UNIVERSITY OF THE PHILIPPINES MANILA
Campus Planning, Development and Maintenance Office
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CPDMO
U.P. MANILA

PROJECT TITLE : **PROPOSED TRANSFER AND RENOVATION OF MIU/EDUTECH CENTER TO EXISTING PGIM OFFICE**
College of Medicine
University of the Philippines Manila

Subject : Summary of Scope of Works

A. General Scope of Work

General Requirements

1. Mobilization and Demobilization
2. Warehouse, board ups, canvass/temporary covering and safety signages
3. Temporary Field Office and Living Quarters
4. Health and Safety (PPE, Medkit, Medical check-up/testing as required for new normal etc.)
5. Permits and Licences

Site Prepartion

1. Demolitions and Dismantling

Architectural Works

1. Openings (Doors and Windows)
2. Finishes (Flooring, Ceiling, Wall finishes)
3. Partitions and Claddings
2. Counters and Cabinets
4. Furniture & Accessories
5. Restoration Works

Auxiliary Works

1. Structured Cabling/LAN & Telephone
2. Fire Detection and Alarm System

Mechanical Works

1. Air Conditioning (VRF System)
2. Ventilation
3. Miscellaneous

Plumbing Works

1. Sanitary Line
2. Water Line
3. Plumbing Fixtures
4. Miscellaneous Works

Electrical Works

1. Wires and Cables
2. Conduit Pipes and Accessories
3. Circuit Breakers and Accessories
4. Wiring Devices and Lighting Fixtures
5. Miscellaneous Items

B. Cost Estimate

Total Materials and Labor cost	:	PhP 6,914,606.53
Administrative Cost @ 3%	:	PhP 207,438.20
Architect's Fee @ 1.5%	:	PhP 103,719.10
Estimated Project Cost	:	**PhP 7,225,763.82**

C. Time of Completion

Estimated Duration of works: One Hundred Eighty (180) calendar days

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PROJECT TITLE : **PROPOSED TRANSFER AND RENOVATION OF MIU/EDUTECH CENTER TO EXISTING PGIM OFFICE**
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SUBJECT : **SCOPE OF WORK AND TECHNICAL SPECIFICATIONS**

DIVISION 1 - GENERAL

01 00 00 General Requirements

1. The Contractor shall furnish all materials, equipment, tools, apparatus, appliances, accessories, transportation, labor and supervision required for the complete construction of the subject project, as shown on the drawings and called for in these specifications, ready for use.

2. All Contractors submitting proposal for this project shall first examine the site. All proposals shall take into consideration all such conditions that may affect the work under this contract. The specifications and plans shall form part as one. Anything mentioned on plans and not mentioned on the scope of work and specifications and vice versa shall be properly consulted to the CPDMO Project Architect/Engineer for clarification. Any work or materials not in accordance with the drawings or specifications shall be replaced with new at the Contractor's expense.

3. The Contractor shall coordinate his work with all parties to ensure proper phasing or comply with the approved schedule of works. The Contractor shall engage under him, a registered Engineer or Architect to supervise his work. He shall remain at all times in the construction site.

4. A logbook shall be available at the site. It shall contain the daily activities in the site, including but not limited to weather condition, delivery, manpower and other matter pertaining to the condition of the project. It will also serve as data for Contractor and the Project Inspector and shall be surrendered to the CPDMO at the end of the project.

5. Identification Card of construction workers and engineer/representative shall be supplied by CPDMO with corresponding fees; it should be worn at all times while inside the building/campus premises. Those without IDs shall not be allowed to enter the premises for security purposes.

6. No alteration or additional work that will result in an additive or deductive cost change from the Contract shall be allowed without the approval of the chancellor.

7. The contractor shall submit at least three (3) options per item for approval. Complete specifications with product sample shall be submitted by the contractor to CPDMO and end-user for evaluation. Inspection of the Project Architect/Engineer in-charge shall be required prior to installation of any item/material on the construction.

8. Regular coordination meeting shall be conducted with CPDMO, Contractor and End-user for proper project monitoring.

9. Existing condition of the work site shall be documented by the contractor and photos shall be taken before commence of work to ensure such status. Any damage on the areas due to the contractor's on-going work shall be refurbished at his expense.

10. The Contractor shall provide a complete copy of "As built plans" of the project/unit concerned which shall include all the civil, architectural, plumbing, electrical and other related layouts in 20" x 30" original sheets. It should be properly drawn indicating all the specifications, layouts, tables and necessary data. An initial layout should be submitted in a A3 sheet for checking and approval of Project Architect/Engineer. Final "As built plans" shall be submitted in 20" x 30" tracing sheets, 3 blue prints with signature of project engineer, and an electronic Autocad drawing file. A copy of the technical documents and warranties of the items shall also be submitted in soft and hard copies.

11. The Contractor shall promptly remove from the premises all rubbish, trash, debris, and all superfluous building materials weekly. After the completion of all works, restore all areas that were damaged as affected by the construction works and leave the site clean to the satisfaction of the Project Inspector or his representative and End-user.

12. All materials removed from the unit shall be properly documented prior to turn-over to the End-user for proper safe keeping. The turn-over document shall be attached to the contractor's final billing.

13. The Contractor shall submit monthly progress report with attached plan highlighted all the completed works to the CPDMO which will evaluate by project architect/engineer and will be the basis of progress billing.

01 30 00 Administrative Requirements

Submittals (Shop Drawings, Product Data and Samples)

- Submit to the CPDMO of shop drawings, product data and /or samples of all materials for review. Submit at least three (3) options per material for approval.
- The CPDMO's review shall be limited to quality and design intent. It shall be the Contractor's responsibility to verify quantities and sizes, and make corrections observed and noted by CPDMO on any returned submissions.
- No work requiring submissions or samples shall be commenced until submission has been reviewed by the End User and or CPDMO.
- Final Acceptance of colors and finishes will be made from samples applied on the job based on the signed and approved sample materials.
- All submittals shall be channeled from General Contractor to CPDMO, Planning and Development Department, and back to the General Contractor. This procedure applies to original submittals as well as required resubmittals. Each organization shall keep its required number of copies and/or make necessary copies. The Contractor will make all corrections noted on check sets, if necessary, and return for review as required by CPDMO.
- No submittal shall be received by the CPDMO without transmittal letter.
- Samples must have Manufacturer's Data Sheet/Specification and must come together with a transmittal sheet with a section for approval/disapproval and recommendation of CPDMO and/or END USER.

01 40 00 **Quality Requirements**

- Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality. Perform quality control procedures and inspections during installation.
- Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate. Comply with manufacturers' tolerances.
- For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

01 50 00 **Temporary Facilities**

- Provide Temporary GI sheets or Board enclosures on all areas for building protection. Such coverings shall be adequate enough to cover all the building facilities throughout the span of the project.
- Charges for restoration or replacement of any damaged facility, equipment, material and the like shall be made on the contractor due to his negligence in providing suitable temporary covering.
- Provide the appropriate scaffoldings, board ups, safety nets and related items to ensure proper installation of all framing systems and protection of the area, at the expense of the contractor as its basic equipment.
- Provision of electric and water meter shall be included in the quotation to be charged to the contractor's overhead. All utility consumption shall be provided with meters to limit the usage of such during working period. Payments of bills shall be made thru the Cashiers Office after the renovation period presenting the statement of account issued by Accounting upon recommendation of the Chief of CPDMO.
- Submit request for tapping of utilities. Tapping for utility sources shall be coordinated and approved by the CPDMO.

DIVISION 2 – EXISTING CONDITION

02 41 19 **Selective Demolition**

Selective Building Demolition

- Selective demolition of interior partitions, systems, and building components designated to be removed.
- Selective demolition of exterior facade, structures, and components designated to be removed.
- Protection of portions of building adjacent to or affected by selective demolition.
- Removal of abandoned utilities and wiring systems.
- Notification to Owner of schedule of shut-off of utilities which serve occupied spaces.
- Pollution control during selective demolition, including noise control.
- Removal and legal disposal of materials.
- Removal and legal disposal of materials.
- Salvage of designated items.
- Interruption, capping or removal of utilities as applicable.

Execution

- Demolition Operations: Do not damage building elements and improvements indicated to remain. Items of salvage value, not included on schedule of salvage items to be returned to Owner, shall be removed from structure. Storage or sale of items at project site is prohibited
- Utilities: Locate, identify, disconnect, and seal or cap off utilities in buildings to be demolished.
- Shoring and Bracing: Provide and maintain interior and exterior shoring and bracing.
- Occupied Spaces: Do not close or obstruct streets, walks, drives or other occupied or used spaces or facilities without the written permission of the Owner and the authorities having jurisdiction. Do not interrupt utilities serving occupied or used facilities without the written permission of the Owner and authorities having jurisdiction. If necessary, provide temporary utilities.
- Operations: Cease operations if public safety or remaining structures are endangered. Perform temporary corrective measures until operations can be continued properly
- Security: Provide adequate protection against accidental trespassing. Secure project after work hours.
- Restoration: Restore finishes of patched areas.

DIVISION 4 – MASONRY

Scope of Work

- The work covered by this Item shall consist of furnishing all masonry work requirements in accordance with Plan and/or standard detail and as herein specified.

Material Requirements

- Use Portland cement which conforms to the requirements of ASTM C-150 Type for normal Portland cement.
- Use fine aggregates which shall be free from injurious amount of clay loam and deleterious materials and shall conform to ASTM C-33 or C-330.
- Concrete hollow blocks, 4" shall be standard manufacture, machine vibrated, and shall have fine and even texture, and well-defined edges. Mortar, filler and plastering shall be Class "A" mixture.
- Deformed steel bars shall conform to ASTM A-305. It shall be clean and free from loose, rust, scales and any coatings that will reduce bond.
- #16 tie wire shall be used for reinforcing bars connections.

Construction Requirements

- Provide CHB wall with 10 mm dia. deformed round bars at 0.60 m on centers both ways. Verify actual location.
- All cells shall be solidly filled with grout.
- Concrete mixture shall be class "A".
- Provide the plastering at 16 mm thick using class "A" mixture.
- Follow plan for details.

DIVISION 6 – WOOD, PLASTIC AND COMPOSITES

06 41 00 Architectural Wood Casework (Thermally Fused Laminate)

Scope of Work

- Work of this Section, as shown or specified, shall be provided by the Contractor and shall be in accordance with the requirements of the Contract Documents and in accordance with the General Conditions of this Document.
- All casework shall be of modern design and constructed in accordance with the best practices of the wood and computer furniture industry. Construction and design will result in "built-in" installations of computer chairs and tables that have the appearance of flush overlay construction without protuberances.
- Works include coordination, Fabrication, and Installation of all Interior Exposed wood members shown on drawings and specified herein, including but not necessarily limited to the following:
    - Wood Shelving
    - Fabricated Cabinets
    - Claddings
    - Miscellaneous Items
- See approved plans for detail.

Material Requirements

- Receiving Counter including Facia and Front Cladding
  18mm Pre-laminated Marine plywood complete with matching edge band (see details)
- Wall Storage Unit and Sliding Writable Door Panel @ Conference Room
  -18 mm thick Plyboard in writable glass coat surface finish complete with silicon bumb edge
  -18 mm thick pre-laminated plyboard cabinets with shelves complete with soft closing concealed hinge, catch, flush type pull-handle satin stainless
- Base Drawers Storage @ Conference Room
  -18 mm thick pre-laminated plyboard cabinets complete with hardware's/accessories, flush type pull-handle satin stainless.
- Hanging Cabinet @ Reception
  -18 mm thick pre-laminated plyboard cabinets with adjustable shelves complete with soft closing concealed hinge, catch, flush type pull-handle satin stainless
- Base Cabinets @ Reception
  -18 mm thick pre-laminated plyboard cabinets complete with hardware's/accessories, flush type pull-handle satin stainless.
- Hanging Cabinets @ Kitchen
  -18 mm thick pre-laminated plyboard cabinets complete with hardware's/accessories, flush type pull-handle satin stainless.
- Base Cabinets @ Kitchen
  -18 mm thick pre-laminated plyboard cabinets complete with hardware's/accessories, flush type pull-handle satin stainless.
- Flip Table at Pantry
  18 mm thick pre-laminated plyboard on 14" Steel Folding Heavy Duty Bracket Black
- Computer Side Table
  18 mm thick pre-laminated marine plywood on 2" x 2" square metal tube frame with gromet

Submittals

- All Submittals shall be made according to Section 1300 and as described herein.
- Submit all the following for each item of Finish Carpentry:
    - Shop Drawings, indicating fabrication and installation methods, to include plans and elevations at not less than (1:20) scale and details at not less than 1'-0" (1:5) scale. Indicate required anchorage and blocking, accessory items, field dimensions, materials and finishes. Indicate compliance with specification requirements. Indicate weight of any materials or systems to be suspended or which require support from structure.
    - Manufacturer's Product Data for all specialty items not manufactured by the carpentry fabricator.
    - Where required by the End user or Consultant the contractor shall provide full size mock-up of panel or wood assembly
    - Contractor shall submit to the Consultant three samples 20" (500m) minimum length of all moldings or molding assemblies to be used for the Project. These shall be full size and finished as specified in the Contract Documents.

Quality Assurance

- All work of this Section shall be performed by skilled mechanics of the trade and shall be of the highest quality. Comply with applicable Industry Standards for all work and materials as specified. Such Industry Standards are to include but not be limited to the applicable provisions or standards of the following:
    - American Society for Testing and Materials (ASTM)
    - PNS 196:2000
- The Contractor shall be responsible for obtaining and complying with all code and regulatory agency requirements for materials and methods.
- The Contractor shall be responsible for accurately obtaining all field dimensions related to his work prior to fabrication. Where discrepancies are found, he shall notify the Consultant immediately in writing.
- All Finish Carpentry materials shall be stored in a dry ventilated place, protected from the weather and complying with the temperature and humidity.
- Protect sanded and finished surfaces from soiling and damages during handling and installation.

Products

- All woodwork materials shall be new and conform to premium grade requirements
- All solid wood elements shall be clear, straight-grain lumber of the best grade of specified species. Lumber shall be free of any defects which might impair serviceability, aesthetics, and/or finish. Solid wood elements shall also be according to the following, unless indicated otherwise on drawings and/or specifications.

Hardware and Accessories

- All required hardware and accessories shall be furnished and installed by Interior Contractor and shall be as indicated on drawings and specifications. Where specific products are not specified in the Contract Documents the Contractor shall recommend hardware to provide the function or condition indicated in the Contract Documents. Hinges, screws, clips and other mounting, attachments or fasteners to be concealed unless otherwise noted on drawings.

- Contractor shall submit samples of each hardware item/type and accessory item/type to CPDMO for approval according to Section 01300.
- All Finish Carpentry hardware and accessories shall be installed in accordance with manufacturer's recommendations.

Other Materials

- Interior Contractor shall be responsible for providing and installing all items and materials as indicated on drawings and specifications comprising all or part of the Finish Carpentry shown. Such items and materials shall be fabricated and/or installed according to manufacturer's recommendations and comply with applicable AWI Quality Standards and industry Standards.
- All paint and other finish material shall be pure, unadulterated and best quality from specified manufacturer as indicated on the drawings and specifications.
- All finish materials shall be flame retardant or treated with flame-retardant process where required by local-code. Should flame-retardant process cause change in color and effect on finish material, the contractor shall notify the CPDMO.
- All transparent finishes shall be alcohol, water and burn resistant.

Execution

- The Contractor shall be responsible for examination of the substrate and the conditions under which the work under this section is to be performed, and notify CPDMO in writing of unsatisfactory conditions. Do not proceed with the work under this section until unsatisfactory conditions have been corrected.

Fabrication

- All the work be performed in such manner as to fulfill the intent of the drawings and specifications.
- Where necessary to fit at site provide ample allowance for cutting and fitting. Sufficient additional material shall be allowed to permit accurate scribing to walls, floors and related work; and due allowance made wherever possible for such shrinkage as may develop after installation. All single and sectional units shall be provided with adequate cleating, blocking, crating and other forms of protection as required to preclude damages thereto during shipping and handling and installation.
- Plastic Laminate edges or metal edges shall be square, self-edged, or post formed as indicated on drawings. Edges shall be neatly beveled; joints shall be minimized in quantity and be made to a smooth hairline and puttied. Appearance of unsightly or excessive joints will be cause for rejection.

Installation

- Installation at the Project shall be by skilled mechanics supervised by the Contractor in accordance with accepted standards.
- Install all Finish Carpentry straight, plumb, level and in true alignment except where otherwise indicated. Fit all joints closely and fasten all pieces rigidly in place. Nails shall be finish or casing nails. Countersink nail heads and leave ready for putty. Joints shall be neatly matched and mitered. Fill exposed joints prior to jointing.

    - Finished size shall be indicated on the drawings
    - Surfaces shall be left free from hammer marks, free from warp, twist, open or other defects and shall be cleaned, scraped and sanded ready for finishing.

Cleaning and Protection

- Clean shop finished work, touch-up finish as required and remove and refinish damaged or soiled areas of finish.
- Protect installed Finish Carpentry from damage by work of others trades until End-user's acceptance of the work.

DIVISION 8 - OPENINGS

08 10 00 Door and Frames

Scope of Work

- The work covered by this Item shall consists of supply and installation of all fabricated door and jambs, equipped with fixing accessories and locking devices including restoration of opening for fitting in accordance with Bill of Quantity, Plan and/or shop drawings and as herein specified.

Material Requirement

- D-1 Insulated Steel Flush Door w/ view panel
  Hollow Core Polystyrene insulation door panel with double glaze view panel window in tempered clear glass, GA #16, G.I. door in laminated finish complete with ball bearing hinge, lever type door handle and cylinder lock combo set (inside knob lock @ AVR), 500k cycles automatic door closer, PU foam insulation strips and bottom sealing strip
  Dimension: 0.80m x 2.10m

- D-2 Insulated Steel Flush Door w/ viewing panel
  Hollow Core Polystyrene insulation door panel with double glaze view panel window in tempered clear glass, GA #16, G.I. door in laminated finish complete with ball bearing hinge, lever type door handle and cylinder lock combo set (inside knob lock @ AVR), 500k cycles automatic door closer, PU foam insulation strips and bottom sealing strip
  Dimension: 0.70m x 2.10m

- D-3 Insulated Steel Flush Door w/ view panel
  Hollow Core Polystyrene insulation door panel with double glaze view panel window in tempered clear glass, GA #16, G.I. door in laminated finish complete with ball bearing hinge, lever type door handle and cylinder lock combo set (inside knob lock @ AVR), 500k cycles automatic door closer, PU foam insulation strips and bottom sealing strip
  Dimension: 0.70m x 2.10m

- D-4 Framed Glass Door
  10mm thick tempered glass door on aluminum powder coated frame complete with stainless pull handle and lock hardware
  Dimensions: 0.90m x 1.80m

- D-5 JIB Door
  Fabricated JIB door using 9mm thick fiber cement board on wood framing, cladded/laminated flush to wall cladding complete with concealed door hinge, lever type door handle with lock
  Dimensions: 0.60m x 2.10m

- D-6 Fire Rates Steel Door/Emergency Escape Door
  Galvanized sheet GA#18 thick GA#16 Jamb complete with panic device rated as BS476 with door closer in powder coated finish
  Dimension: 0.90m x 2.10m

08 53 13 **Vinyl Windows**

Scope of Work

- The work covered by this Item shall consists of supply and installation of all fabricated windows, including materials, labor, tools, restoration of openings for fitting and equipment required in undertaking the proper installation as shown on the Plans and in accordance with this Specifications.

Material Requirement

- W-1 Fixed View Window
  Double glazed clear tempered glass in white uPVC frame window
  Dimension: 0.80m x 1.20m

DIVISION 9 – FINISHES

09 30 00 **Tile**

Scope of Work

- This item shall consist of furnishing all floor tiles, including all labor, tools, equipment and the satisfactory performance in undertaking the proper installation of tile as shown on the plans and in accordance with these specifications.

Material Requirement

- (FF-03) 300 x 300 Porcelain Tiles, matte or rustic surface (grey, beige or brown) including sand, cement, tile grout, adhesive and other accessories (tile trim, expansion joints, transition strips, etc.)
- Cementitious Waterproofing with concrete topping.
- Wall Tiles including sand, cement, tile grout, adhesive and other accessories (tile trim, expansion joints, transition strips, etc.)
- Submit sample and layout of tiles for approval of CPDMO Project Architect/Engineer and End-users.

Application

- Existing floor shall be prepared to level the floor finish with the hallway flooring.
- Tile gap must be uniform.
- Provide tiles on the specified areas as per design of CPDMO and End-users.
- Confer to Project Architect all the floor layouts and features of tiles.
- Layout tiles after the surfaces have been prepared for the work. Tiles shall be free from lamination, serrated edges, chipped off corners, and other imperfections affecting their quality appearance and strength.
- Samples of all tiles shall be submitted to the project Architect/Engineer and End-users for approval as to color, texture quality.

09 50 00 Ceiling Finishes

Scope of Work

- The work covered by this Item shall consists of furnishing all ceiling finishes, equipped with fixing accessories in accordance with Plan and/or shop drawings and as herein specified.

Material Requirements

- (CL-01) Acoustic Ceiling Tiles on T-Runners: Fine Texture, Mold Resistant, Shadow line Tapered Edge at least 0.70 NRC.
- (CL-02) 4.5mm thick fiber cement board on metal furring, painted finish.
- Submit sample for approval of CPDMO Project Architect/Engineer and End-users.

Construction Requirements

- Provide all the necessary preparation of ceiling.
- Hanger rod with adjustable clip shall be at 0.60 m maximum interval both ways but provide additional hanger and support on critical areas.
- Provide all the necessary accessories and framing for proper installation.
- Ensure adequate hanger and support to all the utilities on the area.
- Restore all affected areas.

09 60 00 Flooring

Scope of Work

- The work covered by this Item shall consists of furnishing all floor finishes, including all necessary surface preparations, floor leveling, materials, labor, tools equipment and in accordance with Plan and/or shop drawings and as herein specified.

Material Requirement

- (FF-01) 150 x 900 x 3 mm Vinyl Planks including surface preparation, floor leveling compound, adhesive and other accessories (end trims, transition strips, etc.)
- (FF-02) 500 x 500 x 6.5mm thick Low Pile Carpet Tiles including floor leveling compound

Construction Requirements

- Surface must be leveled evenly and free from any foreign objects.
- Samples of all floor finish shall be submitted to the project Architect/Engineer and End-users for approval as to color, texture quality.
- Provide all the necessary accessories for proper installation.

09 70 00 Wall Finishes

Scope of Work

- The work covered by this Item shall consists of furnishing all wall finishes, equipped with fixing accessories in accordance with Plan and/or shop drawings and as herein specified.

Material Requirements

18mm thick Plywood Wall Cladding in Laminate Finish

Canvas Wall Paper with Stone Textures
Submit sample for approval of CPDMO Project Architect/Engineer and End-users.

Construction Requirements

- Secured them using suitable anchoring method.
- Follow plan for the design and layout of the partitions with boards at one face only, two faces with insulation, two faces with plastering and tiles
- Provide all the necessary accessories for proper installation.

09 83 00 Acoustic Finishes

Scope of Work

- The work covered by this Item shall consists of furnishing all acoustic wall finishes, equipped with fixing accessories in accordance with Plan and/or shop drawings and as herein specified.

Material Requirements

- Sound Absorbing Acoustic Panels complete with all fixing accessories and supports
- Submit sample for approval of CPDMO Project Architect/Engineer and End-users.

Construction Requirements

- Secured them using suitable anchoring method.
- Follow plan for the design and layout of the partitions with boards at one face only, two faces with insulation, two faces with plastering and tiles
- Provide all the necessary accessories for proper installation.

09 91 00 Paints and Coatings

Scope of Works

- This Item shall consist of furnishing all paints, enamels, varnishes and other products to be used including labor, tools and equipment required as shown on the Plans and in accordance with this Specification.

Materials Requirements

- Semi-gloss anti-bacterial paint puttied and sanded
- Self-Cleaning-Antibacterial Paint
- Specified item and/or its components shall be handled in such manner as to prevent damage. The same shall be properly protected from harmful elements or damage by other work prior to its incorporation into the Project.
- Store materials in a well-ventilated space designated for the storage and mixing of paint. Materials delivered to the site shall be properly stored as to minimize exposure to extremes of temperature.

Quality Assurance

- The University reserves the right to subject material samples to test at his expenses. If such material tests do not meet the specified standards, the cost will be charged to the Contractor.
- Number of coats, where specified, is minimum. Contractor shall apply as many as required to meet specifications for solid, uniform appearance. Where film thickness in

mils is specified, spot checks will be made to determine compliance with specified thickness.

- Specified item and/or its components shall be handled in such manner as to prevent damage. The same shall be properly protected from harmful elements or damage by other work prior to its incorporation into the Project.
- Store materials in a well-ventilated space designated for the storage and mixing of paint. Materials delivered to the site shall be properly stored as to minimize exposure to extremes of temperature.

Submittals

- Submit 2 samples of each and every color or finish (including all coats). Where the same color or finish is to be applied over different materials, samples of each shall be submitted on different materials, where practical.
- Sample size shall be a minimum of 150 mm x 150 mm (6" x 6")

Protection

- Paint materials shall be properly protected from damage, providing for adequate storage space. Take all necessary precautions to prevent fire, such as keeping oily rags in U. L. approved metal containers or removing from building at the end of each day's work.
- All work fittings, furniture, etc., are to be suitably protected during execution of the work. Splashes on floors, walls, etc. are to be removed during progress of work and on the whole, left clean and perfect upon completion.
- No exterior or exposed painting shall be carried out under adverse weather conditions, such as extremes of temperature, during rain, fog, etc., or if there is excessive dust in the air.

Lead Content and Warning Labels

- The material manufacturer shall state the lead content on the label of any paint product container based on metal percentage of total solids.
- The label of any paint product exceeding 0.5% lead content shall include the following statement: "This paint contains more than 0.55 lead content and shall not be used on surfaces accessible to children."

Repair of Defective Work

- All defective or damaged work shall be restored to initial condition.
- All voids, cracks, nicks, etc., will be repaired with proper patching material and finished flush with surrounding surfaces.
- Marred or damaged shop coats on metal shall be spot-primed with appropriate metal primer.
- Defective or damaged items and/or components, which cannot be repaired or restored to initial conditions, shall be removed and replaced to the satisfaction of the Architect at no additional cost to the Owner.

Cleaning

- Upon completion of the building, the Painting Contractor shall remove all paint spots from all finished work, remove all empty cans and leave the entire premises free from rubbish or other debris caused by his work. He shall remove his equipment from the premises. He shall clean off all glass free from paint spots and smears and shall present the work clean and free from all types of blemishes.

Products

- General:
  - Materials are specified to establish the standards of grade and quality desired for the work, principal pigments and vehicle types and minimum percentage of solids content by volume.
  - The products of Manufacturers not named may be submitted for use provided they are equal in quality and grade to the primers and finishes specified as approved by the Architect. If substitute paint products are desired, a statement shall be submitted to the Architect giving the Manufacturers name, proposed primer and finish for each paint system, analysis for each type of paint, and the use or uses intended. Failure to submit such statements will be cause for rejection.
  - In cases where the name of a brand or supplier is mentioned under a particular specification, only paint or primer of that manufacturer is acceptable and no substitution shall be permitted on the grounds that the brand specified is not available in the local market. Materials of one manufacturer shall not be applied over that of another, except in the case of shop primer coat.

- Color, Gloss and Texture:
  - Refer to Finish Schedule. All work is to be completed without deviation from these unless written approval is received from the Architect. No extra cost shall be allowed because of the color variety scheduled.

Execution

- General:
  - Work-in-place, on which specified work is to be applied, shall be examined to ensure that conditions are satisfactory for application of specified materials. Any defect, which may influence satisfactory completion of specified work, shall be report, in writing, to the Architect. Absence of such notification will be construed as acceptance of work-in-place.
  - Do not apply exterior paint in damp or rainy weather or until surfaces have thoroughly dried from the effects of such weather.
  - Before start of painting, remove finish hardware, accessories, plates, lighting fixtures, and similar Items, as approved by the Architect, except UL. Labels on Fire Door and Frames, which must not be removed. Use only workmen skilled in the applicable building trade for removal and reinstallation of finished item in-place.
  - The following items shall be masked or protected with suitable covering:
    - Sealing, caulking and glazing compounds (unless otherwise directed by the Architect)
    - Glass.
    - Gauges, thermometers and other recording devices.
    - Moving parts of machinery and other mechanical equipment - such as: shafts, couplings, valve stems, and the like.
    - Coated decorative sheet metal work.
    - Sprinkler heads and the like.
    - U.L. Labels

Surface Preparation as Applied to Various Substrate

a. Wood

New Surface:

- Surface to be painted should be clean and dry, free from oil, grease, dust, dirt, contaminants and all loose girt or mortar; sand rough edges remaining, countersink nail heads for putty applications.
- Dust off surfaces completely then wipe with a clean rag.

b. Metal

New Surface:

- Surface to be painted should be clean and dry, free from oil, grease, dust, dirt, wax, solder flux, and other contaminants by wiping with mineral spirits or paint thinner.
- Remove rust by wire brushing, sanding or scraping.
- Where maximum performance of protective coatings is necessary (e.g. Industrial Plants), prepare surface by blast cleaning.

c. Concrete:

New Surface:

- Surface to be painted should be clean and dry, free from oil, grease, dust, dirt, contaminants and all loose girt or mortar.
- Treat with masonry neutralizer. Mix (1) liter of B-44 with (16) liters of water. Apply liberally by brush and let dry overnight.
- Rinse with water to remove white crystals that form on the surface. Let dry.

Paint Application

- General
  - Specified work shall be done by skilled painters in a workmanlike manner. All spaces shall be broom-cleaned before painting is started. Surface to be painted shall be clean, dry, smooth and adequately protected from dampness. Each coat of paint shall be allowed to dry at least twenty-four (24) hours before succeeding coat is applied. Finish work shall be uniform, of approved color, smooth and free from runs, sags, defective coverage, clogging or excessive flooding. If surfaces are not adequately covered, as determined by the CPDMO Architect/Engineers/Inspectors, further coat shall be applied to the satisfaction of the CPDMO Technical Group. Edges of paint adjoining other materials or colors shall be sharp and clean without overlapping.

- Paint Mixing:
  - Paint mixing and thinning shall be done only in accordance with directions of Manufacturer. Paint must be strained free from all skin and extraneous substances and shall be thoroughly mixed in a clean container during use.

- Methods of Application:
  - Exterior first coats and Interior first coats shall be applied by brush, except on shop-primed surfaces, which shall be applied by brush or roller. All primer shall be applied by brush. Succeeding coats over field-primed surfaces and all coats over shop-primed surfaces may be applied by brush roller or spray. Distemper brushes are to be of approved type and less than 15 cm In width. Rollers for applying enamel shall have a short nap. Spray equipment shall be as

DIVISION 23 – HEATING, VENTILATING AND AIR-CONDITIONING (HVAC)

General Conditions and Provisions

- The work throughout shall be executed in the best and most thorough manner, under the direction of, and to the satisfaction of the Owner or the Owner's duly authorized representative and based on strict conformance with the contract plans and documents.
- The Contractor shall be responsible for his work until its completion and final acceptance and shall replace any of the same which may be damaged lost or stolen without additional cost to the Owner. He shall guard the building and its contents against damage by him, his employees or sub- contractors and shall make repair for any damage free of charge. This Contractor shall indemnify and save harmless the Owner, Architect and Engineering Consultant from and against all liabilities for damages arising from injuries or disabilities to persons or damage to property occasioned by any act or omission of this Contractor or any of his subcontractors, including any and all expenses, legal or otherwise, which may be incurred by the legal or otherwise, which may be incurred by the Owner, the Architect, or the Consulting Engineer in the defense of any claim, action or suit.
- The Contractor shall put his work in place as fast as reasonably possible. He shall at all times keep a competent Engineer in charge of the work, and shall facilitate its inspection by the Owner, Architect and Engineer Consultant. He shall also remove any rubbish caused by his work as expeditiously as possible.
- A fixed sequence of operations is required to properly install the complete system. It shall be the responsibility of the Contractor to closely schedule his work in such a way that it shall be installed at the proper time and without delaying the completion of the entire project. The Contractor shall carefully check space requirement with other subcontractors to ensure that his equipment and pipes can be installed in the space allotted for them. The Contractor, before commencing work, shall examine all adjoining work on which the work in any way dependent for perfect workmanship according to the intent of this specification, and shall report to the Project Manager or Owner's representatives, any conditions which prevent the Contractor from performing first-class work, no "waiver of responsibility" for defective adjoining work will be considered unless notice has been filed before the Contractor submits his proposal. The Contractor shall thoroughly acquaint himself with the work involved, and verify at the building all measurement necessary for the proper installation of his work, obtaining the same, when necessary, from the General Contractor or other Sub-Contractors. He shall also be prepared to promptly furnish to these Contractors any information relating to his own work necessary for the proper installation of their contracts and shall cooperate with them to secure the best progress of, and harmony between the work of the different trades, in the interest of the building as a whole. This Contractor shall confer with other Contractors of other trades for finish adjacent to his own work (such as grilles, escutcheons, etc.) fit in and harmonize with the finish, in a manner satisfactory to the Owner.
- It is specifically intended that all materials and labor which are necessary for the proper completion and best operation of the system shall be furnished as part of this contract without additional cost – whether or not shown in details on the drawings or described in detail in the Specifications. The provision is in consideration of the fact that, in many cases, the use of apparatus of different makes may be considered, which differ in detail from that described, although intended to fulfill the same functions.
- Equipment and piping arrangements shall provide adequate and acceptable clearances

for entry, servicing, filter replacement and maintenance. Access panels shall be provided in the housings of air conditioning equipment and shall be the type that will permit servicing or replacement of the components of the units as installed.

- The contractor shall guarantee all work performed and materials installed by him to be free from inherent defects, and shall keep same in repair and replace any defective materials or workmanship, free of cost to the Owner, for a period of one (1) year, from date of acceptance upon notice from the Architect or the Owner's representative.
- The Contractor shall guarantee that the equipment, materials, accessories, methods of installation and workmanship supplied under this Specification will be of the best class, that it will be erected in a practical and first-class manner, that it will be complete in operation, nothing omitted in the way of labor and shown or mentioned herein, and that it will be delivered in good working order, complete and perfect in every aspect.
- The Contactor shall supervise the installation of this apparatus and equipment, test or adjust them in repair for a stated period or render other similar services. The Contractor will be held responsible for the performance of the specified services under the actual conditions of installation. The same shall apply to cases where special adjustment or other services are necessary to insure the proper and efficient functioning of apparatus even though not specifically hereinafter called for. It is intended that the entire plant, when finally delivered, shall be ready in every respect for satisfactory and efficient operation and the Contractor is hereby made responsible for the result.

Codes, Rules, Permits & Fees

- The Contractor shall give all necessary notices, obtain all permits and pay all government sales taxes, fees and other costs, including utility connections or extensions, in connection with his work; file all necessary plans, prepare all documents and obtain all necessary approvals of all governmental departments having jurisdiction; obtain required certificates of inspection for his work and deliver same to the Owner before request for acceptance and final payment for the work.
- The Contractor shall include in the work, without extra cost to the Owner, any labor, materials, services, apparatus, drawings in order to comply with all applicable laws, ordinances, rules and regulations, whether or not shown on drawings and/ or specified.
- The installations provided for and specified herein shall comply with the laws, ordinances and regulations of the Municipality where the jobsite is located, and the Bureau of Industrial Safety.
- The acceptability of all furnished equipment, materials, accessories, methods of installation and workmanship shall be based on complete adherence with applicable standards established by the following:
    1. PD 1096 National Building Code of the Philippines 2005 ed.
    2. RA 9514 Fire Code of the Philippines 2019 ed.
    3. Philippine Mechanical Code 2012 ed.
    4. American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE)
    5. International Mechanical Code (IMC) 2018 ed.
    6. Philippine Green Building Code (PGBC) 2015 ed.
    7. Philippine Society of Ventilating, Air Conditioning and Refrigerating Engineers (PSVARE)

Intent

- It is the intention of this Specification and Drawing to call for finished work, tested and ready for operation. Wherever the word "provide" is used, it shall mean "furnish and install complete and ready for use".

- Minor details not usually shown or specified, but necessary for the proper installation and operation, shall be included in the work, the same as herein specified or shown.
- It shall be understood that this Specification is written with certain items, equipment and materials specified by manufacturer's name, brand, number or trade name, as a means of establishing a standard of quality and performance. The use of these names to establish quality does not however prohibit use of other make of items, equipment or materials which may be considered to be equally efficient in both performance and quality of materials.

Surveys and Measurements

- The Contractor shall base all measurements, both horizontal and vertical from established bench marks. All work shall agree with these established lines and levels. Verify all measurements at site and check the correctness of same as related to the work
- The Contractor shall examine all drawings relating to his work and verify all governing conditions at the site and shall become fully informed as to the extent and character of the work required its relation to the other work in the area. No consideration will be granted for any alleged misunderstanding of the materials to be furnished or work to be done, it being understood that submission of a proposal is an agreement to all items and conditions referred to herein or indicated on the accompanying drawings. Any exceptions, omission or substitution shall be presented in writing with the contractor's bid.
- Should the Contractor discover any discrepancy between actual measurements and those indicated, which prevents following good practice or the intent of the drawings and specifications, he shall notify the Project Manager and the Owner, and shall not proceed with his work until he has received instruction from the Owner/Project Manager.

Drawings

- Drawings are diagrammatic and indicate the general arrangement of systems and work included in the contract. Drawings are not to be scaled. The architectural drawings and details shall be examined for exact location of fixtures and equipment. Where they are not definitely located, this information shall be obtained from the Architect, or Owner/Project Manager.
- The Contractor shall follow drawings in laying out work and check drawings of other trades to verify spaces in which work will be installed. Maintain maximum headroom and space conditions at all points, where headroom or space conditions appear inadequate, Project Manager or Owner shall be notified before proceeding with installation.
- Should the Contractor discover any discrepancy between actual measurements and those indicated, which prevents following good practice or the intent of the drawings and specifications, he shall notify the Project Manager and the Owner, and shall not proceed with his work until he has received instruction from the Owner/Project Manager.
- Should the Contractor discover any discrepancy between actual measurements and those indicated, which prevents following good practice or the intent of the drawings and specifications, he shall notify the Project Manager and the Owner, and shall not proceed with his work until he has received instruction from the Owner/Project Manager.

Equipment Deviations (Where Applicable)

- Where the Contractor proposes to use an item of equipment other than that specified or detailed on the drawings, which requires any redesign of the partition, structure, foundations, piping, wiring or any other part of the mechanical, electrical or architectural layout, all such redesign and all new drawings and detailing required therefore, shall be

prepared by the Contractor at his own expenses and approved by the Project Manager/Owner.

Scaffolding, Rigging, Hoisting

- This contractor shall furnish all scaffolding, rigging, hoisting, and services necessary for erection and delivery into the premises of any equipment and apparatus furnished. Remove same from premises when no longer required.

Material and Workmanship

- All materials and apparatus required for the work, except as specifically specified otherwise, shall be new, of first-class quality, and shall be furnished, delivered, erected, connected and finished in every detail, and shall be selected and arranged as to fit properly into the building spaces. Where no specific kind or quality of materials is given, a first-class standard article as approved by the Owner or his designated representative.
- The contractor shall furnish the services of an experienced superintendent who shall be constantly in charge of the installation of the work, together with all skilled workmen, fitters, metal works, welders, helpers and labor required to unload, transfer, erect, connect-up, adjust, start, operate, and test each system.
- Unless otherwise specifically indicated on the plans or specifications, all equipment and materials shall be installed with the approval Owner in accordance with the recommendations of the manufacturer. This includes the performance of such tests as the manufacturers recommends.

Electrical Connections (Where Applicable)

- The Electrical Contractor shall furnish and install all wiring except; 1) temperature control wiring; 2) equipment control wiring and 3) interlock wiring. The Electrical contractor shall furnish and install power wiring complete from power source to the individual machine room, terminating in a circuit breaker or junction box.
- The mechanical contractor shall, regardless of voltage, furnish and install all temperature wiring, and all interlock wiring and equipment control wiring for the equipment that the owner furnishes. The mechanical contractor shall furnish the electrical power wiring from the circuit breakers or junction box installed by the Electrical Contractor, to all motor including the furnishing of all starters or combination starters not factory mounted on equipment. The mechanical contractor shall provide and be responsible for the heater in all starters that the Mechanical Contractor furnishes.
- After all circuits are energized and completed, the Electrical Contractor shall be responsible for all power wiring, while all control wiring shall be the responsibility of the mechanical contractor. Motors and equipment shall be provided for current characteristics as shown on the drawings.
- All cost of electricity due to testing and startup operation shall be for the contractor's account, (see applicable sections.)

Accessibility

- The contractor shall be responsible for the sufficiency of the size of shafts and chases, the adequate clearance in double partitions and hung ceiling for the proper installation of his work. He shall cooperate with the General Contractor and all other contractors whose work is in the same and shall advise the Owner Representatives of his requirements. Such spaces and clearances shall however, be kept to the minimum size required.
- The Contractor shall locate all equipment which must be serviced, operated, or maintained in fully accessible positions. Equipment shall include but not be limited to

valves, traps, cleanouts, motors, controllers, switchgear, and drain points. If required for better accessibility, furnish access doors for this purpose. Minor deviations from drawings may be made to allow for better accessibility and any change shall be presented for approval prior to implementation.

Foundations, Supports, Piers & Attachments

- The Mechanical Contractor shall furnish approved shop drawings showing concrete bases required and shall provide the necessary foundation bolts for anchoring the machines, which shall be as shown on the drawings or as directed.
- The Mechanical Contractor shall provide approved anchor bolts with plates, sleeves, washers and double nuts for all apparatus set on concrete foundations. Also provide billets or plat, grouting, etc., as directed to properly distribute the weight of apparatus on foundations and set equipment perfectly level.
- The Mechanical Contractor shall furnish and install as shown or directed, all necessary supports for equipment furnished under this section of the Specifications. To meet varying conditions in each case, saddles, brackets, etc. as shown or directed. All such supports shall have substantial flanges bolted to floor construction. Hangers shall be supported from the structure as previously specified. Supports shall be properly located with reference to any supporting pads, legs, etc of the equipment carried and must be of such number and distributed so as not to throw any undue strains on shells or casing.

Cutting and Patching

- The Mechanical Contractor shall provide all cutting and patching necessary to install the work specified in this section. Patching shall match adjacent surfaces.
- No structural members shall be cut without the approval of the Owner Representatives, Architect and all such cutting shall be done in a manner directed by him.

Sleeves and Plates

- This Contractor shall provide and locate all sleeves and inserts required before the floors and walls are built, or shall be responsible for the cost of cutting and patching required for pipes where sleeves and inserts were not installed, or where incorrectly located. Each Contractor shall do all drilling required for the installation of his hangers.
- Sleeves shall be provided for all mechanical piping passing thru concrete floor slabs and concrete, masonry, tile and gypsum wall construction. Sleeves shall not be provided for piping running imbedded in concrete or insulating concrete slabs on grade.
- Where sleeves are place in exterior walls below grade, the space between pipes or conduit and the sleeves shall be packed with oakum and lead and made completely watertight.
- Sleeves shall be constructed of 24 gage galvanized sheet with lock seam joints for all sleeves set in concrete floor slabs terminating flush with the floor. All other sleeves shall be constructed of galvanized steel pipe unless otherwise indicated on the drawings.
- Fasten sleeves securely in the floors, walls, so that they will not become displaced when concrete is poured or when other construction is built around them. Take precautions to prevent concrete, platters, or other materials being forced into the space between pipe and sleeve during construction

Waterproofing

- Where any work pierces waterproofing including waterproof concrete, the method of installation shall be approved by the Owner's Representative or Architect before work is done. Contractor shall furnish all necessary sleeves, caulking and flashing required to make openings absolutely watertight.

Mechanical Maintenance

- Operation – The Mechanical Contractor shall receive calls for any and all problems experienced in the operation of the equipment provided under this Specification and shall take steps to immediately correct any deficiencies that may exist.

Air-Conditioning

Variable Refrigerant Volume/Flow System (VRV/VRF)

- General – Unit/s shall be air-cooled or water-cooled as specified or indicated in drawings, split type multi system air conditioner consisting of one outdoor unit and multiple indoor units, each having capability to cool independently room requirements. Different types and cooling capacity of indoor units can be connected to one refrigerant circuit and controlled individually. Compressor/s shall be equipped with inverter controller and capable of changing the rotating speed to satisfy variations in cooling load. The refrigerant to be utilized shall be environmentally friendly with zero ODP such as R410A or R407C.

- Outdoor Unit/s – Shall be a factory assembled unit housed in a sturdy weatherproof casing constructed from rust-proofed mild steel panels coated with a baked enamel finish. All outdoor units shall have multiple steps of capacity control to meet cooling variations.
    1) The outdoor unit of 8 and 10 HP shall have two scroll compressors and be able to operate even in case that one inverter compressor is out of order. The outdoor unit of 5 HP shall have one scroll compressor.
    2) The connectable range of indoor units shall be from 0.80 to 10 HP
    3) The compressor shall be of highly efficient scroll type and equipped with inverter control capable of changing the speed in accordance to the cooling load requirement.

- Indoor Unit/s – Shall be of the following models: ceiling cassette, ceiling suspended, wall mounted, ceiling concealed ducted and floor standing.
    1) The heat exchanger shall be constructed with copper tubes mechanically bonded to aluminum fins to form a cross fin coil and shall be covered by anti-corrosion resin film. It shall have electronic control valve which control refrigerant flow rate in respond to load variations of the room.
    2) The fan shall be statically and dynamically balanced to ensure low noise and vibration free operation.
    3) The address of the indoor unit shall be set automatically in case of individual and group control.
    4) In case of centralized control, it shall be set by liquid crystal remote controller.

- Control – Computerized PID control shall be used to maintain a correct room temperature. Unit/s shall be equipped with a self-diagnosis for easy and quick maintenance and service. The LCD (Liquid Crystal Display) remote controller shall memorize the latest malfunction code for easy maintenance.
    1) Local Remote Controller
    2) Central Remote Group Controller

- Refrigerant Circuit – Shall include liquid and gas shut-off valves, solenoid valves and accumulator as the system demands.

- Safety Devices – All necessary safety devices shall be provided to ensure safe operation of the system. The following safety devices shall be part of the outdoor unit: high pressure switch, fan drive overload protector/ fan motor safety thermostat, fusible plug, overload relay, etc.
- The unit/s shall deliver the design cooling capacity at the external ambient specified. The units are rated at 35°C and shall be suitable for continuous operation with reduced capacity at an external ambient temperature of 40°C.
- Provide supports and mounts in accordance with manufacturer's recommendations or as indicated on drawings.
- Condensate removal shall be by means of gravity drainage and/or condensate pump as necessary.
- Unit electrical power shall be 230V/1phase/60Hz or as indicated on the drawings.
- Evaporator and condenser coils shall be of copper tube construction with aluminum fins and additional anti-corrosion coating suitable for salty spray atmosphere.
- Filters shall be washable type, easily accessible, and shall cover the full unit area of re-circulated air.
- Refrigerant Piping and Fittings – Copper refrigerant tube, ASTM B280, cleaned, dehydrated and sealed, marked ACR on hard temper straight lengths.
- Refrigerant Insulation – Flexible closed cell elastomeric rubber insulation; ASTM C534, k = 0.033 W/m- °C, flame spread not over 25, smoke developed not over 50 for temperatures from -4°C (40°F) to 93°C (200°F). No jacket required except specified.

Ventilation

Statement of Work

- Intent – It is the intent of these specifications to furnish ventilation systems complete, fully adjusted and ready for use.
- Equipment – Equipment has been carefully selected for this project and the Contractor is expected to provide all items as closely as possible to the specifications and as called for on the drawings. Equipment specifications as per owner choice.
- Job Coordination – The Contractor for Ventilating and Air Conditioning shall plan his work in advance and shall coordinate all space requirements with other trades involved. Where conflicts occur, the Contractor shall request clarification thru the General Contractor.
- Workmanship – It is the intent of these specifications to provide the best workmanship available.
- Cleaning – It is the intent of these specifications that all work, including the inside of equipment be left in a clean condition. All construction dirt shall be removed from material and equipment.

Equipment

- Ceiling Cassette Fan – exhaust fan shall be of the centrifugal direct drive type. The fan housing shall be constructed of heavy-gauge galvanized steel. The housing interior shall be lined with acoustical insulation. The outlet duct collar shall include a plastic backdraft damper. Outlet shall be adaptable for horizontal or vertical discharge. The access for wiring shall be external. The motor disconnect shall be internal and of the plug-in type. The motor shall be mounted on vibration isolators. The fan wheel shall be of the

Basic Electrical Materials and Methods

Conduit System

- PVC is primarily required for this work. Conduit runs shall be well supported especially on ceiling and slab, concrete encased on soil. All conduits placed on walls and partition shall be embedded, exposed layout will not be allowed. Conduit ends shall be provided with an end bell or adapter with locknut and bushing. Conduit shall enter knockouts squarely. Locknuts and bushing shall be used at termination of conduits in outlets, pull or junction boxes, panels and cabinets. Locknuts shall be screwed tight. Bends and offsets shall be avoided, if possible, but, when necessary, it shall be made with an approved Field bend or pipe / conduit bending machine. The use of pipe tee or vice bending conduits will not be permitted.

Restrictions

- Supply and installation of all material not shown in the drawing nor mentioned in this specification but necessary for the completion of the construction works shall be included. Coordination with CPDMO and Project Inspector should be done for proper installation of all wiring systems.

Hangers and Supports

- All electrical pipes and accessories shall be using appropriate hangers and support follow existing features, GI Wires as support is not allowed. Exposed layout on walls and partition inside offices shall not be allowed. Chipping works required.

Testing of system

- Complete testing of the system involved in operation and provision of all system apparatus for making test and guarantee for a period of one (1) year after acceptance of the project and shall agree to repair and make good at no additional cost to the end user.

Conductors and Cables

- Wires and cable for lights and power shall be type THHN/THW 600 volts insulation approved type building wire. No. 3.5 mm THHN shall be used from the panel board to the last outlet, and shall be the smallest wire that should be used, unless otherwise No. 8.0mm wires THNN and larger shall be stranded and be connected to the panel boards and equipment by solder less connectors sufficiently large to enclose all strands of the conductor and be securely fastened. They shall not get loose under vibration and normal strain. Wire splices shall be mechanically and electrically secured and soldered. Joints taps and splices in wires larger than No. 10 AWG shall be made with the use of solder less connectors. They shall be tapped with electrical tape to the thickness of the wire insulation.
- Wires and cables shall be continued from outlet, or outlet to pull boxes without splices. Conductors shall not be drawn in conduits until plaster is dry and the conduits are cleaned and free of moisture. Conductors of other systems shall not occupy the same conduit and boxes used for light and power.

Scope of Works

- Complete supply and installation of wires and cable shall be included in this scope of

works.

- Tagging of all switches corresponding to the branch circuit number as indicated on the respective panel boards directory using tagging machine.
- Provide Directory in all Electrical Panels
- Balancing of loads
- Wires must be color coded using the standard color coding
- Replacement and upgrading of existing panel
- Dismantling of Existing Wires, Electrical Panel and Other electrical components
- Contractor to terminate/tap the wires of MDP-2 to the New Distribution Panel
- Contractor to terminate/tap the existing 3-125mm2 THHN wire of the new DP
- Wire shall be placed proper to conduit and gutter
- Testing and commissioning

Raceway and Boxes

- All conduit boxes and fittings shall be standard manufactured by reputable electrical manufacturers. All conduit boxes not over 100 cubic inches in size, if constructed of sheet metal, the metal shall not be less than No.14 US gauge and shall be set flush with the surface of the structure in which they are installed and where conduit runs are concealed. Care shall be exercised to line up all outlet boxes, 4" octagon type and 1-½" depth. When more than two conduits enter the outlet box, the 2-1/8" depth type box shall be removed. All outlet boxes indicated to be used for lighting fixtures shall be provided with standard flat metal covers.
- Horizontal or vertical gang boxes shall be installed as indicated or when required. All conduit boxes, junction boxes, and blank outlet boxes shall be fitted with standard flat metal conduit box covers.

Wiring Devices

- All wiring devices to be used hereunder shall be new and of approved type. All wall switches shall be top-action quiet-matic type, wide series, bases to be fire-resistant and non-absorptive material. When more than one switches is indicated in the same location, they shall be mounted in gang under a common plate.
- Convenience outlet shall be duplex-type, universal & flush–type with fire-resistant non-absorptive bases, minimum rating of 16 amperes at 250 volts wide series.
- Suitable single pole and heavy-duty switches shall be installed where indicated on the plans. Sample of wiring devices shall be presented for approval. Minor relocations and re-circuiting shall be the liability of the Contractor.
- Following features shall be followed: one gang, one way switch, 2 gang, one way switch, 3 gang, one way switch, one gang three way switch, two gang three way switch, three gang three way switch, duplex flush type convenience outlet universal grounding type.
- Supply and installation of Floor mounted duplex pop-up outlet universal grounding type (refer to plans for the details)
- Supply and installation of Duplex Universal Grounding type, Ground Fault Circuit Interrupter (GFCI)

26 20 00 Low-Voltage Electrical Distribution

Material Requirement

- PPLO Main @ 60AT, 3 pole, 250V, 18KAIC with 14 branch circuits @ 14-20AT, 2 pole bolt-on type with grounding bus.
- PPAC Main @ 60AT, 3 pole, 250V, 18KAIC with 6 branch circuits @ 2-20AT, 2 pole, 2-30AT, 2 pole & 2-50AT, 2 pole bolt-on type with grounding bus.

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

28 46 00 Fire Detection and Alarm

- Supply and Installation of brand-new Intelligent Photo electronic Smoke Detector, Intelligent Optical Detector with emote indicator output (Certified by LPCB) without base.
- Supply and Installation of brand-new Common Detector Base for Addressable Detector and for conventional detector using EOLR (refer to detailed drawings)

Technical Specifications of Smoke Detector:

1. Operating Voltage
   - Loop 24V (16V ~ 28V)
   - Standby Current: ≤0.8mA
   - Alarm Current: ≤1.8mA (without remote indicator)
     ≤3.8mA (with remote indicator)
   - Code Range: 1 ~ 242
2. Dimensions
   - Diameter: 100mm
   - Height: 54.5mm (with base)

- Supply and Installation of brand-new Digital manual Call point flush mount resettable (non-breaking glass), Supplied with surface mount back box and special reset key.

Technical Specifications of Digital Manual Call Point:

1. Operating Voltage
   - Loop 24V (16V ~ 28V)
   - Standby Current: ≤0.6mA
   - Alarm Current: ≤1.8mA (without remote indicator)
   - Address Range: One address within 1 ~ 242

2. Dimensions (LxWxH):
   - 87.1mm x 87.1mm x 58.5mm (with back box)
   - 87.1mm x 87.1mm x 23.5mm (without back box)

- Supply and Installation of brand new Addressable Combined Sounder and strobe 24VDC required.

Technical Specifications of Addressable Sounder Beacon:

1. Sound Level Output: 84dBA at 3 meters
2. Beacon frequency: 20 ~ 180 times
3. Operating Current:
   Loop: Standby – 0.8mA; Alarm-6mA
   PSU: Standby – 10mA; Alarm-160mA
4. Operating Voltage:
   - Loop 24V (16V ~ 28V)
   - PSU: 24VDC (20VDC ~ 28VDC)
5. Dimensions:
   - 144mm x 90mm x 57mm

- Supply and Installation of brand new #18AWG TF wire, 3.5mm² THHN wire, 1/2Ø EMT conduit pipes, flexible metallic conduit and consumables

Testing of system

- Complete testing of the system involved in operation and provision of all system apparatus for making test and guarantee for a period of one (1) year after acceptance of the project and shall agree to repair and make good at no additional cost to the end user.

- Restoration works of affected areas as result of the project implementation

Hangers and Support

- All conduit pipes and accessories shall be using appropriate hangers and support follow existing features. Exposed layout on walls and partition inside offices shall not be allowed. Chipping works required.

NOTE

The foregoing list of items of works does not in anyway limit the responsibility of the Contractor to perform all other works necessary for the completion of the project, **PROPOSED TRANSFER AND RENOVATION OF MIU/EDUTECH CENTER TO EXISTING PGIM OFFICE.**

GUARANTEE

The Contractor shall guarantee all works under this contract to be free from any technical, material, workmanship and/or factory defects and shall replace and repair to the satisfaction of the Project Architect / Engineer and/or to the Chief of CPDMO on any part or portion of the work which may fail within **a period of one (1) year after the final acceptance of the system.**

COMPLETION PERIOD

The Contractor is given **One Hundred Eighty (180) calendar days** to execute the renovation works including the installation all system requirements. The Contractor shall coordinate to the CPDMO Inspector and End-users for the schedule of testing of systems and other related job.

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