INTEGRATED AUDIO-VIDEO SYSTEMS AND EQUIPMENT

1. GENERAL

A. PROJECT SUMMARY
   a. This Project includes the Audio-Video equipment coordination and installation for the University of Nevada, Las Vegas 2017 Capital Improvement project. The scope under this project includes 34 classrooms and an auditorium within the (Alphabetical by acronym): Frank and Estella Beam Hall (BEH), Robert L. Bigelow Physics (BPB), Carol C. Harter Classroom Building Complex - Building A (CBC-A), Carol C. Harter Classroom Building Complex - Building C (CBC-C), William D. Carlson Education (CEB), Chemistry Building (CHE), Flora Dungan Humanities (FDH), Greenspun Hall (GUA), Lilly Fong Geoscience (LFG), Paul McDermott Physical Education Complex (MPE).
   b. The Audio-Visual Contractor (AVC) in receipt of this design specification and all contract documents acknowledges that they have reviewed the information contained herein and the information is sufficient to enable them to accurately bid the project and complete the work as described in the time allotted for the price agreed to with and accepted by the Owner. This includes all work, whether or not specifically described in the design specification package, which reasonably may be expected or required to present a complete installation that is both fully functional and in compliance with all applicable laws, codes, rules, and regulations applicable to this project.
   c. The scope of services provided by the AVC shall be the supply of Audio-Visual (A/V) Systems, including delivery, installation, and warranty services as specified. Potential Vendors shall provide pricing for the installation of Audio-Visual (A/V) multimedia systems in classrooms, and auditorium.

2. DEFINITIONS

A. The following definitions shall apply herein.
   a. The term ‘Owner’ or ‘UNLV’: University of Nevada, Las Vegas or Classroom Technology Services (CTS).
   b. The term ‘Project Manager’ (PM) or ‘General Contractor’ (GC): TBD
   c. The term ‘Electrical Contractor’ or ‘EC’: TBD
   d. The term ‘Architect’: NA
   e. The term ‘Consultant’: NA
   f. The term ‘P&C’ shall refer to UNLV Planning and Construction.
   g. The term Audio-Video Contractor or ‘AVC’: The successful bidder responsible for the complete installation of the audio-video-control systems specified herein
   h. The term ‘shall’ is mandatory; the term ‘will’ is informative; the term ‘may’ describes an option; the term ‘should’ is advisory; the term ‘provide’ means furnish and install.
   i. The term ‘by others’ shall refer to material and work that is related to this A/V sub contract and for which the AVC is not responsible except as otherwise detailed herein. Some or all of these items may be included in the overall Electrical Contract or GC’s scope.
   j. The term ‘OFE’ shall refer to Owner Furnished Equipment, which shall be provided by the Owner to the AVC. The AVC shall be responsible for installing and integrating this equipment as detailed herein.
   k. The term ‘NIC’ shall mean Not in Contract, which the Owner or other contractors may provide. The AVC shall be responsible for providing cabling, plates, and other infrastructure
as indicated on the drawings and herein so as to provide “plug and play” ready installation of all NIC equipment.

B. The basis for terminology used in this document is standard construction and sound & communications industries practices and that of IEEE/ANSI-100-1988.

3. DESIGN INTENT

A. The Owner’s goal is to upgrade the existing spaces containing analog A/V equipment to new digital A/V equipment following the Owner’s standards.

B. GENERAL: The audio, video, and control systems are outlined below:

a. VIDEO PROJECTION SYSTEMS: The projection aspect ratio shall be 16:10 for all standalone projectors and screens. Projection screens shall be operated via contact closure via the integrated control system with a backup switch located at the lectern or wall.

b. INTEGRATED CONTROL: The controller shall offer simple control of all applicable A/V equipment located within and adjacent to the venue.

c. NETWORK: The AVC shall be responsible for installation and cabling, and assist in troubleshooting of network switches for the audio, video and control systems within the lecterns. Owner will provide IP addressing upon receiving an itemized list including room number, device type, Ethernet port number and MAC addresses.

d. STRUCTURED CABLING: Ethernet, speaker, wireless microphone, mic/line audio and other specialty AV cabling to be provided and installed by AVC. Plenum cable to be used as required in all plenum spaces.

e. ASSISTED LISTENING: The classrooms shall include an XLR output for use of a portable integrated assisted listening system to meet ADA code.

C. LARGE CLASSROOMS AND AUDITORIUM: The general classroom systems are designed to provide the instructor with an expedient and dependable digital media system to effectively connect the students with the teaching media.

a. SOUND REINFORCEMENT AND PLAYBACK AUDIO SYSTEM:
   1. Classrooms shall include a sound reinforcement and playback audio system. The system shall consist of in-ceiling speakers, powered directly by the integrated control and AV switching system local to each classroom.
   2. Large classrooms shall include the functionality of classrooms plus speech reinforcement. Speech reinforcement consists of wired lectern microphones and wireless belt packs.

D. INTEGRATED CONTROL AND AV SYSTEM: Classrooms shall include Crestron control and A/V switching system. The system shall reside on the Owner’s network and be programmed for monitoring and control access through Crestron Fusion server. The system shall control all connected devices either via LAN or serial.
E. MEDIA SOURCES: Classrooms shall have the ability to accept several different media sources for display by the instructor.

A. Lectern Computer - an owner furnished PC shall be installed in the lectern. The AVC shall obtain the PC’s and shelf from the owner and provide security faceplate, listed on equipment list, for them. The AVC shall install the PC’s into the lecterns and provide all necessary connection cabling to the system as illustrated on the drawings.

B. Document Camera – The AVC shall supply and install a high-definition digital document camera for display of physical media.

C. Blu-ray Player – The AVC shall supply and install the specified Blu-ray player in the auditorium controlled by RS-232 commands.

D. VCR/DVD Player – An owner furnished VCR/DVD combo unit shall be installed in the lectern. The AVC shall install the VCR/DVD combo units into the lecterns and provide all necessary connection cabling to the system as illustrated on the drawings.

E. Auxiliary Inputs – The AVC shall supply and install a Crestron flip-top interface box in the top of the lectern to provide inputs for laptops or other portable devices. The inputs shall include HDMI, VGA, analog audio, and network connections.

4. WORK BY OTHERS

A. Conduits, cable pathways, connection boxes, pull boxes, junction boxes, combined services floor boxes and outlet boxes permanently installed in floors, walls, and ceilings.

B. All electrical breaker panels, motorized breaker panels, and power receptacles necessary to bring power to the audiovisual systems equipment racks and to devices in the project as indicated in the drawings.

C. Room lighting fixtures, dimmers, power receptacle outlets, and interconnecting wiring for these circuits.

D. Structural work, wall openings, platforms, railings, stairs, fire prevention and safety devices, rough and finished trim, painting and patching, drapes, carpets, floor coverings, computer floors, glazing, acoustical treatments, heating, ventilating, and air conditioning systems unless noted otherwise.

E. Providing network and power connections only.

F. Providing the pre-determined conduit and boxes inside the walls.

G. Responsible for removing and disposing of the lectern.

H. See Construction Documents for reference to items marked “Not in Contract” and/or “by others”.

5. SCOPE OF WORK

A. The Work detailed within the Contract Documents has been specified to meet certain requirements for performance, appearance, and costs. It shall be the responsibility of the AVC to implement the requirements contained in the Contract Documents and translate them into a
complete design package containing all elements necessary for a complete, operational, and functionally integrated Audio Visual System(s).

B. Provide materials, labor, and equipment including but not limited to:

a. General
   1. The delivery, unloading, setting in place, fastening to walls, floors, ceilings, counters, or other structures where required.
   2. All other work whether or not expressly specified herein and on the drawings to provide complete operational turnkey systems.

b. Projection Screens
   1. Removal of existing manual screens and brackets, as specified.
   2. Installation of motorized projection screens, as specified.
   3. Installation of control cabling to screens. Installation of new redundant switches on lectern, per Owner’s specification.

c. AV Rack and Lectern Racks
   1. Populate with all equipment shown in the drawings, BOM, and herein.
   2. Provide low voltage cable as per A/V drawings and interconnect system components and equipment.

d. Interconnect Cables
   1. Removal of existing cabling in conduit.
   2. Provide low voltage cable as per A/V drawings or as required.
      A. Existing low voltage AV cable is in a shared conduit with UNLV network cabling, do not remove and leave in place undamaged.
   3. All interconnection cable, connectors, terminal strips, conduits, cable pathways, flexible conduit, raceways, etc. to facilitate the A/V systems as detailed in the drawings and herein.

e. Lectern
   1. Installation of lectern equipment, not mounted in rack space, on the lectern in Owner specified location.
      A. Cable cubby
      B. Touch panel
      C. Document camera
      D. Lectern computer monitor, mouse, and keyboard

f. Projector & Mount
   1. Installation of projector, mount, and scaler, as specified.
   2. Relocate AC duplex in adjacent ceiling tile to full-tile false ceiling adapter, as specified.

g. Speakers
   1. Removal of existing speakers, as specified.
   2. Installation of new speakers, in specified locations.

h. Floor Boxes
1. Remove existing interconnect panels, if required.
2. Install new interconnect panels, if required.
   i. The AVC is to work in coordinate all aspect of A/V installation with the CTS staff.

2. RESPONSIBILITIES OF OWNER
   
   A. Owner will supply the following documentation attached to this document.
      a. A/V Line Drawing on general classroom configurations
         1. BEH, BPB, CBC-A, CBC-C, CEB, CHE, FDH, GUA, LFG, MPE
      b. Rack Elevation Drawings
      c. Wire Label Schedule
      d. Approved Equipment List
      e. Furniture drawing from UNLV preferred vendor
   
   B. UNLV CTS assumes limited responsibilities in the implementation effort, including:
      a. Providing the AVC with access to buildings
      b. Providing a Project Manager as the main project contact for the AVC provider team.
      c. Facilitating interactions with other trades and/or vendors to promote information
         exchanges and/or activities required for the installation, implementation, and operation.
      d. Responsible for removing the current lectern populated equipment.

3. PERFORMANCE REQUIREMENTS
   
   A. The AVC shall study the drawings and familiarize themselves with the Work of the entire project
      scope.
   
   B. The AVC shall be responsible for the correct placing of the work of this section, equipment to fit
      into the structure as built, and attachment of equipment to the work of all other trades and
      Owner furnished equipment and facilities.
   
   C. Install all equipment to industry safety and ergonomic standards and provide full engineering
      and technical support throughout the installation process.
   
   D. The functional interconnections of the audio, video, and control systems shall comply with the
      manufacturer’s system installation guidelines, industry standard practices, and as specified
      herein.
   
   E. It shall be the responsibility of the AVC to coordinate with those performing related work and to
      interface other systems with the Work of this section. The AVC shall ensure that the work by
      others shall integrate properly with the Work of this section and that all such work collectively
      complies with all requirements as specified herein
      a. Coordination shall include providing timely submittal and field coordination of mounting
         requirements, dimensions, and any other information required by other trades.
      b. Maintain constant communications with all designated personnel of the CM and attend all
         construction meetings as requested by the CM.
   
   F. The AVC shall generate all shop drawings and information for the complete installation and
      wiring of the system. The AVC shall provide pre-printed wire labels numerically organized for
      signal type and cable count according to the engineering documentation & shop drawings.
   
   G. The AVC shall be responsible for the comprehensive adjustment of the systems as specified
      herein and shall provide all test equipment for the system checkout and acceptance tests.
      Adjust and balance all circuits as specified herein. Set all controls and software parameters to
render fully and optimally operating systems and subsystems. All computer controlled functions shall require complete audio/computer/software setup, balancing, label-entry and documentation.

H. Verify with all manufacturers and/or suppliers’ availability and cost of all material and equipment proposed, including all material and equipment specified herein. No cost increases shall be allowed for manufacturers’ cost increases, or for substitutions required because of unavailability of proposed equipment.

I. The AVC shall be responsible for ensuring that it is fully aware of the expectation of the contract documents as well as the location and condition of the work site, any specific conditions and limitations of the Site, and any other influences that may affect the work as outlined in the design specification.

J. Claims for additional time or additional compensation as a result of The AVC’s failure to familiarize itself with all local conditions and the contract documents will not be accepted or approved.

K. The AVC is to provide all labor, materials, transportation and equipment to complete the installation, furnishing, assembly, set up, and testing of the audio, video, and integrated control systems work indicated on the associated “AV” drawings and specified herein. Notwithstanding any detailed information in this section, provide complete, working equipment. Contractor will provide all materials and assemblies and other such work that is required, whether or not specifically mentioned in these specifications. All equipment shall be completely installed with all the necessary interconnection and wiring to provide fully functioning systems.

L. The AVC is to coordinate with GC/EC for all conduits inclusive of junction boxes and pull-wires. Where not included under the EC scope of supply, AVC to supply and install required conduit and/or cable routing.

M. The AVC shall coordinate with the Owner’s lectern supplier to provide the proper cutout for the touch panel. For the retrofit of existing lecterns, a custom bezel, approved by the Owner, shall be provided by the AVC for mounting the new touch panels.

N. The AVC shall coordinate with the Owner’s lectern supplier to provide the proper cutout for the flip-top.

O. DISCREPANCIES

a. Where there is a discrepancy between drawings and documents, the AVC shall seek clarification and approval from owner. The AVC shall consider all the information in combination and not consider one element alone to meet a minimum requirement. These specifications and the drawings do not necessarily indicate every single component part of each system. It is the responsibility of the AVC to engineer each system and its interconnection in order to provide, furnish, and install completely operational turnkey systems. No error or omission herein or on any related Construction Documents shall relieve the AVC from this responsibility to do so.

4. SUBMITTALS

A. NO OWNER OR END USER SHALL SIGN OFF ON ANY SYSTEM OR SUBMIT FINAL PAYMENT TO THE AV CONTRACTOR IF THESE ITEMS HAVE NOT BEEN DELIVERED.

B. INVENTORY LIST AND DOCUMENTATION

a. The AVC shall submit a spreadsheet listing the location, brand and model, description, serial number, firmware version, MAC address, and Ethernet ports to be connected to of all network equipment.
b. The AVC shall provide custom DSP and Control System programming source code (un-compiled) and compiled versions.

C. AS-BUILT DRAWINGS
   a. After substantial completion of the project, the AVC shall submit marked-up As-Designed drawings as the As-Built drawings. All changes to the As-Designed system shall be indicated on these drawings.

D. SUBSTITUTIONS
   a. Requests for substitutions or deviations shall include the following:
      1. Descriptions of the total foreseeable effect of the substitution or deviation upon the design of the project and agreement to be directly responsible for any resultant extra costs, whether the costs are incurred by the AVC or other contractors.
      2. Upon request, furnish samples (at no additional cost) to Owner of submitted items proposed as substitutes for specified items. Products will be reviewed to determine if proposed substitute items meet required function and quality.

E. INSTALLATION PROGRESS
   a. Provide Work Progress schedules keyed to personnel, vendors, and tasks as specified herein and provide updates as requested by the Owner.

5. QUALITY ASSURANCE

A. CONTRACTOR QUALIFICATIONS
   a. The AVC shall meet the minimum requirements identified herein. The AVC shall have had at least ten (10) years of experience in the programming, fabrication, assembly, and installation of the audiovisual presentation, conferencing and remote control systems of comparable size, magnitude and quality in regards to coordinating, engineering, testing, certifying, supervising, training and documentation as specified for the subject job and shall submit documentation to this effect with the bid return.
   b. The AVC shall be an authorized dealer of the necessary manufacturers, in good standing. The manufacturers' warranty shall be authorized to be transferred to the Owner upon commissioning of the system.
   c. The AVC’s Audiovisual Technicians assigned to the system shall be trained, qualified, and certified by the respective original equipment manufacturers on the engineering installation, operation and testing of the systems. The AVC shall provide formal written evidence of current original equipment manufacturer’s certification(s) for the installer(s) as a part of their submittal before being allowed to commence work on the system. At least one (1) Crestron CTI certified programmer and one (1) DigitalMedia Certified Engineer (DMC-E) shall be assigned to oversee the installation of the system.
   d. The AVC’s Audio Visual Technicians assigned to the systems shall be trained, qualified, and carry valid and current industry certifications regarding the engineering, installation, operation and testing of audiovisual technologies. At least one (1) each CTS shall be assigned to oversee the complete installation of the system. The AVC shall provide formal written evidence of current industry certifications for the installer(s) dedicated to this project as part of their submittal before being allowed to commence work on the system.
   e. The AVC must have a Biamp Tesira Certification onsite.
f. The AVC shall maintain permanent fabrication, service and support facilities within Clark County, Nevada.

B. REFERENCES
a. Furnish no less than three (3) references for installations of similar size and scope, performed throughout the United States within the past eighteen (18) months. At a minimum, reference information will include the reference company or institute name, contact person’s name and title with telephone and fax numbers, address and detailed project description, and contact information of the organization that is responsible for the day-to-day operation of the audiovisual installation.

C. QUALITY OF MATERIALS AND EQUIPMENT
a. All materials and equipment supplied by the AVC shall be new and shall meet or exceed the latest published specification of the manufacturer in all respects.
b. The AVC shall supply, at a minimum, the latest model, available at the time of bidding, of each piece of equipment.
c. The materials and completed Work of this Section shall conform to the applicable requirements of all current local and state codes, and of the following reference codes:
   1. Occupational Safety and Health Act of 1970 and all amendments thereto
   2. National Electrical Code, ANSI C1, as amended by all state and local codes
   3. Uniform Building Code
   4. All Authorities Having Jurisdiction (AHJ)

6. DELIVERY, STORAGE, AND HANDLING

A. Deliver equipment in manufacturer's original undamaged packages or in bulk packing, which provides equivalent protection.
B. Store packaged equipment off ground or slab in manner to protect them from elements, especially moisture damage.
C. As no storage is available by the Owner, AVC must be flexible with multiple equipment delivery locations and times.
D. Timely delivery and installation of material required for the Work of this Section is the responsibility of the AVC. The AVC shall determine equipment lead times prior to developing a construction schedule, and shall be held responsible for all delays associated with both the specified and alternate materials, and for the timely submittal of proposals, submittal items, drawings, and other information in order to expedite the Work and to avoid delays.
E. Costs of all shipping to the site, and of all storage requirements shall be borne by the AVC. It shall be the responsibility of the AVC to make appropriate arrangements, and to coordinate with authorized personnel at the site, for the proper acceptance.
F. During the installation, and up to the date of final acceptance, the AVC shall be under obligation to protect his finished and unfinished work against damage and loss. In the event of such damage or loss, he shall replace or repair such work at no cost to the Owner.

7. COORDINATION

A. GENERAL
a. The proposed work is to be accomplished in an existing occupied building, the AVC shall make every effort to keep noise levels to a minimum. In cases where extreme or disruptive
noise levels are expected, coordinate with the Owner for convenient times for that work. The AVC should thoroughly examine the scope of work to anticipate excessive noise level periods and should prepare his proposals accordingly if after hours work is required.

B. JOB SITE SUPERVISION
   a. The AVC shall provide a working project superintendent to oversee the work of their employees and subcontractors.

C. SPECIFIC SITE CONDITIONS
   a. The construction work should be performed during normal job-site work hours. The AVC shall be required to coordinate all construction activity to eliminate impact on traffic and normal operations of existing tenants. Owner will make best effort to make spaces available during class schedules, however, night or weekend work may be required. Delays and stoppages – any delays or stoppages shall not affect the scheduled completion date unless approved by Owner.
   b. The AVC shall be responsible to survey all areas to locate poke-thrus, furniture openings, sleeves, conduits, cable trays, conduit stub-ups, back boxes and pull boxes provided by others for the A/V cabling.
   c. The AVC shall be responsible for verifying on-site conditions during the mandatory site walk of all systems, equipment and conditions that directly or indirectly affect the AVC’s scope of work to include, but not limited to:
      1. Walls painted
      2. Carpet or other floor covering installed
      3. All power and conduit installed as per project drawings and schedules
   d. All A/V devices installed by the EC or GC such as projection screens, screen low voltage control interfaces, A/V back boxes, A/V floor boxes, room lighting A/V interfaces
   e. All A/V related CATV, data, ISDN, T-1, IP, voice and analog lines
   f. All A/V related furniture installed such as lecterns, credenzas, board/conference tables, closets and other millwork designed to house A/V equipment
   g. All obstructions hidden by ceiling
   h. The AVC shall be responsible for protection of his work from all environmental conditions. Any delivery schedules affected by environmental conditions shall be noted to the CM not less than 72 hours prior to the day of scheduled delivery with just cause documented in writing.
   i. The AVC shall meet all local, state, and federal building and fire codes.
   j. The AVC shall coordinate the finish required for all fixtures, plates, panels, grilles, and enclosures supplied as part of this specification section with the Owner. The AVC shall supply finish samples as requested.
   k. The AVC shall be responsible for coordination with the Millworker for any A/V items to be built or mounted into millwork.
   l. It shall be the responsibility of the AVC to cooperate at all times with all contractors doing work on the project, to the end that lost time, work stoppages, interference, and inefficiencies do not occur.
   m. Perform field surveys to determine existing cabling and mechanical conditions. Verify existing as built documents and conditions including cable labeling and ensure new documentation and installation cabling is coordinated and appropriately labeled.
   n. Project Meetings
1. It shall be the responsibility of the AVC to supply any necessary requested information and have its project supervisor in attendance at all project meetings in order to coordinate with all related trades.

8. EQUIPMENT

A. MAJOR EQUIPMENT
   a. All equipment and material shall be new and of the latest model offered by the manufacturer.
   b. Material and equipment specified herein have been selected as the basis of acceptable quality and performance and have been coordinated to function as components of the specified systems. Where a particular material, device, piece of equipment or system is specified, the current manufacturer’s specification for the same shall be considered to be a part of these specifications, as if completely contained herein in every detail. Each material, device or piece of equipment provided hereunder shall comply with all of the manufacturer’s published specifications for that item.
   c. The audiovisual equipment specified consists of all major equipment for the project. The AVC shall integrate all components and provide any additional components, wiring, or accessories required to complete a functional system.
   d. The manufacturer specifications shall be considered as minimum performance levels of acceptance. These characteristics are part of a design as a whole and particularly the Owner’s designs are in full coordination with these characteristics.
   e. Small Parts - Systems are described in terms of major products. Even if not specifically mentioned, provide and install patch cables, connectors, hardware, converters, power supplies, labels, terminals, mounting accessories etc. necessary for complete and working system meeting design intent of specifications.

9. OWNER FURNISHED EQUIPMENT
   A. The Owner reserves the right to furnish any materials necessary for the project.
   B. Some equipment provided will be legacy equipment from the current room AV System.
   C. For items of equipment which are to be installed but not purchased as part of the Work, the Work shall include:
      a. Coordination of delivery
      b. Safe handling and field storage up to the time of permanent placement in the project
      c. Correction of any damage to the item(s) by the AVC
      d. Mounting in place and connection(s) as specified

10. SUBSTITUTIONS
    A. Model numbers and manufacturers included in this specification are listed as a standard of quality, complexity, and capabilities due to the current enterprise system in place at UNLV.
    B. Proposals for equipment from other manufacturers shall be considered subject to approval by the owner. Unless approved by the Owner, the AVC shall not supply or install any equipment not specified herein.
    C. AVC shall submit full technical data sheets, and any necessary system drawings to demonstrate how the proposed equipment would be used in the system to meet the specification. Substitution requests must be received no later than one week prior to the bid date. Any requests received after that date shall not be accepted.
D. Bidding AVC shall be responsible for all costs associated with submission, review, and approval process for substitutions as well as any item of equipment or hardware not specifically shown on the drawings or specified herein that is required for proper system operation or installation. In the case of a conflict between specified equipment, the AVC shall notify the Owner of the conflict specifics and include proposed modifications to resolve the conflict. The Owner will review the proposal and determine what course of action will be necessary to achieve a resolution.
   a. When a specific piece of equipment specified has been discontinued and/or replaced by a new model, substitution will be acceptable only when the Owner has approved submission of complete data on the new model or substitute.
   b. Subject to the functional and minimum performance requirements for each item, the Owner may require independent laboratory tests proving equivalence of certain alternative equipment not fully or adequately described by the technical specification of the manufacturer. Any and all costs arising from equivalency testing shall solely and completely be the responsibility of the AVC.
E. The Owner reserves the right to accept or refuse any product substitution without justification.

10. EXECUTION
A. GENERAL
   a. Any item of equipment or hardware not specifically shown on the drawings or specified herein that is required for proper system operation or installation, shall be furnished and installed and be of the highest quality available.
   b. The performance of all equipment must meet the most recently published manufacturer’s data sheet.

11. EQUIPMENT LAYOUT
A. The equipment layout and locations shall be as detailed herein and in the A/V drawings and architectural layouts.

12. FABRICATION AND INSTALLATION
A. GENERAL
   a. All installation practices shall be in accordance with, but not limited to, these specifications and drawings. Installation shall be performed in accordance with the applicable standards, requirements, and recommendations of authorities having jurisdiction.
   b. Installation of the system in a manner that will comply with BiCSi, ICIA and routing of all audio, video and control cabling elements of the final design in a subtle, unobtrusive manner to maintain the architectural and visual integrity of the building.
   c. If, in the opinion of the AVC, an installation practice is desired or required, which is contrary to these specifications or drawings, a written request for modification shall be made to the owner. Modifications shall not commence without written approval from the owner.
   d. The AVC must take such precautions as are necessary to guard against electromagnetic and electrostatic hum, to supply adequate ventilation, and to install the equipment so as to provide maximum safety to the operator.
   e. Care shall be taken during installation to prevent chips, scratches, dents, and other cosmetic damage to the product. It shall continue to be the AVC responsibility to protect all material.
from damage and/or theft once installed prior to Owner’s acceptance and handover. Any damaged products must be repaired or replaced prior to installation.

f. To insure a proper finished appearance, the AVC shall furnish and install trim/escutcheon components at all conditions where A/V components pass through the finished ceilings. This would include but not be limited to video projector supports, flat-panel display supports and any other component which is not specifically supplied with integral flanges/trim components; i.e. speaker mounts, assistance listening devices, etc.

g. All trim components at the ceiling plane shall be finished to match the approved ACT ceiling grid system components. The AVC should obtain a sample from the Owner, including any custom color information, or standard color numbers.

h. Dimension Verification - Verify dimensions and space requirements to assure that proper mounting, clearance, and maintenance access space is available for system components.

i. Clean-Up - Leave project clean each day. Place debris where designated by Owner. Debris includes but not limited to: solder splatter, cable ends, stripped insulation, spent crimp connectors, gypsum board and ceiling tile dust, and product wrappings and cartons. After completion of installation, thoroughly clean areas worked, including non-visible areas such as equipment rack interiors, rack top panels, and inside lockable floor and wall boxes.

B. MOUNTING

a. All mounting and attachment methods shall follow industry approved and recommended practices and shall be designed for applicable static and dynamic loads. Double sided adhesive tape is not considered to be permanent mounting solution.

b. Mounting - Mount equipment and enclosures plumb and square. Ensure that permanently installed equipment is firmly and safely held in place. Design equipment supports to support loads imposed with project safety factor of five (5) or greater.

c. Separate safety cable shall be provided for all overhead items (lights, loudspeakers, video projectors, etc.) Safety cables shall attach directly to the suspended device and a structural member capable of supporting the load. Safety cables and their fittings shall be designed to withstand impact loads in any direction and shall permit replacement of the device without damaging the safety cable or attachment fittings.

d. Threaded Connections
   1. All nuts and bolts used together shall be matched in grade and shall conform to U.S. Standard (ANSI, ASTM, and SAE).
   2. All load-bearing fasteners shall employ a nylock locking system that can be verified by visual inspection. Split washers, star washers and any thread-damaging nuts, as well as double nuts are not acceptable.

C. EQUIPMENT RACKS

a. All specified equipment listed must be mounted into equipment racks.

b. Provide unused rack space with blank or ventilating panels.

c. All equipment shall be rack mounted and/or permanently attached. All power supplies, rack mounts, interconnects, brackets, etc., shall be included while they may not be specifically called out herein. See attached rack elevation drawing.

d. Any equipment with front-panel controls that are not required for daily use shall be furnished with protective covers or programmatically locked out to prevent unwanted or inadvertent tampering. Supply and install security covers on any electronics with front panel controls that should not need to be adjusted after initial set-up, per UNLV specification.

e. If decorative equipment fascia interferes with flush mounting of security covers:
Fascia shall be removed, if possible
2. If removal is not possible, custom method to affix security cover to be approved by Owner.

f. UNLV will provide Bryce security bits and Bryce security screws to secure rack components.
   1. One (1) security screw per piece of rack-mounted hardware in the bottom right corner.
   2. Standard Mid-Atlantic rack screws for blank panels and vents

g. Ventilation and Cooling:
   1. AV equipment racks are to be fitted within air-conditioned spaces in order that component’s operating temperatures do not exceed manufacturers’ recommendations.
   2. If rack is not located within technical space, proper furniture with adequate ventilation will be supplied to architectural design.

h. Rack screws shall be tightened to a maximum torque of 24 in/lbs.
i. Rack screws shall be used in all available screw holes, except as otherwise noted.
j. Equipment mounted on shelves shall have ‘L’ brackets preventing equipment rearward motion.
k. Equipment mounted on shelves shall have a security bar to prevent motion.
l. Cable ties shall be hook and loop type fasteners with minimal 1” overlap around cables.
m. Excess signal cabling shall be looped at source device.

D. WIRING AND CABLE HARNESSSES
   a. All shielded cables shall be insulated. Shields shall not contact conduit, raceways, boxes, panels, or equipment enclosures.
   b. Service loops shall be maintained in or adjacent to all enclosures, termination cabinets, racks, and junction boxes. Service loops shall not be excessive in length causing undue crowding in cable raceways. Cables shall be neatly harnessed and dressed with Owner approved hook and loop ties with the appropriate amount to allow for future expansion.
   c. All cables shall be harnessed according to professional practices and to prevent mechanical stress on electrical connections. No cable shall be supported by a connection point.
   d. All wire and cable shall be continuous and splice free for the entire length of run between designated connections or terminations.
   e. Care shall be exercised in wiring so as to avoid damage to the cables and to the equipment. Do not exceed cable manufacturer’s pull-force or bend radius recommendations
   f. Individual cables shall exit the harness at the same elevation as the equipment to which the cables terminate.
   g. Serial data interfaces shall be wired using appropriate cable with an overall shield. These cables shall be terminated with an appropriate connector that plug directly into the serially controlled device.
   h. Microphone and AC power shall by not less than 4”.
   i. Cables running in plenum spaces without conduit shall be plenum rated cable. Cables running in areas exposed to environmental factors such as, but not limited to, UV, chemicals, direct burial, etc. shall be rated for such exposure and shall match the performance characteristics of its equivalent cable as specified.
   j. All wire bundles are to be neat and combed free of cable crossovers.
   k. As a general practice, all power cables, control cables, and high level cables shall be run on the left side of an equipment rack as viewed from the rear. All other cables shall be run on the right side of an equipment rack, as viewed from the rear.
   l. Cables ties shall be placed at appropriate intervals of no greater than six inches for vertical bundles, two inches for horizontal bundles.
m. All vertical cable bundles shall be attached to the rack frame.

n. Except where noted otherwise in the specifications, NO BARE WIRE TERMINATIONS WILL BE ACCEPTED. Heat-shrink tubing shall be used to insulate the ground or drain wire.
o. Unused wires at the end of a cable shall remain unstripped and shall be laid back and held in place with wire ties.
p. When connection stranded wire to compression screw terminals, do not tin the wire ends. When inserting wires into a compression terminal, take proper care to insert only the stripped portion of the cable.

q. Connections made with screw actuated pressure type terminal strips shall be made by stripping approximately 1/4 inch of insulation from the stranded conductor. Then the un-tinned wire shall be inserted into the terminal and the screw tightened using a secure fitting precision screwdriver.
r. All cable ties shall be cut flush with the boot so as not to cut into adjacent cabling or scratch personnel servicing racks.
s. Auxiliary cables shall have a minimum 36” length of cable extending though the cable flip top box.
t. Auxiliary cables shall have an unobstructed path behind the cable flip top box to extend and retract cables.

E. TERMINATION ENCLOSURES (FLOOR BOXES)
a. All cables intended for connection to wall, floor, or ceiling mounted panels shall terminate in the appropriately rated termination enclosure (floor box). Termination of wires and cable, without an appropriately rated enclosure, will be considered to be defective, and will require replacement.
b. All wiring connections shall be secured so they cannot work loose under normal vibration conditions.
c. The AVC shall field verify all back box installation conditions on site.
d. Clean floor boxes of all dust and debris prior to installation of any active or connector plate.

F. TERMINATIONS
a. Proper termination tools and practices shall be used during the termination process. Crimping shall be performed per the connector manufacturer’s instructions.
b. No terminations shall have stress from cable weight or cable bending.
c. Polarity (Audio) shall comply as follows:
   1. The "high" side will be connected to “Pin 2” on XLR connectors
   2. The "low" side will be connected to “Pin 3” on XLR connectors
   3. Microphones will be wired so that an acoustic compression at the diaphragm produces a positive going signal on “Pin 2” with respect to “Pin 3”.
      A. Speakers will be wired so that when a positive going signal is applied to the + or red terminal an acoustic compression is produced.
      B. The system will be wired to maintain absolute polarity through all system components to ensure that a positive signal on “Pin 2” or tip produces a positive signal at the + or red speaker terminal.

d. Shield grounding for audio shall comply with the following to eliminate any possibility of ground loops:
   1. Do not tie pin 1 to the case of XLR connectors anywhere
   2. All audio low-level signal lines will be balanced and floating
3. Should any other situation arise which would form a ground loop, please inform the owner for direction.

G. ELECTRICAL
   a. All AV equipment racks shall have pre-wired AC power distribution strips that conform to an approved testing laboratory specifications.
   b. All power supplies shall be located, oriented, and connected electrically so as to minimize hum and RFI interference. Further, all plug-in type power supplies shall be firmly attached using mechanical fasteners to its associated power receptacle to insure against accidental removal and/or connection loss.
   c. All joints and connections shall be made with rosin-core electrical solder or with mechanical connectors and insulated with heat-shrink on each conductor as approved by the Owner.
   d. Excess power cabling for devices shall be looped at power source, with the exception of service loop at device.

H. LABELING
   a. Cable labeling shall abide by INFOCOMM International Standard (F501.01:2015).
   b. Cable labeling shall follow cable schedules in A/V drawings.

13. CUSTOM SOFTWARE AND PROGRAMMING

A. It is required that the AVC be experienced in programming systems with this complexity. Due to the nature of this project, the Owner will be providing the necessary compiled Crestron program. However, the AVC shall be experienced in the necessary manufacturers’ tools to configure, deploy, and troubleshoot the specified equipment and code. By submitting this bid, the AVC agrees that they understand systems of this type and that all programming services are included to the satisfaction of the Owner.

B. The AVC agrees that they will not make any claim for additional monies because of misinterpretation of programming requirements.

C. The AVC shall provide and install the seamless integration of the management software via the University’s computer network to all of the classrooms, meeting rooms and auditoriums specified within this RFP. The AVC shall work directly with the UNLV CTS Department to implement this function.

14. COMMISSIONING

A. The primary purpose of the official Commission process is to provide the AVC and Owner the opportunity to fully test and inspect the installation practices and functionality of all systems. The AVC is to demonstrate to the Owner in each room the operational functionality.

15. WARRANTY

A. The system warranty shall be for twelve (12) months from the date of final acceptance and be inclusive of all necessary parts and labor. AVC to provide all equipment, material, and labor required to uphold a full system warranty at no charge to the Owner. All manufacturers’ equipment warranties shall be activated in the Owner’s name and shall commence on the date of final acceptance. In the case of any equipment that has been modified from the factory
conditions where the manufacturer’s warranty has been voided, AVC to provide the Owner with a warranty equivalent to that of the original manufacturer.

B. AVC to respond with an on-site technician within 24-hours of a service call (including Saturdays and Sundays) for all equipment and system failures that occur during the warranty period. AVC to provide name(s) and telephone number(s) of service personnel to be contacted regarding repair and maintenance.

C. There shall be no cost to the Owner for maintenance performed during the warranty period beyond the fixed cost of the contracts. AVC to replace or repair, at no cost to the Owner, any failed equipment hardware or software installations required to provide full system operations.

D. To maintain certain manufacturer’s warranties, said equipment must be installed, aligned and serviced by those installers authorized by said manufacturer to perform those duties. If the contractor is not authorized, by said manufacturer, it is his sole responsibility to make the appropriate arrangements and bear all cost and consequences thereof.

END OF SECTION