CBT CURRICULUM FOR
NVQ LEVEL 5 & 6

IN

INFORMATION AND COMMUNICATION TECHNOLOGY

(CBT Curriculum Code: K72C001)

Developed by

Technical Education Development Project

Ministry of Vocational & Technical Training

Edited by

University of Vocational Technology

No.100, Kandawala Road,

Ratmalana

CBT CURRICULUM
FOR
INFORMATION AND COMMUNICATION TECHNOLOGY
NVQ LEVEL 5
(CBT Curriculum Code: K72C001)

List of Modules	Code No.	Page
Technical Modules		
1. Database Systems 1	K72C001M01	12
2. Database Systems 11	K72C001M02	15
3. Graphic Design	K72C001M03	18
4. Software Programming	K72C001M04	21
5. Software Testing	K72C001M05	24
6. System Analysis and Design	K72C001M06	27
7. Web Programming	K72C001M07	30
8. Local Area Networks (LAN)	K72C001M08	33
Employability Modules		
1. Manage workplace information	EMPM01	38
2. Manage workplace communication	EMPM02	41
3. Planning and Scheduling work at workplace	EMPM03	44

Note: NVQ Level 5 exit in Information and Communication Technology area Is recommended only for further learning.

CBT CURRICULUM
FOR
INFORMATION AND COMMUNICATION TECHNOLOGY
NVQ LEVEL 6
(CBT Curriculum Code: K72C100)

Prerequisite: NVQ Level 5 ICT Diploma or equivalent

Elective Group A	**Code No.**	**Page**
Multimedia and Web Technology		
9. Multimedia Design	K72C001M09	47
10. Multimedia Production	K72C001M10	50
11. Design and Develop Web based Information Systems	K72C001M11	53
Elective Group B		
Software Engineering and Database Technology		
12. Software Change Management	K72C001M12	56
13. Configure middleware, application server and third – party software components	K72C001M13	59
14. Test integration of software application	K72C001M14	62
Elective Group C		
Network and Hardware Technology		
15. Data communications, Computer Systems and Networking	K72C001M15	64
16. Install and Configure Local and Wide Area Network Systems	K72C001M16	67
17. User training and maintenance of the Local and Wide Area Networks	K72C001M17	72

Employability Modules

1. Problem Solving and Decision Making	EMPM04	76
2. Teamwork and Leadership	EMPM05	79
3. Creating & Maintaining a learning Culture at work place	EMPM06	82

MODULE STRUCTURE

NVQ Level 5

Semester 1

Module Code	Module	Type	Notional hours	Lectures/ Tutorials	Practicals/Design/ site visits	Self-study
K72C001M01	Database Systems 1	C	125	80	25	20
K72C001M03	Graphic Design	C	250	130	90	30
K72C001M04	Software Programming	C	250	80	100	70
K72C001M06	System Analysis and Design	C	200	130	55	15
EMPM01	Manage workplace information	C	75	30	25	20
EMPM02	Manage workplace communication	C	50	20	20	10
Total			950	490	320	140

Semester 2

Module Code	Module	Type	Notional hours	Lectures/ Tutorials	Practicals/Design/ site visits	Self-study
K72C001M02	Database Systems 11	C	175	60	80	35
K72C001M05	Software Testing	C	250	50	150	50
K72C001M07	Web Programming	C	300	100	150	50
K72C001M08	Local Area Networks (LAN)	C	200	75	100	25
EMPM03	Planning and scheduling work at workplace	C	75	30	25	20
Total			1000	270	545	185

C – Compulsory
E – Elective

NVQ Level 6 Qualification

Elective Group A

Multimedia and Web Technology

Semester1

Module Code	Module	Type	Notional hours	Lectures/ Tutorials	Practicals/Design/ site visits	Self-study
K72C001M09	Multimedia Design	C	350	150	150	50
K72C001M10	Multimedia Production 1	C	200	75	75	50
EMPM04	Problem Solving and Decision Making	C	50	20	20	10
EMPM05	Teamwork and Leadership	C	50	20	20	10
Total			650	265	265	120

Semester 2

Module Code	Module	Type	Notional hours	Lectures/ Tutorials	Practicals/Design/ site visits	Self-study
K72C001M10	Multimedia Production 11	C	150	50	75	25
K72C001M11	Design and Develop Web based Information Systems	C	500	150	250	100
EMPM06	Creating & Maintaining a learning culture at work place	C	50	20	20	10
Total			700	220	345	135

C – Compulsory
E - Elective

NVQ Level 6 Qualification
Elective Group B

Software Engineering and Database Technology

Semester1

Module Code	Module	Type	Notional hours	Lectures/ Tutorials	Practicals/Design/ site visits	Self-study
K72C001M12	Software Change Management	C	450	50	350	50
K72C001M13	Configure middleware, application server and third – party software components 1	C	200	100	75	25
EMPM04	Problem Solving and Decision Making	C	50	20	20	10
EMPM05	Teamwork and Leadership	C	50	20	20	10
Total			750	190	465	95

Semester 2

Module Code	Module	Type	Notional hours	Lectures/ Tutorials	Practicals/Design/ site visits	Self-study
K72C001M13	Configure middleware, application server and third – party software components 11	C	350	25	250	75
K72C001M14	Test integration of software application	C	350	75	200	75
EMPM06	Creating & Maintaining a learning culture at work place	C	50	20	20	10
Total			750	120	470	160

C – Compulsory
E - Elective

NVQ Level 6 Qualification
Elective Group C

Network and Hardware Technology

Semester1

Module Code	Module	Type	Notional hours	Lectures/ Tutorials	Practicals/Design/ site visits	Self-study
K72C001M15	Data communications, Computer Systems and Networking	C	400	200	150	50
K72C001M16	Install and Configure Local and Wide Area Network Systems 1	C	250	150	75	25
EMPM04	Problem Solving and Decision Making	C	50	20	20	10
EMPM05	Teamwork and Leadership	C	50	20	20	10
Total			750	390	265	95

Semester 2

Module Code	Module	Type	Notional hours	Lectures/ Tutorials	Practicals/Design/ site visits	Self-study
K72C001M16	Install and Configure Local and Wide Area Network Systems 11	C	300	50	200	50
K72C001M17	User training and maintenance of the Local and Wide Area Networks	C	400	150	200	50
EMPM06	Creating & Maintaining a learning culture at work place	C	50	20	20	10
Total			750	220	420	110

C – Compulsory
E - Elective

MAPPING OF COMPETENCY UNITS & CURRICULUM MODULES

NVQ Level 5

Semester 1

Module Code	Module	Competency Unit/s related
K72C001M01	Database Systems 1	K72T001U01,U02
K72C001M03	Graphic Design	K72T001U03,U04,U05,U06
K72C001M04	Software Programming	K72T001U07
K72C001M06	System Analysis and Design	K72T001U09,U10
EMPM01	Manage workplace information	EMPU01
EMPM02	Manage workplace communication	EMPU02

NVQ Level 5

Semester 2

Module Code	Module	Competency Unit/s related
K72C001M02	Database Systems 11	K72T001U01,U02
K72C001M05	Software Testing	K72T001U08
K72C001M07	Web Programming	K72T001U11
K72C001M08	Local Area Networks (LAN)	K72T001U12
EMPM03	Planning and Scheduling work at workplace	EMPU03

NVQ Level 6

Elective Group A

Multimedia and Web Technology

Semester 1

Module Code	Module	Competency Unit/s related
K72C001M09	Multimedia Design	K72T001U13
K72C001M10	Multimedia Production 1	K72T001U14
EMPM04	Problem Solving and Decision Making	EMPU04
EMPM05	Teamwork and Leadership	EMPU05

NVQ Level 6

Semester 2

Module Code	Module	Competency Unit/s related
K72C001M10	Multimedia Production 11	K72T001U14
K72C001M11	Design and Develop Web based Information Systems	K72T001U15
EMPM06	Creating & Maintaining a learning culture at work place	EMPU06

NVQ Level 6

Elective Group B

Software Engineering and Database Technology

Semester 1

Module Code	Module	Competency Unit/s related
K72C001M12	Software Change Management	K72T001U16
K72C001M13	Configure middleware, application server and third – party software components 1	K72T001U17
EMPM04	Problem Solving and Decision Making	EMPU04
EMPM05	Teamwork and Leadership	EMPU05

NVQ Level 6

Semester 2

Module Code	Module	Competency Unit/s related
K72C001M13	Configure middleware, application server and third – party software components	K72T001U17
K72C001M14	Test integration of software application	K72T001U18
EMPM06	Creating & Maintaining a learning culture at work place	EMPU06

NVQ Level 6

Elective Group C

Network and Hardware Technology

Semester 1

Module Code	Module	Competency Unit/s related
K72C001M15	Data communications, Computer Systems and Networking	K72T001U19
K72C001M16	Install and Configure Local and Wide Area Network Systems 1	K72T001U20
EMPM04	Problem Solving and Decision Making	EMPU04
EMPM05	Teamwork and Leadership	EMPU05

NVQ Level 6

Semester 2

Module Code	Module	Competency Unit/s related
K72C001M16	Install and Configure Local and Wide Area Network Systems 11	K72T001U20
K72C001M17	User training and maintenance of the Local and Wide Area Networks	K72T001U21
EMPM06	Creating & Maintaining a learning culture at work place	EMPU06

MODULE M01

Module Title	**Database Systems I**
Module Code	**K72C001M01**
Module Type	**Compulsory**
Related Unit/s	**K72T001U01, 02**
Pre-Requisites	**NVQ 3, 4 ICT Qualification**
Module Aims	**To design, implement and manipulate a database**.
Learning Outcomes	1. After completion of this module, the trainee will be able to, • Explain the basic concepts of DBMS • Explain database architecture & modeling • Design Entity Relationship models. • Use normalization process • Design a database • Manipulate data using SQL. • Manipulate data using relational algebra. • Implement a database using suitable DBMS
Learning Content / Topics	1. Introduction to DBMS 1.1. The evolution of database technology 1.2. Characteristics of the database approach 1.3. Components of a DBMS 1.4. Advantages of using the DBMS approach 2. Database architecture and modeling 2.1. Three-Schema architecture 2.2. Categories of data models 3. Database design process 3.1 Database system development life cycle 3.2 Database design stages 4. Relational Data model

	4.1 Relational Model terminology 4.2 Keys 4.3 Constraints 4.4 Relational algebra 5. Entity-Relationship model 5.1 ER concept & terminology 5.2 Entities, Relationship & Attributes 5.3 ER Diagrams 5.4 Mapping conceptual model in to relational schema 5.5 Introduction to EER modeling 6. Data Normalization process and the normal forms 6.1. Introduction to data normalization 6.2. 1st Normal Form (1st NF) 6.3 2nd Normal Form (2nd NF) 6.3. 3rd Normal Form (3rd NF) 7. Data manipulation using SQL 7.1. Introduction to SQL 7.2. DDL 7.3. DML 7.4. Basic queries in SQL 7.5. Insert, Delete, Update statements in SQL 7.6. Create Tables
Resources: Equipment, Tools & Materials	a. Software - VISIO, My SQL, SQL Server, Freeware, Oracle(optional), CASE TOOLS , UML Hardware – Client-server system with network environment
Prescribed Texts	• **Fundamentals of Database Systems** by R. Elmasri and S. B. Navathe, 4th Edition, ISBN-81-7758-476-6 , Pearson Education in South Asia 2006 or new edition. • **Database Management and Design** by G.W.Hansen and J.V. Hansen , 2nd Edition , ISBN-81-203-1465-4,Prentice-Hall of India ,

<table>
<tr><td></td><td colspan="3">Eastern Economy Edition, 2005 or new edition.
• Database Management Systems
by R. Panneerselvam, ISBN-81-203-2028-X,
Prentice-Hall of India, 2006 or new edition.</td></tr>
<tr><td>References</td><td colspan="3"><u>www.microsoft.com</u>, SQL help, www.mysql.com</td></tr>
<tr><td>Recommended Teaching Learning Activities</td><td colspan="3">• Lecture discussions.
• Demonstrations
• Case studies
• Internet Tutorials
• Hands on Practical / Lab Assignments
• Projects
• Presentations</td></tr>
<tr><td rowspan="4">Assessment and Weighting</td><td>Type</td><td>Topic / Activity</td><td>Weighting</td></tr>
<tr><td>Written tests</td><td>Business case with normalization and database design(ER, DFD)</td><td>40%</td></tr>
<tr><td>Practical tests</td><td>Create database and relationships for a given business case</td><td>20%</td></tr>
<tr><td>Individual Project & Presentation</td><td>Design and implement small database solution for real business scenario</td><td>40%</td></tr>
<tr><td>Duration (Nominal ECTS hours)</td><td colspan="3">125Hrs</td></tr>
</table>

MODULE NO 02

Module Title	**Database Systems II**
Module Code	**K72C001M02**
Module Type	**Compulsory**
Related Unit/s	**K72T001U01**
Pre-Requisites	**Database Systems 1**
Module AIM	• **Identify database requirements** • **Identify system requirements** • **Perform the installation** • **Implement the database** • **Configure database and prepare technical documentation**
Learning Outcomes	The student shall be able to ▪ Design advanced database queries ▪ Design a database for given requirement ▪ Perform database maintenance and troubleshooting. o Handle performance issues o Explain data recovery and backup procedure ▪ Create user accounts security levels ▪ Design hardware and operating software requirements for a given database ▪ Install a database in a given environment ▪ Configure database and install application packages
Learning Content / Topics	1. Physical database design 8.1 File structures 8.2 Storage devices 2. Advanced Databases Concepts(Some parts may cover in M01) 2.1. Explain Database Concepts 3. Data manipulation with SQL 3.1. More complex SQL queries (eg. Nested/Sub Queries) 3.2. Aggregate queries with groups 3.3. Views (Virtual Tables) in SQL 3.4. Create Indexes 3.5. Create Relationship and referential integrity 4. Programming Database Applications 4.1. Create procedures and functions 4.2. Database Triggers 4.3. Advanced queries (eg. Cursors) 4.4. Perform Error Handling 4.5. Introduction to Transaction management 4.6. Database connectivity (ADO, ODBC , JDBC) 5. Database Administration 5.1. Implement Server Installation 5.2. Implement Client Installation 5.3. Create Users and Authorization 5.4. Database Backup and backup methods 5.5. Scheduling jobs

	6) Database administration procedures (practical aspects to be covered in the industry) 5.1. Analyze client support issues 5.2. Advice and train clients 5.3. Accommodate change requests 5.4. Identify and resolve database performance problems 5.5. Monitor and administer system and database security 5.6. Prepare technical documents and user manuals
Resources: Equipment, Tools & Material	• Personal computer / computers with standard operating system • Network server / servers capable of running database management system • Software CDs for the database management system. (Eg. MySQL, SQL Server 2008, ORACLE for enterprise Linux, Visual Studio) • Relevant operating system installation CDs • A network setup and a connection • Relevant documentation such as user manuals, installation manuals • Requirement specifications and design documentation • Application software
Prescribed Texts	• **Fundamentals of Database Systems** by R. Elmasri and S. B. Navathe, 4th Edition, ISBN-81-7758-476-6 , Pearson Education in South Asia 2006. • **Database Management and Design** by G.W.Hansen and J.V. Hansen , 2nd Edition , ISBN-81-203-1465-4,Prentice-Hall of India , Eastern Economy Edition, 2005. • **Database Management Systems** by R. Panneerselvam, ISBN-81-203-2028-X, Prentice-Hall of India, 2006.
References	www.microsoft.com, SQL Help, www.mysql.com
Recommended Teaching Learning Activities	• Lecture discussions. • Demonstrations • Case studies • Internet Tutorials • Hands on Practical / Lab Assignments • Projects • Presentations

Assessment & Weighting	**Type**	**Topic / Activity**	**Weighting**
	• Written tests	Procedures, functions, Triggers, Advanced queries	**30%**
	• Assignments (Individual/Group project)	Design and implement database solution for real business scenario with full design with documentation (DML)	**40%**
	• Presentation of above Group Project		**10 %**
	• Case Study	Identify and rectify Performance issue in DBMS	**20 %**
Duration (Nominal ECTS hours)	**175 Hrs**		

MODULE 03

Module Title	**Graphic design**
Module Code	**K72C001M03**
Module Type	**Compulsory**
Related Unit/s	**K72T001U 03,04,05,06 (All graphics units)**
Pre-Requisites	**Basics of computer systems & applications, ICT NVQ L4 Equivalent Competency in Graphic Design NVQ L4**
Module Aims	**To design & Manage a Graphic product effectively**
Learning Outcomes	• Explain Graphics applications • Describe the hardware dependency and requirements for graphic software • How different platforms(Apple, Windows) effects graphic quality • Differentiate Raster & vector graphics • Select suitable layout • Apply correct Drawing tools • Select suitable color types (RGB and CMYK) • Design the suitable art work • Edit an image using correct editing tools • Use the correct file formats • Select the suitable printing material • Print the design using suitable method • Able to manage graphic project • Able to prepare cost estimate • Observe ethics & norms in graphic industry

Learning Content / Topics	Introduction to graphics
	• Raster graphics
	• Vector graphics
	• Image Sensor/acquiring technique
	  ○ Scanners and cameras
	• Introduction to movie and non linear editing technique
	• Designing concepts
	• Designing layouts
	  ▪ Measurement
	  ▪ Page design
	  ▪ Background
	• Drawing Tools
	• Color Types
	• Image Editing
	  ▪ Applying colour
	  ▪ Typography
	  ▪ Photo editing
	• Image Types & File formats
	• Import and Export functions in graphic applications
	• Printing Technology
	  ▪ Paper selection & other printing materials
	  ▪ Color separation methods
	  ▪ Printing Methods
	• Graphic Industry and business
	  ▪ Publication
	  ▪ Designing
	  ▪ Multimedia graphics
	  ▪ Motion picture graphics
	• Copyrights, Ethics and Plagiarism
	• Preparation of Estimates and Budgets
	• Planning Project Proposal
	• Managing Graphic Projects

<table>
<tr><td>Resources: Equipment, Tools & Materials</td><td colspan="3">Graphics Software eg. Adobe graphics collection package
Macintosh or IBM compatible PCs which can run graphics software efficiently.
Color printers, scanners
Colour separation machine (industry)
Printing material – Papers, ink etc.
Digital printers, offset printers (Industry)
Plate maker, Paper cutter etc. (Industry)
MS Office/Open Office software package</td></tr>
<tr><td>Prescribed Texts</td><td colspan="3">Fundamentals Of Computer Graphics And Multimedia (Paperback) by Mukherjee Sanchayan</td></tr>
<tr><td>References</td><td colspan="3">Internet resources</td></tr>
<tr><td>Recommended Teaching Learning Activities</td><td colspan="3">Lectures assisted with multimedia to deliver theory content
Demonstration
Visit to graphic industry and prepare report(assignment)
Guest lectures
Practical (Individual) & Presentation
Project(Individual)</td></tr>
<tr><td rowspan="4">Assessment & Weighting</td><td>Type</td><td>Topic / Activity</td><td>Weighting</td></tr>
<tr><td>Written paper</td><td>Raster graphics, Vector graphics, Image Types & File formats</td><td>30%</td></tr>
<tr><td>Practical test</td><td>Design and develop graphic design to market a product or event.</td><td>30%</td></tr>
<tr><td>Industry Report Assignment presentation (Individual project)</td><td>Select organization and prepare project proposal
Select technology
Planning project proposal
Copy right issues
Printing methods etc.</td><td>40%</td></tr>
<tr><td>Duration (Nominal ECTS hours)</td><td colspan="3">250 Hrs</td></tr>
</table>

MODULE M04

Module Title	**Software programming**
Module Code	**K72C001M04**
Module Type	Compulsory
Related Unit/s	**K72T001U07**
Pre-Requisites	Followed the computer application assistant course (NVQ 3) (ICT technician,NVQ4) or above
Module Aims	1. Design algorithms and business logic 2. Develop a source code 3. Execute code
Learning Outcomes	**After completion of this module trainee must be able to** 1. Explain data structures and algorithms 2. Identify Object Oriented Concepts 3. Identify difference between structured programming and OOP 4. Explain GUI principles and design 5. Explain Error handling techniques 6. Explain Database connectivity techniques
Learning Contents	**1). Identify Basic Syntax** • Explain the Concepts of Programming • Data structures and algorithms o Pseudo code and flow charts o Identify Array **2). Identify Class & Object** • Identify Class & Object **3). Object Oriented Concepts** Polymorphism, Encapsulation, Inheritance,abstraction etc. **4). Graphical User Interface (GUI)** • Identify Windows Form • Identify Event Processing • Perform Menu Creation • Perform Dialog Creation • Design user logins and privilege management **5).Stream and exception handling** • Implement Stream class utilization

	• Implement Exception handling **6). Database Processing** • Database connectivity (ODBC, JDBC,ADO.Net) • Develop systems with databases. **7). IDE, Source code management tool (eg. Visual Source Safe [VSS]) (practical aspects to be covered in industry)**
Resources: Equipment, Tools & Materials	• Personal computer / computers with standard operating system • Network server / servers capable of running database management system • Relevant operating system installation CDs • A network setup and a connection • Relevant documentation such as user manuals, installation manuals • Requirement specifications, application software • Software – Visual Studio Development Pack, Java, VISIO
Prescribed Texts	Object Oriented Software Engineering Software Engineering Software Engineering Theory & Practice Object Oriented & Classical Software Engineering Fundamentals of Software Engineering Java Database Development Software Engineering with Java Object Oriented Programming with C++ LAND Java Programming for everyone in Java Java 2 in 21 days HTML and Java Script Programming Concepts Java 2 by Example Learn Java Script in a week end Java Server Pages in 24 hours Programming with Java C# in 21 days Beginning.NET Web Services Using C# C# How to Program C# Programming Black Book Microsoft Visual C# 2005 n 24 hours
References	www.microsoft.com/msdn, www.php.org
Recommended Teaching Learning Activities	• Lectures • Guest Lectures from Industry • Multimedia Presentations • Assignments (Individual/Group) • Individual practical

Assessment & Weighting	**Type**	**Topic / Activity**	**Weighting**
	• Written tests	Object Oriented Concepts, Algorithms	**30%**
	• Assignments (Individual)	Cover topics in learning contents.	**15%**
	• Project(Individual/Group)	Pseudo code writing, interface design, database connectivity	**15%**
	• Practical (eg. C#)	Implement a given project with code and documentation	**40%**
Duration (Nominal ECTS hours)	**250 Hrs**		

MODULE M05

Module Title	**Software Testing**
Module Code	**K72C001M05**
Module Type	Compulsory
Credits (ECTS)	02
Related Unit/s	**K72T001U08**
Pre-Requisites	**Software programming Module**
Module Aims	After successful completion of this module the trainee will be able to • Explain Test designing process • Identify Test Cases • Test design and administration • Use test supportive tools
Learning Outcomes	After completion of this module trainee must be able to 1). Identify Test needs 2). Identify Basic test process 3). Identify Software Test life cycle 4). Perform Test design technique 5). Perform Test design and administration 6). Perform Testing using test supportive tools
Learning Contents /Topics	**1). Identify Test needs** • Identify Situation of Software system • Identify Cause of Software bug • Identify Roles for Development, • Implement Maintenance • Implement Application **2). Identify Basic test process** • Identify Test design activities and control • Perform Analysis and Design • Implement Development and execution • Implement verification • Identify termination criteria • Perform Termination Task **3). Identify Software Test life cycle** • Identify Test Model • Identify Test variety • Identify Test level Unit test ,Combined test • Review and Test Process **4).Test design technique** • Implement Determination of test condition

<table>
<tr><td></td><td colspan="3">

Perform Black Box Test
Perform White Box Test

5). Test design and administration

Identify Test framework
Perform Planning and Estimate
Perform Progress management

6). Test supportive tools

Identify Tool variety and application
Identify Advantage and Risk

</td></tr>
<tr><td>Resources: Equipment, Tools & Materials</td><td colspan="3">

Personal computer / computers with standard operating system
Network server / servers capable of running database management system
Relevant operating system installation CDs
A network setup and a connection
Relevant documentation such as user manuals, installation manuals
Project management software (MS Project, etc)
Requirement specifications, application software

</td></tr>
<tr><td>Prescribed Texts</td><td colspan="3">

Best Practices for the Formal Software Testing Process: A Menu of Testing Tasks by Rodger Drabick (Paperback - Oct 2003)
Schaum's Outline of Software Engineering by David A. Gustafson (Paperback - Jun 24, 2002)

</td></tr>
<tr><td>References</td><td colspan="3">www.sqatester.com</td></tr>
<tr><td>Recommended Teaching Learning Activities</td><td colspan="3">

Lectures with Multimedia Presentations
Guest Lectures from Industry
Individual practical
Assignments (Individual/Group)

</td></tr>
<tr><td rowspan="3">Assessment & Weighting</td><td>Type</td><td>Topic / Activity</td><td>Weighting</td></tr>
<tr><td>• Written tests</td><td>Test needs, Basic test process, Software Test life cycle, Test design technique</td><td>30%</td></tr>
<tr><td>• Assignments (Individual)</td><td>Based on content topics</td><td>20%</td></tr>
</table>

	• Practical Project	Create SQA test cases and bug fixing in software development environment covering module contents	**40%**
	• Individual /Group presentation	Individual /Group presentations in the given project	**10%**
Duration (Nominal ECTS hours)	**250Hr**		

Module Title	**System Analysis and Design**
Module Code	**K72C001M06**
Module Type	Compulsory
Related Unit/s	**K72T001U09**
Pre-Requisites	Followed the computer application assistant or NVQ level 3 or 4 ICT
Module Aims	After successful completion of this module the trainee will be able to Perform project planning Requirements gathering and analysis Perform documentation of requirement specification
Learning Outcomes	**After completion of this module trainee must be able to perform/describe** 1. Definition of a system 2. Introduction to System Analysis and Design 3. Requirement gathering and fact finding techniques 4. Data Modeling Techniques 5. Object oriented system design 6. System Requirement Specification
Learning Contents/Topics	Definition of a system • Organizational Structure and chart • Why System analysis • Role of a system analyst Introduction to System Analysis and Design • Introduction to system development methodologies (eg. Water fall, spiral, Rapid application Development (RAD)) • Introduction to Structured System Analysis and design methodologies (SSADM) • Principles of System development life cycle (SDLC) Requirement gathering and fact finding techniques • Domain knowledge and introduction to business fundamentals • Interviews • Questionnaires • Site observations • Record reviews Structured System Design • Flow charts

	• Context Diagrams (Level 0 DFD diagram) • Level 1 and 2 Data Flow Diagrams (DFD) Object oriented system design • Use cases, • Activity diagrams, • Sequence diagrams, • collaboration diagrams, • class diagrams, • state diagrams System Requirement Specification (SRS documentation) • Purpose • Scope planning • System overview • Functional and non-functional requirements • User interfaces • Hardware requirements • Data flow diagrams • Other requirements –eg. Handling change requests etc. • Terms of References (ToR) • Cost benefit analysis Prototype Development and presentation
Resources: Equipment, Tools & Materials	• Personal computer / computers with standard operating system • Network server / servers capable of running database management system • Relevant operating system installation CDs • A network setup and a connection • Relevant documentation such as user manuals, installation manuals • Requirement specifications, application software
Prescribed Texts	• Object Oriented Software Engineering • Software Engineering • Software Engineering Theory & Practice • Object Oriented & Classical Software Engineering • Fundamentals of Software Engineering
References	www.smartdraw.com/resources http://www.uml.org/
Recommended Teaching Learning Activities	• Lectures • Guest Lectures from Industry • Multimedia Presentations

	• Assignments (Individual/Group)		
Assessment & Weighting	**Type**	**Topic / Activity**	**Weighting**
	• Written Test	Definition of a system, Introduction to System Analysis and Design, Requirement gathering and fact finding techniques, Data Modeling Techniques, Object oriented system design	**30%**
	• Assignments (Individual)	At least 3 Class assignments based on topics/contents	**30%**
	• Project(Group)	Develop System Requirement Specification for a given project	**40%**
Duration (Nominal ECTS hours)	**200 Hrs**		

Module Title	**Web Programming**
Module Code	**K72C001M07**
Module Type	**Compulsory**
Related Unit/s	**K72T001U11**
Pre-Requisites	Followed the computer application assistant program NVQ 3/4 ICT Qualification
Module Aims	After successful completion of this module the trainee will be able to • Develop and add features to a web site • Host web site • Maintain Web site
Learning Outcomes	**After completion of this module trainee must be able to** 1. Create static and dynamic web pages 2. Develop web pages using scripting languages 3. Insert multimedia contents to web sites/pages 4. Develop form based interactive web pages 5. Manipulating records using database connectivity 6. Role of a web server 7. Install, configure and maintain web server 8 . Publishing a web site
Learning Contents/Topics	**1). Web contents development 1 (HTML)** • Understand and explain the Outline of HTML • Identify HTML basic tags **2). Web contents development 2 (CSS)** • Understand and explain the Outline of CSS • Identify CSS basic syntax **2). Web contents development 3 (Java Script)** **3). Web contents development 3(XML)** • Understand and explain the Outline of XML • Perform XML document creation , • Perform XSLT programming **4) PHP (Basic syntax)** • Understand and explain the Outline of ASP.NET • Create Web form **5). PHP (Page transition and status monitor)** • Perform Page transition

	• Perform status monitor **6).PHP (Database processing)** • Create Web-DB link 7). **PHP (Security Control and optimization)** • Perform Security control • Perform Performance optimization **8). Multimedia application** • Add Multimedia 9. **Role of a web server** • Introduction to internet and web publishing (DNS) **10. Install, configure and maintain web server** • IIS and Apache web servers, • Implementing secure web services using SSL **11 . Publishing a web site** • Creating hosting domain name, Publishing web content
Resources: Equipment, Tools & Materials	• Personal computer / computers with standard operating system • Network server / servers capable of running database management system • Relevant operating system installation CDs • A network setup and a connection • Relevant documentation such as user manuals, installation manuals • Requirement specifications documentation • Application software • ASP.NET Development Pack
Prescribed Texts	Web Database Development Step by step: Net Edition Programming the web using XML Programming in the web : An Introduction PHP and MySQL Web Development Web Design the Complete reference XML and Java Developing Web Applications Beginning. NET web services using C# HTML and Java Script Programming Concepts Learn Java Script in a week end Java Server Pages in 24 hours Beginning.NET Web Services Using C#
References	**www.php.org, java.sun.com**
Recommended Teaching Learning Activities	• Lectures • Guest Lectures from Industry • Multimedia Presentations • Assignments (Individual/Group)

Assessment & Weighting	**Type**	**Topic / Activity**	**Weighting**
	• Written tests	**HTML, XML, .NET, Web Security, etc**	**30%**
	• Assignments (Individual)	At least 3 Class assignments based on topics/contents	**30%**
	• Project(Individual/Group)	Create web page with database connectivity for data entry and retrieve	**40%**
Duration (Nominal ECTS hours)	**300 Hrs.**		

MODULE M8

Module Title	**Local Area Networks (LAN)**
Module Code	**K72C001M08**
Module Type	**Compulsory**
Related Unit/s	**K72T001U12 & 19**
Pre-Requisites	Computer Hardware knowledge, basic knowledge in computer and Network Operating System Exemptions: Networking NVQ L4 (Computer Network Technician)
Module Aims	After completion of this module the trainee will be able to design the LAN according the customer requirement, make a specification of hardware and software requirements, prepare the necessary document for the proposal and install and configure LAN
Learning Outcomes	After completion of this module, the trainee will be able to: I. Functionality of LAN II. Analyze hardware and software requirements for Local Area Networks III. Develop and design Local Area Network Structure IV. Prepare hardware and software specifications V. Create a final proposal for a LAN
Learning Content / Topics	a. Knowledge I. Functionality of LAN • Communication Fundamentals –media types Topologies, standards • OSI Layered Architecture AND Network Standards • Physical Layer Architecture Devices and Circuits • Data Transmission Systems, Transmission Media, Data encoding, • Network and Internet Control Protocols: TCP/IP, IP Addressing –subnetting, network classes • Switches (L2, L3, Manageable, Unmanageable), VLAN Theory and principles

	• Wireless LAN design, WiFi, WAN II. Analyze hardware and software requirements for Local Area Networks **1)** Active and Passive Devices (cabling, switches, network interfaces) **2)** Network Management and Monitoring **3)** Network OS - license and open source **4)** Networking Accessories III. Develop and design Local Area Network Structure **5)** Preparing Network Diagram by using computer tools (CAD,MS Visio) **6)** Design Power line diagram LAN (UPS, Server, Switch & Router) **7)** Preparing Network Documentation (computer labeling system, IP Addresses, passwords, user rights, Socket numbering, layout diagrams, testing reports **8)** Workgroup environment **9)** RAID Systems **10)** External and bridging gateways IV. Prepare hardware and software specifications **11)** Client Computer hardware specifications (CPU, RAM, Cache, HD, NIC) **12)** Client Computer software specifications **13)** Network parts: NIC, Switches, Router, wireless routers, Types of cables & Sockets **14)** Server hardware specification (CPU, RAM, Cache, HD, NIC) **15)** Network Software Specification (Network OS, **16)** Final Test Strategy

	V. Create a final proposal for a LAN **17)** Cost estimate prepared according to the identified hardware and software requirements **18)** Time schedules and responsibilities **19)** Maintenance plan **20)** Data security system, Backup system b. Activities • Software Installation (Client and Server) • Hardware Installation (Client, Server, Switches) • Network cabling (fixed Installation, patch cables) • Peer to peer setup • Workgroup setup and practice, sharing resources • Final Testing with measurement tools and commands • Documentation
Resources: Equipment, Tools & Materials	**21)** Computer Lab with client server environment, **22)** Wired and Wireless LAN environment **23)** Hubs, Switches, Bridges, Repeaters, Routers, Media Converters, Enclosures, Cable Management devices, Patch panels **24)** Cabling tools **25)** Cable Tester **26)** Fiber Termination Equipment **27)** Network Management and Monitoring Software Tools **28)** Cable Materials, plugs sockets and accessories **29)** Network design and drawing tools,
Prescribed Texts	**30)** Computer & Network Technologies & Applications **31)** Local Area Networks **32)** CCNA Cisco Certified Network Associate Study Guide **33)** MCSE Networking Essentials Study Guide **34)** Data Communication, Computer Networks and Open

	Systems **35)** Linux Network Servers		
Prescribed References	**36)** www.cisco.com		
Recommended Teaching Learning Activities	• Lectures assisted with multimedia to deliver theory content • Lab Practical • Brainstorming find out possible cause of faults • Theoretical presentation of network structures • Arrange field visit		
Assessment & Weighting	**Type**	**Topic / Activity**	**Weighting**
	• Written questions	Questions on Analyze hardware and software requirements for Local Area Networks, Develop and design Local Area Network Structure, Prepare hardware and software specifications	**20%**
	• Practical	Install a small LAN with network devices	**20%**
	• Develop network drawings	Develop and design Local Area Network Structure, documentation and Prepare hardware and software specifications	**20%**

	• Preparing proposal and estimate	Create a final proposal for a LAN and estimate (Design, connectivity, devices etc.)	**40%**
Duration (Nominal ECTS hours)	**250Hr**		

MODULE EMP01

Module Title	**Manage workplace Information**
Module Code	**EMPM01**
Module Type	**Compulsory**
Credits	**2**
Pre-Requisites	**none**
Module Aims	**To enable the students to** ▪ Make use of information and information systems to carry out organizational functions ▪ Make use of information and information systems to enhance workplace performance
Learning Outcomes	**The student shall be able to** ▪ Explain the importance of ICT tools in promoting the productivity of the organization ▪ Describes the purpose of establishing ICT tools and strategies in enhancing the performance at workplace ▪ Apply Information skills to enhance the productivity of the organization
Learning Content / Topics	▪ Identification of documentation requirements ▪ Selecting and/or collecting required documentation ▪ Documentation procedures and methods ▪ Completing /perfecting documentation ▪ Reading, interpreting and using equipment/system manuals and specifications ▪ Interpretation of all applicable laws, policies and procedures relevant to enterprise ▪ Computer and information system usage ▪ Forecasting Techniques ▪ Forecasting Software ▪ Mathematical Modeling ▪ Data Collection Techniques for Market Research ▪ The range of analytical techniques appropriate for analysis of information ▪ The influence of human factors on information analysis, e.g. Prejudices and biases ▪ Conducting and recording of performance evaluations
Resources: Equipment, Tools & Materials	Occupational Tools, Instruments, Equipment, material • Documents on Company policies and procedures • Calculator • Computer • MIS resources • Software used for information purposes • Equipment/system manuals and specifications • Safety signs • Safety procedures • Forecasting Software

<table>
<tr><td></td><td colspan="3">• Variety of forms, formats used in the organization
Instructional Tools, Instruments, Equipment, material

• Multimedia projector
• Screen
• Flash cards
• Flip charts
• Permanent and white board markers
• Overhead projector
• Printer
• Transparencies
• Colour Printer and scanner
• Safety manuals
• Safety illustrations</td></tr>
<tr><td>Prescribed Texts & / or References</td><td colspan="3"></td></tr>
<tr><td>Teaching Learning Activities</td><td colspan="3">▪ Discuss/ explain and provide essential theoretical inputs.
▪ Emphasize the importance of a valid information system in promoting customer relations - make reference to following
- Identification of customer needs.
- Measurement of customer needs and satisfaction.
- Obtaining feedback from customers.
- Recognition and understanding of customer problems and resolution or timely referral of problem in a manner satisfactory to the customer.
▪ Application of enterprise policies in satisfying customer needs
▪ Identifying enterprise Protocols associated with "Customer Services"
▪ Discuss "Satisfying customer complaints" using information sources available</td></tr>
<tr><td rowspan="2">Assessment & Weighting</td><td>Type</td><td>Topic / Activity</td><td>Weighting</td></tr>
<tr><td>Multiple Choice Test Items/ Matching and Completion test items and structured essay</td><td>Knowledge on various aspects of information management skills at work place</td><td>30%</td></tr>
</table>

	type questions		

	Oral questioning during class room presentations	Knowledge on various aspects of information management skills at work place	**10%**
	Viva voce	knowledge on application of information management skills	**10%**
	Continuous assessment at work place	Use of ICT Tools, Software applications, application of information management skills	**50%**
Duration (Nominal ECTS hours)	**50**		
Hand Book Entry	***Manage workplace Information*** is a compulsory module. It provides students capability required for collecting, organising and analysing information from a variety of sources and presenting them in a manner appropriate for decision making. Information sources and information collecting methods are introduced in the module. Students are provided with necessary competencies of using computers for handling information and processing them especially for the purpose of decision making		

MODULE EMP02

Module Title	**Manage workplace communications**
Module Code	**EMP M02**
Module Type	**Compulsory**
Credits	**2**
Pre-Requisites	**none**
Module Aims	**To enable the students to** • Apply communication skills to maintain effective workplace performance • Adjust to diverse situations at workplace, through effective manipulation of communication skills
Learning Outcomes	**The student shall be able to** ▪ Identify the essential components of an efficient communication system ▪ Identify and overcome barriers to effective communication ▪ Use all channels of communication equally well ▪ Use common computer applications to collect, analyze and maintain essential data and information required to perform and enhance day to day activities of the organization ▪ Contributes to the overall growth and productivity development of the organization
Learning Content / Topics	▪ Basic communication models - (Reference to 2 typical models) ▪ Principles of effective, interactive communication ▪ Barriers to effective communication and distortions in the communication process ▪ Personal values and communication ▪ Policies of the organization relevant to information and communication function ▪ Protocol and Procedures of the organization ▪ Importance of ICT tools in promoting the efficiency and effectiveness of the organization ▪ Common computer applications ▪ Importance of networking in day to day activities of the organization
Resources: Equipment, Tools & Materials	Occupational Tools, Instruments, Equipment, material • Company policies and procedures • Software used for information/communication purposes • Safety signs • Safety procedures • Variety of forms, formats used within the organization and for external communication • Calculator • Computer

<table>
<tr><td></td><td colspan="3">Instructional Tools, Instruments, Equipment, material

• Multimedia projector
• Screen
• Flash cards
• Flip charts
• Permanent and white board markers
• Overhead projectors
• Transparencies
• Communication models
• Colour Printer and scanner
• Safety manuals
• Safety illustrations</td></tr>
<tr><td>Prescribed Texts & / or References</td><td colspan="3"></td></tr>
<tr><td>Teaching Learning Activities</td><td colspan="3">• Knowledge to be imparted by providing learner centered activities
• Facilitator may use different teaching methodologies such as brainstorming, projects, mind mapping, small group activities, illustrated talk, fish ball technique, demonstrations, when delivering knowledge component of this module

The following may be discussed in groups of trainees and followed up with Exercises" & "Role plays"
• Oral communication
• Written communication

The following may be discussed in groups of trainees and followed up with” Exercises" & “Role plays"

• Constructing sound inductive arguments.
• Reading and comprehending written communications and information
• Using job-related terminology
• Using proper listening techniques</td></tr>
<tr><td rowspan="2">Assessment & Weighting</td><td>Type</td><td>Topic / Activity</td><td>Weighting</td></tr>
<tr><td>Multiple Choice Test Items/ Matching and Completion test items and structured essay type questions</td><td>Knowledge of various aspects of communication skills at work place</td><td>30%</td></tr>
</table>

	Oral questioning during class room presentations	Knowledge of various aspects of communication skills at work place	**10%**
	Viva voce	knowledge on application of communication skills	**10%**
	Continuous assessment at work place	Application of communication skills	**50%**
Duration (Nominal ECTS hours)	**50**		
Hand Book Entry	***Manage workplace communications*** is a compulsory module. This module prepares students to become effective communicators in the workplace using all the modes of communication available to him/her efficiently. The module introduces students to various communication models and their relative merits and demerits. Modern communication modes are particularly emphasized allowing students to study and appreciate their contributions towards improvement in the productivity of the organization.		

MODULE EMP03

Module Title	**Plan and scheduling work at workplace**
Module Code	**EMP M03**
Module Type	**Compulsory**
Credits	**2**
Pre-Requisites	**none**
Module Aims	**To enable the students to** ▪ Plan and schedule work to be performed at workplace ▪ Assign work to workers based on assessment of competencies / work capacities of individual workers/working team ▪ Predict likely problems / probable changes that would come up in implementation of planned schedule
Learning Outcomes	**The student shall be able to** ▪ Prepare a work schedule for a given work situation ▪ Determine work priorities as per predetermined criteria such as goals, targets and organizational requirements ▪ Develop a plan (process) to complete work to be done in a given situation ▪ Assess competencies of individual workers before assigning work
Learning Content / Topics	▪ Goals and Objectives of the organization ▪ Planning priorities ▪ Plans related to work and related activities at workplace ▪ Systems, procedures and processes relevant to the organization ▪ Quality and continuous improvement processes applied within the organization ▪ Company specific performance standards ▪ Industry/Workplace Codes of Practice /Codes of ethics ▪ Frontline management roles applicable to team management ▪ Manufacturer' s specifications and product specifications ▪ Standard specifications of commonly used materials ▪ Simple planning techniques/methods - (two to three common techniques/methods) ▪ Forecasting Techniques /methods ▪ Time management techniques ▪ Competency assessment methods
Resources: Equipment, Tools & Materials	Occupational Tools, Instruments, Equipment, material • Documents on Company policies and Procedures • Documents on Industry/Workplace • Codes of Practice /Codes of ethics • Documents on Manufacturer' s specifications and

<table>
<tr><td></td><td colspan="3">product specifications
• Documents on competency based assessments
• Software used for planning/scheduling
• Software applications used in performance appraisal
• Safety signs
• Safety procedures
• Computer
• Calculator

Instructional Tools, Instruments, Equipment, material

• Multimedia projector
• Screen
• Flash cards
• Flip charts
• Permanent markers
• White board markers
• Overhead projector
• Transparencies
• Colour Printer and scanner
• Safety manuals
• Safety illustrations</td></tr>
<tr><td>Prescribed Texts & / or References</td><td colspan="3"></td></tr>
<tr><td>Teaching Learning Activities</td><td colspan="3">▪ Small group activity -1 - Identify work requirements of a drawing office or of a given project
▪ Small group activity -2 - Set work priorities as per organisational requirements goals and targets
▪ Small group activity -3 -Develop a plan (process) to complete work to be done at drawing office or in a given project
▪ Individual activity - Prepare list/s of tools, equipment, material required to complete the work as indicated in the plan developed in activity -3
▪ Small group activity -4 Brainstorm in groups to identify,
1) Deficiencies in the plan (Developed in activity -3)
2) Modifications to be made to overcome deficiencies
▪ Explain and follow up with exercises

Forecasting methods / Techniques, Time management techniques, Competency assessment methods</td></tr>
<tr><td rowspan="2">Assessment & Weighting</td><td>Type</td><td>Topic / Activity</td><td>Weighting</td></tr>
<tr><td>Multiple Choice Test Items/ Matching and Completion test items and</td><td>Knowledge of various aspects of planning of work to be performed at workplace</td><td>30%</td></tr>
</table>

	structured essay type questions		

	Oral questioning during class room presentations	Knowledge of various aspects of planning of work to be performed at workplace	**10%**
	Viva voce	knowledge on application of planning of work in a given work situation	**10%**
	Continuous assessment at work place	Use of different approaches and techniques related to planning of work, application of skills in Planning work	**50%**
Duration (Nominal ECTS hours)	**50**		
Hand Book Entry	***Plan work to be performed at workplace*** is a compulsory module. The students will be able to acquire the competencies required in planning and scheduling work. It also provides necessary foundation on planning for those involved in management of the organization. The module introduces planning in a business environment through mainly interactive learning exercises. It provides students the necessary tools in planning for quality and productivity improvement required at managerial level.		

Group A - Elective
Multimedia and Web Technology

MODULE M09

Module Title	**Multimedia Designing**
Module Code	**K72C001M09**
Module Type	**Compulsory**
Related Unit/s	**K72T001U16**
Pre-Requisites	Ability to use word processing, presentation, spreadsheet applications
Module Aims	To give competencies required for identifying client requirements, design and prepare project proposal to develop a multimedia product.
Learning Outcomes	**After completion of this module trainee must be able to** 1. **Identify client requirements** • Identify Client/producer requirement • Prepare documentation by analyzing the requirement **2. Design multimedia concept** • Identify Multimedia facilities as per the requirement • Develop storyboard with video, audio and animation aspects • Design framework using concepts, screen shots and mind maps etc. **3. Design framework and navigation for multimedia product** • Identify file formats, video formats and compression methods to suite the design. • Identify software and hardware as per the design document. • Prepare cost estimate according to the design and the resources available • Prepare a Project proposal to suite the clients requirements
Learning Content / Topics	**knowledge :** • Introduction to Multimedia Industry – History, Current Technologies, Future trends etc. • Multimedia Basics – Concepts, Components, Environments, Applications • Instructional Design – Concept, Framework, mind mapping, screens etc.

	• Scripting and Story boards • Shot definitions • Camera movements techniques • Basic lighting techniques • Hardware and software used in Multimedia Production • Basic Editing Techniques • Audio Video File formats, Types, transfer between formats and compression techniques • Audio Video effects – Chrominance and luminance keying • Use of Graphics in multimedia • Animation Basics • Effects Handling (eg. After effects, Combustion software) • Project planning – Network diagrams, Gantt Charts etc • Cost Estimation and preparation of project proposal for multimedia products • Intellectual Property Rights and ethical usage of material and software. **b. Activities:** • Identify client requirement • Design story board • Write scripts • Prepare shot list • Develop project proposal including costing

Resources: Equipment, Tools & Materials	• Sample material – Story board, script, shot list etc. • Planning tools – eg. MS Project • Diagramming Tools –eg. MS Visio • Sample project proposals
Prescribed Texts & / or References	Multimedia Graphics Fundamentals of Computer Graphics & Multimedia Multimedia Sound and Video Multimedia & Web Multimedia Systems Multimedia : Computing, Communications and Application Multimedia Creations Multimedia Graphics
Web references	http://www.maya.com/

<table>
<tr><td>Recommended Teaching Learning Activities</td><td colspan="3">Lectures
Field visits
Guest Lectures from Industry
Multimedia Presentations
Assignments (Individual/Group)
Brainstorming
Role play (Identification of client requirements)</td></tr>
<tr><td rowspan="4">Assessment & Weighting</td><td>Type</td><td>Topic / Activity</td><td>Weighting</td></tr>
<tr><td>Written tests</td><td>Questions from learning contents</td><td>30%</td></tr>
<tr><td>Assignments & Practicals (Individual)</td><td>Preparation of Story board</td><td>30%</td></tr>
<tr><td>Project(Group)</td><td>Develop project proposal covering module activities</td><td>40%</td></tr>
<tr><td>Duration (Nominal ECTS hours)</td><td colspan="3">350 Hrs</td></tr>
</table>

MODULE M10

Module Title	**Multimedia Production**
Module Code	**K72C001M10**
Module Type	**Compulsory**
Related Unit/s	**K72T001U11**
Pre-Requisites	Multimedia Design Module & ability to use word processing, presentation, spreadsheet applications
Module Aims	To give competencies required in editing systems and setups, compression techniques, audio, video and internet technology to develop a multimedia product.
Learning Outcomes	**After completion of this module trainee must be able to** **1. Develop Multimedia Product** • Set up Equipment for proper working condition. • Produce expected output in a given time frame. Identify required Operating System and application software for the development of the production. • Adjust system parameters as per system specifications and technical manuals. • Select & operate after effect software for standard performance. • Develop the multimedia product as per the design specifications. • Save multimedia product in a required format. **2. Test Multimedia Product** • Preview multimedia product for standard quality. • Check multimedia product with the actual requirement in the design documentation. • Modify multimedia product for user requirement.

Learning Contents/Topics	• Multimedia Concepts
	• Introduction to Multimedia Software
	• Audio, Video, Graphics Editing Tools and Techniques
	• Audio and Video capturing devices and techniques
	• Multimedia file formats
	• Handling Multimedia Software –
	  ○ Animation – 3D MAX, MAYA, POSER
	  ○ Editing – Adobe Premier
	  ○ Effects – After effects, Combustion
	  ○ Graphics – Adobe illustrator, Photoshop
	• Multimedia compression techniques

Resources: Equipment, Tools & Materials	• Multimedia lab setup with suitable computers (Video Server/High end PC)
	•
	• Sample material – graphic, audio, video clips, etc.
	• Software –
	  ○ Animation – 3D MAX, MAYA, POSER
	  ○ Editing – Adobe Premier
	  ○ Effects – After effects, Combustion
	  ○ Graphics – Adobe illustrator, Photoshop, Coral Draw
	  ○ Diagramming Tools –eg. MS Visio
	  ○ Audio editing tools – eg. FL studio, Sound Forge etc.
	• Video camera and capturing system
	• DVD Writer
	• Storage devices (CD, DVD, External HDD)
	• Sample project proposals
	• Digital Drawing Pad

Prescribed Texts	(current versions of) Introducing MAYA 3ds Max Bible 3ds Max MAXScript Essentials 3ds Max Fundamentals 3dsMax essentials Adobe(R) Premiere(R): Classroom in a Book [Paperback] Adobe(R) Photoshop: Classroom in a Book [Paperback]
References	**http://www.maya.com/, www.adobe.com**
Recommended Teaching Learning Activities	• Lectures • Field visits – Editing setup, Broadcast setup etc. • Guest Lectures from Industry • Multimedia Presentations

	• Assignments (Individual/Group) • Group/Individual projects		
Assessment & Weighting	**Type**	**Topic / Activity**	**Weighting**
	• Assignments (Individual)	At least 5 Product based assignments	**30%**
	• Practical	Preparation of graphic, audio & video clips	**20%**
	• Project (Individual)	30 s Commercial, Documentary program in DVD not less than 5 minutes.	**50%**
Duration (Nominal ECTS hours)	**350 Hrs**		

MODULE M11

Module Title	**Design and develop web based information system**
Module Code	**K72C001M11**
Module Type	**Compulsory**
Related Unit/s	**K72T001U15**
Pre-Requisites	Followed the computer application assistant course, Develop and host web site module
Module Aims	After successful completion of this module the trainee will be able to • Identify information requirements of the system • Design and develop web based system
Learning Outcomes	After completion of this module trainee must be able to 1. Discuss with client and identify requirements o Practical knowledge on web development methodologies o Application development based on Licensed or Open source software o Requirement gathering and documentation (eg. RFP, SRS) 2. Design Web based system o Web development life cycle o Distributed Architecture systems o Development Applications o Apply business logic in web application o Configure middleware, application servers and third party software components o Apply Distributed Database Systems (Multimedia) 3. Develop Web based system o Web based user authentication and security management o Apply Data access layers (Presentation, Application, Database Access) o Manage coding (Transaction Foundation Server) o Apply error handling o Handle application gateways (eg. Payment gateways) o Apply quality assurance o Apply web based reporting Tools (eg. Business Objects) o Monitoring Application Performance (eg.WAN optimization Tools)

Learning Contents / Topics	1. Requirement Engineering – SDLC 2. Business Models in web based systems (Content management, Business Information Systems) 3. Technical Infrastructure (Eg. .NET framework, J2EE etc) 4. Web development life cycle 5. Distributed Architecture systems (Client-Server architecture – Eg. 3-Tier) 6. Development Applications (eg. MS Visual Studio, JDK 1.7, Open source –PHP) 7. OOD Concepts, (Business Process Execution Language) BPEL 8. Middleware, application servers and third party software components (Eg. IIS, JBOSS,) 9. Distributed Database Systems (Eg. SQL, MySQL, ORACLE) 10. Web based user authentication and security management (eg. Handling Cookies), 11. E commerce concepts, Design and Develop Payment Gateways, validation techniques 12. Data access layers (Presentation, Application, Database Access)(Eg. Data Providers-ODBC, JDBC) 13. Source Code management (eg. Transaction Foundation Server) 14. Introduction to debugging tools 15. ISP Web service Application Models 16. Introduction to software quality assurance tools and techniques 17. Business Objects (Eg. Crystal Reports XII, SQL reporting server) 18. Monitoring Application Performance in Web based systems 19. Security management, File Uploading,
Resources: Equipment, Tools & Materials	• Personal computer / computers with standard operating system • Network server / servers capable of running database management system • Relevant operating system installation CDs • A network setup and a connection • Relevant documentation such as user manuals, installation manuals • Requirement specifications, application software
Prescribed Texts	1. Web Database Development Step by step: Net Edition 2. Programming the web using XML 3. Programming in the web : An Introduction 4. PHP and MyQL Web Development 5. Web Design the Complete reference 6. XML and Java Developing Web Applications 7. Beginning. NET web services using C# 8. ASP.NET Book Series,

<table>
<tr><td></td><td colspan="3">9. JAVA Sun Microsystems book series</td></tr>
<tr><td>References</td><td colspan="3">• Web resources</td></tr>
<tr><td>Recommended Teaching Learning Activities</td><td colspan="3">• Lectures
• Guest Lectures from Industry
• Multimedia Presentations
• Assignments (Individual/Group)
• Practicals
• Projects</td></tr>
<tr><td rowspan="4">Assessment & Weighting</td><td>Type</td><td>Topic / Activity</td><td>Weighting</td></tr>
<tr><td>• Written test</td><td>Questions on learning contents</td><td>30%</td></tr>
<tr><td>• Assignments (Individual)</td><td>At least 4 assignments</td><td>20%</td></tr>
<tr><td>• Project(Group)</td><td>Design and develop ecommerce site for given business model/senario</td><td>50%</td></tr>
<tr><td>Duration (Nominal ECTS hours)</td><td colspan="3">500 Hrs</td></tr>
</table>

Group B – Elective
Software Engineering and Database Technology

MODULE M12

Module Title	**Software Change Management**
Module Code	**K72C001M12**
Module Type	**Compulsory**
Related Unit/s	**K72T001U19**
Pre-Requisites	System Analysis and Design and Software Programming Modules
Module Aims	After successful completion of this module the trainee will be able to apply the knowledge gained in the module to solve practical problems.
Learning Outcomes	After completion of this module trainee must be able to • Highlight interdependencies between requirements and provide change impact analysis including change notification to affected personnel • Facilitate data integrity and resource collaboration through versioning and baselining of requirements • Support customizable fields and flows for user specific Processes • Allow real-time reporting and analysis of application readiness

<table>
<tr><td></td><td colspan="3">Identify and perform change impact analysis
1). Software requirements changes (Basic Design)

Evaluate change impact
Facilitate data integrities
2). Test Plan
• Formulate of test plan
• Formulate evaluation criteria
Support customizable fields and flows for user specific Processes
3). Change task and test execution
• Debug,
• Execute test
4). Manual Development
• Design manual
• Develop manual ,
• Revise manual</td></tr>
<tr><td>Resources: Equipment, Tools & Materials</td><td colspan="3">• Personal computer / computers with standard operating system
• Network server / servers capable of running database management system
• Relevant operating system installation CDs
• A network setup and a connection
• Relevant documentation such as user manuals, installation manuals
• Requirement specifications, application software</td></tr>
<tr><td>Prescribed Texts</td><td colspan="3">Software Engineering
Software Engineering Theory & Practice
Fundamentals of Software Engineering</td></tr>
<tr><td>References</td><td colspan="3"></td></tr>
<tr><td>Recommended Teaching Learning Activities</td><td colspan="3">• Lectures
• Guest Lectures from Industry
• Multimedia Presentations
• Assignments (Individual)</td></tr>
<tr><td rowspan="2">Assessment & Weighting</td><td>Type</td><td>Topic / Activity</td><td>Weighting</td></tr>
<tr><td>• Written tests</td><td></td><td>30%</td></tr>
</table>

	• Assignments (Individual/Group)		**10%**
	• Project(Individual/Group)		**10%**
	• Practical (eg.)		**50%**
Duration (Nominal ECTS hours)	**100 + 350 Hr Industrial Training**		

MODULE M13

Module Title	**Configure middleware, application servers and third-party software components**
Module Code	**K72C001M13**
Module Type	**Compulsory**
Related Unit/s	**K72T001U20**
Pre-Requisites	System Analysis and Design, Software Programming Modules Software Change Management Module
Module Aims	After successful completion of this module the trainee will be able to **1.** Configure middleware, 2, Configure application servers 3. Configure third-party software components 4. Perform integration management
Learning Outcomes	**After completion of this module trainee must be able to** Perform middleware configuration Perform Application server configuration Identify parameters and configure third party software components Install components in selected technology platforms Manage integration of middleware and third party software components Test installation using integration tests

Learning contents/Topics	• Introduction to middleware
	  • Middleware/EAI Basics
	  • Middleware categories and applications
	  • Enterprise Application Integration(EAI)
	  • Application Programming Interface (API)
	  • Java Middleware, CORBA and its applications
	  • Middleware usage and developments
	• Introduction to Application Servers
	  • Types of application servers
	  • Usage of middleware (eg. Telephony, Fingerprint, Email etc)
	  • Advantages of application servers
	• Third-party software components

<table>
<tr><td></td><td>

Introduction to Third-party software component
Component-based software engineering concepts

Perform integration management

Integration management Processes
Integration management concepts
Business process integration
Change impact analysis

</td></tr>
<tr><td>Resources: Equipment, Tools & Materials</td><td>

Personal computer / computers with standard operating system
Network server / servers capable of running database management system
Relevant operating system installation CDs
A network setup and a connection
Relevant documentation such as user manuals, installation manuals
Requirement specifications, application software

</td></tr>
<tr><td>Prescribed Texts</td><td></td></tr>
<tr><td>References</td><td>
http://www.sei.cmu.edu/str/descriptions/middleware.html
Inmon, William. "A Brief History of Integration." EAI Journal.
Ren, Frances. "The Marketplace of Enterprise Application Integration (EAI).
http://www.public.asu.edu/~mbfr2047/eai.html
Vander Hey, Dan. "One Customer, One View." Intelligent Enterprise
Yee, Andre. "Demystifying Business Process Integration." EaiQ.
http://eai.ittoolbox.com/browse.asp?c=EAIPeerPublishing&r=%2Fpub%2Feai%5Foverview%2Ehtm>
Newton, Harry. Netwon’s Telecom Dictionary.
http://www.feer.com/adv/supp/novc.htm
http://www.wallstreetandtech.com/story/stp/WST20010406S0004
http://www.wallstreetandtech.com/story/itWire/INW20020703S0006
IDC. "The Enterprise Application Integration Market Simmers with Robust Growth Expectations.
http://www.javaworld.com/javaworld/jw-03-1999/jw-03-middleware.html#sidebar1
</td></tr>
<tr><td>Recommended Teaching Learning Activities</td><td>

Lectures
Guest Lectures from Industry
Multimedia Presentations
Assignments (Individual/Group)

</td></tr>
<tr><td>Assessment & Weighting</td><td>
<table>
<tr><th>Type</th><th>Topic / Activity</th><th>Weighting</th></tr>
<tr><td>• Written tests</td><td>Questions on contents</td><td>30%</td></tr>
<tr><td>• Assignments (Individual)</td><td>At least 2 assignments</td><td>20%</td></tr>
</table>
</td></tr>
</table>

	• Project (Group) and Assessment and industrial training	Develop software change management case study	**40%**
	• Project Documentation and presentation	Presentation of case study	**10%**
Duration (Nominal ECTS hours)	**100 + 450 Hr (Industrial training)**		

MODULE M14

Module Title	**Test integration of software application**
Module Code	**K72C001M14**
Module Type	**Compulsory**
Related Unit/s	**K72T001U18**
Pre-Requisites	Software Testing Module.
Module Aims	After successful completion of this module the trainee will be able to apply the knowledge gained in the module to develop test cases, prepare test plan and perform testing.
Learning Outcomes	**After completion of this module trainee must be able to** • Identify all the integration points in the application • Define test cases to cover all conditional aspects • Identify steps in test cases • Prepare test date to carry out the testing procedure • Define flow of integration • Execute test for identified test cases • Evaluate test results • Analyze test results and documentation
Learning Contents/Topics	• The Concept of Integration Testing • Different Types of Interfaces • Different Types of Interface Errors • Granularity of System Integration Testing • System Integration Techniques: Incremental, Top-down, Bottom-up, and Sandwich and Big-bang • Software and Hardware Integration

<table>
<tr><td></td><td colspan="3">

- Hardware Design Verification Tests
- Hardware and Software Compatibility Matrix
- Test Plan for System Integration
- Off-the-self Component Integration
- Off-the-shelf Component Testing
- Built-in Testing

</td></tr>
<tr><td>Resources: Equipment, Tools & Materials</td><td colspan="3">

- Personal computer / computers with standard operating system
- Network server / servers capable of running database management system
- Relevant operating system installation CDs
- A network setup and a connection
- Relevant documentation such as user manuals, installation manuals
- Requirement specifications, application software

</td></tr>
<tr><td>Prescribed Texts & / or References</td><td colspan="3">Effective Methods for Software Testing by William E. Perry
Functional Program Testing and Analysis by William E. Howden</td></tr>
<tr><td>Recommended Teaching Learning Activities</td><td colspan="3">

- Lectures
- Guest Lectures from Industry
- Multimedia Presentations
- Assignments (Individual/Group)

</td></tr>
<tr><td rowspan="5">Assessment & Weighting</td><td>Type</td><td>Topic / Activity</td><td>Weighting</td></tr>
<tr><td>• Written tests</td><td>Questions from learning content</td><td>30%</td></tr>
<tr><td>• Assignments (Individual)</td><td>At least 2 assignments</td><td>20%</td></tr>
<tr><td>• Group Project</td><td>Test integration case study in industry environment</td><td>35%</td></tr>
<tr><td>• Presentation</td><td>Case study presentation and report</td><td>15%</td></tr>
<tr><td>Duration (Nominal ECTS hours)</td><td colspan="3">100+350 Hr Industrial Training</td></tr>
</table>

Group C – Elective
Network and Hardware Technology

MODULE M15

Module Title	**Data Communication, Computer Systems and Networking**
Module Code	**K72C001M15**
Module Type	**Compulsory**
Related Unit/s	**K72T001U22**
Pre-Requisites	Followed a NVQ5 ICT Diploma course, Network or Hardware course at NVQ Level 4
Module Aims	After successful completion of this module the trainee will be able to apply the knowledge gained in the module to solve practical problems. Trainees will get the knowledge of the Computer system management and the basics of Data Communications and Networking. Offering the required foundation for the students who wish to specialize in Level 6 in Networking
Learning Outcomes	**After completion of this module trainee must be able to** **1)** Understand the Communication fundamentals and signals **2)** Understand Transmission media and their characteristics **3)** Explain IEEE network (LAN and WAN)standards **4)** Explore IP address, Port address, Physical address and subnetting **5)** Explain LAN and WAN technologies **6)** Management of the Network and Operating systems, Hardware and software management and administration **7)** Discuss Network Designing and architecture concepts **8)** Discuss the benefits of Wireless Local Area Networks
Learning Contents	**Knowledge:** **1)** Communication fundamentals and signals • Analog and Digital Signals, Analog to Digital Conversion, Digital to Analog conversion , Multiplexing , Bandwidth signals **2)** Transmission media and their characteristics • Guided and Unguided media , Media Characteristics **3)** IEEE network (LAN and WAN)standards • Internetworking standards, ISO-OSI seven layers, TCP/IP, IEEE 802 LAN standards **4)** IP address, Port address, Physical address and subnetting • Logical addressing, physical addressing and port addressing and introduction of Subnetting

<table>
<tr><td></td><td colspan="3">
5) LAN and WAN technologies
Local Area Networks , LAN topologies, LAN operation and introduction to Wide Area Networks and communication
6) Management of the Network and Operating systems, Hardware and software management and administration
Perform Network Management, Implementing a workgroup LAN, workstation configuration and securing (virus guards, firewalls etc.)
Manage workgroup users, printers, printer queue and troubleshooting
Perform basic System administration tasks in windows and UNIX platform. Get the Working ability in Linux platform
7) Network Designing and architecture concepts
Gather client requirements, identify system and hardware requirements, designing the LAN draft and create the proposal
Identify network devices and draw standard network diagrams
Discuss benefits of Windows AD infrastructure
8) Wireless Local Area Networks
</td></tr>
<tr><td>Prescribed Texts</td><td colspan="3">Fred Halsall – Data Communications, Computer Networks and Open Systems
Andrew S. Tanenbaum – Computer Networks</td></tr>
<tr><td>References</td><td colspan="3">www.cisco.com, www.juniper.net, http://support.nortel.com</td></tr>
<tr><td>Recommended Teaching Learning Activities</td><td colspan="3">
Lectures
Guest Lectures from Industry
Industry visits
Multimedia Presentations
Assignments, project, demonstrations (Individual/Group)
</td></tr>
<tr><td rowspan="4">Assessment & Weighting</td><td>Type</td><td>Topic / Activity</td><td>Weighting</td></tr>
<tr><td>• Written tests</td><td>Questions from learning contents</td><td>30%</td></tr>
<tr><td>• Assignments (Individual)</td><td>At least 2 assignments from learning outcomes</td><td>20%</td></tr>
<tr><td>• Practical</td><td>Lab practical to implement given network design</td><td>20%</td></tr>
</table>

	• Project and presentations (Group)	Design and document network solution for business requirement	**30%**
Duration (Nominal ECTS hours)	**400 Hrs**		

MODULE 16

Module Title	**Install and configure Local & Wide Area Network systems**
Module Code	**K72C 001M16**
Module Type	**Compulsory**
Related Unit/s	**K72T001U24**
Pre-Requisites	NVQ Level 5 ICT DIploma Computer Hardware Knowledge Advanced knowledge on Computer and Network Components and Operating System
Module Aims	After completion of this module the trainee will be able to setup client server systems, workgroup environment and carry out final testing and trouble shooting of the installed network
Learning Outcomes	After completion of this module, the trainee will be able to: i. Prepare network design and specification ii. Installation of communication media iii. Installation and configuration of Router and switches iv. Server installation and configuration v. Anti-virus software and operating system patch deployment vi. Client software installation and implementation vii. Install UPS and maintain power systems viii. Create test routines and testing ix. Disaster recovery and backup procedure
Learning Content / Topics	Knowledge **1)** Computer hardware advanced knowledge **2)** Cabling standards: TIA/IEE Standards, CAT-5, CAT-6, Fibre Optic, Wireless LAN, UTP, STP, Coaxial, RJ45 & RJ11 connectors (WiFi, WLAN Standard 802.xx) **3)** Hardware and network troubleshooting knowledge **4)** Advanced knowledge in networks and Server Operating Systems **5)** Advanced knowledge for different communication equipment for wired and wireless Local Area Networks (NIC, VLAN cards, Hub, Switch, Routers,

	Wireless Access Points) **6)** Knowledge on workgroup and domain environment o Network Security for LANs o Firewall basics b. Activities 1. Media installation • Installation of network cable according to the cable layout diagram • Sunk boxes and face plate installation, use of crimping tool and cable termination • Cable connectivity testing by using cable tester • Cable Management 2. Router and switches installation • Router/Switch installation and configuration ,VLAN configuration IP and subnet configuration(Class A,B & C) 3. Server installation and configuration • Decide Server hardware specification • Install different Server Operating Systems (MS Windows and Linux) • Install Application packages to the server • Install and configure file server(Linux/Windows) • Configure IP Addresses, workgroups, passwords and user rights, • Preparing external and bridging gateways • Create a new accounts • Backup and recovery procedure • Organization user groups and restriction permissions

	• Install Hard Disk Quota System • Install of Web server/Proxy server for internet(Windows/Linux) • Install and configure Mail Server • Install and configure DHCP Server • Remote Installation Services (RIS) • Install and configure print server sharing printers 4. Client software installation and implementation • Client hardware design and setup • Installation of Operating System on the clients (MS Windows XP, MS Windows 2003 Server, Linux) • Installation of client software applications • Implementation of client IP Address, workgroup and user rights, passwords 5. Add client computers to domain server 6. Install UPS and maintain power systems **1)** Install and configure UPS to Server & clients **2)** Install file backup system 7. Create test routines and testing **3)** Prepare testing plan **4)** Testing of cabling, measure of transmission speed, data transfer speed **5)** Testing user rights and passwords **6)** Testing uninterrupted power supplies **7)** Testing file backup system **8)** Knowledge on earthing and lighting protection

<table>
<tr><td>Resources: Equipment, Tools & Materials</td><td colspan="3">1) Computer Lab with client server environment (Operating Systems (MS Windows and Linux), Application Software, UPS,)
2) Hub, switches, routers, LAN/WAN Cards, Wireless access points, network cables
3) Wireless broadband routers
4) Patch panels
5) Cable installation casing and faceplates
6) Cable Materials (UTP, STP, fiber optic), patch cords, plugs sockets and accessories
7) Network technician toolkit
8) LAN testing and measuring equipment
9) Fiber network termination kit
10) Network simulation tool – CISCO or other</td></tr>
<tr><td>Prescribed Texts & / or</td><td colspan="3">1) Computer & Network Technologies & Applications
2) Local Area Networks
3) CCNA Cisco Certified Network Associate Study Guide
4) MCSE Networking Essentials Study Guide
5) Data Communication, Computer Networks and Open Systems</td></tr>
<tr><td>References</td><td colspan="3">www.microsoft.com, www.linux.org, www.cisico.com</td></tr>
<tr><td>Recommended Teaching Learning Activities</td><td colspan="3">1) Lectures assisted with multimedia to deliver theory content
2) Theoretical presentation of network structures
3) Practical activities to setup and install network hard- and software on workshop
4) Individual creating and realization of testing and trouble shooting</td></tr>
<tr><td rowspan="2">Assessment & Weighting</td><td>Type</td><td>Topic / Activity</td><td>Weighting</td></tr>
<tr><td>• Written questions</td><td>Questions from learning content</td><td>20%</td></tr>
</table>

	• Server installation practical	Select one from: • Web server/Proxy server for internet (Windows/Linux) • Configure Mail Server • Configure DHCP Server • Remote Installation Services (RIS)	**30%**
	• Project(Group)	Design and implement network system for business requirement	**40%**
	Presentation	Report and presentation of given group project	**10%**
Duration (Nominal ECTS hours)	**550 Hrs**		

MODULE M17

Module Title	**User training and maintenance of the Local & Wide Area Networks**
Module Code	**K72C001M17**
Module Type	**Compulsory**
Related Unit/s	**K72T001U23**
Pre-Requisites	Advanced computer hardware knowledge Advanced knowledge Computer and Network Components and Operating System (Unit 7 & 8), Design Local Area Networks (LAN), Install and configure Local Area Network systems
Module Aims	After completion of this module the trainee will be able to explain and realize user training, network administration and maintenance of Local and Wide Area Networks.
Learning Outcomes	After completion of this module, the trainee will be able to: • Train users • Administer Network • Backup and Recovery Systems • Maintain Local Area Networks (wired and wireless) • Maintain Wide Area Networks(wired and wireless)
Learning Content / Topics	a. Knowledge **1)** User and customer training methods **2)** Network administration methods and trouble shooting **3)** Maintenance of hardware, software and file systems **4)** Network and Data security **5)** System Backup and Disaster Recovery – media types, devices etc. b. Activities I. User training

	• User train on switch on, start the system, shut down, switch off and restart the server • Handling log on (log in) log off (log out) procedure • Train user to operate the client software applications • User train on open and saving files • Train user to use Internet and Email II. Network administration **1)** Network Maintenance – i. Hardware - Maintain Network devices (Switches, routers etc) ii. Software – Network monitoring – MRTG, PRTG etc) **2)** Server maintenance **3)** Create, delete and modify user account **4)** Backup and recovery procedure **5)** Organization user group and restriction permission (Eg. Directory Services- Active Directory, Open LDAP, etc) **6)** Disk Quota Management (Eg Windows and Linux) **7) Maintain Servers** – i. Software Level Maintenance ii. Service packs and patch management (eg. WSUS, YUM) iii. Hardware Level Maintenance (Firmware upgrading etc) • File/system backup and recovery(eg Backup strategy, media, safety storage of backups) • Maintenance of Security Systems(eg Physical and System Security) , • Maintenance of Antivirus systems (Update, log maintenance, risk reporting etc) • Maintenance of documentation (eg. Network Security

	policy, Backup policy, Service Agreements, Network Diagrams, PABX diagrams, etc) • Maintenance of Service Level Agreements and software licenses • Troubleshooting and client support • Maintenance of Backup and Uninterruptible Power Supply (UPS) systems (Grid power, UPS, Secondary power supplies, power factor correction systems etc)		
Resources: Equipment, Tools & Materials	**1)** Computer Lab with a fully equipped client server environment (Operating Systems (MS Windows and Linux), Application Software, UPS) **2)** Network devices – Switches, routers **3)** Network technician toolkit **4)** Network cables (CAT 5, CAT5e, CAT6) **5)** LAN testing and measuring equipment- Cable tester **6)** Internet access (ADSL connection/ ILL)		
Prescribed Texts & / or References	Local & Metropolitan area Metropolitan area networks -5th edition Local Area Networks and Their Applications Introduction to Networking Data Communication and Distributed Networks Wireless Local area Networks		
Recommended Teaching Learning Activities	• Lectures assisted with multimedia to deliver theory content • Theoretical presentation of network structures • Practical activities to maintain network and system software in computer lab/environment • Individual creating and realization of testing and trouble shooting • Arrange industrial visit to networked environment		
Assessment & Weighting	**Type**	**Topic / Activity**	**Weighting**
	• Written	Questions from	**30%**

	questions	learning contents	
	• Assignments	At least 2 assignments on learning outcomes	**20%**
	• Practical	Industrial visit and submit report on user training and network maintenance	**40%**
	• Presentation	Presentation on industrial visit	**10%**
Duration (Nominal ECTS hours)	**400 Hrs**		

MODULE EMP04

Module Title	**Problem Solving and Decision Making**
Module Code	**EMP M04**
Module Type	**Compulsory**
Credits	**2**
Pre-Requisites	**none**
Module Aims	**To enable the students to** ▪ Understand the importance of following a systematic approach to identifying and analyzing problem situation/s ▪ Acquire the skills required to compare different solutions to decide the most suitable. ▪ Apply standard techniques of problem solving and decision making to solve problems and make decisions at workplace.
Learning Outcomes	**The student shall be able to** ▪ Analyze a situation and accurately identify a problem ▪ Assess the impact of a problem ▪ Apply systematic procedure and process of solving a problem ▪ Follow a standard approach to foresee likely problems ▪ Follow an acceptable decision making process
Learning Content / Topics	▪ Problem solving models ▪ Problem solving techniques ▪ Decision making models ▪ Decision making process- (Reference to two commonly used decision models) ▪ Decision making styles – (Participatory approaches may be given priority) ▪ Creative decision making - (Particular reference to six stages in Creative decision making process) ▪ Six stages in Creative decision making process ▪ Recognition ▪ Fact finding ▪ Problem finding ▪ Idea finding ▪ Solution finding ▪ Acceptance finding ▪ Vroom and Yetter's tool for decision making - "Decision tree" ▪ Brainstorming technique ▪ Nominal group technique ▪ Front end analysis
Resources: Equipment, Tools & Materials	Occupational Tools, Instruments, Equipment, material • Documents on Company policies and procedures • Documents on Industry/Workplace codes of Practice/Codes of ethics • Documents on Manufacturer' s specifications and product specifications • Model of Vroom and Yetter's tool for decision making - "Decision tree"

	• Calculator Instructional Tools, Instruments, Equipment, material • Multimedia projector • Screen • Computer • Flash cards • Flip charts • Permanent and white board markers • Overhead projector • Transparencies • Colour Printer and scanner • Illustrations of "Problem solving models" • Illustrations of "Problem solving techniques" ▪ Illustrations of "Decision making models"		
Prescribed Texts & / or References			
Teaching Learning Activities	▪ (Small group activity -1) -Provide relevant case studies to trainees and make them work in small groups to identify problems and the impact of the problems on one's immediate area of responsibilities		
	▪ (Small group activity -2) -Get trainees work in small groups to generate ideas using divergent and convergent approaches to create solutions to problems identified in activity -1		
	▪ (Small group activity -3) Get trainees work in small groups to select and communicate the most appropriate solution from among those generated in activity -2		
	▪ Explain • Problem solving models • Problem solving techniques • Decision making models • Decision making process- (Reference to two commonly used decision models) • Decision making styles – (Participatory approaches may be given priority)		
	• Introduce • Creative decision making -		
	▪ Provide a real problem situation (case study) to follow the Six stages in "Creative decision making" process to make appropriate decisions to problems identified in the above case study		
	▪ Describe Vroom and Yetter's tool for decision making - "Decision tree" • Brainstorming technique • Nominal group technique • Front end analysis		
	▪ Provide examples from real workplace situations to make trainees apply principles learnt in each of the above techniques		
Assessment & Weighting	**Type**	**Topic / Activity**	**Weighting**
	Multiple Choice	▪ Knowledge of	**30%**

	Test Items/ Matching and Completion test items and structured essay type questions	various topics on problem solving / decision making	

	oral questioning technique during class room presentations	▪ Knowledge of various topics on problem solving / decision making	**10%**
	Viva voce	• knowledge in applications of problem solving / decision making	**10%**
	continuous assessment at workplace during industry training	▪ Skills in problem solving / decision making	**50%**
Duration (Nominal ECTS hours)	**50**		
Hand Book Entry	***Problem Solving and Decision Making*** is a compulsory module. It provides the students the fundamental knowledge and skills necessary for identifying and analyzing problem situation/s through a step by step approach. It also provides a good foundation for generating solutions for problems, and assessing their impact. The module introduces problem solving models and decision making models and build the confidence of students in applying them through group activities and case studies.		

MODULE EMP 05

Module Title	**Teamwork and Leadership**
Module Code	**EMP M05**
Module Type	Compulsory
Credits (ECTS)	04
Pre-Requisites	None
Module Aims	**To enable the students to** ▪ Acquire the skills of working with others as a team ▪ Understand the need of maintaining positive relationships with others under varying work conditions. ▪ Lead and facilitate work teams to achieve planned outcome while enhancing organizational productivity
Learning Outcomes	**The student shall be able to** ▪ Define objectives and functions of teams to develop team plans towards achieving corporate goals of the organization ▪ Identify the important aspects of motivating individuals/teams and enhancing co-operation and commitment ▪ Demonstrate an understanding of analyzing ideas and information through discussion and making informed decisions. ▪ Manage and develop team performance by applying appropriate techniques and methods ▪ Apply understanding of roles of team leadership and membership to build trust and confidence ▪ Encourage members in the team to take initiative and make innovations
Learning Content / Topics	Introduction - Functions and roles of leadership , teams in an organization Leadership styles and Leadership roles Team processes , Identifying your role within a team , How a team develops, Team planning- defining objectives, purpose functions and accountabilities Discussion techniques Communication in a team environment Decision making techniques Leadership and personality development Social analysis - culture and values, psychological and social aspects of individuals

<table>
<tr><td>Resources: Equipment, Tools & Materials</td><td colspan="3">Occupational Tools, Instruments, Equipment, material

• Documents on Company policies and procedures
• Calculator
• Computer
• Documents on Industry / Workplace Codes of Practice / Codes of ethics
• Documents on Manufacturer' s specifications and product specifications
• Safety signs
• Safety procedures
• Variety of forms, formats used within the organization

Instructional Tools, Instruments, Equipment, material

• Multimedia projector
• Screen
• Flash cards
• Flip charts
• Permanent and white board markers
• Over head projector
• Transparencies
• Colour Printer and scanner
• Safety manuals
• Safety illustrations</td></tr>
<tr><td>Prescribed Texts & / or References</td><td colspan="3"></td></tr>
<tr><td>Teaching Learning Activities</td><td colspan="3">▪ Lectures for imparting the fundamental aspects teamwork and leadership
▪ Brainstorm appropriate interpersonal skills for working with and for others
▪ Conduct exercises in team planning
▪ List out in small groups attitudes of workers that create a positive working atmosphere
▪ Brainstorm how to develop commitment and cooperation within a team
▪ How to manage and develop team performance
▪ Prepare a check list that would outline the main steps in developing team performance</td></tr>
<tr><td rowspan="2">Assessment & Weighting</td><td>Type</td><td>Topic / Activity</td><td>Weighting</td></tr>
<tr><td>Multiple Choice Test Items/ Matching and Completion test items and structured essay type questions</td><td>knowledge on Leading and facilitating work teams</td><td>30%</td></tr>
</table>

	Oral questioning technique during class room presentations	knowledge on Leading and facilitating work teams	**10%**
	Viva voce	knowledge in application of Leading and facilitating work teams	**10%**
	Continuous assessment at workplace during industry training	Skills in application of Leading and facilitating work teams	**50%**
Duration (Nominal ECTS hours)	**100**		
Hand Book Entry	***Teamwork and Leadership*** is a compulsory module. It provides the foundation necessary to become an effective leader through a personality development approach. The module develops competencies required by the frontline management for leading, facilitating and empowering individuals and work teams within the workplace to achieve planned outcome. The module introduces different approaches of leading and facilitating work teams. While introducing different leadership styles and roles it develops the confidence and capabilities of students to become leaders who can get the best out of the team.		

Module Title	**Creating & maintaining a learning culture at workplace**
Module Code	**EMP M06**
Module Type	**Compulsory**
Credits	**2**
Pre-Requisites	**none**
Module Aims	**To enable the students to** ▪ Create awareness and understanding of the concept of learning culture. ▪ Develop competencies required to create and maintain a learning culture at the workplace.
Learning Outcomes	**The student shall be able to** ▪ Inform management about training requirements of workers ▪ Arrange /Conduct training programmes ▪ Demonstrate the use of new equipment and methods
Learning Content / Topics	▪ Definition of training, definition of performance, performance appraisal, methods of identifying performance gaps of workers, how to design training programs ▪ Setting of learning outcomes, Motivating workers for participation at training programmes, Hints and tips on conducting demonstrations ▪ Practice - Arrange /Conduct training programmes ▪ Demonstrate the use of new equipment and methods
Resources: Equipment, Tools & Materials	• Hand outs • Computer • Printer • Photocopier • Multimedia projector • Models • Transparencies • Manuals
Prescribed Texts & / or References	

Teaching Learning Activities	▪ Use lectures to impart theoretical knowledge on various aspects of learning culture. ▪ Use group discussions, case studies , Role plays, to develop required skills and attitudinal aspects. ▪ Create and maintain a positive learning culture at the training center. ▪ Arrange guest lectures on learning culture.		
Assessment & Weighting	**Type**	**Topic / Activity**	**Weighting**
	Multiple Choice Test Items, structured essay type questions, case studies	Knowledge of various aspects of learning culture at work place	**60%**
	Role plays and simulations	skills and attitudes related to various aspects of learning culture at work place	**40%**
Duration (Nominal ECTS hours)	**50**		
Hand Book Entry	***Creating & maintaining a learning culture at workplace*** is a compulsory module. It is designed to develop the skills and attitudes essential for the student to create a learning culture in his work place while himself setting an example through active participation in such activities. The module introduces the concept of learning culture in a workplace. The student will learn how to identify training requirements in the workplace and based on that design and organize training programmes that will lead to the increase in the performance of the workforce.		