1 Introduction
1.1 These guidelines are intended to govern all aspects of design for Purdue’s Classrooms and Learning Spaces and may be applied to classrooms class labs, large conference rooms, gathering spaces, and any facilities that may serve an assembly function as a secondary aspect of the program.

2 Site and Spatial Relationships
2.1 Windows, quality lighting, good ventilation and excellent acoustics are healthy attributes of classrooms.
2.2 Classrooms should be located within one floor of the grade entry level.
Note: Below grade locations are not ideal for classrooms, unless daylight can be provided by means of window wells or atria.
2.3 Consider ceiling height requirements when locating classrooms within a building.
2.4 Classrooms should be protected from disruptive noise.

3 Approaching and Leaving Classrooms
3.1 Allow generous corridors and stairs to serve students arriving and leaving simultaneously and awaiting start of class.
Note: Benches and alcoves may minimize “running the gauntlet” between students lounging along the corridor walls.
3.2 Finish materials outside classrooms should be selected for durability and to control sound penetration and impact noise.
3.2.1 Impact noise may be abated by masonry or high-impact wallboard and sound insulation.
3.2.2 Glazed classroom walls should be laminated or double-pane glass to reduce sound penetration. Translucent treatment should be considered where required as a visual barrier.
3.3 If provided, gathering spaces outside of classrooms should support collaboration, with seating and writing boards.

4 General Classroom Design
4.1 Station count - Verify with Purdue student station quantities required or stated in an Academic Program Statement.
Note: ‘Station’ refers to the quantity of students a classroom is designed to accommodate, not to Occupancy Load which includes students, instructor(s), and additional ADA stations.
4.1.1 Station count in classrooms
• The station count programmed or requested does not include accessible stations.
• Add the appropriate quantity of accessible or wheelchair locations.
4.2 Assignable area
4.2.1 The assignable area stated in an Academic Program Statement does not include ramps, lifts, elevators, and other means required to distribute accessible seating in classrooms.
4.2.2 Add space for ramps, lifts, elevators, etc., as needed, to give disabled students access to the locations provided to meet their needs.
4.3 Room proportions
4.3.1 Classroom dimensions are critical and must be protected throughout the design phases.
4.3.2 Tiered Classrooms
• Large lecture halls should be wedge or fan shaped.
Note: Wedge/fan shapes stagger seats for better views and sit more students closer to the instructor and images.
• Stadium lecture halls, those spanning 2 floors, are discouraged.
Note: Stadium rooms sit students far away from and far above the Instructor, hampering engagement.
4.3.3 Flat floor classrooms
• Flat floor rectangular classrooms with a 1:1 or 2:3 length to width ratio are often ideal.
4.4 Classroom Service
4.4.1 Classroom Service spaces are provided as directed by Owner and should never be entered only through the classroom.
4.4.2 Classroom Service may include demonstration prep, lecture prep, breakout rooms, video conferencing control, a performance area (stage), laptop storage, etc.
4.4.3 Projection booths - No longer needed and being removed during renovations.
4.4.4 Closets
• General Storage, e.g. closets, are not permitted inside of General Purpose Classrooms.
• Class Labs may have General Storage if
PHYSICAL FACILITIES
2019 Consultant’s Handbook
Division 01 General
8813.2 Special Requirements – Instructional Spaces

4.5 Sightlines

4.5.1 Good sight lines must be maintained in all classrooms.

4.5.2 No permanent impediments should interrupt sight lines.
   - No columns are permitted in classrooms.
   - Inboard pilasters are strongly discouraged.
   - Deeply recessed doorways are discouraged depending on placement in the room.

4.5.3 Student distance from projected images
   - No student should be closer to a projected image than 2 times the image height.
   - No student should be farther from a projected image than 7 times the image height.

4.5.4 Vertical sight lines
   - Students should not have to tilt their head more than 45° to view the horizontal centerline of the image.

4.5.5 Horizontal sight lines
   - Projected images - All students should be seated within a viewing triangle that is a 90° arc from the center of the projection screens.
   - Flat panel displays - All students should be seated within a viewing triangle that is a 130° arc from the center of the flat panel.

4.6 Deliverables

4.6.1 Early in the design, the A/E shall provide Cross Sections and Plan Diagrams indicating that every seat meets vertical and horizontal sight line requirements.

4.6.2 Loose furniture - provide at least one code-compliant layout where every seat meets sight line requirements.

4.6.3 Plan all classroom layouts using actual dimensions of Purdue standard furniture and equipment.

4.7 Doors and doorways

4.7.1 In classrooms with a single door, the door is typically located at the front of the room at the Instructor Area, where the open space provides queueing for exit and entrance.

4.8 Accessibility

4.8.1 Purdue addresses some ADA issues “administratively” by tracking students needing accommodation and providing services on a case-by-case basis. Examples:
   - Moving an entire class to a more accessible classroom.
   - Placing special furniture for disabled students.
   - Reducing enrollment to free up a companion seat.

4.8.2 New classrooms must meet all requirements of the Americans with Disabilities Act Accessibility Guidelines (ADAAG). Renovations must meet the highest level of accommodation feasible, as determined by Purdue.

4.8.3 There are a few areas of accessibility that arise often in classroom renovations
   - Accessible entrances - Owner will determine if a renovation requires all entrances to be rebuilt or if any entrance may be grandfathered.
   - Protruding elements - The A/E must provide a detectable element below any object that is mounted with its bottom edge between 27" and 80"AFF and protrudes more than 4" from the wall.
   - Wheelchair stations and companion seats - Purdue will determine the quantity of wheelchair stations to be permanent and the remainder may be added as needed.

4.9 Ceiling height

4.9.1 Small classrooms should have a 10 foot minimum ceiling height. Renovations should strive for 9 feet minimum.

4.9.2 Ceiling height at projection wall(s) is calculated based on the size and placement of

Note: Departments may prefer that Class Labs have rear entrances for late arriving students.

4.7.2 Out-swinging classroom doors along busy corridors should be recessed in shallow alcoves (18” deep).

Note: Any door alcoves should be designed in such a way as to avoid compromising sight lines or causing furniture layout conflicts.

Note: Unlike movie theaters and other public venues, Purdue is aware of every student needing accommodation and meets those needs administratively on a case-by-case basis.
projection screens.
  - Projection screens that pull down in front of writing boards must maintain 5 foot minimum clear from bottom edge to finish floor.
  - Projection screens above writing boards are preferred if student setback is adequate to maintain vertical sight lines - 7 foot minimum clear from bottom edge to finish floor.

4.9.3 Ceiling height in the rear of tiered classrooms must be 8 foot minimum (7 feet in renovations).

4.10 Lighting and controls

4.10.1 Light fixtures
  - If pendant fixtures are used consultant will coordinate locations with the projector.
  - Supplementary light is required on chalkboards while typically good general room lighting will serve for whiteboards.
  - Chalkboard lights, if needed, shall be linear and project no more than 10 inches from the wall. Avoid glare by using white blade diffusers. Avoid ceiling reflections.
  - Relamping - Provide easy access in tiered classrooms for relamping light fixtures and projectors.

4.10.2 Lighting controls
  - Lighting should be controlled in a consistent manner from classroom to classroom, as directed by Owner.
  - Larger classrooms have lighting controls in more than one location and on/off switches at secondary entrance door(s).
  - Small classrooms (<50 seats) have simple lighting controls by the door.
  - Occupancy sensors - All classrooms require sensors for safety and energy efficiency.

4.11 Speech intelligibility

4.11.1 Classrooms must have good acoustical properties.
  - A/E should engage an acoustician to vet the design of any classroom over 60 students.

4.11.2 Acoustical considerations
  - Classroom size, proportion, shape, and volume.
  - Sound and unwanted sound (aka noise) including background noise from inside and outside the room, e.g. mechanical noise, or pass-through noise from adjacent spaces.

5 Technical Guidelines

5.1 Ceilings
  5.1.1 Ceilings shall be white, lay-in acoustical tile systems.
    - Active Learning Classrooms require high-performance fiberglass ceiling pads.

Note: Unlike older, more formal pedagogies, many students (teams) may be talking simultaneously in Active Learning Classrooms, causing a need for better sound attenuation.
  - Longevity and appearance benefit from fiberglass ceiling pads.

Note: Fiberglass ceiling tiles are less susceptible to breakage from repeated access to interstitial spaces (above ceilings) and to water damage from unexpected leaks.

5.1.2 Limited areas of ceiling may be other materials, including wood, drywall, or exposed structure with floating ceiling areas.
  - Acoustics must not suffer.
  - Access to interstitial space must not be hampered.

5.2 Walls
  5.2.1 Finishes should be highly durable.
    - Use semi-gloss paint for improved scrub resistance.

5.2.2 Color schemes must be Purdue approved.
  - Most walls should be Purdue standard classroom field color.
  - An accent color wall is encouraged, unless acoustical panels provide accent color.

5.3 Wall and corner protection
  5.3.1 Wall and corner protection
    - Shall be mechanically-fastened, not adhesive-adhered.
    - Rooms with masonry walls do not require corner or wall protection.
5.3.2 Corner guards
- Should be provided at protruding corners within a classroom.
- Should be provided at protruding corners just outside a classroom.

5.3.3 Wainscot
- Wainscot below the primary writing board protects the wall from damage.

*Note: Walls below boards may be damaged by 'storking' - instructors who lounge against the chalk tray with a foot resting on the wall.*

In classrooms with fixed seating next to a side wall or against a rear wall, protect walls with wainscot to above head height.

*Note: Use wainscot that can be easily cleaned of graffiti and cannot be soiled by hair products.*

- Side-aisle stairs and rear cross-aisles may not require wall protection.

5.3.4 Chair rail
- Chair rail is required in all classrooms with mobile furniture. Position the rail to prevent wall damage by chair backs and table edges.

5.4 Flooring and trims

5.4.1 Flooring
- Non-slip floors - Sloped aisles should have non-slip flooring such as recycled rubber.
- Quiet floors are required in Active Learning Classrooms - Linoleum and recycled rubber products are durable and reduce impact noise.
- Finished concrete (ground, polished, stained, etc.) is permitted on the tiers in lecture halls, but all aisles and instructor area(s) should have finish flooring.
- Vinyl Composition Tile (VCT) is not preferred and requires Owner approval, but if existing and in excellent condition, it may be permitted to remain.

5.4.2 Straight edging
- High traffic areas demand cast aluminum, mechanically fastened edging.
- Aisle stairs.
- Straight tiers.

*Note: Purdue has had great success with Wooster aluminum edging and will often retain old edging in renovations.*

5.4.3 Curved edging
- Curved tier edging of vinyl or rubber may be used only where no one can step or pry up the edging with a foot (under strip tables or behind fixed tablet arm chairs).
- Curved tier edging must be fully-adhered.

5.4.4 Vinyl base
- Base 4” high is required adjacent to moppable floors.
- Never place wooden base next to a moppable floor.
- Stepped base - Use 1 of 2 approved base conditions: preferred step-blocks (HAMP 1252) or Z turn-downs (PHYS 223).

5.4.5 Transition strips
- Transitions at classroom entrances should be metal and mechanically fastened.
- Transition strips at aisles or other flooring changes may be fully adhered vinyl or rubber.

5.5 Doors and hardware

5.5.1 Solid flush wood doors are preferred by Owner.

5.5.2 Vision lights
- Classroom doors must have vision lights with one-way glass.
- Size vision lights to be ADA compliant.
- Assure that the mirror-side faces into the classroom to reduce visual distractions from outside the room.

5.5.3 Doors in renovations
- Always replace or refinish damaged doors.
- Use ‘building standard’ wood species, grain match, and stain.
- Never paint doors unless directed by Owner (seldom used doors, closets, etc.)

5.5.4 Door hardware
- Hardware finish shall match the building standard.
- The Purdue Lock Shop will provide guidance and support regarding door
6 Classroom Audio Visual Equipment

6.1 Every classroom will have:
- AV cart/lectern with a floor or wall box
- Image devices
- Wireless internet access
- Four data jacks in the floor box or lectern wall box
- Four data jacks in the rack closet

6.2 Some classrooms will have additional AV equipment:
- AV Rack
- Additional floor boxes
- Amplified sound systems
- Power to the desktop
- Assistive listening systems
- Distance teaching & learning equipment
- Student response systems
- Sidewall flat panel displays
- Crestron switching matrices

6.3 Purdue AV Services will assist the A/E in planning.

6.3.1 Some AV items are furnished and installed by AV Services from project funds with little or no prep from the General Contractor (GC).

6.3.2 Some AV items require prep by the General Contractor and are furnished and installed by AV Services, e.g. AV racks, flat panel display infrastructure, and ceiling mounted projector infrastructure.

6.3.3 Some AV items require prep by the General Contractor and are furnished and installed by the General Contractor, e.g. projection screens, AV rack niches, and lay-in ceiling speakers.

6.4 Prep for projection screen(s) - AV Services will work with the A/E to determine the type and size of screen for each room.

6.4.1 Blocking and framing is required to support screens from wall or deck.

6.4.2 Permanent screens
- Stretched, wall-mounted projection screens are preferred.
- There must be adequate ceiling height and set-back from the first row.

6.4.3 Drop-down screens
- Motorized drop-down projection screens require Owner approval.
- Dual motorized screens shall have motors at opposite ends of each screen so the screens are close together.
- Assure that any wall-mounted raise/lower switch is outside the lowered position.
- Manual drop-down projection screens are preferred in small classrooms.
- In rooms with low ceilings (<10'), drop-down screens should be pocketed to elevate the upper edge of the image.

6.5 Prep for ceiling mounted projector(s)

6.5.1 Conduit, power, and structure for ceiling mounted projectors will be by the GC. The A/E should plan infrastructure as directed by AV Services.

6.5.2 Projectors are furnished, installed, and wired by AV Services.

6.6 Prep for flat panel displays

6.6.1 Prep for flat panel displays will be by the GC as directed by AV Services. The A/E should plan infrastructure including:
- Blocking in the walls to support large flat panel displays.
- Built-in Flat Panel Interface Box (with attractive cover-plate) requires dedicated 120 VAC 20-amp circuit, network PIC, and a 2” conduit to the video head end.
- AV Services will furnish and install both the mounting bracket and flat panel display.
- Detectable element for ADA compliance.

6.7 Prep for AV equipment rack

6.7.1 GC will build a custom niche for the AV rack. The A/E should plan a niche 84"H x 20"-22"W x 30"-36"D as directed by AV Services.

6.7.2 AV rack is furnished and installed by Owner.

6.8 Prep for Assistive Listening Systems (ALS)

6.8.1 All classrooms should have Assistive Listening systems (ALS).
- Preferred ALS is the Induction Hearing Loop.
- Include cancellation loops where required.
8813.2 Special Requirements – Instructional Spaces

- All conductors shall be surface mounted or concealed in ceiling of floor systems, no embedded conductors in floor slabs.
- Alternate systems if/when available may be considered.

6.8.2 Audiology specialists, as a consultant to the A/E, will design, specify, provide, install, and commission hearing loop systems.
- Contact Owner for the names of qualified firms.

6.9 Prep for sound amplification

6.9.1 Larger classrooms, or any classrooms with an Assisting Listening System, will be equipped with sound amplification systems.

Note: Rule of thumb for classrooms with sound amplification over 64 stations or 37 feet in length.

6.9.2 All classrooms with ‘front’ projected image(s) will include ‘point-source’ speakers.
- GC shall prep for point-source speakers to be furnished and installed by AV Services.
- Point-source sound is not advised when there are images in multiple locations in the room.

6.9.3 Larger rooms will also have distributed sound by means of ceiling speakers.
- Ceiling speakers will be specified by AV Services and installed by the General Contractor.

6.10 Prep for floor boxes

6.10.1 Floor boxes are provided at the AV lectern and in other locations, if directed by Owner, such as:
- At the instructor table.
- At designated secondary teaching location(s).
- At student tables.

6.10.2 Provide floor boxes where directed and with services as directed during design:
- 120 VAC 20-amp dedicated circuit,
- Data connection (PIC),
- 2” conduit video path to the AV rack, with pull string.

6.10.3 AV Cart/Lectern floor box
- Typically located 5’ from front wall and 6’ from side wall on the side opposite the door.
- In large lecture halls, the AV cart/lectern may be centrally located, not off-center as in smaller classrooms.

6.11 Prep for Distance Learning as directed during design.

6.11.1 Additional side wall lighting is needed to improve video production.

6.11.2 A typical 2-camera setup is the standard using wall-mounted till/pan/zoom cameras.
- Locate a camera above the presenter to capture the audience.
- Locate a camera diagonally across from the presenter to capture the presenter.
- Each camera requires a 120 VAC 15-amp circuit within 6” of a single-gang video J-box at 84’min. AFF with a 1” conduit home-run to AV rack or designated ‘head-end’ noted by Owner.

6.12 Prep for Student Response Systems not required.

6.12.1 A state-of-the-art Student Response System will be provided by AV Services in all tiered classrooms and flat floor classrooms over 60 seats.

7 Classroom Fixtures

7.1 Writing boards - All classrooms will be equipped with writing boards except those so large that ordinary writing is not legible from the back rows. Purdue will work with the A/E to determine what boards are needed in each classroom.

7.1.1 Size: Writing boards are at least 16 feet long and 4 feet or 5 feet tall, maximize length on front wall.

7.1.2 Style: Butt-jointed with concealed splines, wide anodized aluminum frame, boxed-end trays, top rail with cork insert, and map clips.

7.1.2.1 Do not use H-splines to join multiple panels.

7.1.3 Installation: All wall mounted boards shall be mechanically fastened to the wall with the top at 7 feet AFF.

7.1.4 Writing surface:
- Chalkboard - Purdue still has many faculty who prefer chalkboards.
- Dry Marker Board (DMB) writing surface – Use only PolyVision e3 Environmental CeramicSteel™ with lifetime warranty.

Note: No substitutions are permitted to PolyVision e3 writing surface, but the material may be bid by any
frame manufacturer. GC is to provide documentation from the vendor for each installation.

- Non-glare glass writing boards are permitted and have excellent longevity and ease of cleaning.

Note: To date Purdue has found the initial cost of glass boards prohibitive.

- Dry Marker paint or wallcovering may be used in Class Labs, if requested.

7.1.5 Sizes of writing boards:

- Instructor board - typically 4’ high by at least 16’ wide, mounted on the front wall or where it can be seen by all students.

- Teaming boards - may be multiple 5’H x 4’W boards spaced around the room or several continuous 5’ high boards on long walls.

Note: PolyVision 5’ high boards are made of 4’ wide stock used vertically with butt-joints every 48’.

Note: PolyVision 5’ wide stock is not preferred because it requires H-splines every 8’-10’ and has an uneven spray-on surface.

- Personal Boards - Small, portable DMBs are carried to the tables for collaboration and then hung on wall track or set on an easel-cart. Manufacturer and model must be approved.

8 Miscellaneous Classroom Items

8.1 Telephone

8.1.1 Provide a wall-mounted campus telephone near the AV cart/lectern. Provide phone mounting plate. Owner will furnish and install phone.

8.2 Recycling and waste containers

8.2.1 Plan a designated space for containers near all entrances, including multiple locations in rooms with multiple exits.

8.2.2 Owner will furnish and install containers.

8.3 Clock

8.3.1 A/E shall assure that appropriate mounting space is available on a side wall near the front of the room.

8.3.2 Owner will furnish and install a battery operated GIS clock.

8.4 Pencil sharpener(s)

8.4.1 GC to furnish and install a stained wood or other approved mounting block for the pencil sharpener(s).

8.4.2 Owner will furnish and install pencil sharpeners.

8.5 Signage

8.5.1 International Hearing Loop signs must be posted for any classroom with an induction hearing loop, including:

- Outside each door (approx. 5”W x 7”H) above or included within room-number sign.
- High on the side wall or front wall (approx. 8.5”W x 11”H in small classrooms, larger in large classrooms) with lettering visible from the back row.

8.5.2 Occupancy rating

- All classrooms over 50 stations must have maximum occupancy posted.
- Owner will determine occupancy rating for each room based on area.

8.5.3 Classroom sign

- A small editable frame is wall-mounted near the phone to indicate critical phone numbers and the furniture type and station count.

- Paper insert is provided by Owner.

8.5.4 Seat numbers

- Permanent seat number plaques shall be provided and installed on all large lecture halls. (Typically >70)

- Owner must approve seat numbering scheme.

8.5.5 Other - Active Learning Classrooms with fixed tables and technology hubs may need:

- table numbers,
- flat panel display numbers,
- writing board numbers.

8.6 Coat hooks

- Not required in General Purpose Classrooms.
- Departments may have coat hooks in Class Labs.
- If provided, coat hooks are seldom needed for every occupant.
8.7 Bulletin boards
- Not permitted in General Purpose Classrooms.
- Departments may have bulletin boards in Class Labs.

8.8 Writing board cleaning supplies
- Purdue may provide paper towel dispenser and spray water bottles in General Purpose Classrooms with marker boards.
- Departments may have cleaning supplies in Class Labs.

8.9 Hand sanitizer
- Not provided in General Purpose Classrooms.
- Departments may have hand sanitizer in Class Labs.

8.10 Artwork
- Artwork is occasionally provided by the University Visual Arts Committee ‘Art in the Classroom’ project.
- Artwork in existing classrooms must be carefully removed and reinstalled when the room is renovated.
- Departments may have artwork in Class Labs.

9 Classroom Furniture

9.1 All furniture must be Purdue Standard makes and models. Contact Purdue.

9.1.1 All classroom furniture shall have standard finishes, unless directed by Owner.

9.2 Tables
9.2.1 Tables - Built-in
- Built-in strip tables in lecture halls have cantilever bases and tops of varying widths.

9.2.2 Tables - Anchored or mobile
9.2.2.1 SCALE-UP - 120 degree tables (for 3)
- May be anchored in groups of 3 around a technology/power Tri-hub.
- May be provided loose to allow teaming for 6 or 9 students.

9.2.2.2 Media-sharing - Wedge-shaped or D-shaped tables
- May have an enclosed compartment for matrix devices.
- May have legs when only power is provided.

9.2.3 Rectangular mobile tables (for 2)
- Are typically 24"x54" or 24"x60" with casters on one end for 'wheelbarrowing'.

9.2.4 60" round tables (for 6)
- May be anchored and provide power to the tabletop.
- May be made up of loose pairs of half-round tables (for 3).

9.2.5 Other tables
- Instructor tables.
- Laptop credenzas anchored below flat panel displays.

Note: Beam-based tablet-chairs offer the opportunity to replace seats in the future without re-drilling the floor.

9.3 Chairs
9.3.1 Chairs - Built-in
- Pedestal based chairs with jury swivel are used at strip tables.
- Theater seats with anti-panic folding tablets are used in some lecture halls.
- Beam-based or pedestal-based tablet-chairs are used in older lecture halls.

9.3.2 Chairs - Loose
- Star-based task chairs with caster and swivel seats are preferred in Active Learning Classrooms.
- Instructor stools - All future classrooms will have a height adjustable stool/chair for the instructor.
- Modern mobile tablet-chairs with casters and large tablets are used for Active Learning Classrooms.
- Small-form 4-leg tablet-chairs with casters may be used in renovations where a smaller footprint is required to maintain capacity.
- 4-leg side chairs with casters may be used in Active Learning Classrooms where budget or space is an issue.
- Chairs in Seminar Classrooms may have arms and may or may not have casters.
• Sled-based side chairs are used in many small classrooms.

**Note:** Sled-bases can tolerate tilting better than 4-leg chairs.

9.4 Instructor furniture

9.4.1 AV cart/lectern
• AV cart/lectern shall have standard finishes.
• Selected, furnished, and installed by AV Services from AV budget.
• ADA accessible by side approach. Front approach models should be considered when budget permits.

9.4.2 Instructor table
• Loose tables have standard finishes.
• A 24” x 54” table is provided for the instructor in addition to the lectern.

9.4.3 Instructor chair or stool
• In all new classrooms, a height adjustable chair/stool is provided.
• A sled-based or task-based chair may have been provided in older classrooms.