MODULE DESCRIPTORS
Information and Communication Technology
NVQ Level 05
Semester I
Technical modules

Module Title	**User requirements for software solution**
Module Code	K72T001M01/ Level 05
Module Type	Compulsory
Relevant Unit/s	K72T001U01
Pre-Requisites	Relevant NVQ Level 4 Qualification or GCE (A/L) or equivalent qualification
Module Aim/s	**To enable the students to:** Identify business processes of various organizations, gather and analyze requirement of selected business organizations and conduct feasibility study.
Learning Outcome/s	**At the end of this module the student shall be able to:** 1. Explain the business processes of a selected domain 2. Prepare and present requirement analysis report of the selected project 3. Prepare and present feasibility study report of the selected project
Learning Content / Topics	• Introduction to various business processes - (15hrs.) o Business domains (E.g. Telecommunication, Hotels, Health, Transport, Super markets, Education, etc.) o Involvement of the stakeholders to the business process o Software solutions to improve the business functions • Study of business processes –(15hrs.) o Study current system /processes o Roles of Stakeholders o Study business process re-engineering options • Requirements Gathering - (12hrs.) o Importance of gathering requirement o Requirements gathering techniques (Document review, Interviews, Surveys and Questionnaires, Observation, etc.) • Requirement analysis - (12hrs.) o Project Scope (Objectives, Specifications, Boundaries, Limitations) o Functional and non-functional requirements • Feasibility study - (6hrs.) o Technical, Economical, Practical, Organizational, Legal, etc.
Practical	• Assignment: o Assignment 01 - Prepare a user requirement document o Assignment 02 - Prepare a feasibility study report for a given industry specific scenario
Resources	• Multimedia, Whiteboard • Smart board • Computers

<table>
<tr><td></td><td colspan="3">• Computer hardware components</td></tr>
<tr><td>Prescribed Texts & / or References</td><td colspan="3">• Software Requirements Essentials, Karl Wiegers, Candase Hokanson, 2023, ISBN-13: 978-0-13-819028-6 / ISBN-10: 0-13-819028-3</td></tr>
<tr><td>Teaching/ Learning Activities</td><td colspan="3">• Interactive Lecture with hands on practical sessions
• Demonstration/practical
• Individual assignment
• Simulation
• Programmed instructions</td></tr>
<tr><td rowspan="4">Assessment & Weighting</td><td>Type</td><td>Topic / Activity/</td><td>Module Weighting</td></tr>
<tr><td rowspan="2">Continuous Assessment</td><td>Assignment 01</td><td>30%</td></tr>
<tr><td>Assignment 02</td><td>30%</td></tr>
<tr><td>Summative Assessment</td><td>Written Exam– Minimum 2hour</td><td>40%</td></tr>
<tr><td>Duration</td><td colspan="3">100hrs. (60T + 30 P + 10 S)
(T-Theory, P-Practical, S- Self Studies)</td></tr>
</table>

Module Title	**System analysis and design**
Module Code	K72T001M02/ Level 05
Module Type	Compulsory
Relevant Unit/s	K72T001U02
Pre-Requisites	K72T001M01
Module Aim/s	**To enable the students to:** Apply concepts related to identify, analyze, prioritize, document, and manage user requirements for software solutions by applying requirement gathering and requirement identification techniques.
Learning Outcome/s	**At the end of this module the student shall be able to:** • Analyze requirements specified in documentation • Apply system analysis techniques for logical design • Identify components and documenting functionality and data • Document requirement outcomes according to standard templates • Develop test cases based on design specifications • Prepare the final requirement document
Learning Content / Topics	• Introduction to systems Analysis -(20hrs.) o System analysis techniques ▪ DFD ▪ Use case diagrams ▪ ER/EER o Introduction to systems design –(20hrs.) ▪ Flow chart and pseudocodes ▪ UI/UX Design o System requirements specification document-(20hrs.) ▪ Executive summery ▪ Summary of user requirements ▪ Proposed solution ▪ Schedule structures
Practical	Group Assignment: Prepare SRS document for a given user requirement document (Can use the user requirement document prepared in K72T003M01)
Resources	• Multimedia, Whiteboard • Smart board • Computers • Computer hardware components
Prescribed Texts & / or References	• Modern systems analysis and design, Joseph S. Valacich,10th Edition, ISBN 9780138179946 • Systems Analysis and Design, Scott Tilley, Twelfth Edition, ISBN: 978-0-357-

<table>
<tr><td></td><td colspan="3">11781-1
• Systems Analysis and Design, Scott Tilley and Harry Rosenblatt, Eleventh Edition, ISBN: 978-1-305-49460-2
• Systems Analysis & Design an Object-Oriented Approach with UML, Alan Dennis, Sixth Edition, ISBN: 978-1-119-55991-7</td></tr>
<tr><td>Teaching/ Learning Activities</td><td colspan="3">• Interactive Lecture with hands on practical sessions
• Demonstration/practical
• Individual assignment
• Simulation
• Programmed instructions</td></tr>
<tr><td rowspan="3">Assessment & Weighting</td><td>Type</td><td>Topic / Activity/</td><td>Module Weighting</td></tr>
<tr><td>Continuous Assessment</td><td>Group Assignment</td><td>60%</td></tr>
<tr><td>Summative Assessment</td><td>Written Exam (Minimum 2hour Paper)</td><td>40%</td></tr>
<tr><td>Duration</td><td colspan="3">100hrs. (60T + 30P + 10S)
(T-Theory, P-Practical, S- Self Studies)</td></tr>
</table>

Module Title	**Mathematics for Computing**
Module Code	K72T001M03/ Level 05
Module Type	Compulsory
Relevant Unit/s	All Units
Pre-Requisites	None
Module Aim/s	To enable the students to: • Understand the different types of number systems • Understand various computer coding systems • Understand basic statistics concepts

Learning Content / Topics	• Types of Number Systems -(01Hrs.)
	  ○ Positional and non-positional
	  ○ Factors affecting to the value of the number
	• Conversion between different bases -(06Hrs.)
	  ○ Decimal to other bases (binary, octal, hexadecimal)
	  ○ Other bases to decimal
	  ○ Non-decimal bases to non-decimal bases
	  ○ Fractional numbers
	• Calculation using different number bases -(04Hrs.)
	  ○ Adding numbers (binary, octal, hexadecimal)
	  ○ Subtracting numbers
	  - One's complement
	  - Two's complement
	• Fractional number representation -(02Hrs.)
	  ○ Fixed point and floating point
	• Sets theory -(02Hrs.)
	• Statistics fundamentals -(03Hrs.)
	  ○ Mean, Median, Mode, Standard Deviation
	• Computer Codes -(02Hrs.)
	  ○ BCD, EBCDIC, ASCII, Unicode

Practical	None

<table>
<tr><td>Resources</td><td colspan="3">Text books
Model Papers</td></tr>
<tr><td>Prescribed Texts & / or References</td><td colspan="3">Discrete Mathematics for Computer Science, An Example-Based Introduction, Jon Pierre Fortney, ISBN: 978-1-003-09147-9</td></tr>
<tr><td>Teaching/Learning Activities</td><td colspan="3">Lectures
Presentations
Discussions</td></tr>
<tr><td rowspan="3">Assessment & Weighting</td><td>Type</td><td>Topic / Activity/Learning outcomes</td><td>Module Weighting</td></tr>
<tr><td>Formative Assessment</td><td>Assignment</td><td>40%</td></tr>
<tr><td>Summative Assessment (Semester end)</td><td>Written test (2 hours)</td><td>60%</td></tr>
<tr><td>Duration</td><td colspan="3">25hrs. (20T + 0P + 05S)
(T-Theory, P-Practical, S- Self Studies)</td></tr>
</table>

Module Title	**Digital Electronics and Computer Architecture**
Module Code	K72T001M04/ Level 05
Module Type	Compulsory
Relevant Unit/s	All Units
Pre-Requisites	K72T001M03
Module Aim/s	**To enable the students to:** • Understand the logic gates • Describe basic computer component and functional organization • Describe processor organization • Familiarize with software systems and IoT integration
Learning Outcome/s	**At the end of this module the student shall be able to:** 1. Demonstrate an understanding of logic gates 2. Design a logic circuit for a given scenario
Learning Content / Topics	• Logic Gates –(12hrs) o Basic Logic Gates o Universal Logic Gates o Simplification of Boolean Expressions ➢ Boolean Algebra laws ➢ Karnaugh maps o Sequential logic circuits o Design logic circuits using NAND / NOR gates • Computer Organization and Architecture –(21hrs) o Processor organization o Fetch and Execution Cycle and program execution o Instructions Set Architecture o Memory organization o Input output organization o Performance evaluation of program execution o Pipeline architecture o High performance computers and multicore architectures • Von-Neumann architecture –(03hrs) • Beyond Von-Neumann architecture –(06hrs) o Quantum computers o Neural Networks o Nature inspired computing
Practical	Assignment - Design a logic circuit using relevant software for a given Boolean expression
Resources	• Computer

<table>
<tr><td></td><td colspan="3">Internet Facility
Relevant Software</td></tr>
<tr><td>Prescribed Texts & / or References</td><td colspan="3">Computer Organization and Architecture Designing for Performance, William Stallings, Eleventh Edition, ISBN 13: 978-1-292-42008-0
Essentials of Computer Architecture, Douglas Comer, Third Edition, ISBN: 978-1-0034-1014-0
The Essentials of Computer Organization and Architecture Linda Null, 6th Edition, ISBN 9781284259438</td></tr>
<tr><td>Teaching/Learning Activities</td><td colspan="3">Lectures
Presentations
Demonstration
Discussions using the materials/ components and product samples</td></tr>
<tr><td rowspan="3">Assessment & Weighting</td><td>Type</td><td>Topic / Activity/Learning outcomes</td><td>Module Weighting</td></tr>
<tr><td>Continuous Assessment</td><td>Assignment</td><td>50%</td></tr>
<tr><td>Summative Assessment</td><td>Written Exam</td><td>50%</td></tr>
<tr><td>Duration</td><td colspan="3">75hrs. (42T + 18P + 15S)
(T-Theory, P-Practical, S- Self Studies)</td></tr>
</table>

Module Title	**Object Oriented Programming Concepts**
Module Code	K72T001M05/ Level 05
Module Type	Compulsory
Relevant Unit/s	All Units
Pre-Requisites	None
Module Aim/s	**To enable the students to:** • Understand the basic program structures (Sequence, Selection, Iteration) • Understand the syntax of selected programming language
Learning Outcome/s	**At the end of this module the student shall be able to:** • Draw flowcharts and write pseudocodes • Write relevant program codes • Test the developed program/s • Apply IDEs for program development
Learning Content / Topics	• Basics of computer programming – (18hrs) o Algorithms o Flowcharts, Pseudocodes • Introduction to Object-Oriented Programming – (06hrs) o Comparison between procedural and object-oriented paradigms • OOP concepts – (24hrs) o Classes and Objects - Real-world examples of classes and objects - Variables and Data Types - Attributes and Methods - Instantiating objects from classes - Accessing attributes and methods - Constructors and Destructors - Overloading o Memory Management in OOP - Dynamic memory allocation - Garbage collection and object lifecycle o Modifiers - Access Modifiers - Non-access modifiers o Encapsulation - Getters and setters o Inheritance - Hierarchies and class relationships - Single, Multiple inheritance - Overriding methods o Polymorphism

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

Abstraction
Abstract Classes and Interfaces
Real-world Examples of Encapsulation and Abstraction

• Association, aggregation and composition – (06hrs)
</td></tr>
<tr><td>Practical</td><td colspan="3">Assignment - Write codes to implement for the designed system</td></tr>
<tr><td>Resources</td><td colspan="3">
• Computer
• Internet Facility
• Relevant Software
• Text Books / Reference Books
• Question Papers
</td></tr>
<tr><td>Prescribed Texts & / or References</td><td colspan="3">
• Hands-On Object-Oriented Programming, Anil Kumar Rangisetti, ISBN-13: 979-8-8688-0524-0
• Python 3 Object-Oriented Programming, Dusty Phillips, Third Edition, ISBN 978-1-78961-585-2
• Java Essentials For Dummies, Doug Lowe and Paul McFedries, ISBN: 978-1-394-29699-6
• Java Foundations, Fifth Edition, John Lewis, ISBN-13: 9780137518401
• Getting Started with Python: Understand key data structures and use Python in object-oriented programming, Romano, Fabrizio;Baka, Benjamin; Phillips, Dusty, ISBN: 9781838551919
• Modern Python Cookbook, Steven F. Lott, Second Edition, 9781800207455
</td></tr>
<tr><td>Teaching/Learning Activities</td><td colspan="3">
• Lectures
• Presentations
• Discussions using the material and questions samples
</td></tr>
<tr><td rowspan="4">Assessment & Weighting</td><td>Type</td><td>Topic / Activity/Learning outcomes</td><td>Module Weighting</td></tr>
<tr><td rowspan="2">Formative Assessment</td><td>Assignment</td><td>30%</td></tr>
<tr><td>Practical test</td><td>40%</td></tr>
<tr><td>Summative Assessment</td><td>Written Exam</td><td>30%</td></tr>
<tr><td>Duration</td><td colspan="3">100hrs. (54T + 36P + 10S)
(T-Theory, P-Practical, S- Self Studies)</td></tr>
</table>

Module Title	**Data Structures and Algorithms**
Module Code	K72T001M06/ Level 05
Module Type	Compulsory
Relevant Unit/s	K72T001U04, K72T001U07
Pre-Requisites	None
Learning Outcome/s	**At the end of this module the student shall be able to:** 1. Apply fundamental programming concepts 2. Draw flowcharts to sort a set of numbers / names 3. Draw flowcharts to find a number / name 4. Write pseudocodes to sort a set of numbers / names 5. Write pseudocodes to find a number / name

Learning Content / Topics	• Introduction to Software Development – (06hrs.)
	  ○ What is software development?
	  ○ Software Development Life Cycle (SDLC) models
	  ▪ Waterfall, Agile, Scrum, etc.
	• Basics of Programming - (06hrs.)
	  ○ Introduction to programming languages
	  ▪ Structured/Object-Oriented programming languages
	  ○ Setting up development environments (IDE, code editors)
	  ○ Writing and executing basic programs
	  ○ Flowcharts
	  ○ Pseudocode
	• Data structures (06hrs)
	  ○ Records
	  ○ Arrays
	  ○ Queues & Stacks
	  ○ Link List
	  ○ Trees
	  ○ Maps
	  ○ Tuples
	  ○ Sets
	• Sorting and searching algorithms (06hrs)
	  ○ Bubble
	  ○ Selection
	  ○ Insertions
	  ○ Quick sort
	  ○ Hashing Techniques
	  ○ Linear search
	  ○ Binary search
	• Programming Concepts (Use Python, Java, PHP) - (18hrs.)
	  ○ Variables, data types
	  ○ Operators (Mathematical, Comparison and Logical)

	○ Control flow statements ▪ Conditions –if..then..else, case/switch /match ▪ Nested Conditions ▪ Loops –for, while, until ▪ Nested Loops ○ Functions and Modular Programming ▪ Defining and invoking functions ▪ Parametrized functions ▪ Scope and lifetime of variables ▪ Recursion • Introduction to Exception Handling - (06hrs.) ○ Basic concepts of exceptions and error handling • Connecting the application to the database - (06hrs.) • Version Control Systems - (06hrs.) ○ Introduction to Git/Git hub
Practical	○ Write a program to sort a set of numbers or names ○ Write a program to find a given number or name in a data set ○ Write a program for a full functional calculator
Resources	• Multimedia, Whiteboard • Smart board • Computers with relevant software
Prescribed Texts & / or References	• Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, Fourth Edition, ISBN 9780262046305 • Absolute Beginner's Guide to Algorithm, Kirupa Chinnathambi, ISBN: 978-0-13-8222229-1 • Data Structures and Algorithms Made Easy with Java: Learn Data Structure using Java in 7 Days: Data Structures and Algorithmic Puzzles for Beginners to Professional, Maurya, Rahul, (No ISBN) • Advanced Data Structures and Algorithms, Abirami A, Priya R L, ISBN: 978-93-5551-792-0 • The Algorithm Design Manual, Steven S. Skiena, Second Edition, ISBN: 978-1-84800-069-8
Teaching/ Learning Activities	Practical: • Practical 01- Interactive Lecture with hands on practical sessions • Practical 02 -Demonstration/practical • Practical 03 - Individual/Group assignment Assignment: Assignment 01- Draw a flow chart to sort a set of numbers or names using a standard sorting algorithm Assignment 02-Draw a flow chart to find the 3rd largest number in a data set

Assessment & Weighting	**Type**	**Topic / Activity/**	**Module Weighting**
	Continuous Assessment	Assignment 01	10%
		Assignment 02	10%
		Mini project (Individual)- Develop a software application with database connection for a given scenario (Use Python/ Java/ PHP)	40%
	Summative Assessment	Written Test (3 Hour)	40%
Duration	**100hrs. (60T + 30 P + 10 S)** **(T-Theory, P-Practical, S- Self Studies)**		

Module Title	**Web Site Design and Hosting**
Module Code	K72T001M07/ Level 05
Module Type	Compulsory
Relevant Unit/s	K72T001U06, K72T001U07
Pre-Requisites	None
Learning Outcome/s	**At the end of this module the student shall be able to:** 1. Design a basic web page/site using HTML 2. Stylize the web pages applying relevant CSS 3. Design a basic web page/site using a web authoring tool/CMS 4. Host the developed web site on a web host
Learning Content / Topics	• Introduction to Web Design - (03Hrs.) o Importance of the Web Design o Overview of Web Technologies o Understanding User Experience (UX) and User Interface (UI) o Tools for Web Design ▪ Web authoring tools, Content Management Systems (CMS) o Web design trends and best practices • Wireframing and Prototyping - (06Hrs.) o Introduction to Wireframing and Prototyping o Tools use for Wireframing and Prototyping o Draw wireframes o Develop Prototypes • Fundamentals of Web Technologies- (03Hrs.) o The World Wide Web (WWW) and its components (browsers, servers, URLs) o Client-side vs. server-side scripting • Hypertext Markup Language (HTML) - (15Hrs.) o Introduction to HTML o HTML Elements and Structure o Creating basic web pages with HTML o Semantic HTML and accessibility • Cascading Style Sheets (CSS) - (12Hrs.) o Introduction to CSS o CSS selectors and properties o Styling web pages with CSS

	• Introduction to Front-End development tools - (03Hrs.)
	  ○ JavaScript
	  ○ TypeScript
	  ○ Next.JS
	
	• JavaScript - (06Hrs.)
	  ○ Introduction to JavaScript
	  ○ Variables, Data Types, and Operators
	  ○ Functions and Control Structures
	
	• Introduction to Front-End Frameworks and Libraries - (03Hrs.)
	
	• Website Hosting - (03Hrs.)
	  ○ What is website hosting?
	  ○ Types of Web Hosting
	  ▪ Shared, VPS, Dedicated, and Cloud Hosting
	  ○ Choosing the Right web hosting provider
	  ○ Use of C-Panel
	
	• Domain Names and DNS - (03Hrs.)
	  ○ What is a Domain Name?
	  ○ Domain Name Registration
	  ○ Understanding DNS (Domain Name System)
	  ○ Configuring DNS Settings
	
	• Deploying a website - (03Hrs.)
	  ○ Uploading website files to the hosting server
	  ○ Basic server administration tasks

Practical	• Practical 01-Create a website with relevant navigations and interactions using HTML, CSS and JavaScript for a given scenario • Practical 02 -Create a website with relevant navigations and interactions using web authoring tool / CMS for a given scenario • Practical 03 - Host the created website
Resources	• Multimedia, Whiteboard • Computer lab with Internet facility • Smart board • CMS- Ex: WordPress, Drupal, Joomla, etc. • IDEs – Ex: VS Code, NetBeans, Eclipse, etc. • XAMPP, WAMP

<table>
<tr><td>Prescribed Texts & / or References</td><td colspan="3">Head First HTML and CSS, 2nd Edition Elisabeth Robson, Eric Freeman ISBN: 9780596159900
Bootstrap: Responsive Web Development, 1st Edition Jake Spurlock ISBN: 9781449344597
Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5 5th Edition Robin Nixon ISBN:978-1491978917
JavaScript: The Definitive Guide, 7th Edition David Flanagan ISBN: 9781491952023
Building Web Apps with WordPress, Second Edition, by Brian Messenlehner and Jason Coleman ISBN: 978-1-491-99008-7
Full Stack Web Development the Comprehensive Guide, Philip Ackermann, ISBN: 978-1-4932-2438-8</td></tr>
<tr><td>Teaching/ Learning Activities</td><td colspan="3">Interactive Lecture with hands on practical sessions
Demonstration/practical
Individual assignment
Simulation
Programmed instructions</td></tr>
<tr><td rowspan="4">Assessment & Weighting</td><td>Type</td><td>Topic / Activity/</td><td>Module Weighting</td></tr>
<tr><td rowspan="2">Continuous Assessment</td><td>Practical 01</td><td>30%</td></tr>
<tr><td>Practical 02</td><td>30%</td></tr>
<tr><td>Summative Assessment</td><td>Written Exam
(2 Hour)</td><td>40%</td></tr>
<tr><td>Duration</td><td colspan="3">100hrs. (60T + 30 P + 10S)
(T-Theory, P-Practical, S- Self Studies)</td></tr>
</table>

Module Title	**Creative design for print media**
Module Code	K72T001M08/ Level 05
Module Type	Compulsory
Relevant Unit/s	K72T001U05
Pre-Requisites	Relevant NVQ Level 4 Qualification or GCE (A/L) or equivalent qualification
Module Aim(s)	**To enable the students to:** • Prepare a creative design with text, graphics and images.
Learning Outcome/s	**At the end of this module the student shall be able to:** 1. Design and develop graphics 2. Edit images 3. Finalize the text / graphic/images for printing

Learning Content /Topics	• Introduction to Text manipulation (02hrs.)
	  ○ Font, Size, Formats, Special effects, Alignment, etc.
	  ○ Text manipulation software
	• Introduction to Graphic Designing (04hrs.)
	  ○ Importance of Graphic designing
	  ○ Sketching / Prototyping
	  ○ Graphic Designing rules (Golden ratio, Gestalt theory)
	  ○ Hardware and software requirement for installation
	  ○ Graphic designing software
	  ▪ Tools panel
	  ▪ Layers
	• Scanning (01hrs.)
	  ○ Flat bed, Drum
	  ○ OCR
	• Introduction to Image editing (06hrs.)
	  ○ Importance of Image editing
	  ○ Camera shots and framing
	  ○ Image editing standards
	  ▪ Scaling
	  ▪ Image quality
	  ○ Hardware and software requirement for installation
	  ○ Image editing software
	  ▪ Tools panel
	  ▪ Layers
	• Page layout (02hrs.)
	  ○ Page layout for different print media

	▪ Offset, Digital, etc. • Types of graphics (02hrs.) o Raster graphics o Vector graphics • Color theory (02hrs.) • Use of Graphic Design software (02hrs.) o Graphic Design Tools o Packaging o Import /Export Graphics /Images o Slicing Graphics/Images • Use of Image Editing software (06 hrs.) o Image Editing Tools o Packaging o Import /Export Images o Slicing Images • Prepare Text/Images/Graphics for printing (01hrs.) o Offset printing o Digital printing o Screen printing • Ethical uses of Graphic and Images (02hrs.) o Copyright Laws o Plagiarism
Practical	Practical: • Practical 01 - Prepare a graphic design for a given scenario (For example creating a poster with a logo) • Practical 02 - Prepare a banner for a given scenario with images, graphics and texts • Practical 03 – Prepare the inner page layouts of a magazine using InDesign Assignment: • Visit to a company and collect their requirement for printing and prepare a proposal /quotation for the above
Resources	• Relevant Software – Corel Draw, Illustrator, Photoshop, InDesign, etc. • Multimedia, Whiteboard • Computer lab with Internet facility • Smart board

<table>
<tr><td>Prescribed Texts & / or References</td><td colspan="3">Designing for Print the Art and Science, Marina Poropat Joyce, ISBN: 978-0996214988
Layout Essentials Revised and Updated: 100 Design Principles for Using Grids, Tondreau, Beth, ISBN: 978-1-63159-631-5</td></tr>
<tr><td>Teaching/ Learning Activities</td><td colspan="3">Interactive Lecture with hands on practical sessions
Demonstration/practical
Individual assignment
Simulation
Programmed instructions</td></tr>
<tr><td>Teaching/ Learning Activities</td><td colspan="3">Lectures assisted with multimedia to deliver theory content
Demonstration
lectures
Practical (Individual)
Presentation
Project (Individual)</td></tr>
<tr><td rowspan="7">Assessment & Weighting</td><td>Type</td><td>Topic / Activity/Learning outcomes</td><td>Module Weighting</td></tr>
<tr><td rowspan="4">Continuous Assessment</td><td>Practical 01</td><td>15%</td></tr>
<tr><td>Practical 02</td><td>15%</td></tr>
<tr><td>Practical 03</td><td>15%</td></tr>
<tr><td>Assignment:</td><td>15%</td></tr>
<tr><td rowspan="2">Summative Assessment</td><td>Prepare a poster/leaflet/label for a given scenario with images, graphics and texts</td><td>20%</td></tr>
<tr><td>Written Exam (01 hour)</td><td>20%</td></tr>
<tr><td>Duration</td><td colspan="3">100hrs. (30T + 60P + 10S)
(T-Theory, P-Practical, S- Self Studies)</td></tr>
</table>

MODULE DESCRIPTORS
Information and Communication Technology
NVQ Level 05
Semester I
Employability modules

Module Title	**Workplace Communications Management**
Module Code	EMTM02
Module Type	Compulsory
Relevant Unit/s	EMTU02
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	**At The student will 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	**Teaching Aids** Networked Computers, Multimedia, Whiteboard
Recommended Texts & / or References	
Teaching Learning Activities	• 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

<table>
<tr><td></td><td colspan="3">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="5">Assessment & Weighting</td><td>Type</td><td>Topic / Activity</td><td>Weighting</td></tr>
<tr><td rowspan="2">Formative assessment</td><td>Application of communication skills at work place</td><td>50%</td></tr>
<tr><td>Knowledge of various aspects of communication skills at work place - Oral questioning during class room presentations</td><td>10%</td></tr>
<tr><td rowspan="2">Summative assessment</td><td>Knowledge of various aspects of communication skills at work place- Multiple Choice Test Items/ Matching and Completion test items and structured essay type questions</td><td>30%</td></tr>
<tr><td>knowledge on application of communication skills- Viva voce</td><td>10%</td></tr>
<tr><td>Duration</td><td colspan="3">50 hours (30T + 15P + 05S)
(T-Theory, P-Practical, S- Self Studies)</td></tr>
</table>

MODULE DESCRIPTORS
Information and Communication Technology
NVQ Level 05
Semester 2
Technical modules

Module Title	**Software Testing & Quality Assurance**
Module Code	K72T001M09/ Level 05
Module Type	Compulsory
Relevant Unit/s	K72T001U04, K72T001U07
Pre-Requisites	K72T001M01, K72T001M02, K72T001M05, K72T001M06, K72T001M07
Learning Outcome/s	**At the end of this module the student shall be able to:** 1. Design and execute test cases 2. Use various testing tools for manual test 3. Conduct specialized tests such as performance, security

Learning Content / Topics	• Introduction to Software Testing – (12hrs.)
	  ○ Definition and importance of software testing
	  ○ Quality assurance vs. Quality control
	  ○ Software testing lifecycle (STLC)
	• Types of Testing (06hrs.)
	  ○ Manual testing, Automated testing
	  ○ Unit testing, integration testing, system testing, and acceptance testing
	  ○ Functional vs. non-functional testing
	• Testing Techniques and Strategies - (03hrs.)
	  ○ Black-box testing techniques
	  ○ White-box testing techniques
	• Test Planning and Documentation - (15hrs.)
	  ○ Test planning and strategy
	  ○ Writing effective test cases
	  ○ Test data preparation
	  ○ Test documentation (test plan, test case, test script, test report)
	• Introduction to Automation Testing - (03hrs.)
	  ○ Introduction to test automation
	  ○ Benefits
	• Security Testing - (03hrs.)
	  ○ Importance of security testing
	  ○ Common security vulnerabilities
	  ○ Introduction to tools and techniques for security testing

<table>
<tr><td></td><td colspan="3"></td></tr>
<tr><td>Practical</td><td colspan="3">Assignment - Prepare the test documentation and present</td></tr>
<tr><td>Resources</td><td colspan="3">• Multimedia, Whiteboard
• Smart board
• Computers with relevant software</td></tr>
<tr><td>Prescribed Texts & / or References</td><td colspan="3">• Foundations of Software Testing ISTQB Certification, 4th edition Dorothy Graham, Rex Black, Erik van Veenendaal ISBN: 9780357884157
• Mastering Software Quality Assurance Murali Chemuturi ISBN: 9781604270327
• Software Quality Assurance Made Easy 2nd Edition Solis Tech [No ISBN]</td></tr>
<tr><td>Teaching/ Learning Activities</td><td colspan="3">• Interactive Lecture with hands on practical sessions
• Demonstration/practical
• Individual/Group assignment</td></tr>
<tr><td rowspan="4">Assessment & Weighting</td><td>Type</td><td>Topic / Activity/</td><td>Module Weighting</td></tr>
<tr><td rowspan="2">Continuous Assessment</td><td>Assignment</td><td>30%</td></tr>
<tr><td>Practical</td><td>30%</td></tr>
<tr><td>Summative Assessment</td><td>Written Test (2 hour)</td><td>40%</td></tr>
<tr><td>Duration</td><td colspan="3">75hrs. (42T + 18 P + 15 S)
(T-Theory, P-Practical, S- Self Studies)</td></tr>
</table>

Module Title	**Web Application Development**
Module Code	K72T001M10/ Level 05
Module Type	**Compulsory**
Relevant Unit/s	K72T001U07
Pre-Requisites	K72T001M02, K72T001M07
Learning Outcome/s	**At the end of this module the student shall be able to:** 1. Customize the theme/templates using a CMS 2. Add interactions to web pages using JavaScript 3. Connect a database to the web page/site 4. Integrate developed website with a payment gateway

Learning Content / Topics	• Cascading Style Sheets (CSS) - (06Hrs.)
	  ○ CSS Positioning and Layouts
	  ○ CSS Grid and Flexbox
	• Responsive web design techniques - (03Hrs.)
	• JavaScript - (03Hrs.)
	  ○ Data validation
	• DOM Manipulation (interacting with web page elements) - (09Hrs.)
	  ○ Understanding the DOM
	  ○ Selecting and Manipulating DOM Elements
	  ○ Event Handling
	  ○ Building user interfaces (UIs) with JavaScript
	• Application of Front-End Frameworks and Libraries -(06Hrs.)
	  ○ jQuery
	  ○ Ajax
	  ○ XML
	• Back-End Programming - (12Hrs.)
	  ○ Introduction to server-side programming concepts
	  ▪ Client-Server Architecture
	  ▪ Introduction to Server-Side Programming (back-end language/s)
	  ▪ Setting Up a Local Development Environment
	  ○ Introduction to Back-End development tools
	  ▪ Node.JS
	  ▪ Nest.JS
	  ○ Introduction to back-end frameworks

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

Databases - (12Hrs.)

Introduction to Databases
SQL vs NoSQL
Working with databases (CRUD operations)

Website Security - (06Hrs.)

Common Web Security Threats
Securing the website from common threats
SSL certificates

Introduction to payment gateway – (01hrs)
Customize the web hosting environment - (02Hrs.)

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

Practical 01 -Develop a responsive website with relevant navigations and interactions with a database connection for a given scenario
Practical 02 - Obtain a domain and publish the developed website

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

Multimedia, Whiteboard
Smart board
Computer lab with internet facility
CMS- Ex: WordPress, Drupal, Joomla, etc.
IDEs – Ex: VS Code, NetBeans, Eclipse, etc.
XAMPP, WAMP
Low-Code No-Code tools and platforms

</td></tr>
<tr><td>Prescribed Texts & / or References</td><td colspan="3">

How To Build a Website, Dogit Al-Ju Domi, [No ISBN]
Learning Web Design - Html5 A Practical Handbook, Shanmugapriyaa S, ISBN: 978-93-5607-098-1
How to be a Web Developer, Radu Nicoara, ISBN: 978-1-4842-9663-9
Master Web Design with HTML CSS JavaScript and jQuery Create Stunning Interactive Websites, Frahann Hussain, Kamaron Hussain [No ISBN]
Java for Web Development, Sarika Agarwal, Vivek Gupta, ISBN: 978-93-55511-430

</td></tr>
<tr><td>Teaching/ Learning Activities</td><td colspan="3">

Interactive Lecture with hands on practical sessions
Demonstration/practical
Individual assignment
Simulation
Programmed instructions

</td></tr>
<tr><td rowspan="3">Assessment & Weighting</td><td>Type</td><td>Topic / Activity/</td><td>Module Weighting</td></tr>
<tr><td rowspan="2">Continuous Assessment</td><td>Practical 01</td><td>30%</td></tr>
<tr><td>Make a presentation and demonstration of practical 01 followed by viva (Individual)</td><td>10%</td></tr>
</table>

		Practical 02	20%
	Summative Assessment	Written Exam (2 hour)	40%
Duration	**100hrs. (60T + 30 P + 10 S)** **(T-Theory, P-Practical, S- Self Studies)**		

Module Title	**Database Management Systems**
Module Code	K72T001M11/ Level 05
Module Type	Core
Relevant Unit/s	K72T001U03
Pre-Requisites	None
Duration (Hrs.)	100 hrs.
Learning Outcomes	After completion of this module the trainee will be able to: 1. Explain different database types 2. Develop Entity Relationships (ER) diagrams 3. Perform Normalization up to 3 NF 4. Mapping ER to Relational schema 5. Create required queries for a given scenario
Learning Content	***Theory:*** ● Introduction to Database Management Systems (DBMS) – (06hrs.) o Compare manual file handling with computerized file handling o The evolution of databases o Database architectures (1-tier, 2-tier, 3-tier) ● Types of databases – (03hrs.) o Hierarchical, Network, Relational, Object-oriented databases o NoSQL, Cloud database ● Entity Relationship Diagrams (ERD) – (12hrs.) o Components of ERD ▪ Entities – Strong, Weak ▪ Attributes – Key, Composite, Derived, Multi value, etc. ▪ Cardinality of the Relationship – 1: 1, 1:M, M: N ▪ Optionality of the relationship ▪ Degree of the relationship o Mapping from ERD to Relational schema ● Fundamentals of Extended/Enhanced Entity Relationship Diagrams (EERD) – (06hrs.) ● Database Normalization – (12hrs.) o Types of Anomalies ▪ Insert anomalies ▪ Delete anomalies ▪ Update anomalies

	○ Levels of Normalization ▪ 1st Normal Form (1st NF) ▪ 2nd Normal Form (2nd NF) ▪ 3rd Normal Form (3rd NF) ○ Database keys ▪ Super key, Candidate key, Primary key, Composite primary key, Foreign Key, Alternate key ● Structured Query Language (SQL) – (15hrs.) ○ Types of SQL statements ▪ Data Definition Language (DDL) - Create, Alter, Drop, Truncate ▪ Data Manipulation Language (DML) - Insert, Update, Delete, Select ▪ Data Control Language (DCL) - Grant, Revoke ○ SQL Datatype ○ Constraints ▪ Unique, Primary key, foreign key, Not null, Check, Default ○ Create Queries ▪ JOIN and Sub Queries ○ Scaler functions and aggregated functions ○ Stored procedures, Functions and Triggers ● Backup and restore database /data – (03hrs.) ● Install and Configure DBMS – (03hrs.) ○ Access privileges
	Practical: • Practical 01 - Draw ER diagram for a given scenario • Practical 02- Create relational schema for the drawn ER diagram • Practical 03 - Make simple queries/ sub queries/ JOIN queries for the given scenarios

<table>
<tr><td>Resources</td><td colspan="3">• Multimedia, Whiteboard
• Smart board
• Computer lab with internet facility
• XAMPP, WAMP, MySQL</td></tr>
<tr><td>Prescribed Texts & / or References</td><td colspan="3">• Introduction to Database Systems, 8th Edition C. J. Date, ISBN: 9780321197849
• Fundamentals of Database Management Systems, Third Edition, Mark L. Gillenson, ISBN: 978-1-119-90746-6
• Database Mastery with Python:SQL, NoSQL, and Beyond, László Bocsó, [No ISBN]
• Modern Database Management, JEFFREY A. HOFFER , V. RAMESH
• HEIKKI TOPI, ISBN 9780134773650
• Learning Relational Database, Shanmugapriyaa S ,ISBN: 978-93-5607-713-3
• Head First SQL: Your Brain on SQL - A Learner's Guide Lynn Beighley, ISBN: 9780596526849</td></tr>
<tr><td>Teaching/ Learning Activities</td><td colspan="3">• Interactive Lecture with hands on practical sessions
• Demonstration/practical
• Individual assignment
• Simulation
• Programmed instructions</td></tr>
<tr><td rowspan="4">Assessment & Weighting</td><td rowspan="3">Continuous Assessment</td><td>Practical 01</td><td>10%</td></tr>
<tr><td>Practical 02</td><td>20%</td></tr>
<tr><td>Practical 03</td><td>20%</td></tr>
<tr><td>Summative Assessment</td><td>Written Exam</td><td>50%</td></tr>
<tr><td>Duration</td><td colspan="3">100hrs. (60T + 30 P + 10 S)
(T-Theory, P-Practical, S- Self Studies)</td></tr>
</table>

Module Title	**Multimedia production**
Module Code	K72T001M12/ Level 05
Module Type	Compulsory
Relevant Unit/s	K72T001U06, K72T001U07
Pre-Requisites	K72T001M08
Module Aim(s)	To enable the students to: • Understand multimedia concepts and its various elements (text, graphics, audio, video, animation).
Learning Outcome/s	**At the end of this module the student shall be able to:** 1. Explain multimedia production and its application in industries. 2. Explain principles of graphic design, layout, and typography. 3. Create graphics, audio, video, animation using relevant software tools 4. Understand and comply on media ethics and legal frameworks
Learning Content / Topics	• Introduction to multimedia (02 hrs.) o Overview of multimedia and its types o Multimedia in different industries (Education, Advertising, Gaming, etc.) o Principles of design: Contrast, Alignment, Repetition, Proximity (C.R.A.P) o Story boarding and concept development for multimedia projects o Understanding user experience (UX) and user interface (UI) in multimedia • Media ethics and legal frameworks (03 hrs.) o Intellectual property and copyrights law o Ethics in media o Data protection and privacy o Social media trends and regulations (Online safety acts) • Graphics and Image Editing (08 hrs.) o Introduction to Raster and Vector Graphics o Raster and Vector graphic tools o Editing Raster images o Creating and manipulating vector images o Color theory and image optimization for multimedia o Designing for different media (web, print, video) o Different graphic file formats

	• Audio Production and Editing (06 hrs.)
	  ○ Sound theory: Frequency, pitch, volume
	  ○ Audio recording techniques (using microphones, field recording)
	  ○ Editing sound
	  ○ Sound effects, Foley, and background music
	  ○ Synchronizing audio with visual content (lip-syncing, video dubbing)
	• Video Production and Editing (06 hrs.)
	  ○ Video production: Camera operation, lighting, framing, angles and shots
	  ○ Video editing principles (cutting, transitions, effects)
	  ○ Motion graphics
	  ○ Exporting videos for different platforms and file formats
	• 2D Animation and Motion Graphics (03 hrs.)
	  ○ Introduction to animation principles (squash & stretch, timing, anticipation)
	  ○ Creating motion graphics for multimedia and web content
	  ○ Integrating animation with video projects
	• Introduction to visual projection, mapping and Playback (02 hrs.)
	  ○ Live streaming
	  ○ Live vision
	  ○ LED wall mapping / projection
	  ○ LED wall animation

Practical	• Practical 01 - Design a web poster • Practical 02 - Create a soundscape for a short multimedia project • Practical 03 - Create a minimum of 1-minute video montage with music and text • Practical 04 - Live streaming on social media • Practical 05 - Produce a short video with relevant titles • Practical 06 - Create a 10-second animated logo or motion graphic • Practical 07 - Animate a character or object using keyframing

<table>
<tr><td>Resources</td><td colspan="3">• Internet connection
• Mobile phone or Device
• Video camera / Digital camera
• Lighting equipment
• Computer and related peripherals
• Required computer software
  • Photoshop
  • Illustrator
  • Corel Draw
  • Premier
  • After Effects
  • Audition
  • Vmix
  • Resolume Areena</td></tr>
<tr><td>Prescribed Texts & / or References</td><td colspan="3">• Zero to Mastery in Multimedia, Dr. R.K. Jain, [No ISBN:]
• Multimedia Making it Work, Nineth Edition, Tay Vaughan, ISBN: 978-0-07-183288-5</td></tr>
<tr><td>Teaching/ Learning Activities</td><td colspan="3">• Lectures
• Demonstration
• Practical
• Assignment
• Case study
• Field visit to video wall production house/site/studio</td></tr>
<tr><td rowspan="4">Assessment & Weighting</td><td>Type</td><td>Topic / Activity/Learning outcomes</td><td>Module Weighting</td></tr>
<tr><td rowspan="2">Continuous Assessment</td><td>Complete a multimedia project (e.g., a promotional video, interactive website, short animation)</td><td>30%</td></tr>
<tr><td>Submit a portfolio with multimedia projects (video, audio, animation).</td><td>30%</td></tr>
<tr><td>Summative Assessment</td><td>Three (3) hour Practical test for a given scenario
Note: -
• Marking should be done just after the practical test
• Should assign maximum of fifteen candidates per invigilator
• Tested softcopies of the projects</td><td>40%</td></tr>
</table>

		and marking of each candidate should be stored in a storage media	
Duration	**100hrs. (30T +60P + 10S)** **(T-Theory, P-Practical, S- Self Studies)**		

Module Title	**Computer Networks**
Module Code	K72T001M13/ Level 05
Module Type	Compulsory
Relevant Unit/s	K72T001U08
Pre-Requisites	None
Module Aim/s	**To enable the students to:** • Explain the requirement of computer networks • Configure the network environment • Segmentation the network
Learning Outcome/s	**At the end of this module the student shall be able to:** 1. Describe the important of computer network 2. Describe computer network devices. 3. Describe the different network types 4. Describe the client computer configuration and server configuration 5. Describe the important of the subnetting
Learning Content / Topics	● Computer Network Fundamentals -(12Hrs.) ○ What is a computer Network ○ Advantages and Disadvantage of Networking ○ Network topologies ○ Types of Networks ▪ LAN, MAN, WAN, etc. ▪ Wired, Wireless ▪ Client-Server, Peer-to-Peer ○ Data communication fundamentals ▪ Data Transmission Modes – Simplex, Half-duplex, Full-duplex ▪ Transmission Media -Wired, Wireless ● Network devices -(06Hrs.) ○ Network switches ○ Routers ○ Repeaters ○ Media Converters ○ Access point ● Server computers -(03Hrs.) ○ Requirement of a server computer ○ Type of servers ▪ File, Print, Web, Proxy, DHCP, DNS, Database, etc. ● Network cables -(03Hrs.) ○ Cable types – Twisted, Co-axial, Fiber • Network cabling tools -(01Hrs.)

	• Network testing tools -(01Hrs.)
	• Computer network reference models -(02Hrs.)
	  ○ OSI, TCP/IP
	• Network Protocols -(02Hrs.)
	• Addressing Host / Devices in a computer network -(03Hrs.)
	  ○ Physical address (MAC Address)
	  ○ Logical address (IP Address)
	  ○ Dynamic, Static
	  ○ IPv4, IPv6
	  ○ Public, Private
	• Subnetting -(09Hrs.)
	  ○ Classful, Classless
	• Installing and configuring network devices -(06Hrs.)
	● Wireless Networking -(03Hrs.)
	  ○ Introduction to wireless communication
	  ○ wireless technologies (wi-fi, Bluetooth, wimax,2G,3G, etc.)
	  ○ wireless security encryptions
	  ○ Configuring wireless access points (WI-FI)
	● Server Configuration -(09Hrs.)
	  ○ Server Operating System Types
	  ○ Domain/Workgroup Configuration
	  ○ Proxy, Firewall configuration		

Practical	Practical: ● Practical 01 - Create a subnet for a given scenario ● Practical 02 - Install and setup a file server/web server / proxy		
Prescribed Texts & / or References	• Computer Networking Bible, Kevin Sims, 2025 Edition, [No ISBN] • Computer Networks, Sixth Edition, Andrew S. Tanenbaum, ISBN: 978-93-560-6325-9 • Networking All-In-One, 9th Edition, Doug Lowe, ISBN: 978-1-394-27839-8 • Networking for Beginners, Jack Mathew, [No ISBN]		
Resources	• Network switches • Routers • Access point • Network toolbox • Multimedia, Whiteboard • Smart board • Computer lab with internet facility		
Assessment &	**Type**	**Topic / Activity/**	**Module Weighting**

Weighting	Continuous Assessment	Practical 01	30%
		Practical 02	30%
	Summative Assessment	Written Exam (3 hour)	40%
Duration	**100hrs. (60T + 30 P + 10 S)** **(T-Theory, P-Practical, S- Self Studies)**		

Module Title	**Cyber Security and Cloud computing**
Module Code	K72T001M14/ Level 05
Module Type	Compulsory
Relevant Unit/s	K72T001U08
Pre-Requisites	K72T001M03, K72T001M13
Module Aim/s	To enable the students to: ● Explain the important of the protection of data and privacy from cyber attack ● Explain the different types of cyber attacks ● Explain how to protect from cyber attacks ● Explain the cloud services provided by different service providers
Learning Outcome/s	At the end of this module the student shall be able to: 1. Describe the CIA triad 2. Describe the common cyber security threats 3. Describe the countermeasures for cyber attacks 4. Describe the important of cloud computing services
Learning Content / Topics	• Introduction to Cybersecurity -(04Hrs.) o Describe the principles of confidentiality, integrity, and availability (CIA Triad) o Compare how cybersecurity threats affect individuals, businesses, and organizations o Types of cybersecurity countermeasures • Cybersecurity Threats, Vulnerabilities and Attacks -(04Hrs.) o Malware and Malicious Code o social engineering o Attacks • Protecting Your Data and Privacy -(04Hrs.) o protect confidentiality. ▪ Cryptography ▪ Access Controls ▪ Obscuring Data o Data Integrity ▪ Digital Signatures ▪ Data Encryption ▪ Certificates o High Availability ▪ Disaster Recovery ▪ Data Redundancy • Introduction to cloud computing (06Hrs.) o Cloud services (IaaS, PaaS, SaaS)

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

Cloud service providers and their services
Cloud deployment models

Accessing cloud services -(03Hrs.)
Configuration of cloud services -(03Hrs.)

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

Assignment 01: - Create an analysis report for three cyber security attacks happened recently
Assignment 02: - Create a report to compare and contrast the services provided by different cloud service providers

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

Multimedia, Whiteboard
Smart board
Computer lab with internet facility
Cyber Security Software Tools (Kali Linux, Wireshark, Nmap)

</td></tr>
<tr><td>Prescribed Texts & / or References</td><td colspan="3">

Cloud Computing Concepts, Technology, Security & Architecture, SECOND EDITION, Thomas Erl, Eric Barceló Monroy, ISBN: 978-0-13-805225-6
Cloud Computing From Beginning to End, Ray Rafaels, ISBN: 978-1986726283
CYBER SECURITY A practitioner’s guide, David Sutton, ISBN: 978-1-78017-342-9
The Cybersecurity and Computer Networking Bible, Trevor Shelwick, [No ISBN]
Cybersecurity All-in-One For Dummies, Joseph Steinberg; Kevin Beaver; Ted Coombs; and Ira Winkler, ISBN: 978-1-394-15286-5
The Complete Cyber Security Course Volume I HACKERS Exposed, Nathan House, [No ISBN]

</td></tr>
<tr><td rowspan="4">Assessment & Weighting</td><td>Type</td><td>Topic / Activity/</td><td>Module Weighting</td></tr>
<tr><td rowspan="3">Continuous Assessment</td><td>Assignment 01</td><td>20%</td></tr>
<tr><td>Assignment 02</td><td>20%</td></tr>
<tr><td>Presentation for a selected cyber security concept including the cloud services</td><td>20%</td></tr>
<tr><td>Summative Assessment</td><td>Written Exam (2 hour)</td><td>40%</td></tr>
<tr><td>Duration</td><td colspan="3">50hrs. (24T + 18 P + 08 S)
(T-Theory, P-Practical, S- Self Studies)</td></tr>
</table>

Module Title	**Developing Mobile App**
Module Code	K72T001M15/ Level 05
Module Type	Compulsory
Relevant Unit/s	K72T001U09
Pre-Requisites	K72T001M01, K72T001M02, K72T001M05, K72T001M06
Module Aim(s)	To enable the students to: • Understand the mobile application development technologies and develop a comprehensive mobile application using a chosen technology
Learning Outcome/s	**At the end of this module the student shall be able to:** • Explain the strengths and weaknesses of each technology • Develop mobile applications using native, web native, and hybrid technologies • Test the developed mobile application
Learning Content / Topics	• Introduction to Mobile Application Development (03 hrs) o Overview of Mobile Application Development o Types of mobile applications (native, web native, hybrid) o Mobile app development frameworks and tools o Mobile Operating Systems (iOS, Android, etc.) o Setting up Development Environments • Native Mobile App Development (20 hrs) o iOS Development o Swift Programming Language ▪ Variables, Functions, Control Flow, OOP Concepts o Introduction to Xcode IDE o iOS UI Components & Design Patterns ▪ UIKit and SwiftUI ▪ Auto Layout, Storyboards, and Interface Builder o Navigation and Data Persistence ▪ Core Data, User Defaults, File System o Testing and Debugging iOS Apps o Deployment of iOS Apps o Android Development o Kotlin Programming Language ▪ Variables, Functions, Control Flow, OOP Concepts

	○ Introduction to Android Studio IDE ○ Android UI Components & Design Patterns ▪ Layouts, Fragments, Recycler View, Jetpack Compose ○ Navigation and Data Persistence ▪ SQLite, Room Database, Shared Preferences ○ Testing and Debugging Android Apps ○ Deployment of Android Apps • Web-Native Development (12 hrs) ○ Introduction to Web-Native Applications ○ Progressive Web Apps (PWAs) using HTML, CSS, and JavaScript ○ Testing and Deploying PWAs ○ Creating a responsive web app • Hybrid Mobile App Development (05 hrs.) ○ Introduction to Hybrid Frameworks ○ React Native ▪ React Native and Component Structure ▪ Accessing Native Features with React Native ▪ Deploying React Native Apps ○ Flutter ▪ Dart Programming Language ▪ Widgets, State Management, and Navigation ▪ Accessing Native Features through Platform Channels ▪ Testing and Deployment • Backend Integration and API Development (08 hrs) ○ Backend for Mobile Apps ○ Building a Backend • Performance Optimization (02 hrs) ○ Memory Management, Reducing App Size, Improving Load Time
Practical	• Practical 01: Develop a To-Do List App where users can: ○ Add new tasks. ○ Mark tasks as completed or not completed. ○ Delete tasks. ○ View a list of pending and completed tasks. • Practical 02: Develop a Contact Book App where users can: ○ Add new contacts. ○ View a list of saved contacts. ○ Search for contacts by name.

<table>
<tr><td></td><td colspan="3">o Edit and delete contacts.</td></tr>
<tr><td>Resources</td><td colspan="3">• Internet connection
• Mobile phone or Device
• Computer and related peripherals
• Required computer software</td></tr>
<tr><td>Prescribed Texts & / or References</td><td colspan="3">• Mastering Mobile Application Development, 2nd Edition, Jonathan Engelsma and Hans Dulimarta, [No ISBN]</td></tr>
<tr><td>Teaching/ LearningActivities</td><td colspan="3">• Lectures
• Demonstration
• Practical
• Assignment
• Case study</td></tr>
<tr><td rowspan="5">Assessment & Weighting</td><td>Type</td><td>Topic / Activity/Learning outcomes</td><td>Module Weighting</td></tr>
<tr><td rowspan="3">Continual Assessment</td><td>Practical 01</td><td>15%</td></tr>
<tr><td>Practical 02</td><td>15%</td></tr>
<tr><td>• Develop an Event Planner App where users can:
o Create new events with details like name, date, time, and description.
o View a list of upcoming events.
o Edit or delete existing events.
o Search for events by name or date.
o Set reminders or notifications for events.</td><td>30%</td></tr>
<tr><td>Summative Assessment</td><td>Three (3) hour Practical test for a given scenario
Note: -
• Marking should be done just after the practical test
• Should assign maximum of fifteen candidates per invigilator
• Tested apps and marking of each candidate should be stored in a storage media</td><td>40%</td></tr>
<tr><td>Duration</td><td colspan="3">75hrs. (50T + 20P + 05S)
(T-Theory, P-Practical, S- Self Studies)</td></tr>
</table>

MODULE DESCRIPTORS
Information and Communication Technology
NVQ Level 05
Semester 2
Employability modules

Module Title	**Workplace Information Management**
Module Code	EMTM01/Level 05
Module Type	Compulsory
Relevant Unit/s	EMTU01
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	**At the end of this module 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

<table>
<tr><td></td><td colspan="3">• Conducting and recording of performance evaluations</td></tr>
<tr><td>Resources</td><td colspan="3">Teaching Aids
Networked Computers, Multimedia, Whiteboard</td></tr>
<tr><td>Recommended Texts & / or References</td><td colspan="3">Information Management: Best Practices – Volume 1
(Bob Boiko, Erik M. Hartman)</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="3">Assessment & Weighting</td><td>Type</td><td>Topic / Activity</td><td>Weighting</td></tr>
<tr><td rowspan="2">Formative assessment</td><td>Use of ICT Tools, Software applications, application of information management skills at work place</td><td>50%</td></tr>
<tr><td>Knowledge on various aspects of information management skills at work place - Oral questioning during class room presentations</td><td>10%</td></tr>
<tr><td>Summative assessment</td><td>Knowledge on various aspects of information management skills at work place - Multiple</td><td>30%</td></tr>
</table>

		Choice Test Items/ Matching and Completion test items and structured essay type questions	
		knowledge on application of information management skills- Viva voce	10%
Duration	75 hours **(45T + 20P + 10S)** **(T-Theory, P-Practical, S- Self Studies)**		

Module Title	**Planning scheduling work at workplace**
Module Code	EMTM03/Level 05
Module Type	Compulsory
Relevant Unit/s	EMTU03
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	**At the end of this module 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)

<table>
<tr><td></td><td colspan="3">• Forecasting Techniques /methods
• Time management techniques
• Competency assessment methods</td></tr>
<tr><td>Resources</td><td colspan="3">Teaching Aids
Networked Computers, Multimedia, Whiteboard</td></tr>
<tr><td>Recommended 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 organizational 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,
• Deficiencies in the plan (Developed in activity -3)
• Modifications to be made to overcome deficiencies
• Explain and follow up with exercises
• Forecasting methods / Techniques, Time management techniques, Competency assessment method</td></tr>
<tr><td rowspan="3">Assessment & Weighting</td><td>Type</td><td>Topic / Activity</td><td>Weighting</td></tr>
<tr><td rowspan="2">Formative assessment</td><td>Use of different approaches and techniques related to planning of work, application of skills in Planning work at work place</td><td>50%</td></tr>
<tr><td>Knowledge of various aspects of planning of work to be performed at workplace - Oral questioning during class room presentations</td><td>10%</td></tr>
</table>

	Summative assessment	Knowledge of various aspects of planning of work to be performed at workplace - Multiple Choice Test Items/ Matching and Completion test items and structured essay type questions	30%
		knowledge on application of planning of work in a given work situation - Viva voce	10%
Duration	75hours **(45T + 20P + 10S)** **(T-Theory, P-Practical, S- Self Studies)**		