Print a message like "Hello Java!" on the console.
- 2) Print the ranges of built-in data types
- 3) Experiment with Arithmetic, Relational, Logical and Bitwise operators
- 4) Demonstrate the use of arrays
- 5) Create a class and experiment with access specifiers
- 6) Create objects
- 7) Experiment with final and static class members
- 8) Demonstrate the use of constructors and finalizer
- 9) Demonstrate method overloading
- 10) Demonstrate inheritance
- 11) Experiment with interfaces
- 12) Demonstrate method overriding
- 13) Create a package hierarchy
- 14) Experiment with Exception handling
- 15) Demonstrate Java Threads
- 16) Create applets
- 17) Demonstrate I/O streams
- 18) Manipulate files

SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted	Marks Allotted
1	05	08
2	05	10
3	06	10
4	07	15
5	08	15
6	08	15
7	05	07
8	06	10
9	06	10
Total	56	100

5.2 Web Designing

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Rationale

With the ever-increasing penetration and speed of Internet there is a trend shift from stand-alone applications to Rich-internet-applications (RIA). World-wide-web is becoming more and more dynamic, versatile and accessible with each passing day. Web designing encompasses many different skills and disciplines in the production and maintenance of websites. The different areas of web design include web graphics design; interface design; authoring; and search engine optimization. This course will give the students a thorough insight into various technologies, tools, practices and standards related to web-designing.

Detailed Contents

- 1. HTML 5 (8 Hrs)**
Semantic elements in HTML 5, Using Canvas, Manipulating Canvas using JavaScript Adding Multimedia Elements.
- 2. JavaScript-Client Side Scripting (10 Hrs)**
Using JavaScript in an HTML document (JavaScript in head element, JavaScript in body element, in an external file), variables, operators (arithmetic, assignment, comparison, logical, conditional), selection statements (if, if-else, switch), loops (while, do-while, for), jump statements (break and continue)
- 3. JavaScript Functions, Events, Image maps and Animations (10 Hrs)**
User defined functions, built-in javascript functions (eval(), isNaN(), parseInt(), parseFloat()), calling functions with timer (setTimeout(), clearTimeout(), setInterval(), clearInterval()), Events (onclick, onscroll, onmouseup, onmousedown, onkeyup, onkeydown, onkeypress, onfocus, onchange, onblur), imagemaps, animations
- 4. JavaScript Objects (8Hrs)**
User-defined objects, built-in objects (string, boolean, number, array, math, date), JavaScript DOM, properties and methods of an object, forms and validation.
- 5. Working with JQuery (10 Hrs)**
JQuery fundamentals, loading and using JQuery, using the JQuery library file, JQuery selectors, JQuery methods to access HTML attributes, JQuery methods for traversing, JQuery manipulators, JQuery effects.
- 6. PHP-Server Side Scripting (10 Hrs)**
Writing simple script with php, variables, operators, getting input, decisions (if-else, switch), looping (for, while, do-while, for each), break and continue statements, arrays (array and loops, keys and values, forms and associative arrays), functions, string manipulation with PHP.

List of Practicals

- 1) To study various HTML tags and to design a form containing commonly used HTML tags.
- 2) To use JavaScript in an HTML document.
- 3) To use JavaScript variables and operators.
- 4) To use JavaScript selection statements.
- 5) To use JavaScript iterative statements.
- 6) To use JavaScript jump statements.
- 7) To use JavaScript user-defined functions and built-in functions.
- 8) To use JavaScript events.
- 9) To use JavaScript functions with timer.
- 10) To use JavaScript image mapping.
- 11) To use JavaScript animations.
- 12) To use JavaScript user-defined objects.
- 13) To use JavaScript built-in objects.
- 14) To use JavaScript properties and methods of an object.
- 15) To validate HTML form (empty field, number, length, valid email ID).
- 16) To use JQuery library.
- 17) To write a simple PHP script.
- 18) To use PHP variables and operators.
- 19) To use PHP decision statements.
- 20) To use PHP looping statements.
- 21) To use PHP arrays.
- 22) To use PHP functions.
- 23) To use PHP string manipulations.

Recommended Books

1. *Developing Web Applications*, by Ralph Moseley & M.T. Savaliaya.
2. *HTML 5, Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP and JQuery-Black Book*, Dreamtech Press.

Suggested Distribution of Marks

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

5.3 Network Operating System

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Rationale

Networking capability is now an integral component of any operating system. We hardly see any computer nowadays which is not connected to one or the other network. Network Operating System (NOS) is a class of Operating System (OS) that is designed for server computers providing services to other computers via network. The objective of NOS is to keep running the network at peak performance. In this course, the students will learn install, configure and maintain network servers. The students will also be able to use various network tools to troubleshoot the networks at OS level.

1. GNU/Linux Overview (8Hrs)

History, Open source, FSF, GPL, UNIX vs Linux, Features of Linux, Linux Architecture, File system structure/hierarchy. Definition, features and examples of Network Operating System

2. Linux Operating System (10Hrs)

Installation, Bootloaders:GRUB vs LILO, Linux file commands: cat,head,tail,cp,rm,mv,more,less,tail, head. Directory commands: pwd,mkdir, rmdir,ls,cd. File access permissions : viewing file access permission, changing file access permission, Standard files and redirection, Piping, Filters.

3. The vi Editor (8Hrs)

Three modes – command mode, input mode, and ex modes, Input mode- entering and replacing text, Saving and quitting, Navigation, Editing text - deleting, moving copying, joining, Undoing, Repeating last command, Searching, and replacing. .

4. Shell Programming (10Hrs)

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

5. System and Network Administration (10Hrs)

Mounting and Unmounting files, User management, Disk Management, Compressing and Decompressing files, Backup and Restore Backup tools – tar, dump, dd, cpio, Installing Packages, Updating GNU/Linux

6. Server Administration (10Hrs)

Steps for making a GNU/Linux machine to act as following server: Telnet Server, SSH Server, FTP Server, NFS Server, Samba Server, DHCP Server, Proxy Server, Web Server, LAMP.

List of Practicals

- 1) Downloading and installing Ubuntu Linux.
- 2) Using Linux CLI to run basic commands/utilities like:
Basic commands/Utilities- man, echo, exit, cal, date, time, mkdir, rmdir, cd, pwd, clear, cat, passwd, uname, tty, hostname, alias, ls, cp, rm, more, less.
Process management based - ps, kill, bg, fg
Filters - wc, cut, grep, tr, awk
Networking based - whoami, who, finger, ifconfig, ping, arp, netstat, route, traceroute
- 3) Writing shell script for following: factorial of a number, prime number, reversing digits of an integer, lower case to upper case conversion and taking backups, sorting and searching a number etc.
- 4) To manage users under Linux. (using commands useradd, userdel, usermod, userdel, su, sudo, groupadd, groupmod, groupdel)
- 5) To learn file management and ownership under Linux. (using commands chmod, chown, chgrp, touch, find, head, tail, cut, paste, sort)
- 6) To manage disk under Linux. (df, du, fdisk, mkfs)
- 7) To Setup a Linux Server(Telnet/SSH/Local Repository Server/NFS Server/SAMBA Server/DHCP Server/Web Server/Proxy Server)

Recommended Books

1. *Time Parker, Linux Unleashed, Third Edition, Techmedia 1999.*
2. *Norton P, Complete Guide to Linux, Techmedia.*
3. *Paul G. Sery, Linux, Network Toolkit, Comdex Computer Publishing.*
4. *Nicholas Wells, Guide to Linux Installing and Administration, Vikas Publishing House.*
5. *NIIT, Linux Operating Systems, Prentice-Hall Of India Pvt. Limited.*

Suggested Distribution of Marks

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

5.4 Software Engineering

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Rationale

Software engineering is the application of a systematic, disciplined, quantifiable approach to the development, operation, and maintenance of software. By using software engineering principles, methods, techniques and tools, high quality software can be developed within cost and time constraints. In this course students will learn about various prevalent models used in software development process with pros and cons of each.

Detailed Contents

1. Basics of Software Engineering (12Hrs)

What is software?, software characteristics, software applications, software crisis, process and project, components of a software process, capability maturity model, software development process models(linear sequential or waterfall model, prototyping model, iterative development model, time boxing model, and spiral model).

2. Software Requirements Analysis and Specification (8Hrs)

Value of a good SRS, requirement process, software requirement specification(SRS), characteristics of an SRS, components of an SRS, structure of a requirements document, analysis models(data flow diagrams (DFD), entity relationship(E-R) diagram).

3. Software Project Planning (8Hrs)

Effort estimation(top-down and bottom-up approaches), project schedule and staffing, quality planning, risk management planning(risk management concepts, risk assessment, risk control), project monitoring plan(measurements, project monitoring and tracking), detailed scheduling, COCOMO model.

4. Design (10Hrs)

Design Concepts(coupling, cohesion), function oriented design(structure charts, structured design methodology), object oriented design(OO concepts, unified modeling language(UML), a design methodology),detailed design(logic/algorithm design).

5. Coding and Testing (6Hrs)

Programming principles (structured programming, information hiding, coding standards), incrementally developing code (incremental coding process, test-driven development), unit testing.

6. Software Testing (12Hrs)

Testing concepts(error, fault, failure; test case; test suite and test harness; levels of testing), testing process(test plan, test case design, test case execution), black and white box testing, integration testing(top-down and bottom-up), validation testing, system testing.

RECOMMENDED BOOKS

1. *Software Engineering Concept* by Richard Fairley, Tata McGraw Hill Publishers.
2. *An Integrated Approach to Software Engineering* by PankajJalote, Narosa Publishing House Pvt Ltd,
3. *S/ W Engineering* by Rajib Mall, PHI Publishers
4. *Software Engineering – A Practitioner’s Approach* by RS Pressman, Tata McGraw Hill Publishers.

Suggested Distribution of Marks

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

5.5.1 Mobile Computing

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3 - 0

Rationale

The ubiquity of wireless communication technologies and the proliferation of portable computing devices have made possible a mobile computing era in which users, on the move, can seamlessly access network services and resources, from anywhere and at any time. This course provides an introduction to the fundamentals of mobile computing. A background in computer networks and wireless communication is required.

Detailed Contents

1. Overview of Mobile Computing (6 Hrs)

Mobility of Bits and Bytes, the convergence leading to ICT, Wireless-the beginning, evolution of wireless networks, evolution of wireless data, evolution of wireless LAN, PAN. Mobile Computing, Mobile Computing Functions, Devices. Wireline networks, wireless networks, Ad hoc Networks, Bearers, Middleware and Gateways, Application and services (contents), Security in Mobile Computing.

2. Mobile Computing Architecture (6 Hrs)

Internet the ubiquitous network, architecture for mobile computing, three tier architecture, 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.

3. Mobile Computing Through Telephony (6 Hrs)

Evolution of Telephony, Multiple access procedures, FDMA, TDMA Variants, CDMA, SDMA, Mobile computing through telephone, IVR Architecture, overview of Voice Software, developing an IVR Application (flow chart only), Voice XML, architecture model, how voice XML fits into Web Environment, TAPI.

4. Emerging Technologies (6 Hrs)

Introduction, Bluetooth, Bluetooth protocols, protocol stack, RFID, Areas of Application for RFID, Wireless Broadband (WIMAX), deployment architecture, protocol stack, Physical layer, Medium access control, broadband applications, Mobile IP, How Mobile IP Works, IPV6, Address Space, Java Card, Mobile computing over SMS, SMS, Strengths of SMS, Short message Mobile Terminated, Short Message Mobile Originated, SMS as Information Bearer. Introduction to GPRS, Applications for GPRS.

5. Wireless Application Protocol (6 Hrs)

Introduction, WAP, WAE, Introduction to WML, Introduction to MMS, MMS Architecture, MMS transaction flow.

6. Client Programming (5Hrs)

Moving beyond desktop, evolution of PDA, Structure of Mobile Device, Overview of Digital Communication Device, Mobile Phones, features of Mobile Phones, PDA, Design Constraints in Applications for Handheld Devices, Recent Developments in Client Technologies, Features of Android OS.

7. Operating Systems for Mobile Devices (7Hrs)

PALM OS Architecture, Kernel Features, Memory Architecture, System Managers, Latest in Palm OS, Introduction to Symbian OS, Symbian OS Architecture, Hardware Interfaces, Memory Management, System Software. Introduction to J2ME Technology, Wireless devices with Windows CE, Introduction, different flavours of Windows CE. Windows CE Architecture.

Recommended Books

1. *“Mobile Computing: Technology, Application and Service Creation”* by Asoke K. Talukdar and Roopa R. Yavagal, Tata McGraw Hill.
2. *“Wireless Communication : Principles and Practices”* by Teodok S. Rappaport, Pearson Education Asia.
3. *“Principles of Mobile Computing”* by Uwe Hansman, LotharMerk, Martin S. Nicklous, Thomas Stober, 2nd Edition Springer.

SUGGESTED DISTRIBUTION OF MARKS

Sr.No.	Time Allotted (hrs)	Marks Allotted (%age)
1	6	12
2	6	12
3	6	15
4	6	18
5	6	15
6	5	8
7	7	20
TOTAL	42	100

5.5.2 Wireless Communication

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3 - 0

Rationale

Wireless communication course is intended to provide exposure and awareness of latest wireless communication technologies such as GSM, CDMA, WLANs and Bluetooth. This course is designed in conjunction with course on Computer Networks, which provides preliminaries required for this course.

Detailed Contents

1. Introduction (7 Hrs)

Evolution of Mobile Communication Systems, Paging Systems, Cordless Telephone Systems, Cellular Telephone system, comparison of common wireless communication systems. 2G cellular networks, 2.5G Wireless Networks, HSCSD, GPRS, EDGE, UMTS, CDMA2000, Wireless Local Loop, Bluetooth and Personal Area Network.

2. System Design Fundamentals (6 Hrs)

Frequency Reuse, channel alignment strategies, handoff strategies, interference and system capacity, improving coverage and capacity in cellular system.

3. Mobile Radio Propagation (6 Hrs)

Free space propagation model, ground reflection (two ray) model, small scale multipath propagation, parameters of mobile multipath channels, types of small-scale fading.

4. Modulation Techniques (8 Hrs)

Overview of Amplitude Modulation, Angle Modulation, Digital Modulation, linear modulation techniques, constant envelop modulation, spread spectrum modulation techniques, fundamentals of equalization, Diversity Techniques, RAKE Receiver, Fundamentals of Channel Coding.

5. Multiple Access Techniques (8 Hrs)

Introduction to FDMA, TDMA, CDMA, SDMA

6. Wireless Systems and Standards (7 Hrs)

GSM, CDMA, Digital Cellular Standard (IS-95), Features of IEEE 802.11 a/b/g/n, Bluetooth.

Recommended Books

1. *“Wireless Communication Principles and Practices”* by Theodore S Rappaport, Pearson Education Asia 2nd Ed.
2. *“Modern Wireless Communication”* by Simon Haykin, Michael Moher, Prentice Hall of India, 1st Edition.
3. *“Wireless Communication”* by Andreas F. Molisch, 2nd Edition, Wiley

SUGGESTED DISTRIBUTION OF MARKS

Sr.No.	Time Allotted (hrs)	Marks Allotted (%age)
1	7	20
2	6	10
3	6	15
4	8	20
5	8	20
6	7	15
TOTAL	42	100

5.5.3 Cloud Computing

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3 - 0

Detailed Contents

1. Overview of Cloud Computing

(8 Hrs)

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

2. Cloud Technologies

(9 Hrs)

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.

3. Data in Clouds

(9 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

4. Security in Cloud

(7 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

5. Cloud Computing Challenges

(9 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 Intercloud 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.

Recommended Books

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

SUGGESTED DISTRIBUTION OF MARKS

Sr.No.	Time Allotted (hrs)	Marks Allotted (%age)
1	8	20
2	9	20
3	9	20
4	7	20
5	9	20
TOTAL	42	100

5.6 GENERIC SKILLS & ENTREPRENEURSHIP DEVELOPMENT

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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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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.)

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 Multimedia Technologies

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Proper selection of appropriate medium (text, picture, video, audio, animation etc.) makes the communication process more concise and effective. Modern computer applications make a very liberal use of all these media to enrich the human-computer interaction experience. This course is designed to expose students to various aspects of multimedia technologies.

Detailed Contents

1. Overview and Terminology (8 Hrs)

Multimedia System, Elements of multimedia, Application areas, Hypermedia, Mass media, Media Properties: Linear and Non-linear, Multimedia production

2. Multimedia Elements (15 Hrs)

Text: Encoding standards (ASCII, EBCDIC, Unicode), Fonts, Style, Size, Hypertext

Graphics and Images: Characteristics of light, Color Models (RGB and CMYK), Pixel, Resolution, Aspect ratio, Color-depth, Bit-mapped and Vector Graphics, Images, Hue, Brightness, Saturation, Opacity, Cropping, Scaling

Sound: Properties of sound, Digitization, Mono and Stereo, Sampled and Synthesized sound, Text-to-speech synthesis, Speech-to-text synthesis

Animation: Rendering, Morphing,

Video: Video formats: Digitization, PAL, NTSC, SECAM

3. Multimedia Hardware (15 Hrs)

Digital camera, Video camera, Microphone, Scanner, MIDI Synthesizer, LCD Projector, Digital Light Projector (DLP), CRT monitor, TFT monitor, Plasma panel, Speaker, Printer: LASER, Inkjet, Thermal, CD-ROM, DVD-ROM, Hard-disk, RAID, RAID levels, Blue ray Disks, Mouse, Keyboard, Joystick, Gamepad, Digitizer, GPU

4. Multimedia Data Compression (8 Hrs)

Lossless compression, Run-length coding, Variable-length coding, Lossy Compression, Image compression (JPEG), Audio compression (MPEG)

5. Multimedia Authoring Tools (10 Hrs)

Design Issues for Multimedia Authoring, Design Approaches to Authoring, Types of Authoring Software – Icon based, time based, storyboarding/ Scripting; Working in Adobe Flash, ActionScript for controlling animation.

List of Practicals

- 1) Using various functions of a digital camera (Focus, Exposure, Macro, Zoom, Flash, Date/Time etc.)
- 2) Using Scanner to scan Photographs and Pages.
- 3) Using OCR to translate scanned documents to editable text.
- 4) Using Photoshop for performing various manipulations on images.
- 5) Preparing animations using Adobe Flash.
- 6) Using ActionScript to control Flash Animation
- 7) Hands on practice on burning CD/ DVD, using touch screens, digitizers, multimedia projectors.
- 8) Preparing presentations using MS-PowerPoint 2007 +.

Recommended Books/ Online Resources

1. *“Introduction to Multimedia Systems”* by Gaurav Bhatnagar, Shikha Mehta and SujataMitra
2. *“Fundamentals of Multimedia”* by Ze-Nian Li & Marks S. Drew
3. *“Multimedia Information Storage and Retrieval: Techniques and Technologies”* by Philip K.C. Tse

Suggested Distribution of Marks

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

6.2 Information and Network Security

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Rationale

Today we live in a Cyber Society. In early days it was not great deal of emphasis on security as the systems were all closed. Data flow among the systems was persisting but it was not beyond the organization but was in a simple LAN. Much of the technical details like protocols used for communication etc was not known to public. But today that's not the scenario everything is public, everything is open to all. It was Internet that has changed the whole computer paradigm and brought tremendous change in the way the computers communicate with each other. This course provides an introduction to the fundamentals of network security . It is hoped that the students will have a wider perspective on security in general and better understanding of how to reduce and manage the security risks.

Detailed Contents

1. Attacks on Computers and Computer Security (10Hrs)

Introduction, The need for security, Security Approaches, Principles of Security, Types of Attacks; Attacks: A general View, Attacks: A Technical View, the practical side of attacks, Programs that attacks, Dealing with viruses, Java Security, Specific attacks.

2. CRYPTOGRAPHY CONCEPTS AND TECHNIQUES (12 Hrs)

Introduction, Plain Text and Cipher Text, Substitution Techniques: Caesar Cipher, Modified version of Caesar cipher, Mono-alphabetic Cipher, Homophonic substitution cipher, Polygram Substitution cipher, play fair cipher, hill cipher, transposition techniques, Rail Fence Technique. Simple Columnar Transposition Techniques. Encryption and Decryption: Symmetric and Asymmetric Key Cryptography. Problem of Key distribution. Diffie Hellman Key exchange Agreement / Algorithm. Man in the middle attack. Asymmetric Key. Operations: Key range and key size.

3. SYMMETRIC KEY CRYPTOGRAPHIC ALGORITHMS (8 Hrs)

Algorithm Types and Modes: Stream Cipher, Block Ciphers, Group Structures, Concepts of Confusion and Diffusion, Algorithm Modes, ECB, CBC, CFB, OFB. An overview of Symmetric Key Cryptography. Introduction to DES (Conceptual working of DES)

4. ASYMMETRIC CRYPTOGRAPHIC ALGORITHMS (10 Hrs)

An overview of Asymmetric Key Cryptography, RSA Algorithm. Comparison between Symmetric and Asymmetric Key Cryptography. Concept of: Digital Signature, Message Digest, Digital Certificate.

5. FIREWALL AND NETWORK SECURITY

(10 Hrs)

The Need for Firewall, Firewall Characteristics, Types of Firewalls, Firewall Basing, Firewall Location and configurations, Limitations of Firewall. IP Security: Introduction, IPSec overview, basic concepts, IPSec Protocols, Authentication Header and Encapsulating Security Payload, IPSec Key Management.

6. CYBER LAWS FOR INFORMATION SECURITY

(6 Hrs)

Introduction to Indian Cyber Law, Objective and scope of the IT Act 2000. Uncitral Model Law, ISP Guideline, Intellectual property issues. Overview of Intellectual property related legislation in India, patent, copyright, trademark law, law related to semiconductor layout and design.

Recommended Books

1. Cyber Law and Information Security by FaiyazAhmed, DreamTech Publication
2. Cryptography and Network Security by AtulKahate, TMH
3. Cryptography and Network Security, William Stallings, Prentice Hall
4. Network Security Essentials, William Stallings, Prentice Hall

Suggested Distribution of Marks

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

6.3.1 Advanced Java

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Object-oriented programming paradigm has become the de-facto standard for all modern programming languages. Java language has taken the world of computer programming by storm. Portability, robustness and its suitability to a wide spectrum of programming scenarios, are a few of its features attributing to its wide acceptance. Java is currently at the top of popularity index as the programming language of choice for application developers (Tiobe Index). With the acquisition of Sun Microsystems by Oracle Inc., the future of Java language looks even brighter. This course is specifically designed to make students appreciate the object-oriented programming paradigm using Java language.

Detailed Contents

1. Java Collections (8 Hrs)

Vector, Stack, Enumeration, Hashtable, BitSet, Map, List, Iterators

2. Java Database Connectivity (JDBC) (10 Hrs)

2-Tier and 3-Tier Application Design, JDBC architecture, JDBC-ODBC bridge, JDBC API, Driver Manager, Connection, Prepared Statement, Statement, Callable Statement, Result Set, Driver and Application layers, Working with Oracle and MySQL.

3. Graphical User Interface (GUI) in Java (10 Hrs)

Abstract Window Toolkit (AWT), GUI Components (Frame, Panel, Dialog, Controls, Menu), Layouts, Graphics, Graphics2D (Rectangle, Oval, Polygon, Arc, Line, Color, Font, Font Metrics), Geometry (Point, Dimension), Events (Listeners)

Java Swing: JComponent, JFrame, JPanel, JMenu, JMenuBar, JMenuItem, JPopupMenu, JButton, JButtonGroup, JRadioButton, JCheckBox, JColorChooser, JComboBox, JDesktopPane, JLayeredPane, JOptionPane, JProgressBar, JSplitPane, JTabbedPane, JTable, JTextField, JTextArea, JPasswordField, JToolBar, JToolTip, JTree

4. Java Programming for the Internet (10 Hrs)

Java Servlets, Servlet Structure, Advantages of Servlets over other server-side scripting, HTTP request-response, Servlet Life-cycle, Servlet API, Reading Form Data, Generating Server Response, Cookies, Session Tracking, Inter-servlet communication,

5. Introduction to Java Server Pages and Java Server Faces (10 Hrs)

6. Java Beans (8 Hrs)

Bean Architecture, JavaBean Event Model, Bean Properties, Inspecting and Customizing Beans, Saving and Restoring Bean Applications.

List of Practicals

- 1) Working with Java Collection
- 2) Working with JDBC (using connection, statements and resultsets)
- 3) Creating GUI applications using AWT
- 4) Creating GUI applications using Swing
- 5) Working with Graphics2D
- 6) Working with Servlets
- 7) Create web-pages using JSP/ JSF
- 8) Working with Java Beans

Recommended Books

1. *“The Java EE 6 Tutorial: Basic Concepts”* by Eric Jendroct et al, Addison Wesley
2. *“Java: How to Program”* by Deitel and Deitel, Pearson Higher Education
3. *“Java: The Complete Reference”* by Herbert Schildt, McGraw Hill

Suggested Distribution of Marks

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

6.3.2 Advanced Web Designing

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With the ever-increasing penetration and speed of Internet there is a trend shift from stand-alone applications to Rich-internet-applications (RIA). World-wide-web is becoming more and more dynamic, versatile and accessible with each passing day. Web designing encompasses many different skills and disciplines in the production and maintenance of websites. The different areas of web design include web graphics design; interface design; authoring; and search engine optimization. This course will give the students a thorough insight into various technologies, tools, practices and standards related to web-designing.

1. JQuery and AJAX

JQuery Vs JavaScript, Including JQuery in a Web Page, Anonymous Functions, Callback Functions, Selectors, Events, Traversal, JQuery Effects, Animation with JQuery, JQuery UI, Widgets and Utilities, Introduction to AJAX.

2. PHP

Overview of PHP, Identifier, Variables, Data Types, Scope of Variables, Operators, Expressions, Functions, Control Statements, Arrays, Associative Arrays, Sorting and Searching in Arrays, Strings, Regular Expressions, String Operations: Formatting, Concatenating, Splitting, Finding and Replacing Substrings; require() and include(), Object-orientation in PHP, Exception Handling, Date and Time, Image Handling

3. MySQL

Relational Database Concepts, Normalization, Database, Tables, Columns, Constraints, Primary Key, Foreign Key, Roles and Privileges, SQL: (DDL, DML and DCL statements), Accessing MySQL from PHP

4. Dynamic Webpage Creation using PHP

PHP Session Management, Cookies, User Authentication, Sending and Receiving E-mails, Dynamically Generating Images, Magic Quotes, Uploading Files

5. Software Products/ Tools for Website Development/ Deployment

Installation, Configuration and Using Apache, FTP Server, Eclipse, Dreamweaver, Filezilla, LAMP, WAMP, XAMP, Mozilla Firefox, Google Chrome

6. Content Management

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

List of Practicals

- 1) To install and configure either of LAMP/ XAMP/ WAMP
- 2) To use JQuery Selectors
- 3) To make use of JQuery UI
- 4) To demonstrate JQuery Widgets
- 5) To demonstrate AJAX
- 6) To experiment with various PHP introductory concepts like variables, functions, arrays, operators, control statements
- 7) To create and configure database, tables and users in MySQL
- 8) To write webpages using PHP to manipulate MySQL database
- 9) Install and configure Joomla
- 10) To demonstrate the website management using Joomla

Reference Books/ Online Resources

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 Distribution of Marks

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

6.3.3 Programming in C++

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Detailed Contents

- 1. C++ Basics (13 Hrs)**
Evolution of C++, applications of C++, I/O statements(cin, cout), structure of a C++ program, A simple C++ program, preprocessor directives, data types(basic, user-defined and derived), variables and constants, operators in C++(arithmetic, increment/decrement, assignment, relational, logical, conditional and bitwise), special operators(sizeof, comma and scope resolution), expressions, type casting, brief description of arrays, pointers, functions, structures and unions.
- 2. Control Structures in C++ (6 Hrs)**
Conditional statements(if, if-else, if-else-if, nested if and switch), iterative statements(for, while and do-while), break, continue, return, goto
- 3. Classes and Objects (8 Hrs)**
Defining classes, private and public members, declaring class members, objects, creating class objects, inline member functions, friend functions and friend classes, static members, constructors(default, parameterized and copy), destructors.
- 4. Overloading Member Functions (6 Hrs)**
Need of operator overloading, overloading unary operators, overloading binary operators, overloading assignment operator, function overloading, constructor overloading.
- 5. Inheritance (8 Hrs)**
Introduction to inheritance , defining derived classes, types of inheritance(single, multiple, hierarchical, multilevel and hybrid), private, public and protected data members, visibility modes(private, public and protected inheritance), constructors and destructors in inheritance, order of invocation, size of a derived class, concept of overriding, virtual base classes.
- 6. Polymorphism (5 Hrs)**
Static Vs Dynamic binding, types of polymorphism, pointers to derived classes, virtual functions, pure virtual functions, abstract base classes, virtual destructors.
- 7. Files and Streams (10 Hrs)**
Need of files, components of a file, stream classes, creation of file streams, operation on files, opening and closing a file, errors in opening a file, file modes, detecting end-of-file, I/O operations on files(character I/O and string I/O), binary files, read() and write functions, fstream class, file pointers and random access files, function manipulations of file pointers, updating files.

List of Practicals

- 1) To write, compile and execute a simple C++ program i.e. to print “ Hello World ” on the screen.
- 2) To use various data types in C++.
- 3) To use various operators in C++.
- 4) To use arrays, pointers, functions, structures and unions.
- 5) To use conditional statements.
- 6) To use iterative statements.
- 7) To use break and continue statements.
- 8) To define a simple class, creating it's objects and accessing class members.
- 9) To understand the concept of private and public members.
- 10) To use inline member function.
- 11) To use friend member functions and friend classes.
- 12) To use static members.
- 13) To use constructors(default, parameterized and copy) and destructors.
- 14) To use operator overloading(unary operators, binary operators, assignment operator, function overloading and constructor overloading)
- 15) To implement different types of inheritance.
- 16) To use protected members.
- 17) To use private, protected and public inheritance.
- 18) To use constructors and destructors in base and derived classes.
- 19) To override base class members.
- 20) To implement the concept of virtual functions.
- 21) To implement the concept of pure virtual functions and abstract base classes.
- 22) To open files using constructors and using open() function and to use close() function.
- 23) To use different file modes.
- 24) To use character and string I/O from /to files.
- 25) To update files.

Recommended Books/ Online Resources

1. *“Mastering C++”* by KR Venugopal and Rajkumar, T Ravishankar; Tata McGraw hillPublishing Co. Ltd.
2. *“Object Oriented Programming in C++”* by E. Balaguruswamy, TMH Publishing Co. Ltd.
3. *“C++ by Robert Lafore”* byGalgotia Publications Pvt. Ltd., Daryaganj
4. *“Object Oriented Programming and C++”* by R Rajaram; New Age International (P) Ltd.,Publishers
5. *“Schaum’s Outline of Programming with C++”* by John R. Hubbard, TMH

Suggested Distribution of Marks

Unit No.	Time Allotted(in Hrs.)	Marks Allotted(%)
1	13	15
2	6	10
3	8	20
4	6	10
5	8	15
6	5	10
7	10	20
Total	56	100

6.4 Major Project

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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
- 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	Very good
iii)	64 <> 50	Good
iv)	49 <> 40	Fair
v)	Less than 40	Poor

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

Important Notes

1. *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 Basics of Management

L T P
3 - 0

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 (04hrs)

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.

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. : PrenticeHall 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 &SagadevanOscar 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

6.6 Practices in Communication Skills

L T P
0 - 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 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.