University of Agriculture, Faisalabad

Tender No.94/2019

SPECIAL INSTRUCTIONS

i. No cutting, erasing is allowed in the Tender bid.
ii. Bid offered strictly in accordance with the bid document will only be accepted.
iii. Only typed bid will be accepted
iv. The bid should be hard bound
v. Call Deposit Receipt (CDR) will be preferred. However, any other bank instrument may also be accepted except Bank Guarantee. CDR including other instruments will be deposited in the University relevant account and in that eventuality, the release of the requisite amount would be made in shape of crossed cheque after deductions of necessary taxes and bank charges
vi. Sound financial position of the bidder (cash available equal to 50% of the quoted value as per bank statement) not earlier than the last week of the closing date of receipt of the tender or 5 time sales volume of quoted value as per Income tax returns of last financial year.
vii. Name of owner/proprietor
viii. Copy of CNIC
ix. Date of Establishment, Age of Firm
x. Copy of NTN and Sales Tax Registration
xi. Copy of Professional Tax
xii. Affidavit (Submission of undertaking on legal valid stamp paper (valuing Rs.100/-) that the firm not blacklisted by any of Provincial or Federal Government Department, Agency, Organization or autonomous body or private Sector Organization anywhere in Pakistan
xiii. **Amount of bid security**
2% of the Estimated Cost in shape of Call Deposit Receipt (CDR) in favour of Director (DPIC), UAF to be attached with the technical Bid. However, if attached with financial bid, please mention CDR No., Date and Bank Name

THIS IS FOR STRICT COMPLIANCE, FAILING WHICH THE RESPECTIVE BID SHALL STAND CANCELLED

UNIVERSITY OF AGRICULTURE, FAISALABAD
(TENDER NOTICE No.94/2019)

Sealed tenders are invited from Income Tax and Sales Tax registered firms on the basis of Two Stage (two envelop procedure) for supply/installation/commissioning of ***Air Conditioning (HVAC) System for New Library and ICT Block*** under development project titled "Establishment of I.T. and Library Infrastructure for new Disciplines of Food and Energy Engineering and Science at University of Agriculture, Faisalabad".

Date of Receiving and Opening 23.05.2019	**Receiving Time**	**10:30 a.m.**
	Opening Time	**11:00 a.m.**
	Bid Security	**2% of the Estimated Cost**
	Tender Fee	**Rs.500/-**

1. The bidding documents are available in the office of the Treasurer **(Tender Cell)** and the same may be obtained subject to the payment of the cost of the printing and provision of the document (tender Fee) as mentioned above to be deposited in the University Income Account (No.11-9/NBP, UAF Branch). The bidding documents can also be down loaded free of cost from the UAF website http://uaf.edu.pk/directorates/dpiv/dpiv_tenders.html

2. **The all interested bidders will submit the bids in the Tender Cell, 1st Floor Admn. Block Treasurer's Office, University of Agriculture, Faisalabad (UAF) as per scheduled mentioned above.**

UMAR SAEED
DIRECTOR (DPIC)
(For & On behalf of the Committee)
Phone#041-9200898, 9200161 **Extn.3503/3504/3505**
E.Mail: dpic@uaf.edu.pk
store_officer@uaf.edu.pk

Bidding Documents

Air Conditioning (HVAC)

of

New Library and ICT Block at University of Agriculture Faisalabad

Vol-I

FOR TECHNICAL RESPONSE:

Sr. #	Name	Contact Nos.
1.	Dr. Anjum Munir, Chairman, Department of Energy System Engineering	0300-9667687
2.	Mr. Tayyab Asif, Executive Engineer (Civil)	0300-5003585
3.	Mr. Sadat ul Islam, Executive Engineer (M)	0300-6603061

Terms of Reference (TOR)

Air Conditioning (HVAC) of New Library and ICT Block at University of Agriculture Faisalabad

1. INTRODUCTION:

This is a **Two Stage Two Envelope** (Technical & Financial Proposal) Contract. The contract shall be Fixed Price & Turn Key solution viz-a-viz design, supply, and installation, testing, commissioning, adjusting, and balancing of heating, ventilation and air conditioning (HVAC) system for the New Library and ICT Block at University of Agricultural Faisalabad at Faisalabad Campus.

2. SCOPE OF WORKS:

The entire facility has to be provided with air conditioning facility, providing cooling in summer and heating in winter, and fresh air shall also be introduced through fresh air ducted ceiling concealed units, and all the baths/Kitchens shall be mechanically ventilated. This contract shall also include all civil, electrical and ancillary works included in Financial Proposal. The design must be prepared by Mechanical Engineer registered with Pakistan Engineering Council (PEC). The lowest bidder will get the design vetted by a reputed HVAC Consulting firm having experience of at least 05 (five) works of similar nature alongwith 3-year experience. The Technical submittals, interim payment certificates, technical & financial evaluations will also be got approved by the Design Vetting firm (registered with PEC) through the employer and the cost incurred will be borne by the Contractor.

3. HVAC SYSTEM CONCEPT:

The entire building except Lecture Theater (ICT Building) shall be air-conditioned by Multi Split Air Conditioning system, using All DC Inverter Technology with Variable Refrigerant Flow system (with R410A refrigerant), and electronic expansion valves with indoor units provided with temperature indicator lights option. The ROOF TOP PACKAGE UNIT will be provided in the Lecture Theater (ICT Building) for HVAC System.

The system shall comprise of one or more outdoor units connected via inter-connecting refrigeration pipe work to multiple indoor units using branch pipe connecters (ref-net joints). The system shall be completed with all the necessary electronic controls and associated control wiring to maintain the space design conditions.

4. VENTILATION:

All toilets/Kitchens shall be provided with mechanical ventilation by means of propeller type or inline exhaust fans as required

5. DESIGN CONDITIONS

HVAC System shall be designed for the conditions listed hereunder. These conditions are being given for the information of the Contractor to enable him to perform specified tests and select the equipment under these conditions.

Summer outside Design Conditions

a) Summer Dry Bulb Temp: 45°C

Wet Bulb Temp: 28°C

HVAC system should be capable to work efficiently (with a proper dehumidification system) during summer peaks with a Dry Bulb Temperature of more than 45°C and up to Relative Humidity of 70% (which both account for heat index)

Inside Design Conditions

a) All air-conditioned areas 23°C +/- 2°C

50% + 10% RH

(No Humidifier Required)

6. MATERIALS:

All materials shall be of the highest grade, free from defects and imperfections, of recent manufacture and unused, and the classification and grades designated, conforming to the requirements of the latest issue of the appropriate specifications cited herein. All materials, supplies, and articles forming part of major equipment and not fabricated by the manufacturer of the equipment shall be the products of the recognized reputable manufacturers.

7. WORKMANSHIP:

Workmanship and general finish shall be of the highest grade, in accordance with the requirements specified herein, and the latest standard practice.

8. EQUIPMENT:

a. All equipment shall be manufactured by companies which have had at least ten years of previous experience in the design and manufacture of equipment of

comparable type, capacity and operating conditions, and shall have authorized distributer in Pakistan.

b. All equipment and materials supplied shall be from approved manufacturers who are adequately represented in Pakistan by an Agent/Partner capable of providing installation, commissioning and after sales service. All major equipment shall be imported directly from the manufacturers through their local agents. Import of this equipment through warehouses/Export Houses will not be accepted.

9. CHASES AND OPENINGS:

The contractor shall provide chases and openings where required and after installation all these opening shall be sealed and repaired to make as good as it was using same finishes.

10. PROTECTION:

During installation the contractor shall not damage any other services, if it is done, then it should be repaired as original and keep all pipes, duct and other openings closed to prevent entry of foreign matter. All fixtures, equipment and apparatus shall be covered and protected against dirt, water, chemical or mechanical damage,

11. CUTTING, PATCHING AND REPAIRING:

As present all the building civil, electrical and all other services are completed, therefore for the installation and completion of HVAC works will include masonry and concrete works and may require carpentry works, painting and re-painting, all these works shall be performed by skilled craftsmen in respective trades and contractor shall made all these works as good as new at his own expense and Contractor shall include the cost of these works in his bid and no additional payment shall be made for these works.

12. ACOUSTIC TREATMENT:

a. The noise criterion (NC) < 35 is to be obtained.

b. Sound measurements will be made at 5 feet above floor level in the area served and not more than 5 feet from the grilles, diffusers or other air devices being tested. Instruments for sound measurement shall be provided by the Contractor.

13. SAMPLES:

Contractor shall provide at his cost, samples of materials, instruments, gauges and electrical items, for approval by the Consultant through the employer before order is placed for the same. Consultant may waive this requirement, if detailed published catalogues submitted by the contractor provide sufficient information for approval. These samples shall include, but not limited to

a. Stainless Steel Sheet Metal
b. Duct Thermal Insulation
c. Refrigerant Piping
d. Condensate drain piping
e. Pipe insulations
f. Adhesives and tapes
g. Air devices
h. Pipe hangers trays and supports
i. Cables, Panels and accessories

14. APPROVAL OF MATERIAL AND EQUIPMENT:

The bidder shall provide Technical Submittals of all the equipment and material along with Technical Proposal, these technical submittals shall in triplicate and shall include all technical, engineering and performance data of all the equipment and material being offered, any incomplete information may cause the rejection of technical proposal.

15. TIME FOR COMPLETION:

The Project has to be completed within **90 days** after award of works and this include the import of equipment plant and machinery and local works has to be completed within this period. Contractor shall inform the progress of the shipment and notify them in advance, in writing, as to when the equipment will be ready for inspection at factory by the Client/Representative prior to shipment. All expanses for the pre-shipment inspection shall be borne by the contractor without any additional cost to the Employer.

16. STANDARDS AND CODE REQUIREMENTS:

All equipment and materials under HVAC Scope of works shall be furnished in conformity with the latest edition of applicable standards of ASME, ASHRAE, ARI, SMACNA, AMCA and applicable \Government and local Codes governing the same. In case of conflict, the strict requirements specified shall govern.

Following Codes and Standards will be applicable in the Contract are as under:

a. ASME – American Society of Mechanical Engineers.
b. ASTM – American Society for Testing & Materials.
c. ASHRAE – American Society of heating, Refrigeration and Air conditioning Engineers.
d. NFPA—National Fire Protection Association, USA
e. ARI - Air-conditioning and Refrigeration Institute, USA.
f. SMACNA — Sheet Metal and Air-conditioning Contractors National Association.
g. GOVERNMENT - Government of Pakistan
h. LOCAL-Local authorities of the city where the Project is located
i. AMCA — Air Moving and Control Association inc. USA
j. P.S. - Pakistan Standards.
k. B.S. - British Standards.

17. MANUFACTURER'S DATA:

Manufacturer's performance data, certified factory drawings and/or curves of apparatus giving full information as to capacity, performance at different operating and ambient conditions, dimensions, materials electrical data and all information pertinent to the adequacy of the submitted equipment shall be submitted for approval. One original and three copies of catalogues and other information shall be submitted.

Manufacturer's names, sizes, catalogue numbers and/or samples or all materials shall also be submitted for approval.

18. OUTDOOR CONDENSING UNITS:

The outdoor condensing units can be installed outside the building at Ground Floor and at Terraces at First Floor; the condensing units should not be visible from inside the building. Condensing units shall be installed on Reinforced concrete foundations,

and these foundations shall be capable to hold the weight of unit, approval of structure engineer shall be required for Terraces.

Condensing units shall be installed that no vibration shall be transferred to the building.

19. PERFORMANCE:

a. All DC Inverter VRF system shall have the following salient features:
b. The operating range for COOLING of the VRF system shall be from 0 C ~ 50°C;
c. The system should be capable to operate at 320V~460V voltage range
d. The indoor unit and outdoor unit of the system should have DC inverter motors to realize step less regulation.
e. The ODU condenser fin shall be painted with specialized anti-corrosion function;
f. The outdoor unit should have the option to be linked with a fire alarm signal so that unit can automatically turn off to avoid damage.
g. The operating priority sequence of the outdoor unit should be able to change without restart after cumulative operation of 12 hours to maximize the service life of the system.
h. The unit shall have key card control function as optional
i. The compulsory energy-saving mode shall be standard along with the system, which can limit the energy saving up to 20%;
j. The ODU can receive a power signal of electricity shortage, in case of not enough power for supplying the VRF operating, the power will only supply on priority to VIP IDUs with sufficient power, make sure the VIP rooms can be provided with air conditioning services
k. Condensing units shall have multiple compressors and all compressors shall be DC Inverter
l. All equipment indoor and outdoor units shall be from same manufacturer and should be compatible to each other.
m. The system should have the highest COP of the Refrigeration/HVAC system and shall be specified.
n. Psychrometric analyses should be presented both for the summer and winter conditions of UAF to justify the cooling load and dehumidification/ moisture removal rate.

20. INDOOR UNITS:

a. Following 02 types of indoor units could be installed
b. Cassette type for Heating and cooling purpose
c. Capacity and number of units will match the internal architectural
d. One, two or four way cassette air conditioners can be used
e. Cassette units with minimum height shall be preferred
f. Ducted ceiling concealed units for fresh air introduction
g. All indoor units shall be provided with electronic expansion valves

21. REFRIGERANT PIPING:

a. Refrigerant Piping shall be sized on manufacturer's software and shall be submitted to Consultant for approval
b. No refrigerant piping shall be visible inside the building, outside the building the piping shall run in galvanized iron trunking of minimum 16 gauge
c. For refrigerant copper piping K type copper tubes shall be used
d. All Ref-net joints shall be provided by manufacturer with insulation
e. All refrigerant pipes shall be insulated with closed cell high density foam insulation

Refrigerant piping insulation schedule shall be as follows:

a. Up to ½ in 15 mm outside diameter use 3/8 inch or 10 mm wall thickness
b. up to 3/4 in 20 mm outside diameter use 1/2inch or 15 mm wall thickness
c. up to 1 ½ in 40 mm outside diameter use 3/4 inch or 20 mm wall thickness
d. Above 1 ½ in 40 mm outside diameter use 1 inch or 25 mm wall thickness

22. CONDENSATE DRAIN PIPES:

a. Use D class PVC pipes
b. All condensate piping shall be insulated with closed cell high density foam insulation
c. Condensate drain piping shall be terminated to nearest drain point or outside the building
d. Refrigerant piping shall be provided with cleanable drain traps

23. ELECTRICAL WORKS:

a. For electrical works, power is available at one source outside the building, the bidder shall visit the site and acquire all information required
b. From this source contractor shall provide power to all HVAC equipment

c. A main Motor Control Center (MCC) shall be provided at some suitable place
d. All indoor and outdoor units shall be operated through Apparatus Control Panels (ACP) provided at different locations
e. All ACPs & MCC shall be provided with volt and Amp meter and phase indication lamps
f. All the equipment shall be provided with earthing
g. All wiring, panels, earthing are included in the bidders scope of work and no additional payment shall be made to bidder for these works
h. All electrical works shall be carried out in standard engineering practices
i. All electric panels, fixtures shall be approved by the Consultant and contractor shall provide test reports
j. All cables shall be from Pakistan Cables, Pioneer Cables, Fast Cables or Newage Cables

24. DUCTING WORKS:

a. All the duct works shall be carried out as per SMACNA standards
b. Air Devices
c. All air devices shall be conforming to Tuttle & Baily Standards or approved equivalent

25. DUCT INSULATION:

a. All conditioned air ducts shall be insulated with fiber glass insulation blanket, having reinforced aluminum foil, and minimum 24 kg/ cu meter density
b. All duct insulation shall be made according to AMACNA standards

26. HANGERS & SUPPORTS:

All hangers and supports shall be fully hot dipped galvanizes with non-aging rubber gaskets from one of the following manufacturers:

a. Sikla
b. Index
c. Hilti
d. Spit

27. ONE YEAR OPERATION & MAINTENANCE:

After the issuance of completion certificate, contractor shall operate & Maintain the entire HVAC system with his own manpower for a period of two year. The contractor

shall bound for a period of 02 years from the date of completion, if there is any fault or any part is damaged, to replace all the parts and make necessary repairs / maintenance to bring the equipment in its original condition without any additional cost to the Client.

Testing Commissioning Adjusting & Balancing Reports in triplicate shall be submitted to the Consultant for approval

28. PREPARATION OF TECHNICAL PROPOSAL:

The technical proposal should be accompanied with minimum following documents

a. Heat load calculations by qualified engineer
b. HVAC Layout drawings (Necessary Drawings uploaded with the tender)
c. HVAC equipment Installation and Constructional Details
d. Detailed Technical Specifications
e. Equipment installation Schedule
f. Equipment offer engineering data
g. Equipment offered performance catalogues
h. Detailed layout and sizing of electrical works
i. Detailed layout and sizing of refrigerant and condensate pipes
j. Details of 5-works alongwith Certificate of Satisfactory Completion from employer.

29. PREPARING OF FINANCIAL PROPOSAL:

All the bidders are advised to visit the site, before preparing Technical & Financial proposals to get the complete data and information

a. Client and Consultant may be contacted for any information required for this particular job.
b. The Financial proposal shall be opened only of those bidders who have qualified technically by the Technical Committee/Tender Committee.
c. The Contract shall be fixed price lump sum contract and the amount entered shall be considered as final and no additional payment shall be to the contractor
d. The Financial Proposal shall include all the works related to HVAC like civil works, preparation of concrete foundation, opening in walls structure, and making of the entire item as good as approved by the engineer/consultant and no additional payment shall be made for these works. The design must be prepared by Mechanical Engineer registered with Pakistan Engineering Council

(PEC). The lowest bidder will get the design vetted by a reputed HVAC Consulting firm having experience of similar nature of at least 05 (five) works. The Technical submittals, interim payment certificates, technical & financial evaluations will also be got approved by the Design Vetting firm (registered with PEC) through the employer and the cost incurred will be borne by the Contractor.

e. In all cases Financial Proposal shall be considered to have included all the items to be completed, complete in all respect to the entire satisfaction of Employer and Drawings and Conditions of the Contract.

f. All equipment proposed to be supplied shall be supported by suitable manufacturer's catalogue/literature technical submittals in triplicate, with the model selected with make, origin and performance data clearly marked for the approval of Consultant/Employer.

g. The Financial Proposal is to be prepared in conjunction with the Drawings, designs and Conditions of Contract.

h. Generally the following shall be deemed to be included in the prices submitted with all items herein:

I. All related civil & electrical works, labour and all cost in connection therewith, materials, goods including but not limited to, transportation to site, delivery, unloading, unpacking, returning packing, handling, hoisting to any height, lowering, octroi charges etc. All types of provincial, central taxes, duties etc. shall be included in the lumpsum Turnkey rates

II. Erection, dismantling and removal on completion contractor's site offices, stores, accommodation.

III. General and other requirements of Specifications & conditions of contract

IV. Installing, fitting and fixing goods and materials in positions.

V. Use of tools, plant and equipment.

VI. Waste of materials.

VII. All necessary cutting and repairing of civil works

VIII. All overheads and profits including Income Tax , Sales Tax and all other taxes and duties

IX. Testing & Pre-shipment Inspection and other miscellaneous Charges

i. If the Contractor does not perform any work in conformance to specification or contract documents. The Employer may deduct or stop the payment against substandard works.

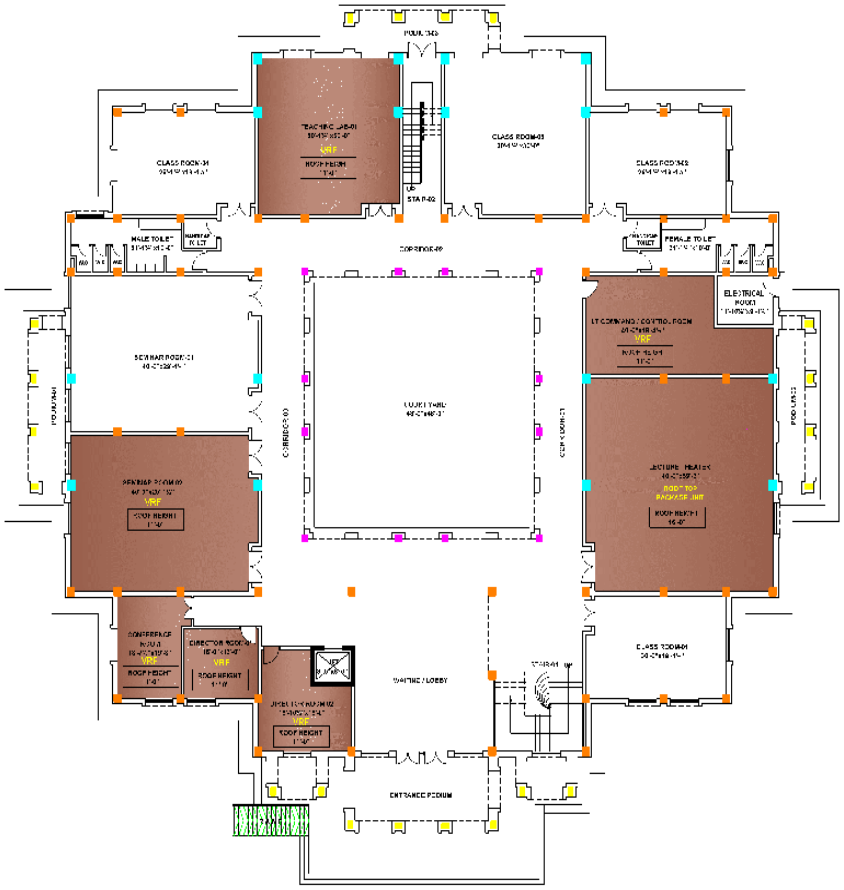
j. If Contractor fails to perform any work within specified time, the Employer has right to execute the same work on the Contractor's risk and cost.

30. EVALUATION OF TECHNICAL PROPOSALS:

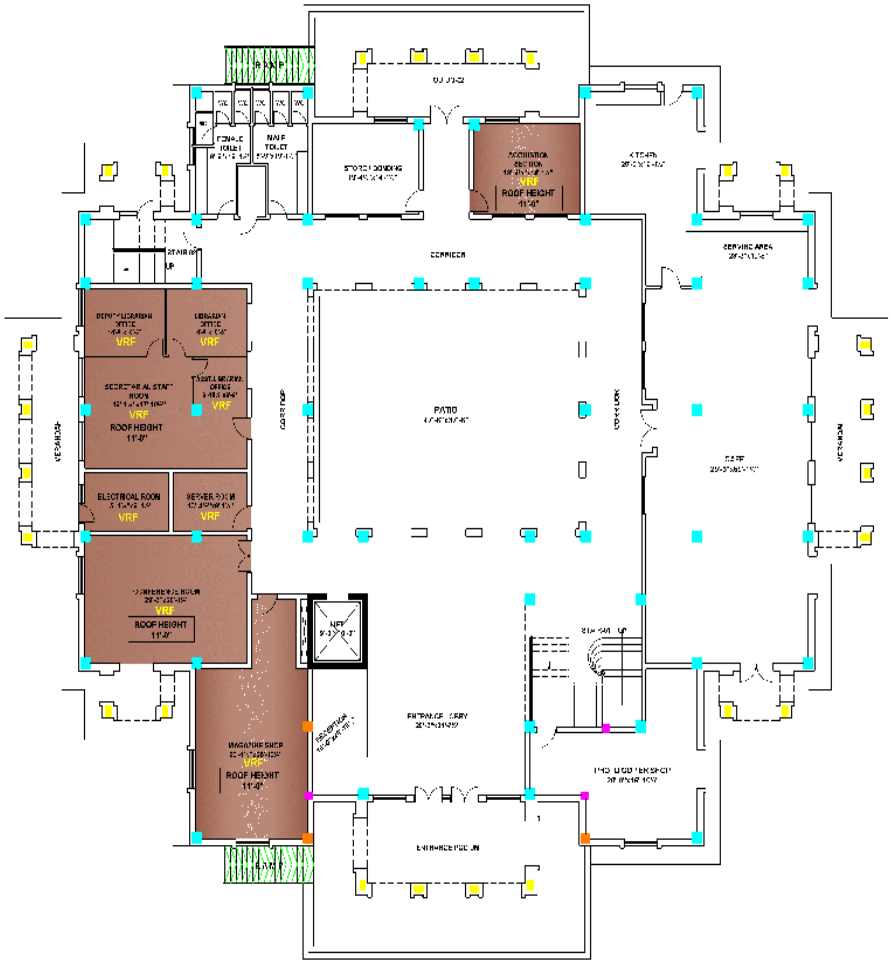
Technical Proposals submitted by the bidders shall be evaluated by the Consultant, Bidders not qualifying in technical proposals shall not be considered eligible for the works and their Financial Proposal shall be returned un-opened.

a. Heat Load Calculations & Documentation
b. Indoor Air Quality & Fresh Air Supply
c. Submission of Construction Drawings
d. Technical Submittals of Equipment & Material
e. Performance of system offered by Bidder (COP etc.)
f. Total Cooling Capacity of the System Offered

Note. <u>GENERAL CONDITIONS OF CONTRACT ALONGWITH SPECIAL STIPULATIONS ARE INTEGRAL PART OF THIS DOCUMENT.</u>



PLAN OF ICT BUILDING AT UAF :
(GROUND FLOOR)



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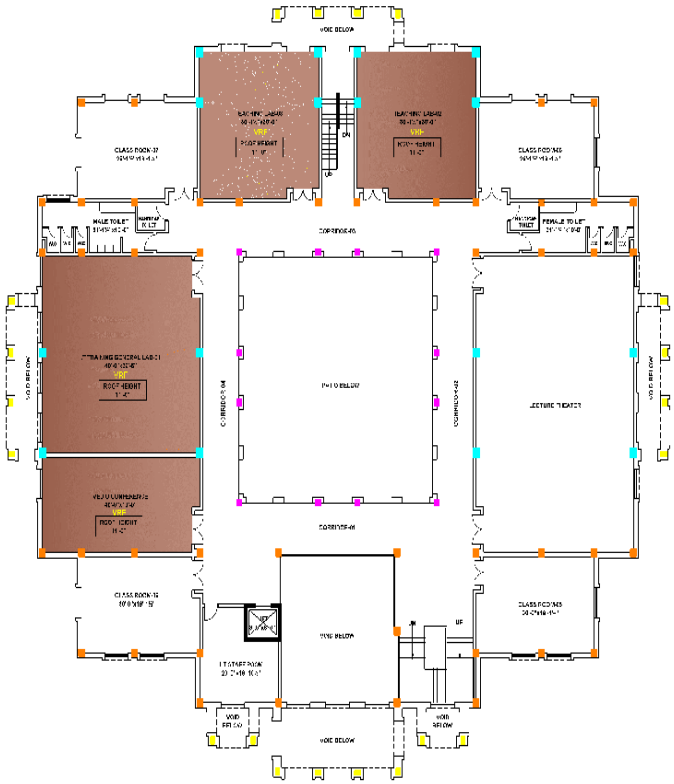
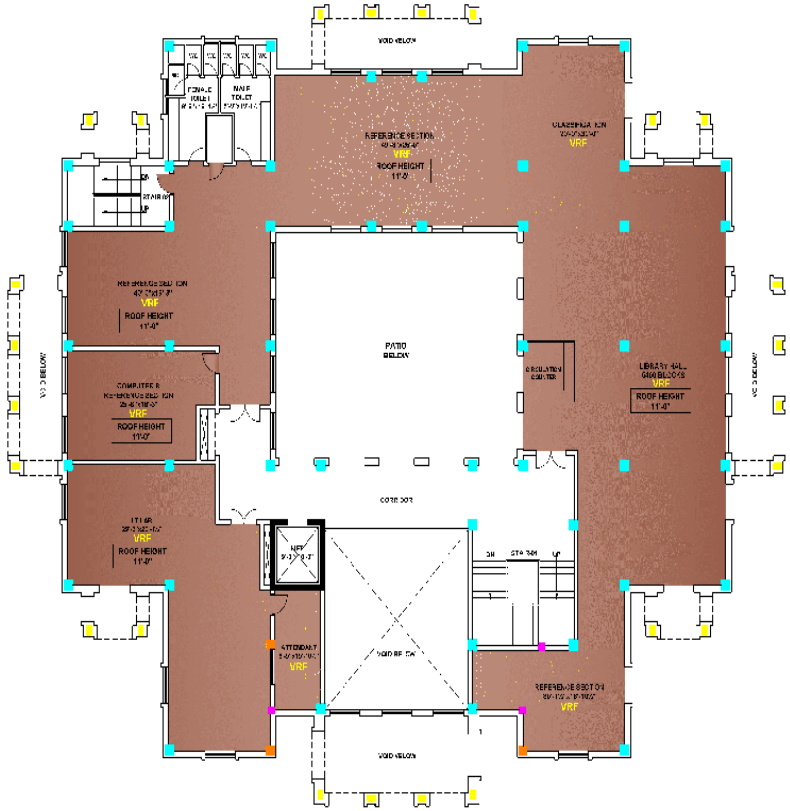
(GROUND FLOOR)



PLAN OF ICT BUILDING AT UAF :
(FIRST FLOOR)



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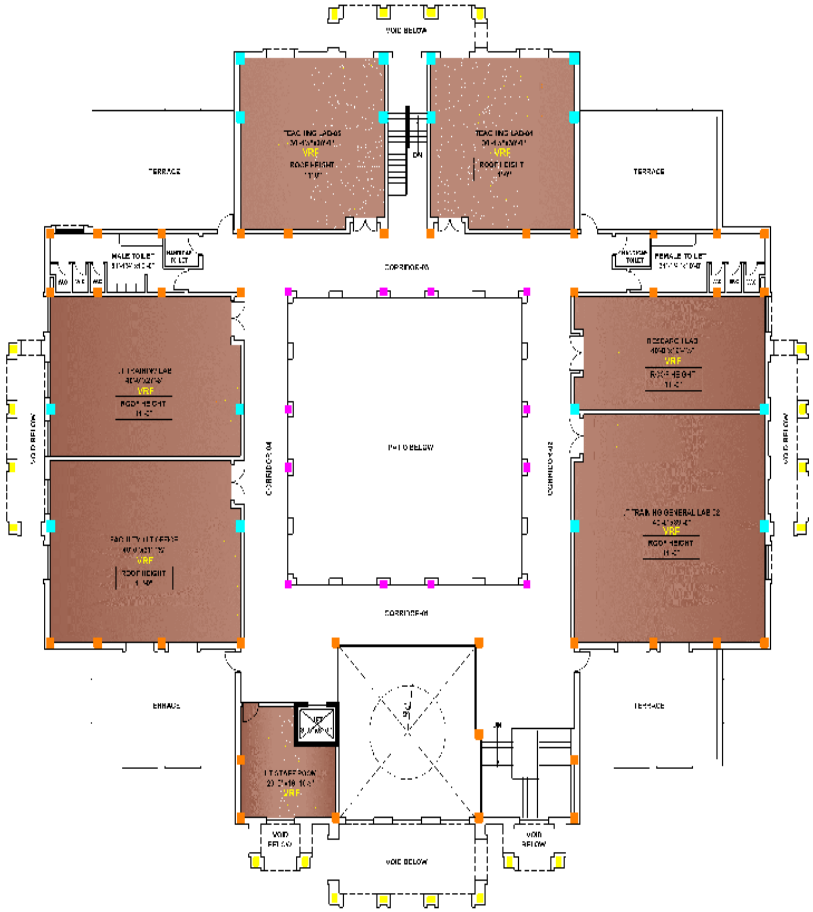
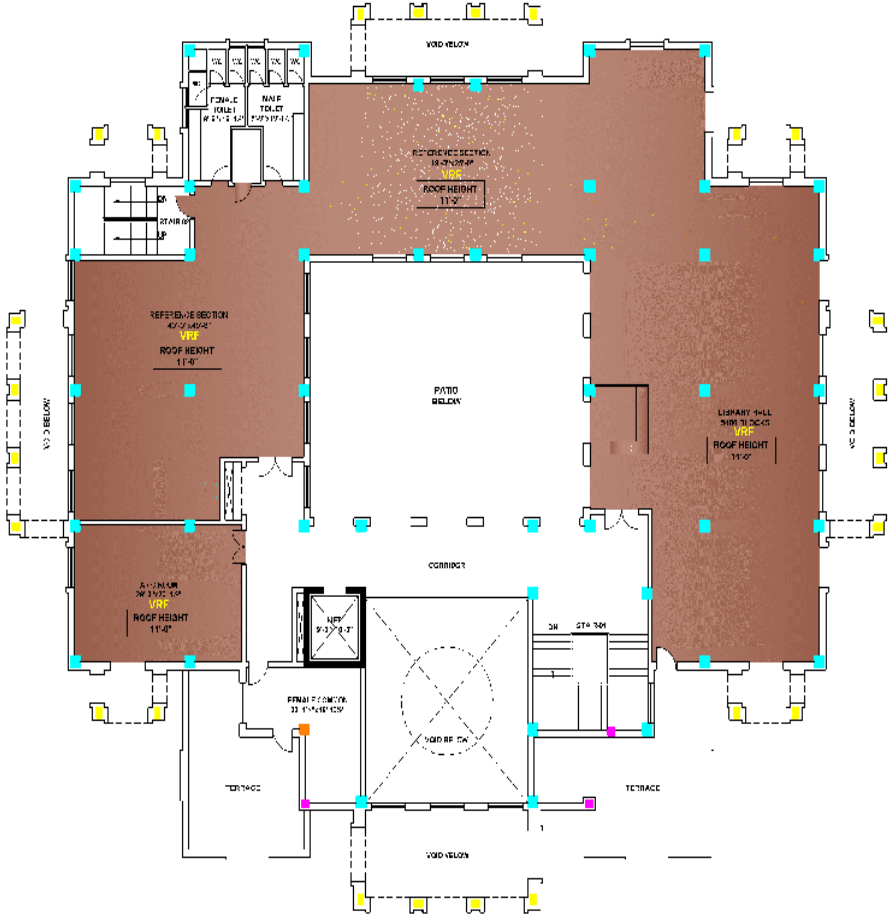


PLAN OF ICT BUILDING AT UAF :
(SECOND FLOOR)



PLAN OF LIBRARY BUILDING ICT AT UAF :
(SECOND FLOOR)