

**Karimnagar Smart City Corporation  
Limited (KSCCL)**

**E-Learning in School and Smart Classroom**

# **Introduction and System Architecture (Illustrative)**

# Introduction

## **Karimnagar Background :**

Karimnagar is the trade and commercial hub of northern Telangana and the third largest city in the state. With the vision “To develop Karimnagar into a major Commercial, and Tourism Hub in Northern Telangana facilitated through digital transformation of City life, and to create an Inclusive, Skilled and Gender-sensitive society.”

## **Aim of the project :**

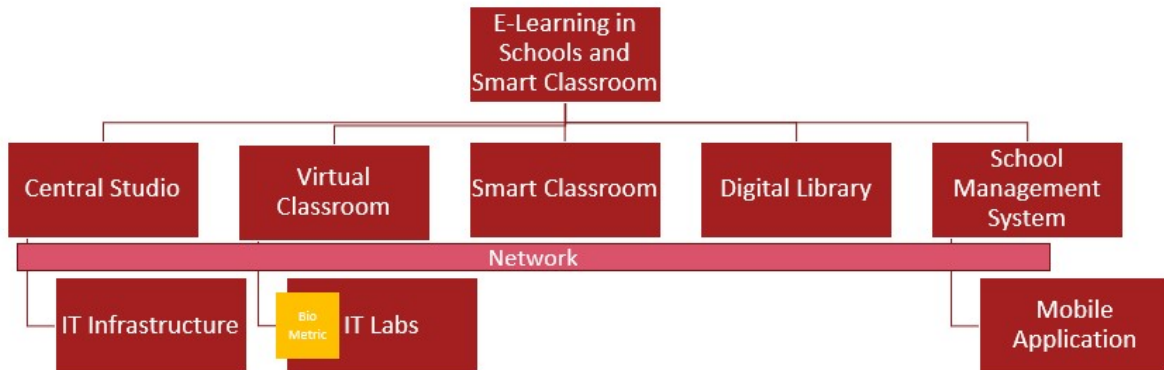
E-Learning and Smart classrooms enables teaching and learning through a blend of online delivery of content and will improve the quality of education and its delivery in approximately 50 No.s Government schools in Karimnagar

Smart Classrooms helps teachers to deliver lectures more effectively by using the different projections and graphic presentations. It helps to create a quick understanding for students, which makes a wonderful learning environment in the classroom. Lessons explained with the help of visual format is more likely to engage the students and they understand things more easily in minimal time.

## System Architecture (Illustrative) :

The main components of E-Learning and Smart classrooms and block diagram are given below

### Illustrative System Architecture



### System Components:

1. **Smart Classrooms:** The use of IT enabled education can bring a paradigm shift in teaching and learning process in schools. The smart classrooms comprise of computers, projectors, network/internet connectivity and other multimedia devices
2. **Virtual Classrooms:** Virtual classroom is an online learning environment that allows students and teachers to communicate with one another, view presentations or videos, interact with other participants, and engage with resources in work groups.
3. **Central studio:** Central studio will enable the subject matter expert to deliver lecturer to all the students remotely located in various locations
4. **IT Labs:** An IT laboratory at schools enables student to access digital library and content, browse websites for additional resources, gain hands-on

experience in creating software programs, develop and demonstrate simple application etc.

5. **Digital library:** A digital library is a collection of documents, articles, books in organized electronic form, available on the Internet or Local Area Network
6. **Network:** It is a backbone for this E-learning in Schools project and shall be connecting Virtual Classrooms and central studio. IT lab content, Smart Classrooms, Digital library may also require internet connectivity either via broadband from ISP or lease line
7. **School Management System:** School Management System is a module to automate a school's diverse operations like scheduling and allocation of classes to faculty, attendance of teachers and students, school administration functions like student admissions, exams, events, etc

# **Tentative Bill of Materials**

### Smart Classroom

S.No	Component	Units	Unit Cost (Rs.)	Total Cost with GST (Rs.)
1	Wall type pull down screen	1		
2	Short/Ultra short throw projector	1		
3	Ceiling kit/wall mount for projector	1		
4	Multimedia cabinet including CPU box	1		
5	Desktops for Smart Classroom	1		
6	Audio System	1		
7	Green Board	1		
8	Air-Conditioning	1		
9	IT Furniture, electric wiring/sockets, painting, water proofing, door locks/window shades/glasses	1		
	<b>Total</b>			

## Virtual Classroom

S.No	Component	Units	Unit Cost (Rs.)	Total Cost with GST (Rs.)
1	Interactive White Board (IWB)	1		
2	Short/Ultra short throw projector	1		
3	Ceiling kit/wall mount for projector	1		
4	Multimedia cabinet including CPU box	1		
5	Audio System	1		
6	Green Board	1		
7	Laptop for IWB and virtual classroom	1		
8	Webcam for Virtual Classroom	1		
9	Microphone with headphone	1		
10	Virtual Classroom software	1		
11	Clickers and Clicker Receiver	1		
12	IT Furniture, electric wiring/sockets, painting, water proofing, door locks/ window shades/glasses	1		
13	Air-Conditioning	1		
	<b>Total</b>			



### IT Lab

S.No	Component	Units	Unit Cost (Rs.)	Total Cost with GST (Rs.)
1	Student Computer Devices – Laptop	1		
2	Wi-Fi router	1		
3	Access Point	1		
4	Storage Facility	1		
5	Networking Cost	1		
6	Furniture	1		
7	Air-Conditioning	1		
	<b>Total</b>			

### Solar Panel

S.No	Component	Units	Unit Cost (Rs.)	Total Cost with GST (Rs.)
1	Solar Panel 1 KVA	1		
2	Solar Panel 5 KVA	1		
	<b>Total</b>			

## Central Studio

S.No	Component	Units	Unit Cost (Rs.)	Total Cost with GST (Rs.)
1	HD Digital Video Camera	1		
2	Camera Tripod	1		
3	Video Switcher	1		
4	Audio mixer	1		
5	Microphone	1		
6	Wired mic with table mic stand	1		
7	Hard disk-based HD Recorder	1		
8	Audio/Studio Monitor	1		
9	Digital SD/HD-SDI video distribution	1		
10	Audio Distribution Amplifier	1		
11	Multi-touch Interactive Panel with 14" laptop	1		
12	45" - 55" LED TV with Floor Mount	1		
13	Streaming Server/Encoder and Decoder	1		
14	Storage Server of 16 TB	1		
15	Transmission Server	1		
16	LED Studio Lights with ceiling Grid and mounting clams/hooks	1		
17	Furniture	1		
18	Studio with Acoustic Interior (Minimum 20' X 20' = 400 Sqft)	1		
19	Power Backup –UPS 10 KVA.	1		
20	Accessories for integration	1		
21	Installation and Commissioning, Integration and Training	1		
22	Interactive Pen and Pad	1		
23	Air-Conditioning	1		
	<b>Total</b>			

### Note:

- Internet charges to be included for approximately 50 schools
- China products are not recommended/entertained

# **Technical Specifications**

## Smart Classroom

S.No	Component	Technical Requirement Specification	
1.	Basic Projector Screen/ Wall type pull down screen	Resolution	1080 P
		Screen Type	Manual, adjustable height , pull-down
		Mount Type	Wall and Ceiling
		Format	Square
		Viewable Diagonal	Between 95-140
		Viewable Width	Between 70-99
		Viewable Height	Between 70-99
		Projection Type	Front
		Projection Surface	Matte White
		Image aspect ratio	16:9 and/or 1:1
		Display Size	Between 100 in to 120 in
2.	Short Throw Projector / Ultra short	Projection System	DLP Short Throw
		Native Resolution	800 x 600
		Brightness	3000 AL or higher
		Contrast Ratio	18000:1
		Aspect Ratio	4:3 native
		Lamp Life (Normal/Economic Mode)	5,000/ 10,000 hours
		Remote Control	Full Function remote control unit for projector (To be supplied along with the projector)
		Projection Distance	0.5-2.5 m
I/O	Minimum VGA input, Audio Input ,		

S.No	Component	Technical Requirement Specification	
		Warranty	Comprehensive onsite warranty for Two years.
		Make of Projector	Dell/BenQ/Canon/Epson/Casio/Optoma/Sony/ Panasonic/ Samsung/Any other best-in-class brand
3.	Ceiling kit/wall mount for projector	Mounting kit for the projector in the classroom with all fastening accessories	
4.	Multimedia digital cabinet/ Smart station computer	<ul style="list-style-type: none"> <li>• Solid Built housing enclosure with metal / fiberglass / rubber wood</li> <li>• Standing type (with wheels and wheel lock) or Wall mounted – Depending on space availability in the respective class</li> <li>• If metal cabinet, should be corrosion free material</li> <li>• Locking system for security</li> <li>• Single cabinet to accommodate CPU, monitor, UPS, keyboard and mouse</li> <li>• Power sockets integrated to accommodate CPU, monitor, Projector, UPS, Sound system. At least 2 additional sockets to be available after accommodating the above.</li> <li>• Cable tray or space to keep the cables tidy</li> <li>• Proper ventilation for equipment</li> </ul>	
5.	Audio system with 2 rear and 2 front speakers	<ul style="list-style-type: none"> <li>• Frequency Response - 40Hz – 20KHz</li> <li>• S/N Ratio - &gt;75 dB</li> <li>• Separation - &gt;50 dB</li> <li>• Speaker - 4”+2.75”x4</li> <li>• In Box - Subwoofer-1pc, speaker- 4pc, Audio cable User manual</li> </ul>	
6.	Laptop	Please refer IT Lab Laptop specifications	

S.No	Component	Technical Requirement Specification	
7.	Green board	Next to the white interactive board, a supply 5x4 feet Green Board as a traditional teaching aid. The viewing angle shall be such that students sitting in all corners of the classroom can see what is being written.	
8.	Air-Conditioning	Cooling Capacity	5.2 kW (1.5 TR) or above
		Star rating	3 or above
		Type	Wall Mounted Split AC
		Remote Control	Wireless with LCD display
		Function modes	Multiple
		Air filtering unit	Dust proof and anti-bacteria filter
		Comprehensive warranty for 2 years and above	
9.	IT Furniture, electric wiring/sockets, painting, water proofing, door locks/ window shades/glasses	<ul style="list-style-type: none"> <li>• Desk</li> <li>• Chairs with High Raise, Cushioned, Reclining, Ergonomics and adjustable features</li> <li>• Water proofing for roof</li> <li>• Provision &amp; fixing of frame and soundproof casement door with multipoint locking system and both side handle with locking arrangements</li> <li>• Window shades on all windows in a class</li> <li>• Power sockets for normal and additional usages</li> </ul>	

## Virtual Classroom

S.No	Component	Technical Requirement Specification	
1.	Interactive White Board/White Board With Interactive Device/White Board With Interactive Projector (With Mounting Kit)	Active Size	Minimum 77/78" diagonal or above
		Technology	Infrared or latest technology
		Board surface	Scratch resistant, Solid surface; maintenance free, Compatible with ink marker, any object touch and Multi touch.
		Aspect Ratio	4:3 or 16:9 or 16:10
		Writing Tools	Pen, Stylus, Finger. Should be multi-touch
		Active Area	Minimum active diagonal length of 2000 mm
		Resolution	8000 x 8000
		Operating system compatibility	Compatible with Windows 10 or Equivalent operating system and compatibility with Linux Operating System and Android.
		Computer Interface	USB 2.0 or above. Minimum 5-meter cable to be included
		Annotation software	Annotation software shall include features like draw, pens, annotate, erase, color, shapes, sizes, text, edit, fonts, stamp, move, capture picture, video, save, rotate, undo, image gallery, print, floating keyboard and background etc.
		Compatibility	Should support multiple projector brands with all functionalities
		Warranty	Comprehensive onsite warranty for 2 years.
Power	100V to 240V AC, less than 7 W, Indian power cord to be included		

S.No	Component	Technical Requirement Specification	
2.	Short Throw Projector / Ultra Short	Projection System	DLP Short Throw
		Native Resolution	800 x 600
		Brightness	3000 AL or higher
		Contrast Ratio	18000:1
		Aspect Ratio	4:3 native
		Lamp Life (Normal/Economic Mode)	5,000/ 10,000 hours
		Remote Control	Full Function remote control unit for projector (To be supplied along with the projector)
		Projection Distance	0.5-2.5 m
		I/O	Minimum VGA input, Audio Input ,
		Warranty	Comprehensive onsite warranty for Two years.
		Make of Projector	Dell/BenQ/Canon/Epson/Casio/Optoma/ Sony/ Panasonic/ Samsung/Any other best-in-class brand
3.	Ceiling kit/wall mount for projector	Mounting kit for the projector in the classroom with all fastening accessories	
4.	Smart digital cabinet & Smart station computer	<ul style="list-style-type: none"> <li>• Solid Built housing enclosure with metal / fiberglass / rubber wood</li> <li>• Standing type (with wheels and wheel lock) or Wall mounted – Depending on space availability in the respective class</li> <li>• If metal cabinet, should be corrosion free material</li> <li>• Locking system for security</li> </ul>	



S.No	Component	Technical Requirement Specification	
		<ul style="list-style-type: none"> <li>• Single cabinet to accommodate CPU, monitor, UPS, keyboard and mouse</li> <li>• Power sockets integrated to accommodate CPU, monitor, Projector, UPS, Sound system. At least 2 additional sockets to be available after accommodating the above.</li> <li>• Cable tray or space to keep the cables tidy</li> <li>• Proper ventilation for equipment</li> </ul>	
5.	Audio system with 2 rear and 2 front speakers	<ul style="list-style-type: none"> <li>• Frequency Response - 40Hz – 20KHz</li> <li>• S/N Ratio - &gt;75 dB</li> <li>• Separation - &gt;50 dB</li> <li>• Speaker - 4”+2.75”x4</li> <li>• In Box - Subwoofer-1pc, speaker- 4pc, Audio cable User manual</li> </ul>	
6.	Green board	Next to the white interactive board, a supply 5x4 feet Green Board as a traditional teaching aid. The viewing angle shall be such that students sitting in all corners of the classroom can see what is being written.	
7.	Laptop for IWB and virtual classroom	Please refer IT Lab Laptop specifications	
8.	Webcam for Virtual Classroom	Connection Type	Corded USB
		USB type	Hi speed USB 2.0
		Microphone	Built-in Suppression
		Focus Type	Fixed Type
		FOV	60 Degrees
		Focal Length	4 mm
		Optical Resolution	1280 x 960 1.2MP
		Image Capture (4:3 SD)	320x240, 640x480 1.2 MP, 3.0 MP

S.No	Component	Technical Requirement Specification	
		Image Capture (16:9 W)	360p, 480p, 720p
		Video Capture (4:3 SD)	320x240, 640x480, 800x600
		Video Capture (16:9 SD)	360p, 480p, 720p
		Frame Rate	15fps @ 640x480
		Indicator Lights (LED)	Activity/Power
		Cable Length	2 mtrs.
		Comprehensive warranty for 2 years	
9.	Virtual Classroom software	<ul style="list-style-type: none"> <li>• Should be compatible to common standards like H.264, H.265</li> <li>• Ability to send and receive two live simultaneous video sources in a single call, so that the image from the main camera and desktop/laptop screen is visible on a single screen to students</li> <li>• G.711, G.722, G.722.1, 64 kbps MPEG-4 AAC-LD or equivalent standards must be supported.</li> <li>• Should be able to conduct classroom sessions on standard definition as well as high definition video quality concurrently</li> <li>• Reverse interactivity - Interactive application that shall support Audio, Video, Screen, Written query, Images for interactions.</li> <li>• Students shall able to participate from a classroom using Video conferencing or the Web camera connected to Desktop</li> <li>• The Utility should provide them with a complete learning environment where they can view the instructor and course material, as well as interact with the instructor by their voice or video or written query.</li> <li>• Automatically gets downloaded in the particular classroom using the application software</li> </ul>	

S.No	Component	Technical Requirement Specification	
10.	Microphone with headphone	<ul style="list-style-type: none"> <li>• Laptop compatible</li> <li>• Wired</li> <li>• Volume Controls</li> <li>• Microphone</li> <li>• Minimum frequency : 30 Hz</li> <li>• Maximum frequency : 20000 Hz</li> </ul>	
11.	Clickers and Clicker Receiver	Clicker receiver:	2.4GHz digital RF technology, 4 radios channels
		Features	<ul style="list-style-type: none"> <li>• 11 buttons</li> <li>• 1 second Response</li> <li>• 2 AAA batteries to be included</li> <li>• One receiver supporting required RF remotes</li> <li>• Unique ID support</li> <li>• Application for data collection and evaluation</li> <li>• Clicker storage rack</li> </ul>
		Port:	REC-A: USB port or 232 port REC-C: USB port
		Operating Temperature:	0-40 degree
		Receiving angle:	360 degree
		Receiving distance:	> 25 meters
		LED status:	Green and red
		ID Address:	Programmable for multiple students
		Transmission distance:	Reliable distance of minimum 30 meters
		Transmission angle:	360 degree

S.No	Component	Technical Requirement Specification	
12.	IT Furniture, electric wiring/sockets, painting, water proofing, door locks/ window shades/glasses	<ul style="list-style-type: none"> <li>• Desk</li> <li>• Chairs with High Raise, Cushioned, Reclining, Ergonomics and adjustable features</li> <li>• Water proofing for roof</li> <li>• Provision &amp; fixing of frame and soundproof casement door with multipoint locking system and both side handle with locking arrangements</li> <li>• Window shades on all windows in a class</li> <li>• Power sockets for normal and additional usages</li> </ul>	
13.	Air-Conditioning	Cooling Capacity	5.2 kW (1.5 TR) or above
		Star rating	3 or above
		Type	Wall Mounted Split AC
		Remote Control	Wireless with LCD display
		Function modes	Multiple
		Air filtering unit	Dust proof and anti-bacteria filter
		Comprehensive warranty for 2 years and above	

## IT Lab

S.No	Component	Technical Requirement Specification	
1	Laptop	Processor	Intel Core i5 or above Processor
		Generation	6th Gen
		Speed	2.3 GHz with Turbo Boost Upto 2.8 GHz
		RAM	8 GB or higher
		HDD Capacity	Minimum 1 TB
		VGA Port	Yes
		HDMI port	Yes
		Screen Size	14.1 inch Or higher
		Graphic Memory Capacity	1GB Or higher
		Battery Backup	Up to 3.5 hours
		Wireless LAN	IEEE 802.11b/g/n
		Web Camera	0.9 Megapixel
		OS	64-bit Windows / Equivalent Open Source (With OEM Licenses)

## Wi-Fi Router and cable accessories

S.No	Component	Technical Requirement Specification
1	Wi-Fi Router	<ul style="list-style-type: none"><li>• Minimum 1200 mbps</li><li>• Supports dual band 2.4Ghz and 5 Ghz</li><li>• 10/100/1000 Mbps - 4 LAN, 1 WAN with auto-sensing technology</li><li>• Minimum 1 USB port</li><li>• MIMO and MU-MIMO</li><li>• WiFi Protected Access (WPA/WPA2—PSK and WEP)</li><li>• IEEE® 802.11 n/ac</li><li>• 4 MB flash and 32 MB RAM</li><li>• Supports IPv6 and IPv4</li><li>• Features:<ul style="list-style-type: none"><li>○ QoS for streaming video</li><li>○ Parental Control, Guest Network</li><li>○ Firewall protection</li></ul></li></ul>

## School Management System/Software

S.No	Component	Technical Requirement Specification
1	School Management software module	<ul style="list-style-type: none"> <li>• Software should be accessible over web and mobile app (both Android and IOS)</li> <li>• Should support all known browsers like chrome, firefox, Safari, etc.</li> <li>• Single sign-on feature</li> <li>• Software should follow applicable e-Governance standards stipulated by Government of India like interoperability, Open standards, security, etc.</li> <li>• Should be user friendly</li> <li>• Maintains personal and academic information</li> <li>• Performance and progress</li> <li>• Schedule Timetable</li> <li>• Student attendance with analysis</li> <li>• Exam schedule</li> <li>• Conduct and evaluate tests/exams online</li> <li>• Class wise and category wise registers</li> <li>• Fee Collection</li> <li>• Tracks Students Fees pending</li> <li>• Summary reports of outstanding dues of students</li> <li>• Interaction with students as well as their parents</li> <li>• Interaction between the parents and the teaching staff</li> <li>• Parents can receive and send notifications/ responses</li> <li>• Compare overall yearly performance class-wise, school wise</li> <li>• Standard and ad-hoc report generation</li> </ul>

## Bio Metric System

S.No	Component	Technical Requirement Specification
1	Bio Metric Attendance system	<ul style="list-style-type: none"><li>• Fingerprint, palm and/or face recognition-based system</li><li>• Battery backup – minimum 5 hours</li><li>• Student attendance and teacher attendance for IT Lab</li><li>• Installation type to be wall mounted</li><li>• Memory capacity – 512 MB or above</li><li>• Resolution : 500 DPI or above</li><li>• Operating Temperature -10 to +70 degree Celsius</li><li>• Sensor Type : Optical sensor</li><li>• Storage : 800+ user information</li><li>• Logs : 1 Million with reset capability</li><li>• Device to have On the board memory</li><li>• Pen drive option</li></ul>



## Central Studio

S.No	Component	Technical Requirement Specification	
1.	Digital Video Camera	Image System	3-chip 1/2-inch type Full HD CMOS
		Effective Pixel	1920 x 1080 HD Resolution or above
		Lens system	10x to 14x HD lens package
		Focus	Auto and Manual
		White Balance	Auto and Manual
		Input / Output	SD/HD selectable SDI Output (BNC connector)
		In built	3.5" LCD Monitor and Built-in Viewfinder
		Recording Media	SD Card or HD card
		Recording Format	Standard based non-proprietary format enabled to be edited
		Accessories	Solid state card (32 GB), AV cable, Battery and battery charger, Remote control, Operational manual
2.	Camera Tripod	Load Capacity – Static Weight	Upto 5 kgs. To match with the camera supplied and should compatible with other reputed camera manufacturers/ models
		Counterbalance Range	To match with the camera supplied
		Tilt Drag	Continuously adjustable from 0 to max level
		Tilt Range	80° to +90° tilt range front to back
		Tilt Lock	Yes

S.No	Component	Technical Requirement Specification	
		Spring Loaded Counterbalance	Yes
		Pan Drag	Continuously adjustable from 0 to max level
		Pan Range	360°
		Pan Lock	Yes
		Other required features	<ul style="list-style-type: none"> <li>• Adjustable to match different height requirements</li> <li>• Adjustable 3-way pan head for various angles</li> <li>• Quick camera release lever</li> <li>• Should be foldable, compact and portable</li> </ul>
3.	Video switcher	Video input	HD-SDI/SD-SDI BNC x 8 (IN 1 to 8), DVI-D x 1 (Mix of HD and SD)
		Video output	4 x HD-SDI/SD-SDI BNC , DVI-D x 1
		Mix	HD and SD video
		Data loss	Near Zero
		Switching	Real-time seamless switching
		Features/ functions	<ul style="list-style-type: none"> <li>• Either Built-in multi-mode color LCD monitor display versatile menus, image monitor, waveform/vector scope or additional units to achieve the functionality to be provided along with the video switcher</li> </ul>

S.No	Component	Technical Requirement Specification
		<ul style="list-style-type: none"> <li>• Featuring High-quality Chroma keying and versatile transitions, including DVE functions</li> <li>• Video PIP with various Enhanced Multi Viewer Display with up to 16 splits Video Memory function allows playback</li> </ul>
4.	Audio mixer	<ul style="list-style-type: none"> <li>• 8 input, 2 Bus mixer with 4 Mic Pre Amps.</li> <li>• 3 Band EQs</li> <li>• Stereo FX processor with preset like reverb, chorus, flanger, delay, pitches shifter etc.</li> <li>• FX send control</li> <li>• Built-in Talk back system</li> </ul>
5.	Microphone	<ul style="list-style-type: none"> <li>• Cordless Lavalier</li> <li>• Omni directional</li> <li>• Condenser type</li> <li>• Phantom power</li> <li>• 20Hz – 20KHz</li> <li>• Output connector – 3.5mm</li> <li>• Cordless microphone with light and compact body pack transmitter.</li> <li>• Minimum 3 hours of battery life.</li> <li>• Automatic setup function for quick and easy operation</li> <li>• Transmitter battery status indicator</li> <li>• Should be compatible will all reputed camera manufacturers and Smart phones (both IOS &amp; Android)</li> <li>• Cord length – Minimum 1 meters</li> <li>• Wearable clips</li> </ul>

S.No	Component	Technical Requirement Specification	
6.	Table Mic with table stand	<ul style="list-style-type: none"> <li>• Microphone type – Dynamic</li> <li>• Should include 3 Pin XLR Connector – male cable (Minimum 10 meters)</li> <li>• Omni-Directional condenser</li> <li>• Operable with 48W Phantom power</li> <li>• Polar pattern – Cardioid</li> <li>• Frequency response – 40 Hz – 16 KHz</li> <li>• Indication for mute status</li> <li>• Lockable on/off switch</li> <li>• Built-in pop filter that reducing explosive breath sounds and wind noise</li> </ul>	
7.	Hard disk based HD Recorder	Video Connections	Inputs: 1x HD/SD-SDI
		Supported Input Resolutions	<ul style="list-style-type: none"> <li>• 1080p(23.9, 24, 25, 29.9, 30)</li> <li>• 1080i(50, 59.9, 60)</li> <li>• 720p(50, 59.9, 60)</li> <li>• 576i(50)</li> <li>• 480i(59.9)</li> </ul>
		Outputs	1x HD/SD-SDI, 1x HDMI
		Audio Connections Inputs	2x Balanced XLR
		Outputs	2x Balanced XLR
		Embedding	Stereo Audio embedded to HD/SD-SDI
		Recording Format	PCM 24-bits / 8-Channels / 48KHz Sampling Rate
		Loop Through	1x HD/SD-SDI
		Color Sampling	<ul style="list-style-type: none"> <li>• HD (35-125Mbps): 4:2:2</li> <li>• HD (10-25Mbps): 4:2:0</li> </ul>

S.No	Component	Technical Requirement Specification	
			<ul style="list-style-type: none"> <li>SD (15-50Mbps): 4:2:2</li> <li>SD (8Mbps): 4:2:0</li> </ul>
		Hard Drive	300GB HDD
8.	Audio/ Studio Monitor	Speaker type	2-way bass-reflex bi-amplified near field studio monitor
		Frequency range	43 Hz - 30 kHz
		Crossover	2kHz-3kHz
		Output	> 70W
		I/O connectors	XLR3-31 type and TRS 1/4" phone jack inputs for balanced/unbalanced signals
		Features	<ul style="list-style-type: none"> <li>i. Solid metal speaker platform</li> <li>ii. MDF cabinet material</li> </ul>
9.	Digital SD/HD-SDI video distribution	Input/output	1 input to 4 Output HD/SD SDI Distribution Amplifier (no scaling).
		Type	HD/SD SDI Connections
		Power	Low Power Consumption
		Casing	Metal Case
10	Audio Distribution Amplifier	<ul style="list-style-type: none"> <li>Balance Audio(XLR) for both In and OUT</li> <li>Minimum 1 IN 3OUT</li> <li>Compatible to the above Audio Mixer</li> </ul>	
11.	Multi-touch Interactive Panel	<ul style="list-style-type: none"> <li>20 – 25 inch HD Touch</li> <li>Professional levels of pen-pressure and pen-tilt sensitivity that catch every detail</li> <li>Use multi-touch gestures to pan, zoom, rotate and more in supporting applications</li> <li>Ergonomic stand adjusts to your preferred working position</li> </ul>	

S.No	Component	Technical Requirement Specification
		<ul style="list-style-type: none"> <li>• Express Keys and Touch Strips activate personalized shortcuts and modifiers</li> <li>• 1920 x 1080, HD display,</li> <li>• Easy to accessorize with an array of compatible pens, grips and pen tips</li> </ul>
12	55” LED TV	<ul style="list-style-type: none"> <li>• Full HD 1920x1080 resolution</li> <li>• Input: 2 HDMI, 2 USB, Component, Composite</li> <li>• Will all necessary power cable and accessories cable</li> <li>• Mounting kits – both floor mount with height adjustment and wall mount</li> </ul>
13	Streaming Server/Encoder and Decoder/ Transmission Server	<ul style="list-style-type: none"> <li>• Intel Core i7, 3.4 GHz or higher</li> <li>• Minimum 8 GB RAM</li> <li>• PCI Express Display card with 1 GB RAM</li> <li>• 2 TB Hard disk drive</li> <li>• Windows 10 Professional OS with media</li> <li>• 18” LED Display, Keyboard, Mouse DVD Writer, Cabinet and 600W SMPS</li> <li>• I/O Card with SDI IN/OUT and Analog Component /composite IN/OUT</li> <li>• Streaming, encoder/ decoder software with license media having: <ul style="list-style-type: none"> <li>○ Supports multicast streaming</li> <li>○ H.264, H.265 encoding engine</li> <li>○ Supports 720p, 1080i and 1080p HD video format.</li> <li>○ Supports HDMI, HD/SD-SDI digital video input.</li> <li>○ Supports CVBS, and YPbPr analog video input.</li> <li>○ Supports XLR (balance); (unbalance) analog audio input.</li> <li>○ IP output</li> </ul> </li> </ul>

S.No	Component	Technical Requirement Specification
14	Storage Server of 16 TB	<ul style="list-style-type: none"> <li>• 19” Rack-mountable Storage box with minimum 8 HDD bays.</li> <li>• Six 3 TB Enterprise class SATA or SAS 6 Gbps Hard Disc drives with Hot Swap.</li> <li>• Minimum Intel Xeon E3 v5 3.4 Ghz or higher</li> <li>• 8 GB DDR4 RAM.</li> <li>• Dual RJ-45 10/100/1000 Ports, Four USB 2.0 Ports.</li> <li>• Facility to add additional Gigabits Ports or 10 GbE ports by installing HBA.</li> <li>• Dual, hot-plug, redundant power supply (1+1)</li> </ul>
15	LED Studio Lights with ceiling Grid and mounting clams/hooks	<ul style="list-style-type: none"> <li>• Minimum 500 Lux</li> <li>• Color temperature: 5600 K/3200K</li> <li>• Dimmable output from 100% to 10%</li> <li>• Power consumption: Less than 80W.</li> <li>• Ceiling mounts facility</li> <li>• AC Adaptor, Barn door and filters</li> <li>• Operated from nominal 230 V/50 Hz Ac Supply</li> </ul>
16	Furniture	<p>Desk</p> <ul style="list-style-type: none"> <li>• 1 X no. 4 X 6 Modular Office Table (Desk with Overbridge to keep)</li> <li>• Storage draws for safekeeping of small components like mics, files, cables under lock &amp; key. Should have sufficient space to accommodate more items like laptops, etc.</li> <li>• Termite resistant material</li> </ul>

S.No	Component	Technical Requirement Specification	
		Chairs	6 Nos. with High Raise, Cushioned, Reclining, Ergonomics, Adjustable features
17	Installation and Commissioning	<ul style="list-style-type: none"> <li>• Earthing + Cabling &amp; Installation + Integration + Testing + Training</li> <li>• Integration of studio equipment.</li> <li>• Installation includes the fixing of the lights, testing &amp; commissioning and functioning of the all the above</li> <li>• Training, Warranty and support</li> </ul>	
18	Accessories for integration	Accessories like required convertors, cables, audio/video connectors, adopters etc.	
19	Acoustic, Fabric Above Acoustics with Air Condition	<ul style="list-style-type: none"> <li>• Acoustic Board false ceiling</li> <li>• Providing and fixing carpet</li> <li>• Providing and fixing of curtains with accessories</li> <li>• Provision &amp; fixing of pre-fabricated acoustic panels for the walls inside the studio topped with suitable fabric/ foams giving an aesthetic finish</li> <li>• Acoustic doors of size: door size 4 x 7'</li> <li>• Provision &amp; fixing of frame and sound proof casement door with multipoint locking system and both side handle with locking arrangement with vision panel for studio main door and control room door</li> </ul>	



## UPS and Solar Panel

1.	UPS - 10 KVA	<ul style="list-style-type: none"> <li>• 3 phase + neutral (Bidder to survey the location for phase requirements)</li> <li>• High power backup</li> <li>• Wide input voltage range 415V – 20% - 15%</li> <li>• Output - 230V + or -1%, single phase</li> <li>• Frequency - 50Hz +or -1hz</li> <li>• Advanced PFC Technology</li> <li>• Advanced Battery Management</li> <li>• Automatic Battery charging in UPS off mode</li> <li>• Short circuit and overload protection</li> <li>• Interactive LCD touch panel</li> <li>• Type – Online</li> <li>• Backup duration – 1 hour</li> <li>• Battery Type – Sealed Maintenance Free</li> <li>• All cable laying, trenching, earthing, etc.</li> </ul>
2.	Solar Panel	<ul style="list-style-type: none"> <li>• Capacity: 1 KVA and 5 KVA</li> <li>• Output Power: 800W or higher</li> <li>• Output: 220V, 50Hz</li> <li>• Waveform: Pure Sine wave</li> <li>• DC to ac Efficiency: Greater than 90%</li> <li>• Inverter technology: IGBT based, High Frequency Grid charger: SMPS type constant current- constant voltage- Trickle</li> <li>• Battery Voltage: 24V DC</li> </ul>

		<ul style="list-style-type: none"><li>• Backup requirement: 120 minutes for the Classroom setup.</li><li>• Solar capacity: Minimum 600Wp Solar charger type: MPPT Power Management: Automatic</li><li>• Data Logging: Time stamp, DC Voltage, Output Voltage, Load, Fault condition, Solar power</li><li>• Connectivity: IEEE 801.11b based to local host</li><li>• Display: LCD</li><li>• Protection: Overload, Short circuit, Overcharge, Overheat, Battery Low</li><li>• Cooling: Forced air with speed control Battery stand</li></ul>
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