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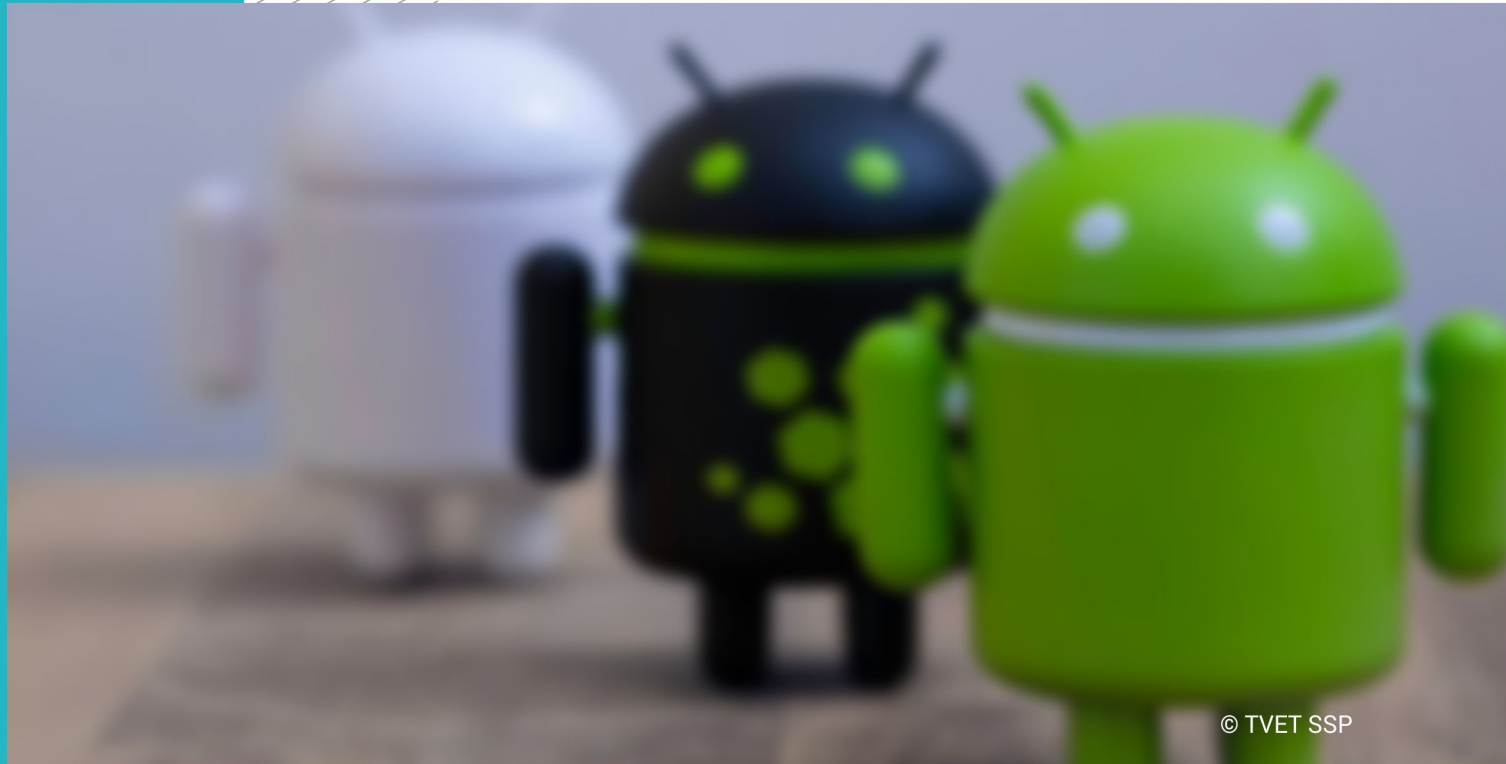
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ANDROID APPLICATION DEVELOPER



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CBT Curriculum

National Vocational Certificate Level 3

Version 1 - November 2019



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Introduction

Definition/ Description of the training programme for *Android Application Developer(Assistant)*

The course will provide learners with an understanding of key points in the Android app development from the initial process to the end product .It is specifically designed to teach the critical skills needed to be successful in this specific field and thoroughly understand the app life cycle and its main components, setting up and understanding of Android Development Environment., identify different techniques to plan, design and prototype of mobile apps before writing any code, Create a graphical user interface (GUI), Designing and building a functional Android application, Debugging Android applications using different tools and plugins, register and publishing on Play Store.

Purpose of the training programme

The competency based NVQ has been developed to train the unskilled men and women of Pakistan on the technical and entrepreneurial skills to be employed / self-employed and inevitably set sustainable impact on their lives by increase in their livelihood income generation.

The purpose of these qualifications is to set professional standards for Android Application Developer experts, who will serve as key elements enhancing quality of Pakistan's Software Developing Industry.

Overall objectives of training programme

The specific objectives of developing these qualifications are as under:

- Develop knowledge, skills and understanding through the making of Android Application that leads to and demonstrates conceptual and technical accomplishment;
- Support you to acquire specialist knowledge and practical experience of developing Android Application.
- Encourage you to test and explore different software for Knowledge, understanding and implementation.
- Enable you to develop an individually negotiated practice informed by a relevant theoretical and contextual framework.

- Produce informed independent and technically sound developers who can adapt their knowledge, understanding and skills for a variety of professional Applications.

Competencies to be gained after completion of course

At the end of the course, the trainee must have attained the following competencies:

- Perform and comply Personal & workplace Health and Safety Guidelines and take initiatives where required
- Perform effective Communication at workplace
- Identify, Implement & Follow Workplace Policy and Procedure
- Perform IT & Computer Application Skills
- Manage Human Resource Services
- Develop Entrepreneurial Skills & Manage Personal Finances
- Develop Android Apps
- Test & Integrate Mobile App Components
- Deploy Mobile Apps
- Use Social Media for Marketing
- Integrate New features for Android Apps
- Undertake Research & Planning for Apps Development

Possible available job opportunities available immediately and later in the future

Android Application Developer(Assistant) can be hired as:

- Freelance assistant developer
- Assessor
- Teacher
- Entrepreneur
- Assistant app developer
- Self-employment

- Quality assurance assistant
- Social media marketing expert
- Mobile App Search Optimization (ASO)

Trainee entry level

- Minimum middle with Level 2 for level 3

Minimum qualification of trainer

- BS/BE (CS/IT/SE) Equivalent to 16 years of education
- BCS equivalent to 14 years of education with recent relevant industry experience of 2 years

Recommended trainer: trainee ratio

The recommended maximum trainer: trainee ratio for this programme is 1 trainer for 20 trainees.

Medium of instruction i.e. language of instruction

Instruction will be Urdu and English.

Duration of the course (Total time, Theory & Practical time)

This curriculum comprises 10 modules. The recommended delivery time is 1000 hours. Delivery of the course could therefore be full time, 5 days a week, for 6 months. Training providers are at liberty to develop other models of delivery, including part-time and evening delivery.

The full structure of the course is as follow:

Module	Theory ¹ Days/hours	Workplace ² Days/hours	Total hours
Module 10: Apply Work Health and Safety Practices (WHS)			30
Module 11: Identify and Implement Workplace Policy and Procedures			20
Module 12: Communicate at Workplace			30
Module 13: Perform Computer Application Skills			40
Module 14: Manage Personal Finances			30
Module 15: Develop Android Apps	05	135	140
Module 16: Test & Integrate Mobile App Components	10	70	80
Module 17: Deploy Mobile Apps	05	35	40
Module 18: Use Social Media for Marketing	05	45	50
Module 19: Integrate New features for Android Apps	10	70	80

¹ Learning Module hours in training provider premises

² Training workshop, laboratory and on-the-job workplace

Sequence of the modules

This qualification is made up of 10 modules which covers Level 3. Five further modules relate to the Level 3 skills of an Android App Developer(Assistant). These Modules are 15, 16,17,18, 19. The distribution table suggests that these should be delivered before the delivery of advance level of Android Application Development.

There are 5 further modules relating to general skills that an Android App Developer, Assistant must have, for example” Apply Work Health and Safety Practices (WHS), Identify and Implement Workplace Policy and Procedures, Communicate at workplace, Perform Computer Application Skills,. These Modules need to be delivered in parallel with technical and functional Modules of Level 3

Each module covers a range of learning components. These are intended to provide detailed guidance to teachers (for example the Learning Elements component) and give them additional support for preparing their lessons (for example the Materials Required component). The detail provided by each module will contribute to a standardized approach to teaching, ensuring that training providers in different parts of the country have clear information on what should be taught. Each module also incorporates the cultural background of Pakistan, including specialist features and technology that make this qualification unique to Pakistan’s needs.

The distribution table is shown below:

Module 15: Develop Android Apps	Module 16: Test & Integrate Mobile App Components	Module 17: Deploy Mobile Apps
Module 18: Use Social Media for Marketing	Module 19: Integrate New features for Android Apps	

Summary – overview of the curriculum

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
<p>Module 10: Apply Work Health and Safety Practices (WHS)</p> <p>Aim: The aim of this module to develop basic knowledge, skills and understanding to Apply Work Health and Safety Practices (WHS)</p>	<p>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</p>			30
<p>Module 11: Identify and Implement Workplace Policy and Procedures</p> <p>Aim: The aim of this module to develop basic knowledge, skills and understanding to Identify and Implement Workplace Policy and Procedures</p>	<p>LU1: Identify workplace policy & procedures LU2: Implement workplace policy & procedures LU3: Communicate workplace policy & procedures LU4: Review the implementation of workplace policy & procedures</p>			20

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
<p>Module 12: Communicate at Workplace</p> <p>Aim: The aim of this module to develop basic knowledge, skills and understanding for Communicating at Workplace</p>	<p>LU1: Communicate within the organization LU2: Communicate outside the organization LU3: Communicate effectively in workgroup LU4: Communicate in writing</p>			30
<p>Module 13: Perform Computer Application Skills</p> <p>Aim: The aim of this module to develop basic knowledge, skills and understanding to Perform Computer Application Skills</p>	<p>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</p>			40
<p>Module 14: Manage Personal Finances</p> <p>Aim: The aim of this module to develop basic knowledge, skills and understanding to Manage Personal Finances</p>	<p>LU1: Develop a personal budget LU2: Develop long term personal budget LU3: Identify ways to maximize future finances</p>			30

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
<p>Module 15: Develop Android Apps</p> <p>Aim: The aim of this module to develop basic knowledge, skills and understanding to Develop Android Apps</p>	<p>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</p>	05	135	140
<p>Module 16: Test & Integrate Mobile App Components</p> <p>Aim: The aim of this module to develop basic knowledge, skills and understanding to Test & Integrate Mobile App Components</p>	<p>LU1: Perform User Interface Testing LU2: Perform Unit Testing LU3: Perform Integration Testing LU4: Perform Compatibility Testing</p>	10	70	80
<p>Module 17: Deploy Mobile Apps</p> <p>Aim: The aim of this module to develop basic knowledge, skills and understanding for Deploying Mobile Apps</p>	<p>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</p>	05	35	40

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
<p>Module 18: Use Social Media for Marketing</p> <p>Aim: The aim of this module to develop basic knowledge, skills and understanding to Use Social Media for Marketing</p>	<p>LU1: Apply Play Store Optimization LU2: Perform Play Store Analytics LU3: Use Ad Network Integration LU4: Brand the App on Social Media</p>	05	45	50
<p>Module 19: Integrate New features for Android Apps</p> <p>Aim: The aim of this module to develop basic knowledge, skills and understanding to Integrate New features for Android Apps</p>	<p>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</p>	10	70	80

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Module-10
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Modules

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:

Theory:

Practical:

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Implement safe work practices at work place	The trainee will be able to:		Total Theory: Practical:		
LU2: Participate in hazard assessment activities a work place	The trainee will be able to:		Total Theory: Practical:		
LU3: Follow emergency procedures at	The trainee will be able to:		Total Theory:		

workplace			Practical:		
LU4: Participate in OHS consultative processes	The trainee will be able to:		Total Theory: Practical:		

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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:

Theory:

Practical:

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Identify workplace policy & procedures	The trainee will be able to:		Total Theory: Practical:		
LU2: Implement workplace policy & procedures	The trainee will be able to:		Total Theory: Practical:		
LU3: Communicate workplace policy & procedures	The trainee will be able to:		Total Theory:		

			Practical:		
LU4: Review the implementation of workplace policy & procedures	The trainee will be able to:		Total Theory: Practical:		

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Module-12
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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:

Theory:

Practical:

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Communicate within the organization	The trainee will be able to:		Total Theory: Practical:		
LU2: Communicate outside the organization	The trainee will be able to:		Total Theory: Practical:		
LU3: Communicate effectively in workgroup	The trainee will be able to:		Total Theory:		

			Practical:		
LU4: Communicate in writing	The trainee will be able to:		Total		
			Theory:		
			Practical:		

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Module-13
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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:

Theory:

Practical:

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Prepare In-page documents as per required information	The trainee will be able to:		Total Theory: Practical:		
LU2: Prepare Spreadsheets as per required information	The trainee will be able to:		Total Theory: Practical:		
LU3:	The trainee will be able		Total		

Use MS Office as per required information	to:		Theory: Practical:		
LU4: Perform computer graphics in basic applications	The trainee will be able to:		Total Theory: Practical:		
LU5: Create Email account for communications	The trainee will be able to:		Total Theory: Practical:		

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Module-14
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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:

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:		

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Module-15
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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 over 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, create user interface, apply user input, use multiple screens, connect apps over network and use data storage management.

Duration:
140 Hours

Theory: 5
Hours

Practical:
135 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
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 for Testing	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 Understanding Physical & Virtual Device Connecting Physical Device with android	Total 7 hours Theory: 1 Hours Practical: 6 Hours	Paper, pencil, erasers, Markers, Flip chart/white board, pen Rulers, Laptops/ desktops as per requirements, Microsoft Word, Printer, Multimedia	Computer Lab equipped with networking facility, electricity backup and internet connectivity. Classroom

	Create Emulator for Testing	<p>studio using software like PDA.net etc</p> <p>Understanding and differentiating various types of emulators.</p> <p>Adding emulator into the android studio</p>			
LU2: Create User Interface	<p>The trainee will be able to:</p> <p>Create a new Project using Android studio</p> <p>Create Activity and Fragments</p> <p>Create Layout by using view Elements</p> <p>Make Layout</p>	<p>Introducing basic elements of the project</p> <p>Understanding User Interface</p> <p>Understanding basic view Elements like Text View, Edit Text, Button, Image View, etc.</p> <p>Understanding life cycle of activity and fragments</p> <p>Understanding Parent and Child Activities</p> <p>Understanding the difference between Activity and Fragment</p> <p>Understanding View Groups like constraint layout, Linear Layout, Relative layout, Frame Layout, etc.</p> <p>Understanding how to communicate with layout programmatically</p> <p>Designing layout for different screens</p>	<p>Total</p> <p>45 Hours</p> <p>Theory:</p> <p>1 Hours</p> <p>Practical:</p> <p>44 Hours</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>Computer Lab equipped with networking facility, electricity backup and internet connectivity.</p> <p>Classroom</p>

	Responsive 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 Process data from the prospective of generating results	Understanding the concept of Google material design Applying rules of UX (User Experience) to make app interactive. Understanding method of communication with layout programmatically Evaluating the user input	Total 19 Hours Theory: 1 Hours Practical: 18 Hours	Paper, pencil, erasers, Markers, Flip chart/white board, pen Rulers, Laptops/ desktops as per requirements, Microsoft Word, Printer, Multimedia	Computer Lab equipped with networking facility, electricity backup and internet connectivity. Classroom
LU4: Use Multi Screens app	The trainee will be able to: Create Multi-Screen App using different Activities Create Multi-View App using Fragments	Understanding the concept of intent. Implementing the concept of intent. Understanding the concept of fragment transaction. Implementing the concept of fragment transactions. Managing fragment manager and back stack.	Total 13 Hours Theory: 1 Hours Practical: 12 Hours	Paper, pencil, erasers, Markers, Flip chart/white board, pen Rulers, Laptops/ desktops as per requirements, Microsoft Word, Printer, Multimedia	Computer Lab equipped with networking facility, electricity backup and internet connectivity. Classroom

LU5: Connect Apps over 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	Total 25 Hours Theory: 1 Hours Practical: 24 Hours	Paper, pencil, erasers, Markers, Flip chart/white board, pen Rulers, Laptops/ desktops as per requirements, Microsoft Word, Printer, Multimedia	Computer Lab equipped with networking facility, electricity backup and internet connectivity. Classroom
LU6: Use Data Storage Management	The trainee will be able to: Use internal file storage for data management Use external file storage for data management	Understanding internal file storage. Implementing Read and Write File feature in Android internal storage e.g. file input stream/ file output stream Evaluating internal storage Understanding external file storage e.g. primary external storage and secondary external storage. Implementing external storage states e.g. "get external storage state"	Total 31 Hours Theory: 0 Hours Practical: 31 Hours	Paper, pencil, erasers, Markers, Flip chart/white board, pen Rulers, Laptops/ desktops as per requirements, Microsoft Word, Printer, Multimedia	Computer Lab equipped with networking facility, electricity backup and internet connectivity. Classroom

	<p>Use shared-preferences for data management</p> <p>Use databases for structured data management</p>	<p>Evaluating external storage</p> <p>Understanding shared-preferences e.g. hashmap, key value pair, Implementing of shared preferences e.g. initialization, storing data, retrieving data and deleting data</p> <p>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</p>			
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Module-16

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Module 16: 0613001022 Test & Integrate Mobile App Components

Objective of the module:

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

**Duration: 80
Hours**

**Theory: 10
Hours**

**Practical: 70
Hours**

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Perform User Interface Testing	The trainee will be able to: Verify the responsiveness of application Verify the flow of application Test the main design of app elements	Identifying the importance of Testing and testing tools Evaluating the responsiveness of application such as check on different device screens (Portrait/Landscape Mode) including <ul style="list-style-type: none"> • Check input fields are correctly sized • Check all items of app screen are correct on different screens Follow and verify app flow as per given requirements such as run app on Device and check its results Understand consistency of UI screen on elements such as icons, mipmaps,	Total: 25 Hours Theory: 3 Hours Practical: 22 Hours	<ul style="list-style-type: none"> • Whiteboards & Markers • Android Studio • Android Emulator • Testing tools 	Computer Lab equipped with networking facility, electricity backup and internet connectivity, Classroom

	Apply testing tools	drawables etc. Understanding different testing tools such as MonkeyRunner, Appium, UI Automator, etc Implementing UI testing tools using MonkeyRunner, Appium, UI Automator of your choice.			
LU2: Perform Unit Testing	The trainee will be able to: Apply testing techniques. <ul style="list-style-type: none"> • Statement coverage • Branch coverage Apply unit testing tools using JUnit	Identifying key terms to perform unit testing including JUnit and Unit Testing. Understanding JUnit testing. Write test cases for already developed apps Executing test cases using JUnit for specific mobile app	Total 25 Hours Theory: 3 Hours Practical: 22 Hours	<ul style="list-style-type: none"> • Whiteboards & Markers • Android Studio • Android Emulator 	Computer Lab equipped with networking facility, electricity backup and internet connectivity, Classroom
LU3: Perform Integration Testing	The trainee will be able to: Perform integration of different units/modules using Android Studio	Understanding of Integration testing Write test cases to perform integration testing Perform integration testing for specific application according to test cases	Total: 15 Hours Theory: 2 Hours Practical: 13 Hours	<ul style="list-style-type: none"> • Whiteboards & Markers • Android Studio • Android Emulator 	Computer Lab equipped with networking facility, electricity backup and internet connectivity,

	Perform integration testing using Android Studio				Classroom
LU4: Perform Compatibility Testing	<p>The trainee will be able to:</p> <p>Perform testing under different environments</p> <ul style="list-style-type: none"> • Run the app in different android versions • Run the app on different machines • Run the app on different networks <p>Validate the system in different environment</p>	<p>Importance of Compatibility Testing</p> <p>Understanding different environments such as different behavior of similar functions in different android devices such as OS versions, limitations of services/broadcast etc.</p> <p>Testing of android application on different android devices.</p>	<p>Total: 15 Hours</p> <p>Theory: 2 Hours</p> <p>Practical: 13 Hours</p>	<ul style="list-style-type: none"> • Whiteboards & Markers • Android Studio • Android Emulator 	<p>Computer Lab equipped with networking facility, electricity backup and internet connectivity,</p> <p>Classroom</p>

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Module-17

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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: 40
Hours**

**Theory: 5
Hours**

**Practical: 35
Hours**

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
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 research	Understanding market place to deploy an android app such as <ul style="list-style-type: none"> • Google play store • Amazon Appstore Understanding target audience <ul style="list-style-type: none"> • 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	Total: 6 Hours Theory: 1 Hours Practical: 5 Hours	Multimedia projectors, White Board, White Board Markers, Internet Browsers	Computer Lab equipped with networking facility, electricity backup and internet connectivity. Classroom

	Perform competitor market Analysis	Identifying competitors in market Generating market analysis report			
LU2: Build Marketing Strategy	The trainee will be able to: Plan a marketing strategy based on marketing analysis Make presentable graphics Make effective introductory story and preview video Make executable strategy based on market research	Understanding App Marketing Strategies <ul style="list-style-type: none"> • 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 Taking App Interface screenshots Promoting App through a Promo Video Performing App Marketing Strategies	Total: 6 Hours Theory: 1 Hours Practical: 5 Hours	Multimedia projectors, White Board, White Board Markers, Internet Browsers	Computer Lab equipped with networking facility, electricity backup and internet connectivity. Classroom

<p>LU3: Plan for Google Play Store Optimization</p>	<p>The trainee will be able to:</p> <p>Enlist app features</p> <p>Find App Store keywords for optimization</p> <p>Make optimization plan based on keywords and features</p>	<p>Describing App features to be placed on play store for promotion purposes.</p> <p>Highlight the importance of ASO</p> <ul style="list-style-type: none"> • 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 <p>Execute ASO for a specific app</p>	<p>Total: 11 Hours</p> <p>Theory: 1 Hours</p> <p>Practical: 10 Hours</p>	<p>Multimedia projectors, White Board, White Board Markers, Internet Browsers</p>	<p>Computer Lab equipped with networking facility, electricity backup and internet connectivity.</p> <p>Classroom</p>
<p>LU4: Ensure Security Measures</p>	<p>The trainee will be able to:</p> <p>Perform User Authentication Measures</p> <p>Perform Data Protection Measures</p>	<p>Understanding App authentication</p> <p>Ensure app authentication for a designed app</p> <p>Securing android app such as</p> <ul style="list-style-type: none"> • Validating user input 	<p>Total: 7 Hours</p> <p>Theory: 1 Hours</p> <p>Practical: 6 Hours</p>	<p>Multimedia projectors, White Board, White Board Markers, Internet Browsers</p>	<p>Computer Lab equipped with networking facility, electricity backup and internet connectivity.</p> <p>Classroom</p>

		<ul style="list-style-type: none"> • Encrypting all data • Using HTTPS instead of HTTP • Using authorized APIs only • Using Pro-Guard before publishing <p>Understanding intellectual property Understanding cryptography Implement data protection measures for a specific app</p>			
LU5: Deploy an Application on App Store	<p>The trainee will be able to:</p> <p>Create account on Google play store</p> <p>Upload Build File with proper details</p> <p>Verify details before publishing the app</p>	<p>Introducing app deployment on app store</p> <p>Registering a Google play developer account</p> <p>Familiarizing with Developer Console</p> <p>Providing necessary account details</p> <p>Uploading APK (Android Package Kit) file</p> <p>Providing details for app store listing</p> <p>Adding price and distribution details</p> <p>Verifying provided details before publishing</p> <p>Publishing the application</p>	<p>Total: 10 Hours</p> <p>Theory: 1 Hour</p> <p>Practical: 9 Hours</p>	<p>Multimedia projectors, White Board, White Board Markers, Internet Browsers</p>	<p>Computer Lab equipped with networking facility, electricity backup and internet connectivity.</p> <p>Classroom</p>

ANDROID APPLICATION DEVELOPER



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Module-18

CBT Curriculum

National Vocational Certificate Level 3

Version 1 - November 2019

Module 18: 061300124 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: 50
Hours**

**Theory: 5
Hours**

**Practical: 45
Hours**

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
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 (titles, keywords and descriptions), icon designs, preview videos, screenshotting and factors like ratings and downloads. Learning tools like App Annie, Mobile Action, and Google Analytics.	Total 15 Hours Theory: 2 Hours Practical: 13 Hours	Computers Internet Android Studio Software Tools - App Annie - Google Analytics - Mobile Action Paper Pencils Pens	Classroom Computer Lab
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.	Total 15 Hours Theory: 1 Hours Practical: 14 Hours		

		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: <ul style="list-style-type: none"> • 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.	Total 10 Hours Theory: 1 Hours Practical: 9 Hours		
LU4: Brand the App on Social Media	The trainee will be able to: Promote App with Social Media as per given instructions of Google Play Store Offer free promotions in exchange for App downloads Analyze Social Media Demographics on YouTube Channel 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.	Total 10 Hours Theory: 1 Hours Practical: 9 Hours		

ANDROID APPLICATION DEVELOPER



Module-19
CBT Curriculum
National Vocational Certificate Level 3

Version 1 - November 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. Learner 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: 80
Hours**

**Theory: 10
Hours**

**Practical: 70
Hours**

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
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	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	Total 16 Hours Theory: 2 Hours Practical: 14 Hours	Paper, pencil, erasers, Markers, Flip chart/white board, pen Rulers, Laptops/desktops as per requirements, Microsoft Word, Printer, Multimedia	Computer Lab equipped with networking facility, electricity backup and internet connectivity. Classroom

	functional Test design on different screens resolutions	Implementing back end functionality (coding). 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 Maintain application database size for better application performance	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. Applying checks on database in order to enhance memory efficiency. e.g. out of memory exception	Total 16 Hours Theory: 2 Hours Practical: 14 Hours	Paper, pencil, erasers, Markers, Flip chart/white board, pen Rulers, Laptops/desktops as per requirements, Microsoft Word, Printer, Multimedia	Computer Lab equipped with networking facility, electricity backup and internet connectivity. Classroom

	Maintain application storage capacity for better memory management	<p>Evaluating and testing the applied checks on the databases for memory efficiency enhancement</p> <p>Understanding the internal and external storage capacity of the application e.g. memory profiler, on trim memory and garbage collection</p> <p>Implementing memory management techniques such as avoid using enum, hashmap, unnecessary objects, declare large heap etc.</p> <p>Evaluating applied memory management techniques.</p>			
LU3: Measure the Security Matters	<p>The trainee will be able to:</p> <p>Check leakage of web API's to avoid vulnerability</p>	<p>Evaluating API functionality using techniques/rules such as API must have keys etc</p> <p>Understanding of testing processes for information leakage e.g. gradle.properties, build.gradle</p> <p>Implementing testing processes to avoid information leakage vulnerability such as</p>	<p>Total</p> <p>18 Hours</p> <p>Theory:</p> <p>2 Hours</p> <p>Practical:</p> <p>16 Hours</p>	<p>Paper, pencil, erasers, Markers, Flip chart/white board, pen</p> <p>Rulers, Laptops/desktops as per requirements, Microsoft Word, Printer,</p>	<p>Computer Lab equipped with networking facility, electricity backup and internet connectivity.</p> <p>Classroom</p>

	Enable the code for better security measures	<p>never save password in shared preferences, don't print LogCat, keep your dependencies up to date</p> <p>Enabling Pro-Guard property for better security measures.</p> <p>Moving API links to gradle.properties in order to avoid leakages.</p> <p>Final testing to ensure the security matters</p>		Multimedia	
LU4: Integrate with Bigger Eco-Systems	The trainee will be able to: Check third party Application Programming Interface (API) compatibility Connect 3 rd party Application Programming Interface (API) using Android Studio	<p>Understand REST (Representational State Transfer) API e.g. tenor API.</p> <p>Creating online POJO's for encapsulation</p> <p>Connecting POJO's using tools such as retrofit</p> <p>Connecting REST API data with front end designs.</p> <p>Evaluating connections and results of REST API's.</p>	<p>Total 14 Hours</p> <p>Theory: 2 Hours</p> <p>Practical: 12 Hours</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>Computer Lab equipped with networking facility, electricity backup and internet connectivity.</p> <p>Classroom</p>
LU5: Follow Business Driven Solution	The trainee will be able to: Add New features in the App as per requirement Finalize upgradation of App	<p>Implementing new feature addition techniques in documentation</p> <p>Understand the App Upgradation</p> <p>Evaluating the final up graded application.</p>	<p>Total 16 Hours</p> <p>Theory: 2 Hours</p> <p>Practical: 14 Hours</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>Computer Lab equipped with networking facility, electricity backup and internet connectivity.</p> <p>Classroom</p>

General assessment guidance for *Android Application Developer(Assistant)*

Good practice in Pakistan makes use of sessional and final assessments, the basis of which is described below. Good practice by vocational training providers in Pakistan is to use a combination of these sessional and final assessments, combined to produce the final qualification result.

Sessional assessment is going on all the time. Its purpose is to provide feedback on what students are learning:

- To the student: to identify achievement and areas for further work
- To the teacher: to evaluate the effectiveness of teaching to date, and to focus future plans.

Assessors need to devise sessional assessments for both theoretical and practical work. Guidance is provided in the assessment strategy

Final assessment is the assessment, usually on completion of a course or module, which says whether or not the student has "passed". It is – or should be – undertaken with reference to all the objectives or outcomes of the course, and is usually fairly formal. Considerations of security – ensuring that the student who gets the credit is the person who did the work – assume considerable importance in final assessment.

Methods of assessment

For lessons with a high quantity of theory, written or oral tests related to learning outcomes and/ or learning content can be conducted. For workplace lessons, assessment can focus on the quality of planning the related process, the quality of executing the process, the quality of the product and/or evaluation of the process.

Methods include direct assessment, which is the most desirable form of assessment. For this method, evidence is obtained by direct observation of the student's performance.

Examples for direct assessment of Android Application Developer include:

- Work performances, for example making a program in PLC for a particular application and designing with external interfaces (Mobile Phone Devices)
- Work performances by developing an android application and then installing it on an emulator.
- Work performances by developing an android application and then installing it on a mobile phone then checking its performance.

- Work performances, for example uploading the developed app on social media such as play store and then checking the feedback of the users).
- Work performance by assigning a project by the examiner.
- Work performance by checking the previously developed and uploaded android apps during the training session.
- Direct questioning, where the assessor would ask the student why he is preparing for a particular application

Indirect assessment is the method used where the performance could not be watched and evidence is gained indirectly.

Examples for indirect assessment of Android Application Developer include:

- Submission of already developed App
- Portfolio of work etc.

Indirect assessment should only be a second choice. (In some cases, it may not even be guaranteed that the work products were produced by the person being assessed.)

Principles of assessment

All assessments should be valid, reliable, fair and flexible:

Fairness means that there should be no advantages or disadvantages for any assessed person. For example, it should not happen that one student gets prior information about the type of work performance that will be assessed, while another candidate does not get any prior information.

Validity means that a valid assessment assesses what it claims to assess for example, if complex android app needs to be developed, the assessment should be involved according to performance criteria that are directly related to that particular App. Use of already developed App would not meet the performance criteria.

Reliability means that the assessment is consistent and reproducible. The results for the particular application should be the same.

Flexibility means that the assessor has to be flexible concerning the assessment approach. For example, if there is a power failure during the assessment, the assessor should modify the arrangements to accommodate the students' needs.

Assessment strategy for *Android Application Developer*

Sessional assessment

The Sessional assessment for all modules shall be in two parts: theoretical assessment and practical assessment. The Sessional marks shall contribute to the final qualification.

Theoretical assessment for all learning modules must consist of a written paper lasting at least one hour per module. This can be a combination of multiple choice and short answer questions.

For practical assessment, all procedures and methods for the modules must be assessed on a sessional basis. Guidance is provided below under Planning for assessment.

Final assessment

Final assessment shall be in two parts: theoretical assessment and practical assessment. The final assessment marks shall contribute to the final qualification.

The final theoretical assessment shall consist of half multiple choice and half short-answer questions. This part shall cover the technical, functional and generic modules:

Level 3

- Module 10: Apply Work Health and Safety Practices (WHS)
- Module 11: Identify and Implement Workplace Policy and Procedures
- Module 12: Communicate at Workplace
- Module 13: Perform Computer Application Skills
- Module 14: Manage Personal Finances
- Module 15: Develop Android Apps
- Module 16: Test & Integrate Mobile App Components
- Module 17: Deploy Mobile Apps
- Module 18: Use Social Media for Marketing
- Module 19: Integrate New features for Android Apps

For the final practical assessment of Level -3, each student shall be assessed over a period of one day, with Four hour sessions. During this period, each student must be assessed on his/her ability to the following parameters of Android Application Developer;

- Designing
- Configuration
- Installation
- Interfacing
- Programming
- Operating
- Controlling
- Monitoring

Module 10: Apply Work Health and Safety Practices (WHS), Module 11: Identify and Implement Workplace Policy and Procedures, Module 12: Communicate at Workplace, Module 13: Perform Computer Application Skills, Module 14: Manage Personal Finances shall not be assessed separately, but must be assessed during practical sessions.

The assessment team

The number of assessors must meet the needs of the students and the training provider. For example, where two assessors are conducting the assessment, there must be a maximum of five students per assessor. In this example, a group of 20 students shall therefore require assessments to be carried out over a day period. For a group of only 10 students, assessments would be carried out over a day period only.

Planning for assessment

Sessional assessment: assessors need to plan in advance how they will conduct sessional assessments for each module. The tables on the following pages are for assessors to use to insert how many hours of theoretical and practical assessment will be conducted and what the scheduled dates are.

Final assessment: Training providers need to decide ways to combine modules into a cohesive two-day final assessment programme for each group of five students. Training providers must agree the dishes for practical assessments in advance.

Complete list of tools and equipment

Tools and Equipment Required

The tools and equipment required for this competency standard are given below:

Sr#	Description	Quantity
Consumable		
1.	Paper	A4 Rim (As per requirement)
2.	Pencils	25
3.	Chart	As per requirement
4.	Color Pencils	25 sets
5.	Sharpener	25
6.	Eraser	25
7.	Note Book	1
Non-Consumable		
8.	Computer	25
9.	Internet Connection	In all Computers
10.	Software: <ul style="list-style-type: none"> • Web Browser • MS Office 	In all Computers
11.	Notepad++	Per each computer
12.	Net Beans	Per each computer
13.	Computer system	25
14.	Multimedia Projector	01

15.	USB/Memory Stick	01
16.	Internet	As per required
17.	Android Studio	As per requirement
18.	Android SDK (Software Development Kit)	As per requirement
19.	MS Access, SQLite Browser	As per requirement
20.	Adobe XD	1
21.	Visio	1
22.	Printer	01
23.	Scanner	01
24.	Software DVD's	25
25.	Computer System (Ref: Minimum SSD 240, 8GB RAM)	As per software requirement
26.	Computer Software (JDK, Android Studio)	As per requirement
27.	Network Printer	1
28.	MS Word	As per requirement
29.	Web Browser (chrome/Firefox etc.)	
30.	Computer system	25
31.	Multimedia Projector	01
32.	Visio Computer Software	1
33.	JIRA	For each computer
34.	Android Data cable for connectivity	As per requirements
35.	Graphic Design Software (Adobe XD etc.)	25
36.	Emulator	For each computer

37.	Software Testing Tools (Appium, Robotium)	For each computer
38.	Android Phones	As per requirements
39.	Android Data cable for connectivity	As per requirements
40.	Networks Switches,	As per requirements
41.	Network Cable cat-6,	As per requirements
42.	RJ-45 connectors,	As per requirements
43.	Cable Testers,	As per requirements
44.	Crimping tools	As per requirements

Credit values

The credit value of the National Certificate Level -2, Level-3 and Level-4 in Android Application Developer is defined by estimating the amount of time/ instruction hours required to complete each competency unit and competency standard. The NVQF uses a standard credit value of 1 credit = 10 hours of learning (Following Higher Education Commission (HEC) guidelines).

The credit values are as follows:

Competency Standard	Estimate of hours	Credit
J: Apply Work Health and Safety Practices (WHS)	30	3
K: Identify and Implement Workplace Policy and Procedures	20	2
L: Communicate at Workplace	30	3

Competency Standard	Estimate of hours	Credit
M:Perform Computer Application Skills	40	4
N:Manage Personal Finances	30	3
O:Develop Android Apps	140	14
P:Test & Integrate Mobile App Components	80	08
Q:Deploy Mobile Apps	40	40
R:Use Social Media for Marketing	50	5
S:Integrate New features for Android Apps	80	8

