



Co-funded by the European Union



Norwegian Embassy  
Islamabad



# ANDROID APPLICATION DEVELOPER



© TVET SSP

## LEARNER GUIDE

National Vocational Certificate Level 2

Version 1 - October, 2019



Implemented by  
**giz**  
Deutsche Gesellschaft  
für Internationale  
Zusammenarbeit (GIZ) GmbH

**Published by**

National Vocational and Technical Training Commission  
Government of Pakistan

**Headquarter**

Plot 38, Kirthar Road, Sector H-9/4, Islamabad, Pakistan  
[www.navttc.org](http://www.navttc.org)

**Responsible**

Director General Skills Standard and Curricula, National Vocational and Technical Training Commission  
National Deputy Head, TVET Sector Support Programme, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

**Layout & design**

SAP Communications

**Photo Credits**

TVET Sector Support Programme

**URL links**

Responsibility for the content of external websites linked in this publication always lies with their respective publishers. TVET Sector Support Programme expressly dissociates itself from such content.

This document has been produced with the technical assistance of the TVET Sector Support Programme, which is funded by the European Union, the Federal Republic of Germany and the Royal Norwegian Embassy and has been commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ). The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH in close collaboration with the National Vocational and Technical Training Commission (NAVTTTC) as well as provincial Technical Education and Vocational Training Authorities (TEVTAs), Punjab Vocational Training Council (PVTTC), Qualification Awarding Bodies (QABs)s and private sector organizations.

**Document Version**

October, 2019

**Islamabad, Pakistan**

# LEARNER GUIDE

## National Vocational Certificate Level 2

Version 1 - October, 2019

- This is the main content of your learner's guide with detail of the knowledge and skills (practical activities, projects, assignments, practices etc.) you will require to achieve learning outcomes stated in the curriculum
- This section will include examples, photographs and illustrations relating to each learning outcome
- **Summary of modules:**
  - This contains the summary of the modules that make up your learner's guide
- **Frequently asked questions:**
  - These have been added to provide further explanation and clarity on some of the difficult concepts and areas. This further helps you in preparing for your assessment.
- **Multiple choice questions for self-test:**
  - These are provided as an exercise at the end of your learner's guide to help you in preparing for your assessment.

## Module 1: Comply Personal Health and Safety Guidelines

### Objective of the module:

This Competency Standard identifies the competencies required to protect/apply occupational Safety, health and Environment at workplace according to the industry's approved guidelines, procedures and interpret environmental rules/regulations. Trainee will be expected to identify and use Personal Protective Equipment (PPE) according to the work place requirements. The underpinning knowledge regarding Observe Occupational Safety and Health (OSH) will be sufficient to provide the basis for the job at workplace.

**Duration**      30 hours      **Theory:**      hours      **Practical:**      hours

Learning Unit	Learning Outcomes	Learning Elements	Materials Required
LU1: Identify Personal Hazards at Workplace	The trainee will be able to:		
LU2: Apply Personal Protective and	The trainee will be able to:		

Learning Unit	Learning Outcomes	Learning Elements	Materials Required
Safety Equipment (PPE)			
LU3: Comply Occupational Safety and Health (OSH)	The trainee will be able to:		
LU4: Dispose of hazardous Waste/materials from the designated area.	The trainee will be able to:		

# Module-2

## LEARNER GUIDE

National Vocational Certificate Level 2

Version 1 - October, 2019

## Module 2: Communicate the Workplace Policy and Procedure

### Objective of the module:

This unit describes the performance outcomes, skills and knowledge required to develop communication skills in the workplace. It covers gathering, conveying and receiving information, along with completing assigned written information under direct supervision.

**Duration:20hours**

**Theory:**

**Practical:**

Learning Unit	Learning Outcomes	Learning Elements	Materials Required
LU1: Identify workplace communication procedures	The trainee will be able to:		
LU2: Communicate at workplace	The trainee will be able to:		
LU3: Draft Written Information	The trainee will be able to:		
LU4: Review Documents	The trainee will be able to:		

# Module-3

## LEARNER GUIDE

National Vocational Certificate Level 2

Version 1 - October, 2019



### Module 3: Perform Basic Communication (Specific)

#### Objective of the module:

This unit describes the skills and knowledge required to assist in the development of communication competence by providing information regarding different forms of communication and their appropriate use.

By the end of this program, learners will be able, to communicate more effectively and efficiently by: working in a team, follow supervisor's instructions and develop generic communication work skills at workplace.

**Duration:** 30  
hours

**Theory:**

**Practical:**

Learning Unit	Learning Outcomes	Learning Elements	Materials Required
LU1: Communicate in a team to achieve intended outcomes	The trainee will be able to:		
LU2: Follow Supervisor's instructions as per organizational SOPs	The trainee will be able to:		
LU3: Develop Generic communication skills at workplace	The trainee will be able to:		

# Module-4

## LEARNER GUIDE

National Vocational Certificate Level 2

Version 1 - October, 2019

#### Module 4: Perform Basic Computer Application (Specific)

##### Objective of the module:

This unit describes the skills and knowledge required to use spreadsheet to prepare a page of document, develops familiarity with Word, Excel, Access, PowerPoint, email, and computer graphics basics.

It applies to individuals who perform a range of routine tasks in the workplace using a fundamental knowledge of spreadsheets, Microsoft office and computer graphics in under direct supervision or with limited responsibility.

**Duration: 40  
hours**

**Theory:**

**Practical:**

Learning Unit	Learning Outcomes	Learning Elements	Materials Required
LU1: Create Word Documents	The trainee will be able to:		
LU2: Use internet for Browsing	The trainee will be able to:		

# Module-5

## LEARNER GUIDE

National Vocational Certificate Level 2

Version 1 - October, 2019

## Module 5: 0613001016 Use information technology skills capable of Android Development

### Objective of the module:

This competency standard will enable learners to develop knowledge about basic Fundamentals of IT required to operate system, networking, browsing internet, MS Office, E-Marketing and cyber Laws. After completion of this competency standard Learner will be able to perform networking and internet browsing, use MS Office for various documentation and perform e-marketing at digital platforms according to cyber laws.

**Duration: 120  
Hours**

**Theory: 30  
Hours**

**Practical: 90  
Hours**

Learning Unit	Learning Outcomes	Learning Elements	Materials Required
<b>LU1:</b> <b>Use IT Fundamentals to operate the computer</b>	<b>The trainee will be able to:</b> Identify the components of computer <ul style="list-style-type: none"> <li>• CPU</li> <li>• Input &amp; Output Devices</li> <li>• Memory &amp; Storage Device</li> </ul> Use Operating System  Install Basic Computer Software as per	Understanding the basics of computer; Introduction to computers, types of computers, such as mainframe computer, mini computers ,micro computer Understanding various types of data such as numeric data, alphanumeric data etc. Understanding memory units such as bit, nibble, byte etc. Differentiate between software and hardware Understanding types of software System software Application software Understanding hardware components of computer	White board, white board markers. Computer systems <ul style="list-style-type: none"> <li>• Operating Systems</li> <li>• MS Office</li> </ul>

	requirement	<ul style="list-style-type: none"> <li>• CPU</li> <li>• Input &amp; Output Devices</li> <li>• Memory &amp; Storage Devices</li> </ul>	
<b>LU2: Perform Networking in regard to Data Communication</b>	<p><b>The trainee will be able to:</b></p> <p>Perform connectivity of computers for data sharing.</p> <p>Apply Internet Protocol (IP) Address for connectivity</p> <p>Perform basic Troubleshooting commands for networking</p>	<p>Understanding the need of networking for data communication.</p> <p>Understanding the basics of networking</p> <p>Understanding network topologies.</p> <p>Understanding different network cables</p> <p>Understanding the types of networking</p> <ul style="list-style-type: none"> <li>• Local Area Network</li> <li>• Wide Area Network</li> <li>• Metropolitan Area Networks</li> </ul> <p>Understanding Transmission Control Protocol / Internet Protocol (TCP / IP)</p> <p>Understanding basic troubleshooting commands such as Ping, Ipconfig/all, Tracert etc.</p>	<p>Computers,</p> <p>Networks Switches,</p> <p>Network Cable cat-6,</p> <p>RJ-45 connectors,</p> <p>Cable Testers,</p> <p>Crimpling tools</p>
<b>LU3: Use Internet for Browsing</b>	<p><b>The trainee will be able to:</b></p> <p>Perform web surfing to find relevant information</p> <p>Browse information on specific topic (Videos, Images, articles etc)</p> <p>Use digital platforms for</p>	<p>Understanding HTTP (Hyper Text Transfer Protocol)</p> <p>Understanding Internet www (World Wide Web).</p> <p>Understanding Websites &amp; Blogs.</p> <p>Understanding Search Engine such as google, yahoo, bing etc.</p> <p>Procedures of using digital platforms for communications such as gmail and skype</p>	<p>Computer Systems with Internet facility,</p> <p>Web Browsers.</p>

	<p>communication</p> <ul style="list-style-type: none"> <li>Gmail, Skype, etc.</li> </ul>	etc.	
<b>LU4:</b> <b>Use MS Office for documentation</b>	<p><b>The trainee will be able to:</b></p> <p>Prepare Word document as per required format</p> <p>Prepare Excel Sheet as per given required format</p> <p>Prepare presentation in PowerPoint as per given guidelines</p>	<p>Understanding the importance of using MS Office</p> <p>Understanding the key terms used in Word processing such as creating new file, opening file, saving file, printing file and editing file.</p> <p>Understanding composing and formatting to prepare word documents.</p> <p>Preparing the word document using the key terms as per required format.</p> <p>Understanding the key terms used in Excel such as Excel Spreadsheets, formulae, functions, graphs etc.</p> <p>Preparing the excel spreadsheet using the key terms as per required format.</p> <p>Understanding the key terms used in Power Point Presentations such as slideshow, adding animations, transitions, layouts, themes etc.</p> <p>Preparing the Power point presentation using the key terms as per required format</p>	<p>Computer Systems, Multimedia projectors, Printers.</p> <p>MS Office latest version such as 2013, 2016.</p>

<b>LU5:</b> <b>Follow E-Marketing using digital platforms</b>	<b>The trainee will be able to:</b> Perform E-Marketing using emails.  Perform E-Marketing using social media	Understanding the basics of E-Marketing for using digital platforms. Understanding the Types of E-Marketing; <ul style="list-style-type: none"> <li>• Social media marketing</li> <li>• Email marketing</li> <li>• Content Marketing             <ul style="list-style-type: none"> <li>(a) Blogs</li> <li>(b) videos</li> </ul> </li> <li>• Paid Advertising</li> </ul> Follow the techniques of Social Media Marketing.	Computer Systems, Multimedia projectors, Printers Web Browsers
<b>LU6:</b> <b>Follow Cyber Laws as per relevant industry requirement</b>	<b>The trainee will be able to:</b> Use Internet according to Cyber Laws  Use permissible assets according to Cyber Laws	Understanding Cyber laws for Internet usage such as electronic transactions ordinance, electronics cybercrimes ordinance etc. for inland applications of cyber laws. Understanding importance of Cyber laws Preventing the plagiarism by following the cyber laws.	Computer Systems with Internet facility, Web Browsers Documents containing cyber laws.



# Module-6

## LEARNER GUIDE

National Vocational Certificate Level 2

Version 1 - October, 2019

## Module 6: 0613001017 Use Basics of Programming

### Objective of the module:

This competency standard will enable learners to understand the basics of programming languages, various types of programming applications and languages for mobile app development and basic structure of a program. After completing this competency standard learner will be able to use basic language and object oriented programming for Mobile App.

**Duration: 200**  
**Hours**

**Theory: 42**  
**Hours**

**Practical: 158**  
**Hours**

Learning Unit	Learning Outcomes	Learning Elements	Materials Required
<b>LU1:</b> <b>Use basic Language for Mobile App</b>	<b>The trainee will be able to:</b>  Introduction of basic programming  Prepare basic algorithm as per given task  Prepare basic pseudo code as per given algorithm  Draw flowchart as per given algorithm	 Understanding Programming fundamentals, variables, arithmetic's, operators, data-types, conditional statements, loops functions, inputs and outputs in java.  Know the importance of algorithm, problem solving, program logic, Follow and present already developed algorithm.  Learn the concepts of pseudo code, importance of pseudo code and development of pseudo code.  Learn symbols of flowcharts (Process, Terminal/Terminator, Decision, Document, Data, or Input/Output, Stored Data, Flow Arrow etc.), flowchart design and implementation.	 Net Beans Microsoft Visio Computer Systems as per requirements Multimedia projector Printer Internet USB Paper, Pencil, Erasers White Boards Markers Dusters

	Write basic program as per given task	Understanding programming environment, Follow and present already developed program includes conversion of Pseudo code, algorithm and flowcharts into a program, develop programming skills.	
<b>LU2:</b> <b>Use Object Oriented Programming</b>	<p><b>The trainee will be able to:</b></p> <p>Prepare a class for an object using inheritance as per given requirements.</p> <p>Prepare a basic program by using polymorphism techniques as per given requirements</p> <p>Prepare a basic application as per given requirements.</p>	<p>Understanding the concepts of OOP (Class, access modifiers, attributes, methods, constructors, parameters, objects and inheritance) and implementations of inheritance.</p> <p>Understanding Polymorphism, importance of polymorphism, Types of polymorphism (Run time and Compile time polymorphism), Implementing polymorphism technique to prepare a basic program</p> <p>Understanding of program development using OOP concepts, program development using inheritance, program development using types of polymorphism (run time and compile time polymorphism)</p> <p>Evaluating the whole process of preparing a program using OOP</p>	<p>Net Beans</p> <p>Computer Systems as per requirements</p> <p>Multimedia projector</p> <p>Printer</p> <p>Internet</p> <p>USB</p> <p>Paper</p> <p>White Boards</p> <p>Markers</p> <p>Dusters</p>
<b>LU3:</b> <b>Identify Data Structure</b>	<p><b>The trainee will be able to:</b></p> <p>Prepare a program to swap</p>	Learn the Types of Data structures (Arrays, Stacks, Queues, Linked lists, Trees, Graphs, Hash	<p>Notepad++ latest version</p> <p>Net Beans latest version</p>

	<p>data as per given requirements</p> <p>Prepare a program to show contact list by using hash-map techniques as per given requirements</p>	<p>Tables etc),</p> <p>Understanding and explaining Data swapping using different types of Data structures,</p> <p>Creating data swapping program using different types of Data structures</p> <p>Learning Java HashMap class, key-value pair,</p> <p>Follow and present already developed program using Hash-map</p>	<p>Computer Systems as per requirements</p> <p>Multimedia projector</p> <p>Printer</p> <p>Internet</p> <p>USB</p> <p>White Board</p> <p>Paper</p> <p>Markers</p> <p>Dusters</p>
--	--	---	---

# Module-7

## LEARNER GUIDE

National Vocational Certificate Level 2

Version 1 - October, 2019

## Module 7: 0613001018 Interpret Technical Requirements for Apps Development

### Objective of the module:

This competency standard will help learner to interpret technical texts required for Android App, Identify programming challenges and components for Apps Development. After completion of this competency standard learner will be equipped technical knowledge required for development of Android App.

**Duration: 110  
Hours**

**Theory: 20  
Hours**

**Practical: 90  
Hours**

Learning Unit	Learning Outcomes	Learning Elements	Materials Required
<b>LU1: Interpret technical texts for required Android App</b>	<b>The trainee will be able to:</b> Create a block diagram for interpreted technical statement  Build a report listing functional and non-functional needs of system to be developed.	Understanding the concept of block diagrams e.g. flowcharts  Understanding paper prototyping for the creation of block diagram.  Understanding requirement gathering techniques i.e. brainstorming, questionnaire etc Understanding functional and non-functional requirements List functional and non-functional requirements;	Paper, pencil, erasers, Markers, Flip chart/white board, pen  Rulers, Laptops/ desktops as per requirements, Microsoft Word, Printer, Multimedia
<b>LU2: Identify Programming</b>	<b>The trainee will be able to:</b> Identify the activities,		Paper, pencil, erasers, Markers, Flip chart/white board, pen

<b>challenges for software design</b>	<p>services, broadcasts, app/ additional resources, app permissions of system</p> <p>Identify any potential challenges and solutions</p>	<p>Understanding Android App Fundamental Components e.g. android life cycle, activities, fragments broadcasts and services etc.</p> <p>Understanding the Android Studio Components e.g. layouts, styles, drawables &amp; app folder</p> <p>Understanding the Software/Hardware limitation of Android e.g. permission for the android application</p> <p>Understanding the Concepts of Packages and Plugins</p> <p>Understanding the problem solving techniques e.g. logical, problem statement, algorithm ,pseudo codes</p> <p>Understanding basics of the software design.</p>	<p>Laptops/desktops as per requirement, android studio</p> <p>App testing mobile device.</p>
<b>LU3: Identify Components for Apps Development</b>	<p><b>The trainee will be able to:</b></p> <p>Create a Proposal Document based on App requirements specifications.</p>	<p>Understanding the key components of Software Requirement Specification Document</p> <p>Making the software requirement specification document.</p> <p>Evaluating the software requirement specification document.</p>	<p>Paper, pencil, erasers, Markers, Flip chart/white board, pen</p> <p>Rulers, Laptops/ desktops as per requirements, Microsoft Word, Printer, Multimedia</p>

# Module-8

## LEARNER GUIDE

National Vocational Certificate Level 2

Version 1 - October, 2019



## Module 8: 0613001019 Use Data Bases for Apps Development

### Objective of the module:

This competency standard will enable learners to Develop knowledge about managing databases for various types of operations, develop data base for App Development and draw entity relationship diagrams (ERD). After completing this competency learner will be able to draw diagrams, perform operations and develop data base for Apps Development.

**Duration: 150  
hours**

**Theory: 20  
Hours**

**Practical: 130  
Hours**

Learning Unit	Learning Outcomes	Learning Elements	Materials Required
<b>LU1: Identify the basics of Data base for Apps Development</b>	<b>The trainee will be able to:</b>  Create data tables          Create Relationship between tables.	Understanding the requirements for the application development  Listing the processes associated with the creation of entities, attributes, and in populating fields, using input based  Understanding the structure of data tables e.g. fields, attributes, rows, columns   Making paper prototype of the data tables.  Understanding the basics of relational database. e.g. types of database keys such as primary key constraint key, foreign key etc.	Paper, pencil, erasers, Markers, Flip chart/white board, pen  Rulers, Laptops/ desktops as per requirements, Microsoft Word, Printer, Multimedia

		Understanding relationships and its types i.e. one to one, one to many etc.	
<b>LU2: Draw Entity Relationship Diagrams for Apps Development</b>	<p><b>The trainee will be able to:</b></p> <p>Identify system entities and relationships for database as per requirements</p> <p>Create ERD (Entity Relationship Diagram) using software (Microsoft Visio etc.)</p>	<p>Understanding ERD development tools.</p> <p>Understanding the creation of auto generated ERD tools.</p> <p>Understanding normalization techniques e.g. 1NF, 2NF, 3NF etc.</p> <p>Importance of Entity Relationship Diagrams for Apps Development</p> <p>Understanding the basics of Microsoft Visio.</p> <p>Understanding the structural concepts of ERD diagrams i.e. table name, attributes,</p> <p>Understand the mechanism of joins, e.g. inner joins, outer joins etc.</p> <p>Understanding symbols and notations for ERD.</p>	<p>Paper, pencil, erasers, Markers, Flip chart/white board, pen</p> <p>Rulers, Laptops/ desktops as per requirements, Microsoft Word, Printer, Multimedia</p>
<b>LU3: Perform Operations for Database Development</b>	<p><b>The trainee will be able to:</b></p> <p>Apply CRUD (Create, Read, Update &amp; Delete)</p> <p>Apply joins</p>	<p>Understanding basics of Database Management Systems DBMS, SQL .e.g. queries, normalization, denormalization, primary key, foreign key, composite key,</p> <p>Understand DDL (Data Definitions Language)</p>	<p>Paper, pencil, erasers, Markers, Flip chart/white board, pen</p> <p>Rulers, Laptops/ desktops as per requirements, Microsoft Word, Printer, Multimedia</p>

	<p>Apply aggregate functions</p> <p>Create Stored procedures and views</p>	<p>Performing joins i.e. inner joins, outer joins.</p> <p>Understanding aggregate functions. Performing different aggregate functions e.g. max, mean, mode and min etc.</p> <p>Understanding stored procedures. Understanding views e.g. create view, update view, drop view etc. Recognizing the store procedure functionalities</p>	
<p><b>LU4:</b></p> <p><b>Develop Database for Apps development</b></p>	<p><b>The trainee will be able to:</b></p> <p>Apply DDL (Data Definition Language)</p> <p>Develop basic Database Project</p>	<p>Performing basic operations of the DDL e.g. COMMIT, ROLL BACK, SAVE POINT etc.</p> <p>Performing development of database for Android app including table creation, normalization, ERD etc.</p>	<p>Paper, pencil, erasers, Markers, Flip chart/white board, pen</p> <p>Rulers, Laptops/ desktops as per requirements, Microsoft Word, Printer, Multimedia</p>

# Module-9

## LEARNER GUIDE

National Vocational Certificate Level 2

Version 1 - October, 2019

## Module 9: 0613001020 Design User Interface for Mobile Apps

### Objective of the module:

This competency standard will help learners to understand basics of wireframes, graphic user interface, user case and elements of interface. After completion of this competency standard, the learner will have hands on experience to make wireframes and graphic user interface.

**Duration: 120  
Hours**

**Theory: 20  
Hours**

**Practical: 100  
Hours**





Learning Unit	Learning Outcomes	Learning Elements	Materials Required
<b>LU1: Make Wireframes</b>	<b>The trainee will be able to:</b>  Make sketch as per requirement  Make wireframe as per provided sketch	Understanding the elements and principles to design User Interface for Mobile Apps Explaining Mobile User Interfaces (App screens, navigation, features), User experience, understanding designing requirements of an application, Prepare a sketch according to the given requirements Understanding wireframes, components of wireframes (Label, Text Field, Button, Toggle Button, Switch, Checkbox, Radio Button, Spinner etc)	<ul style="list-style-type: none"><li>• Computer systems as per requirements</li><li>• USB</li><li>• Internet</li><li>• White Board</li><li>• Markers</li><li>• Multimedia Projector</li><li>• Papers</li><li>• Pencils</li></ul>

<b>LU2: Make Graphic User Interface</b>	<b>The trainee will be able to:</b> Make prototype using up-to-date design software Make final design using up-to-date design software  Apply transition using up-to-date design software	Learning tool (Adobe XD) to implement wireframes (App screens), Follow already developed wireframes Understanding of linking of elements to target screens using Adobe XD, Present already developed wireframes Learning Transitions, Understanding Transition concepts (Action, Duration, preserve scroll position, Overlay). Follow and present already developed wireframes using Transition affects	<ul style="list-style-type: none"> <li>• Computer systems as per requirements</li> <li>• Adobe XD</li> <li>• USB</li> <li>• Internet</li> <li>• White Board</li> <li>• Markers</li> <li>• Multimedia Projector</li> <li>• Papers</li> <li>• Pencils</li> </ul>
<b>LU3: Prepare Use Case</b>	<b>The trainee will be able to:</b> Prepare Use Case Diagram using relevant software as per given requirement  Create paths and user scenario as per provided document  Make relationship and system boundaries as per given requirement	Understanding Use Case Diagrams, Learning Use case diagram concepts (System, Use Case, Actors, Relationships), Following already developed Use case diagram Learn use case paths, use case scenario, Follow already developed use case paths and use case scenarios Understanding relationships (communicates, includes, extends), system boundaries in use case diagrams. Present already developed use case diagram includes relationships and system boundaries	<ul style="list-style-type: none"> <li>• Computer Systems as per requirements</li> <li>• Microsoft Visio</li> <li>• Printer</li> <li>• USB</li> <li>• Internet</li> <li>• White Board</li> <li>• Markers</li> <li>• Multimedia Projector</li> <li>• Papers</li> <li>• Pencil</li> </ul>
<b>LU4: Identify the Elements of the Interface</b>	<b>The trainee will be able to:</b> Perform content prioritization as per design	Understanding content prioritization, Learning content prioritization concepts (creating a comprehensive Strategy and Governance,	<ul style="list-style-type: none"> <li>• Computer Systems as per requirements</li> <li>• Microsoft Visio</li> <li>• Printer</li> <li>• USB</li> </ul>




	<p>requirement</p> <p>Apply space distribution as per design requirement</p> <p>Apply intendant action as per design requirement</p> <p>Perform input controls</p>	<p>Content Lifecycle etc)</p> <p>Learning distributed interaction space, sharing user interfaces</p> <p>Understanding User Interface elements,</p> <p>Learning Input controls (checkboxes, radio buttons, dropdown lists, list boxes, buttons, toggles, text fields, date field etc)</p>	<ul style="list-style-type: none"> <li>• Internet</li> <li>• White Board</li> <li>• Markers</li> <li>• Multimedia Projector</li> <li>• Papers</li> <li>• Pencil</li> </ul>
--	--	--	--

## Examples and illustrations

### Videos

	<p>Introduction to computers</p> <p>URL</p> <p><a href="https://www.youtube.com/results?search_query=how+to+use+computer">https://www.youtube.com/results?search_query=how+to+use+computer</a></p>
	<p>Introduction to computer networking</p> <p>URL</p> <p><a href="https://www.youtube.com/results?search_query=basics+of+computer+networking">https://www.youtube.com/results?search_query=basics+of+computer+networking</a></p>
	<p>How to use MS office</p> <p>URL</p> <p><a href="https://www.youtube.com/results?search_query=how+to+use+ms+office">https://www.youtube.com/results?search_query=how+to+use+ms+office</a></p>
	<p>Follow E-Marketing using digital platforms</p> <p>URL</p> <p><a href="https://www.youtube.com/results?search_query=Follow+E-Marketing+using+digital+platforms">https://www.youtube.com/results?search_query=Follow+E-Marketing+using+digital+platforms</a></p>



	<p>Basics of Programming</p> <p>URL</p> <p><a href="https://www.youtube.com/results?search_query=Introduction+to+basic+programming">https://www.youtube.com/results?search_query=Introduction+to+basic+programming</a></p>
	<p>Object Oriented Programming</p> <p>URL</p> <p><a href="https://www.youtube.com/results?search_query=object+oriented+programming">https://www.youtube.com/results?search_query=object+oriented+programming</a></p>
	<p>Data structures and algorithms</p> <p>URL</p> <p><a href="https://www.youtube.com/results?search_query=data+structures+and+algorithms">https://www.youtube.com/results?search_query=data+structures+and+algorithms</a></p>

## Example and Illustrations

### Relevant topics and web links

S.No	Links and definitions
1	Computer networking basic concepts <a href="https://www.techopedia.com/definition/25598/computer-networking">https://www.techopedia.com/definition/25598/computer-networking</a>
2	Basics of programming <a href="https://www.tutorialspoint.com/computer_programming/computer_programming_basics.htm">https://www.tutorialspoint.com/computer_programming/computer_programming_basics.htm</a>
3	How to Write Specification for a Mobile App Development Project? <a href="https://apro-software.com/writing-specifications-for-a-mobile-app-development-project/">https://apro-software.com/writing-specifications-for-a-mobile-app-development-project /</a>
4	Introduction to databases <a href="https://www.guru99.com/introduction-to-database-sql.html">https://www.guru99.com/introduction-to-database-sql.html</a>

## Module summary

Module	Learning Unit	Duration
<b>Module 1:</b> Comply Personal Health and Safety Guidelines  <b>Aim:</b> This module aims to develop the knowledge, skills and understanding needed to Comply Personal Health and Safety Guidelines	<b>LU1:</b> Identify Personal Hazards at Workplace <b>LU2:</b> Apply Personal Protective and Safety Equipment (PPE) <b>LU3:</b> Comply Occupational Safety and Health (OSH) <b>LU4:</b> Dispose of hazardous Waste/materials from the designated area	30 hours
<b>Module 2:</b> Communicate the Workplace Policy and Procedure  <b>Aim:</b> This module aims to develop the knowledge, skills and understanding needed to Communicate the Workplace Policy and Procedure	<b>LU1:</b> Identify workplace communication procedures <b>LU2:</b> Communicate at workplace <b>LU3:</b> Draft Written Information <b>LU4:</b> Review Documents	20 hours

Module	Learning Unit	Duration
<b>Module 3:</b> Perform Basic Communication (Specific)  <b>Aim:</b> This module aims to develop the knowledge, skills and understanding needed to Perform Basic Communication (Specific)	<b>LU1:</b> Communicate in a team to achieve intended outcomes <b>LU2:</b> Follow Supervisor's instructions as per organizational SOPs <b>LU3:</b> Develop Generic communication skills at workplace	30 hours
<b>Module 4:</b> Perform Basic Computer Application (Specific)  <b>Aim:</b> This module aims to develop the knowledge, skills and understanding needed to Perform Basic Computer Application (Specific)	<b>LU1:</b> Create Word Documents <b>LU2:</b> Use internet for Browsing	40 hours

Module	Learning Unit	Duration
<b>Module 5:</b> Use information technology skills capable of Android Development  <b>Aim:</b> This module aims to develop the knowledge, skills and understanding needed to Use information technology skills capable of Android Development	<b>LU1:</b> Use IT Fundamentals to operate the computer <b>LU2:</b> Perform Networking in regard to Data Communication <b>LU3:</b> Use internet for Browsing <b>LU4:</b> Use MS Office for documentation <b>LU5:</b> Follow E-Marketing using digital platforms <b>LU6:</b> Follow Cyber Laws as per relevant industry requirement	120 hours
<b>Module 6:</b> Use Basics of Programming  <b>Aim:</b> This module aims to develop the knowledge, skills and understanding needed to Use Basics of Programming	<b>LU1:</b> Use basic Language for Mobile App <b>LU2:</b> Use Object Oriented Programming <b>LU3:</b> Identify Data Structure	200 hours
<b>Module 7:</b> Interpret Technical Requirements for Apps Development  <b>Aim:</b> This module aims to develop the knowledge, skills and understanding needed to Interpret Technical Requirements for Apps Development	<b>LU1:</b> Interpret technical texts for required Android App <b>LU2:</b> Identify Programming challenges for software design <b>LU3:</b> Identify Components for Apps Development	110 hours

Module	Learning Unit	Duration
<b>Module 8:</b> Use Data Bases for Apps Development <b>Aim:</b> This module aims to develop the knowledge, skills and understanding needed to Use Data Bases for Apps Development	<b>LU1:</b> Identify the basics of Data base for Apps Development <b>LU2:</b> Draw Entity Relationship Diagrams for Apps Development <b>LU3:</b> Perform Operations for Database Development <b>LU4:</b> Develop Database for Apps development	150 hours
<b>Module 9:</b> Design User Interface for Mobile Apps <b>Aim:</b> This module aims to develop the knowledge, skills and understanding needed to	<b>LU1:</b> Make Wireframes <b>LU2:</b> Make Graphic User Interface <b>LU3:</b> Prepare Use Case <b>LU4:</b> Identify the Elements of the Interface	120 hours

## Frequently Asked Questions

1. What is Competency Based Training (CBT) and how is it different from currently offered trainings in institutes?	Competency-based training (CBT) is an approach to vocational education and training that places emphasis on what a person can do in the workplace as a result of completing a program of training. Compared to conventional programs, the competency based training is not primarily content based; it rather focuses on the competence requirement of the envisaged job role. The whole qualification refers to certain industry standard criterion and is modularized in nature rather than being course oriented.
2. What is the passing criterion for CBT certificate?	You shall be required to be declared “Competent” in the summative assessment to attain the certificate.
3. What are the entry requirements for this course?	The entry requirement for this course is 8th Grade or equivalent.
4. How can I progress in my educational career after attaining this certificate?	You shall be eligible to take admission in the National Vocational Certificate Level-3 in Android application developer). You shall be able to progress further to National Vocational Certificate Level-4 in Android application developer (Supervisor); and take admission in a level-5, DAE or equivalent course. In certain case, you may be required to attain an equivalence certificate from The Inter Board Committee of Chairmen (IBCC).
5. If I have the experience and skills mentioned in the competency standards, do I still need to attend the course to attain this certificate?	You can opt to take part in the Recognition of Prior Learning (RPL) program by contacting the relevant training institute and getting assessed by providing the required evidences.
6. What is the entry requirement for Recognition of Prior Learning program (RPL)?	There is no general entry requirement. The institute shall assess you, identify your competence gaps and offer you courses to cover the gaps; after which you can take up the final assessment.
7. Is there any age restriction for entry in this course or Recognition of Prior Learning program (RPL)?	There are no age restrictions to enter this course or take up the Recognition of Prior Learning program

8. What is the duration of this course?	The duration of the course work is 3220 hours
9. What are the class timings?	The classes are normally offered 25 days a month from 08:00am to 01:30pm. These may vary according to the practices of certain institutes.
10. What is equivalence of this certificate with other qualifications?	As per the national vocational qualifications framework, the level-4 certificate is equivalent to Matriculation. The criteria for equivalence and equivalence certificate can be obtained from The Inter Board Committee of Chairmen (IBCC).
11. What is the importance of this certificate in National and International job market?	This certificate is based on the nationally standardized and notified competency standards by National Vocational and Technical Training Commission (NAVTTTC). These standards are also recognized worldwide as all the standards are coded using international methodology and are accessible to the employers worldwide through NAVTTTC website.
12. Which jobs can I get after attaining this certificate? Are there job for this certificate in public sector as well?	You shall be able to take up jobs in the android application development industry which comprises of development of applications for play store as well as testing and optimization of the apps.
13. What are possible career progressions in industry after attaining this certificate?	You shall be able to progress up to the level of supervisor after attaining sufficient experience, knowledge and skills during the job. Attaining additional relevant qualifications may aid your career advancement to even higher levels.
14. Is this certificate recognized by any competent authority in Pakistan?	This certificate is based on the nationally standardized and notified competency standards by National Vocational and Technical Training Commission (NAVTTTC). The official certificates shall be awarded by the relevant certificate awarding body.
15. Is on-the-job training mandatory for this certificate? If yes, what is the duration of on-the-job training?	On-the-job training is not a requirement for final / summative assessment of this certificate. However, taking up on-the-job training after or during the course work may add your chances to get a job afterwards.
16. How much salary can I get on job after attaining this certificate?	The minimum wages announced by the Government of Pakistan in 2019 are PKR 17,500. This may vary in subsequent years and different regions of the country. Progressive employers may pay more than the



	mentioned amount.
17. Are there any alternative certificates which I can take up?	There are some short courses offered by some training institutes on this subject. Some institutes may still be offering conventional certificate courses in the field.
18. What is the teaching language of this course?	The teaching language of this course is Urdu and English.
19. Is it possible to switch to other certificate programs during the course?	There are some short courses offered by some training institutes on this subject. Some institutes may still be offering conventional certificate courses in the field.
20. What is the examination / assessment system in this program?	Competency based assessments are organized by training institutes during the course which serve the purpose of assessing the progress and preparedness of each student. Final / summative assessments are organized by the relevant qualification awarding bodies at the end of the certificate program. You shall be required to be declared "Competent" in the summative assessment to attain the certificate.
21. Does this certificate enable me to work as freelancer?	You can start your small business/ software house related to android application development and you can work as freelancer as well after the completion of the course. You may need additional skills on entrepreneurship to support your initiative.

## Test Yourself (Multiple Choice Questions)

**MODULE 5**

**Question 1** Which computer form is Tablet?

- A Mini computer
- B Mega Computer
- C Super Computer
- D Main Frame

**Question 2** IP addresses exist in the numeric format of XXX.YYY.ZZZ.AAA. This format of specifying addresses is referred to as the dotted decimal notation. Each address consists of four \_\_\_\_\_ separated by dots (.).

- A 8 bit fields
- B 4 bit fields
- C 6 bit fields
- D 2 bit fields

**Question 3** Which of the following are the cheapest memory devices in terms of Cost/Bit?

- A Semiconductor memories
- B Magnetic Disks
- C Compact Disks
- D Magnetic Tapes

**Question 4** Which of the following have the fastest access time?

- A Semiconductor memories
- B Magnetic Disks
- C Compact Disks
- D Magnetic Tapes

**Question 5** Which component in computer is capable to store single binary bit?

- A Register
- B Flip Flop
- C Capacitor
- D Inductor

**MODULE 6**

**Question 6** The operator << is called

- A An insertion operator
- B Put to operator
- C Either a or b
- D None of these

**Question 7** What is FIFO?

- A First in Few out
- B Few in Few out
- C First in first out
- D Few in first out

**Question 8** What is a reference?

- A An operator
- B Used to rename object
- C A reference is an alias for an object
- D None of these

**Question 9** Which data structure uses LIFO?

- A Array
- B Int
- C Stacks
- D Queues


**Question 10** What is a Syntax Error?

- A An error you will never find
- B An error you find at the end when the program gives out a wrong value due to logic error
- C An error caused by language rules being broken.
- D An error caused by language rules being broken.

**MODULE 7**

**Question 11** What is a diagrammatic representation that illustrates the sequence of operations to be performed to get the solution of a problem?

- A Algorithm
- B Flowchart
- C Pseudo code
- D Programming

**Question 12**  This image is called the:

- A Terminal
- B Of Page connector
- C On Page connector
- D Decision symbol

**Question 13** Which of the following does not belong to transitions?

- A View Switcher
- B View flipper
- C View animator
- D View sllider

**Question 14** Fragment is not a part of activity

- A True
- B False
- C
- D



**Question 15** Which one of the following is not included in API level 8 or lesser?

- A Spinner
- B Fragment
- C List view
- D Progress bar

**MODULE 8**

**Question 16** In a database program, a set of related information is called as?

- A Field
- B Entry
- C file
- D Record

**Question 17** What software do you use to make databases?

- A Microsoft Access
- B Microsoft Word
- C Microsoft Excel
- D Microsoft powerpoint

**Question 18** What is a property that describes various characteristics of an entity

- A ER Diagram
- B Column
- C Relationship
- D Attribute

**Question 19** Duplication of data is the disadvantage of DBMS

A True

B False

C

D

**Question 20** What is an association between entities

A Relation

B One to one

C Generalization

D Specialization

**MODULE 9**

**Question 21** What are the skeleton of a mobile app

- A Graphs
- B Displays
- C Views
- D Wireframe images

**Question 22** What basically is mobile user interface (mobile UI)

- A Graphical display
- B Displays
- C Views
- D Wireframe images

**Question 23** Which option is UML diagram that facilitates requirements gathering and interacts between system and external users, is called as

- A Flowchart Diagram
- B Sequence Diagram
- C Use Case Diagram
- D Data Flow Diagram

**Question 24** How UML diagrams, relationship between object and component parts is represented by

- A Ordination
- B Aggregation
- C Segregation
- D increment

**Question 25** Which one is not a input control

- A CPU
- B Toggles
- C Button
- D Data Field

