STUDY AND EVALUATION SCHEME FOR DIPLOMA PROGRAMME IN COMPUTER ENGINEERING
(For J&K State)

SIXTH SEMESTER (Computer Engineering)

Sr. No.	SUBJECTS	STUDY SCHEME Hrs/Week		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**	-	**25**	-	25	100	3	-	-	100	125
6.2	*Visual Programming Using (.Net)	**4**	4	**15**	10	25	100	3	50	3	150	175
6.3	Artificial Intelligence	**3**	3	**15**	10	25	100	3	50	3	150	175
6.4	Installation, Maintenance and Troubleshooting of Computer Networks	**3**	4	**15**	10	25	100	3	50	3	150	175
6.5	Elective – II	**3**	3	**25**	-	25	100	3	-	-	100	125
6.6	Major Project Work	**-**	8	**-**	100	100	-	-	200	3	200	300
#	Student Centred Activities(SCA)	**-**	2	**-**	25	25	-	-	-	-	-	25
	Total	16	**24**	95	**155**	**250**	**500**	**-**	**350**	**-**	**850**	**1100**

Electives-II To choose one from: a) Computer Graphics b) Network Security* c) Mobile Computing

***Common with diploma programme in Information Technology**

**** Common with other diploma programmes**

 # Student Centred Activities will comprise of co–curricular activities like extension lectures, library studies, games, hobby clubs e.g. photography, painting, singing, seminars, declamation contests, educational field visits, N.C.C., NSS, Cultural Activities, Civil Defence/ Disaster Management activities etc.

6.1 BASICS OF MANAGEMENT

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RATIONALE

The diploma holders are generally expected to take up middle level managerial positions, their exposure to basic management principles is very essential. Topics like Structure of Organization, Leadership, Motivation, Ethics and Values, Customer Relationship Management (CRM), Legal Aspects of Business, Total Quality Management (TQM), Intellectual Property Rights (IPR) etc. have been included in the subject to provide elementary knowledge about these management areas.

DETAILED CONTENTS

1. Principles of Management (06 hrs)

   1.1. Introduction, definition and importance of management.

   1.2. Functions of Management
   Planning, Organizing, Staffing, Coordinating, Directing, Motivating and Controlling.

   1.3. Concept and Structure of an Organization

   Types of industrial organization
   a) Line organization
   b) Functional organization
   c) Line and Functional organization

   1.4. Hierarchical Management Structure
   Top, middle and lower level management

   1.5. Departmentalization
   Introduction and its advantages.

2. Work Culture (06 hrs)

   2.1. Introduction and importance of Healthy Work Culture in organization
   2.2. Components of Culture
   2.3. Importance of attitude, values and behaviour
   Behavioural Science – Individual and group behaviour
   2.4. Professional ethics – Concept and need of Professional Ethics

3. Leadership and Motivation (06 hrs)

   3.1. Leadership

   a) Definition and Need of Leadership
   b) Qualities of a good leader
   c) Manager vs. leader

3.2. Motivation

a) Definition and characteristics of motivation
b) Factors affecting motivation
c) Maslow's Need Hierarchy Theory of Motivation

3.3. Job Satisfaction

4. Legal Aspects of Business: Introduction and Need (06 hrs)

4.1. Labour Welfare Schemes

a) Wage payment : Definition and types
b) Incentives: Definition, need and types

4.2. Factory Act 1948

4.3. Minimum Wages Act 1948

5. Management Scope in different Areas (12 hrs)

5.1. Human Resource Development

a) Introduction and objective
b) Manpower Planning, recruitment and selection
c) Performance appraisal methods

5.2. Material and Store Management

a) Introduction, functions and objectives of material management
b) Purchasing: definition and procedure
c) Just in time (JIT)

5.3. Marketing and Sales

a) Introduction, importance and its functions
b) Difference between marketing and selling
c) Advertisement- print media and electronic media
d) Market-Survey and Sales promotion.

5.4. Financial Management – Introduction

a) Concept of NPV, IRR, Cost-benefit analysis
b) Elementary knowledge of Income Tax, Sale Tax, Excise duty, Custom duty, Provident Fund

5.5 Maintenance Management

a) Concept

b) Preventive Maintenance

6. Miscellaneous Topics (12 hrs)

6.1. Customer Relationship Management (CRM)

a) Definition and Need
b) Types of CRM
c) Customer satisfaction

6.2. Total Quality Management (TQM)

a) Inspection and Quality Control
b) Concept of Quality Assurance
c) TQM

6.3. Intellectual Property Rights (IPR)

a) Introduction, definition and its importance
b) Infringements related to patents, copyright, trade mark

INSTRUCTIONAL STRATEGY

It is observed that the diploma holders generally take up middle level managerial positions, therefore, their exposure to basic management principles is very essential. Accordingly students may be given conceptual understanding of different functions related to management. Some of the topics may be taught using question answer, assignment or seminar method. 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 organizations. 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 Shyamal Bannerjee: 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 Pvt Limited , 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 , McGraw Hill Book Company, New Delhi.
7. Marketing Management by Philip Kotler, Prentice Hall of India, New Delhi
8. Total Quality Management by 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, Maruti Udyog Ltd.
11. Customer Relationship Management: A step-by-step approach, Mohamed & Sagadevan Oscar Publication, Delhi
12. Customer Relation Management, Sugandhi RK, Oscar Publication, Delhi.

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER

Sr No	Topic No.	Time Allotted (hrs)	Marks Allotted (%)
1.	Principles of Management	06	15
2.	Work Culture	06	10
3.	Leadership and Motivation	06	15
4.	Legal Aspects of Business: Introduction and Need	06	10
5.	Management Scope in different Areas	12	25
6.	Miscellaneous Topics	12	25
	Total	**48**	**100**

6.2 VISUAL PROGRAMMING USING (.NET)

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RATIONALE

VB .NET is the visual programming technique based on Object Oriented Concepts. This subject will give the students an indepth understanding the features of VB .NET. The practical exercise of VB.NET during the course of study will reinforce the understanding of the subject.

DETAILED CONTENTS

1 Introduction to Microsoft. Net Framework (06 hrs)

Introduction to client server architecture, Introduction to .NET framework, feature of .Net framework, architecture and component of .Net, elements of .Net. Common Language Runtime (CLR), Common Type System (CTS), Common Language Specifications (CLS), Microsoft Intermediate Language (MSIL), Just In Time Compiler.

2 VB.NET Integrated Development Environment (04 hrs)

VB.NET Development Environment, Creating Applications, Building Projects Using simple components, Running VB .NET applications.

3 VB.NET Basics (14 hrs)

Visual Basic .NET Programming Language-Variables & Data Type, Strings, Arithmetic Operators, Building the project, Common Control Controls, Functions Call and Arguments, Select Case, Loops, Nesting of Loops, Decision Structures, Error handling using Try.. Catch Block

4 Windows Applications (14 hrs)

Developing Windows Applications: Introduction to Windows Applications, Using Windows Forms, Visual Inheritance, Windows Forms, Text Boxes, Buttons, Labels, Check Boxes, and Radio Buttons, List Boxes, Combo Boxes, Picture Boxes, Scrollbars, Splitters, Timer, Menus, Built-in Dialogs, Image List, Tree Views, List Views, Toolbars, Status Bar and Progress bars.

5 Database Connectivity (08 hrs)

Database Programming with ADO.NET: ADO.NET Object Model, Database: Connections, Data adapters and datasets, Data Reader, Connection to database with server explorer, Multiple Table Connection, Data binding with controls like Text Boxes, List Boxes, Data grid etc. Navigating data source, Data Grid View, Data form wizard, Data validation, Connection Objects, Command Objects, Data Adapters, Dataset Class.

6 Crystal Reports (06 hrs)

Crystal reports, Connection to Database, Table, Queries, Building Report, Modifying Report, Formatting Fields and Object.

7. Engineering Web Services (12 hrs)

Web services, creating web services, consuming web services Web forms, ASP.NET, Request, Response, Server objects. Creating web reports using ASP.NET, using ADO.NET with SQL Server and System .XML

LIST OF PRACTICALS

1. Exercise on opening projects.
2. Exercise on all the menus of opening window of VB .NET
3. Exercise on all basic Controls.
4. Exercise on designing form.
5. Exercise on Database Connectivity.
6. Exercise on Creating Crystal reports.
7. Creating Web forms using ASP.NET
8. Creating reports on Web using ASP.NET

RECOMMENDED BOOKS

1. Visual Basic.NET by C Muthu, Tata McGraw Hill Education Pvt Ltd , New Delhi
2. Visual Basic.NET Programming Black Book, W/CD, by Steven Holzner, Wiley India Pvt Ltd. Daryaganj, New Delhi
3. Applications of .NET Technologies, by ISRD Group, Tata McGraw Hill Education Pvt Ltd , New Delhi
4. Programming Microsoft visual Basic .NET-Francesco Balena
5. The complete Reference-Visual Basic. NET- Jefrey R. Shapiro
6. Murach's VB .NET database programming with ADO.NET-Anne Prince and Doug Lowe

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER

Sr No	Topic	Time Allotted (Hrs)	Marks Allotted (%)
1	Introduction to Microsoft. Net Frame work	6	10
2	VB.NET Integrated Development Environment	4	06
3	VB.NET Basics	14	20
4	Windows Applications	14	20
5	Database Connectivity	8	14
6	Crystal Reports	6	10
7.	Engineering Web Services	12	20
Total		**64**	**100**

6.3 ARTIFICIAL INTELLIGENCE

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3 - 3

RATIONALE

The objective of this course is to introduce the concept of Artificial Intelligence (AI) and its application in various areas including game playing, expert systems and natural language understanding. The students will be aware of the techniques and methods involved in developing various applications in these areas. The AI languages PROLOG is also introduced to enable students to develop simple AI applications.

DETAILED CONTENTS

1. Introduction (06 hrs)

   History, Definition, issues and applications of Artificial intelligence in games, expert systems and natural language understanding.

2. Problem Solving Concepts (10 hrs)

   State space representation, Importance of search, Heuristic Search techniques – Hill climbing and best first search, Minimax Search, examples using these techniques.

3. Expert Systems (08 hrs)

   Definition and applications, issues, characteristics, Architecture of typical expert system, building an expert system, role of expert knowledge engineer and the user.

4. Knowledge Representation (10 hrs)

   Information and knowledge, issues in knowledge representation, knowledge representation methods – proportional and first order, Predicate logic, Semantic networks.

5. State of the art in Artificial Intelligence (06 hrs)

   Current developments, examples of Robots developed using artificial intelligence techniques, Distributed Artificial Intelligence.

6. Introduction to Prolog (08 hrs)

   Structure of a Prolog Program, Data Types, various statements of Prolog for representing rules, facts and goals, examples of prolog programs using the above statements.

INSTRUCTIONAL STRATEGY.

This subject is research oriented and involves deep understanding of the concepts. The teacher is expected to frame assignments on various topics to test their understanding.

LIST OF PRACTICALS

1. To implement breadth first search in graph.

2. To implement depth first search in graph
3. To implement simple game (TIC-TAC-TOE) using Minmax technique.
4. Introduction of programming in Prolog.
5. To implement predicate logic using Prolog.
6. To use representation of rules and logic using Prolog.
7. To compare various expert systems available online

RECEOMMENDED BOOKS

1. Principles of Soft Computing, 2 edition, W/CD by S.N Sivanandam, Wiley India Pvt Ltd. Daryaganj, New Delhi
2. Artificial Intelligence by Elain Rich and Kevin Knight, Tata McGraw Hill Publishing Co, New Delhi
3. Artificial Intelligence and Expert System by Patterson,
4. Artificial Intelligence Techniques by Balaguruswami,
5. Artificial Intelligence and Expert System by Janaki Raman, MacMillan, New Delhi, 2001
6. Artificial Intelligence and Expert System by DW Patterson, Prentice Hall, 1998
7. Artificial Intelligence by Rich and Knight, Tata McGraw Hill, New Delhi, 1998
8. Introduction to Artificial Intelligence by E Chamaik, Addison Wesley, California, 2000.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1.	6	15
2.	10	20
3.	8	15
4.	10	20
5.	6	15
6.	8	15
Total	**48**	**100**

6.4 INSTALLATION, MAINTENANCE AND TROUBLESHOOTING OF COMPUTER NETWORKS

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RATIONALE

This subject gives the knowledge and competency to diagnose the faults for trouble shooting for systematic repair and maintenance of computers and computer peripherals.

DETAILED CONTENTS

1. Installation & Servicing (12 hrs)

   Environmental requirements for computer system and peripherals, Site preparation and design of computer room, Installation of computer system and peripherals. Preventive and corrective maintainance, concept of grounding shielding, Power supply requirements and considerations for computer and its peripherals.
   Testing and specifications of computer system, Repair and replacement of parts of computer, understanding PC specifications.

2. Networking (10 hrs)

   LAN failure, cabling connectivity, hub, bridge, switches, managing network services TCP/IP, Address management, DNS, Domain, Work Group

3. Trouble shooting of computers, component and peripherals (12 hrs)

   Managing Network Services: TCP/IP, address Management, DNS, DOMAIN, Workgroup (Create workgroup), Network addresses Management of Gateway, Map Network drive, client-server technology, Network Neighborhood. Installation and troubleshooting of Routers, Access Point, LAN Cards Input/output channels, Hub, Switches,

4. Sharing of devices on Networks, Installation and management of network sharing tools i.e squidpoxy, managing IP addresses, 2-Tier, 3-Tier Network Architecture (6 hrs)

5. Establishment of LAN/WAN: (8 hrs)

   Sub-netting of IP address, Access Point Configuration, Router Configuration, Configuration of manageable switch

LIST OF PRACTICALS

1. Installation of modems and startup a new internet connection in a standalone machine.
2. Study of troubleshooting and maintenance of computer systems
3. Installation and study of ISDN, PSTN lines, V-sat, RF-link

4. Study of BNC, RJ-45 connectors
5. Study of cables and their connecting structure (i.e simple or cross cable (color coding of cables)
6. Study and management of Network resources,
7. Study and Installation of Firewall in your system
8. Sharing of resources on LAN

INSTRUCTIONAL STRATEGY

While taking the theory classes, the teachers should lay emphasis on the practical aspects of trouble shooting and maintenance. As the given subject is based on hardware aspects of computer system, it needs lot of technical skills to study it thoroughly, field visit to maintenance repair and assembly centres will be beneficial to the students.

RECOMMENDED BOOKS

1. PC Upgrading , Maintenance and Troubleshooting Guide by SK Chauhan, SK Kataria and Sons, New Delhi
2. Troubleshooting and Maintenance of electronic Equipment by K. Sudeep Singh: SK Kataria and Sons, New Delhi
3. Troubleshooting Computer System by Robert C Benner
4. IBM PC and Clones Govinda Rajalu
5. Computer Maintenance and Repair – Scholi Muller
6. Upgrading your PC by Mark Minersi

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	12	25
2-4	28	60
5	8	15
Total	**48**	**100**

ELECTIVE II
6.5.1 COMPUTER GRAPHICS

L	T	P
3	-	3

RATIONALE

This subject will enable the students to have awareness about fundamental graphics which can be generated through computers using programming language C. He will be able to make picture and introduce motion in them using basic transformation.

DETAILED CONTENTS

1. Graphic Systems (06 hrs)

   Display devices, display processors graphics software coordinate representation, graphics functions and standards.

2. Scan conversion and Output Primitives (12 hrs)

   Scan converting the point, Scan converting the straight line - Bresenham's line algorithm, Scan converting a circle - Defining a circle, Bresenham's circle algorithm, Region filling - introduction, flood filling, boundary filling, Side effects of scan conversion.

   Graphic primitives in C, Point plotting, line drawing algorithms – DDA algorithms, Bresenham's line algorithms, circle-generating algorithms

3. Two-Dimensional Transformations (08 hrs)

   Basic transformations-translation, scaling, rotation, matrix representations and homogeneous coordinates, composite transformations – scaling relative to a fixed pivot, rotation about a fixed pivot point, general transformation equations, other transformation – reflection and shearing.

4. Windowing and Clipping Techniques (08 hrs)

   Windowing concepts, clipping algorithms, area clipping, line clipping, polygon clippings, text clipping, blanking, window to-viewpoint transformation, Cohen Sutherland clipping algorithm.

5. Three Dimensional Graphics (08 hrs)

   Three dimensional transformation, wire frame model, hidden line and hidden surface elimination (z-buffer algorithm), curve fitting and tracing

6. Perspective and Transformations (06 hrs)

   Perspective and Parallel transformations, vanishing points, perspective anomalies

LIST OF PRACTICALS

Write programs for following:

1. To draw a line
2. To move a character about a line
3. To move two characters in. opposite direction.
4. To draw a circle
5. To move a character along circumference
6. To move along radius.
7. To use 2-D translation technique,
8. To use 2-D scaling technique
9. To use 2-D rotation technique.
10. To use 2-D reflection technique

INSTRUCTIONAL STRATEGY

As the subject deals with Core Graphics Packages and techniques with vast applications in Medical Science, Animation Software, Image Processing, Compression techniques. Teacher is required to expose basic idea of graphics and implementation of various algorithms in C Programming language. The teacher should make the students to write the algorithm first and then based on those algorithms make them implement.

LIST OF RECOMMENDED BOOKS

1. Computer Graphics with Virtual Reality Systems by Rajesh K. Maurya, Wiley India Pvt Ltd. Daryaganj, New Delhi
2. Computer Graphics by Donald Hearn and M Pauline Baker
3. Theory and problems of Computer Graphics by Roy A Plastock and Gordon Kalley. McGraw Hill
4. Publishers, Schaum's Outline series.
5. Interactive Computer Graphics by Harengton
6. Computer Graphics Programming Approach by Steven Harrington
7. Principles of Interactive Computer Graphics by WM Newman and RF Spraull
8. Computer Graphics for Engineers by A Rajaraman, Narosa Publishing House Pvt Ltd Daryaganj, New Delhi 110002

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER

Sr No	Topic No.	Time Allotted (hrs)	Marks Allotted (%)
1.	Graphic Systems	6	10
2.	Scan conversion and Output	12	25
3.	Two dimentional Transformation	8	20
4.	Windowing and Clipping Techniques	8	20
5.	Three Dimentional Graphics	8	15
6.	Perspective and Transformation	6	10
	Total	**48**	**100**

ELECTIVE II
6.5.2 NETWORK SECURITY

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RATIONALE

This course has been designed by keeping in view the basic computer users and information system managers. The concepts needed to read through the ripe in the market place and understanding risks and how to deal with them. It is hoped that the student will have a wider perspective on security in general and better understanding of how to reduce and manage the security risks.

DETAILED CONTENTS

1. Introduction (6 hrs)

   Need for securing a network; attacks from within and external, introduction to cyber crime, cyber law-Indian Perspective (IT Act 2000), cyber ethics, ethical hacking. What is hacking. attacker, phreaker etc.

2. Securing Data over Internet (6 hrs)

   Introduction to basic encryption and decryption, concept of symmetric and asymmetric key cryptography, overview of DES, RSA and PGP. Introduction to Hashing: MD5, SSL, SSH, HTTPS, Digital Signatures.

3. Virus, Worms and Trojans (8 hrs)

   Definitions, preventive measures – access central, checksum verification, process neutering, virus scanners, neuristic scanners, application level virus scanners, deploying virus protection.

4. Computer Network Attacks: (6 hrs)

   Active Attacks, Passive Attacks, Stealing Passwords, Social Engineering, Bugs and Backdoors, Authentication Failures, Protocol Failures, Information Leakage, Denial-of-Service Attacks, Botnets, Phishing Attacks

5. Firewalls (4hrs)

   Definition and types of firewalls, defining access control policies, address translation, firewall logging, firewall deployment

6. Intrusion Detection System (IDS) (3 hrs)

   Introduction; IDS limitations – teardrop attacks, counter measures; Host based IDS set up

7. Virtual Private Network (VPN) (6 hrs)

   Basics, setting of VPN, VPN diagram, configuration of required objects, exchanging keys, modifying security policy

8. Disaster and Recovery (6 hrs)

   Disaster categories; network disasters – cabling, topology, single point of failure, save configuration files; server disasters – UPS, RAID, Clustering, Backups, server recovery

9. OS Vulnerabilities (3 hrs)
   Study of Linux and Windows OS Vulnerabilities. Importance of Original Software, (Due to patches for Loopholes, Security Vulnerabilities), Licencing, Piracy

Note: A visit to organizations must be organized for the demonstration about network security and exposure to available software

INSTRUCTIONAL STRATEGY

Since the facilities are not available in the polytechnic, students need exposure to various security systems and software available in some organisations, universities and engineering colleges. For this, visits may be organized for students. The teachers should also be exposed in this area. Some practicals can be conducted in the laboratory.

LIST OF PRACTICALS

1. Installation and comparison of various anti virus software
2. Installation and study of various parameters of firewall.
3. Writing program in C to Encrypt/Decrypt using XOR key.
4. Study of VPN.
5. Study of various hacking tools.
6. Practical applications of digital signature.

RECOMMENDED BOOKS

1. Cryptography and Network Security by Forouzon, Tata Mc Graw Hill Education Pvt Ltd, New Delhi
2. Cryptography and Network Security by Atul Kahate, Tata Mc Graw Hill Education Pvt Ltd, New Delhi
3. Cryptography and Network Security by Padmanabham, Wiley India Pvt Ltd. Daryaganj, New Delhi
4. Network Security by Eric Cole, Bible, Wiley- India Pvt Ltd. Daryaganj, New Delhi
5. Network security by William Stalling

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER

Sr No	Topic No.	Time Allotted (hrs)	Marks Allotted (%)
1.	Introduction	6	10
2.	Securing Data over Internet	6	10
3.	Virus, Worms and Trojans	8	15
4.	Computer Network Attacks	6	15
5.	Firewalls	4	10
6.	Intrusion Detection System (IDS)	3	10
7	Virtual Private Network (VPN)	6	10
8	Disaster and Recovery	6	10
9	OS Vulnerabilities	3	10
	Total	**48**	**100**

ELECTIVE II
6.5.3 MOBILE COMPUTING

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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 anytime. This course provides an introduction to the fundamentals of mobile computing. A background in computer networks and wireless communication is required.

DETAILED CONTENTS

1. Introduction (04 hrs)

   Evolution of wireless networks, wireline and wireless data networks, advantages of mobile computing, networks, middleware and gateways, application, services and security

2. Mobile Computing Architecture (05 hrs)

   3-tier architecture, design considerations for mobile computing, mobile computing through internet

3. Cellular Networks (06 hrs)

   GSM principles and architecture, GPRS architecture, EDGE, 3G, CDMA Technologies

4. Wireless System and Standards (06 hrs)

   Bluetooth, RFID, IEEE 802.11.a/b/g/n, Mobile IP, IPV6, JAVA Card, Features of WIMAX

5. Wireless Application Protocol (WAP) (06 hrs)

   WAP, MMS, GPRS Applications

6. Operating Systems for Mobile Devices (05 hrs)

   Design constraints in applications for handheld devices, palm and symbian OS features and architecture, introduction to J2ME technology

INSTRUCTIONAL STRATEGIES

Since the subject is comparatively new and the students are required some background of other subjects like computer networks and wireless communication. So while explaining of concepts, real-time examples and case studies may be used. In addition, institute may arrange visits to places

LIST OF PRACTICALS

1. Visit to institutes to see Wi-Fi, WiMax setup

2. Visit to service providers like: BSNL, AirTel etc. to see GSM, GPRS and 3G technologies

3. Developing applications for hand-held mobile devices using (a) WAP/WML (b) J2ME/ J2EE

4. Installation of OS (palm, symbian etc.)

RECOMMENDED BOOKS

1. Mobile Computing : Technology, Applications and Service Creation by Asoke K. Talukdar and Roopa R. Yavagal, Tata McGraw Hill Education Pvt Ltd , New Delhi
2. Handbook of Wireless Networks and Mobile Computing by Stojmenovic, Wiley India Pvt Ltd. Daryaganj, New Delhi
3. Wireless Communication: Principles and Practice by Theodok S. Rappaport, Pearson Education Asia, 2nd Edition.
4. Principles of Mobile Computing by Owe Hansman, Lothar Merk, Martin S Nicklous and Thomas Stober, Springel-Verlag, 2nd Edition, 2003, New Delhi.

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER

Sr No	Topic	Time Allotted (Hrs)	Marks Allotted (%)
1	Introduction	04	10
2	Mobile Computing Architecture	05	15
3	Cellular Networks	06	20
4	Wireless System and Standards	06	25
5	Wireless Application Protocol (WAP)	06	15
6	Operating Systems for Mobile Devices	05	15
	Total	**32**	**100**

6.6 MAJOR PROJECT WORK

L	T	P
-	-	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:

- Installation of computer systems, peripherals and software
- Programming customer based applications
- Web page designing including database connectivity
- Database applications
- Networking (Cabling, Hubs, Switch etc)
- Software Development
- Fabrication of components/equipment (computer related components)
- Fault-diagnosis and rectification of computer systems and peripherals
- Bringing improvements in the existing systems/equipment
- Projects related to Multimedia
- Projects related to Computer Graphics
- Web Hosting
- Configuration of Network Operating System(Windows, Linux)

- Configuration of servers (Proxy, DNS etc)

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

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

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

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

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

Important Notes

1. **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 another 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.