



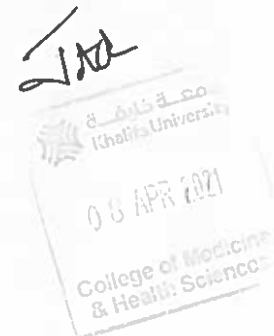
جامعة خليفة
Khalifa University

**DESIGN AND CONSTRUCTION, COMPLETION OF SHELL AND CORE SPACE
FOR KU - MEDICAL COLLEGE**



ANNEXURE 'A'

PART 1 - SCOPE OF WORKS



SCOPE OF WORK

PART1-GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings, general provisions, clauses related to, including general and Particular Conditions and Specification Sections, apply to this Section.

1.2 SCOPE OF WORK

The Works covered in this Contract comprise the provision by the Contractor at his own risk and cost of all materials, scaffolding, tools, plant, labour, transport and everything else necessary including Health and Safety Protocol related to COVID-19.

The contractor shall be bound to all other sections of the specifications that relate to the above for this project.

The scope is limited to the completion, construction and related fit-out shown in the layout, stated in the BOQ and as may indicate in the corresponding layout.

- Layout Drawings should be read, understood and analysed in conjunction with the given Bill of Quantity and Specifications. Any discrepancies found should and shall be addressed with urgency as clarifications. Answers will be dealt with in a form of "Bulletins"
- Contractor is hereby advice to check and verify site condition whenever applicable in order to come up with an executable plan in connection to overall requirements and quantity as a whole.
- VENDOR shall submit an itemized presentation on "A4 or A3 SHEETS" with specifications of all the proposed items highlighting manufacturer source and origin in full "COLOR" not "Black and White" or "PHOTOCOPY" wherever deem required. Contractors/Vendors are also to submit along with their Technical submittal as a mandatory copy of exclusions and conditions related to site execution if any.
- With the Tender VENDOR shall include a comprehensive Schedule Plan for the design, manufacture, installation and commissioning. Detailed preventive maintenance within the warranty period is to be laid out in a separate sheet.
- Before Manufacturing or supply, all material samples shall be submitted to end user for review along with specifications, original catalogue and shop drawings.
- Any material and items ordered, installed without prior approval shall and will be at the VENDOR's own cost. KU – end user focal have the right to reject such items if found not in compliance with the required specification. On such occurrence, an automatic replacement is implied.
- The review and/or approval of the design and or sample items by end user do not release in any way the responsibility of the VENDOR concerning the quality and performance of the concerned items.

1.3 APPROVAL OF MATERIALS

- A. It is conditional that authorized signature from users representative must be obtained for all products and materials prior to use in the works.


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- B. The Contractor shall supply samples of materials matching existing, proposed sources of materials as may be selected and required, rest of items that do not exists.
- C. Goods and material rejected shall be removed from the Site at the Contractors expense.
- D. Material whenever required to match those of the existing to preserve continuity and aesthetic of the building and ease of maintenance.

1.4 VERIFICATION AND QUANTITY

The Contractor responsibility to carefully check and verify all items quantity and existing conditions on site before proceeding with any work. No variation shall be given for any discrepancies between the Drawings, Specifications and actual conditions on site.

1.5 SERVICES

Before commencing any preparation works, the Contractor must co-ordinate with all the relevant maintenance contractor, conduct thorough survey and confirm the exact line and location of services and its status. Any damage to these services during mobilization and preparation or other works during execution shall be the total responsibility of the Contractor. Services, pick up points needed in relation to, found to be not in working condition and cannot be utilized should be reported, to address with in a timely manner.

1.6 SITE DIMENSIONS, LEVELS AND CONDITIONS

Before proceeding with any work, the Contractor shall carefully check and verify all dimensions, levels, and the conditions of areas where works required. Any discrepancies between the Drawings, Specifications and actual conditions on site shall be immediately reported, confirm in writing for discussion and resolution.

For commencement, the Contractor shall have complete understanding of the existing site conditions. Confirm that the Drawings and other details provided are adequate to successfully complete the work. Proposed otherwise solution on grey areas there may be for approval.

1.7 WORKS SCHEDULE

The Contractor shall within 1 week after the receipt of Letter of Acceptance, submit detailed execution plan in MS project / Primavera.

1.8 DAMAGE DURING RENOVATION

Any damage to existing system and hard surface during execution shall be made good at the Contractors expense.

1.9 GOODS, MATERIALS AND WORKMANSHIP

Materials and workmanship throughout the project shall be in accordance with the Drawings and Specifications and to full satisfaction of user.

1.10 INSPECTION & HOLD POINTS

The Contractor shall notify user authorized representative at the following stages of Works in order to arrange inspection.

- A. All inspection herein specified should be made jointly along with user and FM Team. The Contractor shall request inspection at least (24 hours) in advance.
- B. The Contractor shall not proceed to the next stage of work until obtaining approval following inspection.

1.11 ORDERING

The Contractor shall place orders for specified materials at the earliest possible date after notification of acceptance of tender or at such times as may be specifically stated for any particular material.

1.12 "AS BUILT" SET OF DRAWINGS

The contractor on drawings shall record any changes made, submit along with other details in the handing over upon the completion of project.

1.13 SUBMITTALS

Samples of all materials to be used in this contract shall be submitted for approval. The approved samples shall be to the quality standard for the specific material and its placement.

The Contractor shall submit to user representative samples of the following:

One sample of each item with specification. Samples approved by user representative to proceed shall be kept on-site, in an agreed, protected location, until work has been completed and accepted. Work shall conform to approved samples.

Two (2) sets of hard copies along with soft copy for all drawings and details, warranties, preventive maintenance, certification and test reports and other documents related to, should be submitted.

Keys are to be securely tagged, to be handed over on appropriate KEY Box cabinet.

1.14 SAMPLE & TESTING

Sampling and Testing shall be the responsibility of the Contractor and shall be performed at no additional cost to the Contract if requested as may deem required. Tests shall be performed in sufficient number to ensure that materials and performance meet the specified requirements and as detailed in the specifications.

1.15 FIRST AID KIT

The Contractor shall be required to provide a complete First Aid Kit, which shall be kept and properly maintained in the Contractor's custody. The kit shall be in the charge of either the Contractor's site representative or some other responsible person who shall be on the Site during all working hours to ensure that the first aid facilities are available without delay at all times when work is in progress. At least one (1) responsible member of the Contractor's staff shall be trained in first aid duties.



1.16 SAFETY FACILITIES

The Contractor shall provide PPE for all workers and supervisors / Contractor's site representative. Contractor, subcontractor and supplies shall observe PI HSE safety standards to execute the work.

1.17 SUBCONTRACTORS

Wherever required, contractor is advised to make use of all university in-house services keeper taking care of the building maintenance related to Fire Fighting, CCTV, and Access card system.

1.18 TECHNICAL EVALUATIONS CRITERIA

1. Specification Conformity.
2. Understanding of tender and Technical Presentation.
3. Ability to deliver on time.
4. Projected Key Personnel & Staff Structure.
5. Design methodology and approach – specific to the project
6. Work schedule on project software and completion period
7. Maintenance service and Warranty coverage in details
8. Company credibility after sales service
9. Previous execution of similar works.
10. Technical specification

PART2-PRODUCTS

2.00 MATERIALS FOR RENOVATION WORK

All materials to be used shall match wherever possible with existing, others as approved. Installation of all items shall strictly follow and accord with the specifications, guidelines and instructions of the manufacturer.

Concrete Block	-	UAE make to BS 5628
Cement	-	Ordinary Portland cement of UAE Make
Sand	-	Coarse sand
Gypsum sheet	-	Fire rated Gypsum Board, Local make
Sanitary ware	-	to match
Toilet accessory	-	Grohe Europe make
Mirror	-	Belgium
Ceramic tiles	-	to match
Kitchen false ceiling Tiles	-	to match
False ceiling tiles	-	to match and or better
False ceiling suspension	-	to match and or better
Iron monger	-	to match
Door closers	-	to match
Primer	-	Jotun PVA Primer
Wall putty	-	Jotun
Paint	-	Jotun
Aluminium	-	AL JABER / WHITE ALUMINIUM / ALICO
Wood	-	Polyester Powder Coated Finish and or to match existing
Kitchen Cabinets	-	Mirrantly to match

Kitchen Sinks (Stainless Steel)	-	Blanco / LEISURE / CARRON
Switch and sockets	-	to match
Electrical DB	-	ABB / Schneider Electric / GE
Exhaust fan	-	KDK / Xplair
Light Fittings	-	Philips / Frater
Electronic Ballast	-	Osram / Philips
Thermostat	-	to match
Water Heater	-	AO Smith USA Make
FCU	-	Carrier / York Europe make
LAN cable	-	Belden or equivalent
CCTV Camera	-	to match
Access Card System	-	Salto
Door KEYS	-	Master Keying to match

PART3-EXECUTION

The works includes but is not limited to the following:

3.1 PARTITIONS

(1) Block work

All blockwork shall be built level, plumb and true to line with all perpends in line vertically. Blockwork shall be built in stretcher bond and alternate courses shall be bonded in at all junctions. Blockwork to be plastered shall have joints struck off flush and left rough.

- Corridor Partition; Work size(s): nominal 400 x 150 x 200 mm, overall thickness to match
- Internal Partition ; Work size(s): nominal 400 x 100 x 200 mm

(2) Cement

The cement, unless otherwise described, shall be Ordinary Portland Cement.

(3) Cement mortar

Mortar for precast concrete units, brickwork and blockwork shall be gauged in the proportions (1:3) of one part of cement to three parts of sand. All mortar shall be used within 30 minutes of mixing and no remaking up of mortar shall be permitted thereafter.

(4) Gypsum Board

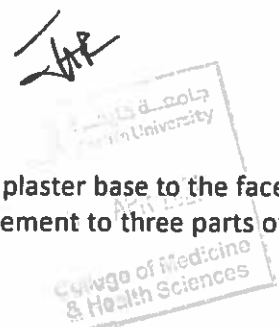
12mm thick standard partition to match existing

(5) Glazing

Double-glazing to match to match existing

3.2 PLASTERING

Plaster shall be 15 mm thickness when measured from the face of the plaster base to the face of the finished plaster surface in the proportions (1:3) of one part of cement to three parts of sand.



The reinforcement wire mesh shall be fixed in the masonry and concrete joints.
Corner Beads shall be fixed at all external angles in plasterwork.

3.3 GYPSUM BOARD CEILING

- (1) Gypsum board - Gypsum board must be held firmly against the framing while fastening to avoid later movement of gypsum board on the shank of the nails or screws.
- (2) Nails or Screws: Nails and screws shall be a minimum 3/8" and a maximum of 1/2" from edges and ends of wallboard and the heads shall be seated slightly below the surface without breaking the paper. Nails shall be spaced not to exceed 7" on ceilings or 8" on sidewalls. Head diameter shall be a nominal 1/4" with the length 1 1/2" to penetrate a minimum of 7/8" into nailing member. Nails shall meet the minimum requirements of ASTM C514 and may include coated, Etched treated or annular ring shanks to improve withdrawal resistance. Drywall screws shall meet the minimum requirements of ASTM C1002. Bugle-shaped heads shall be 0.315" in nominal diameter and contain a No. 2 Phillips driving recess. Type "W" screws are designed for easier fastening in wood.
- (3) Joints: At gypsum, wallboard joints install a 2" paper tape. Press a strong, good quality tape firmly onto sheathing joints and around openings, imbedded in joint cement. At corners and angles, install metal corner beads as specified by manufacturer. If corners are rounded, install corner reinforcement as required. Spread gypsum wallboard mud at all tape joints, corner beads, nails and screw penetrations and where a smooth surface is needed. Apply second coat of wallboard mud after a minimum 24 hours. After drying (minimum 48 hours), sand all joints and other areas to a smooth consistent surface. Apply final skim coat of joint compound.
- (4) Ceilings: Apply a single layer of 1/2" gypsum wallboard across the supports and fasten with nails or screws. Offset joints between layers at least 10". Nails are spaced 6" on center (OC) with 1 1/4" heads. Screws are spaced 12" on center (OC). Ceiling finish shall be smooth.
- (5) In same time of filling joint compound (Boral), Joint mesh (Boral), should be fixed and matching same level of Gypsum Board Ceiling
- (6) Gypsum Board should be fixed staggering in same horizontal level.
- (7) All joints tape shall be even and shall not exceed the level of board by removing paper from the edge which does not have sloped edges but not for chamfered edge which already to receive filling materials.

3.4 SUSPENDED CEILING (Europe Make)

- (1) Fixing the wall angle by Gun steel nail to the wall matching the level which had been marked before starting the fixation.
- (2) Fixing the main tee angle by 3mm hanging wire Supported from soffit of slab using Hilti Material fixation Ceiling Clip with the steel nail along with adjustable clip as approved in our submittal from engineer.
- (3) Fixing with the cross tee angle perpendicularly with main tee.
- (4) Hangers and fasteners - Hangers need to be installed above the main beams typically at 1200mm intervals.

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(5) Ceiling tiles to match with those of existing

3.5 CERAMIC TILING

- A) Comply with the manufacturer's instructions for the Installation of each material required.
- B) When lying on existing tile surfaces follow levels of existing.
- C) Grout tile joints to comply with the manufacturer's recommendation.
- D) Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

(1) Wall Tiling

Cement and sand (1:4) mix backing ten (10) mm thick shall be laid as base for wall tiling. The surface of the backing shall be scratched in an approved manner, when completely set, to form key. The surface of the backing shall be well wetted before the tiling is applied and shall be fully cured for three (3) days or as indicated by the adhesive manufacturer, before tiling starts. For existing wall surfaces, prepare an equivalent smooth but keyed surface. Ceramic tiles to be fixed using a manufacturer-approved adhesive with no vertical Slip.

- a ceramic wall tiles, fixed above 150 mm suspended ceiling
- b Bedding: Thin bed cement based adhesive on plaster
- c Grouting: Epoxy grout; Color to Engineer's approval; Joint width: 2mm to align with floor/skirting tile
- d Accessories: all exposed edges and corners to have performed rounded edges
- e Color/Type: to approval

(2) Floor Finish

Firstly, substrate must be thoroughly washed to remove all traces of grease, dirt and contaminants. Recommended adhesive is as per approved manufacturer standard, VOC free.

- a Non-slip ceramic floor tiles on screed wherever required
- b Anti-slip ceramic tile for toilets, shower room and kitchen to match
- c 3mm thick vinyl wherever stated on VOC free adhesive
- d Bedding: Cement/sand bed; laid to fall away from building
- e Grouting: Epoxy grout; Colour to Engineer's approval; Joint width: 3mm
- f Colour/Type: to approval



3.6 WOODEN DOORS AND FRAMES

A) HARDWOOD FOR JOINERY

- (1) Hardwood for joinery is to be as stated on the drawings or in the Particular Specification, and it is to be suitable for its intended use in accordance with Appendix B of BS 1186 (Part 1)
- (2) Hardwood is to be quarter sawn unless otherwise indicated and is to show a straight and regular grain throughout. Timber in the finished joinery is to be free from woolly texture, soft heart, sapwood, splits, and shakes, knots, all evidence of insect attack and all faults caused by compression failures. There are to be no waney edges. It is to be free from unsound knots and there are to be no knots of any description on exposed faces, unless specially agreed. Plugging or piecing in will not be permitted.
- (3) Color of hardwood throughout is to be consistent and to the approval of the Engineer.
- (4) Doorframe shall be solid seasoned hard wood to match the existing in other buildings.

B) SOLID CORE DOORS

- (1) Leaf Thickness: 40 mm unless 2 hr. fire resistance in which case the thickness is 58mm.
- (2) Core: Doors having this core type in the schedule shall be of complete solid wood construction, in thickness and configuration.
- (3) Door shutter shall be semi solid core flush door to match the existing in other buildings.
- (4) Door to have viewing pane, double glaze as required to match

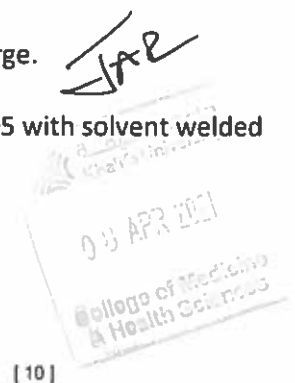
3.7 SANITARY WARES

Sanitary ware means all the sanitary ware shown on the drawings with their mixers, showerheads and spray hoses. All necessary traps, wastes, plugs and the like are to be included as necessary.

Unless specified otherwise, toilet fixtures shall be of the best quality RAK Ceramics White colour and fitting and accessory shall be Grohe to match existing

(1) PIPING WORKS

- a. Pipe shall be concealed after completing the Pressure test and approved corresponding party.
- b. BS EN 1329:2000 Plastic Piping Systems for Soil and Waste Discharge.
- c. Cold water supply pipe work grade shall be uPVC Class E to BS 3505 with solvent welded fittings to BS4346



- d. PVC coated copper pipe for Hot water piping network of approved copper tubes to BS EN 1057 covered with white plastic to meet the requirements of BS EN 13349 with compression fitting.
- e. Polypropylene pipes and pipe fitting PN20 to DIN 8077.
- f. Hot water Pipe shall be hanged properly in the soffit.

3.8 PAINTING

(1) SUBMITTALS

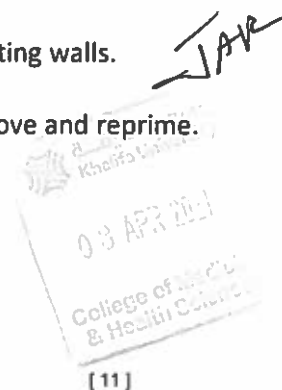
Product Data: For each paint system indicated. Include block fillers and primers.

(2) PAINT MATERIALS

- g. Material Compatibility Provide block fillers, primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
- h. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.
- i. Colors: to be approve

(3) PREPARATION AND PAINTING

- a. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of size or weight of the item, provide surface-applied protection before surface preparation and painting. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
- b. Cleaning: Before applying paint or other surface treatments, clean substrates of substances that could impair bond of the various coatings. Remove oil and grease before cleaning. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
- c. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.
 - (i) Contractor shall Scrap out the peeled of paint from existing walls.
 - (ii) Provide barrier coats over incompatible primers or remove and reprime.



- (iii) **Cementitious Materials:** Prepare concrete; concrete unit masonry and Cement plasters surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.
- (iv) **Wood:** Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.
- (v) Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- (vi) Prime, stain, or seal wood to be painted immediately on delivery. Prime edges, ends, faces, undersides, and back sides of wood, including cabinets, counters, cases, and paneling.
- (vii) Back prime paneling on interior partitions where masonry, plaster or other wet wall construction occurs on back side.
- (viii) Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of primer immediately on delivery.

(4) MATERIAL PREPARATION

Mix and prepare paint materials according to manufacturer's written instructions.

- a. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
- b. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
- c. Use only thinners approved by paint manufacturer and only within recommended limits.

(5) APPLICATION

A) **General:** Apply paint according to manufacturer's written instructions.

- (i) Use applicators and techniques best suited for substrate and type of material being applied.
- (ii) Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or Conditions detrimental to formation of a durable paint film.
- (iii) Provide finish coats that are compatible with primers used. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, convactor covers, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.

- (iv) Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 - (v) Paint interior surfaces of ducts with a flat, non-specular black paint where visible through registers or grilles.
 - (vi) Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
 - (vii) Sand lightly between each succeeding enamel and varnish coat.
- B) Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
- (i) The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
 - (ii) Omit primer over metal surfaces that have been shop primed and touchup painted.
 - (iii) If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
 - (iv) Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.
- C) Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
- (i) Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.
 - (ii) Rollers: Use rollers of carpet, velvet-back, or high-pile sheep's wool as recommended by manufacturer for material and texture required
 - (iii) Spray Equipment: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.
- D) Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.
- (i) Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.
 - (ii) Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not

been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.

- E) Internal Wall and Ceiling Coatings: The following wall and ceiling coatings shall be provided on designated areas in strict compliance with Manufacturer's instructions and method statement, to the full satisfaction of the Engineer.

(i) Internal Emulsion Coating (Internal Area Wall and Gypsum ceiling)

Matt Emulsion paint on existing and new smooth plaster finish comprising:

- a. 1 coat PVA Primer, a PVA co-polymer based primer/sealer.
- b. 2 coats of a PVA co-polymer based putty.
- c. 2 coats silk emulsion. Jotun Fenomastic Silk or equivalent. Choice of PI approved colour.

(ii) Coatings for Wooden Internal Doors, Cabinet Doors, and Frames

Apply two or more coat the Jotun enamel paint strictly applied according to manufacturer's specification. Include also frames and architraves.

- a. 1 base coat and 2 finish coats.
- b. Apply paint finish only in areas where dust is no longer being generated by related construction operations such that airborne particles will not affect the quality of the finished surface.
- c. Apply paint only when surface to be painted is dry properly cured and adequately prepared.

- F) Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

G) CLEANUP

- (i) At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.
- (ii) After completing painting, clean glass and paint-spattered surfaces remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.

3.9 ALUMINIUM WORK

A) PROPOSAL SUBMISSION

Proposal from the Contractor for the work of this section shall be accompanied with a set of shop drawings and data details which show how manufacturer intends to comply with requirements of this

Specification section for the sliding door and windows as follows:

1. Shop drawings: to include showing typical head, sill jamb and corner details and typical intermediate mullions.
2. Junction with and anchorage to the building fabric adjacent.



B) QUALITY ASSURANCE

1. The Contractor is responsible for the complete and proper installation of the work indicated on the Drawings or as specified herein.
2. All Aluminium finishes shall match in appearance and colour as per approved sample. Finishing of Aluminium shall be in strict accordance with the standard, procedure and quality control plan established by the approved Aluminium manufacturer.

C) PRODUCTS

1. Aluminium Extrusions: BS 1474, Powder Coating BS 6496
1. Material extrusion shall be to the approval of the Engineer and shall be extruded by an approved source.

D) IRONMONGERY

1. All ironmongery is to be obtained from an approved manufacturer and to match in colour, finish and quality. The Engineer has the right to change, add or select new sets.

E) PAINT

1. All Aluminium surfaces that are to be in contact with cured concrete, mortar, steel and other metal shall have the contact surfaces protect wherever they may entrap moisture or corrosive elements. Metals that are to be in contact with mortar or concrete shall be protected with zinc chromate or bituminous coating.
2. Prime paint steel parts of anchors, anchor inserts reinforcement, supports, and all parts after field welding or bolting with zinc chromate. Minimum dry film thickness of 1 mil. For zinc chromate and 30 mils for bituminous paint.

F) GASKETS

Non-visible central neoprene gasket (APTK - material as per DIN 7863 and NAMM Standard Specification, APTK = Aetylen, Propyen, Tarr, Kautscuk - India Rubber) is to be provided for all opening windows to prevent against water infiltration and should not be exposed to Sunlight.

G) FABRICATION

All elements shall be new and free from defects that would impair their strength, durability or appearance and to the full satisfaction of the Engineer. Aluminium elements shall be mechanically jointed by means of corner cleats or T Cleats, the cleats have to correspond to the inner cross section profile. Mechanical joints shall be made with Aluminium alloy pins or pressed with corner crimping machine. Joints shall be glued to ensure air and water tight joints.

H) GLAZING FITTINGS

Glazing fittings must adequately support the glass after installation without distortion or damage.

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I) SEALANTS

The sealant required shall be type guaranteed by manufacturer for each joint size and movement. Sealant shall be such as to remain permanently elastic, non-shrinking and Non-migrating.

J) INSTALLATION

1. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction. Include threaded fasteners for concrete and masonry inserts toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.
2. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
3. All metalwork shall be rigidly braced and secured to surrounding construction, and shall be free of rattle, vibration and noticeable deflection after installation.

3.10 KITCHEN CABINETS

A) ALUMINUM CABINET BOXES

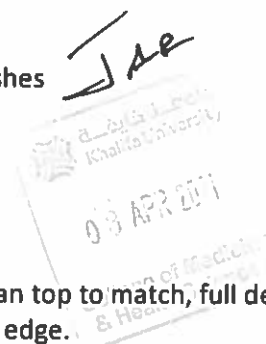
1. Framework shall be constructed from extruded Aluminium sections of HE 9 alloy to TE and TF specifications having a nominal thickness of 1.50 mm.
2. Base cabinets shall be mounted on tiled concrete masonry unit base or as recommended by manufacturer and approved by the Engineer.
3. Panels shall be constructed from high pressure solid laminate sheets (HPL) impregnated with phenolic and melamine resin by means of high pressure presses operated at high temperatures.
4. Panels shall be of the following minimum thicknesses,
 - carcasses 4 mm
 - shelves 6 mm
 - doors 6 mm
5. Shelves shall be reinforced with hemmed edges, and shall be fully adjustable.
6. Drawer guides shall be epoxy coated with nylon rollers providing a positive stop.
7. Hinges shall be concealed, self-closing and adjustable.
8. End panels shall coordinate with cabinet finish and shall be decorative end panels.
9. Color: as per existing

B) ALUMINUM DOORS

1. Doors shall be fitted with rubber slamming gaskets or brushes
2. Color and Finish: as per existing
3. Handles: 1" heavy duty round knobs.

C) COUNTERTOPS

1. Shall be 30 mm thick Granite for counter tops and or Korean top to match, full depth of work base surface including splash back and profiled front edge.



D) SINK

1. Shall be approved quality of single bowl stainless steel as match the existing.

E) QUALITY STANDARD

2. Aluminium Exteriors BS 1474
3. Powder Coating BS 6496
4. Panels ISO 4586

F) WARRANTY

1. Provide 3 years min or as per manufacturers warrantee.

3.11 ELECTRICAL

Design, manufacture, testing and method of installation of all apparatus and materials, required to these specifications shall conform to latest publications or Standard rules of the following:

- (a) Abu Dhabi Distribution Company (ADDC) regulations for electrical installation works
- (b) Department of Civil Defense requirements
- (c) ETISALAT standards and requirements.
- (d) Regulations for the Electrical Equipment of Buildings (IEE), (BS) London.
- (e) British Standards.

The Contractor shall perform the quality Control/Quality Assurance duties.

A) SWITCHES:

1. The switches provided for local isolation of electrical supply of individual apparatus and / or circuits shall comply with BS 3676. The rating of the switches shall be selected based on individual applications, such as for resistive or inductive loads. The minimum current rating shall be 5A.
2. Weatherproof switches shall be used for all out door installations.
3. Switches installed for control of discharge lighting shall have a current rating not less than twice the study state continuous current of the circuits. To match existing

B) POWER OUTLET:

1. The single-phase plugs and socket outlets used in domestic and commercial installations shall comply with BS 1363. The socket outlets shall be shuttered type, double pole 3 pin flat type with switch.
2. Appropriate, weatherproof socket shall be to BSEN 60309-2.
3. Unless otherwise stated 13 amp switch socket outlets and spur boxes shall be wired on ring main circuits. When more than two outlet is connected to a circuit

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C) MOUNTING HEIGHTS

1. The mounting heights for the electrical equipment and accessories shall be coordinated
2. with the furniture layout and shall be as per site requirements to Engineer's instruction
3. and approval and subject interior decorators approval:

	Above FFL
(a) Switches	1300 mm
(b) Switch socket outlets, telephone outlets, TV sockets	400 mm
(c) Switch socket outlets in plant rooms.	1300 mm
(d) MCB Distribution Boards	1800 mm
(e) Flexible outlets for water heaters and other equipment ceiling Adjacent to units	

D) FINAL DISTRIBUTION BOARD

1. All Distribution board must be provided with Circuit breakers; such as CBs, MCBs, MCCBs, and RCDs etc., shall not contain fuses of any kind.
2. All Distribution boards must be factory assembled, type tested and comply with BS EN 60439
3. Distribution board must be of robust construction, capable of withstanding expected electrical, thermal and environmental stresses in normal service and during faults.
4. Load distribution Schedule must be provided at each Distribution board.
5. Shall be self-contained, rustproof, durable stoves silver-grey hammered enameled, cubicle pattern sheet steel units complete with circuit breakers of the size and ratings required to meet the power demand. All distribution boards shall contain an integral main MCCB as incomer and MCCB's as outgoing of appropriate capacity.
6. The short circuit capacity of the distribution boards shall be 25 kA minimum. Breakers of distribution boards shall have a minimum short circuit rating equal to related distribution board where the same are installed.
7. The distribution board shall be constructed to BSEN 60439 Part 1 Form 2 Type 2.
8. A sub-feed neutral assembly with a removable link for isolation shall be available as an integral part of the distribution board. Earthing bar assembly shall also be available to facilitate the connection of earth continuity conductors.
9. Door locks shall be fitted as standard to all distribution boards, all locks shall be keyed alike. The degree of protection of the switchboard shall comply with BSEN 60529 and IP31 of IEC 529 or upgraded to meet the requirement of particular location.

E) LIGHTING

1. Lighting circuit shall be fed from 6A, 10A or 16A MCBs from a final Distribution board.
2. All luminaires must be connected to Final circuit using a ceiling rose or other purpose made connection point and not directly to such circuits. Where cables are run within luminaires, they shall be of the heat resistant type or protected by heat resistant sleeves.

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3. Luminaires and other light fittings must be installed with due consideration to the weight taken by fixing and supports and need for adequate ventilation and heat dissipation.
4. All to have motion detection system, matching existing

4.0 LAN

A) General Conditions for Network related work.

1. All equipment and materials must be new. Used, re-conditioned and refurbished equipment and materials are not acceptable.
2. All components and installation methods shall be EIA/TIA 568 approved and conform to EIA/TIA 569 practices and methods.
3. Contractor shall assume all responsibility to repair or replace fixtures and materials it damages during its work
4. All items quoted shall be completely installed and functional as per specifications.

B) Final Clean-up

Upon completion of the work, the Contractor shall reconnect any utilities, equipment, system furniture panels or trim, or appliances removed in the course of work, and replace all furniture, etc., moved for the performance of the work. Debris and rubbish caused by the work shall be removed from the premises. Site will be left in a clean, neat, and orderly fashion

C) Horizontal/Vertical UTP cabling

- 1) Unless otherwise requested, all cabling will be installed and terminated in accordance with ANSI/TIA/EIA-568 standards.
- 2) All cable should be a minimum of Cat 6 UTP, unless otherwise requested before construction.
- 3) In the IDF Rack(s), the cable will be terminated on Cat 6 patch panels. The Contractor shall provide Patch Panels and install wire-management, mounting and labelling based on collaborative / existing design.
- 4) Cat6 Patch cords have to be provided by contractors for proposed installation.
- 5) GI containment should be of approved standard with appropriate size and compartment, securely fastened/hooked up ensuring steadiness.

D) Backbone cabling

- 1) All cabling will be installed and terminated in accordance with the ANSI/TIA/EIA-568 standards, unless otherwise requested.
- 2) Common connectors will be utilized as required (LC).
- 3) GI containment should be of approved standard with appropriate size and compartment, securely fastened/hooked up ensuring steadiness

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E) Labeling

Computer generated labelling will be provided by the Contractor. All labelling will be per ANSI/EIA/TIA-606A unless otherwise requested. At such time, a jointly agreed upon labelling convention will be incorporated into the Contractors pre-installation plan

F) Testing

All cables will be tested and certified with an industry compliant tester (e.g. Fluke DTX-1800 tester or equivalent tester). The tester will be equipped with the latest Category 6 software available. The tester will measure the electrical characteristics of the cable using a true frequency sweep method, similar to that of high-end laboratory style testing equipment. Each test will be conducted from the Horizontal or Cross-connect to the workstation outlet. All cable pairs and terminations will be tested for continuity including shorts, opens, crosses, splits, and wire mapping. In addition, each cable test will be documented with its actual performance results in the following areas:

- Length (ft.)
- Impedance (ohms)
- Resistance (ohms)
- Capacitance (pF)
- Attenuation (dB)
- Near End Cross Talk (NEXT)
- Power Sum Near End Cross Talk (PS-NEXT)
- Power Sum Far End Cross Talk (PS-FEXT)
- Return Loss (RL)
- Delay Skew (DS)
- Pair to pair Power Sum Cross Talk (ELFEXT)
- Attenuation to Crosstalk Ratio (ACR)
- Power Sum Attenuation to Crosstalk ratio (PS-ACR)

Hard-copy results for each UTP Category 6, 4-pair cable will be submitted as part of SCS "as-built" project performance 5 of 30 acceptance records. In addition to the above information, the documentation will also include a pass indication for the specified cable, the test date, and the serial number and software version of the scanner

5.0 FIREFIGHTING

In continuation with all provisions there may be, to match those of existing. All to conform to Civil Defence and other local authority standard

6.0 CCTV

In continuation with all provisions there may be, to match those of existing. All to conform to local authority standard

7.0 ACCESS CARD SYSTEM

In continuation with all provisions there may be, to match those of existing. All to conform to local authority standard

8.0 HVAC


System is to be design to achieve the environmental of the comfort of users and process in consolidation of overall system that exist.

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1. Existing building HVAC Standard should be maintained.
2. Contractor responsibility to calculate the required capacity of the FUC as per the standard.
3. BS 8233:2014 "Sound insulation and noise reduction for buildings - Code of Practice" should be maintained for noise level.
4. Work includes supply, installation, testing and commissioning of FUC with all associated duct works, pipe works and controls.
5. Contractor should submit FCU technical specification for *technical evaluation* and approval.
6. The Coil pressure drop of the new unit to be similar to that of the existing FCUs to avoid any impact on the existing Chilled water pumps.
7. The Size of three way valves to be selected as per the existing design. The existing sizes are from ¾" to 1". Please verify otherwise to match
8. DRV to be provided to the FCU valve package.
9. Flushing of the modified Chilled water piping (If any) to be done before connecting it to the existing system.
10. Air balancing to be done for the FCUs, which are feeding more than one room.
11. Chilled water balancing to be carried out after FCU Installations.
12. ESP of FCU to be selected considering the friction losses as per the existing ducting layout.
13. Duct and Pipe Insulation to be check for any damages and rectified, shall be coated with Antifungal Vapor barrier.
14. Consider installing a VAV (By pass type) for proper air distribution for FCU of capacity 1600CFM which is feeding more than one area or as per appropriate calculation based on required volume
15. Installation of Pressure Monitoring system wherever required
16. Sufficient extraction and ventilation system in adherence to local and international standard, ensuring that spaces are free of condensation and humidity. Calculation of design to be submitted for approval

9.0 AUDIO / VIDEO

Contractor/ vendor to refer to Scope intended solely specially on project basis. Should require, contractor is to provide comprehensive solution as describe. Contractor to submit design, BOQ and specific catalogues referencing proposed items.


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10.0 SERVICES TO BENCHES

General

Other than required services; power, voice/data and medical gases plus extraction for Fume Cupboards that runs/located along walls where contractor has to fully terminate, tested and commissioned; - All required services that goes to the benches where there is Service Riser and Spine, contractor is only to provide the following;

- Appropriate DB along with circuits breakers installed in each labs spaces ready to accommodate cable connection by Lab Furniture supplier. Contractor is to calculate appropriate quantity and rating required based on the number of services shown in the drawings and as describe below. Each lab contractor is to provide emergency power push button.
- Similarly, for Voice and Data, contractor is to ensure that all related Networking as per standard (switches, patch panel, backup power etc.) are to be readily available in the IDF/MDF room. Contractor is to determine no. of points required based in the no. of points indicated in the benches.
- Medical Gases, contractor to provide pick up points anywhere above ceiling level. All ends of piping to be provided with valve – lever shutter. All lines to be tested and pressurised with helium, 10 bars - 24 hours
- Drainage to be provided to location where sink is indicated
- Hot and Cold water to be provided with pick up point above ceiling level with angle valve

Standard Services to consider

Whenever possible a standard type of Movable Table (Bench) with 1800 mm width is adopted to provide a good level of standardization for the laboratories.

Standard movable table will be equipped with the following services:

1. *Compressed Air and Vacuum*
 2. *Gases*
 - Nitrogen, Oxygen,
 3. *Electrical power and Data/telecom*
 - 4 sockets for power 13A 230V
 - 1 socket connected to UPS to be fix/install alternately
 - 2 sockets connected to emergency power supply
 - ❖ 2 sockets standard alternately in absence of UPS and 1 wherever UPS is
 - 1 socket for data/telecommunication at every space where there is UPS
- *Above three (3) items shall be located at every modular tables as shown in the layout.*

Drainage

Sinks will be connected to the Chemical Waste Drainage System provided, as may deem required special trap to be installed whenever needed.

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11.0 Construction Equipment / Machineries

1. Must ensure that the work equipment you provide meets all standard
2. Third party test certificate and drives competence certificate need to be submitted and obtain approval from EHS.
3. Maintain in a safe condition for use so that people's health and safety is not at risk.
4. Inspected in certain circumstances, to ensure that it is and continues to be safe for use. A competent person should carry out any inspection.
5. Should also ensure that risks created by using the equipment are eliminated by taking appropriate 'hardware' measures, eg. Providing suitable guards, protection devices, markings and warning devices, and personal protective equipment.

11.0 CLEARING, CLEANING AND MAKING GOOD ON COMPLETION

The Contractor shall gather up and clear away all rubbish as it accumulates during the progress of the Works at least twice each week at times. The services shall be continued until the completion of the Works. Garbage or construction waste shall be disposed in a contractors garbage skip at site.

