Government of Pakistan

National Vocational and Technical Training Commission

Prime Minister's Hunarmand Pakistan Program

"Skills for All"

Course Contents / Lesson Plan
Course Title: BLOCKCHAIN
Duration: 6 Months

Revised Edition

Course Title	**BLOCKCHAIN**
Objectives and Expectations	**Employable skills and hands-on practice for Blockchain** Blockchain is radically improving supply chains, banking and other business networks, as well as creating new opportunities for innovation. Blockchain technology provides a dynamic shared ledger that can be applied to save time when recording transactions between parties, remove costs associated with intermediaries, and reduce risks of fraud and tampering. Businesses contain many examples of networks of individuals and organizations that collaborate to create value and wealth. These networks work together in markets that exchange assets in the form of goods and services between the participants. 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. 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 **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. 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, they should also know the strengths and weaknesses of each trainee to prepare them for such market roles during/after the training. 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. ii. To materialize the main expectations, a special module on **Job Search & Entrepreneurial Skills** has been included in the latter 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 favored labor destination countries also form a part of this 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 in the workplace 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 the Pakistani workforce would undergo a positive transformation in the local as well as international job markets.

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

The 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 a longer time without boredom and loss of interest because they can 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.
Course-related motivational lectures online link is available in **Annexure-II**.

(ii)   Success Stories
Another effective way of motivating the trainees is using 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 using 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 comprehendible words. Moreover, it is helpful if it is assumed that the reader/listener knows nothing of what is being revealed. The 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 in **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 the classroom 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 be presented to the trainees. The trainer may adopt a PowerPoint presentation or video format for such case studies whichever is deemed suitable but only those cases must be selected that are relevant and of a learning value.
The Trainees should be required and supervised to carefully analyze the

	cases.
	For this purpose, they must be encouraged to inquire and collect specific information/data, actively participate in the discussions, and intended solutions to the problem/situation.
	Case studies can be implemented in the following ways: -
	    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	Intermediate
Learning Outcomes of the course	Skills to Learn how the individual components of the Bitcoin protocol make the whole system works: transactions, script, blocks, and the peer-to-peer network
Course Execution Plan	The total duration of the course: **6 months (26 Weeks)** Class hours: **4 hours per day** Theory: **20%** Practical: **80%** Weekly hours: **20 hours per week (5 days a week)** Total contact hours: **520hours**
Companies offering jobs in the respective trade	• DevProvider. • RNS Solutions. • TechCreatix. • HireNinja. • Block360. • Ideofuzion Pvt Ltd. • HTML Pro. • Bazingo Inc. • IBM. • Voatz and many more
Job Opportunities	Blockchain is one of the fastest-growing technology in the market, and a large number of banking, insurance, and tech giants have been deploying numerous blockchain solutions
No of Students	25
Learning Place	Classroom / Lab
Instructional Resources	● https://www.w3schools.com/ ● https://www.coursera.com/ ● https://www.towardsdatascience..com/ ● https://www.codingbat.com/ ● https://www.pythonforeverybody.com/ ● https://www.edx.org/course/big-data-analytics-2 ● https://online-learning.harvard.edu/subject/big-data ● https://www.theknowledgeacademy.com/pk/courses/big-data-and-analytics-training/#showmoreoverview50339330

MODULES

Scheduled Week	Module Title	Learning Units	Remarks
Week 1	Introduction to Blockchain	● **Motivational Lecture** **(** *For further detail please see Annexure: II)* ● Introduction to Blockchain -Learning Outcomes ● Course Introduction ● Definition and Applications ● Positive and Negative Applications ● Cryptocurrency Issues ● Trust Computing ● Bitcoin Blockchain - Learning	**TASK1** *Details may be seen at Annexure-I*
Week 2	Introduction to Blockchain	● **Success stories** **(** *For further detail please see Annexure: III)* ● Distributed Consensus, ● Concepts of Cryptography ● Symmetric Key Algorithm ● Public Key Cryptography ● Introduction to Blockchain - Lesson Summary	**TASK 2** **TASK 3** *Details may be seen at Annexure-I*
Week 3	Properties of Blockchain	● **Motivational Lecture** **(** *For further detail please see Annexure: II)* ● Properties of Blockchain - Learning	**TASK 4** **TASK 5**

		Outcomes	**TASK 6**
		● Hash Function	*Details may be seen at Annexure-I*
		● Hash Pointers and Data Structures	
		● Digital Signatures	
		● Blockchain Platform Implementation	
Week 4	Properties of Blockchain	● **Success stories** (*For further detail please see Annexure: III)*	**Task 7** *Details may be seen at Annexure-I*
		● How to Create a Ledger of Transactions	
		● How Validation Codes Work	
		● Generating Public Keys	**1st Monthly Test at end of month (Week-4)**
		● Hash Pointers and Blockk Rewards	
		Properties of Blockchain-Lesson Summary	
Week 5	Bitcoin Blockchain	● **Motivational Lecture** (*For further detail please see Annexure: II)*	**TASK 8** **TASK 9**
		● Bitcoin Blockchain - Learning Outcomes	*Details may be seen at Annexure-I*
		● Introduction to Bitcoin	
		● Decentralization in Blockchain	
		Consensus Mechanism	
Week 6	Bitcoin Blockchain	● **Success stories** (*For further detail please see Annexure: III)*	**TASK 10** **TASK 11**
		● Blockchain Growth Dynamics	*Details may be seen at*

		● Working Principles of Bitcpin ● Running Nodes and Block Rewards ● Incentive Mechanism	*Annexure-I*
Week 7	Bitcoin Blockchain	● **Motivational Lecture** **(** *For further detail please see Annexure: II)* ● Proof of Work Properties ● Summary of Previous Lectures ● Nature of Bitcoin ● Bitcoin Blockchain - Lesson Summary	**TASK 12** *Details may be seen at Annexure-I*
Week 8	Bitcoin Blockchain	● **Success stories** **(** *For further detail please see Annexure: III)* ● Blockchain Mechanics - Learning Outcomes ● Bitcoin Blockchain Mechanics ● Bitcoin Transactions ● Bitcoin Scripting Language	**TASK 13** *Details may be seen at Annexure-I* **2nd Monthly Test at end of month (Week-8)**
Week 9	Blockchain Mechanics	● **Motivational Lecture** **(** *For further detail please see Annexure: II)* ● Application of Bitcoin Scripts ● Bitcoin Blocks and Network ● Blocks and Nodes ● Forking	**TASK 14** **TASK 15** *Details may be seen at Annexure-I*
Week 10	Blockchain Mechanics	● **Success stories** **(** *For further detail please see Annexure: III)*	**TASK 16** *Details may be seen at*

		● Hard Fork	*Annexure-I*
		● Intraduction to Ethereum Blockchain	
		● Ethereum Insight	
		● Blockchain Mechanics-Lesson	
Week 11	Ethereum Blockchain	● **Motivational Lecture** (*For further detail please see Annexure: II)*	**TASK 17** *Details may be seen at Annexure-I*
		● Ethereum Blockchain - Learning Outcomes	
		● Smart Contracts	
		● Ethereum Networks	
		● Ethereum Design Principles	
		● Accounts and UTXOS	
		● Storing Blocks on The Blockchain	
Week 12	Ethereum Blockchain	● **Success stories** (*For further detail please see Annexure: III)*	**TASK 18** **TASK 18A** *Details may be seen at Annexure-I*
		● Creating Contracts	
		● Ethereum Overview	
		● Collection of On Chain Smart Contracts	
		● Contract Creation Analysis	
		● Security of Ethereum	
		● Ethereum Blockchain-Lesson Summary	
	Build your CV	Download professional CV template from any good site (https://www.coolfreecv.com or relevant)	

		• Add Personal Information • Add Educational details • Add Experience/Portfolio • Add contact details/profile links	
Week 13	Mid-Term Assignment/Exam		
Week 14	Permission and Permissionless Blockchain	● **Motivational Lecture** **(** *For further detail please see Annexure: II)* ● Permission and Permissionless Blockchain - Learning Outcomes ● Blockchain for Business ● Hyper Ledger Project ● Hyper Ledger Consesus	**TASK 19** **TASK 20** *Details may be seen at Annexure-I*
Week 15	Permission and Permissionless Blockchain	● **Success stories** **(** *For further detail please see Annexure: III)* ● Hyper Ledger Fabric Model ● Order-Execute Paradigm ● Trust Modules and Fabric Blockchain ● Overview of Hyper Ledger Fabric and Order-Execute Paradigm	**TASK 21** **TASK 21A** *Details may be seen at Annexure-I*
	Create an account profile on Fiverr (at least two gigs) and Upwork	Create an account by following these steps: Step 1: Personal Info Step 2: Professional Info Step 3: Linked Accounts Step 4: Account Security	
Week 16	Permission and Permissionless	● **Success stories** **(** *For further detail please see Annexure: III)*	**TASK 22** **TASK 23**

	Blockchain	● Limitations of Order-Everute Daradiam ● State Machine Replication ● SMR Requirements and Implementation ● Permission and Permissionless Blockchain- Lesson Summery	*Details may be seen at Annexure-I* **3rd Monthly Test at end of month (Week-16)**
Week 17	Blockchain Applications	● **Motivational Lecture** (*For further detail please see Annexure: II)* ● Blockchain Applications-Learning Outcomes ● Byzantine Tolerance and Fabric Overview ● Endersement Policy and Fabric Transactions ● Introduction to Internet of Things Internet of Things	**TASK 24** *Details may be seen at Annexure-I*
Week 18	Blockchain Applications	● **Success stories** (*For further detail please see Annexure: III)* ● How IOT Works ● Tangle in Place of Blockchain ● Tangle Simulations I ● Tangle Simulations II ● Corda Blockchain	**TASK 25** *Details may be seen at Annexure-I*
Week 19	Blockchain Applications	● **Motivational Lecture** (*For further detail please see Annexure: II)*	**TASK 26** **TASK 27**

		● Blockchain Services Features of Corda Blockchain ● Corda Ledger ● Blockchain Applications - Lesson Summary	*Details may be seen at Annexure-I*
Week 20	Blockchain Overview	● **Success stories** (*For further detail please see Annexure: III)* ● Blockchain Overview - Learing Outcomes ● Overview of Blockchain 1.0 ● Algorand ● Blockchains 20 and 3.0	**TASK 28** **TASK 29** *Details may be seen at Annexure-I* **4th Monthly Test at end of month (Week-20)**
Week 21	Employable Project/Assignment (6 weeks (i.e 21-26) in addition to regular classes.	● **Motivational Lecture** (*For further detail please see Annexure: II)* ● Guidelines to the Trainees for selection of students employable project like final year project (FYP) ● Assign Independent project to each Trainee ● A project based on trainee's aptitude and acquired skills. ● Designed by keeping in view the emerging trends in the local market as well as across the globe. ● The project idea may be based on Entrepreneur.	**TASK21** *Details may be seen at Annexure-I*

		● Leading to the successful employment.	
		● The duration of the project will be 6 weeks	
		● Ideas may be generated via different sites such as:	
		https://1000projects.org/	
		https://nevonprojects.com/	
		https://www.freestudentprojects.com/	
		https://technofizi.net/best-computer-science-and-engineering-cse-project-topics-ideas-for-students/	
		● Final viva/assessment will be conducted on project assignments.	
		● At the end of session the project will be presented in skills competition	
		● The skill competition will be conducted on zonal, regional and National level.	
		● The project will be presented in front of Industrialists for commercialization	
Week 22	Blockchain Overview	● **Success stories** (*For further detail please see Annexure: III)* ● IOTA and KSI Blockchains ● Applications using Blockchain ● Land Records and Corda ● Hyper Ledger Fabric	**TASK 31** **TASK 31A** *Details may be seen at Annexure-I*

	How to search and apply for jobs in at least two labor marketplace countries (KSA, UAE, etc.)	• Browse the following website and create an account on each website
		   ▪ Bayt.com – The Middle East Leading Job Site
		   ▪ Monster Gulf – The International Job Portal
		   ▪ Gulf Talent – Jobs in Dubai and the Middle East
		 • Find the handy 'search' option at the top of your homepage to search for the jobs that best suit your skills.
		 • Select the job type from the first 'Job Type' drop-down menu, next, select the location from the second drop-down menu.
		 • Enter any keywords you want to use to find suitable job vacancies.
		 • On the results page you can search for part-time jobs only, full-time jobs only, employers only, or agencies only. Tick the boxes as appropriate to your search.
		 • Search for jobs by:
		   ▪ Company
		   ▪ Category
		   ▪ Location
		   ▪ All jobs
		   ▪ Agency
		 ● Industry	

Week 23	Blockchain Overview	● **Motivational Lecture** (*For further detail please see Annexure: II)* ● Application Design and Workflow ● Blockchain Misconceptions I ● Blockchain Misconceptions II ● Blockchain Overview - Lesson Summary	**TASK 32** **TASK 34** *Details may be seen at Annexure-I*
Week 24	Intro to Machine Learning (EDA)	● **Success stories** (*For further detail please see Annexure: III)*	**TASK 34** *Details may be seen at*

		● Outlier Detection on Pandas	*Annexure-I*
		● Introduction to Feature Engineering	
		● Handling Categories	
		● Visualizing Data using Matplotlib	
Week 25	Intro to Machine Learning (Modelling)	● **Motivational Lecture** **(** *For further detail please see Annexure: II)*	**TASK 35** *Details may be seen at Annexure-I*
		● Python Scikit-learn Library	
		● Classification	
		● Regression	
		● Clustering	
		● Feature Selection	
		● Evaluating Models	
		● Class Exercise	
		● Feature Selection	
		● Evaluating Models	
		● Class Exercise	
Week 26	Entrepreneurship and Final Assessment in project	● **Success stories** **(** *For further detail please see Annexure: III)*	**TASK 36** *Details may be seen at Annexure-I*
		● Job Market Searching	
		● Self-employment	
		● Freelancing sites	
		● Introduction	

		● Fundamentals of Business Development	
		● Entrepreneurship	
		● Startup Funding	
		● Business Incubation and Acceleration	
		● Business Value Statement	
		● Business Model Canvas	
		● Sales and Marketing Strategies	
		● How to Reach Customers and Engage CxOs	
		● Stakeholders Power Grid	
		● RACI Model, SWOT Analysis, PEST Analysis	
		● SMART Objectives	
		● OKRs	
		● Cost Management (OPEX, CAPEX, ROCE etc.)	
		● Final Assessment	

Tasks For Certificate in Blockchain programming

Task No.	Task	Description	Week
	Blockchain Programming		
1	**Bitcoin transactions**	Consider the steps involved in processing Bitcoin transactions. Which of these steps are computationally expensive?	**Week-1**
2	**Transaction validation:**	If you're an entity validating many transactions (say, a miner) what data structure might you build to help speed up verification?	**Week-2**
3	**Bitcoin script**	For the following questions, you're free to use non-standard transactions and op codes that are currently disabled. You can use as a shorthand to represent data values pushed onto the stack. For a quick reference, see here: https://en.bitcoin.it/wiki/Script.	**Week-2**
4	**ScriptPubKey**	Write the Bitcoin ScriptPubKey script for a transaction that can be redeemed by anybody who supplies a square root of 1764.	**Week-3**
5	**ScriptSig script**	Write a corresponding ScriptSig script to redeem your transaction.	**Week-3**
6	**RSA factoring challenge**	Suppose you wanted to issue a new RSA factoring challenge by publishing a transaction that can be redeemed by anybody who can factor a 1024-bit RSA number (RSA numbers are the product of two large, secret prime numbers). What difficulties might you run into?	**Week-3**
7	**Bitcoin script II**	Alice is backpacking and is worried about her devices containing private keys getting stolen. So she would like to store her bitcoins in such a way that they can be redeemed via knowledge of only a password. Accordingly, she stores them in the following	**Week-4**

Task No.	Task	Description	Week
		ScriptPubKey address: OP_SHA1 OP_EQUALVERIFY. c. Would implementing this using Pay-to-script-hash (P2SH) fix the security issue(s) you identified? Why or why not?	
8	ScriptSig	Write a ScriptSig script that will successfully redeem this transaction. [Hint: it should only be one line long.]	Week-5
9	protect Bitcoins	Explain why this is not a secure way to protect Bitcoins using a password	Week-5
10	Bitcoin script III.	Write a ScriptPubKey that requires demonstrating a SHA-256 collision to redeem. b. (Hard) write a corresponding ScriptSig that will successfully redeem this transaction.	Week-6
11	Burning and encoding	What are some ways to burn bitcoins, i.e., to make a transaction unredeemable? Which of these allow a proof of burn, i.e., convincing any observer that no one can redeem such a transaction? [Hint: you have more control over the contents of the transaction "out" field than might at first appear.]	Week-6
12	burnt bitcoins	What are some ways to encode arbitrary data into the block chain? Which of these result in burnt bitcoins?	Week-6
13	JavaScript code into the block chain	One user encoded some JavaScript code into the block chain. What might have been a motivation for doing this?	Week-7
14	Green addresses:	One problem with green addresses is that there is no punishment against double-spending within the Bitcoin system itself.	Week-9
15	GreenCoin	you decide to design an altcoin 99 called "GreenCoin" that has built-in support for green addresses. Any attempt at double spending from addresses (or transaction outputs) that have been designated as "green" must incur a financial penalty in a way that can	Week-9

Task No.	Task	Description	Week
		be enforced by miners. Propose a possible design for GreenCoin	
16	**SPV proofs:**	Suppose Bob the merchant runs a lightweight client and receives the current head of the block chain from a trusted source. b. Estimate how many bytes this proof will require. Assume there are 1024 transactions in each block.	**Week-10**
17	**Adding new features**	Assess whether the following new features could be added using a hard fork or a soft fork: a. Adding a new OP_SHA3 script instruction.	**Week-11**
18	**prove that their payment to Bob**	What information should Bob's customers provide to prove that their payment to Bob has been included in the block chain? Assume Bob requires 6 confirmations.	**Week-12**
18A	**Build your CV**	Download professional CV template from any good site (https://www.coolfreecv.com or relevant) • Add Personal Information • Add Educational details • Add Experience/Portfolio • Add contact details/profile links	
19	**OP_SHA1 instruction**	Disabling the OP_SHA1 instruction	**Week-14**
20	**UTXOs**	A requirement that each miner include a Merkle root of unspent transaction outputs (UTXOs) in each block	**Week-14**
21	**Outputs sorted**	A requirement that all transactions have their outputs sorted by value in ascending order	**Week-15**
21A	**Create an account profile on Fiverr (at least two gigs) and Upwork**	Create an account by following these steps: Step 1: Personal Info Step 2: Professional Info Step 3: Linked Accounts Step 4: Account Security	
22	**Hard fork**	The most prominent Bitcoin hard fork was a transient one caused by the version 0.8 bug. How many blocks were abandoned when the fork was resolved?	**Week-16**

Task No.	Task	Description	Week
23	**Soft fork**	The most prominent Bitcoin soft fork was the addition of pay-to-script-hash. How many blocks were orphaned because of it?	**Week-16**
24	**Heuristic(s)**	Bitcoin clients go into "safe mode" when they detect that the chain has forked. What heuristic(s) could you use to detect this?	**Week-17**
25	**Proof of reserve.**	Transparent Exchange claims that it controls at least 500,000 BTC and wants to prove this to its customers. To do this it publishes a list of addresses that have a total 128 balance of 500,000 BTC.	**Week-18**
26	**Transparent Exchange**	It then signs the statement "Transparent Exchange controls at least 500,000 BTC" with each of the corresponding private keys, and presents these signatures as proof. What are some ways in which Transparent Exchange might be able to produce such a proof even if it doesn't actually currently control 500,000 BTC?	**Week-19**
27	**exchange to cheat**	How would you modify the proof to make it harder for the exchange to cheat?	**Week-19**
28	**Proof of liabilities.**	Transparent Exchange implements a Merkle Tree based protocol to prove an upper bound on its total deposits. (Combined with a proof of reserve, this proves that the exchange is solvent.) Every customer is assigned a leaf node containing an ID which is the hash of her username and a value which is her BTC balance. The protocol specifies that Transparent Exchange should propagate IDs and values up the tree by the following recursive definition — for any internal node: node.value = node.left_child.value + node.right_child.value node.id = Hash(node.left_child.id ‖ node.right_child.id ‖ node.value) The exchange publishes the root ID and	**Week-20**

Task No.	Task	Description	Week
		value, and promises to prove to any customer that her node is included in the tree (by the standard Merkle tree proof of inclusion).	
29	**Transaction fees.**	Alice has a large number of coins each of small value v, which she would like to combine into one coin. She constructs a transaction to do this, but finds that the transaction fee she'd have to spend equals the sum of her coin values. Based on this information (and the default transaction fee policy specified in slide 50), estimate v. Can Alice somehow consolidate her coins without incurring any transaction fee under the default policy?	**Week-20**
30	**Transaction fees II**	Compared to a fee structure that doesn't factor the age of the inputs into the transaction fee, what effect might the current default fee structure have on the behavior of users and services?	**Week-21**
31	**Multi-signature wallet**	BitCorp has just noticed that Mallory has compromised one of their servers holding their Bitcoin private keys. Luckily, they are using a 2-of-3 multi-signature wallet, so Mallory has learnt only one of the three sets of keys. The other two sets of keys are on 129 different servers that Mallory cannot access. How do they re-secure their wallet and effectively revoke the information that Mallory has learned?	**Week-22**
31A	**How to search and apply for jobs in at least two labor marketplace countries (KSA, UAE, etc.)**	- Browse the following website and create an account on each website - Bayt.com – The Middle East Leading Job Site - Monster Gulf – The International Job Portal - Gulf Talent – Jobs in Dubai and the Middle East - Find the handy 'search' option at the top of your homepage to search for the jobs that best suit your skills.	

Task No.	Task	Description	Week

		• Select the job type from the first 'Job Type' drop-down menu, next, select the location from the second drop-down menu.
		• Enter any keywords you want to use to find suitable job vacancies.
		• On the results page you can search for part-time jobs only, full-time jobs only, employers only, or agencies only. Tick the boxes as appropriate to your search.
		• Search for jobs by:
		  ▪ Company
		  ▪ Category
		  ▪ Location
		  ▪ All jobs
		  ▪ Agency
		
		Industry	

32	**BitCorp**	If BitCorp uses a 2-out-of-2 instead of a 2-out-3 wallet, what steps can they take in advance so that they can recover even in the event of one of their servers getting broken into (and Mallory not just learning but also potentially deleting the key material on that server)?	**Week-23**
33	**Exchange rate**	Speculate about why buying bitcoins in person is generally more expensive than buying from an online exchange. Moore and Christin observe that security breaches and other failures of exchanges have little impact on the Bitcoin exchange rate. Speculate on why this might be.	**Week-23**
34	**Payments.**	A Bitcoin payment service might receive thousands of payments from various users near-simultaneously.	**Week-24**
35	**payment protocol**	How can it tell whether a particular user Alice who logged into the payment service website and initiated the payment protocol actually made a payment or not?	**Week-25**
36	**BitcoinLotto:**	Suppose the nation of Bitcoinia has decided to convert its national lottery to use Bitcoin. A trusted scratch-off ticket printing factory exists and will not keep records	**Week-26**

Task No.	Task	Description	Week
		of any values printed. Bitcoinia proposes a simple design: a weekly run of tickets is printed with an address holding the jackpot on each ticket. This allows everybody to verify the jackpot exists. The winning ticket contains the correct private key under the scratch material. What might happen if the winner finds the ticket on Monday and immediately claims the jackpot? Can you modify your design to ensure this won't be an issue? Some tickets inevitably get lost or destroyed. So you'd like to modify the design to roll forward any unclaimed jackpot from Week n to the winner in Week n+1. Can you propose a design that works, without letting the lottery administrators embezzle funds? Also make sure that the Week n winner can't simply wait until the beginning of Week n+1 to attempt to double their winnings.	

What is freelancing and how you can make money online - BBCURDU

https://www.youtube.com/watch?v=9jCJN3Ff0kA

What Is the Role of Good Manners in the Workplace? By Qasim Ali Shah | In Urdu

https://www.youtube.com/watch?v=Qi6Xn7yKllQ

Hisham Sarwar Motivational Story | Pakistani Freelancer

https://www.youtube.com/watch?v=CHm_BH7xAXk

21 Yr Old Pakistani Fiverr Millionaire | 25-35 Lakhs a Month Income | Interview

https://www.youtube.com/watch?v=9WrmYYhr7S0

Success Story of a 23 Year - Old SEO Expert | How This Business Works | Urdu Hindi Punjabi

https://www.youtube.com/watch?v=tIQ0CWgszl0

Failure to Millionaire - How to Make Money Online | Fiverr Superhero Aaliyaan Success Story

https://www.youtube.com/watch?v=d1hocXWSpus

Annexure-II

SUGGESTIVE FORMAT AND SEQUENCE ORDER OF MOTIVATIONAL LECTURE.

Mentor

Mentors are provided an observation checklist form to evaluate and share their observational feedback on how students within each team engage and collaborate in a learning environment. The checklist is provided at two different points: Once towards the end of the course. The checklists are an opportunity for mentors to share their unique perspective on group dynamics based on various team activities, gameplay sessions, pitch preparation, and other sessions, giving insights on the nature of communication and teamwork taking place and how both learning outcomes and the student experience can be improved in the future.

Session- 1 (Communication):

Please find below an overview of the activities taking place Session plan that will support your delivery and an overview of this session's activity.

Session- 1 OVERVIEW
Aims and Objectives:
- To introduce the communication skills and how it will work   - Get to know mentor and team - build rapport and develop a strong sense of a team   - Provide an introduction to communication skills   - Team to collaborate on an activity sheet developing their communication, teamwork, and problem-solving   - Gain an understanding of participants' own communication skills rating at the start of the program

Activity:	Participant Time	Teacher Time	Mentor Time
Intro Attend and contribute to the scheduled.			
Understand good communication skills and how it works.			
Understand what good communication skills mean			
Understand what skills are important for good communication skills			
Key learning outcomes:	**Resources:**		**Enterprise skills developed:**
Understand the communication skills and how it works.	- Podium - Projector - Computer		- Communication - Self Confidence - Teamwork

	Flip Chart	
• Understand what communication skills mean • Understand what skills are important for communication skills	• Flip Chart • Marker	

Schedule	Mentor Should do
Welcome: **5 min**	Short welcome and ask the **Mentor** to introduce him/herself. Provide a brief welcome to the qualification for the class. Note for Instructor: Throughout this session, please monitor the session to ensure nothing inappropriate is being happened.
Icebreaker: **10 min**	Start your session by delivering an icebreaker, this will enable you and your team to start to build rapport and create a team presentation for the tasks ahead. The icebreaker below should work well at introductions and encouraging communication, but feel free to use others if you think they are more appropriate. It is important to encourage young people to get to know each other and build strong team links during the first hour; this will help to increase their motivation and communication throughout the sessions.
Introduction & Onboarding: **20mins**	Provide a brief introduction of the qualification to the class and play the "Onboarding Video or Presentation". In your introduction cover the following: 1. Explanation of the program and structure. (Kamyab jawan Program) 2. How you will use your communication skills in your professional life. 3. Key contacts and key information – e.g. role of teacher, mentor, and SEED. Policies and procedures (user agreements and "contact us" section). Everyone to go to the Group Rules tab at the top of their screen, read out the rules, and ask everyone to verbally agree. Ensure that the consequences are clear for using the platform outside of hours. (9am-8pm) 4. What is up next for the next 2 weeks ahead so young people know what to expect (see pages 5-7 for an overview of the challenge). Allow young people to ask any questions about the session topic.
Team Activity Planning: **30 minutes**	MENTOR: Explain to the whole team that you will now be planning how to collaborate for the first and second collaborative Team Activities that will take place outside of the session. There will not be another session until the next session so this step is required because communicating and making decisions outside of a session requires a different strategy that must be agreed upon so that everyone knows what they are doing for this activity and how. • "IDENTIFY ENTREPRENEURS" TEAM ACTIVITY • "BRAINSTORMING SOCIAL PROBLEMS" TEAM

	ACTIVITY" *As a team, collaborate on a creative brainstorm on social problems in your community. Vote on the areas you feel most passionate about as a team, then write down what change you would like to see happen.* Make sure the teams have the opportunity to talk about how they want to work as a team through the activities e.g. when they want to complete the activities, how to communicate, the role of the project manager, etc. Make sure you allocate each young person a specific week that they are the project manager for the weekly activities and make a note of this. Type up notes for their strategy if this is helpful - it can be included underneath the Team Contract.
Session Close: **5 minutes**	**MENTOR:** Close the session with the opportunity for anyone to ask any remaining questions. **Instructor:** Facilitate the wrap-up of the session. A quick reminder of what is coming up next and when the next session will be.

MOTIVATIONAL LECTURES LINKS.

TOPIC	SPEAKER	LINK
Informatica CEO: The Business Of Big Data	CEO	**https://www.youtube.com/watch?v=CONitz2n68w**
Taking On Big Data	**Talend CEO**	**https://www.youtube.com/watch?v=8jB_1-P7qV4**
How to Face Problems In Life	Qasim Ali Shah	https://www.youtube.com/watch?v=OrQte08Ml90
How To Prepare For Applying Freelancing Jobs For Data Science	Krish Naik	https://www.youtube.com/watch?v=EXbMZGjswjI
Big Data and AI in Small Business	Bernard Marr	https://www.youtube.com/watch?v=hYoRMqkN_TI
Just Control Your Emotions	Qasim Ali Shah	https://www.youtube.com/watch?v=JzFs__yJt-w
How to Communicate Effectively	Qasim Ali Shah	https://www.youtube.com/watch?v=PhHAQEGehKc
Your ATTITUDE is Everything	Tony Robbins Les Brown David Goggins Jocko Willink Wayne Dyer Eckart Tolle	https://www.youtube.com/watch?v=5fS3rj6eIFg
Control Your EMOTIONS	Jim Rohn Les Brown TD Jakes Tony Robbins	https://www.youtube.com/watch?v=chn86sH0O5U
Defeat Fear, Build Confidence	Shaykh Atif Ahmed	https://www.youtube.com/watch?v=s10dzfbozd4
Wisdom of the Eagle	Learn Kurooji	https://www.youtube.com/watch?v=bEU7V5rJTtw
The Power of ATTITUDE	Titan Man	https://www.youtube.com/watch?v=r8LJ5X2ejqU
STOP WASTING TIME	Arnold Schwarzenegger	https://www.youtube.com/watch?v=kzSBrJmXqdg
Risk of Success	Denzel Washington	https://www.youtube.com/watch?v=tbnzAVRZ9Xc

SUCCESS STORY*

S. No	Key Information	Detail/Description
1.	**Self & Family background**	Mr Usman is a computer Engineering graduate from UET with distinction and also a founder of DsPortal (A Data Science Growth Platform). He has 5+ years of experience in providing IT training and has been attached to key institutes since then. He holds a master in data science and has 3 international publications in Machine Learning/Data Science **If at first, you don't succeed, try try again**
2.	**How he came on board NAVTTC Training/ or got trained through any other source**	Form UET(NAVTTC partner institute)
3.	**Post-training activities**	Usman area of expertise is in **Big Data**. In his first month using Fiverr, he pitched mostly for projects centered around logo designing. But it wasn't so simple. In the first few weeks, he didn't hear back from even a single client, despite pitching for dozens of projects. "I needed to understand what worked, so I read blogs, participated in forums, and analyzed profiles of successful freelancers. It was an uphill struggle, but I didn't want to give up," he explains. Usman says he understands why clients would be apprehensive giving projects to untested freelancers. They have hundreds of options to choose from, he explains, and to give a project to someone with no experience requires a strong leap of faith. A slow stream of projects started to come Usman way. Within a few months, he was landing an average of a hundred projects every month, with a large number of repeat clients. He also expanded the range of his professional services, Mirpur, threatened to derail his freelancing career. "Sometimes I haven't had connectivity for two days straight," he explains. "That's unthinkable for someone who makes his livelihood on the internet."

4.	**Message to others** **(under training)**	Take the training opportunity seriously Impose self-discipline and ensure regularity Make Hard work pays in the end so be always ready for the same.

Example pattern

Note: Success story is a source of motivation for the trainees and can be presented in several ways/forms in a NAVTTC skill development course as under: -

1. To call a passed out successful trainee of the institute. He will narrate his success story to the trainees in his own words and meet trainees as well.
2. To see and listen to a recorded video/clip (5 to 7 minutes) showing a successful trainee Audio-video recording that has to cover the above-mentioned points.*****
3. The teacher displays the picture of a successful trainee (name, trade, institute, organization, job, earning, etc) and narrates his/her story in the teacher's own motivational words.

* *The online success stories of renowned professional can also be obtained from **Annex-II***

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.