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Overview

The intention of the Classroom and Office Design Guidelines is to regard these spaces more judiciously, to ensure that new construction and renovation is planned realistically, efficiently, carefully and conservatively. Promoting optimum use and conservation of these spaces in existing and renovated buildings is imperative to the overall mission of Northern Arizona University. These guidelines are intended to help create a dialog during the early planning process and assist in determining the most important criteria that should be addressed during classroom and office design. It is also important for these guidelines to remain flexible for the needs of Northern Arizona University in the future.

There are three types of guidelines that impact the programming, design, and construction/renovation of a classroom or office: NAU Design Guidelines, Space Management Guidelines, and NAU Technical Standards. The NAU Classroom & Office Design Guidelines are overarching principles to create functional, flexible and aesthetically pleasing classrooms and spaces. The NAU Technical Standards are a roadmap to planning, designing and constructing University of Northern Arizona (NAU) facilities. The NAU Classroom & Office Design Guidelines are part of the NAU Design Guidelines.

Design Review and Approval

1. Approvals

All classroom and office designs must be approved in writing by Northern Arizona University’s Planning, Design and Construction group (PDC). Reviews by PDC will be required at each step of the planning, design, and construction process (conceptual design, schematic design, design development, construction documents, and any value engineering or changes). A project must be initiated in order to seek approval for designs.

If classroom or office designs change the square footage of the space, what the room is used for, or it changes who is occupying the room, prior approval from the Space Management Committee is required. A “Space Allocation Request” form is available online at http://www4.nau.edu/vpadmin/space_management.html. Approval from the committee must be given before renovation or construction can begin.

1.1. Discrepancies

Any discrepancies between these Classroom Design Guidelines and the NAU Technical Standards or the ADA Standards for Accessible Design, shall be resolved with NAU PDC & Facility Services.
Classroom Space Design

1. Classroom Space Utilization

University classrooms are rooms used for scheduled classes that are not limited in their use to a specific subject or discipline. University classrooms include general purpose classrooms, lecture halls, seminar rooms, auditoriums, and computer classrooms. In the calculation of space utilization, classroom space is defined as the square footage within the walls including the seating area, the circulation space, any instructor/demonstration area, and storage/service area associated with the room.

Utilization of classrooms is defined by the student station size, room use in terms of hours per week, and station/seat occupancy rate. Spaces can vary by institution or campus, depending upon the existing or desired mix of classroom capacities, size of the institution, hours of use and types of programs. The station/seat space factor includes an allowance for students, instructor, internal circulation and 5% service. It can vary by room subtypes and type of seating, and depends upon the desired mix of room capacities. Architects should take into consideration the geometry of the room, since form can also impact the capacity of the room rendering a less efficient space.

2. Pedagogy and the Learning Environment

Technological advancement and accessibility of mediation at a lower cost, and subsequent changes in pedagogy all place demands on the physical space. There is still a need for lecture type rooms where seat count can be maximized by the nature of the learning method (instructor in front with presentation area, rows of seats). Yet, there is also an increasing need for rooms that can accommodate a variety of teaching methods, quick reconfiguration, and technology.

Recent programming exercises for new buildings and subsequent feedback on the use of the current classrooms have rendered the following valuable information:

- Faculty demand for flexible space in classrooms
- Faculty and student demand for collaborative work spaces
- Faculty and student demand for technology-mediated classrooms
- Ever increasing demand for special needs student furnishings.
3. Room Definitions – Space Standards

Different pedagogical techniques require different types of learning spaces. NAU has defined six basic classroom types that are prevalent on its campuses. The recommended square footage requirements reflect the pedagogical style, and take into consideration the diversity of cultural values regarding personal space.

3.1. Classroom: Traditional, Loose Seating

Traditional classrooms are our most common learning spaces. They have movable furniture, and are very flexible. Furniture can be rearranged to allow for lecture, seminar, group work, or anything else the instructor might require.

- Traditional classrooms contain 25 to 60 non-fixed seats.
- Flat floors are required.
- The first row of student seating should be a minimum of 1.5 times the width of the projection screen from the front of the room. Example: projection screen size 90”H x 120”W, first row of student seating would be 15’-0” from front of room. If not possible to maintain formula outcome, allow a minimum of 9 feet from the front of the room to the first row of seats.
- The instructor’s station will require 10 square feet.
- 20 - 22 square feet per student accommodates some collaborative functions.

3.2. Classroom: Traditional/collaborative

Collaborative classrooms are a subset of traditional classrooms in which the teaching methods require group work. The furniture is movable and flexible.

- Traditional/collaborative classrooms contain 25 - 40 non-fixed seats.
- Flat floors are required.
- 25 - 30 square feet per student accommodates flexibility in furniture arrangement to meet most types of pedagogy.
- Larger, flat work surfaces (sometimes achieved by pushing desks together)

3.3. Classroom: Seminar

Seminar rooms generally accommodate smaller numbers of students seated in any number of seating configurations.

- Seminar rooms contain 19 - 25 seats.
- A face-to-face seating arrangement is possible.
The instructor sometimes sits with students.  
25 - 30 square feet per student accommodates this type of pedagogy.

3.4. Lecture Halls

Lecture halls are larger tiered classrooms, usually with either fixed seating or fixed tables and movable chairs.

- Lecture Halls contain 50 - 150 seats
- Tiered floors (aisles may be sloped but seating areas must be tiered)
- The dimensions of the seating tier or tray must easily accommodate movement behind seats
- Theater-style seating with attached tablets (preferably retractable) or fixed tables with free-standing chairs.
- A curved configuration is preferred where possible
- 18 - 20 square feet per student overall, but at least 10.5 square feet per students for the seating area, allows for ample circulation amongst the seats.
- The square feet per student ratio is proportionate to the space associated with the podium/front of room, and amount of circulation space required. If the function of the room requires a large stage area or specific circulation pattern, the overall square feet per student may be over guideline.

3.5. Auditoriums

- Auditoriums contain more than 150 seats, with a practical upper limit of...~300
- Aisles may be sloped but all seating areas must be tiered
- Theater-style seating with attached tablets (preferably retractable) are allowed
- A curved configuration is optimum
- 18 square feet per student overall, but at least 6.5 square feet per student in the seating area, allows for ample circulation amongst the seats.
- The square feet per student ratio is proportionate to the space associated with the podium/front of room, and amount of circulation space required. If the function of the room requires a large stage area or specific circulation pattern, the overall square feet per student may be over guideline.

3.6. Computer Classroom
Computer classrooms are specific to the prescribed instruction mode.

- 32 square feet per student accommodates the larger station sizes for equipment and writing space, and generous aisle widths to allow unobstructed instructor movement behind seated students.
- Design for future, and current cabling and electrical requirements.
- Design space for alternative technology set ups:
  - Desktop computer provided where furniture is typically fixed and technology secured, software is necessary.
  - BYO (bring your own) technology where the furniture is flexible and the room supports mobile technology.
- Rooms may need additional HVAC, because of the added heat from numerous machines. This can be reduced if using energy saving designs and software settings.

3.7. Vocational & Laboratory Spaces

Reference Section #12 of the NAU Design Guidelines for design specifications;

Additional space allocation information and room definitions are available in the Space Management Guidelines.

4. General Application

4.1. Locations

- Classrooms should be located no more than one floor up or one floor down from the main entrance to the building.
- In some urban buildings, classrooms may be placed on upper floors, but the building design shall provide for ease of access and for convenient vertical mobility of students. In such cases, elevator studies must be provided to satisfy movement requirements especially between class changes.
- Classrooms should be located away from noise generating areas such as mechanical rooms, elevators, vending machines, and restrooms. If physical separation is not feasible, increased acoustical treatments may be needed.

4.2 Hallways/Corridors
• Hallways should not only be part of the building design and aesthetics, but should also be viewed as an extension of the learning environment. They should always be as visually interesting as possible.
• Egress hallways should be sized to accommodate at least double the loads identified in code due to the large number of students leaving and entering the rooms, and gathering space should be provided in the hallways for in between classes.
• Hallways should be viewed as an opportunity to improve classroom acoustics.
• Non-recessed doors that open into the hallways are to be avoided.
• Hallways should also be seen as opportunities to incorporate built in seating for waiting space outside of large auditoriums or lecture halls.

4.3 Informal Interaction Spaces

The design of adjunct teaching/learning space for small or one-on-one collaborative and instructional interaction is encouraged. Small spaces can be incorporated within lobbies, hallways or any other architectural opportunities that might be present.

• Touch down space: these can be café height surfaces with a public access computer to briefly check email or to surf the web. Typically they are not designed to encourage the user to stay for any extended period of time. This can be done by not providing a chair or by providing a high stool.
• Space for quiet study: Table space to spread out work, wireless and/or wired internet connection, plentiful outlets for power, comfortable ergonomic furniture, quiet surroundings, appropriate ambient temperature, natural light when possible, and location should be separated from busy areas but not “cloistered”, access to refreshments.
• Group study area: Moveable furniture including tables, white board, wireless and/or wired internet connection, plentiful outlets for power, comfortable, ergonomic furniture, appropriately quiet (no loud HVAC or other environmental noises,) appropriate ambient temperature, natural light when possible, location should be separated from busy areas but not “cloistered,” access to refreshments. There is a greater need for trash collection in these areas with the increased accessibility to food and beverage.
• Informal meeting area - includes areas outside of classrooms where students can continue classroom conversations with faculty: Some degree of privacy for conversations, white board, natural light when possible, comfortable, ergonomic furniture, appropriate ambient temperature. Ideally these areas should also have power outlets, wireless internet, and either projectors or large display screens to plug into.
4.4 ADA

- Design all classrooms to comply with *ADA Standards for Accessible Design*. Any discrepancy between the ADA Standards and this document shall be resolved in design review.
- Provide accessible wheel chair seating positions distributed in each room according to ADA Standards.

4.5 Universal Design Considerations

**Principle One: Equitable Use:**
The design is useful and marketable to people with diverse abilities.

- Provide the same means of use for all users: identical whenever possible, equivalent when not.
- Avoid segregating or stigmatizing any users.
- Provisions for privacy, security, and safety should be equally available to all users.
- Make the design appealing to all users.

**Principle Two: Flexibility in Use**
The design accommodates a wide range of individual preferences and abilities.

- Provide choice in methods of use.
- Accommodate right- or left-handed access and use.
- Facilitate the user's accuracy and precision.
- Provide adaptability to the user's pace.

**Principle Three: Simple and Intuitive Use**
Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.

- Eliminate unnecessary complexity.
- Consistency from one room to the next.
- Be consistent with user expectations and intuition.
- Accommodate a wide range of literacy and language skills.
- Arrange information consistent with its importance.
- Provide effective prompting and feedback during and after task completion.

**Principle Four: Perceptible Information**
The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.
• Use different modes (pictorial, verbal, tactile) for redundant presentation of essential information.
• Provide adequate contrast between essential information and its surroundings.
• Maximize "legibility" of essential information.
• Differentiate elements in ways that can be described (i.e., make it easy to give instructions or directions).

**Principle Five: Tolerance for Error**
The design minimizes hazards and the adverse consequences of accidental or unintended actions.

• Arrange elements to minimize hazards and errors: most used elements, most accessible; hazardous elements eliminated, isolated, or shielded.
• Provide warnings of hazards and errors.
• Provide fail safe features.
• Discourage unconscious action in tasks that require vigilance.

**Principle Six: Low Physical Effort**
The design can be used efficiently and comfortably, and with a minimum of fatigue.

• Allow user to maintain a neutral body position.
• Use reasonable operating forces.
• Minimize repetitive actions.
• Minimize sustained physical effort.

**Principle Seven: Size and Space for Approach and Use**
Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.

• Provide a clear line of sight to important elements for any seated or standing user.
• Make reach to all components comfortable for any seated or standing user.
• Accommodate variations in hand and grip size.
• Provide adequate space for the use of assistive devices or personal assistance.
4.6 Applicable Procurement Requirements

Classroom design and product specification must conform to procurement requirements set by the NAU Purchasing Department.

4.7 Classroom Storage

There is often a need for a small storage room for classroom supplies that is separate from the audio/visual storage. It should be approximately 100 square feet to store board supplies, movable lecterns and additional chairs. This space requires lighting, a lockable door, conditioned air, power, and a few shelving units for small supplies. It should have no window and needs to be equipped with a storeroom function lock. Classroom storage should be accessible from outside the classroom.

5. Classroom Interiors

5.1. Design

Classrooms should be developed and designed from the “inside out”. The following items should be considered when creating a new classroom:

- The optimum orientation and shape of the classroom should be determined by the primary expected teaching style, the capacity of the room, and the level of mediation.
- Designing for the flexibility of room use is strongly encouraged. The more square footage allotted to each student, the greater the opportunity for flexibility.
- The total square footage of each room is to be based on the type of classroom, the specific capacity and the type of seating, as specified in Section 3, Room Definitions.
- Classrooms with a capacity of 49 or less are to be as square as possible to allow for greater flexibility in furniture arrangement, and better sight lines.
- Generally, classrooms should be sized in a 2:3 or 3:4 width to length ratio. Long, narrow, “railcar”-style rooms are not acceptable.
- Lecture halls with capacities above 60 require tiered seating. A curved configuration improves visibility and student/instructor connectivity.
- Every seat must have an unobstructed view of the teaching wall. No columns or other visual obstructions are allowed in Northern Arizona University classrooms.
In classrooms where the instructor’s workstation is movable, adequate space must be provided to allow the workstation to be positioned at least three feet away from the teaching wall. In classrooms with fixed tables and/or fixed seating, the front edge of the instructor’s workstation must be at least six feet from the front row.

- Thoughtful placement of utilities (lectern umbilical cord, power outlets, room controls, network jacks, etc.) based on anticipated use and room flow patterns may be in the floor, on the walls, or mounted to fixed furniture. Should be designed with consideration to possible spills, dirt, tripping hazards.

5.2. Door/Room Security

5.2.1. Door Hardware

All classroom doors shall conform to Division #8 of the NAU Technical Standards. Additionally classroom doors should have the following:

- Concave wall bumpers installed at an appropriate height to assure wall protection.
- Door silencers to muffle the noise of the door closing.
- Card readers when applicable (see NAU Building Access Services specifications)
- ADA accessible doors and hardware as specified in ADA Standards for Accessible Design.

5.2.2 Doors

- Doors should be located at the back of the classroom to ensure that students who are entering or exiting the space will not disrupt instruction. Exceptions include large tiered classrooms or auditoriums, since those kinds of spaces can require multiple doors. In rooms that require two or more egress points, the doors should be located as far from the presentation area as possible while still meeting current building codes.
- Each door leaf to be a minimum of 36” wide, including those used in pairs at double doors.
- No strike mullion on double doors. Where exit, double doors require a strike mullion the mullion must have the ability to be removed.
• Door opening force, hardware, width, thresholds and maneuvering clearances should comply with ADA Standards.
• Occupancy within the classroom should be clearly (but discretely) visible from the hallway. Any viewing device must be positioned to meet ADA standards. Door shall be equipped with a vision panel made of shatterproof glass and tinted to reduce light transmission. The area of the glass shall not exceed 100 square inches and should be double-paned with acoustically rated seals. Doors without vision panels shall have either a viewer peep hole installed to provide a view into the room to check activity or have a separate sidelight.

5.3. Windows

Daylight is an important part of most learning environments. Windows should be included in classrooms whenever possible. Windows must comply with the “Glass and Glazing” specifications in Division #8 of the *NAU Technical Standards*.

• For window covering specifications reference Division #12 of the *Technical Standards, section 12500.*
• Interior windows should also be considered during the design phase of learning spaces in order to provide a sense of openness.

5.4. Flooring

• When selecting flooring finishes; refer to the specifications in Division #9 of the *NAU Technical Standards*.
• If carpet cannot be installed underneath fixed seating, all aisles and other open areas must be carpeted.
• All aisle risers must be of contrasting color to the remaining floor to highlight level change.
• Aisle riser nosings are preferred to be vinyl, metal or rubber.
5.5. Wall and Ceilings

5.5.1. Walls

- Refer to the specifications in Division #9 of the *NAU Technical Standards*.
- Internal classroom walls shall run deck-to-deck, with a Sound Transmission Coefficient (STC) rating of 50 minimum.
- Folding or moveable walls must meet the STC rating of 50 and should be specified for unique use only.
- Walls in lecture halls should be designed to provide the optimum acoustical environment. (See Acoustical Section 9)

5.5.2. Walls Protection

- Apply chair rail on the rear and side walls of university classrooms that contain movable student furniture.
- Chair rail material should be wide enough to work with tables and chairs of varying proportions and must be mounted at a height that will prevent damage to wall surfaces. Typically, the chair-rail will be 6” - 10” wide and the bottom edge will start approximately twenty-five inches above the finished floor. Approved rails include Inpro Corp #1800 Silhouette 8” wall guard or approved equal rails shall match the design of the room.
- Outside wall corners (such as entry recesses) shall receive corner guards 4’-0” A.F.F. applied so that students cannot work them loose.

5.5.3. Ceilings

- Refer to the specifications in Division #9 of the *NAU Technical Standards*.
- To accommodate classroom lighting and technology requirements, the ceiling height of all classrooms should be no less than twelve feet above the finished floor.
- In large sloped or tiered classrooms, the ceiling height is directly related to the distance from the front of the room to the last row of seats. Ceilings in lecture halls should be at least nine feet high at the rear, and the ceiling height at the front of the room must accommodate the appropriate screen size.
- The ceiling should act as a sound mirror, reflecting sound downward to blend with direct sound.
• Access for the maintenance of technology, power, etc. must be included where applicable. (Consult the Electrical and IT departments for current specifications.) Running wide low-voltage cable conduits inside the drywall with regularly spaced access points can assist in rewiring.

5.6. Vertical Writing Surfaces

• For specifications for vertical writing surfaces reference Division #10 of the NAU Technical Standards.
• Multiple boards may be required depending on programming.
• Boards should be located on at least two different walls. A board must always be installed on the front teaching wall; the other wall/walls should be selected as appropriate to the layout of the room.

NOTE: Single boards may not be longer than 12 feet (accessibility to classrooms through doors and elevators)

5.7. Signage

5.7.1. Room Identification Sign

Each room will have a standard room identification sign mounted near the door on the lockset side (exterior of room), mounted at a height as indicated by The ADA Standards for Accessible Design. Braille lettering is required on the sign to identify the room as well. Standard room ID sign is a modular sign produced by NAU Sign Shop consisting of (3) 3” x 9” panels and (1) 9” x 11” clear plastic page holder. For signage guidelines reference Section #10 of the NAU Design Guidelines. Signage needs to be legible from a distance and while moving in the traffic flow. It should be of high contrast and self-explanatory. For Room Numbering guidelines reference Section #4 of the NAU Design Guidelines.

5.7.2. Bulletin Boards

• Provide at least one 48” x 48” bulletin board in each room.
• Location and finishes of the bulletin boards will be determined at design.
• The department reserves the right to review all posting and remove anything they deem inappropriate; such as postings for other
universities, non-NAU sponsored events & for profit business advertising.

5.7.3 Maximum Occupancy Sign

Provide maximum occupancy sign to be mounted in rear of room at a height high enough to discourage students from removing it. Size to be 8” x 11” minimum.

5.8. Colors/Finishes

- Accent walls are desired. Avoid using accent color on walls that might reflect onto projection screen.
- Specify highly durable finishes that are easy to maintain.
- Use of approved “green” products in all applications is required (See NAU Purchasing Department specifications)

5.9. Reflectance Values

The Engineering Society of North America recommends the following reflectance values for finish materials.

- Ceilings - 80% or higher
- Non-accent walls - between 50% and 70%
- Floors - between 20% and 40%

Reflectance values of paints, laminate and other finish materials should be selected to enhance ambient illumination and the illumination at the instructor’s and student’s work areas. Recommended value - between 40% and 60%.


In accordance with ARS HB2583, “All classrooms in the State of Arizona are to be equipped with a United States flag and copies of the Constitution of the United States and the Bill of Rights.” United States flags must be manufactured in the United States and be at least two feet by three feet. Hardware must be provided to appropriately display the United States flag. Flags in classrooms shall be displayed in accordance with Title 4 of the United States Code. The legible copy of the Constitution of the United States and the Bill of Rights must be manufactured in the United States, and shall be displayed adjacent
5.10.1. Flag Location

- Flags should be hung in the front of each room in a holder attached directly to wall.
- The flag should not interfere with the screen, the writing surface, or any other classroom activity.

5.10.2. Constitution / Bill of Rights

- The Constitution and the Bill of Rights are two separate documents, which are produced in-house by NAU.
- Install the documents next to the writing surface in the front of each room, behind the instructor, adjacent to the wall mount flag or as appropriate for the layout of the room.

6. Furniture

Consult the NAU PD&C Interiors Department for all current furnishing specifications.

6.1. Tables/Work Surfaces

6.1.1. Design Standard

- Tables can be for 1, 2, or 3 students allowing a minimum of 30” per student. The number of students per table is flexible and is determined by the type of classroom and the configuration of the classroom.
- To allow for note taking and reference materials the minimum work surface area should be 3.75 square feet per occupant.
- Depths of tables can vary from 18”-30” based on room layout.
- Modesty panels are allowed and encouraged when applicable.
- Fixed tables with cantilevered pivot arm seats are not allowed (because they are wheelchair inaccessible). If fixed tables are installed, provide loose seating with casters.
- Furniture must be able to interface with technology (i.e. pathway for power/data), based on PD&C and Electrical department specifications.
- When tablet arms are specified the following criteria must be met:
• Provided tablet size should be equal to or larger than 12 inch x 15 inch (1.25 square feet).
• 10% - 15% of the tablet work surfaces should have a left-handed orientation or be left-right reversible.

6.1.2 Construction/Fabrication

• Laminated work surfaces shall be constructed of plastic laminate applied to MDF (Medium-Density Fiberboard) or hardwood plywood. Tops shall have a non-glare, medium tone surface to reduce eye strain.
• The legs of fixed tables should not block the student’s knee space within the 30-inch work space allotment. Table legs should not impede configurations that allow additional students to work collaboratively.
• Table edge to be a heavy-duty extremely durable material.
• Tables to withstand loading of 300 lbs. of applied load (people sitting on table) per linear foot.
• Rounded corners preferred over sharp 90 degree corners

6.1.3 Clearances

Widths between aisles of tables to be 36” or greater depending on room layout and number of students serviced per aisle.

6.1.4 ADA

In cases where fixed tables and loose chairs are used or where fixed seating with tablet-arms is used, adjustable-height ADA tables must be provided according to ADA Accessibility Standards. Insure that 72” clearance behind table is maintained for access.

6.1.5 Replacement Availability/Warranty

• Work surfaces/Tables shall be procured from “name brand manufacturers that demonstrate proven track records in the marketplace, and maintain stock levels that insure replacement can be made without backorder delays.
• Provide written warranty for all proposed furniture. NAU prefers 10 year or longer warranty on all furniture items.
6.2 Seating

Seating should be selected that will meet minimum passive ergonomic standards and still satisfy the requirements of Uniform Building/Fire Codes, durability, functional comfort, appearance/finish, and performance over time. Chairs should accommodate both left and right-handed individuals. Chairs should be comfortable for use by people ranging in size from the 5th percentile (4’-11” tall, approximately 113 lbs.) to the 95th percentile male (6’-2” tall, approximately 246 lbs.).

6.2.1 Design Standard

When selecting seating in order to achieve minimum standards of comfort, aspects such as width of seat, type of lumbar support, appearance, versatility of seating, replacement availability/ease of maintenance and cost should be considered.

6.2.2 Seating Width

- The selection of seating width should be based upon the criteria set forth for the type of seating utilized.
- Seat width comfort will range from 18 to 22 inches for loose seating such as stackers, sled base chairs & chairs with casters (4-leg or star-base).
- Auditorium fixed seat width to be at 24 inches unless restricted by row curve.

6.2.3 Seating Back Support

- All seating shall have proper lumbar support.

6.2.4 Seating Clearances

To ensure adequate circulation through the learning spaces, minimum clearances must be maintained as referenced in Section 3.

6.2.5 Appearance

- The appearance shall be coordinated with the interior of the classroom and meet the acoustical requirements for the space. Light colors are discouraged.
• Upholstered seating is recommended in large auditoriums or lecture halls only where reverberation of sound is a problem.
• The construction and materials should be selected so that their color and surface are consistent with the other furnishing within the classroom.
• For material specifications reference Division #12 of the NAU Technical Standards.

6.2.6 Replacement Availability/Ease of Maintenance/Warranty

• Chairs shall be procured from name brand manufacturers that demonstrate proven track records in the marketplace, and maintain stock levels that insure replacement can be made without untimely backorder delays.
• Chairs shall be selected that facilitate easy cleaning of the floor surface, and require minimum maintenance of the seat covering (if applicable).
• Provide written warranty for all proposed furniture. NAU prefers 10 years or longer warranty on all furniture items.
• When casters are specified on seating, insure that the casters are the correct type for the floor finish (carpet, VCT, etc.)

6.2.7 Quality

High quality seating shall be purchased to minimize the long term life cycle costs since funding for equipment replacement, repair, and maintenance are becoming increasingly difficult to obtain.

6.2.8 ADA

All ADA accessible seating in classrooms should comply with ADA Standards for Accessible Design. We require that Universal Design be applied when possible.
• In Classrooms with loose tables and chairs, NAU standard prefers at minimum 10% of seats to have height adjustable tables.
• In classrooms or lecture halls with fixed seats with or without tablet arms, minimum required accessible locations to be per 2009 International Building Code.
• In lecture halls with fixed tables and loose seats, the accessible locations are required to have height adjustable tables that coordinate with the fixed tables.
6.2.9 Versatility

- Fixed seating shall be provided in all large lecture halls, and shall be constructed of cast iron or steel frames. Auditorium seating shall have retractable tablet arms.
- Non-fixed lecture seating requires free-standing chairs with casters.
- In lecture rooms where programs will typically exceed 2 hours, padded seats and backs can be selected and passive ergonomic considerations should be made.
- Fixed auditorium seating may require electrical/data outlets, based on programming needs.

6.3 Computer Workstations

Computer workstations are used for teaching methods which require University-procured computers/laptops. Computer workstations should accommodate computer equipment, plus the necessary space for student materials.

6.3.1 Design Standard

- Allow for a minimum surface area of six and one quarter (6.25) square feet to be provided.
- Furniture selection for computer workstations shall have provisions for securing the equipment and the furniture in the room.
- Computer workstation classrooms shall have provisions for increased ventilation and conditioned air supply due to the increased heat load produced by the computers.
- Provisions to prevent or mitigate electrical fires should be considered for computer workstation equipped classrooms.
- Furniture may be arranged in a row or in collaborative pods.
- ADA tables must be provided according to ADA Standards.
- Computer classroom furniture is an extension of the programming requirement and should conform to the department’s needs.

6.4 Instructor Classroom Furniture Accessories

When providing additional equipment, attempts should be made to maintain aesthetic and functional compatibility with the overall decor of the room.
6.4.1 Design Standard

- For all rooms: Provide an adjustable height, instructor’s lectern, a height adjustable table and a stool.

6.5 ADA Table Mediation

All tables and lecterns must comply with the *ADA Standards for Accessible Design*.

6.6 Miscellaneous Classroom Items

- Recycling and trash receptacles are required in all rooms. See NAU Purchasing Guidelines. Containers shall not encroach on circulation path.

6.7 Lighting and Electrical

6.7.1 Lighting Zones

As a rule, all classroom spaces will have lighting organized into a number of zones. These zones can be combined and dimmed to create any number of different lighting scenarios. Classroom lighting should include day lighting, multi-modal lighting, controllability, and optimize energy performance. A room can be zoned based on the amount of day lighting available, with each fixture responding to the amount of light at any time and location. For lighting specifications refer to Division #26 of the *NAU Technical Standards*.

The zones described below are functional zones. There are five functional lighting zones in most classrooms:

- Zone 1 — Main classroom lighting (student seating area) this zone services students and allows them to read and take notes in class. Use multi-directional recessed (lay-in) fixtures that cast a modest amount of light downward (35%) and a larger amount of light toward the ceiling (65%), provides a comfortable overall lighting with relatively high efficiency. Avoid pendant mount fixtures.
- Zone 2 — Instruction area (front of classroom and lectern area). Design whiteboard and demonstration table lighting to provide visibility when the room lights are at full intensity. The foot candles in this area should be consistent with the overall lighting of the room.

- Zone 3 — Non-projection white board (board that is not obscured by a lowered projection screen). Lighting of whiteboards during concurrent AV presentations allows instructor to write on the board while in projection, without light bleeding over onto the projected image.

- Zone 4 — Projection white board (board that is obscured by a lowered projection screen) Use the same requirements as Zone 3 during non-projection mode.

- Zone 5 — Instructor workstation. The instructor should be able to read notes and use AV equipment with low-light conditions of projection mode

**Foot Candle (fc) Guidelines***

<table>
<thead>
<tr>
<th></th>
<th>Day Lighting Mode</th>
<th>General Mode/Non-Day Lighting</th>
<th>AV Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student desk</td>
<td>30 fc min</td>
<td>30 fc min</td>
<td>10 fc min</td>
</tr>
<tr>
<td></td>
<td>150-200 max</td>
<td>70 fc max</td>
<td></td>
</tr>
<tr>
<td>Whiteboard</td>
<td>30 fc vertical min</td>
<td>30 fc vertical min</td>
<td>Na</td>
</tr>
<tr>
<td>Screen</td>
<td>Na</td>
<td>Na</td>
<td>8 fc vertical allow 8:1 video image with 3000 lumen projector</td>
</tr>
<tr>
<td>Walls</td>
<td>10 fc vertical</td>
<td>10 fc vertical</td>
<td>Na</td>
</tr>
</tbody>
</table>

* Based on the “IESNA Lighting Handbook Reference and Application”, Ninth Edition

In larger auditoriums, install a down-light in a location that will provide adequate illumination on the face of the sign language facilitator when the AV mode lighting is in place.
6.7.2 Emergency Lights

Isolate emergency light radiation away from the projection screen.

6.7.3 Color Temperature

The color temperature for all light fixtures should be the same. The color temperature goal is 3200 degree Kelvin. Color temperature range of 3000-3500 degree Kelvin is acceptable as long as all of the fixtures are the same.

6.7.4 Motion Sensors

Motion sensors are preferred in all rooms. When installing motion sensors, be sure to set timer to maximum to avoid light shut off during low-motion activities such as test taking. Motion sensors should also be positioned so that they are not falsely triggered by shifting shadows, bulletin board postings moved by ventilation, etc.

6.8 Electrical

For electrical specifications, including outlets refer to Division #26 of the NAU Technical Standards.

6.8.1 Wall Outlets

- Place outlets on walls of the classrooms at 6’ intervals or as necessary to allow for 30% student utilization.
- Wall outlet intervals in the lecture halls are not as critical. (adding occasional data and/or power outlets on the vertical surfaces in tiered halls may be useful, if power and data are not incorporated into the furniture design) Follow code to determine the appropriate number.
- Install one phone jack, one data port, and one electrical outlet adjacent to the instructor’s workstation (Figure 1).
- Install one 2-gang AV wall box (min 2 W’ D) at least 18 inches above the finished floor.
- Install two 1”- 4” conduit stub-outs above the ceiling (if the existing wall is hollow, conduit may not be necessary).
6.8.2 **Ceiling Outlets**

- Install one AC power quad outlet attached by flexible conduit to a J-box located above the suspended ceiling to allow for the future installation of a data projector, wireless access point, wireless video receiver, etc. This quad should be sited 12’-15’ from the screen.
- Install one single-gang data outlet above the ceiling 12’-15’ from the screen.

Provide 120V power capped at a J-box located above the suspended ceiling to allow for the future installation of a low voltage motorized screen controller.

6.8.3 **Floor Outlets**

- Provide floor outlets for every classroom to ensure optimum flexibility.
- Floor boxes are to accommodate AV, AC power, data.
- The number of floor outlets is determined by the size of the room, the capacity, and the function. Identify the likely furniture layout before placing outlets.

6.9 **HVAC & Fire Prevention**

For other HVAC and Fire Life Safety specifications refer to Division #23 of the *NAU Technical Standards*.

6.9.1 **Diffuser Location**

Diffusers should be located as to avoid any movement of the screens which would be caused by air flow.

6.9.2 **Location of Above-Ceiling Mechanical Equipment**

Access to mechanical equipment for the building should not be located within a classroom.

6.9.3 **Noise**

Excessive background noise or reverberation in classrooms interferes with speech communication and thus presents an
acoustical barrier to learning. In all phases of the classroom design and construction process, careful attention must be paid to acoustics. Locate all mechanical equipment as far from the classroom as possible. If adjacency is unavoidable, provide for sound attenuation methods at doors, light fixtures, and all other ceiling or wall breaches. System components (fans, ductwork & diffusers) shall be selected to meet sound criteria of NC20 to NC25.

6.9.4 Fire Strobes

Locate fire strobes away from projection screen to prevent sightline obstructions when screen is extended.

6.10 Acoustics

When classrooms are located within close proximity to functions that generate significant noise levels, higher STC ratings and special wall-construction details must be included for all interior walls, elevated slabs, floors and exterior walls (including doors and windows). Provide for sound attenuation to contain noise generated from adjacent locations and from both above and below the classroom location.

- The review of acoustical requirements for classrooms by an acoustical consultant is recommended whenever possible.
- Minimum NC ratings: 0-59 seats: NC30-35 or less; 60 to 149 seats: NC 25-30 or less; 150+ seats: NC20-25 or less.
- In all cases, walls in classrooms should have a minimum sound transmission class (STC) of 50 as recommended: ANSI S1.4-1983 (R 2006).
- Individual equipment such as fans, ductwork and diffusers shall have ratings not exceeding NC 25 throughout the load range as recommended: ANSI S12.60-2002.

6.11 Mediation

NAU classroom design continues to evolve as technology enhances teaching and as learning capabilities become available. Aside from actually installing technology in classrooms, NAU strives to ensure proper infrastructure is provided for classrooms in order to service upcoming technologies without incurring future construction costs. NAU specifies room layout, power locations, data connections, and audiovisual infrastructure room layout. This document identifies general elements
NAU considers when planning an educational space. NAU recommends providing Basic Mediation (laptop projection) in any classroom.

Recommended Technology Enhanced Formal Learning Spaces

Every classroom at Northern Arizona University should have a minimum configuration for technology enhancement in order to promote and support pedagogical and technological innovations that increase student engagement, learning, and success. The following recommended standards not only build upon the current University strategic goals, but look into the future as NAU continues to provide outstanding undergraduate, residential graduate, professional programs, and sophisticated methods of distance delivery.

The following two tiers of technology for classrooms and selected enhancements, adopted as classroom standards, will also assist faculty with their expectations of technology as they consider the learning environment in which they teach, and will allow them to intuitively use the technology provided regardless in which building or department they teach.

All configurations included here are considered to be bare minimums, and departments may choose to have additional hardware available in individual classrooms. The listed technology costs are approximate, and cover equipment costs only, without regard to installation, infrastructure, electrical, or additional furniture required in the classroom.

1. Equipment
   Consistency of equipment across rooms is very important. At a minimum, colleges should standardize on typical equipment set for ease of training, repair and replacement, and movement between rooms.

   Current departments/areas that could be models for a standard configuration: School of Communication, Engineering, Health and Learning Center (HLC) classrooms, WA Franke College of Business classrooms, and Hotel and Restaurant Management.

   **Tier 1 - Minimum Technology Enhanced Configuration**

   Approximate Technology Cost: $x,xxx.xx

   - A basic push button control system that adheres to ADA accessibility standards
- A lockable lectern that can be adjusted with pneumatic or electronic risers for accessibility.
- 3200+ Lumen Ceiling Mounted Projector (or ~60” HDTV 1080p resolution)
- Podium or Desk rack mounted computer with a 17 inch flat panel display, minimum 4 GB RAM and Core i5 or better processor, Windows 7 or MacOS X (where both platforms are in common use, a dual-boot Mac Mini is a practical option. At NAU, this includes A&L, SBS, and Comm.).
- Laptop connection with Ethernet, VGA (or better, HDMI) output, and stereo sound output
- RCA Composite Audio-Video Connection, (Component Video or HDMI for higher quality)
- CD/DVD player (may be part of the computer installation)
- Pull Down or Powered Screen
- Tiered (Staged) Lighting (dimmable) around the front projection screen
- Small 20 watt amplifier and speaker system
- Portable microphone for instructor in classrooms with seating for 40 or more students
- Stereo mini-plug for iPods and other MP3 players
- Dedicated A/C 15amp power for Projector and Instructor Podium/Desk
- Podium task lamp to illuminate presenter materials (optional)
- iClicker receiver (optional - people who use clickers tend to carry their own)
- Webcam (either integrated or external)
- USB Headset Microphone (for higher audio quality for Camtasia recordings, Skype and Collaborate sessions, etc.)
- Audio System (based on room size)
- Wireless connection for students
- Data on wall or in floor boxes

This configuration of technology includes integrated room control. There will be networking technology for at least the podium computer and Laptop, and standard NAU wifi for student connectivity.

**Tier 2 - Standard Technology Enhanced Classroom Configuration**

Approximate Technology Cost: $x,xxx.xx

Everything in Tier 1 and the following:

- Powered Projection Screen
- Upgraded to a professionally programmed touch screen control system (See example of [Crestron touch screen used in media classroom at SUNY](#))
- Upgraded 4500+ Lumen Projector with power zoom
Multiple projectors, projection screens, or LCD displays for seminar and auditorium classrooms may be useful; ability to display different content or the same content on each screen

Sound reinforcement to expand reach of instructor voice in large rooms

Enhancements that will be installed in selected classrooms on an as-needed and strategic basis

Approximate Technology Cost noted for each item.

- Web Conference room: wireless microphone and podium webcam for use with Bb Collaborate (Secondary camera located in the front of the classroom)
- Video in smaller rooms - two or three plasma or LCD 50" to 80" monitors (quieter than projectors, no bulb replacement costs)
- Wireless projection (i.e. Apple TV, Class-spot or Chromecast – allows faculty and students to display from iPads to room display using airplay technology.
- Lecture capture appliance or cloud based such as Echo 360 (appliance) or Tegrity (cloud)
- An interactive whiteboard system, such as eBeam, can be used with a normal dry-wipe board to replace the more expensive electronic writing devices used for front projection, such as a SmartBoard or Sympodium
- Document/Pad camera (as price drops, these might be moved to Tier 1)

Mobile Computer Labs (Technology Carts) can be used as an alternative to an instructional computer lab when computers are not needed every day. A cart that includes a network printer, wireless access point, and stored laptops that are charged when on the cart, allows the mobile lab to be wheeled into a classroom on a scheduled basis. This also eliminates the need to retrofit a classroom with power and data cables. For more information on Mobile Computer Labs, see the Learning Spaces Study – Fall 2007.

2. Instructor Station

Classroom podiums need to allow instructors access to USB and CD/DVD devices along with connecting their own laptop, but should be robust against cable, computer, or peripheral damage. Other A/V equipment may include a microphone, a document/pad camera, and LCD projector controls. Designs with built-in security, such as podiums that house the computer and electrical connections inside a locked (but adequately ventilated) cabinet with rear access, are a must. A phone in the room with departmental technical support contact information is recommended. Remote management software is also recommended.
When designing the room, it is critical to speak with those who will support and use it. Some instructors may prefer to sit and others will want to move around the room while teaching. Tables with a modified or recessed control panel, and electronics housed separately, are alternatives to the standard podium-style instructor station. A remote (wireless) mouse/slide advancer/laser pointer is essential for those who move around, and is recommended for all classroom instructor stations, need will be determined on a per room basis (as battery life and charging can present problems).

3. Network Requirements

Wired data connections are needed at the teaching station area, the projector, the webcam, and to the fixed student computers if applicable. Wireless networks are considered a supplement to the classroom network. Presently, our wireless networks will not provide guaranteed shared multi-user and rich media over a network. Please refer to Division #27 of the NAU Technical Standard’s new construction guidelines for current cable specifications.

4. Teaching Station

The teaching station or lectern must be height adjustable to meet the needs of any instructor. The teaching station can be wall fed or floor fed though a floor box depending on room size and requirements. When poke-thru devices are not feasible due to structural limitations or costly abatement, use Extron Electronics AVTrac low profile floor-mount raceway system or equivalent. With the proper conduit infrastructure in place, the teaching station can range from a simple table housing a laptop connection to a permanent PC station offering rack mount equipment, microphone, document cameras, interactive monitor, audience response system, class capture (podcast), and videoconference gear. NAU uses AMX, Crestron and Extron control systems to standardize and simplify room control as well as provide network administrative functions such as equipment status.

5. Mediation Packages

NAU strives to provide the basic mediation package in each classroom. The level of mediation provided is based on such variables as size and shape of the room, teaching style and discipline-based need.

Mediation package options are as follows:
• **Capacity and/or Discipline-Specific Requirements may include:**
  Microphones for large capacity rooms (over 40 capacity)
  Document camera
  Slide projector
  Assisted listening (over 40 capacity)
  Multiple projectors / screens
  Stereo audio
  Video conferencing
  Class capture
  Class streaming
  Annotative monitor

5.1. **Screens**

5.1.1. **Location**

• Multiple screens may be required. The type of seating, the capacity, the room configuration and the primary instruction style dictate the optimum number.

• The number of screens required is based on the seating capacity, the configuration of the room, and the primary instruction style.

• Where possible, NAU recommends angling the screen in the corner of the classroom to both maximize the viewing angle to the audience and increase free whiteboard writing space. Angle-mounting the screen must typically addressed in building planning stages since it usually requires detailing reflected ceiling plan to address ceiling grid and lighting. If angle-mounting the screen is unfeasible, screen placement should still remain opposite from the teaching station area on the teaching wall to maintain whiteboard surface. (Please see Figures 1 and 2). Ceiling height is also critical when planning the layout of a Classroom. NAU recommends a minimum of 12 ft. finished ceiling height to accommodate both lighting and technology.

• The higher the ceiling, the larger the screen and image size it can accommodate. Screens should drop no lower than 48 inches from the floor.

• LCD multimedia projectors and motorized projection screens are recommended for use in all NAU classrooms including computer labs, and wet and dry laboratories. Seminar rooms may opt to use LCD panels for small group presentations, and
Video Conference classrooms are configured as per the specifications set forth in Section 3.1 of this document. Large auditoriums and lecture halls may require a secondary manual projection screen which can be used with an overhead projector or pad camera. This screen should be located so that the main screen can be used simultaneously. Two or three motorized screens should be used in rooms with over 60 student seats.

- LCD projectors should be mounted from the ceiling and not part of the instructor podium. Selecting an LCD projector that produces adequate lumens for visibility in a well-lit room is important, as is the ability for a projector to be flipped vertically and horizontally to allow for upside down mounting. Lockable security housing that is easy to open for servicing and changing bulbs, and a sturdy ceiling mount, is recommended due to the frequency that projectors are targeted by thieves.

- Lighting controls in all learning spaces are necessary to provide best viewing of electronic images and text. Window treatments and dimmers for lights above screens should be installed wherever LCD projectors or other document cameras are used for presentation.

- Projection screens and whiteboards should be located so they can be used at the same time. All screens should be installed in front of any lighting fixtures that are used to illuminate whiteboards. Control switches should be visibly accessible, and labeled, for ease of operation. Housing for motorized screen units should be recessed into ceilings with the ability to drop out components of the screen and the motor separately for repair and maintenance.

- Projection screens should align with student seating, the screen mounting heights, and screen sizes at NAU should adhere to the following general guidelines.

  “Align screen so that 45-degree sight lines left and right of the perpendicular centerline cover all student seats within the 90-degree cone. The vertical angle for the front seated viewer to the top of the screen should not exceed 35-degree to floor at student viewing height. A/V designs should include sight line diagrams that verify these requirements. Construction Documents should note angle and dimensions on plan to allow exact placement in field.

- Screen Mounting Height – Set high and fully recess the housing to keep
- bottoms of viewing area 48 in. (preferably 72 in.) or greater above floor.
- Screen Size – size screen width to most distant viewer - use a ratio of 1 to 4.
- Example – 32 ft. to most remote viewer gives an 8 ft. wide screen. Alternatively, the maximum distance to the back row should be 6X image height, and the minimum distance to the front row should be 2x image height.” (Yale University Classroom Design Review Committee, 2007, p. 8).
- For more detailed specifications and cost estimate examples, see Appendix C - Learning Spaces Procurement Specifications.

5.1.2 Size and Automation

- To calculate the distance from the projection screen to the seats the following formulas are adequate:
  Minimum distance to front row = 2x the image size
  Maximum distance to back row= 6x the image size
- All projection screens must be tab-tensioned with aspect ratios of 16:10 to accommodate high definition format.

6. Wireless Access Point

- Enclosure should be required within ceiling- or wall-mounted enclosure dependent upon room layout and ceiling height access.
- CAT 6 cabling & POE Ethernet according to Division #27 of the NAU Technical Standards.

7. Infrastructure

When additional heat buildup is a possibility, the AV designer is responsible for reviewing the potential cooling load changes with the NAU PM and Mechanical Engineer when applicable.

8. Special Conditions

There may be rooms that will require discipline-based equipment or additional technology, such as media systems, not listed in these guidelines.
9. Floor boxes & Poke-thru devices

- Poke-thru device to be Wiremold/Legrand 8ATCGY (or equivalent) with the following add-on features (required). Interior Device configuration to include #682A (device plate to accept up to 2 ports of communication devices), #68REC (proprietary 20-amp duplex power receptacle), #8AAP (mounting plate to accept up to 4 Extron AAP Series device plates, & #8ACT6A (mounting plate to accept up to 6 ports of communication devices in any one of 3 gang in the center area). Underside Device Configuration to include #5PTHA (1/2 gang pass through housing assembly), #1PTHA (1 gang pass through housing assembly) & #575CHA (1/2 gang ¼” conduit housing assembly). Cover color to be grey.
- Floor box to be Wiremold/Legrand RFB9 (for retrofit floor cuts) and RFB 11 (pre-construction and where depth permits).

Office Space Utilization

1. Office Space Design

Optimizing our current and future office space ensures that, as an institution, we use these important physical resources effectively. The following guidelines were developed to help Northern Arizona University (NAU) allocate office space and align these decisions with benchmarks of existing and future buildings.

1.1 Square Footage Ranges

The square footage ranges are provided to accommodate the varying programmatic needs of these positions across the University. For example, a unit may assign an office on the smaller end of the square footage range to a person who is more likely to spend time working in a research lab than in an office. Conversely, a person may be assigned an office on the upper end of the range to accommodate frequent meetings with multiple individuals.

1.2 Applying the Guidelines in Shared Spaces

The recommended square footages of shared spaces specify the total amount of office space that should be dedicated to any one person. They do not necessarily indicate the actual size of the office or workspace. For example, a department should designate a cumulative 120-256 square feet for four temporary employees (30-64 square feet per person); this space may or may not accommodate all four persons simultaneously.
2. Private Offices, Shared Offices and Cubicles

**General Guidelines:** Color selection and finishes in state-owned buildings (carpet, wall covering, demountable wall, vinyl base, paint, fabrics and laminates, etc.) must be approved by the Facility Services- Planning, Design, and Construction.

2.1 Private Offices

Private offices are necessary for many positions at the University. The size of the office varies depending on the type of work and the need to meet with individuals or groups frequently and in a private setting. These spaces should be able to accommodate a desk, files, bookshelves, and space to meet with an additional one to six people. The following positions would, in most cases, require private offices:

<table>
<thead>
<tr>
<th>Executive</th>
<th>Academic</th>
<th>Administrative</th>
</tr>
</thead>
<tbody>
<tr>
<td>President</td>
<td>Dean</td>
<td>Associate or Assistant Vice President</td>
</tr>
<tr>
<td>Vice President</td>
<td>Associate or Assistant Dean</td>
<td>Director</td>
</tr>
<tr>
<td></td>
<td>Department Chair</td>
<td>Associate or Assistant Director</td>
</tr>
<tr>
<td>Faculty, Tenure Track</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faculty, Research</td>
<td></td>
<td></td>
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<tr>
<td>Unit Administrative Manager</td>
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</tbody>
</table>

Some positions in a unit or department may require private office space, while a person with similar duties in another unit or department may not. The following positions should be allocated private office space on a case-by-case basis:

<table>
<thead>
<tr>
<th>Academic</th>
<th>Administrative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty, Non-Tenure Track</td>
<td>Manager</td>
</tr>
<tr>
<td>Staff, Professional (Full-time)</td>
<td>Staff, Professional (Full-time)</td>
</tr>
<tr>
<td>Faculty, Emeritus (Active)</td>
<td></td>
</tr>
<tr>
<td>Technician, Associate or Specialist (Research)</td>
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</tbody>
</table>
### 2.2 Shared Offices and Cubicles

Shared offices, cubicles, and open workspaces are an efficient use of office space. Shared offices should be assigned to individuals who require a certain amount of privacy or reduced noise levels. Cubicles and open workspaces are particularly space-efficient, flexible, and can accommodate additional guests as needed. The following positions would, in most cases, be assigned a shared office, cubicle or open workspace:

<table>
<thead>
<tr>
<th>Academic</th>
<th>Administrative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty, Visiting or Consulting</td>
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<td>Research Fellow</td>
<td>Staff, Professional (Full-time)</td>
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<td>Fellow, Lecturer, Visiting Scholar</td>
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<td>Faculty, Emeritus (Non-active)</td>
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<td>Staff, Administrative Support (Full-time)</td>
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<tr>
<td>Staff, Administrative Support (Part-time)</td>
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<tr>
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<td>Staff, Administrative Support (Full-time)</td>
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<tr>
<td>Graduate Student Research Assistant</td>
<td>Staff, Administrative Support (Part-time)</td>
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<tr>
<td>Temporary or Student Staff</td>
<td>Temporary or Student Staff</td>
</tr>
</tbody>
</table>

### 3. Space-per-person Recommendations

The following space-per-person recommendations are based on recent construction projects at the University and on space guidelines from other higher education institutions and the private sector. They were developed in collaboration with the Office of the President; Facility Services- Planning, Design, and Construction; and various administrative and academic units.

<table>
<thead>
<tr>
<th>Type of Room Occupants</th>
<th>Space Type</th>
<th>Recommended NASF per Person</th>
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</thead>
<tbody>
<tr>
<td>Executive</td>
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<td>President</td>
<td>Private Office</td>
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<td></td>
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<td>Dean</td>
<td>Private Office</td>
<td>240</td>
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<tr>
<td>Associate or Assistant Dean</td>
<td>Private Office</td>
<td>160</td>
</tr>
<tr>
<td>Department Chair</td>
<td>Private Office</td>
<td>160</td>
</tr>
<tr>
<td>Faculty, Tenure Track</td>
<td>Private Office</td>
<td>100-160</td>
</tr>
<tr>
<td>Role</td>
<td>Office Type</td>
<td>Space (sq ft)</td>
</tr>
<tr>
<td>-------------------------------------------------</td>
<td>------------------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Faculty, Research</td>
<td>Private Office</td>
<td>100-160</td>
</tr>
<tr>
<td>Faculty, Non-Tenure Track¹</td>
<td>Private Office, Shared Office, or Cubicle</td>
<td>80-100</td>
</tr>
<tr>
<td>Faculty, Visiting or Consulting</td>
<td>Shared Office or Cubicle</td>
<td>80</td>
</tr>
<tr>
<td>Faculty, Emeritus (Active)</td>
<td>Private Office, Shared Office, or Cubicle</td>
<td>64-140</td>
</tr>
<tr>
<td>Faculty, Emeritus (Non-active)</td>
<td>Shared Office or Cubicle</td>
<td>30-64</td>
</tr>
<tr>
<td>Fellow, Lecturer, Visiting Scholar</td>
<td>Shared Office or Cubicle</td>
<td>80</td>
</tr>
<tr>
<td>Unit Administrative Manager</td>
<td>Private Office</td>
<td>100-160</td>
</tr>
<tr>
<td>Technician, Associate, or Specialist (Research)</td>
<td>Private Office, Shared Office, or Cubicle</td>
<td>30-100</td>
</tr>
<tr>
<td>Research Fellow</td>
<td>Shared Office or Cubicle</td>
<td>30-80</td>
</tr>
<tr>
<td>Staff, Professional (Full-time)</td>
<td>Private Office, Shared Office, or Cubicle</td>
<td>64-100</td>
</tr>
<tr>
<td>Staff, Professional (Part-time)¹</td>
<td>Shared Office or Cubicle</td>
<td>80</td>
</tr>
<tr>
<td>Staff, Administrative Support (Full-time)</td>
<td>Shared Office or Cubicle</td>
<td>64-100</td>
</tr>
<tr>
<td>Staff, Administrative Support (Part-time)¹</td>
<td>Shared Office or Cubicle</td>
<td>64-80</td>
</tr>
<tr>
<td>Graduate Student Instructor</td>
<td>Shared Office or Cubicle</td>
<td>30-64</td>
</tr>
<tr>
<td>Graduate Student Research Assistant</td>
<td>Shared Office or Cubicle</td>
<td>30-64</td>
</tr>
<tr>
<td>Temporary or Student Staff¹</td>
<td>Shared Office or Cubicle</td>
<td>30-64</td>
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</table>

**Administrative Units**

<table>
<thead>
<tr>
<th>Role</th>
<th>Office Type</th>
<th>Space (sq ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Associate or Assistant Vice President</td>
<td>Private Office</td>
<td>160-240</td>
</tr>
<tr>
<td>Director</td>
<td>Private Office</td>
<td>100-160</td>
</tr>
<tr>
<td>Associate or Assistant Director</td>
<td>Private Office</td>
<td>100-140</td>
</tr>
<tr>
<td>Manager</td>
<td>Private Office, Shared Office, or Cubicle</td>
<td>80-140</td>
</tr>
<tr>
<td>Staff, Professional (Full-time)</td>
<td>Private Office, Shared Office, or Cubicle</td>
<td>64-100</td>
</tr>
<tr>
<td>Staff, Professional (Part-time)¹</td>
<td>Shared Office or Cubicle</td>
<td>80</td>
</tr>
<tr>
<td>Staff, Administrative Support (Full-time)</td>
<td>Shared Office or Cubicle</td>
<td>64-100</td>
</tr>
<tr>
<td>Staff, Administrative Support (Part-time)¹</td>
<td>Shared Office or Cubicle</td>
<td>64-80</td>
</tr>
<tr>
<td>Temporary or Student Staff¹</td>
<td>Shared Office or Cubicle</td>
<td>30-64</td>
</tr>
</tbody>
</table>

¹Part-time denotes the room occupant is 50% FTE or less. If the occupant is more than 50% FTE, it is recommended to follow the guidelines for a full-time room occupant.
4. General Applications

4.1 Locations

- Offices should be located to have access to common areas provided for the use of faculty and staff.
- Offices for faculty should be kept near the classrooms used for their associated departments, or near their research labs according to their duty assignments.

4.2 ADA

Design all offices to comply with *ADA standards for Accessible Design*. We require that *Universal Design Standards* be applied when possible. Any discrepancy between the ADA Standards and this document shall be resolved in design review.

4.3 Applicable Procurement Requirements

Office design and product specification must conform to procurement requirements set by the NAU Purchasing Department.

5. The Office Interiors

5.1 Design

The following items should be considered when creating a new office:

- Designing for the flexibility of office space is strongly encouraged. The more provisions made for flexibility, the more options there are for future use of the space.
- The total square footage of each office is to be based on the type of office, the room occupant and the expectations of that position, as specified in Section 3, Office Types.
5.2 Door/Room Security

5.2.1 Door Hardware

All classroom doors shall conform to Division #8 of the NAU Technical Standards. Additionally office doors should have the following:

- ADA accessible doors and hardware as specified in *ADA Standards for Accessible Design*.

5.2.2 Doors

- Each door leaf to be a minimum of 36” wide, including those used in pairs at double doors.
- No strike mullion on double doors.
- Door opening force, hardware, width, thresholds and maneuvering clearances should comply with ADA Standards.

5.3 Windows

Daylight is an important part of most environments. Windows should be included whenever possible. Windows must comply with the “Glass and Glazing” specifications in Division #8 of the *NAU Technical Standards*.

- If easily accessible, window coverings can be manually operable; otherwise, coverings must be motorized with controls located at the instructor’s workstation on the AV touch panel. Where applicable, the depth of the window should be designed to allow for the installation of motorized shade tracks.
- Vertical blinds and drapes are not desired. If necessary, they are to have non-plastic, heavy-duty operating components.
- All window treatments are required to have a non-reflective matte finish and unless otherwise specified, the color selection should match or blend with the window frame.

5.4 Flooring

- When selecting flooring finishes; refer to the specifications in Division #9 of the *NAU Technical Standards*.
- Specify an anti-static, high traffic, commercial grade carpet tile. No solid or light colors are permitted.
5.5 Walls and Ceilings

5.5.1 Walls

- Walls to be painted in an eggshell finish. No wall coverings should be used. To improve Indoor Air Quality (IAQ) no-VOC paint should be used.

5.5.2 Ceilings

- The surface of the ceiling must be designed to accommodate the required acoustical properties of the room. Ceiling panels shall have a Noise Reducing Coefficient (NRC) between .65 and .85, and a STC of 50.
- The ceiling should act as a sound mirror, reflecting sound downward to blend with direct sound.
- Ceiling material to be non-sagging (humidity resistant) lay-in acoustical tile for most ceiling areas. Nominal size 24” x 24” or 24” x 48”.

5.5.3 Vertical Writing Surfaces

- If a vertical writing surface is provided it should be a high-fired, ceramic-covered steel, dry marker writing surface.
- Fixed-height whiteboards should be mounted with the bottom edge at 36 inches above the floor.
- Each whiteboard should have a continuous marker tray below each marker board. Do not mount marker holder to wall due to marker bleed ruining wall finish.
- At the top of the whiteboard, a tack board strip and clips for display materials are required.
5.6 Signage

5.6.1 Room Identification Sign

Each room will have a standard room identification sign mounted near the door on the lockset side (exterior of room), mounted at a height as indicated by The ADA Standards for Accessible Design. Braille lettering is required on the sign to identify the room as well. Standard room ID sign is a modular sign produced by NAU Sign Shop consisting of (3) 3” x 9” panels and (1) 9” x 11” clear plastic page holder. For Room Numbering guidelines reference Section #4 of the NAU Design Guidelines.

5.6.2 Bulletin Boards or Tackable Surface

- A tackable surface should be provided in each office.
- Location and finishes of the bulletin boards will be determined at design.

5.7 Colors/Finishes

- If an accent wall is incorporated, avoid using accent color on walls that might overpower the room or be unappealing to future occupants.
- Specify highly durable finishes that are easy to maintain.
- Use of approved “green” products in all applications is required (See NAU Purchasing Department specifications)

5.8 Reflectance Values

The Engineering Society of North America recommends the following reflectance values for finish materials.

- Ceilings - 80% or higher
- Non-accent walls - between 50% and 70%
- Floors - between 20% and 40%

Reflectance values of paints, laminate and other finish materials should be selected to enhance ambient illumination and the illumination at the instructor’s and student’s work areas. Recommended value - between 40% and 60%.
6. Furniture

Consult the NAU PD&C Interiors Department for all current furnishing specifications.

6.1 Work Stations

Typical work stations should consist of a desk, return, task chair, 2 desk, storage pedestals, and one bookshelf or storage cabinet.

6.1.1 Design Standard

- Desk sizes can range in width from 48” to 72”; and depth can range from 25” to 30”
- Return sizes can range in width from 42” to 60”; and depth can range from 20” to 25”
- Desk storage is required in the form of a “box, box, file” pedestal or “file, file” pedestal
- Additional storage can be provided in the form of a combination cabinet, two door storage cabinet, book shelf, or large lateral/vertical file.

6.1.2 Construction/Fabrication

- Laminated work surfaces shall be constructed of plastic laminate applied to commercial, furniture grade MDF or hardwood plywood. Tops shall have a non-glare, medium tone surface to reduce eye strain.
- The end panels and legs of desks should not block the occupant’s knee space within the work space allotment.
- Table edge to be a heavy-duty extremely durable material.
- Tables to withstand loading of 300 lbs. of applied load (people sitting on table) per linear foot.

6.2 Clearances

Minimum of 36” for egress and path of travel throughout office.

6.3 Replacement Availability/Warranty
• Office furniture shall be procured from “name brand manufacturers that demonstrate proven track records in the marketplace, and maintain stock levels that insure replacement can be made without timely backorder delays.
• Provide written warranty for all proposed furniture. NAU prefers 10 year or longer warranty on all furniture items.

6.4 Seating

Seating should be selected that will meet minimum passive ergonomic standards and still satisfy the requirements of Uniform Building/Fire Codes, cost, durability, functional comfort, appearance/finish, and performance over time. Chairs should be comfortable for use by people ranging in size from the 5th percentile (4’-11” tall, approximately 113 lbs.) to the 95th percentile male (6’-2” tall, approximately 246 lbs.).

6.4.1 Design Standard

When selecting seating in order to achieve minimum standards of comfort, aspects such as width of seat, type of lumbar support, appearance, versatility of seating, replacement availability/ease of maintenance and cost should be considered.

6.4.2 Task Seating

Shall be ergonomic to include:

• Pneumatic height adjustability
• 5 star caster base
• Adjustable lumbar support
• Adjustable seat depth
• Arms to be height and width adjustable
• Seat width will range from 22 to 25 inches

6.4.3 Guest Seating

• Seat width will range from 18 to 22 inches.
• If 2 guest seats are provided one should be specified without arms and one with.
• 4 legged chairs with or without casters are preferred.
6.4.4 Seating Clearances

To ensure adequate circulation through the learning spaces, minimum clearances must be maintained as referenced in Section 3.

6.4.5 Appearance

- The construction and materials should be selected so that their color and surface coordinate with the other furnishing within the office.
- Light colors are discouraged.
- For material specifications reference Division #12 of the NAU Technical Standards.

6.4.6 Replacement Availability/Ease of Maintenance/Warranty

- Chairs shall be procured from name brand manufacturers that demonstrate proven track records in the marketplace, and maintain stock levels that insure replacement can be made without untimely backorder delays.
- Provide written warranty for all proposed furniture. NAU prefers 10 years or longer warranty on all furniture items.
- When casters are specified on seating, insure that the casters are the correct type for the floor finish (carpet, VCT, etc.)

6.4.7 Quality

High quality seating shall be purchased to minimize the long term life cycle costs since funding for equipment replacement, repair, and maintenance are becoming increasingly difficult to obtain.

6.5 Types of Furniture to Avoid

- Furniture not on Tri-University or State contract.
- Furniture that does not meet warranty standards.

6.6 Miscellaneous Office Items

- Recycling and trash receptacles are required in all rooms. See NAU Purchasing Guidelines. Containers shall not encroach on circulation path.
• See Manager of Sustainability Program for additional specifications.

7. Lighting and Electrical

7.1 Lighting Zones

As a rule, all offices will have sufficient lighting to provide visibility to the user. Foot Candle Guidelines must be followed for standard offices. For lighting specifications refer to Division #26 of the NAU Technical Standards.

7.1.1 Color Temperature

The color temperature for all light fixtures should be the same. The color temperature goal is 3200 degree Kelvin. Color temperature range of 3000-3500 degree Kelvin is acceptable as long as all of the fixtures are the same.

7.1.2 Motion Sensors

Motion sensors are preferred in all rooms. When installing motion sensors, be sure to set timer to maximum to avoid light shut off during low-motion activities.

7.2 Electrical

For electrical specifications, including outlets refer to Division #26 of the NAU Technical Standards.

7.2.1 Wall Outlets

• Place outlets on walls of the offices at 6’ intervals or as necessary to allow for multiple desk set ups. It will typically suffice to have and outlet and data location each on opposing walls.

8. HVAC & Fire Prevention
For other HVAC and Fire Life Safety specifications refer to Division #23 of the NAU Technical Standards.

### 8.1 Location of Above-Ceiling Mechanical Equipment

Access to mechanical equipment for the building should not be located within an office.

### 9. Acoustics

Recommendations.

- The review of acoustical requirements for classrooms by an acoustical consultant is recommended whenever possible.
- Minimum NC ratings: 0-59 seats: NC30-35 or less; 60 to 149 seats: NC 25-30 or less; 150+ seats: NC20-25 or less.
- In all cases, walls in classrooms should have a minimum sound transmission class (STC) of 50 as recommended: ANSI S1.4-1983 (R 2006).
- Individual equipment such as fans, ductwork and diffusers shall have ratings not exceeding NC 25 throughout the load range as recommended: ANSI S12.60-2002.