ANDROID APPLICATION DEVELOPER

© TVET SSP

LEARNER GUIDE

National Vocational Certificate Level 3

Version 1 - October, 2019

ANDROID APPLICATION DEVELOPER

© TVET SSP

LEARNER GUIDE
National Vocational Certificate Level 2

Version 1 - October, 2019

Introduction

Welcome to your Learner's Guide for the android application developer programme. It will help you to complete the programme and to go on to complete further study or go straight into employment.

The android application developer programme is to engage young people with a programme of development that will provide them with the knowledge, skills and understanding to start this career in Pakistan. The programme has been developed to address specific issues, such as the national, regional and local cultures, the manpower availability within the country, and meeting and exceeding the needs and expectations of their customers.

The main elements of your learner's guide are:

- **Introduction:**
    - o This includes a brief description of your guide and guidelines for you to use it effectively
- **Modules:**
    - o The modules form the sections in your learner's guide
- **Learning Units:**
    - o Learning Units are the main sections within each module
- **Learning outcomes**:
    - o Learning outcomes of each learning units are taken from the curriculum document
- **Learning Elements:**

    - o 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
    - o This section will include examples, photographs and illustrations relating to each learning outcome
- **Summary of modules**:
    - o This contains the summary of the modules that make up your learner's guide
- **Frequently asked questions**:
    - o 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**:
    - o These are provided as an exercise at the end of your learner's guide to help you in preparing for your assessment.

ANDROID APPLICATION DEVELOPER

Module-10
LEARNER GUIDE
National Vocational Certificate Level 3

Version 1 - October, 2019

Module 10: Apply Work Health and Safety Practices (WHS)

Objective of the module:

This unit describes the skills to work with safety and participate in hazard assessment activities, follow emergency procedures and participate OHS practices in process.

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

Learning Unit	Learning Outcomes	Learning Elements	Materials Required
LU1: **Implement safe work practices at work place**	**The trainee will be able to:**		
LU2: **Participate in hazard assessment activities a work place**	**The trainee will be able to:**		
LU3: **Follow emergency procedures at workplace**	**The trainee will be able to:**		
LU4: **Participate in OHS consultative processes**	**The trainee will be able to:**		

ANDROID APPLICATION DEVELOPER

© TVET SSP

Module-11
LEARNER GUIDE
National Vocational Certificate Level 3

Version 1 - October, 2019

Module 11: Identify and Implement Workplace Policy and Procedures

Objective of the module:

This unit describes the skills and knowledge required to develop and implement a workplace policy & procedures and to modify the policy to suit changed circumstances. It applies to individuals with managerial responsibilities who undertake work developing approaches to create, monitor and improve strategies and policies within workplaces and engage with a range of relevant stakeholders and specialists.

Duration: 20 hours   **Theory:**   **Practical:**

Learning Unit	Learning Outcomes	Learning Elements	Materials Required
LU1: **Identify workplace policy & procedures**	**The trainee will be able to:**		
LU2: **Implement workplace policy & procedures**	**The trainee will be able to:**		
LU3: **Communicate workplace policy & procedures**	**The trainee will be able to:**		
LU4: **Review the workplace policy & procedures implementation of**	**The trainee will be able to:**		

ANDROID APPLICATION DEVELOPER

© TVET SSP

Module-12
LEARNER GUIDE
National Vocational Certificate Level 3

Version 1 - October, 2019

Module 12: Communicate at Workplace

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

Learning Unit	Learning Outcomes	Learning Elements	Materials Required
LU1: **Communicate within the organization**	**The trainee will be able to:**		
LU2: **Communicate outside the organization**	**The trainee will be able to:**		
LU3: **Communicate effectively in workgroup**	**The trainee will be able to:**		
LU4: **Communicate in writing**	**The trainee will be able to:**		

ANDROID APPLICATION DEVELOPER

Module-13
LEARNER GUIDE
National Vocational Certificate Level 3

Version 1 - October, 2019

Module 13: Perform Computer Application Skills

Objective of the module:

This unit describes the skills and knowledge required to use spreadsheet applications, prepare in page documents, 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 hourss **Theory:** **Practical:**

Learning Unit	Learning Outcomes	Learning Elements	Materials Required
LU1: Prepare In-page documents as per required information	**The trainee will be able to:**		
LU2: Prepare Spreadsheets as per required information	**The trainee will be able to:**		
LU3: Use MS Office as	**The trainee will be able to:**		

per required information			
LU4: **Perform computer graphics in basic applications**	**The trainee will be able to:**		
LU5: **Create Email account for communications**	**The trainee will be able to:**		

ANDROID APPLICATION DEVELOPER

Module-14
LEARNER GUIDE
National Vocational Certificate Level 3

Version 1 - October, 2019

Module 14: Manage Personal Finances

Objective of the module:

This unit of competency describes the outcomes required to manage develop, implement and monitor a personal budget in order to plan regular savings and manage debt effectively.

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

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: **Develop a personal budget**	**The trainee will be able to:**		**Total** **Theory:** **Practical:**		
LU2: **Develop long term personal budget**	**The trainee will be able to:**		**Total** **Theory:** **Practical:**		
LU3: Identify ways to maximize future finances	The trainee will be able to:		Total Theory: Practical:		

ANDROID APPLICATION DEVELOPER

© TVET SSP

Module-15
LEARNER GUIDE
National Vocational Certificate Level 3

Version 1 - October, 2019

Module 15: 0613001021 Develop Android Apps

Objective of the module:

In this competency standard learners will be able to understand the basic knowledge required to install Android Studio, create user interface, apply user input, use multiple screens, connect apps with network and use data storage management. After Completing this competency standard learner will be able to install Android studio along with required software and applications.

Duration: 230 Hours	Theory: 10 Hours	Practical: 220 Hours

Learning Unit	Learning Outcomes	Learning Elements	Materials Required
LU1: **Install Android Studio capable of Android Development**	**The trainee will be able to:** Install Java Development Kit (JDK) for Android Studio according to requirement Install Android Studio for Development Connect Physical Device	Introducing JAVA development environment Understanding Installation Requirements for Android Studio Understanding Installation & Configuring Android JDK & Android Studio Performing installation of JDK Understanding Android Studio components Performing installation of Android Studio	Paper, pencil, erasers, Markers, Flip chart/white board, pen Rulers, Laptops/ desktops as per requirements, Microsoft Word, Printer, Multimedia

		for Testing	
	Create Emulator for Testing	Understanding Physical & Virtual Device Connecting Physical Device with android studio using software like PDA.net etc Understanding and differentiating various types of emulators. Adding emulator into the android studio	
LU2: **Create User Interface**	**The trainee will be able to:** Create a new Project using android studio Create Activity and Fragments	Introducing basic elements of the project Understanding User Interface Understanding basic view Elements like Text View, Edit Text, Button, Image View, etc. Understanding life cycle of activity and fragments Understanding Parent and Child Activities Understanding the difference between Activity and Fragment Understanding View Groups like constraint	Paper, pencil, erasers, Markers, Flip chart/white board, pen Rulers, Laptops/ desktops as per requirements, Microsoft Word, Printer, Multimedia

	Create Layout by using view Elements	layout, Linear Layout, Relative layout, Frame Layout, etc. Understanding how to communicate with layout programmatically	
	Make Layout Responsive for Different Screens	Designing layout for different screens Evaluating several designed layouts Creating different modes e.g. portrait mode and landscape mode. Testing XML on different android screen sizes.	
LU3: **Apply User Input**	**The trainee will be able to:** Make App Interactive for Users	Understanding the concept of Google material design Applying rules of UX (User Experience) to make app interactive.	Paper, pencil, erasers, Markers, Flip chart/white board, pen Rulers, Laptops/ desktops as per requirements, Microsoft Word, Printer, Multimedia
	Process data from the prospective of generating results	Understanding method of communication with layout programmatically Evaluating the user input	
LU4: **Use Multi Screens app**	**The trainee will be able to:** Create Multi-Screen App using different Activities	Understanding the concept of intent. Implementing the concept of intent.	Paper, pencil, erasers, Markers, Flip chart/white board, pen Rulers, Laptops/ desktops as per requirements, Microsoft

			Word, Printer, Multimedia
	Create Multi-View App using Fragments	Understanding the concept of fragment transaction. Implementing the concept of fragment transactions. Managing fragment manager and back stack.	
LU5: Connect Apps with Network	**The trainee will be able to:** Use Java Script Object Notation (JSON) parsing for the creation of Plain Old Java Object (POJO) Establish connection with source network for getting relevant data	Introducing concepts of JSON Understanding Java Script Object Notation JSON parsing Understanding Http Request & response Identifying source network Understanding main and background threads Evaluating the established connection and JSON parsing	Paper, pencil, erasers, Markers, Flip chart/white board, pen Rulers, Laptops/ desktops as per requirements, Microsoft Word, Printer, Multimedia
LU6: Use Data Storage Management	**The trainee will be able to:** Use internal file storage for data management	Understanding internal file storage. Implementing Read and Write File feature in Android internal storage e.g. file input stream/	Paper, pencil, erasers, Markers, Flip chart/white board, pen Rulers, Laptops/ desktops as per requirements, Microsoft Word, Printer, Multimedia

		file output stream	
		Evaluating internal storage	
	Use external file storage for data management	Understanding external file storage e.g. primary external storage and secondary external storage.	
		Implementing external storage states e.g. "get external storage state"	
		Evaluating external storage	
	Use shared-preferences for data management	Understanding shared-preferences e.g. hashmap key value pair	
		Implementing of shared preferences e.g. initialization, storing data, retrieving data and deleting data	
	Use databases for structures data management	Understanding databases e.g. android SQLite	
		Implementing various features of SQLite e.g. SQLite open helper, SQLite database, etc.	
		Upgrading database using DB helper e.g. inserting new record, updating record and deleting record etc.	
		Evaluating the created databases	

ANDROID APPLICATION DEVELOPER

Module-16
LEARNER GUIDE
National Vocational Certificate Level 3

Version 1 - October, 2019

Module 16: 0613001022 Test & Integrate Mobile App Components

Objective of the module:

This competency standard will help equip learners with knowledge of performing various types of Testing. After completion of this competency standard learner will be able to perform testing of user interface, unit integration and compatibility.

Duration: 160 Hours   Theory: 30 Hours   Practical: 130 Hours

Learning Unit	Learning Outcomes	Learning Elements	Materials Required
LU1: **Perform User Interface Testing**	**The trainee will be able to:** Verify the responsiveness of application Verify the flow of application	Identifying the importance of Testing Evaluating the responsiveness of application such as check on different device screens (Portrait/Landscape Mode) including • Check input fields are correctly sized • Check all items of app screen is correct on different screens Follow and verify app flow as per given	• Whiteboards & Markers • Android Studio • Android Emulator

Duration: 160 Hours	Theory: 30 Hours	Practical: 130 Hours	
	Test the main design of app elements Apply testing tools	requirements such as run app on Device and check its results Understand consistency on elements of UI screen such as icons, mipmaps, drawables etc. Understanding different testing tools such as MonkeyRnner, appium, UI Automator, etc Implementing UI testing tools using Monkey Runner, appium, UI Automator of your choice.	
LU2: **Perform Unit Testing**	**The trainee will be able to:** Apply testing techniques. • Statement coverage • Branch coverage Apply unit testing tools	Identifying key Terms to perform unit testing including Junit and Unit Testing. Understanding to perform Junit. Write test cases for already developed apps	• Whiteboards & Markers • Android Studio • Android Emulator

Duration: 160 Hours   **Theory: 30 Hours**   **Practical: 130 Hours**

	using Junit	Executing test cases using Junit for specific mobile app	
LU3: **Perform Integration Testing**	**The trainee will be able to:** Perform integration of different units/modules using Android Studio Perform integration testing using Android Studio	Understanding of Integration testing Write test cases to perform integration testing Preform integration testing for specific application according to test cases	• Whiteboards & Markers • Android Studio • Android Emulator
LU4: **Perform Compatibility Testing**	**The trainee will be able to:** Perform testing under different environments • Run the software in different android versions • Run on different machines • Run on different networks Validate the system in different environment	Importance of Compatibility Testing Understanding different environments such as different behavior of similar function in different android devices such as OS versions, limitations of services/broadcast etc. Testing of android application on different android devices.	• Whiteboards & Markers • Android Studio • Android Emulator

ANDROID APPLICATION DEVELOPER

© TVET SSP

Module-17
LEARNER GUIDE
National Vocational Certificate Level 3

Version 1 - October, 2019

Module 17: 0613001023 Deploy Mobile Apps

Objective of the module:

This competency standard will enable learners to carry out in-depth market research for building marketing strategies, making plans, ensure security measures and deploy application. After completion of this competency unit learner will be able to deploy the application successfully.

Duration: 60 Hours   Theory: 10 Hours   Practical: 50 Hours

Learning Unit	Learning Outcomes	Learning Elements	Materials Required
LU1: **Carry out in depth Market Research**	**The trainee will be able to:** Identify different available market places Perform target market research Perform target market analysis Perform competitor market	Understanding market place to deploy an android app such as • Google play store • Amazon App store Understanding target audience • Category e.g. entertainment, travel, food etc. • Geographical e.g. location • Device type e.g. smart phone, tablet. • Demographic e.g. gender, age, profession etc Accomplish target audience such as geographical, demographical etc Identifying competitors in market	Multimedia projectors, White Board, White Board Markers, Internet Browsers

	research Perform competitor market Analysis	Generating market analysis report	
LU2: **Build Marketing Strategy**	**The trainee will be able to:** Plan a marketing strategy based on marketing analysis	Understanding App Marketing Strategies • Understanding target market to deploy the developed app • Researching competitors to explore the strengths and weaknesses of the app • Uploading app on play store • Researching your audience with social media Develop a marketing strategy plan based on market analysis	Multimedia projectors, White Board, White Board Markers, Internet Browsers
	Make presentable graphics	Taking App Interface screenshots	
	Make effective introductory story and preview video	**Promoting App through a Promo Video**	
	Make executable strategy based on market research	Performing App Marketing Strategies	
LU3: **Plan for Google**	**The trainee will be able to:**		Multimedia projectors, White Board, White Board Markers,

Play Store Optimization	Enlist app features	Describing App features to be placed on play store for promotion purposes.	Internet Browsers
	Find App Store keywords for optimization	Highlight the importance of ASO	
	Make optimization plan based on keywords and features	- Understanding basics of ASO (App Store Optimization)- such as Optimizing app title - Naming App Icon - Adding Description about app on play store - Choosing right category keywords - Designing App icon image - Taking App Screenshots - Setting app download price - Taking into account the International market Execute ASO for a specific app	
LU4: **Ensure Security Measures**	**The trainee will be able to:** Perform User Authentication Measures	Understanding App authentication Ensure app authentication for a designed app	Multimedia projectors, White Board, White Board Markers, Internet Browsers
	Perform Data Protection Measures	Securing android app such as Validating user input	

		• Encrypting all data	
		• Using HTTPS instead of HTTP	
		• Using authorized APIs only	
		• Using Pro-Guard before publishing	
		Understanding intellectual property	
		Understanding cryptography	
		Implement data protection measures for a specific app	
LU5: **Deploy an** **Application on** **App Store**	**The trainee will be able to:** Create account on google play store	Introducing app deployment on app store Registering a Google play developer account Familiarizing with Developer Console Providing necessary account details	Multimedia projectors, White Board, White Board Markers, Internet Browsers
	Upload Build File with proper details	Uploading APK (Android Package Kit) file	
	Verify details before publishing the app	Providing details for app store listing Adding price and distribution details Verifying provided details before publishing Publishing the application	

ANDROID APPLICATION DEVELOPER

© TVET SSP

Module 18: 0613001024 Use Social Media for Marketing

Objective of the module:

This competency standard will provide skills and knowledge for applying and performing optimization and analytics. After completion of this competency standard learner will be able to brand the app on social media successfully.

Duration: 80 Hours	Theory: 22 Hours	Practical: 58 Hours

Learning Unit	Learning Outcomes	Learning Elements	Materials Required
LU1: **Apply Play Store Optimization**	**The trainee will be able to:** Apply App store Optimization to improve the accessibility of a mobile app in the Google Play store as per given application Use any ASO Tool to optimize app in google play store	Understanding ASO concepts, importance in app success, mechanics (tiles, keywords and descriptions), icon designs, preview videos, screenshot and factors like ratings and download. Learning tools like App Annie, Mobile Action, and Google Analytics.	Computers Internet Android Studio Software Tools - App Annie - Google Analytics - Mobile Action Paper Pencils Pens
LU2: **Perform Play Store Analytics**	**The trainee will be able to:** Integrate google analytics with given app Analyze reports as per given app	Introducing basics of Google Analytics Learning how to create an account, implement tracking code, analyze basic reports, and set up goals and campaign tracking. Understanding how to use configurations like Custom Dimensions, Custom Metrics, and Event Tracking to collect data that's specific to your	

		business.	
LU3: **Use Ad Network Integration**	**The trainee will be able to:** Create account and register app Include ads in your app as client requirement: • banner ads • rewarded ads • Interstitial ads	Learn setup and integrations, ad units, app registration with tools like Android Studio. Learn types of ads (banner, Interstitial, rewarded and native) there integration and setup in Android Studio.	
LU4: **Brand the App on Social Media**	**The trainee will be able to:** Promote App with Social Media Influencers as per given instructions of Google Play Store Offer free promotions in exchange for App downloads Analyze Social Media Demographics on Channel YouTube as per given instructions	Learn to create ads on Facebook, budgeting, target audience, ads images and videos content creation and description writing. Learn the concepts of promotions like referral, takeaways, exchange downloads and importance of use retention. Learn to create YouTube Channels, Video Content and targeted marketing.	

ANDROID APPLICATION DEVELOPER

© TVET SSP

Module-19
LEARNER GUIDE
National Vocational Certificate Level 3

Version 1 - October, 2019

Module 19: 0613001025 Integrate new features for Android Apps

Objective of the module:

This competency standard will provide skills and knowledge about integrating new feature in Android App. Leaner will be able to ensure simplicity in design, how to maintain ongoing evaluation and security matters. After completion of this competency standard learner will be able to integrate new features for android apps.

Duration: 120 Hours	Theory: 30 Hours	Practical: 90 Hours

Learning Unit	Learning Outcomes	Learning Elements	Materials Required
LU1: **Ensure Simplicity in Design**	**The trainee will be able to:** Create simple design to fulfill the requirements Implement backend functionality on design to make the design functional	Introducing new features in existing Android applications Understanding the architecture of existing app Modifying the existing code of the app as per requirement. Understanding how to communicate with layout programmatically	Paper, pencil, erasers, Markers, Flip chart/white board, pen Rulers, Laptops/ desktops as per requirements, Microsoft Word, Printer, Multimedia

		Implementing back end functionality (coding).	
	Test design on different screens resolutions		
		Understanding human computer interaction HCI	
		Updating App using HCI features	
		Testing different mobile apps on several devices e.g. virtual and physical device	
LU2: **Maintain Ongoing Evaluation**	**The trainee will be able to:** Maintain application code as per new technology	Upgrading the android dependencies (libraries) in build.gradle Modifying functions of the upgraded libraries. Modifying the code for speed optimization. Using functions such as trim memory running, trim memory background etc.	Paper, pencil, erasers, Markers, Flip chart/white board, pen Rulers, Laptops/ desktops as per requirements, Microsoft Word, Printer, Multimedia
	Maintain application database size for better application performance	Applying checks on database in order to enhance memory efficiency. E.g. out of memory exception Evaluating and testing the applied checks on the databases for memory efficiency enhancement ,	
	Maintain application storage capacity for better memory management	Understanding the internal and external storage capacity of the application. . E.g. memory	
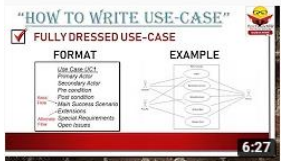
		profiler, on trim memory and garbage collection	
		Implementing memory management techniques such as avoid using enum,, hashmap, unnecessary objects, declare large heap etc. Evaluating applied memory management techniques.	
LU3: **Measure the** **Security Matters**	**The trainee will be able to:** Check leakage of web API's to avoid vulnerability	Evaluating API functionality using techniques/rules such as API must have keys etc Understanding of testing processes for information leakage e.g. gradle.properties, build.gradle Implementing testing processes to avoid information leakage vulnerability such as never save password in shared preferences, don't print LogCat , keep your dependencies up to date	Paper, pencil, erasers, Markers, Flip chart/white board, pen Rulers, Laptops/ desktops as per requirements, Microsoft Word, Printer, Multimedia
	Enable the code for better security measures	Enabling pro guard property for better security measures. Moving API links to gradle.properties in order to	

		avoid leakages. Final testing to ensure the security matters	
LU4: **Integrate with Bigger Eco-Systems**	**The trainee will be able to:** Check third party API compatibility Connect 3rd party Application Programming Interface (API) using Android Studio	Exhibition REST (Representational State Transfer) API. E.g. tenor API. Creating online POJO's for encapsulation Connecting POJO's using tools such as retrofit Connecting REST API data with front end designs. Evaluating connections and results of REST API's.	Paper, pencil, erasers, Markers, Flip chart/white board, pen Rulers, Laptops/ desktops as per requirements, Microsoft Word, Printer, Multimedia
LU5: **Follow Business Driven Solution**	**The trainee will be able to:** Add New features in the App as per requirement Finalize up gradation of App	Implementing new feature addition techniques in documentation Understand the App Up gradation Evaluating the final up graded application.	Paper, pencil, erasers, Markers, Flip chart/white board, pen Rulers, Laptops/ desktops as per requirements, Microsoft Word, Printer, Multimedia

Examples and illustrations

Videos

	Install Android Studio capable of Android Development URL https://www.youtube.com/results?search_query=Install+Android+Studio+capable+of+Android+Development
	Interpret technical texts for required Android App URL https://www.youtube.com/results?search_query=Interpret+technical+texts+for+required+Android+App
	Basic android application development tutorial URL https://www.youtube.com/results?search_query=basic+android+application+development+tutorial+
	Create a Proposal Document based on App requirements specifications. URL https://www.youtube.com/results?search_query=Create+a+Proposal+Document+based+on+App+requirements+specifications.
	Identify the basics of Data base for Apps Development URL https://www.youtube.com/results?search_query=Identify+the+basics+of+Data+base+for+Apps+Development

	Basics of Entity Relationship Diagrams for Apps Development URL https://www.youtube.com/results?search_query=Draw+Entity+Relationship+Diagrams+for+Apps+Development
	Perform Operations for Database Development URL https://www.youtube.com/results?search_query=Perform+Operations+for+Database+Development
	Develop Database for Apps development URL https://www.youtube.com/results?search_query=Develop++Database+for+Apps+development
	How to make wireframe for android app URL https://www.youtube.com/results?search_query=how+to+make+wireframe+for+android+app+
	How to Prepare Use Case URL https://www.youtube.com/results?search_query=Prepare+Use+Case
	Develop Android Apps URL https://www.youtube.com/results?search_query=develop+android+app

	Test & Integrate Mobile App Components URL https://www.youtube.com/results?search_query=Test+%26+Integrate+Mobile+App+Components
	Deployment of Mobile Applications URL https://www.youtube.com/results?search_query=Deploy+Mobile+Apps

Example and Illustrations

Relevant topics and web links

S.No	Links and definitions
1	User Interface design for mobile applications https://searchmobilecomputing.techtarget.com/definition/mobile-UI-mobile-user-interface
2	Android application development manual https://www.instructables.com/id/How-To-Create-An-Android-App-With-Android-Studio/
3	Mobile App testing manuals and tutorials https://www.softwaretestinghelp.com/beginners-guide-to-mobile-application-testing/
4	How to deploy the mobile application https://www.telerik.com/blogs/7-steps-to-a-successful-mobile-deployment

Module summary

Module	Learning Unit	Duration
Module 10: Apply Work Health and Safety Practices (WHS) **Aim:** This module aims to develop the knowledge, skills and understanding needed to Apply Work Health and Safety Practices (WHS)	**LU1:** Implement safe work practices at work place **LU2:** Participate in hazard assessment activities a work place **LU3:** Follow emergency procedures at workplace **LU4:** Participate in OHS consultative processes	30 hours
Module 11: Identify and Implement Workplace Policy and Procedures **Aim:** This module aims to develop the knowledge, skills and understanding needed to Identify and Implement Workplace Policy and Procedures	**LU1:** Identify workplace policy & procedures **LU2:** Implement workplace policy & procedures **LU3:** Communicate workplace policy & procedures **LU4:** Review the implementation of workplace policy & procedures	20 hours
Module 12: Communicate at Workplace **Aim:** This module aims to develop the knowledge, skills and understanding needed to Communicate at Workplace	**LU1:** Communicate within the organization **LU2:** Communicate outside the organization **LU3:** Communicate effectively in workgroup **LU4:** Communicate in writing	30 hours

Module	Learning Unit	Duration
Module 13: Perform Computer Application Skills **Aim:** This module aims to develop the knowledge, skills and understanding needed to Perform Computer Application Skills	**LU1:** Prepare In-page documents as per required information **LU2:** Prepare Spreadsheets as per required information **LU3:** Use MS Office as per required information **LU4:** Perform computer graphics in basic applications **LU5:** Create Email account for communications	40 hours
Module 14: Manage Personal Finances **Aim:** This module aims to develop the knowledge, skills and understanding needed to Manage Personal Finances	**LU1:** Develop a personal budget **LU2:** Develop long term personal budget **LU3:** Identify ways to maximize future finances	30 hours
Module 15: Develop Android Apps **Aim:** This module aims to develop the knowledge, skills and understanding needed to Develop Android Apps	**LU1:** Install Android Studio capable of Android Development **LU2:** Create User Interface **LU3:** Apply User Input **LU4:** Use Multi Screens app **LU5:** Connect Apps with Network **LU6:** Use Data Storage Management	230 hours

Module	Learning Unit	Duration
Module 16: Test & Integrate Mobile App Components **Aim:** This module aims to develop the knowledge, skills and understanding needed to Test & Integrate Mobile App Components	**LU1:** Perform User Interface Testing **LU2:** Perform Unit Testing **LU3:** Perform Integration Testing **LU4:** Perform Compatibility Testing	160 hours
Module 17: Deploy Mobile Apps **Aim:** This module aims to develop the knowledge, skills and understanding needed to Deploy Mobile Apps	**LU1:** Carry out in depth Research Market **LU2:** Build Marketing Strategy **LU3:** Plan for Google Play Store Optimization **LU4:** Ensure Security Measures **LU5:** Deploy an Application on App Store	60 hours
Module 18: Use Social Media for Marketing **Aim:** This module aims to develop the knowledge, skills and understanding needed to Use Social Media for Marketing	**LU1:** Apply Play Store Optimization **LU2:** Perform Play Store Analytics **LU3:** Use Ad Network Integration **LU4:** Brand the App on Social Media	80 hours

Module	Learning Unit	Duration
Module 19: Integrate New features for Android Apps **Aim:** This module aims to develop the knowledge, skills and understanding needed to Integrate New features for Android Apps	**LU1:** Ensure Simplicity in Design **LU2:** Maintain Ongoing Evaluation **LU3:** Measure the Security Matters **LU4:** Integrate with Bigger Eco- Systems **LU5:** Follow Business Driven Solution	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 (NAVTTC). These standards are also recognized worldwide as all the standards are coded using international methodology and are accessible to the employers worldwide through NAVTTC 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 (NAVTTC). 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 leaching 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	15

Question	26	Setting java environment is important while installing android studio?	A	True
			B	False
			C	
			D	

Question	27	What is the life cycle of foreground activity in android?	A	onCreate() –> onStart() –> onResume() –> onStop() –> onRestart
			B	onCreate() –> onStart() –> onResume() –>onStop()
			C	onCreate() –> onStart() –> onResume()
			D	onCreate() –> onStart() –> onStop()

Question **28** What is Android component that shows part of an activity on screen is called

A   Intent

B   Fragment

C   View

D   Manifest

Question **29** Where is layout or design of an android application saved in

A   Text file

B   Java file

C   Dex file

D   XML file

Question   **30**   Which can be used from below in order to see UI design
hierarchy and individual design elements

A   Properties

B   Component tree

C   Layout

D   Terminal

MODULE   **16**

Question   **31**   Where is the draw able folder exist under

A   App folder

B   Built gradlle

C   Android manifest

D   Layout folder

Question **32** What are the main issues for not responsiveness of the android designs

A Giving static values for layouts, buttons, text fields etc.

B Making the layout in relative layout

C Making the layout in linear layout

D Making the layout in constraint layout

Question **33** Which are the screen sizes can't be made under res/layout/ in android studio

A Hdpi

B Mdpi

C Hhpi

D Cxhdpi

Question **34** What is JUnit apart from an automation framework for Unit

A   UI **Testing**

B   Appium

C   UI Automator

D   Monkey runner

Question **35** Is Component testing can be done in isolation from rest of the system depending upon its life cycle model?

A   True

B   False

C

D

MODULE	17

Question **36** What Are The Best App Marketing Strategies

A Asking people for the application trending

B Research target market, reach your audience with social networks, make your app visible in app store etc

C Cloning the applications

D None of the above

Question **37** Which is the best market place for android application

A Google play store

B Amazon store

C APK Mirror

D Kindle Store

Question **38** Which things we have to change while updating the application on Google play store

A   Version Code

B   Version name

C   Both version code and name

D   Dependencies

Question **39** Which things are required to upload the application on Google play store

A   Feature banner, content rating and target audience and content

B   email , feature banner, custom store listings, app availability, content rating form and privacy policy

C   Live experiments, custom store listings, app availability, wear OS by Google and target audience and content

D   Signed apk,title, description, screenshots , application type , category ,email , feature banner, content rating form and privacy policy.

Question   **40**   Content rating is compulsory while submitting the application?

A   True

B   False

C

D

MODULE   **18**

Question   **41**   Why ASO is important

A   Speed the application

B   Increase in the download

C   Stop memory leakage

D   Reduce the size of apk

Question **42** Which is not the type of ads

A   Banner

B   Interstitial

C   Rewarded

D   Cloning

Question **43** How many size of banners are available e.g. BANNER,Large_BANNER,FULL_BANNER,SMART BANNER

A   7

B   3

C   8

D   6

Question **44** Which are the methods for Interstitial ads

A   onAdLoaded,OnCreate,OnResume and OnStop

B   conAdClicked,onAdOpened,   OnCreate,OnResume and onAdClosed

C   onAdLoaded,onAd,Opened,onAdClicked, onAdLeftApplication,onAdClosedand onAdFaliedToLoad

D   onAdLeftApplication,onAdClosed, onAdFaliedToLoad and OnCreate

Question **45** Does adding dependency is important for loading the ads

A   True

B   False

MODULE	19			

Question **46** What are the key reasons to upgrade the dependencies

A Security issues fixes, usage of new features, fill up the space, maintenance etc

B Adding new key feature, changing atmosphere, changing in code, fixing bugs etc

C Security issues fixes, usage of new features, performance improvements, reducing maintenance of an old version, etc

D Reduce the bugs, adding new modules, adding libraries, fixing user app code etc

Question **47** Which method we use to show the specific layout using code

A setContentView(R.res.activityname)

B setContentView(R.layout.activityname)

C setContentView(R.drawable.activityname)

D findviewbyId(R.id.activityname)

Question **48** What is Emulator?

A It is used to delete the application from android device

B It is used to install the application manually on android device

C It assures you that your application will work smoothly in customer handsets.

D It is a software program that allows your mobile to imitate the features of another computer or mobile software you want them to imitate by installing them to your computer or Mobile

Question **49** Why are security flaws popping up in APIs?

A APIs can be crawled by search engine bots and hackers

B Authorize the user and authenticate the app, protect credentials, Avoid static or embedded passwords

C Authorize the web tokenization, add some good quality software's, enhancing the code, valid designs

D Flaw less app, good marketing strategies, giving updates to play store continuously

Question **50** What is POJO?

A Plain Old Java Object

B Performance Old Java Object

C Performance Optimize Java Object

D None of the above