

SECTION IV: TECHNICAL SPECIFICATION

Project: PROPOSED COMPLETION OF ENGINEERING & TECHNOLOGY (MECHATRONICS) BUILDING
Location: SLSU-MAIN CAMPUS, SOGOD, SOUTHERN LEYTE
Owner: SOUTHERN LEYTE STATE UNIVERSITY

ITEMS	DETAILS
I MOBILIZATION	
1.0 Mobilization/Demobilization	Contractor shall mobilize and put into operation all equipment and plants required to undertake the Bid Documents, which is the Bill of Quantities and all associated work items. Demobilization includes the clean-up of the site and the removal of materials, debris, waste, etc., and making good damages or temporary alterations, restoration of damages to the surrounding area (including vegetation, minor structures etc) resulting from the construction or construction-related activities.
2.0 Temporary Facilities/ Water & Electric/ Site Clearing	Contractor shall, as a priority in all his activities, undertakings and endeavors, ensure the continued and continuous safety of the public and all persons directly or indirectly associated with the Works. During the entire process of constructing the Works -- including preparation of the site, temporary water and electric line, barracks and final clean up upon completion -- the Contractor shall exercise the utmost care in order to prevent damage to the environment and adjoining properties. Due precautions shall be taken by the Contractor, at his own cost, to ensure the safety and protection against accidents of all staff and labor engaged on the Works and the public in the vicinity of the Works. The Contractor will be responsible for the safety
II EARTHWORKS	
1.0 Excavation/Backfilling	Labor only. Volume of footing, wall footing and covering of foundation
2.0 Batter Board	2" x 2" x 8' cocolumber
3.0 Stake	2" x 2" x 8' cocolumber
4.0 Consumable for Lay-out	2" Common Nail, Red Oxide Primer, Nylon Strings #80
III CONCRETING WORKS	
1.0 Concrete	
1.1 Footing (Columns & Stairs)	Maximum Compressive Strength at 28 days = 21 MPa (3000psi), G3/4"
1.1.1 Cement	Portland Cement (Type1) in 40kgs. Use one brand of cement all through-out acceptable to the Engineer -in-charge.
1.1.2 Sand	Washed Sand (S1). Uncoated granules, strong, durable,
1.1.3 Gravel	Gravel (3/4"). Uncoated granules, strong, durable,
1.1.4 Mixture	Class AA concrete mixture (1 : 1-1/2 : 3 ratio) , 0.53 water / cement ratio
1.2 Footing Tie Beam	(3000psi), G1
1.2.1 Cement	Portland Cement (Type1) in 40kgs. Use one brand of
1.2.2 Sand	White Sand (S1). Uncoated granules, strong, durable,
1.2.3 Gravel	Gravel (1"). Uncoated granules, strong, durable, reasonably
1.2.4 Mixture	/ cement ratio

1.3	Slab L1		Maximum Compressive Strength at 28 days = 21 MPa (3000psi), G3/4"
1.3.1	Cement		Portland Cement (Type1) in 40kgs. Use one brand of cement all through-out acceptable to the Engineer -in-charge.
1.3.2	Sand		Washed Sand (S1). Uncoated granules, strong, durable,
1.3.3	Gravel		reasonably clean and free from organic matter
1.3.4	Mixture		Class AA concrete mixture (1 : 1-1/2 : 3 ratio) , 0.53 water / cement ratio
1.4	Slab L2		Maximum Compressive Strength at 28 days = 21 MPa (3000psi), G3/4"
1.4.1	Cement		Portland Cement (Type1) in 40kgs. Use one brand of cement all through-out acceptable to the Engineer -in-charge.
1.4.2	Sand		Washed Sand (S1). Uncoated granules, strong, durable,
1.4.3	Gravel		reasonably clean and free from organic matter
1.4.4	Mixture		Class AA concrete mixture (1 : 1-1/2 : 3 ratio) , 0.53 water / cement ratio
1.5	Column L1		Maximum Compressive Strength at 28 days = 21 MPa (3000psi), G3/4"
1.5.1	Cement		Portland Cement (Type1) in 40kgs. Use one brand of cement all through-out acceptable to the Engineer -in-charge.
1.5.2	Sand		Washed Sand (S1). Uncoated granules, strong, durable,
1.5.3	Gravel		reasonably clean and free from organic matter
1.5.4	Mixture		Class AA concrete mixture (1 : 1-1/2 : 3 ratio) , 0.53 water / cement ratio
1.6	Column L2		Maximum Compressive Strength at 28 days = 21 MPa (3000psi), G3/4"
1.6.1	Cement		Portland Cement (Type1) in 40kgs. Use one brand of cement all through-out acceptable to the Engineer -in-charge.
1.6.2	Sand		Washed Sand (S1). Uncoated granules, strong, durable,
1.6.3	Gravel		reasonably clean and free from organic matter
1.6.4	Mixture		Class AA concrete mixture (1 : 1-1/2 : 3 ratio) , 0.53 water / cement ratio
1.7	Beam L2		Maximum Compressive Strength at 28 days = 21 MPa (3000psi), G3/4"
1.7.1	Cement		Portland Cement (Type1) in 40kgs. Use one brand of cement all through-out acceptable to the Engineer -in-charge.
1.7.2	Sand		Washed Sand (S1). Uncoated granules, strong, durable,
1.7.3	Gravel		reasonably clean and free from organic matter
1.7.4	Mixture		Class AA concrete mixture (1 : 1-1/2 : 3 ratio) , 0.53 water / cement ratio
1.8	Roof Beam		Maximum Compressive Strength at 28 days = 21 MPa (3000psi), G3/4"
1.8.1	Cement		Portland Cement (Type1) in 40kgs. Use one brand of cement all through-out acceptable to the Engineer -in-charge.
1.8.2	Sand		Washed Sand (S1). Uncoated granules, strong, durable,
1.8.3	Gravel		reasonably clean and free from organic matter
1.8.4	Mixture		Class AA concrete mixture (1 : 1-1/2 : 3 ratio) , 0.53 water / cement ratio

1.9	Stair - L1 to L2	Maximum Compressive Strength at 28 days = 21 MPa (3000psi), G3/4"
1.9.1	Cement	Portland Cement (Type1) in 40kgs. Use one brand of cement all through-out acceptable to the Engineer -in-charge.
1.9.2	Sand	Washed Sand (S1). Uncoated granules, strong, durable,
1.9.3	Gravel	Gravel (3/4"). Uncoated granules, strong, durable,
1.9.4	Mixture	Class AA concrete mixture (1 : 1-1/2 : 3 ratio) , 0.53 water / cement ratio
1.10	Canopy & Lintel Beam	Maximum Compressive Strength at 28 days = 21 MPa (3000psi), G3/4"
1.10.1	Cement	Portland Cement (Type1) in 40kgs. Use one brand of cement all through-out acceptable to the Engineer -in-charge.
1.10.2	Sand	Washed Sand (S1). Uncoated granules, strong, durable,
1.10.3	Gravel	reasonably clean and free from organic matter
1.10.4	Mixture	Class AA concrete mixture (1 : 1-1/2 : 3 ratio) , 0.53 water / cement ratio
2.0	Rebars	
2.1	Footing (Columns & Stairs)	
2.1.1	Reinforcing Bars	Deformed type reinforcing bars with minimum yield strength, FY = 280 MPa (Grade 40)
2.1.2	Material	20mm X 6.0m Deformed Rebars (Grade40), 16mm X 6.0m Deformed Rebars, 12mm X 6.0m Deformed Rebars, G.I. Tie Wire # 16
2.1.3	Typical Plan	Refer to Structural plans for details
2.2	Footing Tie Beam	
2.2.1	Reinforcing Bars	Deformed type reinforcing bars with minimum yield strength, FY = 280 MPa (Grade 40)
2.2.2	Material	16mm X 6.0m Deformed Rebars, 10mm X 6.0m Deformed Rebars (Grade33), G.I. Tie Wire # 18
2.2.3	Typical Plan	Refer to Structural plans for details
2.3	Slab L1	
2.3.1	Reinforcing Bars	Deformed type reinforcing bars with minimum yield strength, FY = 275 MPa (Grade 33)
2.3.2	Material	10mm X 6.0m Deformed Rebars, G.I. Tie Wire # 16
2.3.3	Typical Plan	Refer to Structural plans for details
2.4	Slab L2	
2.4.1	Reinforcing Bars	Deformed type reinforcing bars with minimum yield strength, FY = 275 MPa (Grade 33)
2.4.2	Material	12mm X 6.0m Deformed Rebars, G.I. Tie Wire # 16
2.4.3	Typical Plan	Refer to Structural plans for details
2.5	Column L1	
2.5.1	Reinforcing Bars	Deformed type reinforcing bars with minimum yield strength, FY = 280 MPa (Grade 40)
2.5.2	Material	20mm X 6.0m Deformed Rebars (Grade40), 10mm X 6.0m Deformed Rebars (Grade33), G.I. Tie Wire # 18
2.5.3	Typical Plan	Refer to Structural plans for details
2.6	Column L2	
2.6.1	Reinforcing Bars	Deformed type reinforcing bars with minimum yield strength, FY = 280 MPa (Grade 40)
2.6.2	Material	20mm X 6.0m Deformed Rebars (Grade40), 10mm X 6.0m Deformed Rebars (Grade33), G.I. Tie Wire # 18
2.6.3	Typical Plan	Refer to Structural plans for details

2.7	Beam L2	
2.7.1	Reinforcing Bars	Deformed type reinforcing bars with minimum yield strength, FY = 280 MPa (Grade 40)
2.7.2	Material	20mm X 6.0m Deformed Rebars(Grade40), 16mm X 6.0m Deformed Rebars(Grade40), 10mm X 6.0m Deformed Rebars, G.I. Tie Wire # 16
2.7.3	Typical Plan	Refer to Structural plans for details
2.8	Roof Beam	
2.8.1	Reinforcing Bars	Deformed type reinforcing bars with minimum yield strength, FY = 280 MPa (Grade 40)
2.8.2	Material	16mm X 6.0m Deformed Rebars(Grade40), 12mm X 6.0m Deformed Rebars(Grade40), 10mm X 6.0m Deformed Rebars (Grade33),G.I. Tie Wire # 16
2.8.3	Typical Plan	Refer to Structural plans for details
2.9	Stair - L1 to L2	
2.9.1	Reinforcing Bars	Deformed type reinforcing bars with minimum yield strength, FY = 280 MPa (Grade 40)
2.9.2	Material	16mm X 6.0m Deformed Rebars (Grade40), 12mm X 6.0m Deformed Rebars (Grade40), 10mm X 6.0m Deformed Rebars (Grade33), G.I. Tie Wire # 18
2.9.3	Typical Plan	Refer to Structural plans for details
2.10	Canopy & Lintel Beam	
2.10.1	Reinforcing Bars	Deformed type reinforcing bars with minimum yield strength, FY = 280 MPa (Grade 40)
2.10.2	Material	12mm X 6.0m Deformed Rebars (Grade40), 10mm X 6.0m Deformed Rebars (Grade33), G.I. Tie Wire # 18
2.10.3	Typical Plan	Refer to Structural plans for details
3.0	Formworks & Shoring	
3.1	Formworks-Structural	
3.1.1	Material Specification	2" x 2" x 12' cocolumber, 2" x 3" x 12' cocolumber, 1/4" Plywood, Common Nail no. 1-1/2, 2-1/2, 4

IV MASONRY WORKS		
1.0	Masonry Wall/Plant Box/Septic Tank	
1.1	Concrete Mortar	4" & 6" Ordinary Concrete Hollow Blocks
1.1.1	Cement	Portland Cement (Type1) in 40kgs. Use one brand of cement all through-out acceptable to the Engineer -in-charge.
1.1.2	Sand	Washed Sand (S1). Uncoated granules, strong, durable, reasonably clean and free from organic matter
1.1.3	Mixture	Class A mortar mixture (1 : 2 ratio)
1.2	Reinforcing Bars	
1.2.1	Reinforcing Bars	Deformed type reinforcing bars with minimum yield strength, FY = 275 MPa (Grade 33)
1.2.2	Material	Deformed Steel Bar 10mm X 6.0m, G.I. Tie Wire # 16
1.2.3	Typical Plan	Refer to Structural plans for details
1.3	Plastering	1" (25.4mm) thick plastering. Maximum Compressive Strength = 4000 psi
1.3.1	Cement	Portland Cement (Type1) in 40kgs. Use one brand of cement all through-out acceptable to the Engineer -in-charge.
1.3.2	Sand	Washed Sand (S1). Uncoated granules, strong, durable, reasonably clean and free from organic matter
1.3.3	Mixture	Class A mortar mixture (1 : 2 ratio)

V STRUCTURAL STEEL		
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1.0	Roof Framing		
1.1	Framing		
1.1.1	Truss		Top and Bottom Chord 2-2"x2"x1/4" thick angle bar, Vertical and Web member 2-2"x2"x3/16", Gusset Plate 1.20m x 2.40m x 6mm thk, Base Plate 1.20m x 2.40m x 12mm thk
1.1.2	Frame		1"x 1"x3/16"x6m. Angle bar (Metal Fascia Frame), 16mm dia. Round Bars Cross Bracing, 20mmØ Turnbuckle
1.1.3	Purlins		2"x 4"x 20'x 1.5mm C-Purlins
1.1.4	Sagrod		Deformed Steel Bar 10mm X 6.0m
1.1.5	Consumables		Anchor Bolt 16mmØ x 50mm x 300mm Long w/ Nuts and Washer, Welding Rod, Rust Converter, Red Lead Paint, Paint thinner, Roller & Paint brush, #16 GI wire
VI THERMAL AND MOISTURE PROTECTION			
1.0	Roofing		0.5mm thick Twin Rib Type Prepainted Rib type roof long span, Oceanic Blue
1.1	Accessories		0.5mm thick Preformed Ridge Roll (Oceanic Blue)
1.2	Insulation		10mm thk Double Sided PE Foam
1.3	Consumable		2-1/2" tekscrews, 1/8" x 1/2" Blind Rivets, Sealant
VII DOORS AND WINDOWS			
1.0	Door		
1.1	Door 1		Heavy Duty Swing Glass Door 1/4" thick clear glass,with 1-3/4"x3"Aluminum Powder Coated Frame
1.2	Door 2		900mm x 2100mm, Painted KD solid wood panel door with 2"x5" KD hardwood door jamb
2.0	Door Accessories		
2.1	Lockset		Cylindrical Lockset
2.2	Hinge		4" Loose Pin Hinges (Solid), 3" Loose Pin Hinges (Flush door)
3.0	Door cornering		
3.1	Concrete Mortar		
3.1.1	Cement		Portland Cement (Type1) in 40kgs. Use one brand of cement all through-out acceptable to the Engineer -in-charge.
3.1.2	Sand		Washed Sand (S1). Uncoated granules, strong, durable, reasonably clean and free from organic matter
3.1.3	Mixture		Class A mortar mixture (1 : 2 ratio)
4.0	Window		
4.1	Glass		Sliding Glass Window 1/4" Clear glass panels w/ 2"x 4" Aluminum Powder Coated Frame
4.2	Dimension		Refer to Architectural Details
4.3	Location		Refer to Architectural Details
VIII FINISHES			
1.0	Floor Topping		
1.1	Floors		
1.1.2	Ground Floor		Smooth finish
1.1.3	Second Floor		Floor Tiles
2.0	Exterior Finishes		Painted plain cement finish
3.0	Interior Finishes		Painted plain cement finish
4.0	Carpentry Works		
4.1	Exterior Ceiling		Light Metal Frame, 0.60m offset from exterior wall

4.1.1	Wall Angle	25mm x 25mm x 0.4mm thick, 2.40m, Ga 26, wall angle fastened to wall
4.1.2	Double Furring	19mm x 50mm x 0.4mm thick, 5m, Ga 26, double furring at board terminations only
4.1.3	Carrying Channel	12mm x 38mm x 0.80mm thick, 5m, Ga 22 carrying channel with double furring clip (W-clip) to fasten carrying channel and double furring spaced at 1.20m O.C.
4.1.4	Single Furring	19mm x 25mm x 0.4mm, 5m, Ga 26 thick single furring spaced at 0.60m O.C.
4.1.5	Accessories	Double Furring Clips, Hardi Screws (6mm dia. X 3/4"), Blind Rivets (1/8" dia. X 1/2"), Fanhead Screws for Wall Angle to Furring Connection, Concrete Nail 1" for Wall Angle to Wall Connection
4.1.6	Sheeting	1/4" thick fiber cement board (4' x 8'). Allow 5mm gap in all terminations
4.2	Interior Ceiling	Light Metal Frame
4.2.1	Wall Angle	25mm x 25mm x 0.4mm thick, 2.40m, Ga 26, wall angle fastened to wall
4.2.2	Double Furring	19mm x 50mm x 0.4mm thick, 5m, Ga 26, double furring at board terminations only
4.2.3	Carrying Channel	12mm x 38mm x 0.80mm thick, 5m, Ga 22 carrying channel with double furring clip (W-clip) to fasten carrying channel and double furring spaced at 1.20m O.C.
4.2.4	Single Furring	19mm x 25mm x 0.4mm, 5m, Ga 26 thick single furring spaced at 0.60m O.C.
4.2.5	Accessories	Double Furring Clips, Hardi Screws (6mm dia. X 3/4"), Blind Rivets (1/8" dia. X 1/2"), Fanhead Screws for Wall Angle to Furring Connection, Concrete Nail 1" for Wall Angle to Wall Connection
4.2.6	Sheeting	1/4" thick fiber cement board (4' x 8'). Allow 5mm gap in all terminations
4.3	Ceiling Vents	Straight type ceiling vent with screen located at the
4.3.1	Material Specification	150mm width 1" x 1" (25mm x 25mm) wood KD vent slats spaced at 6.5mm (clear)
4.4	Stairs	
4.4.1	Handrail	25x75x1.5mm Rectangular Tubing, 50x150x1.5mm tubular
4.4.2	Railings	16mm Square Bar, 2"x1/4" Flat Bar
4.4.3	Consumables	Welding Rod
5.0	Painting Works	
5.1	Exterior Wall	Application of Concrete Neutralizer, 1 coat skimcoat (Primer), 2 coats gloss latex Use # 120 sandpaper
5.1.1	Color	White, w/ Tinting Color
5.2	Eaves and Ceiling Vent	Epoxy adhesive, 2 coats semi-Flat Wall Enamel Use # 120 sandpaper
5.2.1	Color	White, w/ Tinting Color
5.3	Interior Wall	Application of Concrete Neutralizer, 1 coat skimcoat (Primer), 2 coats semi-gloss latex Use # 120 sandpaper
5.3.1	Color	White, w/ Tinting Color
5.4	Interior & Exterior Ceiling	Application of Concrete Neutralizer, 1 coat skimcoat (Primer), 2 coats gloss latex Use # 120 sandpaper
5.4.1	Color	White, w/ Tinting Color

5.5 Handrail/Railings	Red oxide primer, 1 coat quick dry enamel paint Use # 120 sandpaper
5.5.1 Color	Black
5.6 Consumables	Paint brush 2", 3", Roller 6"
6.0 Tile Works	

6.1	Second Floor	16" x 16" (400mm x 400mm) textured floor tiles
6.1.1	Terminations	Grout Termination, shade depending on the choice of tiles
6.2	Comfort Room	16" x 16" (400mm x 400mm) textured floor tiles & glazed premium wall tiles
6.2.1	Waterproofing	2 coats Flexibond on flooring and 2 layers on wall tiles
6.2.2	Terminations	Grout Termination, shade depending on the choice of tiles
6.2.3	Layers	Refer to Architectural plan details
6.3	Counter	Granite 3/4", White or equivalent
IX ELECTRICAL		
1.0	Roughing Ins	
1.1	Circuit Breaker and Branch	Refer to Electrical details and design analysis
1.1.1	Breakers	Refer to Electrical details and design analysis
1.1.2	Ground	Copperclad Gound rod, Ground Rod Clamp
1.2	Conduits - Main Line	PVC Utility Box 2"x4", PVC Junction Box 4"x4", service entrance cap 1½" Ø
1.3	Conduits Powerline	PVC Rigid Conduit 3/4" x 3m, 3/4" Long Elbow
1.4	Conduits Lighting line	1/2" Polyflex, PVC Rigid Conduit 1/2" x 3m, 1/2" Long Elbow
1.5	Conduits - ACU	PVC Rigid Conduit 1/2" x 3m, 1/2" Long Elbow, 1/2" Long Elbow
1.6	Wiring Mainline	THHN wire #10 - 5.5 sqmm stranded
1.7	Wiring Powerline	THHN wire #12 - 3.5 sqmm stranded
1.8	Wiring Lightingline	THHN wire #14 - 2.0 sqmm stranded
1.9	Wiring Rough-ins	PVC Utility Box 2"x4", PVC Junction Box 4"x4", service entrance cap 1½" Ø
1.10	Cables Rough-in (Internet)	PVC Rigid Conduit 1/2" x 3m
2.0 Finishing		
2.1	Switches	Switch, Flush Type, "Wide series"
2.2	Outlets	Duplex Convinience Outlet, Flush Type "Wide series"
2.3	Fixtures	
2.3.1	Rooms & Lobby (1/F)	21 Watts T5 Fluorescent Lamp (Day Light)
2.3.2	Rooms & Lobby (2/F)	LED Circular Downlight 8"Ø, 20 Watts (Day Light)
2.3.3	Comfort Rooms	LED Circular Downlight 6"Ø, 15 Watts (Day Light)
2.3.4	Ceiling Eaves	Surface type Downlight 4"Ø,24W with housing (69400 white)
2.3.5	Ceiling Fan	56" Industrial Fan
X SANITARY		
1.0	Pipes and Fittings-Waterline	PPR- 1" x 3 meters, 1/2" x 3 meters, 1/2" Tee, 1/2" Threaded Elbow, 1/2" Plain Elbow, 1/2" Threaded Tee, 1/2" End Cap, Teflon Tape 1/2", Solvent Cement (400 cc), Male
2.0	Pipes and Fittings-Sanitaryline	4" X 3.00m PVC Orange pipe S-1000, 2" X 3.00m PVC Orange pipe S-1000, 2" X 3.00m PVC Orange pipe S-1000, PVC Orange Elbow, Wye, Tee, (Refer to Plumbing drawings for connections), PVC Orange Bushing Reducer 4" X 2", PVC Orange P-trap 2", PVC Orange clean out with 4" cap
3.0 Plumbing Fixtures		
3.1	Water Closet	Front round water closet with tank fitting, seat and cover, flexible hose, bidet hose, angle valve, soap & tissue holder.
3.2	Lavatory	50cmx45cm Ceramic White Rectangular Surface Mounted Sink

3.3	Foot Faucet	Plain Bibb Faucet (1/2" x 4") - Chrome
3.4	Floor Drain	4" x 4" (100mm x 100mm) Stainless floor drain
XI TESTING		
1.0	Materials Testing	Construction materials such as steel bars and concrete must be subjected to Tensile and Compressive strength respectively. If tests are conducted outside, certificate
2.0	Flood Test	of tiles. All fixtures must be tested prior to acceptance to ensure its functionality.
3.0	Leak Test	Water line must be tested prior to plastering and prior to the acceptance of the project to ensure that no leak will occur and to verify continuous flow of water along the line
4.0	Electrical Test	Electrical breakers and lines must be tested for its functionality.

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