

DESIGN REFERENCE MANUAL

GENERAL ASSIGNMENT CLASSROOM DESIGN STANDARDS

The standards in this section must be applied to general assignment classrooms. They do not represent standards for other classrooms, but may provide useful guidelines for the design of those rooms.

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GENERAL APPROACH TO CLASSROOM DESIGN:

To develop rooms with good sight lines and efficient seating layouts, design should proceed from the “inside out:”

- Determine screen size and location, seat size and orientation, and size of the instructor area at room front.
- Draw viewing angles from each screen and insure that all seats fit within them.
- Determine location and width of access aisles.
- Only after these steps, determine where walls should be located.

Designs in which seating capacities are reduced because rooms are too small, or which have inefficient shapes, obstructions, narrow aisles, seats or work surfaces that are too small, or seats placed too close together for comfort are unacceptable.

CLASSROOM TYPES AND GENERAL FEATURES.

These are standard classroom types. Design details may vary to accommodate the latest best practices for teaching, with approval from Campus and Facilities Planning.

1. Seminar room

- Furnished with a large central table or multiple small tables that can be grouped into one central table
- Designed for up to 22 students
- Size the room allowing 25 sq ft per seat

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2. Small classroom
 - Flat-floor
 - Furnished with moveable tables and chairs
 - Designed for up to 50 students
 - Size the room allowing 25 sq ft per seat. (Where use of tablet arm chairs has been authorized by Campus and Facilities Planning, allow 18 sq ft per seat.)
3. Large classroom
 - Tiered floor. Entrances may be located at the room front for disability access.
 - Furnished with fixed tables and moveable chairs.
 - Designed for 51-99 students.
 - Size the room allowing 20 sq ft per seat.
4. Lecture hall/auditorium
 - Sloped or tiered floor
 - Furnished with fixed tablet-arm seats. Seats must be labeled for row and number.
 - Designed for 100+ students.
 - Size the room allowing 12 sq ft per seat.

Classroom Proportions:

All seats must be located within a 90 degree viewing angle from the center of the projection screen. That is, within 45 degree horizontal angles from the perpendicular to the center of screens.

Classrooms should be narrow enough to permit all seats to be within the 90 degree viewing angle from the front wall, but no narrower. Rooms that are too narrow and deep make it hard for students and instructors to interact.

Classroom front:

The distance from the front wall to the first row of seats should be 1-2 times the height of the projection screen. Typical screen height in a flat-floor classroom is 8', so the first row of seats must be minimum 8' from the front wall; 10-12' is preferred.

The multimedia lectern should be placed to one side of the front teaching wall, leaving students an unobstructed view of the writing surface and projection screen. Media should be installed either in the lectern or in a rack near the lectern.

The projection screen should be placed to leave at least a 6' wide portion of the writing surface visible when the screen is lowered. Placing the screen at a slight angle in the corner opposite the instructor lectern often works well.

Space for a moveable instructor's table 48"-60" wide x 24" deep, plus an instructor chair must be provided. No instructor's table is provided in a seminar classroom.

Projection booth:

An enclosed booth with projection shelf and window is the preferred location for projectors in lecture halls/auditoria, to facilitate maintenance. Adequate booth cooling must be provided.

The booth includes light controls for the entire room.

Run 2" conduit from the lectern to the booth.

Where an enclosed booth is not possible a securable cabinet may be provided instead.

CLASSROOM PLACEMENT

Locate general assignment classrooms as close as possible to the main building

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entrances, to limit student travel through the building. This is most important for large capacity classrooms.

Keep classrooms grouped together on the same floor.

Locate classrooms away from noise-generating equipment and activities, including mechanical systems, elevators, and restrooms. Where classrooms adjoin such spaces, provide noise buffers to prevent class disruption.

Locate restrooms near lecture halls, but with no common wall between restrooms and classrooms.

Appropriate lobby space should adjoin auditoria to provide a gathering area.

Provide corridor seating outside the lecture halls and along the hallways outside classrooms.

ACCESSIBILITY

Special consideration will need to be given in classrooms for inclusion of specialized equipment for persons with disabilities such as wiring and lighting.

- Remote Real Time Captioning- Additional telephone lines with access to long distance and an electrical outlet in the front of the room for all auditoria seating 100+. It would be prudent to provide an extra Ethernet connection for future web access to replace the current method.
- Lighting for Signer- A separate light for a sign language interpreter in all auditoria seating 100+ will need to be placed adjacent to the front of the room. This light should not spill onto the projection screen. The light control may be located with other controls at the lectern.

Preference for disability seating in lecture halls is fixed table and moveable chairs and/or open space for wheelchairs.

ACOUSTICS

Design walls and ceilings to evenly distribute sound through the classroom. Voices must be heard easily and accurately. Design must prevent unwanted background or outside noise. The room must be designed to foster effective sound transmission not only from a speaker at room front to an audience, but to allow student comments to be easily heard as well. Classroom acoustics must meet the standards recommended by the Acoustical Society of America (ASA). Figures given below reflect the 2002 ASA standards.

All walls must extend to the floor above or to the roof construction, and not stop at ceiling.

Select system components (fans, ductwork and diffusers) that will meet the acoustical criteria for classrooms.

Walls between classrooms will have a Sound Transmission Class (STC) rating of at least 50. Walls separating classrooms from common spaces or restrooms must have an STC of at least 53. Walls separating classrooms from mechanical spaces or other areas with high noise levels must have at least an STC of 60.

Ambient noise level should not exceed 35 decibels when measured with the A-scale of a sound level meter.

Reverberation time in rooms with under 10,000 cubic feet of space should not exceed .5 seconds. Spaces larger than 10,000 cubic feet should be designed for maximum reverberation time of .7 seconds.

Walls and ceilings may require angling and/or applied acoustical treatment.

Materials at room front should be reflective to project sound to the back of the room.

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Sound absorbing materials should be placed beyond arm's reach.

CEILING

Ceiling height is based on the classroom capacity, depth and design. In particular, the ceiling must be high enough to accommodate the projection screen when the bottom of screen is no lower than 40" from floor and screen height is 1/5 the distance from front wall to last row of seats. Ceiling height requirements may differ for seminar rooms, classrooms, and auditoria within the same building.

DOORS & LOCKS

The preferred door location is at the rear of the classroom.

Equip doors with delay action closures, kick plates, and clear glass vision panels or sidelights in accordance with applicable codes. The area of glass in doors should not exceed 100 square inches, with the vision panel base no higher than 42" from the floor and top at least 62" from the floor. Side lights should be no wider than 12".

Doors must operate quietly and provide good sound control.

Locking capabilities must include both manual and electronic functions and include "prox" card access.

Doors open out to the corridor but must be located so that they do not block corridor traffic. A recessed entrance may suffice.

ELECTRICAL SYSTEMS

All conduit and electrical circuits shall have the same ground reference. It is preferable to have two separate grounds, one for telecommunications and one for the building.

All audio, video, and control electrical circuits should be fed from "clean legs" from the transformer, free of high inductive loads. There must be NO elevator motors, compressor motors, blower motors, etc. on the side of the power transformer that feeds the media equipment.

Conduit to teaching lectern in general assignment classrooms must be pulled ready for installation by FM Equipment Services.

The number of outlets required in classrooms will depend on the size of the room.

These must be distributed throughout the room for overhead projectors, computer access, and vacuum cleaners, etc. The front teaching wall must have at least one duplex outlet. The number and location of the outlets will be coordinated with FM Equipment Services in the design phase of the project.

Electrical outlets must be provided in all fixed student tables, with outlets for each pair of seats.

Floor boxes should be FSR or equivalent as specified by FM Equipment Services.

Provide at least one circuit above the ceiling to support a data projector, location to be specified by FM Equipment Services.

FLOORING

Flat Floors: Install smooth, non-slip surface of rubber or vinyl composition tile in general assignment classrooms. All flooring shall be resistant to stains and spills.

Sloped and Tiered Floors: A non-slip surface is required for corridors, cross aisles, and for rows if moveable seating is used. Rubber flooring or vinyl composition tile is preferred to carpet for maintenance reasons. Sealed concrete under seating areas is acceptable; painted concrete is unacceptable.

Carpet should be used only when warranted by physical configuration of room or when

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authorized by Campus and Facilities Planning. Carpet may be suitable where special use requires a more luxurious floor finish than resilient flooring and operating budgets are sufficient to insure proper maintenance.

Where carpet is used, it should be variegated in color, not solid, in order to hide dirt and wear. On carpeted stair aisles, the edge of stair risers must be easily seen to prevent tripping. In new construction, aisle lighting is required.

FURNISHINGS

Furnishings will be selected for durability, ease of maintenance, and comfort. General assignment classroom furniture must have an appearance distinct from other furnishings in the building. Writing surfaces should be dark colored and resist marks. Tablet arms should be large, ideally able to hold both an 8.5' x 11" pad and calculator.

Any furniture item should be comfortable for use by people ranging in size from the 5th percentile female (4' 11" tall, 113 pounds) to the 95th percentile male (6'2" tall, 246 pounds). Preferred width for auditorium seats is 23" – 24."

Student tables will be at least 18" deep. Moveable tables will be equipped with casters. Ten percent of all seating must be suitable for left-handed use.

Upholstered fabrics are used only on lecture hall and seminar room seating. Fabrics must have heavy-duty stain repellent.

A moveable instructor table with modesty panel 48"-60" wide x 24" deep, plus an instructor chair must be provided

Each classroom is furnished with a GPS clock, as part of an existing campus clock system.

Each room will have a moveable tabletop lectern or free standing lectern in addition to the multimedia lectern.

Provide a trash receptacle in each classroom.

Do not provide coat racks.

Do not provide pencil sharpeners.

Do not provide tack surfaces in the general assignment classrooms, unless approved by Campus and Facilities Planning.

LIGHTING

The lighting system must provide a comfortable level for reading and writing at the student stations plus the ability to light the writing surface and screen at the instruction area independently of the rest of the classroom. It should allow everyone in the room to see each other's faces easily, to foster class discussion.

Lighting must provide a level of room darkening to view projections on the front screen that also provides sufficient lighting for note taking.

All classrooms shall have no less than two separately controlled lighting areas – seating area and instructional area. The ability to dim both areas shall be provided as standard.

When the classroom is dimmed for projection, some lighting will be required at the presentation area. Special lighting on the equipment rack or technology controls may be needed.

In auditoria seating over 100, a separate light for a sign language interpreter will need to be placed adjacent to the front of the room. This light should not spill onto the projection screen. The light control may be located with other controls at the

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lectern.

Dimmer or toggle switches are preferred; no programmable lighting system should be installed without prior approval from ITS Classroom Technology Services.

Where programmable lighting is planned, provide a mock-up for instructor review well before planned installation, allowing time for modifications to product selection.

If rooms are equipped with occupancy sensor lighting, BOTH motion and heat must trigger it. In addition, a manual override system should be in place. Occupancy sensors shall have time delay adjustments of 30 minutes before turning lights OFF.

Place back-lit switches at every room entrance, to provide at least minimal room illumination so users never need enter a dark room. In windowless rooms, provide a small light at the door.

Locate lighting controls with a clearly labeled switchplate on the instructor multimedia lectern, and on the wall nearest to the instructional area. Where programmable lighting is used, controls should be integrated into the multimedia control panel.

Duplicate lighting controls should be placed in the projection booth, if applicable.

Lighting should use indirect lay-in fixtures. Avoid suspending fixtures from the ceiling, to prevent conflict with ceiling-mounted projectors.

Fixtures must be installed to evenly light the front writing surface, on its own circuit.

MECHANICAL SYSTEMS

Buffer classrooms from the interior noise of mechanical systems, elevators, restrooms, etc.

Select system components that meet the criteria under ACOUSTICS.

Position ceiling diffusers to avoid conflict with placement of ceiling-mounted projectors.

MEDIA TECHNOLOGY

All new or renovated classrooms include a full range of installed multimedia equipment.

Consulting: If a media consultant is retained, FM Equipment Services must specify all media equipment for general assignment classrooms prior to purchase.

Installation: If media equipment is to be installed by FM Equipment Services, installation will not begin until the classrooms are "media ready". Media ready means that all finish work is complete, any fixed seating or tables are in place, and all outlets and lights are energized and working. The time required to install the media equipment and teaching lecterns will be a minimum of 2 working days per room.

Closet: Provide an audio/visual storage closet with storeroom lock in or near classrooms for portable media equipment for use in general assignment classrooms. This closet must include one data and one electrical outlet.

Connectivity: All general assignment classrooms will have the capability for telephone, Internet, and campus cable.

Lectern: If multimedia equipment is rack-mounted in the multimedia lectern, the lectern must be properly ventilated. The top surface will include an 18" space for writing and a document camera. Cables to dock a laptop computer are included. Provide locking access doors on the back (student side) for service access. Provide a task light. Wire one dedicated 20 amp circuit at the lectern, plus four data outlets and one phone line. A phone for hotline calls will hang on the

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lectern, not rest on the top surface. If a phone cannot hang conveniently on the lectern, it should be placed on the wall nearest the lectern.

Provide a mock-up of the lectern for instructors to view. Allow sufficient time to permit review and modification before the planned installation.

Pathways: A/V signal pathways, conduit size, and termination points in the general assignment classrooms will be approved or specified by ITS Equipment Services.

Projector: There will be a video/data projector either mounted to the ceiling or in a projection booth, depending on ceiling height and ability to access a ceiling-mounted projector for maintenance. Typically, this means that projectors in lecture halls should be located in a booth.

Screen: There will be a motorized tension projection screen in all large general assignment classrooms and lecture halls. Pull-down screens may be used in seminar rooms and small classrooms. Screen size, surface and placement will be specified or approved by ITS Equipment Services. ITS Equipment Services will normally provide the screen for installation by contractor. As the room deepens the screen height must increase. The bottom of screen will be no lower than 40" from floor. The screen height will be 1/5 the distance from front wall to last row of seats.

Voice amplification is required for rooms seating 70 or more.

SIGNAGE

Room numbers should identify all classrooms at the door entrance and be consistent with building signage.

WALL SURFACES

All wall surfaces are to resist pencil and pen marks and other stains. All painted surfaces must be washable. *No flat paint* should be applied.

In classrooms with moveable chairs, provide a chair rail at an appropriate height for the selected seating on both back and side walls.

Apply a durable, easy-to-clean surface such as epoxy paint across the entire front wall below the writing surface.

WINDOWS

If windows are present, they should be at the side of the room, and not at the front or back.

Provide light control suitable to support media projection at each window.

WRITING SURFACES

A porcelain-covered steel dry marker writing surface shall be provided in each classroom.

Provide the maximum possible amount of writing surface at the front instruction wall (minimum 12' width). A continuous tray the full length of the board should be provided for erasers and markers.

The board shall be 4' in height and mounted with the top of the board 86" above the finished floor. In no case shall the bottom of the board be lower than 36" from the floor.

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All boards will have a cork tack strip along the entire top. The strip will be equipped with map hooks, one per every 2' of board length.