

University of Connecticut

Classroom Design Standards

Applicable to New Classrooms

Please note: These standards are directly applicable to new classrooms and lecture halls. The audiovisual equipment standards are also applicable to renovations for existing classrooms. However, because existing rooms have their own environment and physical constraints, they become goals that will be modified by found conditions.

Additionally, the Classroom Committee is developing standards for a TECHNOLOGY READY (TR) classroom. This room will provide faculty with a wide range of media capabilities, but rely on portable devices (laptop computers, VCR's, etc) for media input. This may present a less expensive option for multiplying high tech capabilities.

This document is still in draft, please contact George Kraus, 860-486-3236 or george.Kraus@uconn.edu for any recommendations.

General Guidelines Need for Guidelines on 300-500 seat classrooms

- Classrooms shall be constructed with adequate important especially for rooms with sound systems, and 2 classrooms that are back to back. This may preclude having divider to open a room up sound isolation from adjacent classrooms and corridors. This is especially important when plenum return air schemes are used.
- Classrooms shall be located on the lower floors to minimize the amount of traffic that uses elevators or stairways.
- Classrooms shall be designed to maximize the seating capacity.
- As much as possible, the designer should avoid the placement of structural columns within the seating area.
- Ceiling height should be a minimum of 9'. The larger the room, the higher the ceiling should be.
- The height of the projected image should be no less than $(1/6^{\text{th}}$ the distance) good of the farthest student from the projection screen.
- The design professional shall consult with ACNS on the choice of floor coverings and the color scheme used within the classrooms.
- A high-density plastic chair rail shall be placed on the side walls surrounding the seating area.
- Dry-erase marker boards: Marker boards should contain a marker tray and 1-1/2" continuous tack strip at the top. Mount tray 36" AFF to the tray. The dry-erase board should cover as much of the front wall as practical. Avoid placing fire-alarm enunciators in conflict with the dry-erase board.
- Projection screens mounted above the marker board must clear the board's marker (chalk) tray. Typically, provide 6"-8" clear from the face of the marker board to the back of the screen. The projection screen in its lowered position must not cover light switches and outlets.
- Ceiling-mounted or wall-mounted projection screens should not conflict with the lighting fixtures or access to lighting fixtures for changing lamps.
- Instructor consoles should be located so as not to obscure the students' sight line of the projection screen(s) and marker board(s).
- All classrooms with permanently installed multimedia equipment shall be connected to a security system In order to keep room(s) secure it is important to have adequate air flow, and possibly control of climate to avoid users opening windows and leaving them open. The security system shall include a card access reader; 1 accessible seat per 40 students. Some guidelines like this may be useful at the main entry door, door security contacts on each door and motion sensors in the room. Corridor walls (or common walls with other unsecured rooms) shall run from floor to underside of structure above. Special consideration should be given to wall or partition construction above the ceiling lines on the corridor side of the room.
- If windows are provided in the classroom, provide window shade system typically

2" aluminum blinds to darken room.

- All rooms should have pencil sharpeners.
- All high-tech controls should be easily accessible by instructor while lecturing so adjustments, equipment-switching, etc., can be seamless.
- Non-large rooms, low-ceilinged (i.e. Family Studies 025): if the screen and image is large then the front row/s of students obscure the image.
- Whiteboards should be strategically placed in all classrooms where all students can read them.
- Program-controlled Distance Learning facilities in large rooms – broad/narrowcast out locations.
- Consider location of equipment for left-handers in terms of ease of use.

Class I Classroom: Up to 49 students, electronically equipped Hi-tech, non-tiered

Area and Affiliated Spaces

- Classroom Area: Min. 20 (NSF) = Normal Square Foot /Student, max. 24 NSF/Student
- Number of Accessible Seating Spaces: One
- Lectern Area: Included with student area
- Electronic Equipment Room: None

Furnishings and Equipment No “Barrier” (i.e. tables) separating instructor from students if possible)

- Seating: Standard student desks with fixed arm tablets.
- Accessible Seating: Desks and loose chair for accessibility-impaired students: One station
- Instructional Furniture and Equipment:
 - Portable stand-up lectern
 - Table top desk and chair
 - Marker Board: 4' ht. X 16' length (typical)
 - Projection Screen: Electric, vinyl screen, 84"W x 84"H; recessed mounting not required, mounted on front wall of classroom. Switch is to be located adjacent to the instructor console.
 - LCD Projector: A ceiling-suspended LCD projector bracket centered on the projection screen and located between 12'-0" and 18'-0" from the center of the bracket to the face of the projection screen, depending on the size of the projected image.
 - Instructor console, approximately 30"(d) x 66"(w) x 37"(h), containing a computer, VCR, DVD player, video switching equipment, amplifier, laptop interfaces, and document camera. The instructor console shall be located with approximately 3'-6" clear distance between the front wall and the rear face of the instructor console. Countertop space for laptop
- Audio Equipment

1. Speakers: Sound Advance CT8BST
 2. Ceiling mounts for above Sound Advance TBS8-10
 3. AMPS: Toa A700 series w/racks ears
 4. MICS: Audio Technical AT831R with 25' extension
- Video Equipment
 1. VCR: Samsung SV-5000W with rack mounts
 2. Document Camera: Samsung SDP-900
 3. Power Conditioner, Surgex SX1115RT
 4. Projector, Mitsubishi LD X25U
 5. Mount for above projector, Chief RPA 025
 6. Switcher/Router Extron Crosspoint ???HVA
 7. Video DA. Extron CDVA 6 EQMX
 8. RGBHV DA Extron ADA4 300HV
 9. DVD Player Phillips Pro175
 10. AMX AXB-TPI Touch Screen control AXB-TPI/4
 11. AMX 15" VTM-D15
 12. AMX Volume control, NXC-Vol 4
 13. AMX Single Card Cage NXS-MHS
 14. AMX Netlinx Integrated Controller NI 4000
 15. AMX Video Card AXB-TP4-VID
 16. AMX Graphics card AXB-TP4-RGB
 17. AMX Power supply: AMX PSN6.5
 18. AMX UPC-20 Screen Controller
 19. Somphy up, stop, down switch to use with UPC-20
 20. AMX Axlink Bus Strip ABS
 21. Cable Turner Contemporary Research RS 232 controlled
 - Audio Video Equipment
 1. Projector Cart: Luxor TL-OH-38
 2. Overhead Projector: EIKI 3990BP
 3. Screen: Draper Signature series 5 size depending on image size needed for furthest viewable location.
 - Teaching station – Harris AV1 Series

Architectural Features

- Room Shape: traditional rectilinear, 2:3 ratio oriented to instructional area at front of room.
- Ceiling Height: Min. 9 feet; 10 feet preferred.
- Doors: Min. one, with narrow door light, located in the back of the room.
- Floors: Vinyl tile, carpet preferred

- Walls: Light color, min. 85% reflectivity.
- Ceilings: 2 x 2 acoustical panels and grid, white.
- Additional Acoustical Treatment: As required.

Lighting

- Recessed 2 x 4 fluorescent, parabolic, prefer (dimming) a must ballast.
- Lighting shall be controlled at the room's entrances and adjacent to the instructor console. Lighting shall be such that no one location can lock out the other nor change the preset controls of the dimming system.
- There shall be (two dimming zones) all lights or light groups (zones) should be dimmable NONE should be only all-on vs. all-off – Zone 1 for the front row of light fixtures, and Zone 2 for the remaining light fixtures. Dimming controls shall be located near the instructor console. Dimmer controls shall be by "Lutron Electronics Company."
- General lighting (full on / full off) shall be located at the Classroom entrance.
- If lighting is not dimmable (must be dimmable), then "inboard/outboard" switching should be used, and row of lights at front of room should be switched separately.
- To illuminate the whiteboard, we prefer a parallel row of 2 x 4 fluorescent fixtures, with acrylic lenses, running the length of the whiteboard. This row shall be separately switched.

If windows, must have BLACK-OUT curtains or equivalent

Power Outlets

- Quadraplex adjacent to each communications outlet, standard duplex receptacles other walls.

Special Equipment Power Requirements

- LCD Projector Power: A duplex receptacle shall be provided above ceiling (in the vicinity of the projector bracket) for the LCD projector. The receptacle should be circuited on the same circuit as the power for the instructor console (must be on same phase).
- Provide one quad power receptacle on the wall beside the instructor console.
- Provide three quad power receptacles in the instructor console.

Audio system w/jacks for laptops; Vol control via dial (or other) potentiometer that is easily accessible while lecturing (i.e., not in a cabinet)

Data/Communications Outlets and Infrastructure

- One RJ45 outlet at front and rear walls.
- One RJ45 data outlet with 4 data circuits shall be provided inside the instructor

console.

- Provide one RJ45 data outlet above ceiling at LCD projector location.

Room Security

- In addition to keyed lever latch sets and closers, provide card access system (low voltage) entry to the selected main entry door. All doors accessing the room shall have door security contacts wired to the security system. Provide wall and/or ceiling mounted motion sensors in the room.

Example of Satisfactory Classroom(s) on Campus

CUE116 CUE 318, Castleman 201

Class I Classroom: Up to 49 students, electronically equipped Tech-ready, non-tiered

Area and Affiliated Spaces

- Classroom Area: Min. 20 (NSF) = Normal Square Foot /Student, max. 24 NSF/Student
- Number of Accessible Seating Spaces: One
- Lectern Area: Included with student area
- Electronic Equipment Room: None

Furnishings and Equipment No “Barrier” (i.e. tables) separating instructor from students if possible)

- Seating: Standard student desks with fixed arm tablets.
- Accessible Seating: Desks and loose chair for accessibility-impaired students:
One station
- Instructional Furniture and Equipment:
- Portable stand-up lectern
- Table top desk and chair
- Marker Board: 4' ht. X 16' length (typical)
- Projection Screen: Electric, vinyl screen, 70"W x 70"H; Draper Signature series 5, recessed mounting when capable, mounted on front wall of classroom. Switch is to be located adjacent to the instructor console.
- LCD Projector: A ceiling-suspended LCD projector bracket centered on the projection screen and located between 12'-0" and 18'-0" from the center of the bracket to the face of the projection screen, depending on the size of the projected image.
- Instructor console, None
- AV wall plate mounted on side wall closest to instructor console with inputs for female computer connection (VGA), computer audio connection (female mini), video connection (female BNC) and 2 audio connections (female RCA) for stereo audio.

- AV touch panel mounted on side wall closest to instructor console with password access to control room lighting, ceiling mounted electric screen, audio volume and ceiling mounted LCD projector.

- Audio Equipment

1. Speakers: 2 Sound Advance CT10BST
2. Ceiling mounts for above Sound Advance TBS8-10
3. Ceiling Speaker Back Can Sound Advance PBB8-10
4. AMPS: TOA BG 130
5. Line level aux modules Peavey

- Video Equipment

1. Projector, Mitsubishi LVP-XL25U
2. Mount for above projector, Chief RPA 025
3. AMX UPC-20 Screen Controller
4. Somphy up, stop, down switch to use with UPC-20
5. AMX NI-700 system controller
6. AMX CP4/A touch panel
7. AMX CB-CP4/A back box
8. AMX Volume control, NXC-Vol 4
9. AMX Single Card Cage NXS-MHS
10. AMX PS6.2 power supply
11. AMX AXB-REL8 relay controller
12. Extron AAP 102 black wall plate
13. Video/audio input module Extron CVEQ1 AAP black
14. Computer input module Extron Extender with VGA-QXGA line driver with audio
15. SurgeX Power conditioner SA966 1 each
16. Equipment Wall unit; Middle Atlantic TOR-2-20RP 1 each

Architectural Features

- Room Shape: traditional rectilinear, 2:3 ratio oriented to instructional area at front of room.
- Ceiling Height: Min. 9 feet; 10 feet preferred.
- Doors: Min. one, with narrow door light, located in the back of the room.
- Floors: Vinyl tile, carpet preferred
- Walls: Light color, min. 85% reflectivity.
- Ceilings: 2 x 2 acoustical panels and grid, white.
- Additional Acoustical Treatment: As required.

Lighting

- Recessed 2 x 4 fluorescent, parabolic, prefer (dimming) a must ballast.
- Lighting shall be controlled at the room's entrances and adjacent to the instructor console. Lighting shall be such that no one location can lock out the other nor change the preset controls of the dimming system.
- There shall be (two dimming zones) all lights or light groups (zones) should be dimmable NONE should be only all-on vs. all-off – Zone 1 for the front row of light fixtures, and Zone 2 for the remaining light fixtures. Dimming controls shall be located near the instructor console. Dimmer controls shall be by "Lutron Electronics Company."
- General lighting (full on / full off) shall be located at the Classroom entrance.
- If lighting is not dimmable (must be dimmable), then "inboard/outboard" switching should be used, and row of lights at front of room should be switched separately.
- To illuminate the whiteboard, we prefer a parallel row of 2 x 4 fluorescent fixtures, with acrylic lenses, running the length of the whiteboard. This row shall be separately switched.

If windows, must have BLACK-OUT curtains or equivalent

Power Outlets

- Quadraplex adjacent to each communications outlet, standard duplex receptacles other walls.

Special Equipment Power Requirements

- LCD Projector Power: A duplex receptacle shall be provided above ceiling (in the vicinity of the projector bracket) for the LCD projector. The receptacle should be circuited on the same circuit as the power for the instructor console (must be on same phase).
- Provide one quad power receptacle on the wall beside the instructor console.
- Provide three quad power receptacles in the instructor console.

Audio system w/jacks for laptops; Vol control via dial (or other) potentiometer that is easily accessible while lecturing (i.e., not in a cabinet)

Data/Communications Outlets and Infrastructure

- One RJ45 outlet at front and rear walls.(near Instructor location)
- One RJ45 data outlet with 3 data circuits shall be provided in equipment cabinet.
- Provide one RJ45 data outlet above ceiling at LCD projector location.

Room Security

- In addition to keyed lever latch sets and closers, provide card access system (low voltage) entry to the selected main entry door. All doors accessing the room shall have door security contacts wired to the security system. Provide wall and/or ceiling mounted motion sensors in the room.

Example of Satisfactory Classroom(s) on Campus

None as of yet.

Class II Classroom: 50 to 99 students, electronically equipped, (non-tiered) all comments for Class I rooms apply here. For this size (and up) sloped or stadium seating is preferable Area and Affiliated Spaces

- Classroom Area: Min. 20 NSF/Student, max. 24 NSF/Student
- Number of Accessible Seating Spaces: 4
- Lectern Area: Included with student area
- Electronic Equipment Room: None

Furnishings and Equipment

- Seating: Standard student desks with fixed arm tablets. For larger rooms, tables and chairs may be considered, along with fixed seating (see specifications for Class III classrooms)
- Accessible Seating: Desks and loose chairs for accessibility-impaired students: Four stations
- Instructional Furniture and Equipment:
 - Portable stand-up lectern
 - Table top desk and chair
 - Marker Board: 4' ht. X 24' length (typical)
 - Projection Screen: Electric, vinyl screen, 84"W x 84"H; recessed mounting not required, mounted on front wall of classroom. Switch is to be located adjacent to the instructor console. For the larger rooms, an electric screen measuring up to 9' x 12', with recessed mounting, should be considered.
- LCD Projector: A ceiling-suspended LCD projector bracket centered on the projection screen and located between 12'-0" and 18'-0" from the center of the bracket to the face of the projection screen, depending on the size of the projected image. Instructor console, approximately 30"(d) x 66"(w) x 37"(h), containing a computer, VCR, DVD player, video switching equipment, (amplifier/laptop interfaces, and document camera. The instructor console shall be located with approximately 3'-6" clear distance between the front wall and the rear face of the instructor console. Speakers (mounted within 2x2 ceiling grid)

Audio Equipment

1. Speakers: Sound Advance CT8BST
2. Ceiling mount for above Sound Advance TBS8-10
3. AMPS: Toa Mixer amp A700 series
4. MICS: Audio Technical AT831R with 25' extension

Video Equipment

1. VCR: Samsung SC-5000W with rack mount
2. Document Camera: Samsung SDP-900
3. Power Conditioner, Surgex SX1115RT
4. Projector, Mitsubishi LD X25U
5. Mount for above projector Chief RPA 025
6. Switcher/Router Extron Crosspoint - HVA
7. Video DA Extron CDVA 6 EQMX
8. RGBHV DA Extron ADA4 300 HV
9. DVD Player Panasonic Philips Pro 175
10. AMX AXB-TPI Touch Screen control AXB-TPI/3
11. AMX 15" VTM-D15
12. AMX Volume control, NXC-Vol 4
13. AMX Single Card Cage NXS-MHS
14. AMX Netlinx Integrated Controller NI 4000
15. AMX Video card AXB-TP3-VID
16. AMX Graphics card AXB-TP3-RGB
17. AMX Power supply: AMX PSN6.5
18. AMX UPC-20 Screen Controller
19. Somphy up, stop, down switch to use with UPC-20
20. AMX Axlink Bus Strips ABS
21. Cable Tuner Contemporary Research RS 232 controlled

• Audio Video Equipment

1. Projector Cart: Luxor TL-OH-38
2. Overhead Projector: EIKI 3990BP
3. Screen: Draper Signature series 5 size depending on image size needed for furthest viewable location.

Architectural Features

- Room Shape: traditional rectilinear, 2:3 ratio oriented to instructional area at front of room.
- Ceiling Height: Min. 10 feet
- Doors: Two, with narrow door lights. Main entry is located at front of the room
- Floors: Vinyl tile, carpet preferred
- Walls: Light color, min. 85% reflectivity.

- Ceilings: 2 x 2 acoustical panels and grid, white.
- Additional Acoustical Treatment: As required.

- Teaching station – Harris AV1 Series

Lighting

- Recessed 2 x 4 fluorescent, parabolic, prefer dimming ballast.
- Lighting shall be controlled at the room's entrances and adjacent to the instructor console. Lighting shall be such that no one location can lock out the other nor change the preset controls of the dimming system.
 - There shall be two - three dimming zones – Zone 1 for the front row of light fixtures, Zone 2 for the middle set of light fixtures, and Zone 3 for the remaining light fixtures. Dimming controls shall be located near the instructor console. Dimmer controls shall be by "Lutron Electronics Company."
 - General lighting (full on / full off) shall be located at the Classroom entrance.
 - If lighting is not dimmable, then "inboard/outboard" switching should be used, and row of lights at front of room should be switched separately.
 - To (illuminate the whiteboard) nice idea, I'm not sure I've seen an illuminated whiteboard , we prefer a parallel row of 2 x 4 fluorescent fixtures, with acrylic lenses, running the length of the whiteboard. This row shall be separately switched.

Power Outlets

- Quadruplex adjacent to each communications outlet, standard duplex receptacles other walls.

Special Equipment Power Requirements

- LCD Projector Power: A duplex receptacle shall be provided above ceiling (in the vicinity of the projector bracket) for the LCD projector. The receptacle should be circuited on the same circuit as the power for the instructor console (must be on same phase).
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- Provide three quad power receptacles in the instructor station.

Data/Communications Outlets and Infrastructure

- One RJ45 outlet at front and rear walls.
- One RJ45 data outlet with 4 data circuits shall be provided in the instructor console.
- Provide one RJ45 data outlet above ceiling at LCD projector location

Room Security

- In addition to keyed lever latch sets and closers, provide card access system (low voltage) entry to the selected main entry door. All doors accessing the room shall have door security contacts wired to the security system. Provide wall and/or ceiling mounted motion sensors in the room.

Example of Satisfactory Classroom(s) on Campus

CLAS 105, CLAS 110, HRM 143

Class III Classroom: 100+ students, tiered seating, Standard Lecture Hall Area and Affiliated Spaces

- Classroom Seating Area: Min. 17 NSF/Student, max. 19 NSF/Student. (Area includes aisle ways within seating area.)
- Number of Accessible Seating Spaces: Five for 101 to 125 persons
- Lectern/Podium: Minimum of 8' from front wall for the width of the front wall.
- Projection Room (optional): approximately 200 NSF, depending on configuration.
- (Foyer) Foyer is a great idea for a class this size (optional): To accommodate students waiting on change of classes. This area may contain rest rooms. Sound isolation is important.

Furnishings and Equipment

- Seating: Fixed continuous desktop with pedestal mounted swing-out chairs. Accessible seating shall have continuous desktop surface for wheelchair access. Provide one loose chair per accessible station matching pedestal chairs. Desktops (may be equipped with power/data modules) data ports should be mandatory @ student desks in classrooms 100+ in size. This is crucial w/many schools initiating a laptop program can also facilitate holding conferences at UConn (ports) for each seating station. If so, modules shall consist of one duplex receptacle and two ports for data connectors. Each module shall be equipped with a cord with a three-prong plug for connecting into the wiring harness. The power wiring harness shall be enclosed in a wire trough below the countertop with a metal divider to separate power from data cables.
- Instructional Furniture and Equipment:
 - Portable stand-up lectern
 - Table top desk and chair
 - Marker Board: 4' ht. X 24' length (typical)
 - Large Monitor on BACK wall facing instructor for this and larger rooms
 - Projection Screens: Two electric screens, measuring up to 9' x 12', with recessed mounting. Switch is to be located adjacent to the instructor console. Use of two fixed, aluminum framed, stretched vinyl screens, approximately 9' x 12', and should be considered. Viewing angles should not be worse than 30 degrees for the seats on the side to the farthest edge of the projected images.
 - LCD Projectors: Two ceiling-suspended LCD projector brackets centered on the appropriate projection screen and located between 12'-0" and 18'-0" from the center of the bracket to the face of the projection screen, depending on the size of the projected image. Depending on the size of the room and the height of the ceiling, a projection room may be necessary to house the LCD projectors.
 - Instructor console, approximately 30"(d) x 72"(w) x 36"(h), containing a computer, VCR, DVD player, AMX control system, video switching equipment, laptop

interface, and two document cameras. The instructor console shall be located with a minimum of 4' clear distance between the front wall and the rear face of the instructor console.

- Speakers, mounted at the edges of the front wall. May be recessed into front wall.
- (Optional) Electronic Marker Board, approximately 4' x 8', mounted on front wall.
- Remote microphones
- User equipment rack located in teachers station
- Non-user equipment rack located in rear or front equipment booth

Architectural Features

- Room Configuration: Straight rowed tiered risers or curved risers oriented to front of the room. 45-degree orientation to the front corner of the room may also be considered. Placement of instructional furniture and equipment and specifically the instructor console shall not conflict with student seating sightlines to the marker board(s) and projection screens.
- Ceiling Height: Min.9 feet at rear of room; min. 12 feet at front of room at projection screen. For large rooms (~200 seats), would prefer ceiling height of 18' at front of room.
- Doors: Min. two, each with narrow door light.
- General non-seating floors: Vinyl tile, prefer carpet
- Tiered Risers: Carpeted with vinyl nosings and risers
- Walls: Light color, min. 85% reflectivity.
- Ceilings: 2 x 2 acoustical panels and grid, white.
- Additional Acoustical Treatment: Voice projection system or PA system should control room acoustic dynamics. Some wall treatment should be considered.
- Electronic Equipment Closet: This space shall only open into the main classroom. No exterior doorways are permitted.
- (Optional) Projection Room: This space shall open into a corridor or foyer.

Lighting

- Recessed 2 x 4 fluorescent, parabolic, dimming ballast.
- Lighting shall be controlled at the room's entrances and adjacent to the instructor console. Lighting shall be such that no one location can lockout the other nor change the preset controls of the dimming system.
- There shall be a minimum of three dimming zones – Zone 1 for the front two rows of light fixtures, Zone 2 for the middle two rows of light fixtures and Zone 3 for the remaining light fixtures. Dimming controls shall be located near the instructor console. Dimmer controls shall be by "Lutron Electronics Company."
- To illuminate the whiteboard, we prefer a parallel row of 2 x 4 fluorescent fixtures, with acrylic lenses, running the length of the whiteboard. This row shall be separately switched.
- Special lighting to illuminate maps or charts may be required. Such lighting shall be zoned separately to allow control via the AMX control system.
- For larger rooms, aisle lighting should be considered.

Power Outlets

- In addition to outlets for the seating system, provide general room perimeter outlets.

Special Equipment Power Requirements

- LCD Projectors Power: A duplex receptacle shall be provided above ceiling (in the vicinity of the projector bracket) for each LCD projector. The receptacle should be circuited on the same circuit as the power for the instructor console (it must be on the same phase). Provide duplex receptacle for electronic marker board at appropriate wall elevation.
- Provide three quad power receptacle in the instructor station.
- Provide one quad power receptacle in the Projection Room in the vicinity of the projectors.

Data/Communications Outlets and Infrastructure

- Provide one concealed 2" diameter conduit (with pull string) running from each LCD Projection Bracket to a floor located junction box at the instructor console. May be part of the path from the instructor's console to the Electronic Equipment Closet or Projection Room.
- Instructor console data circuits: Specify three Category 5 data circuits and receptacle at the instructor console.
- Provide one RJ45 data outlet above ceiling at LCD projector location.

Room Security

- In addition to keyed lever latch sets and closers, provide card access system (low voltage) entry to the selected main entry door. All doors accessing the room shall have door security contacts wired to the security system. Provide wall and/or ceiling mounted motion sensors in the room.

Example of Satisfactory Classroom(s) on Campus

Area and Affiliated Spaces

- Classroom Seating Area: Min. 17 NSF/Student, max. 19 NSF/Student. (Area includes aisle ways within seating area.)
- Number of Accessible Seating Spaces: Five for 101 to 125 persons
- Lectern/Podium/Demonstration: Minimum of 8' from front wall for the width of the front wall.
- Electronic Equipment Closet: 25 NSF for single stacked rack of equipment.
- Projection Room (optional): approximately 200 NSF, depending on configuration.
- Preparation Room: approximately 200 - 300 NSF, depending on materials stored.
- Foyer (optional): To accommodate students waiting on change of classes. This area may contain rest rooms. Sound isolation is important.

Furnishings and Equipment

- Seating: Fixed continuous desktop with pedestal mounted swing-out chairs. Accessible seating shall have continuous desktop surface for wheelchair access. Provide one loose chair per accessible station matching pedestal chairs. Desktops may be equipped with power/data modules (ports) for each seating station. If so, modules shall consist of one duplex receptacle and two ports for data connectors. Each module shall be equipped with a cord with a three-prong plug for connecting into the wiring harness. The power wiring harness shall be enclosed in a wire trough below the countertop with a metal divider to separate power from data cables.
- Instructional Furniture and Equipment:
 - Portable stand-up lectern
 - Table top desk and chair
 - Marker Board: 4' ht. X 24' length (typical)
- Projection Screens: Two electric screens, measuring up to 9' x 12', with recessed mounting. Switch is to be located adjacent to the instructor console. Use of two fixed, aluminum framed, stretched vinyl screens, approximately 9' x 12', and should be considered. Viewing angles should not be worse than 30 degrees for the seats on the side to the farthest edge of the projected images.
- LCD Projectors: Two ceiling-suspended LCD projector brackets centered on the appropriate projection screen and located between 12'-0" and 18'-0" from the center of the bracket to the face of the projection screen, depending on the size of the projected image. Depending on the size of the room and the height of the ceiling, a projection room may be necessary to house the LCD projectors.
- Flat screen LCD monitor size as required for image re-enforcement to rear of room.

Audio Equipment

1. Speakers: Sound Advance CT8BST
2. Ceiling mount for above Sound Advance TBS8-10
3. AMPS: Toa Mixer amp A700 series
4. MICS: Audio Technical AT831R with 25' extension

Video Equipment

1. VCR: Samsung SV-5000W with rack mount
2. Document Camera: Samsung SDP-900
3. Power Conditioner, Surgex SX1115RT
4. Projector, Mitsubishi LD X25U
5. Mount for above projector Chief RPS025
6. Switcher/Router Extron Crosspoint
7. Video DA Extron CDVA 6 EQMX
8. RGBHV DA Extron ADA4 300HV
9. DVD Player Philips Pro175
10. AMX AXB-TPI Touch Screen control AXB-TPI/4
11. AMX 15" VTM-D15

12. AMX Volume control, NXC-Vol 4
13. AMX Single Card Cage NXS-MHS
14. AMX Netlinx Integrated Controller NI 4000
15. AMX Video card AXB-TP4-VID
16. AMX Graphics card AXB-TP4-RGB
17. AMX Power supply: AMX PSN6.5
18. Flat screen back lit LCD Mitsubishi MLM400
19. AMX UPC-20 Screen Controller
20. Somphy up, stop, down switch to use with UPC-20
21. AMX Axlink Bus Strips ABS
22. Cable Tuner Contemporary Research RS 232 controlled

Audio Video Equipment

1. Projector Cart: Luxor TL-OH-38
 2. Overhead Projector: EIKI 3990BP
 3. Screen: Draper Signature series 5 size depending on image size needed for furthest viewable location.
- Teaching station – Harris AV1 series
 - Program speakers, mounted at the edges of the front wall. May be recessed into front wall.
 - Ceiling voice re-enforcement speakers located in ceiling to fill listening area at seated position
 - Equipment rack, located in Electronic Equipment Closet, containing audio equipment
 - (optional) Electronic Marker Board, approx. 4' x 8' mounted on front wall
 - Demonstration Bench:
 - Sink (may require special waste line)
 - Air supply and gas supply
 - GFI electrical outlets
 - (Optional) Exhaust system
 - Camera that is connected to AMX control system and video switching equipment

Architectural Features

- Room Configuration: Straight rowed tiered risers or curved risers oriented to front of the room. 45-degree orientation to the front corner of the room may also be considered. Placement of instructional furniture and equipment and specifically the instructor console shall not conflict with student seating sight lines to the marker board(s) and projection screens.
- Ceiling Height: Min.9 feet at rear of room; min. 12 feet at front of room at projection screen. For large rooms (~200 seats), would prefer ceiling height of 18' at front of room.
- Doors: Min. two, each with narrow door light.
- General non-seating floors: Vinyl tile, prefer carpet
- Tiered Risers: Carpeted with vinyl nosings and risers

- Walls: Light color, min. 85% reflectivity. Consider the use of an accent wall (usually the rear wall)
- Ceilings: 2 x 2 acoustical panels and grid, white.
- Additional Acoustical Treatment: Voice projection system or PA system should control room acoustic dynamics. Some wall treatment should be considered.
- Electronic Equipment Closet: This space shall only open into the main classroom. No exterior doorways are permitted.
- (Optional) Projection Room: This space shall open into a corridor or foyer.
- (Optional) Preparation Room: This space shall open into a corridor or to the exterior. It may require an exhaust system, or special storage (e.g., hazardous materials).

Lighting

- Recessed 2 x 4 fluorescent, parabolic, dimming ballast.
- Lighting shall be controlled at the room's entrances and adjacent to the instructor console. Lighting shall be such that no one location can lockout the other nor change the preset controls of the dimming system.
- There shall be a minimum of three dimming zones – Zone 1 for the front two rows of light fixtures, Zone 2 for the middle two rows of light fixtures and Zone 3 for the remaining light fixtures. Dimming controls shall be located near the instructor console. Dimmer controls shall be by "Lutron Electronics Company."
- To illuminate the whiteboard, we prefer a parallel row of 2 x 4 fluorescent fixtures, with acrylic lenses, running the length of the whiteboard. This row shall be separately switched.
- Special lighting to illuminate maps or charts may be required. Such lighting shall be zoned separately to allow control via the AMX control system.
- Special lighting to illuminate demonstration area may be required. Such lighting shall be zoned separately to allow control via the AMX control system.
- For larger rooms, aisle lighting should be considered.

Power Outlets

- In addition to outlets for the seating system, provide general room perimeter outlets.
- Special Equipment Power Requirements**
- LCD Projectors Power: A duplex receptacle shall be provided above ceiling (in the vicinity of the projector bracket) for each LCD projector. The receptacle should be circuited on the same circuit as the power for the instructor console (it must be on the same phase).
 - Provide one quad power receptacle in the floor instructor station.
 - Provide duplex receptacle for electronic marker board at appropriate wall elevation.
 - Provide one quad power receptacle in the Electronic Equipment Closet.
 - Provide one quad power receptacle in the Projection Room in the vicinity of the projectors.

- Provide a minimum of one GFI quad power receptacle in the demonstration bench.

Data/Communications Outlets and Infrastructure

Provide one RJ45 data outlet above ceiling at LCD projector location

- Instructor console data circuits: Specify three Category 5 data circuits and receptacle at the instructor console.
- Provide one (1) 1" conduit and pull string from electronic marker board to instructor console.
- Provide four (4) 2" conduits and pull strings from the instructor's console to the Electronic Equipment Closet or Projection Room.
- Provide one (1) 1" conduit from Electronic Equipment Closet to each speaker.
- Provide two (2) 1" conduits (or chase) from demonstration bench to instructor console.

Room Security

- In addition to keyed lever latch sets and closers, provide card access system (low voltage) entry to the selected main entry door. All doors accessing the room shall have door security contacts wired to the security system. Provide wall and/or ceiling mounted motion sensors in the room.

Example of Satisfactory Classroom(s) on Campus

Class V Classroom: 100+ students, Combination Lecture/(Performance Venue)

Area and Affiliated Spaces

- Classroom Seating Area: Min. 17 NSF/Student, max. 19 NSF/Student. (Area includes aisle ways within seating area.)
- Number of Accessible Seating Spaces: Five for 101 to 125 persons
- Lectern/Podium: Minimum of 8' from front wall for the width of the front wall.
- Performance Stage: Consult with Individual Department.
- Electronic Equipment Closet: 25 NSF for single stacked rack of equipment.
- Projection Room (optional): approximately 200 NSF, depending on configuration.
- Ticket Office: approximately 200 NSF.
- Foyer (optional): To accommodate students waiting on change of classes. This area may contain rest rooms. Sound isolation is important.

Furnishings and Equipment

- Seating: Fixed auditorium seating with folding tablet arms. Accessible seating shall have continuous desktop surface for wheelchair access. Provide one loose chair per accessible station matching seats.
- Instructional Furniture and Equipment:
- Portable stand-up lectern

- Table top desk and chair
- Marker Board: 4' ht. X 8' length, portable (typical)
- Projection Screens: Two electric screens, measuring up to 9' x 12', with recessed mounting. Switch is to be located adjacent to the instructor console. Viewing angles should not be worse than 30 degrees for the seats on the side to the farthest edge of the projected images.
- LCD Projectors: Recessed projector lifts centered on the appropriate projection screen and located between 12'-0" and 18'-0" from the center of the bracket to the face of the projection screen, depending on the size of the projected image. A projection room may be considered to house the LCD projectors.
- Instructor console, approximately 30"(d) x 72"(w) x 36"(h), containing a computer, VCR, DVD player, AMX control system, video switching equipment, laptop interface, and two document cameras. The instructor console shall be located with a minimum of 4' clear distance between the front wall and the rear face of the instructor console. Easily accessible storage for this console must be provided.
- Speakers, mounted at the edges of the front wall. May be recessed into front wall.
- Equipment rack, located in Electronic Equipment Closet, containing audio equipment.

Architectural Features

- Room Configuration: Traditional auditorium orientation, with sloping or tiered floor.
- Ceiling Height: Min.9 feet at rear of room; min. 12 feet at front of room at projection screen. For large rooms (~200 seats), would prefer ceiling height of 18' at front of room.
- Doors: Min. two, each with narrow door light.
- General non-seating floors: Carpet
- Tiered Risers: Carpeted with vinyl nosings and risers
- Walls: Light color, min. 85% reflectivity. Consider the use of an accent wall (usually the rear wall)
- Ceilings: 2 x 2 acoustical panels and grid, white.
- Additional Acoustical Treatment: Voice projection system or PA system should control room acoustic dynamics. Wall treatment must be considered.
- Electronic Equipment Closet: This space shall only open into the main classroom. No exterior doorways are permitted.
- (Optional) Projection Room: This space shall open into a corridor or foyer.

Lighting

- Classroom and performance lighting should be separated, with separate controls and capable of being programmed separately.
- Classroom: Prefer recessed 2 x 4 fluorescent, parabolic, dimming ballast.
- Performance: Requirements determined by Department.
- Lighting shall be controlled at the room's entrances and adjacent to the instructor

console. Lighting shall be such that no one location can lockout the other nor change the preset controls of the dimming system.

- There shall be a minimum of three dimming zones – Zone 1 for the front two rows of light fixtures, Zone 2 for the middle two rows of light fixtures and Zone 3 for the remaining light fixtures. Dimming controls shall be located near the instructor console. Dimmer controls shall be by "Lutron Electronics Company."
- To illuminate the whiteboard, we prefer a parallel row of 2 x 4 fluorescent fixtures, with acrylic lenses, running the length of the whiteboard. This row shall be separately switched.
- Aisle lighting should be provided.

Power Outlets

- In addition to outlets for the seating system, provide general room perimeter outlets.

Special Equipment Power Requirements

- LCD Projectors Power: A duplex receptacle shall be provided above ceiling (in the vicinity of the projector bracket) for each LCD projector. The receptacle should be circuited on the same circuit as the power for the instructor console (it must be on the same phase). A "kill switch" should be provided that will interrupt power to the receptacle the LCD projector is plugged into. This switch should be located in the Electronic Equipment Closet or the Projection Room, and should have a Leviton #4979-GY Vertical wet location cover (for switch and outlet).
- Provide one quad power receptacle in the floor at the location of the instructor console.
- Provide duplex receptacle for electronic marker board at appropriate wall elevation.
- Provide one quad power receptacle in the Electronic Equipment Closet.
- Provide one quad power receptacle in the Projection Room in the vicinity of the projectors.
- Provide a minimum of one GFI quad power receptacle in the demonstration bench.

Data/Communications Outlets and Infrastructure

- Provide one concealed 2" diameter conduit (with pull string) running from each LCD Projection Bracket to a floor located junction box at the instructor console. May be part of the path from the instructor's console to the Electronic Equipment Closet or Projection Room.
- Instructor console data circuits: Specify three Category 5 data circuits and receptacle at the instructor console.
- Provide one (1) 1" conduit and pull string from electronic marker board to instructor console.
- Provide four (4) 2" conduits and pull strings from the instructor's console to the Electronic Equipment Closet or Projection Room.
- Provide one (1) 1" conduit from Electronic Equipment Closet to each speaker.

- Provide two (2) 1" conduits (or chase) from demonstration bench to instructor console.

Room Security

- In addition to keyed lever latch sets and closers, provide card access system (low voltage) entry to the selected main entry door. All doors accessing the room shall have door security contacts wired to the security system. Provide wall and/or ceiling mounted motion sensors in the room.

Example of Satisfactory Classroom(s) on Campus

Class VI Classroom: Computer Classroom, 24-32 Students

Area and Affiliated Spaces

- Classroom Area: Min. 24 NSF/Student, max. 28 NSF/Student
- Number of Accessible Seating Spaces: One
- Lectern Area: Included with student area
- Network Equipment/File Server Room: approximately 100 NSF

Furnishings and Equipment

- Seating: Tables (minimum of 60" x 30") and task chairs.
- Accessible Seating: Desks and loose chair for accessibility-impaired students: One station
- Instructional Furniture and Equipment:
 - Portable stand-up lectern
 - Marker Board: 4' ht. X 16' length (typical)
 - Projection Screen: Electric, vinyl screen, 84"W x 84"H; recessed mounting not required, mounted on front wall of classroom. Switch is to be located adjacent to the instructor console.
 - LCD Projector: A ceiling-suspended LCD projector bracket centered on the projection screen and located between 12'-0" and 18'-0" from the center of the bracket to the face of the projection screen, depending on the size of the projected image.
 - Instructor console, approximately 30"(d) x 66"(w) x 37"(h), containing a computer, VCR, DVD player, video switching equipment, amplifier, laptop interfaces, and document camera. The instructor console shall be located with approximately 3'-6" clear distance between the front wall and the rear face of the instructor console.
 - Speakers (mounted within 2x2 ceiling grid)
 - (One computer per student) Linux, Mac or windows ? .

Architectural Features

- Room Shape: traditional rectilinear, 2:3 ratio oriented to instructional area at front of room.
- Ceiling Height: Min. 9 feet; 10 feet preferred.
- Doors: Min. one, with narrow door light, located at front of the room

- Floors: Carpet
- Walls: Light color, min. 85% reflectivity.
- Ceilings: 2 x 2 acoustical panels and grid, white.
- Additional Acoustical Treatment: As required.

Lighting

- Recessed 2 x 4 fluorescent, parabolic, prefer dimming ballast.
- Lighting shall be controlled at the room's entrances and adjacent to the instructor console. Lighting shall be such that no one location can lock out the other nor change the preset controls of the dimming system.
- There shall be two dimming zones – Zone 1 for the front row of light fixtures, and Zone 2 for the remaining light fixtures. Dimming controls shall be located near the instructor console. Dimmer controls shall be by "Lutron Electronics Company."
- General lighting (full on / full off) shall be located at the Classroom entrance.
- If lighting is not dimmable, then "inboard/outboard" switching should be used, and row of lights at front of room should be switched separately.
- To illuminate the whiteboard, we prefer a parallel row of 2 x 4 fluorescent fixtures, with acrylic lenses, running the length of the whiteboard. This row shall be separately switched.

Power Outlets

- Quadruplex adjacent to each communications outlet, standard duplex receptacles other walls.

Special Equipment Power Requirements

- LCD Projector Power: A duplex receptacle shall be provided above ceiling (in the vicinity of the projector bracket) for the LCD projector. The receptacle should be circuited on the same circuit as the power for the instructor console (must be on same phase). A "kill switch" located adjacent to the instructor console should be provided that will interrupt power to the receptacle that supplies power to the LCD projector. This switch may be located adjacent to the dimmer controls. This switch should have a Leviton #4979-GY Vertical wet location cover (for switch and outlet).
- Provide one quad power receptacle on the wall beside the instructor console.
- Provide one quad power receptacle on wall at the end of each "finger" of tables. Typically, each "finger" will have 4 computers.
- In some cases, tables with built-in power and data will be used.

Data/Communications Outlets and Infrastructure

- One RJ45 data outlet with 4 data circuits shall be provided inside the instructor console.
- One RJ45 data outlet per "finger" of tables (typically, 4 computers per "finger"), with sufficient data circuits for the number of computers. Because of the number of data circuits involved, the design professional is strongly encouraged to investigate the use of data raceways, and wire trays (above ceiling) instead of the standard method of one 1" home-run conduit per outlet. If raceway is chosen, please consult with ACNS for specifications.

- Provide one concealed 2” diameter conduit (with pull string) running from the LCD Projection Bracket to a junction box beside the instructor console.

Room Security

- In addition to keyed lever latch sets and closers, provide card access system (low voltage) entry to the selected main entry door. All doors accessing the room shall have door security contacts wired to the security system. Provide wall and/or ceiling mounted motion sensors in the room.

Example of Satisfactory Classroom(s) on Campus

Design Issues Non-Assignable Space

In the larger classrooms, an accessible chase or furred wall space for communications raceways serving the console may be considered. It should be recessed in the wall or located in the corner of the room near the console. Power poles are not permitted.

Owner Provided Equipment

Furniture and equipment not included in the construction cost, but provided and installed by University of Connecticut may include:

Standard marker boards

Instructor console

LCD projector and bracket

Electronic marker board

Voice lift system or PA system including speakers, unless specifically noted in the Facilities Program to be provided as part of the construction cost.

Security access card reader.

In some cases, it may be desirable for the contractor to supply and install certain items (e.g., marker boards, projection screens, instructor consoles (if custom cabinetry), or to install certain owner-provided equipment (e.g., projector mounts, marker boards). Such situations should be discussed with ACNS prior to the finalization of the construction documents.

For more specific AV specs and drawings please go to WWW.UCIMT.UCONN.EDU see AV Technology Services division, AV classroom standards link.

All control systems shall follow UCIMT standard layouts and functionality. All control system programs shall be turned over to UCIMT when final AV sign-off is completed.

Final AV system flows, site line drawings and room layouts shall be turned over to UCIMT on final sign-off of AV system. Drawings shall be DWG drawings provided on CD with building and room on label.