

Government of Pakistan

National Vocational and Technical Training Commission

Prime Minister's Hunarmand Pakistan Program

"Skills for All"



Course Contents / Lesson Plan

Course Title: Mobile Application Development

Duration: 3 Months

Revised Edition

Trainer Name	
Course Title	Mobile Application Development
Objectives and Expectations	<p>Objectives and Expectations, Employable skills and hands on practice for Mobile Application Development</p> <p>This is a special course designed to address unemployment in the youth. The course aims to achieve the above objective through hands on practical training delivery by a team of dedicated professionals having rich market/work experience. This course is therefore not just for developing a theoretical understanding/back ground of the trainees. Contrary to that it is primarily aimed at equipping the trainees to perform commercially in a market space in independent capacity or as a member of a team.</p> <p>The course therefore is designed to impart not only technical skills but also soft skills (i.e interpersonal/communication skills; personal grooming of the trainees etc) as well as entrepreneurial skills (i.e marketing skills; free lancing etc). The course also seeks to inculcate work ethics to foster better citizenship in general and improve the image of Pakistani work force in particular.</p> <p>Main Expectations: In short, the course under reference should be delivered by professional instructors in such a robust hands- on manner that the trainees are comfortably able to employ their skills for earning money (through wage/self-employment) at its conclusion.</p> <p>This course thus clearly goes beyond the domain of the traditional training practices in vogue and underscores an expectation that a market centric approach will be adopted as the main driving force while delivering it. The instructors should therefore be experienced enough to be able to identify the training needs for the possible market roles available out there. Moreover,</p> <p>they should also know the strengths and weaknesses of each individual trainee to prepare them for such market roles during/after the training.</p> <p>i. Specially designed practical tasks to be performed by the trainees have been included in the Annexure-I to this document. The record of all tasks performed individually or in groups must be preserved by the management of the training Institute clearly labeling name, trade, session etc so that these are ready to be physically inspected/verified through monitoring visits from time to time. The weekly distribution of tasks has also been indicated in the weekly lesson plan given in this document.</p> <p>ii. In order to materialize the main expectations, a special module on Job Search & Entrepreneurial Skills has been included in the later part of this course (5th & 6th month) through which, the trainees will be made aware of the Job search techniques in the local as well as international job markets (Gulf countries). Awareness around the visa process and immigration laws of the most favoured labour destination countries also forms a part of this</p>

module. Moreover, the trainees would also be encouraged to venture into self-employment and exposed to the main requirements in this regard. It is also expected that a sense of civic duties/roles and responsibilities will also be inculcated in the trainees to make them responsible citizens of the country.

iii. A module on Work Place Ethics has also been included to highlight the importance of good and positive behavior at work place in the line with the best practices elsewhere in the world. An outline of such qualities has been given in the Appendix to this document. Its importance should be conveyed in a format that is attractive and interesting for the trainees such as through PPT slides +short video documentaries. Needless to say that if the training provider puts his heart and soul into these otherwise non-

technical components, the image of Pakistani workforce would undergo a positive transformation in the local as well as international job markets.

In order to maintain interest and motivation of the trainees throughout the course, modern techniques such as:

- Motivational Lectures
- Success Stories
- Case Studies

These techniques would be employed as an additional training tool wherever possible (these are explained in the subsequent section on Training Methodology).

Lastly, evaluation of the competencies acquired by the trainees will be done objectively at various stages of the training and proper record of the same will be maintained. Suffice to say that for such evaluations, practical tasks would be designed by the training providers to gauge the problem solving abilities of the trainees.

(i) Motivational Lectures

The proposed methodology for the training under reference employs motivation as a tool. Hence besides the purely technical content, a trainer is required to include elements of motivation in his/her lecture. To inspire the trainees to utilize the training opportunity to the full and strive towards professional excellence. Motivational lectures may also include general topics such as the importance of moral values and civic role & responsibilities as a Pakistani. A motivational lecture should be delivered with enough zeal to produce a deep impact on the trainees. It may comprise of the following:

- Clear Purpose to convey message to trainees effectively.
- Personal Story to quote as an example to follow.
- Trainees Fit so that the situation is actionable by trainees and not represent a just idealism.
- Ending Points to persuade the trainees on changing themselves.

A good motivational lecture should help drive creativity, curiosity and spark the desire needed for trainees to want to learn more.

Impact of a successful motivational strategy is amongst others commonly visible in increased class participation ratios. It increases the trainees' willingness to be engaged on the practical tasks for longer time without boredom and loss of interest because they can clearly see in their mind's eye

where their hard work would take them in short (1-3 years); medium (3 - 10 years) and long term (more than 10 years).

As this tool is expected that the training providers would make arrangements for regular well planned motivational lectures as part of a coordinated strategy interspersed throughout the training period as suggested in the weekly lesson plans in this document.

(ii) Success Stories

Another effective way of motivating the trainees is by means of Success Stories. Its inclusion in the weekly lesson plan at regular intervals has been recommended till the end of the training.

A success story may be disseminated orally, through a presentation or by means of a video/documentary of someone that has risen to fortune, acclaim, or brilliant achievement. A success story shows how a person achieved his goal through hard work, dedication and devotion. An inspiring success story contains compelling and significant facts articulated clearly and easily comprehensible words. Moreover, it is helpful if it is assumed that the reader/listener knows nothing of what is being revealed. Optimum impact is created when the story is revealed in the form of:-

- Directly in person (At least 2-3 cases must be arranged by the training institute)
- Through an audio/ videotaped message (2-3 high quality videos must be arranged by the training institute)

It is expected that the training provider would collect relevant high quality

success stories for inclusion in the training as suggested in the weekly lesson plan given in this document.

Suggestive structure and sequence of a sample success story and its various shapes can be seen at annexure III.

(iii) Case Studies

Where a situation allows, case studies can also be presented to the trainees to widen their understanding of the real life specific problem/situation and to explore the solutions.

In simple terms, the case study method of teaching uses a real life case example/a typical case to demonstrate a phenomenon in action and explain theoretical as well as practical aspects of the knowledge related to the same. It is an effective way to help the trainees comprehend in depth both the theoretical and practical aspects of the complex phenomenon in depth with ease. Case teaching can also stimulate the trainees to participate in discussions and thereby boost their confidence. It also makes class room atmosphere interesting thus maintaining the trainee interest in training till the end of the course.

Depending on suitability to the trade, the weekly lesson plan in this document may suggest case studies to be presented to the trainees. The trainer may adopt a power point presentation or video format for such case studies whichever is deemed suitable but it's important that only those cases are selected that are relevant and of a learning value.

The Trainees should be required and supervised to carefully analyze the cases.

For the purpose they must be encouraged to inquire and collect specific

	<p>information / data, actively participate in the discussions and intended solutions of the problem / situation.</p> <p>Case studies can be implemented in the following ways:</p> <ol style="list-style-type: none"> i. A good quality trade specific documentary (At least 2-3 documentaries must be arranged by the training institute). ii. Health & Safety case studies (2 cases regarding safety and industrial accidents must be arranged by the training institute) iii. Field visits(At least one visit to a trade specific major industry/ site must be arranged by the training institute)
Entry-level of trainees	<p>Since intake level is Bachelor of Computer Science (BCS) / B.Sc (Computer Science) so expectations from the trainees are:</p> <ul style="list-style-type: none"> • To have knowledge of Programming Concepts • To have studied languages such as C, C++, C# • To have concept of Computer system
Learning Outcomes of the course	<ul style="list-style-type: none"> • Understanding of programming techniques • Design and structure of android based application databases • Design and structure of web-based applications • Design and coding skills • Integration with API'S • Problems Solving Skills • Threading • Web Based android application • Understanding of Graphics • Designing and structure
Course Execution Plan	<p>The total duration of the course: 3 months (12 Weeks)</p> <p>Class hours: 4 hours per day</p> <p>Theory: 20%</p> <p>Practical: 80%</p> <p>Weekly hours: 20 hours per week</p> <p>Total contact hours: 260 hours</p>
Companies offering jobs in the respective trade	<ul style="list-style-type: none"> • Upwork • Freelancing • Fiverr • Government Institutes • Software Houses • Crossover • All Private Institutes who are managing software's
Job Opportunities	<p>All over the world there is a high demand in the Information Technology industry for developers in various fields such as mobile application development, web development and graphic designing. Smartphone have brought about revolution; This increase in usage of websites, apps android smart devices has created new opportunities for all to earn big and make a career out of this field. With the help of this course, we will be able to give technical trainings of Information Technology to our youth. There are also opportunities for start-up/entrepreneurship due to the high market demand for the following designated jobs;</p>

	<ul style="list-style-type: none"> • Software Engineers • Mobile App Developers • DBAs • Web Developers • Network Administrator • IT Support Officer • Manager / Assistant Manager IT
No of Students	25
Learning Place	Classroom / Lab
Instructional Resources	<p>Development Platform:</p> <ul style="list-style-type: none"> • https://github.com/, • https://firebase.google.com/, • https://developer.android.com/studio, • https://visualstudio.microsoft.com/, • https://jquery.com/ • https://www.oracle.com/index.html • https://flutter.dev/doc <p>Learning Material:</p> <ul style="list-style-type: none"> • https://deitel.com/other-books/ • https://www.youtube.com/@freecodecamp • http://learnopenerp.blogspot.com/

MODULES

Schedu led Weeks	Module Title	Days	Hours	Learning Units	Home Assignment
Week 1	Introduction to Mobile Application Development	Day 1	Hour 1	Basics of Android (Introduction to Android Studio)	
			Hour 2	Installing Android Studio. (Sdk)	
			Hour 3	Setting up emulator.	
			Hour 4	Going through With Android Studio (Explanation of IDE).	
		Day 2	Hour 1	Packages , API Levels	
			Hour 2	Success story (<i>For further detail please see Page No: 5 and Annexure-III at the end</i>)	
			Hour 3	Packages, API levels	
			Hour 4	Creating First App	
		Day 3	Hour 1	Understanding the Resource folders	
			Hour 2	Creating Hello world app in Android	
			Hour 3	Understanding the editor for Android studio	
			Hour 4	Project structure	
		Day 4	Hour 1	Gradle (app level)	

			Hour 2	Gradle(Project level)	
			Hour 3	Project structure	
			Hour 4	Android Studio User interface	
		Day 5	Hour 1	- Motivational Lecture(<i>For further detail please see Page No: 4</i>) - Table Layout	
			Hour 2	Constraint layout	
			Hour 3	Scroll view	
			Hour 4	Main building blocks part 1	
	Programming Fundamentals	Day 1	Hour 1	Runing Java code on Android studio	•Task 2 <i><u>Details may be seen at Annexure-I</u></i>
			Hour 2	comments	
			Hour 3	Main method Syntax	
			Hour 4	Variable and output	
		Day 2	Hour 1	Datatypes	
			Hour 2	numbers	
			Hour 3	Moving between activites	
			Hour 4	Transfer data between activities	

		Day 3	Hour 1	Activities stack				
			Hour 2	Session of CV building				
			Hour 3	How to make notable CV				
			Hour 4	Dos and don'ts of CV making				
		Day 4	Hour 1	Session on Self-Employment				
			Hour 2	How to start a Business.				
			Hour 3	Requirements (Capital, Physical etc)				
			Hour 4	Benefits/Advantages of self-employment				
		Day 5	Hour 1	A project based on trainee's aptitude and acquired skills.				
			Hour 2	Designed by keeping in view the emerging trends in the local market as well as across the globe.				
			Hour 3					
			Hour 4	Leading to the successful employment.				
		Week 3	Views	Day 1		Hour 1	List View and Grid View	•Task 3 <i><u>Details may be seen at Annexure-I</u></i>
			Hour 2			Simple List View		
			Hour 3			Add Layout		

			Hour 4	Add data
		Day 2	Hour 1	Display in activity
			Hour 2	Customize List View
			Hour 3	Add Model(Data plus model class)
			Hour 4	Add controller(Adapter Class)
		Day 3	Hour 1	Add View(Activity or Fragment)
			Hour 2	Customize List View
			Hour 3	Add On Item Click Listner
			Hour 4	Add On Item Click Listner
		Day 4	Hour 1	Select and implement functionality on every list
			Hour 2	Select and implement functionality on every list
			Hour 3	Send list Item data in new Activity
			Hour 4	Send list Item data in new Activity
		Day 5	Hour 1	
			Hour 2	
			Hour 3	Display data on new Screen like Daraz or

				AliBaba.	
			Hour 4	Display data on new Screen like Daraz or AliBaba.	
Week 4	Tables	Day 1	Hour 1	Table Layout	<p>•Task 4</p> <p><u>Details may be seen at Annexure-1</u></p>
			Hour 2	Constraint Layout	
			Hour 3	ScrollView	
			Hour 4	Main Building Blocks (Part 1)	
		Day 2	Hour 1	Activities	
			Hour 2	Activity lifecycle	
			Hour 3	Customize Back Press Button	
			Hour 4	Intents	
		Day 3	Hour 1	Main Building Blocks (Part 2)	
			Hour 2	Launch Activity	
			Hour 3	Moving Between Activities	
			Hour 4	Transfer Data Between Activities	
		Day 4	Hour 1	Activities Stack	

			Hour 2	Session on CV Building.	
			Hour 3	How to make notable CV.	
			Hour 4	Dos and Don'ts of CV making.	
		Day 5	Hour 1		
			Hour 2		
			Hour 3		
			Hour 4		
Week 5	Views and widgets	Day 1	Hour 1	View Group	
			Hour 2	UI Editing in Android Studio	
			Hour 3	View's Attributes	
			Hour 4	TextView - Formatting Texts	
		Day 2	Hour 1	Declaring & Initialising Views	•Task 5 <i>Details may be seen at Annexure-I</i>
			Hour 2	EditText	
			Hour 3	Buttons	
			Hour 4	Listeners in Android	
		Day 3	Hour 1	ImageView - Displaying Images	

			Hour 2	The Greetings App	
			Hour 3	setTag() methods	
			Hour 4	GetTag() methods	
		Day 4	Hour 1	Adapters	
			Hour 2	Custom adapters	
			Hour 3	Methods	
			Hour 4	View class holders	
		Day 5	Hour 1	Displaying custom ListViews	
			Hour 2	View Holder	
			Hour 3	Adapter Mehtods	
			Hour 4	Linear layout manager	
Week 6	Fagments & Adapters and Data binding	Day 1	Hour 1	Android Fragments	<p>• Task 6</p> <p><i>Details may be seen at Annexure-I</i></p>
			Hour 2	Fragment Lifecycle	
			Hour 3	Building fragments app	
			Hour 4	Frame layout	
		Day 2	Hour 1	Fragment Transaction	

			Hour 2	Fragment state adapter
			Hour 3	Tab layout with viewer Pager
			Hour 4	What's Jetpack
		Day 3	Hour 1	Data binding
			Hour 2	Data binding App
			Hour 3	Data binding App
			Hour 4	Handling Click Events in Data Binding
		Day 4	Hour 1	Two-Way Data Binding
			Hour 2	getView() Method
			Hour 3	Layout Inflater
			Hour 4	
		Day 5	Hour 1	
			Hour 2	
			Hour 3	
			Hour 4	

Week 7	dastabase	Day 1	Hour 1	What's Firebase?	<p>• Task 7</p> <p><i><u>Details may be seen at Annexure-I</u></i></p>
			Hour 2	Adding Firebase to Apps	
			Hour 3	Write Data to Firebase Realtime Database	
			Hour 4	Read Data From Firebase Real-Time Database	
		Day 2	Hour 1	Reading & Writing Custom Objects	
			Hour 2	What's Firestore?	
			Hour 3	Adding Firestore to Apps	
			Hour 4	Creating Layouts & Model Class	
		Day 3	Hour 1	Adding Data to Firestore	
			Hour 2	Reading All Documents in a Collections	
			Hour 3	Update & Delete Documents in a Collection	
			Hour 4		
		Day 4 OCR and QR App	Hour 1	Adding Depenedency - OCR	
			Hour 2	Creating Layouts - OCR	
			Hour 3	Initializing Widgets - OCR	
			Hour 4	Adding Functionality- OCR	

		Day 5	Hour 1	Running the App – OCR	
			Hour 2		
			Hour 3		
			Hour 4		
Week 8	Firebase Authentication	Day 1	Hour 1	Project Setup - Adding Dependencies	<ul style="list-style-type: none"> • Task 8 <i>Details may be seen at Annexure-I</i>
			Hour 2	Model Class - The Journal	
			Hour 3	Sign-In Layout	
			Hour 4	Creating Gradient Drawables	
		Day 2	Hour 1	Journal Layout	
			Hour 2	Sign-Up Activity	
			Hour 3	AuthState Listener	
			Hour 4	Auth SignUP	
		Day 3	Hour 1	Sign Up a New User	
			Hour 2	Auth Login	
			Hour 3	RecyclerView Adapter	
			Hour 4	Journal List Activity	

		Day 4	Hour 1	Getting All Journals From Firestore	
			Hour 2	Add Journal Activity Layout	
			Hour 3	Getting userID & Username	
			Hour 4	Activity Result Launcher	
		Day 5	Hour 1		
			Hour 2		
			Hour 3		
			Hour 4		
Week 9	Front end for mobile application	Day 1	Hour 1	Frontend Designing	<p>•Task 9</p> <p><i>Details may be seen at Annexure-1</i></p>
			Hour 2	Relative Layout for Placement	
			Hour 3	Linear Layout for responsiveness	
			Hour 4	Scroll View for infinite Scrolling	
		Day 2	Hour 1	UI	
			Hour 2	Multiple Files with one screen	
			Hour 3	Based on size	
			Hour 4	Based on orientation	

		Day 3	Hour 1	UI for tablets devices	
			Hour 2	Services	
			Hour 3	Services Life Cycle	
			Hour 4	Activity and service	
		Day 4	Hour 1	Start Service	
			Hour 2	Stop Service	
			Hour 3	Saving user information	
			Hour 4	Shared Preferences	
		Day 5	Hour 1	Key Value Pair	
			Hour 2	Remove and clear functions.	
			Hour 3	Counter Example.	
			Hour 4	Introducing SQLite	
Week 10	Continuation of previous plus KOTLIN	Day 1	Hour 1	SQLite Open Helper and creating a database	•Task 10 <i><u>Details may be seen at Annexure-I</u></i>
			Hour 2	Opening and closing a database	
			Hour 3	SQLite & Paper DB 93	
			Hour 4	FireBase	

		Day 2	Hour 1	Saving user Info
			Hour 2	Kotlin Syntax
			Hour 3	Output
			Hour 4	Comments
		Day 3	Hour 1	Variables
			Hour 2	Data Types
			Hour 3	Numbers
			Hour 4	Decimals
		Day 4	Hour 1	Boolean
			Hour 2	Characters
			Hour 3	Opeartors
			Hour 4	Strings
		Day 5	Hour 1	Conditional Statements
			Hour 2	Loops - [For, While, Do While Loops]
			Hour 3	Break & Continue
			Hour 4	Arrays

Week 11	Kotlin OOP	Day 1	Hour 1	Functions & Parameters	<p>•Task 11 <i>Details may be seen at Annexure-I</i></p>
			Hour 2	Return Type of Function	
			Hour 3	Function Overloading	
			Hour 4	What's OOP?	
		Day 2	Hour 1	Classes	
			Hour 2	Objects	
			Hour 3	Primary Constructor	
			Hour 4	What's Inheritance?	
		Day 3	Hour 1	Inheritance Example	
			Hour 2	Open Keyword	
			Hour 3	init & Secondary Constructors	
			Hour 4	Primary vs Secondary Constructors	
		Day 4	Hour 1	Super Keyword	
			Hour 2	Getters & Setters	
			Hour 3	Visibility Modifiers	
			Hour 4	Abstract Class	

		Day 5	Hour 1	Interfaces	
			Hour 2		
			Hour 3		
			Hour 4		
Week 12	Entrepreneurship, overseas employment and Final Assessment in project	Day 1	Hour 1	Session on General Overseas Employment opportunities.	<p>•Task 12</p> <p><i>Details may be seen at Annexure-I</i></p> <p>Final Project</p>
			Hour 2	Job search Avenues.	
			Hour 3	Visa Processes and other necessary requirements.	
			Hour 4	Immigration Information (Legal age requirements, Health Certificate, Police Clearance & Travel Insurance)	
		Day 2	Hour 1	Depth Perception	
			Hour 2	Stereo Vision	
			Hour 3	Time of Flight (ToF)	
			Hour 4	Time of Flight (ToF)	
		Day 3	Hour 1	Business Incubation and Acceleration	
			Hour 2	Business Value Statement	

			Hour 3	Business Model Canvas
			Hour 4	Sales and Marketing Strategies
		Day 4	Hour 1	How to Reach Customers and Engage CxOs
			Hour 2	Stakeholders Power Grid
			Hour 3	RACI Model, SWOT Analysis, PEST Analysis
			Hour 4	SMART Objectives
		Day 5	Hour 1	OKRs
			Hour 2	Cost Management (OPEX, CAPEX, ROCE etc.)
			Hour 3	Final Assessment
			Hour 4	Business Incubation and Acceleration

Tasks for Certificate in AI (Robotics)

Task No.	Task	Description	Week
1.	Use Output Statement	Write a code to Display your name on the Mobile	Week 1
2.	Make a button	Display a button on the mobile screen	Week 2
3.	Change the Mobile Background Color	Make a mobile app to change the Background of the screen to Yellow	Week 3
4.	Display a textbox	Write a mobile code to display a Textbox on the screen	Week 4
5.	Display alert message on the mobile screen	Display Textbox and Button on the screen and when we add a Text in Textbox, it is displayed on the Mobile screen as an Alert Message.	Week 5
6.	Connectivity with Database using Mobile application.	Display Textbox and Button on the screen and when we add a Text in Textbox, and when button is pressed it is stored in Database	Week 6
7.	Accessing Hardware	Create a simple App with button to turn on mobile torch	
8.			
9.			
10.			
11.			
12.			
13.	Project	Final Project	

**Motivational Lectures
Mobile Application Development**

Annexure-IV:

Workplace/Institute Ethics Guide

Work ethic is a standard of conduct and values for job performance. The modern definition of what constitutes good work ethics often varies. Different businesses have different expectations. Work ethic is a belief that hard work and diligence have a moral benefit and an inherent ability, virtue, or value to strengthen character and individual abilities. It is a set of values-centered on the importance of work and manifested by determination or desire to work hard.

The following ten work ethics are defined as essential for student success:

1. Attendance:

Be at work every day possible, plan your absences don't abuse leave time. Be punctual every day.

2. Character:

Honesty is the single most important factor having a direct bearing on the final success of an individual, corporation, or product. Complete assigned tasks correctly and promptly. Look to improve your skills.

3. Team Work:

The ability to get along with others including those you don't necessarily like. The ability to carry your weight and help others who are struggling. Recognize when to speak up with an idea and when to compromise by blend ideas together.

4. Appearance:

Dress for success set your best foot forward, personal hygiene, good manner, remember that the first impression of who you are can last a lifetime

5. Attitude:

Listen to suggestions and be positive, accept responsibility. If you make a mistake, admit it. Values workplace safety rules and precautions for personal and co-worker safety. Avoids unnecessary risks. Willing to learn new processes, systems, and procedures in light of changing responsibilities.

6. Productivity:

Do the work correctly, quality and timelines are prized. Get along with fellows, cooperation is the key to productivity. Help out whenever asked, do extra without being asked. Take pride in your work, do things the best you know-how. Eagerly focuses energy on accomplishing tasks, also referred to as demonstrating ownership. Takes pride in work.

7. Organizational Skills:

Make an effort to improve, learn ways to better yourself. Time management; utilize time and resources to get the most out of both. Take an appropriate approach to social interactions at work. Maintains focus on work responsibilities.

8. Communication:

Written communication, being able to correctly write reports and memos. Verbal communications, being able to communicate one on one or to a group.

9. Cooperation:

Follow institute rules and regulations, learn and follow expectations. Get along with fellows, cooperation is the key to productivity. Able to welcome and adapt to changing work situations and the application of new or different skills.

10. Respect:

Work hard, work to the best of your ability. Carry out orders, do what's asked the first time. Show respect, accept, and acknowledge an individual's talents and knowledge. Respects diversity in the workplace, including showing due respect for different perspectives, opinions, and suggestions.