

GENERAL INSTRUCTION BUILDING (GIB) and ARMY CONTINUING EDUCATION SYSTEM (ACES)

Standard Design Criteria Final Version

U.S. ARMY CORPS OF ENGINEERS (Norfolk District)

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CHAPTER 1

DESIGN OBJECTIVES

1-1 **PURPOSE.** This manual provides guidance for the standard design of General Instruction Buildings (GIB) (Category Code 17120). The criterion addresses the inclusion of the Army's Continuing Education System (ACES) Facility (Category Code 74025), and other special use functional areas located with general instruction classrooms. Including these special areas in the GIB programming is functionally and financially beneficial to the government. Where feasible, it allows for the integration of formal Army training with on and off duty adult continuing education for mission and self-development requirements to maximize the use of a facility. This criteria will be referred to throughout the rest of this document as "GIB".

1-2 **APPLICABILITY.** This standard applies to all U.S. Army elements and as a supplement to AR 140-483, Army Reserve Land and Facilities Management for Army Reserve facilities. The information is to be used by those individuals involved in the planning, programming, design or evaluation of facilities. The concepts developed in this document are applicable to new construction, although most are also appropriate for retrofit or renovation applications. Some facilities will have special needs in addition to the basic GIB criteria and these should be considered during planning and design. Examples are the U. S. Army War College library and auditorium requirements.

1-3 **DESIGN GUIDANCE.** The criterion provides the basic guidelines for evaluating, planning, programming, and designing new and renovated General Instruction facilities. The criteria contained in this document establish the baseline levels of features, spaces and finishes to be provided in these facilities. The programming work sheet allows master planners, in coordination with the user, to insert the number of functional spaces required, allowing a determination of gross areas for the building based on actual installation needs. Facilities must be in compliance with Army Standards and the Installation Design Guide (IDG). This criteria can be used for stand alone general instruction and/or continuing education facilities or provide the criteria for the general instruction portion of a facility also containing applied instruction or other space.

1-3.1 **Space Attributes.** The designer must allow for and be sensitive to the differences in space requirements for students, instructors, administrators, and general instruction and applied instruction requirements.

1-3.2 **Entry and Circulation Identification.** There are many first time users in education and training facilities. Students must be able to easily identify their entrance when approaching the site. Once in the building, the Registration/Information desk must be obvious. Students should be able to find counselors, classrooms, and building facilities easily. Zones should be established for the various users of the facility. Instructor's spaces should be closely related to the classrooms while administrators are more remote. Applied Instruction areas often require the use of temporary equipment and therefore must be easily accessible from vehicular circulation on the exterior of the building.

1-4 **REGULATORY STANDARDS.** Planning, design, operation and maintenance of the GIB shall use the latest Unified Facilities Criteria (UFC), Uniform Federal Guide Specifications (UFGS) and other applicable codes, regulations, Technical Instructions and Manuals, and criteria. This document is intended to supplement the other standards, etc. without repeating the common requirements found in those documents. Facilities shall comply with the construction

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requirements of UFC 1-200-01, Design: General Building Requirements, which is a guidance document for the application of model building codes to the design and construction of Department of Defense (DOD) facilities. Codes and standards incorporated into the UFCs by reference include- the International Building Code (IBC); National Fire Protection Association (NFPA); Uniform Federal Accessibility Standards (UFAS) and the Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG); NRCA, Roofing and Waterproofing Manual; NFPA 70, National Electric Code; NFPA 54, National Fuel Gas Code; and various Military Handbooks and Technical Instructions.

1-4.1 **Occupant Load.** The allowable occupant load for life safety is based on the requirements of UFC 1-200-01 Design: General Building Requirements.

1-4.2 **Occupancy Classification.** General Instruction Buildings are Business Group B occupancy classification under the International Building Code. Supplemental spaces such as Assembly Group A-3 may be included for auditoriums or large lecture halls. Storage requirements may also include Storage Group S occupancy classification.

1-4.3 **Historic Preservation Act.** Modifications of historic buildings or buildings deemed eligible for the National Register of Historic Places must follow appropriate guidelines including coordination with the State Historic Preservation Organization (SHPO).

1-5 **ENERGY AND RESOURCES CONSERVING FEATURES.** Public Law 102-486, Executive Order 13123, and Federal Regulations 10 CFR 435, require federal buildings to be designed and constructed to reduce energy consumption in a life cycle, cost-effective manner using renewable energy sources when economical. Products designed to conserve energy and resources by controlling the amounts of consumed energy or by operating at increased efficiencies should be considered.

1-6 **THE ARMY'S INSTALLATION DESIGN STANDARDS.** Facilities planning and design shall comply with the Army's Installation Design Standards ([HTTP://WWW.HQDA.ARMY.MIL/ACSIMWEB/HOMEPAGE.SHTML](http://www.hqda.army.mil/acsimweb/homepage.shtml)). The Headquarters, Department of the Army Facilities Standardization Committee, is the approval authority for waivers to Army Standards. The Headquarters, Department of the Army Facilities Standardization Sub-Committee is the approval authority for waivers to Army standard criteria.

1-6.1 **Installation Real Property Master Plan.** Facilities planning and design shall be coordinated with the Installation Real Property Master Plan. The plan provides comprehensive documentation of the existing conditions of natural, man-made, and human resources. It also guides future land-use development.

1-6.2 **Installation Design Guide.** Facilities planning and design shall be coordinated with the design guidance and criteria contained in the local Installation Design Guide.

1-6.3 **Master Planning Criteria.** Facilities space requirements (by category code) shall be coordinated and reflect the Army Criteria Tracking System (ACTS) as applicable. Facilities space requirements planning and design shall be supported by the latest approved Installation Real Property Planning and Analysis System (RPLANS) and Facility Planning System (FPS) reports. RPLANS and FPS are automated installation systems that incorporate space-planning criteria with installation populations. This document treats GIB and support spaces as category code 17120, while special functional use areas would have other category codes.

1-7 **ACCESSIBILITY REQUIREMENTS.** All areas and facilities required to be accessible

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to physically disabled persons shall conform to the Uniform Federal Accessibility Standards (UFAS) Federal Standard 795, and the Americans With Disabilities Act Accessibility Guidelines (ADAAG).

1-7.1 Accessible desks and chairs shall be handled by the installation based on specific needs. Accessible desks are not required in each classroom. In Auditoriums access to permanent stages and wheel chair space in the audience shall be provided in accordance with standards.

1-7.2 Accessible parking spaces shall be provided for those visitors and non-military employees with disabilities. The required number of spaces is prescribed by the accessibility guidelines. Such spaces are required to be located so as to provide convenient access to the building entrance.

1-7.3 The following areas are not required to be handicapped accessible: mechanical, electrical, and communications equipment rooms; storage space; hazardous waste/materials storage space; loading docks. All other spaces are required to be accessible.

1-8 **FORCE PROTECTION & ANTI-TERRORISM CONSIDERATIONS.** Project design and construction shall comply with the latest edition of the Department of Defense 'UFC 4-010-01 Design: Minimum Anti-Terrorism Standards for Buildings'. To determine levels of threat and protection, the installation prior to design must provide a threat assessment. Coordinate with the installation security forces and facilities engineer to determine if the minimum standards are adequate for the project location. Provide higher levels of protection if a threat analysis has identified a specific threat that requires more stringent measures than provided by the minimum standards. Special consideration shall be made where drive-up/drop-off areas and delivery areas are required.

1-9 **SUSTAINABLE DESIGN AND DEVELOPMENT.** The goals for improving the sustainability of facilities include: (a) use resources efficiently and minimize raw material resource consumption, including energy, water, land and materials, both during the construction process and throughout the life of the facility, (b) maximize resource re-use, while maintaining financial stewardship, (c) move away from fossil fuels towards renewable energy sources, (d) create a healthy and productive work environment for all who use the facility, (e) build facilities of long-term value with reconfigurable features when feasible, and (f) protect and, where appropriate, restore the natural environment.

1-9.1 Sustainable design techniques shall be considered as they relate to site and building design, construction, and operation and demolition/deconstruction. Techniques that conserve energy, improve functionality, and can be justified by life cycle cost analysis as cost effective are encouraged. Where specific materials are indicated by these criteria, the intent is to provide a basis for functional performance and quality. Designers should consider substitute materials that provide higher levels of sustainable design. For example, permeable pavements and reduced structured drainage techniques should be considered where it is compatible with other requirements and provides a well-engineered solution.

1-9.2 The level of incorporation of sustainable design principles will be measured through use of the Army developed Sustainable Project Rating Tool (SPiRiT), available from the following website: www.cecer.army.mil/sustdesign. Projects must meet the current Army-wide certification level requirement.

1-9.3 Areas of sustainable design that are beyond the control of project designers must be

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coordinated with the installation before credit can be taken. These areas may include installation master planning, site selection, or involving facility users in the programming process.

CHAPTER 2

SPACE DESIGN CRITERIA

2-1 GENERAL REQUIREMENTS

2-1.1 Gross Area Limitations. Maximum gross building allowances are identified in TI 800-1 and the Army Criteria Tracking System (ACTS). A GIB/ACES facility shall include a combination of applicable educational spaces (identified in paragraph 2-4 below) and may include (as required) administrative, special functional use, and support space (identified in paragraphs 2-5, 2-6, 2-7 below). The Programming Worksheet included in the Appendix of this document shall be used for programming the spaces within the TM 800-1 and ACTS gross area limitation. The worksheet should be completed shortly before or during the planning charrette process.

2-1.2 Gross and Net Area Definition. Gross area shall follow the definition in TI 800-01, Chapter 5 Buildings and Facilities Criteria, Basis for Space Allowances.

2-1.3 Net Area Requirements. Net area for programmed spaces is included in this document. If net area requirements are not specified, the space shall be sized to: accommodate the required function; and comply with code, overall gross area limitations and other requirements. Examples of spaces without net areas defined are corridors, stairs, restrooms, and mechanical and electrical rooms. Provided net areas and room sizes are guidance that may be adjusted for specific situations such as special functional requirements, construction efficiency, or adaptation for existing facilities.

2-2 COORDINATION. Each project shall be coordinated with the Regional Installation Management Agency (IMA), Installation, the Using Activity, and the USACE Center of Standardization (COS). The COS is responsible for maintaining the latest standards and may be a resource for current projects and lessons learned. For General Instruction Buildings, USACE Norfolk District is the COS. The USACE COS should participate in both planning and design charrettes for GIBs.

2-3 SPACE REQUIREMENTS. The space requirements of each facility will be different based on the needs of the local installation and mission requirements. The criteria in this manual state the area requirements in terms of Net Area (NA) or Gross Area (GA). Space requirements in chapter 2 for the various uses are expressed in terms of NA. GA is determined by adding all NA spaces plus an estimated area for building construction (including wall thickness, chase space, structural enclosure, circulation, etc) and half scope areas such as entry canopies. Gross area in the spreadsheet is based on 145% of the net area required by building functions. This gross area factor is used to cover the area of walls, partitions, structure, mechanical/electrical rooms, chases, restrooms and corridor/hallway circulation. The factor does not include network/server rooms, storage, break area or service spaces, which are identified in net areas. In some cases the 145% may not be appropriate such as very small facilities where it would be inadequate or very large facilities where it may be excessive. Any minor adjustments to the gross area factor should be determined during the planning process.

2-3.1 Instruction Programs. Specific coordination with the Installation Master Planner, the User, Major Command, and Regional IMA is required to determine the functions to be included in the facility. Although trends and research indicate a combined General Instruction facility including NCO training and ACES as well as some applied instruction is very efficient and desirable, the IMA is ultimately responsible for determining functional programs to be

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included in the project. Laboratories are provided in the form of computer instruction. Traditional chemistry or biology laboratories are not normally included in general instruction facilities but may be added as needed for special situations but only if demand for such single-purpose facilities are validated in advance (experience indicates that in ACES centers, where present, they are often highly under-utilized). Functional spaces not included in this criteria may be required such as command offices, joint services offices, mailroom, map rooms, book store, AAFES/MWR spaces, library, applied instruction or simulator space.

General Instruction programs are typically for full time attendance by students who are on temporary assignment by area commands (these students are usually on post or commute). NCO training is normally for those on full time temporary assignment from a larger geographic area, attending the training for a longer period of time. ACES training is typically for self initiated training of local soldiers or civilian employees, their dependents and sometimes the local community on a part time basis most often after normal duty hours to attain education degrees.

Generally operation for a GIB is normal duty hours Monday through Friday. When NCO and ACES functions are included, the hours of operation extend to approximately 2230 plus weekends. Some Installations have developed agreements with state or regional education systems to share Installation GIB/ACES facilities as a means of expanding the education programs offered to military personnel and their dependents.

2-3.2 **Space Programs.** Classroom sizes and mix of types and sizes shall be coordinated with the user, planner, and designer in response to the optimum class instructional size for the anticipated classes as well as the mix of room types. Depending on the use, classrooms may be enlarged to accommodate special equipment related to the instruction for instance in a combined general/applied instruction situation.

2-3.3 **Furniture/Fixtures/Equipment (F/F/E).** The space description includes recommended F/F/E for each classroom. The designer shall verify requirements with the user and coordinate specific sizes, arrangements and finishes. F/F/E that is Government Furnished Government Installed (GFGI) is by the government but the contractor must plan for it (provide space, power, cooling, etc.). The government must program and purchase GFGI items so they are available at the proper time.

2-4 **EDUCATION SPACES**

2-4.1 **Traditional Classroom.** (Category Code 17120) The space is used to present lectures, projected images and written information on the board. These spaces have the flexibility to teach in the traditional lecture mode and use projection media. Since this type of space takes only slightly less space than a Multi-Purpose Classroom, the use of Multi-Purpose classrooms should be considered where budget allows. Power and network connections shall be provided in the room for future access to each desktop. This type of classroom shall be programmed for various size classes. If classes smaller than 30 are required, Multi-Purpose Classrooms will be used. 30 and 40 student classes shall have a single projector and projection screen while 50 through 70 student classrooms shall have 2 projectors and projection screens. Interactive whiteboard shall be included with white boards at the front of the class. In these classrooms whiteboards are not a satisfactory projection surface.

Function: Instruction of students through lecture, projected images, computer presentation and written information on the board.

Occupancy: 30 students, 1 instructor

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40 students, 1 instructor
50 students, 2 instructors
60 students, 2 instructors
70 students, 2 instructors

Adjacency Reqmnts: Classrooms should be clustered and have student break, vending and restrooms nearby. Classrooms shall be easily accessed from the public entrance. Instructors' offices should be close to the classrooms.

Space requirement: Total net area.
30 students- approximately 9144 mm [30 ft] wide by 10973 mm [36 ft] deep = 100 m² [1080 s.f.].
40 students- approximately 12192 mm [40 ft] wide by 10973 mm [36 ft] deep = 134 m² [1,440 s.f.].
50 students- approximately 12192 mm [40 ft] wide by 12802 mm [42 ft] deep = 156 m² [1,680 s.f.].
60 students- approximately 12192 mm [40 ft] wide by 14630 mm [48 ft] deep = 178 m² [1,920 s.f.].
70 students- approximately 14022 mm [46 ft] wide by 14630 mm [48 ft] deep = 204 m² [2,200 s.f.]

Mechanical: Mechanical system shall be designed to accommodate partial to full occupancy with temperature control separate from other portions of the building. Equipment and airflow shall be quiet. Each classroom must have individual temperature control¹.

Electrical/Lighting: Day lighting is preferred and shall be controlled. Electric lighting shall be switched to allow variable lighting levels. Each Classroom shall have individual lighting control that switches off automatically when the room is not in use¹.

Communications: Instructor shall have data and power receptacles. Room shall have data and power receptacle for future use by every student. This future use shall be by recessed floor or wall-mounted raceway (below desk level) or below computer access flooring.

Furniture/Fixtures/Equipment (F/F/E) Provide ceiling mounted projectors and screens, map rail, white board and projector mount, projection screen, tack board, Government furnished equipment includes computers, printer, student desks, and chairs, interactive whiteboard, ceiling mounted projectors and instructor's desk. Student desk shall be 914 mm wide [3 ft] wide by 762 mm deep [30 inches] for each student. (Refer to AR415-15)

Finishes: See the Finish Schedule for standard finishes.

Other Requirements: A storage space, typically about 3.3 m². [36 s.f.] is required in each classroom. Large classrooms may require more. Classrooms with greater than 5 rows of seating (i.e., 50 students or more) should have higher ceilings to allow better viewing of the screen at the front of the room.

¹ This is an Army Standard for GIB

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2-4.2 Multi-Purpose Classrooms. (Category Code 17120) These spaces have the flexibility to accommodate teaching in the traditional lecture mode, perform computer instruction at each desk, and use projection media. Since this type of space requires only slightly more space than a traditional lecture class, Multi-Purpose Classrooms shall be used in lieu of Traditional Lecture Classrooms where budget allows. This criterion applies the recent move at some Installations to use laptop computers at each desk, providing for a more flexible classroom. The laptops may be stored in the classroom in a storage cabinet or carried by students when they are provided. Power and network connections are provided to each computer. The use of laptops requires less desk surface than desktops and permits better sightlines for students. Some installations may choose to use a desktop computer with a LCD flat panel to save desk space relative to CRT monitors. Desk with CRT monitors located below a transparent desktop is also an option for ACES classes but not when used primarily as a GIB. This type of classroom shall be set up for various size classes. The 15 student classroom has the same attributes as larger classes but is used for highly interactive, small group learning. These smaller classes often use a conference table or U-shaped desk layout.

Function: Instruction of students through lecture, projected images, computer presentation and written information on the board.

Occupancy: 15 students, 1 instructor
30 students, 1 instructor
40 students, 1 instructor
50 students, 2 instructors
60 students, 2 instructors
70 students, 2 instructors

Adjacency Reqmnts: Classrooms should be clustered and have student break, vending and restrooms nearby. Classrooms shall be easily accessed from the public entrance. Instructors' offices should be close to the classrooms.

Space requirement: Total net area.
15 students- approximately 9144 mm [30 ft] wide by 5486 mm [18 ft] deep = 50.2 m² [540 s.f.]
30 students- approximately 9144 mm [30 ft] wide by 12192 mm [40 ft] deep = 111 m² [1,200 s.f.]
40 students- approximately 12192 mm [40 ft] wide by 12192 mm [40 ft] deep = 149 m² [1,600 s.f.]
50 students- approximately 12192 mm [40 ft] wide by 14630 mm [48 ft] deep = 178 m² [1,920 s.f.]
60 students- approximately 12192 mm [40 ft] wide by 16764 mm [55 ft] = 204 m² [2,200 s.f.]
70 students- approximately 14326 mm [47 ft] wide by 16764 mm [55 ft] = 241 m² [2,590 s.f.]

Mechanical: Mechanical system shall be designed to accommodate partial to full occupancy with temperature control separate from other portions of the building. Equipment and airflow shall be quiet. Each classroom must have individual temperature control¹.

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Electrical/Lighting: Day lighting is preferred and shall be controlled. Electric lighting shall be switched to allow variable lighting levels. Each Classroom shall have individual lighting control that switches off automatically when the room is not in use¹.

Communications: Room shall have data and power receptacle for every student and instructor space.

F/F/E: Provide two ceiling mounted projectors and screens (one of each is needed for class size up to 30), white board, map rail, tack board, Government furnished equipment includes computers, printer, student desks, chairs, interactive whiteboards, projectors, instructor's integrated podium or instructor's workstation. In 15 student classrooms the interactive whiteboard may be used as a projection surface and the screen and whiteboard may be deleted. Student desk shall be approximately 914 mm [3 ft] wide by 762 mm [30 inches] deep for each student. (Refer to AR415-15).

Finishes: See the Finish Schedule for standard finishes.

Other Requirements: A storage space typically about 3.3 m² [36 s.f.] is required in or near each classroom as well as a storage cabinet for laptop computers. Larger classrooms may require more storage. Classrooms with greater than 5 rows of seating (i.e., 50 students or more) should consider higher ceilings to allow better viewing of the screen from the rear of the room. A method for flexible data and power distribution and reconfiguration shall be considered such as access flooring (see paragraph 3-5.6.4 for options).

2-4.3 Seminar Model Classroom. (Category Code 17120) These spaces are often used for higher levels of education such as the master's program at the War College. The model consists of two rooms. A larger room serves the class of 16 - 24 students and 1 – 4 instructors in a seminar fashion around moveable tables. The group breaks into two teams to solve problems and prepare research for a significant portion of time. The breakout requires a second space. Therefore this model consists of a primary space of 93.5 m² [1000 s.f.] and a breakout of 46.5 m² [500 s.f.] for a total of 139 m² [1500 s.f.]. Both rooms use tables/chairs that can be rearranged, have four computer terminals, white boards, and storage. The larger room should have an overhead projector. One to four instructors interact with this group depending on lesson requirements.

Function: Instruction of students through lecture, interactive work groups, projected images, computer presentation and written information on the board.

Occupancy: 24 students, 4 instructors

Adjacency Reqmnts: The two rooms required for this function should be near each other. Instructors' offices and classroom storage should be close to the classrooms.

Space requirement: Total net area.

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Two rooms totaling 139 m² [1500 s.f.].

- Mechanical:** Mechanical system shall be designed to accommodate partial to full occupancy with temperature control separate from other portions of the building. Equipment and airflow shall be quiet. The larger of the two rooms must have individual temperature control¹.
- Electrical/Lighting:** Day lighting is preferred and shall be controlled. Electric lighting shall be switched to allow variable lighting levels. Each Classroom shall have individual lighting control that switches off automatically when the room is not in use.¹
- Communications:** Room shall have data and power receptacle for each computer workstation.
- F/F/E:** Provide screen in large space, white board, map rail, and tack board in each space, Government furnished equipment includes ceiling mounted projector, interactive whiteboard, instructor's workstation, computers, printer, student desks, chairs. The interactive whiteboard may be used as a projection surface and the screen and whiteboard may be deleted in the small space. Student desk shall be approximately 914 mm [3 ft] wide by 762 mm [30 inches] deep for each student, large space shall have desk to accommodate all students. Additional desk shall be provided with four computer workstations in each room. A method for flexible data and power distribution and reconfiguration shall be considered such as access flooring (see paragraph 3-5.6.4 for options).
- Finishes:** See the Finish Schedule for standard finishes.
- Other Requirements:** A storage cabinet is required in each space. Access flooring shall be considered in this space.

2-4.4 Consolidated Training Configuration (CTC) Space. (Category Code 17120) The space is specifically used by the Defense Language Institute (DLI) but could be useful in other intense training situations. It uses a cluster of 3 small classrooms for 10 students and 2 instructors each, 2 instructor rooms with 3 work stations each, a breakout room, and a common space break room that includes 2 storage areas. Each of the 7 rooms is 27.9 – 32.5 m² [300 – 350 s.f.] for a total net area of 195 – 228 m² [2100 – 2450 s.f.] Instructors use lectures, projected images, written information on the board and a great deal of verbal interaction. Power and network connections shall be provided to each moveable desktop. Classes shall have a single projector and interactive whiteboard at the front of the class. Instructor rooms are offices with 3 workstations and a desk, 4-shelf bookcase, shared white board/tack board, and coat rack. The break rooms usually have a coffee bar and are furnished based on the course requirements.

Demountable or moveable wall panel partitions are desirable within the CTC.

- Function:** Instruction of students through lecture, projected images, computer presentation, written information on the board, and discussion.

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- Occupancy: 30 students, 6 instructors.
- Adjacency Reqmnts: CTC should be clustered in classroom area.
- Space requirement: Total net area 228 m² [2,450 s.f.].
- Mechanical: Mechanical system shall be designed to accommodate partial to full occupancy with temperature control separate from other portions of the building. Equipment and airflow shall be quiet. Each CTC must have one or more zones for individual temperature control.
- Electrical/Lighting: Day lighting is preferred and shall be controlled. Electric lighting shall be switched to allow variable lighting levels. Each Classroom shall have individual lighting control that switches off automatically when the room is not in use¹.
- Communications: Room shall have data and power receptacle for every student and instructor space.
- F/F/E: Provide tack board. Government furnished equipment includes one ceiling mounted projector, interactive whiteboard, computers, printer, student desks, chairs, and two instructor's workstation. Student desk shall be approximately 914 mm [3 ft] wide by 762 mm [30 inches] deep for each student. Instructor's workstation must be able to secure the computer and files.
- Finishes: See the Finish Schedule for standard finishes.
- Other Requirements: A storage space, typically about 3.3 m². [36 s.f.] is required in each classroom. A method for flexible data and power distribution and reconfiguration shall be considered such as access flooring (see paragraph 3-5.6.4 for options).

2-4.5 Video-Tele Training Classroom. (Category Code 17120) The spaces have full distance learning capabilities with 2-way audio-video communication. The room is served through the Network Operations Center and remote communication closets. Each desk has a full size desktop computer. Risers or a high ceiling are very desirable in the larger classroom for better sight lines. Distance learning shall be compatible with the Total Army Distance Learning Program (TADLP). It shall include connectivity to the DOD Satellite Education Network (SEN) and Teletraining Network (TNET).

A communication rack is required for the VTT function in each classroom. For renovations, the rack is often in an alcove leading into the room while in new construction it is usually in a closet within the room.

- Function: Instruction of students through teletraining, lecture, projected images, and computer presentation. In some cases the instructor may be remotely located. The space may also be used as a lecture classroom on occasion
- Occupancy: 15 students, 1 instructor
30 students, 1 instructor

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- Adjacency Reqmnts: Classrooms should be clustered and have student break, vending and restrooms nearby. Classrooms shall be easily accessed from the public entrance. Instructor's offices and classroom storage should be close to the classrooms as well.
- Space requirement: Total net area.
15 students- approximately 12192 mm [40 ft] wide by 7315 mm [24 ft] deep = 91 m² [975 s.f.]
30 students- approximately 12192 mm [40 ft] wide by 12192 mm [40 ft] deep = 149 m² [1,600 s.f.]
- Acoustics: Partitions shall comply with the acoustic paragraphs of this criteria. Ceilings shall be absorptive, NRC 50 minimum
- Mechanical: Mechanical system shall be designed to accommodate partial to full occupancy with temperature control separate from other portions of the building. Equipment and airflow shall be quiet. Each classroom must have individual temperature control
- Electrical/Lighting: Day lighting shall be controlled. Electric lighting shall be switched to allow variable lighting levels. Each Classroom shall have individual lighting control that switches off automatically when the room is not in use¹.
- Communications: Provide a power and data connection for each instructor and student. Full functional capability requires the following communication components:
 - 1) Connectivity from the site/installation to the wide area network (DISN);
 - 2) Connectivity from the building switch to the installation back-bone;
 - 3) Connectivity from the building switch to the classroom switch, and
 - 4) Connectivity from the classroom switch to each workstation and peripheral in the classroom.
- F/F/E: Provide white board, cameras, microphones, and speaker system. Government furnished equipment includes two ceiling mounted projectors and screens (one each in the smaller rooms), interactive whiteboard (if used as a non-VTT classroom also), instructor's workstation, document camera, computers, printer, student desks, and chairs. Student desk shall be approximately 914 mm [3 ft] wide by 762 mm [30 inches] deep for each student.
- Finishes: See the Finish Schedule for standard finishes. Low contrast between materials is important for better camera function. A blue color scheme is recommended because it provides a technically correct broadcast quality VTT background.
- Other Requirements: A storage space, typically about 3.3 m². [36 s.f.] is required in each

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classroom. A method for flexible data and power distribution and reconfiguration shall be considered such as access flooring (see paragraph 3-5.6.4 for options).

2-4.6 **Classroom XXI.** (Category Code 17136) CR XXI design focuses on instructor use, instructor led training, and instructor facilitated self-paced student training. The level classroom used in these facilities is "Level 3/High Tech Room". It is an open architecture, standards compliant, fully networked multimedia classroom with interoperable Video Teletraining (VTT), Internet access, Installation networked with full distance learning capability. The space requires two video projectors and two 3048 mm [10 ft] wide motor operated projection screens. For ease of viewing and transmitting, other CRXXI technologies are used in favor of marker/integrated white boards. The instructor workstation and projection screens are located at the front of the room. An unobstructed view to the front of the room by all students is required. The instructor has digital access to each student computer. The instructor station has a computer, document camera, projector control, lighting and a sound system. Each student must have a networked computer on a desk. Rooms are generally square in plan with a wall at least 9144 mm [30 ft] long is optimal. A communication rack is required for the VTT function in each classroom. For renovations, the rack is often in an alcove leading into the room while in new construction it is usually in a closet within the room.

This criteria uses a 20 – 24 person classroom, which has been most common to the Army and very successful. Larger Classroom XXIs may be used in coordination with TRADOC.

Function: Digital training.

Occupancy: 20 - 24 students, 1 instructor.

Adjacency Reqmnts: Locate near other classrooms.

Space requirement: Total net area of 130 m² [1,400 s.f.]

Acoustics: Refer to the Acoustics paragraph in this criteria. Partitions shall be STC 50 minimum. Ceiling shall be absorptive, NRC 50 minimum. Floors shall be absorptive, NRC 25 minimum. Doors shall be acoustic to match partitions.

Mechanical: Mechanical system shall be designed to accommodate partial to full occupancy with temperature control separate from other portions of the building. Equipment and airflow shall be quiet. Each classroom must have individual temperature control.

Electrical/Lighting: Day lighting shall be controlled. Electric lighting shall be switched to allow variable lighting levels. Each Classroom shall have individual lighting control that switches off automatically when the room is not in use¹. Lighting shall be planned to eliminate facial shadows. Lights shall not cast direct glare on the projection surface.

Communications: Provide a power and data connection for each instructor and student. Full functional capability requires the following communication components:

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- 1) Connectivity from the site/installation to the wide area network (DISN);
- 2) Connectivity from the building switch to the installation back-bone;
- 3) Connectivity from the building switch to the classroom switch, and
- 4) Connectivity from the classroom switch to each workstation and peripheral in the classroom.

F/F/E: Government furnished equipment includes an integrated VTT system, video/data projection system (instructor and student cameras, 2 projectors and projection screens, and document camera), audio system (wireless instructor microphone/student microphones and typically 6 room ceiling speakers, depending upon classroom size), instructor classroom management system, touch control panel (to control lighting, sound levels, projection sources, VTT), fax machine and printer on an equipment stand, and student/instructor networked computers, ergonomic desks and chairs (padded, rolling, adjustable height, tilt, lumbar support, and armrest). Student desk size varies according to room size and number of student workstations required. Student Workstations are commonly 1219 mm [4 ft] wide by 762 mm [30 inches] deep. Instructor Workstation is commonly 2032 mm wide by 762 mm deep [80"w x 30" d] with a side return 1067 mm wide by 762 mm deep [42"w x 30" d].

Finishes: See the Finish Schedule for standard finishes. Low contrast between materials is important for better camera function. A blue color scheme is recommended because it provides a technically correct broadcast quality VTT background. The color scheme shall include an integrated interior design package for all features and furnishings in the classroom. A finished ceiling height of 3658 mm [12 feet] above the finished floor is desirable to enable maximization of screen sizes and maintain a comfortable room temperature.

Other Requirements: A sound system is required which includes a wireless microphone for the instructor and typically 6 speakers. The system must allow students to hear the instructor as well as hear and speak on VTCs. EIRS BULLETIN 95-05, Engineering and Design, Automation-Aided Classroom Design Criteria applies to the design of these classrooms. Department of the Army Real Property Category Code is Construction Category Code, 17136, Automation-Aided Instruction Building as supplemented by this document. Access flooring is required in this space.

2-4.7 Noncommissioned Officer (NCO) Academy Training Space. (Category Code 17120)

The space is used to present lectures, projected images and written information on the board. Instructors are traditionally military. This type of classroom is planned for 16 students arranged in a "U-shaped" desk configuration. These spaces have the flexibility to teach in the traditional lecture mode, use projection media, present hand held material, and work on group projects that may require moving furniture to create an open area. Power and network connections shall be provided to each instructor and student desk. Classes shall have a single projector, an interactive whiteboard and white board at the front of the class.

In the past, small open offices have been remotely provided for instructors but it has been found that they are not often used. Provide two 5.9 m² [64 s.f.] workstation cubicles in each classroom for NCO Academy instructors. Consider the additional need for shared private space for

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counseling.

Function: Instruction of NCO Academy students through lecture, projected images, computer presentation and written information on the board.

Occupancy: 16 students, 2 instructors

Adjacency Reqmnts: NCO Academy classrooms should be clustered and have vending and restrooms nearby. Classrooms shall be easily accessed from the public entrance. Instructors' offices should be in the classrooms. NCO Academy classes may be separate from GIB classrooms.

Space requirement: Total net area.
16 students-102 m² [1,100 s.f.]

Acoustics: Partitions shall be STC 45 minimum.

Mechanical: Mechanical system shall be designed to accommodate partial to full occupancy with temperature control separate from other portions of the building. Equipment and airflow shall be quiet. Each classroom must have individual temperature control.

Electrical/Lighting: Day lighting is preferred and shall be controlled. Electric lighting shall be switched to allow variable lighting levels. Each Classroom shall have individual lighting control that switches off automatically when the room is not in use¹.

Communications: Room shall have data and power receptacle for every student and instructor space.

F/F/E: Provide white board, tack board. Government furnished equipment includes one ceiling mounted projector, interactive whiteboard, computers, printer, student desks, chairs, podium/lectern, and two instructor's workstation. Student desk shall be approximately 914 mm [3 ft] by 610 mm [24 inches] for each student.

Finishes: See the Finish Schedule for standard finishes.

Other Requirements: A storage space typically 3.3 m² [36 s.f.] is required in each classroom. Lower level NCOES programs require additional storage space for NBC and communications equipment. Typically requires housing nearby for longer TDY assignments. A method for flexible data and power distribution and reconfiguration shall be considered such as access flooring (see paragraph 3-5.6.4 for options).

2-4.8 **Digital Training Access Center (DTAC).** (Category Code 13115) The DTAC is directly associated with the CRXXI. It allows training-on-demand to the student's desktop or the instructor's equipment "anywhere at anytime". It allows students to access the same or different courseware simultaneously. It allows the use of high bandwidth over the Local Area Network (LAN). Generally a DTAC serves an entire installation. It is often located in the Department of

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Information Management (DOIM) building but may be located in the GIB, within the Network Operations Center (NOC) or in another facility.

The DTAC electronically stores and distributes the digital proponent record copy of approved training and other materials. It is the proponent's portion of the Reimer Digital Library. It will interface with the Automated Systems Approach to Training (ASAT) [ASAT is planned to be replaced in the future, possibly by the Training and Doctrine Developers Tool (TDDT)] to receive completed training materials.

The DTAC is also considered a large communications area and its configuration is dependent on the engineering solution for the systems architecture. The DTAC includes an area for 4-12 servers housed in 2 communication racks usually, 2 workstations for technical support personnel, and an uninterrupted power source (UPS). Shelving storage is required for software. If an overhead raceway is not feasible, a sub-floor system with a complete utility supply and cable management system (raised flooring) is acceptable.

Function: Information storage and distribution.

Occupancy: 2 System Administrators.

Adjacency Reqmnts: The DTAC is centrally located for the GIB or CRXXI but may be remote if necessary.

Space requirement: 37 m² [400 s.f.]

Mechanical: Year round air conditioning is required.

Electrical/Lighting: Day lighting is not desirable. A raised floor or overhead cable raceway system is required.

Communications: The space is a large network room or a communications area.

F/F/E: Government furnished equipment includes computers, servers, switches, hubs, UPS, communication racks, shelves, workstations, software.

Finishes: A ceiling height of 2438 mm [8 ft] to 2743 mm [9 ft] is required.

2-4.9 Resource Center. (Category Code 17120) The Resource Center is sometimes called a Learning Center and is intended to eventually replace the paper/book library found in many GIBs. It includes the Military Occupational Specialty (MOS) library which is required to be digital in future facilities. It provides LAN and commercial Internet access to students and staff for research. It is not intended to be a group instruction space. In certain education facilities such as the US Army War College or the US Army Sergeant Major Academy the requirements of a Resource Center may still include a large Library (Category Code 61065).

A Common access card may be required for students to use computers in the center.

The Programming Worksheet has a 10-student (small) and 30-student (large) Resource Center. The small space would for example reflect the needs of an ACES facility with a capacity of 2000 students. The large would be used for more demanding General Instruction Buildings or combination GIB and Education Center. With the growing availability of electronic information

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and student self-learning, it is expected multiple Resource Centers could be required in large facilities.

- Function: Access to digital and printed information.
- Occupancy: 10 students, 1 administrator (small); 30 students, 2 administrators (large)
- Adjacency Reqmnts: Student areas.
- Space requirement: Total net area of 37 m² [400 s.f.] (small); 111 m² [1,200 s.f.] (large).
- Mechanical: Mechanical system shall be designed to accommodate partial to full occupancy with temperature control separate from other portions of the building.
- Electrical/Lighting: Day lighting is not desirable. Use indirect or parabolic lighting fixtures to reduce glare on video display terminals (VDTs). Each Classroom shall have individual lighting control that switches off automatically when the room is not in use¹.
- Communications: Include on corridor public address system. Room shall have data and power receptacle for every student and instructor/administrator space.
- F/F/E: Government shall provide shelving, cabinets, study carrel type computer stations, staff work stations, telephones, computers, printers, and copier.
- Finishes: See the Finish Schedule for standard finishes.
- Other Requirements: A method for flexible data and power distribution and reconfiguration shall be considered such as access flooring (see paragraph 3-5.6.4 for options).

2-5 ADMINISTRATION SPACES

2-5.1 Information/Reception. Students wait to see counselors or college representatives (mostly an ACES function), very little use by NCO Academy. The functional size, furnishings, seating and staff is based on the needs for a GIB. If the facility is also co-used as an ACES facility, the space should be keyed to peak registration simultaneous load data. Staff is located behind a service counter where they use computers and files to access records and standard forms and coordinate appointments for counselors. Students wait in a seating area for processing by someone who can assist them. This space must be easy to find by visitors and have clear signage and information displays.

- Function: Waiting area for students and administrative space for staff.
- Occupancy: 30 students, 2 staff
- Adjacency Reqmnts: Near and observable from building entrance, convenient access to restrooms.

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- Space requirement: Total net area of 50 m² [540 s.f.].
- Mechanical: Mechanical system shall be designed to accommodate partial to full occupancy with temperature control separate from other portions of the building.
- Electrical/Lighting: Day lighting is encouraged.
- Communications: Cable television connection, network and telephone for staff. Public address system is required in larger spaces to contact waiting students. Space shall have telephone and LAN receptacles per the 13A Policy.
- F/F/E: Government shall provide seating, workstations for staff, file cabinets, shelving, large screen televisions, computers, and printers. A service counter shall be built-in or provided as part of the GFGI systems furniture. Provide a directory, bulletin board, and signage.
- Finishes: See the Finish Schedule for standard finishes.

2-5.2 Instructors Offices. (Category Code 17120) Offices required near classrooms for senior, permanent, transient instructors. In many cases the grouping of offices into a larger space with individual desk/work stations is desirable. Where offices are grouped, provisions for confidential counseling must be accommodated. Some situations require the instructor store additional materials in the office in which case additional room size is justified in accordance with Army Regulation 405-70. Some instruction facilities have senior level instructors that require larger offices due to grade (such as the Army War College or Sergeant Major Academy). These offices may be increased in size in accordance Army Regulation 405-70. Planners shall modify the room size on the worksheet as appropriate for these special situations. Facilities that support mainly ACES activities should consider grouping instructor cubicles into space allocated for resident colleges rather than place them adjacent to particular classrooms. Since all college instructors who do not double as college advisors are by nature transient the space requirement could be smaller, possibly 6 m² [65 s.f.].

- Function: Office.
- Occupancy: 2 students, 1 instructor
- Adjacency Reqmnts: Near classrooms.
- Space requirement: Total net area of 10.2 m² [110 s.f.]
- Mechanical: Space shall provide heating, cooling, and ventilation.
- Electrical/Lighting: Day lighting is desirable, but not necessary and should be controlled when used.
- Communications: Space shall have telephone and LAN connections.
- F/F/E: Provide coat hooks, tack board, and white board. Government furnished equipment includes workstations or desk approximately 1524 mm [5 ft] wide, seating (for instructor plus 2 students/guest), 4-shelf bookcase,

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telephone, computer, and printer.

Finishes: See the Finish Schedule for standard finishes.

2-5.3 Director's Office. (Category Code 17120) Office space for the director who oversees the program operation. The office includes a small meeting space.

Function: Office.

Occupancy: 1 staff, 2 guests.

Adjacency Reqmnts: Administrative area.

Space requirement: Total net area of 20.4 m² [220 s.f.].

Mechanical: Space shall provide heating, cooling, and ventilation.

Electrical/Lighting: Day lighting is desirable, but not necessary and should be controlled when used.

Communications: Space shall have telephone and LAN connections.

F/F/E: Government furnished equipment includes workstation, seating (for director plus 2 guests), small meeting table with seating, file cabinet, shelving, telephone, computer, and printer.

Finishes: See the Finish Schedule for standard finishes.

2-5.4 Administration Office. (Category Code 17120) Space for building operations, budget, program and training administration. In addition to handling the on-site training, GIB administrators often schedule and arrange off-site training for Installation forces.

Function: Office.

Occupancy: 1 staff, 2 guests.

Adjacency Reqmnts: Director's office.

Space requirement: Total net area of 12 m² [130 s.f.].

Mechanical: Space shall provide heating, cooling, and ventilation.

Electrical/Lighting: Day lighting is desirable, but not necessary and should be controlled when used.

Communications: Space shall have telephone and LAN connections.

F/F/E: Provide tack board and white board. Government furnished equipment includes workstation, seating (for administrator plus 2 guests), file cabinet, shelving, telephone, computer, and printer.

Finishes: See the Finish Schedule for standard finishes.

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2-5.5 **Building Manager's Office.** (Category Code 17120) Required for controlling the use of the classrooms. Space for copying and media storage is required. Serves as security office and has monitors for the security cameras that are located throughout the facility.

- Function: Office space for building administration and security.
- Occupancy: 3 staff, 2 guests
- Adjacency Reqmnts: Near building entrance.
- Space requirement: Total net area 46.5 m² [500 s.f.]
- Mechanical: Space shall provide heating, cooling, and ventilation.
- Electrical/Lighting: Day lighting is desirable, but not necessary and should be controlled when used.
- Communications: Space shall have telephone and LAN system including data and cable television.
- F/F/E: Provide tack board and white board. Government furnished equipment includes 3 workstations, seating, shelving, copier, storage cabinets, computers, fax and printers.
- Finishes: See the Finish Schedule for standard finishes.
- Other Requirements: Security camera and monitor requirements shall be coordinated with the local Installation Security Office. In most cases two monitors are required with the ability to switch cameras or have multiple views displayed.

2-5.6 **Conference Room.** (Category Code 61050) The conference room shall provide comfortable seating and meeting space. Furniture system shall provide for a variety of seating arrangements.

- Function: Staff and administrative meetings.
- Occupancy: 20 staff
30 staff
50 staff
- Adjacency Reqmnts: Near administrative area.
- Space requirement: Total net area.
20 staff- 44 m² [480 s.f.]
30 staff- 67 m² [720 s.f.]
50 staff- 111 m² [1,200 s.f.]
- Acoustics: Walls shall have acoustic wall panels.
- Plumbing: Restrooms and drinking fountains shall be located nearby.
- Mechanical: Mechanical system shall be designed to accommodate partial to full

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occupancy with temperature control separate from other portions of the building. Equipment and airflow shall be quiet.

Electrical/Lighting: Day lighting is not desirable or, if provided, should be controlled. Lighting shall be controlled to allow variable light levels. Each room shall have individual lighting control that switches off automatically when the room is not in use¹.

Communications: Space shall have telephone and LAN system including data and cable television. Flush data and power receptacles shall be located below probable table locations to avoid exposed wiring during meetings. A clock shall be provided on the rear wall.

Adjacency Reqmnts: Near the building administration unless shared as a training room.

F/F/E: Government furnished equipment includes conference tables (reconfigurable table is preferred), seating, and credenza. Provide in the large rooms a speaker system. Government shall provide an interactive lectern and "smart" board system that shall be placed at one end of the room. Government shall provide a ceiling mounted projector in all size rooms. Consider coat/cap closet or rack for ½ of the occupants.

Finishes: See the Finish Schedule for standard finishes.

2-5.7 Network Operations Center (NOC). (Category Code 13131) The NOC is also considered a large communications area and its configuration is dependent on the engineering solution for the systems architecture. For the GIB, the NOC is the intelligent connection to the Communications room, serving as the distribution point for VTT (Teletraining Network known as TNET and the Satellite Education Network known as SEN), internet/intranet, cable television, telephone, and data distribution. The NOC electronically stores and distributes digital training material and other materials. The GIB NOC may contain the DTAC required for Classroom XXI. It will serve VTT classrooms as well as all network functions in the building. Depending on the size of the facility, the NOC may serve sub-communication closets or serve directly to the desktop.

The NOC includes area for servers, switches, and uninterruptible power supplies, housed in racks. In large facilities, provide two workstations for technical support personnel and administrator.

A cable management system (raised flooring) is necessary. Where the raised floor is not feasible, an overhead raceway is acceptable.

Function: Information storage and distribution.

Occupancy: 2 staff.

Adjacency Reqmnts: Near classrooms.

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- Space requirement: Total net area of 65.0 m² [700 s.f.].
- Mechanical: A separate cooling system capable of year-round cooling operation is recommended.
- Electrical/Lighting: Day lighting is not desirable.
- Communications: Space shall have TNET, SEN, telephone, Internet/intranet and LAN system including data and cable television.
- F/F/E: Government/school furnished equipment includes workstations, seating, shelving, storage cabinets, racks, servers, switches, computers, and printers.
- Finishes: See the Finish Schedule for standard finishes. Avoid materials that generate or hold static charges.
- Other Requirements: The space shall also be connected to and supply information to the Army's Satellite Education Network (SEN). While this broadcast/receiver system is not as reliable as other hardwire methods, the technology is necessary for remote distribution of information. TRADOC does use it in some of their programs. Broadcast through a SEN is important to commands such as those in Germany who will set up field training facilities in remote locations with broadcast coming from the local instruction facility. This function is often related to the optional Broadcast Studio space. A method for flexible data and power distribution and reconfiguration shall be considered such as access flooring (see paragraph 3-5.6.4 for options).

2-5.8 Computer Maintenance Area. (Category Code 13115) For computer setup, storage, maintenance serving classrooms and administrative requirements in large GIBs (usually over 3716 m² [40,000 s.f.]).

- Function: Computer service.
- Occupancy: 2 staff.
- Space requirement: Total net area 111 m² [1,200 s.f.]
- Mechanical: Space shall provide heating, cooling, and ventilation.
- Electrical/Lighting: Electrical and lighting shall be arranged for flexible use of space as a maintenance bay.
- Communications: Space shall have telephone and LAN system including data and cable television.
- F/F/E: Government/school furnished equipment includes 2 workstations, seating, shelving, copier, storage cabinets, workbenches, computers, fax and printers.

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Finishes: See the Finish Schedule for standard finishes.

2-5.9 **Loading Dock.** (Category Code 17120) A loading dock is important for new stand-alone facilities. It should be remote from the student entrance, and have storage and vertical circulation. In large facilities (over 3716 m² [40,000 s.f.]), where delivery of supplies or instruction material is received daily, loading docks are usually required. The dock shall be raised with a platform height at 1097 mm [3 ft-6 inches] above lowered truck area. Dock shall include a roof, dock leveler and stairs.

Function: Receiving area.

Adjacency Reqmnts: Near Material Storage and Service Elevator. Remote from student entrance.

Space requirement: Total net area 14.9 m² [160 s.f.] Gross area impact for this space is calculated at 50% and equals 7.4 m² [80 s.f.]

Acoustics: Isolate from Classrooms and Testing.

Plumbing: Drain truck pit.

Electrical/Lighting: Provide lighting.

Communications: Space shall have an intercom to the Facility Manager's Office.

Finishes: See the Finish Schedule for standard finishes.

2-5.10 **Transient Storage.** (Category Code 17120) Secure storage for transient programs near the Loading Dock is required. Transient programs will use the GIB for temporary training needs. They bring materials and equipment packed in crates. The material and equipment is moved to the classroom and the crates must be stored for return transport. This space is sometimes needed for installations that have an ACES that support a large amount of special short-term training.

Function: Short term storage of crates and teaching materials for visiting instructors.

Occupancy: 1 staff

Adjacency Reqmnts: Near Loading Dock

Space requirement: Total net area of 37.2 m² [400 s.f.].

Mechanical: Space shall be heated and ventilated.

Electrical/Lighting: Day lighting is not desirable. Each room shall have individual lighting control that switches off automatically when the room is not in use¹.

Communications: Space shall have telephone and LAN connection.

F/F/E: GFGL storage cabinet, desk and chair.

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Finishes: See the Finish Schedule for standard finishes.

2-5.11 **Record Storage.** (Category Code 17120) Storage is required for student records held for 7 years. These files are currently in the form of paper files stored in file cabinets.

Function: Storage space for files.

Adjacency Reqmnts: Near administrative area.

Space requirement: Total net area of 11.1 m² [120 s.f.]

Mechanical: Space shall be heated, cooled, and ventilated.

Electrical/Lighting: Day lighting is not desirable. Provide convenience power receptacles.

Communications: Provide telephone and LAN receptacles.

F/F/E: GFGI desk, storage cabinet, and file cabinets.

Finishes: See the Finish Schedule for standard finishes.

2-5.12 **Copy Room.** (Category Code 17120) Central reproduction room for printing/copying documents, collating, binding and sometimes sending facsimiles. This space is required on each floor. Some facilities may find it unacceptable to share these functions between staff and students, in which case separate and probably smaller spaces would be provided.

Function: Open area for administrative, faculty, and student use.

Adjacency Reqmnts: Near administrative area.

Space requirement: Total net area 18.6 m² [200 s.f.]

Acoustics: Partitions shall be used to reduce noise transmission into other areas.

Mechanical: Space shall be heated, cooled, and ventilated.

Electrical/Lighting: Day lighting is not desirable.

Communications: Space shall have telephone and LAN connections.

F/F/E: Government/school furnished equipment includes shelving, copiers, storage cabinets, computer, fax and printers as well as paper and office supplies. Provide a built-in 863 mm [34 inches] high counter approximately 3048 mm [10 ft] long with wall cabinet above and drawer base cabinet below. Cabinets shall have cam locks.

Finishes: See the Finish Schedule for standard finishes.

2-5.13 **Supply Storage.** (Category Code 17120) Storage is required for paper and office supplies. In multi-story buildings, the space shall be divided among each floor or area.

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Function:	Storage space for administrative materials.
Adjacency Reqmnts:	Near administrative area.
Space requirement:	Total net area of .6% of the building net area subtotal is appropriate. This would provide 27.9 m ² [300 s.f.] for a 4645 m ² [50,000 s.f.] facility.
Mechanical:	Space shall be heated, cooled, and ventilated.
Electrical/Lighting:	Day lighting is not desirable. Provide convenience power receptacle. Rooms shall have individual lighting control that switches off automatically when the room is not in use ¹ .
F/F/E:	Provide 406 mm [16 inch] deep shelving full height on 2 walls for paper storage.
Finishes:	See the Finish Schedule for standard finishes.
Communications:	Space shall have telephone receptacle.

2-6 SPECIAL FUNCTIONAL USE AREAS

2-6.1 Small Arms Training Room. (Category Code 17131) A small arms training room has the same requirements as a classroom with a few exceptions. Because units bring in their own weapons for training, the room should be located near a delivery area for processing weapons and equipment in and out. An Arms Vault is required for storage of the weapons; in fact, use of the Arms Vault is part of the training. The vault is to be accessible from the classroom. Cleaning agents are used with the weapons, therefore special consideration shall be given to ventilation, room and furniture finishes. Worktables should be provided.

Function:	Weapons training.
Occupancy:	32 students, 2 instructors.
Adjacency Reqmnts:	Near delivery area, on first floor.
Space requirement:	Total net area of 104 m ² [1,125 s.f.]
Acoustics:	Partitions shall be STC 45 minimum.
Mechanical:	Mechanical system shall be designed to accommodate partial to full occupancy with temperature control separate from other portions of the building. Equipment and airflow shall be quiet. A separate exhaust system is required. Return air shall not be mixed with adjacent rooms.
Electrical/Lighting:	Day lighting is desirable but should be controlled. Electrical lighting and power is same as typical classrooms. Each room shall have individual lighting control that switches off automatically when the room is not in use ² .

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Communications: Classroom shall be wired like multipurpose classroom for power and data connections at each seat.

F/F/E: Government provided projector, interactive white board, instructor's lectern, display table for mounting weapons, 1524 mm [5 ft] by 610-mm [2 ft] worktables at stool height with 2 student stools (vinyl finish), two instructor's workstations, chairs, computers, and printers. Provide a ceiling mounted projector mounting and white board.

Finishes: See the Finish Schedule for standard finishes. Finishes are required to be more durable than typical classrooms due to the use and movement of equipment. Floor should be light to medium darkness without patterns so that small items can more easily be found.

Other Requirements: See Arms Vault.

2-6.2 Arms Vault. (Category Code 44223) Provide one per weapons training classroom. Minimum dimensions shall be 4000 mm [13 ft] x 7000 mm [23 ft]. Provide GSA approved Class 5 vault door with day gate between Vault and classroom. Walls and ceiling of Vault shall be reinforced concrete masonry or concrete. Floor shall be reinforced concrete. Rack anchor rings shall be provided. Design shall be in compliance with TI 800-01 Design Criteria and AR 190-11 Physical Security of Arms, Ammunition, and Explosives.

Function: Secure storage of weapons used for instruction. Ammunition is not to be stored in the vault.

Adjacency Reqmnts: Access from the Small Arms Training Room.

Space requirement: Total net area of 27.9 m² [300 s.f.]

Mechanical: Space shall be heated and cooled as part of the classroom.

Electrical/Lighting: Day lighting is not allowed.

Communications: Provide telephone and LAN receptacles. Provide a conduit for the government installed intrusion detection system.

F/F/E: Government shall provide intrusion detection system, racks, shelving, and clearing barrel.

Finishes: See the Finish Schedule for standard finishes. Finishes are required to be more durable than typical classrooms due to the use and movement of equipment.

2-6.3 Fixed Seat Auditorium. (Category Code 17120) The auditorium may not be a required space in every facility. Often the Installation has satisfactory spaces for addressing large groups near instruction buildings. When a fixed seat auditorium is required (and there are no on post facilities that can reasonably accommodate this requirement) it will be sized from the 151 or more person capacity. Requirements for smaller auditorium sizes will be accommodated with existing on post facilities, the multi-purpose auditorium, or a multi-purpose classroom.

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The size of the auditorium is based on the number of anticipated users at one time. ACTS has a formula for calculating this. This criteria uses 1.2 m² [13 s.f.] per seat for net area including related spaces. Auditoriums should include spaces such as a vestibule, main seating area, stage, storage and sound room. Projection rooms are not usually required since most presentations are computer based.

Project equipment should include a lectern (with proper lighting/audio/visual controls), two electric projection screens or a wide screen, two projectors, wireless microphones, theater quality audio system, theater seating with writing tablets.

A sloped floor is very desirable. Where it can be accommodated, curved or fan shaped rows of seating are preferred to straight rows. Seating should focus on and provide a good viewing of the speaker and projection screens. Seating should have upholstered seats and backs to soften acoustics but solid bottoms and rear panels for durability. **Fixed seating should not create a maintenance and repair problem for auditorium floor, consider swivel type fixed seating so that floor mounts due not unduly damage flooring surface.**

Function:	A presentation and learning space for large groups including graduation ceremonies.
Adjacency Reqmnts:	Near the building entrance and restrooms
Occupancy:	Based on need
Space requirement:	Total net area including support spaces shall be number of seats x 1.2 m ² [13 s.f.] net.
Acoustics:	Partitions shall be STC 45 minimum. Rear wall and floor should have an absorptive NRC of 25 minimum while the ceiling, front and sidewalls shall be reflective.
Plumbing:	Restrooms and drinking fountains shall be located nearby.
Mechanical:	Mechanical system shall be designed to accommodate partial to full occupancy with temperature control separate from other portions of the building. Equipment and airflow shall be quiet.
Electrical/Lighting:	Day lighting is not desirable or should be controlled. Lighting shall be HID type and dimmable with controls at the speaker's podium and rear wall.
Communications:	Audio, video, cable television systems are required. A clock shall be provided on the rear wall. Provide telephone and LAN receptacles serving the podiums and stage areas; additional wall outlets will be evenly spaced around the room's perimeter at the rate on one per 500 SF of auditorium area.
F/F/E:	Provide auditorium seating, projector mounting, a/v/ system rack, audio system and projection screens. Government furnished equipment includes projectors, lectern, computers, freestanding tables and chairs as required for special functions.
Finishes:	See the Finish Schedule for standard finishes.

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Other Requirements: See code requirements for Assembly occupancies.

2-6.4 Multipurpose Auditorium. (Category Code 17120) The multipurpose auditorium is meant for smaller groups and diverse functions compared to the larger auditorium. It may not be a required space in every facility and can often be shared between GIBs. The multipurpose auditorium is intended to seat from 71 up to 150 people using stackable chairs (generally, auditorium requirements below 71 people should be accommodated within multi-purpose classrooms rather than a separate auditorium). It requires storage space for the chairs. It is to have a raised podium/stage sized for the functions of the particular installation. The stage and seating area must accommodate persons with disabilities. A vestibule space and sound/projection room is not required.

Project equipment should include a lectern (with proper lighting/audio/visual controls), two electric projection screens, two projectors, audio system, wireless microphone, and stackable seating. A sloped floor is not acceptable in this multi-use space. Seating should focus on and provide good viewing of the speaker and projection screens.

Function: A multi-use gathering, presentation and learning space for large groups including graduation ceremonies.

Adjacency Reqmnts: Near the building entrance and restrooms

Occupancy: 71 – 150 people.

Space requirement: Total net area including support spaces shall be 209 m² [2,250 s.f.]

Acoustics: Partitions shall be STC 45 minimum. Rear wall and floor should have an absorptive NRC of 25 minimum while the ceiling, front and sidewalls shall be reflective.

Plumbing: Restrooms and drinking fountains shall be located nearby.

Mechanical: Mechanical system shall be designed to accommodate partial to full occupancy with temperature control separate from other portions of the building. Equipment and airflow shall be quiet.

Electrical/Lighting: Day lighting is not desirable or if provided, should be controlled. Lighting shall be dimmable with controls at the speaker's podium and rear wall.

Communications: Provide telephone and LAN receptacles serving the podiums and stage areas; additional wall outlets will be evenly spaced around the room's perimeter at the rate on one per 500 SF of auditorium area. Audio, video, and cable television systems are required. A clock shall be provided on the rear wall.

F/F/E: Provide projector mounting, a/v/ system rack, audio system and projection screens. Government furnished equipment includes projectors, lectern, computers, freestanding tables and chairs as required for planned functions.

Finishes: See the Finish Schedule for standard finishes.

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Other Requirements: See code requirements for Assembly occupancies.

2-6.5 Army Continuing Education System (ACES) Classrooms and Support Space. (Category Code 74025) These spaces often operate until late at night. Consider sharing classrooms with daytime general instruction space, but program as ACES facility so adequate support space is provided. See GIB classroom and office administration descriptions for selection of appropriate spaces. Include Information/Reception, College Offices, Counselor Offices, and Testing facilities listed below as required by the ACES function. For ACES, Instructor offices should be located near college offices and administration space instead of near classrooms; this provides more flexibility to change use of the space as requirements change. Sizing of ACES functional areas should be based maximum student load usually occurring in the early spring or late fall. Information/Reception Area is often located near the Break Area for overflow during peak registration times.

2-6.5.1 College Office. (Category Code 74025) This is a function of the ACES. The Army provides offices for those colleges serving their ACES. Each office varies in size based on the needs at the particular Installation. Provisions are usually made for shared offices by those colleges who do not provide full time staff on site.

Function: Office space for administrative and counseling support to students.

Occupancy: 2 students, 1 counselor.

Adjacency Reqmnts: Near administrative area and reception area.

Space requirement: Total net area at an average of 11.1 m² [120 s.f.] full time staff person.

Acoustics: Partitions shall be STC 45 minimum.

Mechanical: Space shall be heated, cooled, and ventilated.

Electrical/Lighting: Day lighting is desirable, but not necessary and should be controlled when used.

Communications: Space shall have telephone and LAN system including data and cable television.

F/F/E: Government/school furnished equipment includes workstations, seating, shelving, copier, storage cabinets, computers, fax and printers.

Finishes: See the Finish Schedule for standard finishes.

2-6.5.2 Counselors. (Category Code 74025) Counselors assist students in planning their education and registering or changing class schedules. The functional size, furnishings, seating and staff is based on the needs for an ACES facility. The requirement should be adjusted appropriately based on Installation needs. In some facilities, counselors will also require administrative assistance. Space for assistants would be programmed as a counselor office function at a ratio of approximately one per five counselors.

Some situations require the counselor store additional materials in the office in which case additional room size is justified in accordance with Army Regulation 405-70. Some counselors

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have larger groups to counsel in which case it is preferable to use common meeting/conference space. Planners shall adjust the room size on the worksheet as appropriate for these special situations.

Function:	Private office for counseling.
Occupancy:	One counselor, 2 students.
Adjacency Reqmnts:	Near administrative area and reception area.
Space requirement:	Total net area of 11.1 m ² [120 s.f.] per counselor.
Acoustics:	Partitions shall be STC 45 minimum.
Mechanical:	Space shall be heated, cooled, and ventilated.
Electrical/Lighting:	Day lighting is desirable, but not necessary and should be controlled when used.
Communications:	Space shall have telephone and LAN connections.
F/F/E:	Government furnished equipment includes workstations, seating (for counselor plus 2 students), shelving, bulletin/white board, telephone, computer, and printer.
Finishes:	See the Finish Schedule for standard finishes.

2-6.5.3 Testing Room. (Category Code 74025) Testing is generally a requirement of ACES. The space shall also be useable as a Multi-Purpose Classroom. Testing requires space for traditional (paper) and computer testing as well as administration, observation and storage space. One proctor is required for each 15 students; testing rooms are normally set up for 15 or 30 students. The testing room and process shall comply with AR 611-5 Army Personnel Testing and DANTES Exam Program Handbook.

The space shall be sized for 30 students but dividable as two rooms for testing 15 on each side. The moveable partition shall provide an STC rating equal to the requirement for fixed wall construction. An intercom system shall be used between the Control Room and each side of the Testing Room. A minimum of 4 speakers and microphones shall be used for each 15-student area.

Function:	Student testing.
Occupancy:	30 students, 2 instructors
Adjacency Reqmnts:	Testing Control Room and within a quiet area of the facility.
Space requirement:	Total net area of 111 m ² [1,200 s.f.] (dividable 30-student space).
Acoustics:	STC 48.
Mechanical:	Mechanical system shall be designed to accommodate partial to full occupancy with temperature control separate from other portions of the

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	building. Equipment and airflow shall be quiet.
Electrical/Lighting:	Day lighting is not necessary. Electric lighting shall be switched to allow variable lighting levels.
Communications:	Room shall be wired like multi-purpose classroom for power and data connections at each seat. The standard intercom addressing all classrooms shall not be used in the Testing Room.
F/F/E:	Government shall provide desk approximately 610 mm [2 ft] deep by 914 mm [3 ft] wide for use with or without computers and seating. Desks that have transparent tops with a computer monitor below are a desirable feature to allow computer based testing and paper testing without changing room arrangement. Provide wall clock, marker board, and tack board.
Finishes:	See the Finish Schedule for standard finishes.

2-6.5.4 Testing Control Room. (Category Code 74025) Certain testing must be observed from an adjacent space. The Control Room shall comply with AR 611-5 Army Personnel Testing and DANTES Exam Program Handbook. A large observation window shall be used with one-way glass. The Testing Control Room is approximately 13.9 m² [150 s.f.] and included with the Testing Room because it is an integral requirement. With proper layout, a single Testing Control Room could serve two 30-person rooms. The space also requires approximately 6.5 m² [70 s.f.] of miscellaneous Storage (furniture, materials and computers) and approximately 6.5 m² [70 s.f.] of Secure Storage connected to the Testing Control Room. All of these spaces are included in the Testing Room net area. Some facilities may have two personnel assigned to this space, requiring separate computers and a test scanner. Students will not have access to the test control room.

Function:	Observe testing, store test.
Occupancy:	1 - 2 instructor(s).
Adjacency Reqmnts:	Testing rooms.
Space requirement:	Total net area of 26.9 m ² [290 s.f.].
Acoustics:	STC 48.
Mechanical:	Space shall be heated and cooled as part of the Test Room.
Electrical/Lighting:	Day lighting is not desirable. Lighting shall be dimmable to enhance use of one-way glass.
Communications:	Public address going to other classrooms shall be included in the Test Control Room. Provide an intercom to the Test Room. Space shall have telephone and LAN connections.
F/F/E:	Government shall provide safe, files, shelves, seating, computer, test scanner, and printer. Provide built-in counter, observation window with one-way glass, window blind, and tack board.

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Finishes: See the Finish Schedule for standard finishes.

2-6.5.5 Testing Administrator. (Category Code 74025) An office space for a test administrator is required in some facilities but is often combined with the Testing Control room in ACES facilities.

Function: Office.

Occupancy: 2 students, 1 administrator

Adjacency Reqmnts: Near Testing Rooms.

Space requirement: Total net area of 10.2 m² [110 s.f.]

Mechanical: Space shall be heated, cooled, and ventilated.

Electrical/Lighting: Day lighting is desirable, but not necessary and should be controlled when used.

Communications: Space shall have telephone and LAN connections.

F/F/E: Government furnished equipment includes workstations, seating (for administrator plus 2 students), shelving, file cabinet, telephone, computer, and printer.

Finishes: See the Finish Schedule for standard finishes.

2-6.6 Broadcast Studio. (Category Code 13175) The space is used to record and send out instructor information. The digital information may be produced, copied and distributed from the space to the Network Operations Center. From there it may be broadcast on the SEN.

Function: Digital recording of video and audio information.

Occupancy: 2 staff.

Adjacency Reqmnts: Quiet, remote location away from mechanical equipment.

Space requirement: Total net area 41.8 m² [450 s.f.]

Acoustics: Partitions shall be STC 52 minimum. Rear wall and floor should have an absorptive NRC of 25 minimum while the ceiling, front and sidewalls shall be reflective.

Mechanical: Space shall be heated, cooled, and ventilated with individual temperature control. System shall be quiet.

Electrical/Lighting: Day lighting is not desirable. Consider use of studio lighting to eliminate facial shadows.

Communications: Space shall have telephone, LAN, and high-speed connection to the Network Operations Center.

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F/F/E: Government furnished equipment includes audio/video recording and broadcast equipment, workstations, seating, shelving, storage cabinets, computers, printer, studio lighting and recording equipment.

Finishes: See the Finish Schedule for standard finishes. Low contrast between materials is important for better camera function. A blue color scheme is recommended because it provides a technically correct broadcast quality VTT background.

2-6.7 Applied Instruction Building Module. (Category Code is dependent on actual use) This document does not include specific criteria for Applied Instruction spaces but does allow the planner/designer to input requirements in the GIB programming worksheet. Installation specific requirements must be evaluated and input to the programming and design documents. Refer to the latest Real Property Planning and Analysis System (RPLANS) and Facility Planning System (FPS) reports for category codes 1713x for various types of applied instruction facilities.

Applied Instruction often includes special equipment such as vehicle lifts, pneumatic tools, high bay work/training areas, special electricity, large quantities of water or cooling, special supply and disposal requirements, and unique ventilation. Examples of applied instruction training facilities are vehicle maintenance, helicopter maintenance, dive tanks, ordnance, large weapons, and equipment instruction.

Function: Instruction for specific hands-on applications often involving military equipment.

Occupancy: Student and instructor load is based on the particular requirements of the Applied Instruction and must be programmed on an individual basis.

Adjacency Reqmnts: Applied Instruction often requires bringing in equipment, therefore facilities must be located near delivery.

Space requirement: Total net area is based on the particular requirements of the Applied Instruction and must be programmed on an individual basis.

Acoustics: Consider appropriate acoustic treatments to separate from classroom and administrative spaces. Partitions shall be STC 45 minimum.

F/F/E: F/F/E requirements are specific to the instruction being taught.

Finishes: Finishes are generally more industrial in durability and appearance than used for General Instruction spaces.

Communications: Provide telephone and LAN receptacles.

2-7 SUPPORT SPACES

2-7.1 Vestibule. (Category Code 17120) A vestibule or air lock shall be provided at the main entrance.

Function: Reduce drafts and improve energy efficiency.

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Adjacency Reqmnts: Exterior and Lobby

Space requirement: Total net area of 7.4 m² [80 s.f.]. The net area is part of the gross area factor calculation.

Mechanical: Space may be heated in cool climates.

Finishes: See the Finish Schedule for standard finishes. Use durable materials and take the opportunity to continue exterior material palette into the building.

Other Requirements: Provide a recessed entrance floor mat. Exterior glazing should be insulated.

2-7.2 Student Break and Vending Area. (Category Code 17120) Separate instructors and students break areas required. Student Break area works well as an open “food court” style space in coordination with the Vending Area, offering flexibility in types of seating and gathering. A variety of machines/food selection is necessary. The installation shall determine the number and type of machines to be used. Acoustic separation from classrooms is important. In two story facilities, a Break/Vending area may be required on each floor. In ACES facilities it is advantageous to locate this near the Reception area for over flow during class registration.

Designers shall coordinate with the installation AAFES on number and size of vending machines to be provided so the result will be a designed/coordinated space for the actual government provided equipment.

Function: Serves as a snack vending and break area for students and workers.

Adjacency Reqmnts: Adjacent to corridor and vertical circulation. Restrooms and drinking fountains shall be located nearby. Relationship to outdoor areas is desirable.

Space requirement: Total net area is calculated at approximately 6% of the gross area subtotal.

Acoustics: Determined by surrounding spaces.

Plumbing: Include an electric water cooler near by. Plumbing as required for vending machines (coffee).

Mechanical: Space shall be heated, cooled, and ventilated. Heat load calculations shall consider the machines to be installed.

Electrical/Lighting: Provide receptacles for vending machines, refrigerator, coffee maker and microwave oven.

Communications: Include speaker for corridor PA system. Provide wall (Installation access only) telephone receptacles. Consider providing two pay phones. (Verify phone requirements with Installation).

F/F/E: Government shall provide trash/recycle receptacles, seating and tables. AAFES will provide vending machines. Provide tack boards.

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Finishes: See the Finish Schedule for standard finishes. Casework with durable finishes.

Other Requirements: Exterior windows are desirable. Casework with lockable storage below. Plan for restocking of vending machines.

2-7.3 Staff Break Area. (Category Code 17120) Separate administrative staff and students break areas are required. Additional staff break areas may be required for instructors in multi-story facilities. In facilities with less than 30 staff, a staff break area is not usually provided. Generally staff will share the student vending machine. The staff space shall be an enclosed space. Acoustic separation from classrooms is important. Provide for handicapped accessibility.

Function: Serves as a snack and break area for staff.

Occupancy: 16 staff.

Adjacency Reqmnts: Adjacent to corridor and vertical circulation, near Administration areas.

Space requirement: Total net area of 27.9 m² [300 s.f.] is generally adequate. The net area is part of the gross area factor calculation.

Acoustics: Partitions shall be STC 45 minimum.

Plumbing: Plumbing connections for a refrigerator ice maker and coffee maker. Provide a single bowl polished stainless steel sink and instantaneous hot water dispenser.

Mechanical: Space shall be heated, cooled, and ventilated.

Electrical/Lighting: Provide convenience receptacles as well as receptacles for refrigerator and counter top appliances.

Communications: Provide telephone and LAN receptacles. Include speaker for corridor PA system.

F/F/E: Government shall provide trash/recycle receptacles, vending machines (if not provided elsewhere), refrigerator, coffee maker, microwave oven, seating and tables. Provide wall and base cabinets, and tack boards.

Finishes: See the Finish Schedule for standard finishes. Casework with durable finishes.

Other Requirements: Exterior windows are desirable. Casework with lockable storage below.

2-7.4 Restrooms. Plan on proper male/female ratio and for surges when classes break. Currently, many installations have a greater male instruction program than female and this must be considered when determining fixture counts. In facilities with more than 30 staff, separate administrative restrooms from student restrooms. Minimum number of fixtures shall be as required by International Plumbing Code (Business occupancy). Consider additional fixtures to handle surge of students. Arrange entrance to provide visual privacy.

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Function: Restrooms for occupants. Include accessible fixtures as required by code.

Adjacency Reqmnts: Adjacent to corridor, near classrooms, student break and vending areas, staff break areas and administrative area.

Space requirement: The area is part of the gross area factor calculation. Total net area is calculated at approximately 4% of gross area subtotal.

Plumbing: Efficiently locate fixtures. Toilets, urinals, and lavatories shall have automatic valves. Installation shall determine if the valves are battery or hardwired.

Mechanical: Space shall be heated, cooled, and ventilated.

Electrical/Lighting: Provide GFI-protected convenience receptacles.

Communications: Include speaker for corridor PA system.

F/F/E: Government shall provide trash receptacles. Provide countertop-mounted lavatories, floor or wall mounted toilets, and wall-hung urinals. Countertops shall be solid surfacing material. Provide toilet partitions at each toilet, and urinal partitions between urinals. Partitions shall be solid polymer plastic, overhead-braced type. Provide the following toilet accessories: one continuous mirror full width of countertop at countertop mounted lavatories; full length mirror; one paper towel dispenser/waste receptacle per three toilet fixtures; one soap dispenser per lavatory; one toilet tissue dispenser per toilet; one robe hook on each toilet partition door. In addition, for Women's room provide one sanitary napkin disposal per toilet and consider one sanitary napkin/tampon vending machine. Toilet accessories shall be fabricated from stainless steel, provide semi-recessed units where possible. Provide a minimum of one floor drain with deep seal trap; locate floor drain outside of traffic areas.

Finishes: See the Finish Schedule for standard finishes.

Other Requirements: Consider the need for showers and locker rooms on a per project basis. Actual need must be compared to available facilities (building location relative to other facilities such as housing and physical fitness centers).

2-7.5 Janitor Closet. Provide one at each group of toilets on each floor of the building. Minimum area: 4.5 m² [48 s.f.]. Room shall be accessed from the corridor. Provide one floor mounted mop sink and mop rack for three mops. One Janitor's Closet is required on each floor minimum.

Function: Sink and storage of cleaning supplies, soap, paper products, floor buffer, and wet vacuum.

Adjacency Reqmnts: Near toilets.

Space requirement: Total net area of 4.5 m² [48 s.f.] The net area is a part of the gross area

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factor calculation.

Plumbing: Faucet shall be designed to support a bucket and have a threaded end to receive a hose.

Mechanical: Space shall be ventilated.

Electrical/Lighting: Provide a receptacle near the shelving wall.

F/F/E: Provide shelving.

Finishes: See the Finish Schedule for standard finishes.

2-7.6 Mechanical Room. Provide dedicated interior spaces and exterior areas for plumbing, fire protection, and HVAC equipment. Size and locate rooms (including doorways) to allow equipment removal and maintenance. Provide floor openings and vertical shaft spaces as necessary.

Function: Mechanical support spaces for the building.

Adjacency Reqmnts: Locate main mechanical room on ground floor with doors opening to exterior. Mechanical support spaces shall not be used for storage or other purposes; access to mechanical spaces will be limited to authorized personnel. Locate exterior mechanical equipment and air intake and openings in exterior walls to comply with force protection standards.

Space requirement: The area is part of the gross area factor calculation. Total net area equal to 5% of the gross building area subtotal for planning purposes. Actual required area shall be determined during programming based on Installations and environmental requirements.

Plumbing: Provide plumbing as required for functions of the space.

Mechanical: Space shall be heated independently from the remainder of the building.

Electrical/Lighting: Provide convenience receptacles as well as requirements for equipment.

Communications: Provide telephone service for energy management system and maintenance use.

Finishes: See the Finish Schedule for standard finishes.

Other Requirements: Locate air intake and exhaust openings to provide optimum indoor air quality. Locate air intakes to meet AT/FP requirements.

2-7.7 Electrical Room. Provide dedicated interior spaces and exterior areas for electrical equipment. Size and locate rooms (including doorways) to allow equipment removal and maintenance. Provide floor openings and vertical shaft spaces as necessary. Provide minimum of one electrical room per floor.

Function: Electrical support spaces for the building.

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Adjacency Reqmnts: Locate main electrical equipment room on ground floor. Electrical rooms on upper floors should be located to allow efficient distribution. Size and locate rooms to allow equipment removal and maintenance. Electrical rooms shall not be used for storage or other purposes; access to electrical rooms will be limited to authorized personnel. Locate exterior electrical equipment to comply with force protection standards.

Space requirement: The area is part of the gross area factor calculation. Total net area equal to 1.5% of the gross building area subtotal for planning purposes. Actual required area shall be determined during programming based on Installations and environmental requirements.

Plumbing: Do not run plumbing over electrical panels.

Mechanical: Space shall be ventilated.

Electrical/Lighting: Provide convenience receptacles.

Communications: Provide telephone service for fire alarm and security systems and maintenance use. Where transmitters and antennas are used by the installation, provide compatible equipment.

Finishes: See the Finish Schedule for standard finishes.

Other Requirements: Electrical service to the building shall be underground. Provide masonry screen walls with lockable metal access gates around outdoor equipment Coordinate with requirements of Installation Design Guide. It is preferable to locate transformer within the screened mechanical equipment area. Comply with AT/FP standards.

2-7.8 Communications (Comm) Room. A Communications Room is required to manage building connection to telephone, fiber optic, cable television, and other infrastructure. The room shall not be located remote from the Network Operations Center (NOC) or classrooms for the purpose of being located near Department of Public Works managed spaces such as Mechanical or Electrical Rooms. The Communications Room shall serve the NOC, which is the primary means of distributing information/communications systems through the facility to desktops. Provide additional telephone closets as required to meet the I3A Technical Guide.

Function: Communications service to the building.

Adjacency Reqmnts: Within service distance to NOC.

Space requirement: The area is part of the gross area factor calculation. Total net area of 10.2 m² [110 s.f.] or as required by the project.

Mechanical: Space shall be cooled.

Electrical/Lighting: Provide convenience power receptacles.

Communications: Provide telephone and LAN receptacles.

F/F/E: GFGL distribution hardware, switches, servers, etc. Provide backboards

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and racks.

Finishes: See the Finish Schedule for standard finishes.

Other Requirements: Communications service to the building shall be underground.

2-7.9 **Corridors.** Provide as required for circulation; minimum corridor width shall be as required by applicable codes, but not less than 1829 mm [6 ft] for student areas (24384-mm to 36576-mm [8 to 12 ft] is appropriate in large facilities) and 1524 mm [5 ft] for administrative areas. Provide glazed aluminum (or other material as required by the Installation Design Guide) storefront doors at public entrances. Provide insulated hollow metal doors and frames for exterior service areas.

Function: Circulation and egress; movement of equipment and people throughout

Adjacency Reqmnts: Adjacent to stairs, elevator, exterior entrances and classrooms, and other core areas.

Space requirement: Total net area as required by design. The net area of corridors is part of the gross area factor calculation.

Acoustics: See requirements for adjacent rooms

Mechanical: Space shall be heated and cooled.

Electrical/Lighting: Provide convenience receptacles (15 m [50 ft] o.c. minimum).

Communications: Provide wall telephone and LAN receptacles as required for safety and security. Public address system shall be provided in the corridors and public areas.

F/F/E: Provide room identification signage at doors to each room.

Finishes: See the Finish Schedule for standard finishes.

Other Requirements: Overhang or recess at exterior doors is desirable for weather protection. Provide vestibules at secondary entrances as required by the Installation. Coordinate user requirements for access control of exterior corridor doors. Where equipment on carts or dollies is regularly moved through corridors, add requirement for wall guard and corner guard protection

2-7.10 **Stairs.** Provide as required for circulation and egress in multi-story buildings. Interior stairs are preferable in most climates. A stair shall be conveniently located near the Lobby/Elevator/Public Entrance to the building. Minimum stair width shall be as required by applicable codes, but not less than 1118 mm [44 inches.] The main student use stair should be at least four feet wide. Provide exit signage. Stair doors shall have glazed panels (comply with code requirements for fire ratings and safety glazing). Exterior stairs shall be cast-in-place concrete construction. Interior stairs shall be cast-in-place concrete or steel construction with concrete-filled treads. Open risers and metal grating treads are prohibited.

Function: Circulation and egress, movement of equipment and people between floors.

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Adjacency Reqmnts: Adjacent to corridors, exterior entrances. Main stair should be located close to public main entrance.

Space requirement: Total net area is a part of the gross area factor calculation.

Mechanical: Fire stairs shall be heated in cool climates. The main stair shall be cooled and heated.

Finishes: See the Finish Schedule for standard finishes.

2-7.11 **Elevator.** Provide at least one hydraulic passenger elevator in each multi-story building. Some facilities will require an additional passenger and freight elevator but the designer should focus on convenient stair design and locations to minimize the need for elevators. Passenger elevator: 1134 kg [2,500 lb] capacity, minimum 22860 mm [75 feet] per minute speed; center opening doors. Elevator is required for handicapped accessibility to floors not on ground level.

Function: Vertical conveyance of people, equipment and furniture.

Adjacency Reqmnts: Adjacent to corridor, near main entry for public use. The freight elevator shall be located near the receiving and computer maintenance areas.

Space requirement: Total net area is part of the gross area factor calculation.

Acoustics: STC 48 for both the elevator shaft and the equipment room.

Plumbing: Elevator pit shall have a sump as required by code.

Mechanical: Equipment room shall be ventilated.

Electrical/Lighting: Lighting in passenger elevators shall be recessed down lights

Communications: As required by Elevator Code.

Finishes: See the Finish Schedule for standard finishes. Car door and front: satin finish stainless steel. Hoist way entrance doors and frame: satin finish stainless steel.

Other Requirements: Provide one elevator machine room in each multi-story building adjacent to elevator and corridor. Consider locating the machine room door on the exterior of the building to reduce noise in the building. Size to comply with equipment and code requirements.

2-7.12 **General Storage.** Storage is required for furniture, computers, etc. when re-arranging classroom layout.

Function: Storage space for furniture and equipment.

Adjacency Reqmnts: Near classroom and receiving areas.

Space requirement: The net area is part of the gross area factor calculation. Total net area

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equal to 2% of the gross building area subtotal.

Mechanical: Space may be heated, cooled, and ventilated as determined by the storage requirement.

Electrical/Lighting: Day lighting is not desirable. Provide convenience power receptacle. Each room shall have individual lighting control that switches off automatically when the room is not in use¹.

Finishes: See the Finish Schedule for standard finishes.

2-8 OUTDOOR SPACE

2-8.1 Outdoor Break Area. This space is desirable in appropriate climates but do not locate where it will disturb classes. Assure this space is not located near mechanical fresh air intakes or noisy equipment.

Function: Near Break/Vending Area for staff and students.

Occupancy: 30 students.

Adjacency Reqmnts: Convenient to vending, away from main building entrance. Away from mechanical fresh air intake louvers.

Space requirement: Outdoor Break Area is not a part of the calculated area unless it is a covered space in which case the gross area is calculated at 50% of net. This would be programmed for the individual needs of the Installation.

Acoustics: Avoid conflicts with Classrooms.

Plumbing: Assure area is properly drained.

Electrical/Lighting: Provide area lighting for nighttime use.

Communications: Include area on the public address system.

F/F/E: GFGI appropriate seating and ash/trash/recycle receptacles as desired by the Installation. Comply with the Installation Design Guide.

Finishes: Low maintenance outdoor finishes. Comply with the Installation Design Guide.

Other Requirements: Assure surfaces are well drained.

2-8.2 Parking. Comply with the requirements of Technical Instructions 804-11 Design for Non-Organizational or Privately Owned Vehicle (POV) Site Circulation and Parking and Technical Instructions 800-01 Design Criteria, Chapter 3 Site Planning and Design Criteria. Special consideration is required for number of parking spaces when an ACES function is included in the project. ACES's may include off base students that will increase the parking requirement. ACES requires parking for 50% of the ACES classroom seats. Where located

¹ This is an Army Standard for GIB

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adjacent to existing activities, consider shared parking areas

Function: Parking for staff and students.

Adjacency Reqmnts: Near entrances, accessible from roads, and in compliance with ATFP standards.

Electrical/Lighting: Provide lighting in compliance with the Installation Design Guide.

F/F/E: Comply with the Installation Design Guide.

Finishes: Comply with the Installation Design Guide for signage, lighting and furnishings.

2-8.3 Equipment Yard. Equipment yards shall be provided in compliance with ATFP and the Installation Design Guide to house and screen mechanical and electrical equipment, satellite antennas, emergency generators, etc. Access to the yards shall be provided for maintenance; consider the use of turf pavers for vehicle access.

Function: To enclose and screen equipment from view.

Adjacency Reqmnts: Place out of the main pedestrian and vehicular flow but in a location that can be accessed for repair work and convenient for utility lines to the mechanical/electrical rooms. Comply with ATFP setback from buildings.

Finishes: Comply with the Installation Design Guide.

Other Requirements: Provide masonry screen walls. Coordinate with requirements of Installation Design Guide.

2-8.4 Dumpster Enclosure. Consider locating recycling space in the same enclosure.

Function: To enclose dumpsters and screen from view.

Adjacency Reqmnts: Place out of the main pedestrian and vehicular flow but in a location that can be accessed by truck for emptying the dumpster. Comply with AT/FP required setback from buildings.

F/F/E: Provide bollards on the exterior to protect from vehicles. Provide bollards on the interior to prevent dumpsters from bumping the rear wall.

Finishes: Comply with the Installation Design Guide.

Other Requirements: Provide size, gates and landscape in accordance with the Installation Design Guide. Assure the height is adequate for the dumpsters to be used. Provide a reinforced concrete apron for the front tires of the truck to bear on. Use landscape screening.

2-8.5 Outdoor Storage. Storage facility for outdoor equipment such as lawn maintenance equipment may be considered. The structure must be consistent with Installation Design Guide and same architectural theme and color scheme as the GIB.

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Function: To store equipment away from the building.

Adjacency Reqmnts: Place out of the main pedestrian and vehicular flow but in a location that can be accessed by lawn maintenance equipment. Comply with AT/FP required setback from buildings.

Space requirement: Net area of approximately 11.1 m² [120 s.f.] is required. Confirm with Installation.

Finishes: Comply with the Installation Design Guide.

Other Requirements: Use landscape screening.

CHAPTER 3

FACILITY DESIGN

3 FACILITY DESIGN. Work shall be in accordance with the current versions of Army Design Guides, Technical Manuals, Technical Instructions and applicable codes and standards as listed in the appendix.

3-1 SITE PLANNING AND CIVIL ENGINEERING

3-1.1 Design Standards and Codes. Comply with TI-804-01 Area Planning, Site Planning and Design for site planning and civil engineering and UFC 4-010-01 DOD Minimum Antiterrorism Standards for Buildings, as well as other applicable requirements.

3-1.2 Site Planning Objective. Provide a functional layout of buildings and site elements. The site plan should place emphasis on creating a safe work environment. Arrange vehicular circulation to minimize conflict with pedestrian circulation. Pavement marking and signage shall clearly delineate traffic patterns, especially important to first time visitors at the site. Integrate sustainable design principles by retaining and using existing topography to advantage; preserve environmentally sensitive areas and reduce overall project impact on the site.

3-1.3 Site Selection. The location of the facility shall be integrated with the Installation Master Plan and be consistent with the approved Land Use Plan and Army Installation Design Standards. It shall be located in an accessible area based on the use of the facility. When NCO training is included it shall have temporary duty housing nearby. When used as an ACES facility it shall be convenient to students located on and off post. Consider requirements for future expansion as well as transient service requirements. Use sustainable planning and design principles to take advantage of passive energy and siting efficiencies.

3-1.4 Site Design. Site planning is an essential aspect of the facility design. The art of site planning requires the interdisciplinary involvement of the community planner, architect, landscape architect, civil, mechanical, electrical, and communication engineers. Community planning is an integral part of site planning. The facility must be located in relation to other functional areas such as temporary duty housing, transportation facilities, an auditorium, library, ACES facility, dining facilities and housing where the facility is a consolidated GIB/ACES facility. Siting should consider shared use parking based on the time that adjacent facilities are in use. The design of vehicular paths, pedestrian paths and landscape design can define the functional campus yet enhance the flow into and out of the area. Provide appropriate buffer areas to separate and visually isolate the facility from adjacent areas. Consider providing landscaping or other screening between incompatible land uses.

3-1.5 Vehicle Traffic. Site the facility so it is clearly visible to pedestrians, cars and delivery vehicles. Separate service/delivery access from the student/staff access and circulation. Plan for daily deliveries to the loading area in larger facilities. Control vehicular access within UFC 4-010-01 standoff distances for the building.

3-1.6 Parking and Vehicular Circulation. Comply with TI 804-11 Design for Non-Organizational or Privately Owned Vehicles (POV) Site Circulation and Parking. Coordinate parking and vehicular circulation with AT/FP standards. Prepare a site traffic impact study to determine the traffic patterns and impact on the local roads and circulation patterns. Access requirements for fire equipment, trash/recycling removal, and service vehicles on site should be considered. Consider shared use parking with adjacent sites. Design entrance and exit drives

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for safe and controlled traffic flow. Consider pavement maintenance and snow removal (if applicable) in the design. Consider the use of alternate materials such as turf pavers for service vehicle access to mechanical rooms. Provide concrete paved parking for motorcycles. Pavement for organizational vehicle parking should be designed for the heaviest vehicle at the installation. Provide handicap-parking area when required.

3-1.7 **Walkways.** Connect the building to public walkway system and to parking with pedestrian walkways. Primary building entrances shall be at least 2438 mm [8 ft] wide. The minimum width of a sidewalk shall be 1524 mm [5 ft]. Place handicapped curb cuts in convenient locations while not creating obstacles for walkers. Depress curbs for handicapped access where possible instead of creating ramps. Consider brick or concrete pavers or patterned concrete to identify significant entrances. Provide well-lighted walkways since the facility is often used in the evening (especially if it is to be used as an ACES).

3-1.8 **Grading and Drainage.** The grading should maintain existing topography while recognizing standard gradients. There should be a balance of the quantity of cut and fill soils which would create a smooth transition of graded areas into the existing natural site. The plan should reflect selective site clearing that preserves groups of trees. Grading should manage site runoff to maintain rate of flow and quantity to pre-construction levels, or reduce site runoff where possible. The principles of positive drainage should be applied to control the conditions that remove rainfall away from facilities and functions. Site design should seek to minimize the disturbance of land, and utilize natural drainage paths where possible. Federal, State and local regulations regarding the design of storm water management systems shall establish minimum design criteria. Coordinate requirements for downspouts, underground and surface drainage with the Installation. Limit sheet drainage in pedestrian and parking areas. Rather than creating large retention basins, control storm water at the source by using micro-scale features that are distributed throughout the site. Integrate the landscape design into the storm water management strategy, creating plant areas that benefit from storm water while pollutants are controlled through natural processes. Additionally, minimize the impact of construction activities on drainage and prevent loss of soils by water and wind erosion.

3-1.9 **Utilities.** Consider the location and adequacy of existing utilities and their connection points when making the site selection and building orientation. The required services include water, sewer, storm water, electricity, telephone, cable television, fiber optics, possibly gas or steam lines, emergency generator, or satellite antennas.

3-1.10 **Stormwater Management Systems.** The storm drainage system shall be properly coordinated with surrounding properties to ensure that runoff does not cause damage to other properties. Treat contaminated storm water prior to discharge from the site. Design storm water management systems in accordance with the applicable requirements of "Controlling Urban Runoff: A Practical Manual for Planning and Designing Urban BMPS", by the Department of Environmental Programs or in accordance with the requirements of the agency having jurisdiction. Coordinate requirements for an on-site storm water retention/detention system based on the requirements of the Installation. Connection to building roof (as required by the Installation) or area drain lines shall be constructed in accordance with the International Building Code latest edition.

3-1.11 **Outdoor Furnishings.** Provide outdoor furnishings including trash and recycling receptacles, seating, bicycle racks, lighting standards, bollards in coordination with the Installation Design Guide. Where the climate is acceptable, provide outdoor break areas with tables, seating and shading devices.

3-1.12 **Signage.** Plan site identification signage in coordination with site approach, landscape,

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and lighting. Comply with the Installation Design Guide and the Army Installation Design Standards. Provide traffic control signage as well as “No Parking” signs at service drives. Provide informational signs to direct students to appropriate entries.

3-1.13 **Site Lighting.** Site lighting is an integral part of the design. Comply with the requirements of the Installation Design Guide. Provide lighting to ensure safe movement through outdoor areas. Consider the color rendition of outdoor lighting. Use bollards or variations in lighting to articulate entrances and public areas. Design lighting levels in accordance with the *Illuminating Engineering Society (IES) Lighting Handbook* illumination levels. Use photocells, motion detectors and timers to control lighting and conserve energy.

3-2 LANDSCAPE DESIGN

3-2.1 **Landscaping.** Coordinate the landscape design with AT/FP and Installation requirements. Preserve natural landscape features including existing topography, trees, and vegetation. Provide windbreaks and shading where appropriate. Consider earth berms to screen parking and roadways. Where berms or swales are used use gradual slopes no greater than 1:5 to allow use of mowing equipment. Screen service area and outdoor equipment. Shade parking areas to reduce heat developed by exposed pavement. Landscaping shall be in accordance with requirements of the Installation. Where appropriate, provide a variety of plants with seasonal change, color, texture, fragrance, and interpretive value. Always use local, durable, native species to help ensure survivability. The use of native plants will also minimize the requirement for chemical pesticides, herbicides and watering. Choose plant materials on the basis of plant hardiness, climate, soil conditions, low maintenance, and quality. Selected plant materials shall be easily maintained and tolerant of the specific site conditions. Incorporate sustainable design principles into the selection of plants. Planting or seeding shall occur only during periods when beneficial results can be obtained. Plant varieties shall be nursery grown or plantation grown stock. They shall be grown under climatic conditions similar to those in the locality of the project. Plants shall be furnished that have heavy, well developed, and balanced top with vigorous well developed root system, and shall be furnished in containers.

3-2.2 **Soil Test.** A soil test shall be performed for pH, chemical analysis, and mechanical analysis to establish the quantities and type of soil amendments required to meet local growing conditions for the type and variety of plant material specified.

3-2.3 **Sprinkler and/or Irrigation System.** In accordance with the Installation requirements, where required provide a complete permanent automatic irrigation system with controllers covering all common planting areas and slopes. Design the system to function with available water pressure or other sources of water to minimize use of treated water. Where automatic sprinkler systems are used, provide hydrometer control to prevent inappropriate watering. Investigate and employ methods of irrigation based on sustainable design principles, where practical and feasible.

3-3 GEOTECHNICAL.

3-3.1 **Geotechnical Design.** Geotechnical information shall be considered during the planning of the project. Where confident assumptions may be made based on past projects in the area, the geotechnical investigation may take place during the design phase. The geotechnical information is to consider loads from the structure, pavement, walkways, and vehicles. It shall assess the sub-surface condition determining soil type, density, and moisture content. Where significant debris is expected to exist on site, excavations shall be performed.

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3-3.2 **Capillary Water Barrier.** A capillary water barrier is required for all interior slabs on grade, including storage, loading dock, mechanical and electrical spaces.

3-3.3 **Termite Treatment.** Preventive methods for subterranean termites shall be applied in accordance with local regulations.

3-3.4 **Radon Testing.** Test shall be performed for potential radon exposure to occupants in accordance with TI 810-10.

3-4 STRUCTURAL.

3-4.1 The structural design shall be based on accurate geo-technical information and anticipated loads for the building type and geographic location. Select an economical structural system based on facility size, projected load requirements, and local availability of materials and labor. Consider the use of pre-engineered systems and components when conducting economic analysis.

3-4.2 **Structural Loads.** Structural loads (including dead, live, hydrodynamic, earth, vehicular, snow, wind, seismic loads and AT/FP) and design shall be in accordance with UFC 1-200-01 Design: General Building Requirements and all codes referenced therein. Computer access flooring shall always be rated for at least 488 kg/m² [100 psf].

3-5 ARCHITECTURE.

3-5.1 **Design Standards and Codes.** The design shall be in accordance with the current versions of the Unified Facilities Criteria UFC 1-200-01 Design: General Building Requirements and other relevant codes and criteria.

3-5.2 **Goals and Objectives.** Overall architectural goals for the facility are to provide a functional, visually appealing facility that is a source of pride for facility users, and the installation, instilling attitudes of a high level of achievement and environmental awareness. Provide coherent, architecturally compatible design consistent with the Installation's architectural theme.

3-5.2.1 **Exterior Design Objectives.** Design buildings to enhance the visual environment of the installation. Exterior materials, roof forms, and detailing shall comply with the Installation Design Guide and shall be compatible with the immediate local context. Use durable, low-maintenance materials. Configure building massing and use exterior elements such as entry focal points and material detailing to provide human scale, especially at public areas.

3-5.2.2 **Interior Design Objectives.** Arrange spaces in an efficient, functional manner. Provide simple circulation schemes that allow easy way finding within buildings. Use durable materials and furnishings that can be easily maintained and replaced. Use interior surfaces that are light in color; avoid trendy or bright color schemes. Where feasible, arrange spaces to allow rearrangement of furniture layout. Structure interior spaces to allow maximum flexibility for future modifications. Maximize use of day lighting and operable windows.

3-5.3 **Flexibility.** The need for flexibility is primarily related to interior functional layouts where functional changes are normal operation. Changes may routinely take place in courses being taught, the materials required by the course, teaching techniques, and student load. Multi-purpose use should be considered in design of floor loads, ceiling heights and floor systems. Provisions for and location of adequate storage space is important, as is the capability of

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adapting environmental services for changing requirements.

3-5.4 Material and Product Selection Criteria. Materials shall meet the requirements of the criteria. The criterion includes a range of specificity: some material requirements are specific (no option); other material requirements allow a range of options. The criteria requirements establish a minimum quality level.

3-5.5 Exterior Design.

3-5.5.1 Entrances. Building entrances for the public shall be identifiable and sheltered from harsh weather. Materials, such as flooring, storefront, hardware, etc., shall be exceptionally durable for high use. Entrances shall be accessible to handicapped. Entrances should offer a transparency for recognizing activity in the building. Service entrances shall be screened. Consider alarming egress doors that are not desirable for building access; this will improve security and deter theft.

3-5.5.2 Building Systems. Consider efficient yet durable building systems that compliment flexibility. Interior load bearing partitions often deter future re-design for changing needs.

3-5.5.3 Windows. Windows in classrooms should be placed high on the wall for small classes to allow more useable wall space. All exterior windows in occupied spaces shall have blinds to control sunlight. Windows in this facility type must satisfy the requirements of UFC 4-010-01 Design: Minimum Antiterrorism Standards for Buildings.

3-5.5.4 Signage. Comply with IDG for interior and exterior signage. The exterior facility sign shall be illuminated. Provide additional site signage for handicapped accessible parking and traffic control. Provide a "No Parking" sign at the service drive and any required drive within 25 meters of the building.

3-5.6 Interior Design.

3-5.6.1 Scope. Interior design shall consider creation of spaces, circulation, and functional use as well as materials and colors that compliment the instructional and learning experience.

3-5.6.2 Circulation. Vestibules, corridors, stairs, elevators and common spaces shall be linked in obvious ways to make circulation convenient and clear. Low and mid-rise facilities shall not rely on elevators as the primary source of circulation. Stairs shall be located for convenience as well as life safety. Use materials in circulation areas that will control and reduce noise.

3-5.6.3 Floors. Consider the requirements for durability in areas that will receive more traffic and areas that have high abuse. Porcelain tile is identified for traffic areas but other durable products such as terrazzo may be considered. Consider using a water proofing membrane and mortar bed for thick setting materials. Coordinate Installation requirements that may require recessed structure. Carpet is not to be used in high traffic areas such as stairs, corridors, and typical classrooms. Where carpet is used consider carpet tile in a multi-color pattern. In Communication and NOC Rooms provide non-static flooring. Carpet static control shall be provided to permanently control static buildup to less than 3.5 kv when tested at 20% relative humidity and 70 degrees F in accordance with AATCC 134.

3-5.6.4 Raised Access Floors. Raised access floor has sometimes been found to meet life cycle requirements allowing for quick reconfiguration of electrical and communication systems to serve the changing needs for technology through less disruption to the permanently fixed

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floors and walls. Projects in the planning phase shall consider programming raised access floor (or some flexible system of providing power and data) throughout the education, communication and electrical areas of the building or in individual areas. Raised floor is not necessary for mechanical, administrative, service and support areas. When considering access flooring in optional areas, designers shall perform an economic analysis relative to anticipated use. Other alternatives should also be considered such as wall or floor raceways, recessed duct banks, and redundant floor or wall receptacles. "Tombstone" type floor receptacles are not acceptable.

Laminate or tile floor finish is desirable in high traffic areas. Where a plenum is used below the floor for mechanical requirements, additional space and fire stopping is required. Low profile 102 – 127 mm [4" – 5"] access flooring may be used in areas with minor cable requirements. Classroom XXI requires access floor and the low profile floor system has been successful.

3-5.6.5 Interior Walls and Partitions¹. Non-combustible construction is preferable, even where combustible materials are allowed by code. A better level of materials is required for GIBs to reinforce the desired level of professionalism and achievement the Army is pursuing in the education of the military force. Painted gypsum board or plaster shall be the standard, although designs should consider using reconfigurable partitions for future room change requirements. Moveable partitions should also be considered to allow similar room types to be expanded on occasion. When reconfigurable or moveable partitions are used, other requirements such as acoustic ratings and equipment locations must be considered. Metal studs for interior partitions shall not be lighter than 20ga. Use chair rails in small rooms with moveable furniture.

3-5.6.6 Room Dividers. Where multiple classrooms are located adjacent to one another, moveable partitions (panel type) shall be used in at least one location to allow classrooms to be opened into a larger instruction space. Consider the stacking requirement for the partition. See acoustic requirements in paragraph 3-5.6.22.

3-5.6.7 Ceilings and Ceiling Heights. Ceilings are identified in the finish schedule generically. Where acoustic tile is used, gypsum board or plaster may be incorporated to add interest such as bulkheads, soffits or other patterns. In acoustically rated spaces the wall/partition shall penetrate the ceiling. The acoustic rating shall include the entire envelope, therefore requiring partitions to extend to the structure above or treatment of the ceiling to prevent sound from transmitting over the partition.

Refer to the Finish Schedule for minimum ceiling heights. Any room with a ceiling mounted projector must have a ceiling at least 2.7 m [9 ft] high. Classroom XXI requires 3658 mm [12'] high ceilings. This is sometimes impossible in renovation projects. In difficult situations, if a 3048 mm [10'] foot ceiling cannot be provided for Classroom XXI alternative spaces should be investigated. Classrooms and conference rooms with forty (40) or more people should have at least 3048 mm [10'] ceilings. Classrooms and conference rooms with sixty (60) or more people should have at least 3353 [11'] ceilings.

3-5.6.8 Window Treatments. Typically, in occupied spaces, exterior windows shall have window blinds capable of being adjusted to control natural lighting. Consider blinds in public spaces that will not produce maintenance problem. In Classroom XXI and VTT classrooms lighting control is critical and shall be handled by the addition of blackout drapes or shutters.

3-5.6.9 Interior Doors and Frames. Provide hollow metal frames and solid core wood

¹ This is an Army Standard for GIB

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doors generally. Hollow metal doors are acceptable at service areas. Where equipment will be moved in and out often such as transient classrooms, consider double doors. Doors at classrooms, counselors, and conference rooms shall have a small window.

3-5.6.10 **Door Finish Hardware.** Locks shall be series 1000 mortised locks. Classrooms shall be locked and opened by the Building Manager's office when needed for classes. Integrate with the Installation locking system where possible. Use programmable electronic card access locks¹. For NCO academies there is often an interest in using cipher locks for specific classrooms.

3-5.6.11 **Elevators.** Consider service use of the elevators when making material selections. The elevator shall have the same level of design as other portions of the building in terms of quality of materials. Stainless steel doors and entrances are preferred. Carpeted floors are acceptable in low service use elevators since it is easily replaced.

3-5.6.12 **Coat Storage.** Consider project specific requirements for coat storage. This usually takes place inside of classrooms. Storage in corridors is not acceptable.

3-5.6.13 **Interactive Whiteboard.** Interactive Whiteboards should be wall mounted in coordination with other equipment in the room. Small classrooms and meeting rooms, but not large classrooms or Classroom XXI or full time VTT rooms, may use the white board as a projection surface. The board shall be used to write and edit notes to work in projected and non-projected modes. The board shall be able to capture notes and save them to a digital file. The system shall be fully integrated into the classroom with concealed power and data. Installations shall determine the size of the boards based on current models and room requirements. Operating software shall be included with each board. Boards used as a projection surface shall have appropriate optional surface treatment.

LCD panels located at lecterns or instructor's workstation and provide the same functions as interactive whiteboards may be used to replace the white boards. This will allow instructors to work without turning their backs to students or blocking the information.

3-5.6.14 **Whiteboard/Marker board.** Marker board shall have a porcelain enamel writing surface (on a steel backing) and chalk tray. It shall be a factory assembled unit complete in one piece, without joints whenever possible. Marker board shall include a map rail with a tackable insert and shall have map hooks with clips for holding sheets of paper. Dry erase markings shall be removable with a felt eraser or dry cloth without ghosting. Unit shall come complete with accessories. Installations shall determine the size of the boards based on current models and room requirements.

3-5.6.15 **Tack board.** Tack board should have fabric wall covering laminated to cork, insulation board or fiberboard and framed to match other specialties in the space. In offices, tack board and whiteboard may be a combination unit. Installations shall determine the size of the boards based on current models and room requirements.

3-5.6.16 **Projection Screen.** Ceiling mounted motorized projection screen should be motor operated in large rooms. Screen shall be flame retardant, mildew resistant, and white matte with black masking borders, tab tensioned. Screen shall have a 3-position control switch to stop or reverse screen at any point. Switch and motor shall have an auto stop function. Ceiling mounted case shall be recessed and aluminum with white paint finish. Screen shall be UL listed. Provide

¹ This is an Army Standard for GIB

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screen at a minimum 1828-mm [72"] high x 2134-mm [84"] wide or larger as appropriate for room size. Bottom of screen should not be below 914-mm [36"]. Coordinate controls with interactive lectern/instructor's workstation in rooms where they are required.

3-5.6.17 **Projectors and Brackets.** Projectors and brackets shall be ceiling mounted with concealed power and control wiring. Fixed brackets are preferred. Models shall be selected based on individual classroom requirements. Generally the building contractor shall provide the bracket and junction boxes while the government will provide the projector.

3-5.6.18 **Lectern.** Interactive Lecterns shall be enclosed metal or wood cabinets manufactured specifically as a lectern. They shall integrate control of room lights, projector, and sound system in large classrooms (50 or more students), large conference rooms (50 or more people), and auditoriums. It shall include a sloped reading surface, reading light, sound system, wireless microphone, clock with countdown feature, and space/connectivity for a computer. The lectern shall be coordinated with building electrical power and lighting and LAN. Cabling shall be concealed. As indicated in the space narratives, instructor's desk with the same functions should be used for VTT and Classroom XXI in lieu of a lectern. Lectern requirements shall be coordinated for each project to address special needs such as rack-mounted computer. Some large auditoriums may require 2 lecterns.

3-5.6.19 **Furniture.** Desk and chairs for students and staff shall be heavy duty, ergonomic designs for high use. The use of keyboard trays will be up to the local school based on their teaching situation (classes that seldom use computers but require maps and books on the desk will prefer keyboard trays). In automated classrooms, such as VTT and Classroom XXI, keyboard trays should not be used. Desk that has keyboards on the top should be 686 mm [27"] high for proper typing ergonomics. Consider desk with recessed computer monitors for ACES classrooms where a variety of classes are taught for short durations (looking through the desktop at a monitor for long periods of time is not ergonomic). Student desk shall be modular and have appropriate wire management to allow easy reconfiguration of spaces. Where desktop computers are used, consider flat screen monitors to use less desk space and provide better sight lines to the front of the class.

Desks should be steel frame based using at least 18-gauge steel with high-density particleboard or plywood to minimize lifecycle costs. Student desk should be approximately 914 mm [3 feet] wide by 762 mm [30 inches] deep. This may vary based on the subject being taught and the inclusion of applied instruction. Where students work in pairs, a singlewide desk may be required. Where use of equipment or printed maps/drawings is taught, a deeper and occasionally wider desk may be required. In the case of applied instruction such as the operation and repair of radios, special desk are required to support and power equipment. These things should be considered in the planning process.

Administrative spaces should make use of systems furniture where possible and should include integral cabling and task lighting. Desktops shall have medium to low reflectivity durable surfaces. Conference room tables shall be modular to allow for reconfiguration and removal from the room. Common area furniture such as in Lounges shall be durable, comfortable and reconfigurable.

Fixed auditorium seating should consider riser mounting to keep the floor open. Consider the need for writing tablets, data and power connections in special situations.

3-5.6.20 **Signage.** Provide interior room identification signage for all rooms. Provide gloss or matte finish plaques with slots in base laminate for insertion of changeable message strips.

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Auditoriums and conference room signage shall have an “In Use” feature. Provide a building directory at the public entrance. In large complex facilities provide a graphic directory indicating orientation of the building from the location the directory is placed.

3-5.6.21 **Finish Schedule.** A finish schedule is provided to establish minimum levels of acceptance. The designer in conjunction with the Installation should determine the requirements for the specific project in compliance with Army Standards. Ceiling heights are minimum recommended. See room descriptions for higher ceilings in large spaces. It is understood some renovation projects may not be able to achieve the higher ceiling heights.

Space Name	Floor	Base	Walls	Ceiling	Clg Hgt Minimum
EDUCATION SPACES					
Traditional Classroom	Vinyl Tile	Resilient	Paint	Susp Acou	3048 mm [10 ft]
Multi-Purpose Classroom	Vinyl Tile	Resilient	Paint	Susp Acou	3048 mm [10 ft]
Seminar Model Classroom	Vinyl Tile	Resilient	Paint	Susp Acou	2743 mm [9 ft]
CTC	Vinyl Tile	Resilient	Paint	Susp Acou	2743 mm [9 ft]
NCO Training Space	Vinyl Tile	Resilient	Paint	Susp Acou	3048 mm [10 ft]
Video-Tele Training	Carpet	Resilient	Paint	Susp Acou	2743 mm [9 ft]
Classroom XXI	Carpet	Resilient	Paint	Susp Acou	3658 mm [12 ft]
DTAC	Carpet	Resilient	Paint	Susp Acou	2743 mm [9 ft]
Resource Center	Vinyl Tile	Resilient	Paint	Susp Acou	2743 mm [9 ft]
ADMINISTRATION SPACES					
Information/Reception	Tile	Resilient	Paint	Susp Acou	3048 mm [10 ft]
Instructors Offices	Carpet	Resilient	Paint	Susp Acou	2743 mm [9 ft]
Director’s Office	Carpet	Resilient	Paint	Susp Acou	2743 mm [9 ft]
Administration Office	Carpet	Resilient	Paint	Susp Acou	2743 mm [9 ft]
Building Manager	Carpet	Resilient	Paint	Susp Acou	2743 mm [9 ft]
Conference Room	Carpet	Resilient	Paint	Susp Acou	2743 mm [9 ft]
NOC	Vinyl Tile	Resilient	Paint	Susp Acou	2743 mm [9 ft]
Computer Maintenance	Vinyl Tile	Resilient	Paint	Susp Acou	2743 mm [9 ft]
Loading Dock	Concrete	NA	E Wall	Plaster	3048 mm [10 ft]
Transient Storage	Concrete	Resilient	Paint	Open Struct	3048 mm [10 ft]
Record Storage	Vinyl Tile	Resilient	Paint	Susp Acou	2743 mm [9 ft]
Copy Room	Vinyl Tile	Resilient	Paint	Susp Acou	2743 mm [9 ft]
Supply Storage	Vinyl Tile	Resilient	Paint	Susp Acou	2743 mm [9 ft]
SPECIAL FUNCTIONAL USE AREAS					
Small Arms Training	Vinyl Tile	Resilient	Paint	Susp Acou	3048 mm [10 ft]
Arms Vault	Concrete	Resilient	Paint	Susp Acou	2438 mm [8 ft]
Fixed Seat Auditorium	Vinyl Tile	Resilient	Paint	Susp Acou	Varies
Multipurpose Auditorium	Vinyl Tile	Resilient	Paint	Susp Acou	3048 mm [10 ft] min
College Office	Carpet	Resilient	Paint	Susp Acou	2743 mm [9 ft]
Counselors	Carpet	Resilient	Paint	Susp Acou	2743 mm [9 ft]
Testing Room	Vinyl Tile	Resilient	Paint	Susp Acou	2743 mm [9 ft]
Testing Control Room	Carpet	Resilient	Paint	Susp Acou	2743 mm [9 ft]
Testing Administrator	Carpet	Resilient	Paint	Susp Acou	2743 mm [9 ft]
Broadcast Studio	Carpet	Resilient	Paint	Susp Acou	3048 mm [10 ft]
AIB Module	Varies	Resilient	Paint	Susp Acou	Varies
SUPPORT SPACES					
Vestibule	Tile	Tile	Paint	Susp Acou	2743 mm [9 ft]

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Student Break/Vending	Tile	Tile	Paint	Susp Acou	2743 mm [9 ft]
Staff Break Area	Tile	Tile	Paint	Susp Acou	2743 mm [9 ft]
Restrooms	Ceramic	Ceramic	Paint	Susp Acou	2438 mm [8 ft]
Janitor Closet	Ceramic	Ceramic	Paint	Paint Gyp	2438 mm [8 ft]
Mechanical Room	Concrete	NA	Paint	Open Struc	NA
Electrical Room	Concrete	NA	Paint	Open Struc	NA
Comm Room	Vinyl Tile	Resilient	Paint	Susp Acou	2743 mm [9 ft]
Corridors	Tile	Tile	Paint	Susp Acou	2743 mm [9 ft]
Lobby Stair	Tile	Tile	Paint	Susp Acou	2743 mm [9 ft]
Stairs	Vinyl Tile	Resilient	Paint	Susp Acou	2438 mm [8 ft]
Elevator	Carpet	Lamin	Lamin	Metal	2235 mm [7 ft-4]
General Storage	Vinyl Tile	Resilient	Paint	Susp Acou	2743 mm [9 ft]

Abbreviations:

Ceramic	Ceramic Tile
Concrete	Sealed Concrete
E Wall	Exterior Wall Construction
Lamin	Laminate Panels
NA	Not Applicable
Susp Acou	Suspended Acoustic Tile
Tile	Large Porcelain or Ceramic Tile

3-5.6.22 **Acoustic Design.**

Design. Designers and planners must consider environmental as well as functional noise when locating and designing instruction facilities. Where possible avoid background noise from traffic, airfields, outdoor activities and mechanical equipment. Work within the building to acoustically separate classrooms from student gathering areas, mechanical equipment, restrooms, etc. Extend acoustically rated partitions to the horizontal acoustic element such as the roof deck or floor slab above (acoustic ceilings do not effectively stop sound transmission over partitions). Use acoustic doors in sound rated partitions. Consider acoustic windows in exterior walls. Separate and seal penetrations in rated partitions. Locate mechanical equipment in less sensitive areas such as over corridors. Use low noise ballasts in light fixtures. Realize the use of operable partitions increases noise levels.

Reverberation. Effective learning requires students be able to hear. The Signal Noise Ratio (SNR) and Reverberation Time are key factors for intelligible hearing. A successful SNR is 15 decibels (dB) or more. For instance, an instructors voice should be approximately 50 decibels average weighted (dBA) at the rear of the classroom. To achieve a SNR 15 the ambient noise in the room cannot be greater than 35 dBA. Likewise the reverberation time or length of time it takes a sound to decay should not exceed 0.6 – 0.7 seconds to avoid build-up of noise and degradation of speech.

Space Requirements.

- Classrooms and large meeting spaces (which we will define as 15 students or more) with a volume less than 283 cubic meters [10,000 cubic feet] should have background noise levels of 35dBA or less and a reverberation time of no more than 0.6 seconds.
- Classroom and large meeting spaces with a volume between 283 cubic meters [10,000 cubic feet] and 566 cubic meters [20,000 cubic feet] should have

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- background noise levels of 35dBA or less and a reverberation time of no more than 0.7 seconds.
- Classrooms and large meeting spaces with a volume of 566 cubic meters [20,000 cubic feet] or more should have background noise levels of 40dBA. An acoustic designer should determine the reverberation time in compliance with ANSI S12.60-2002.

STC/IIC/NRC. To achieve these sound levels and reverberation limits walls/partitions, floors, and ceilings must have certain Sound Transmission Class (STC), Impact Insulation Class (IIC) and Noise Reduction Coefficient (NRC) ratings. The STC rating is a measure of the isolation provided between adjacent surfaces for noises in the range of common speech. The IIC rating is similar but measures the isolation of impact noise between a space and the space below it. The higher the STC or IIC number the greater the isolation. The NRC is a measure of a materials ability to absorb the sound within a space when the sound waves hit it. The NRC is described in hundredths using a decimal point such as .65 NRC.

- This standard will use the following minimum wall STC ratings for classrooms and meeting spaces for 15 or more students-
STC-45 adjacent to circulation spaces, offices, and conference rooms.
STC-50 adjacent to other classrooms/meeting spaces or outdoors.
STC-53 adjacent to restrooms.
STC-60 adjacent to mechanical room and student gathering areas.
STC-47 for moveable partitions.
- This standard will require STC-30 or higher ratings for classrooms/meeting space doors.
- This standard will use an IIC of 50 (recommended) and 45 (minimum) for spaces above classrooms/meeting spaces in new construction.
- Classrooms/meeting spaces should have a ceiling with a NRC of 0.70 or higher.

3-6 FIRE PROTECTION.

3-6.1 Design Standards and Codes. The fire protection design for all facilities shall be in accordance with the current versions of the Unified Facilities Criteria 3-600-01 Design: Fire Protection Engineering for Facilities, International Building Code and the National Fire Protection Association (NFPA) standards and codes.

3-6.2 Sprinkler System. Provide a wet and/or dry type sprinkler as required by the project. Design shall be provided by a qualified Fire Protection Engineer as defined in UFC 3-600-01 and shall be in compliance with UFC 3-600-01 and NFPA 13, Standard for the Installation of Sprinkler Systems.

3-6.3 Loading Docks. Covered loading docks shall be fully sprinkled by a suitable sprinkler system.

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3-6.4 **Hydrant Flow Data:** A hydrant flow test shall be performed in the early stages of design indicating Date and Location of Test, Static Pressure, Flow, and Residual Pressure. Provide preliminary hydraulic calculations to determine whether there is sufficient water supply and pressure to meet the flow demands of the sprinkler systems within the facility and the fire department hose stream requirements from the fire hydrants.

3-6.5 **Fire Pump.** When a pump is required, type of pump shall be in accordance with Unified Facilities Criteria 3-600-01 Design: Fire Protection Engineering for Facilities. Provide electric driven fire pump and controllers in accordance with NFPA 20. Provide a diesel fuel tank in accordance with NFPA criteria.

3-6.6 **Fire Extinguishers and Cabinets.** Provide portable fire extinguishers in accordance with NFPA 10. Provide bracket-mounted extinguishers in service areas. Provide semi-recessed aluminum fire extinguisher cabinets with clear view panel in public areas. Provide fire-rated cabinets in fire-rated wall assemblies.

3-6.7 **Interior Wall and Ceiling Finishes.** Wall and ceiling finishes and movable partitions shall conform to the requirements of the IBC and NFPA 101, except as follows:

Interior finish for exits, and exit passageways shall be Class A only.

Flame spread (FS) and smoke development (SD) shall be tested in accordance with IBC requirements. Class C materials shall only be permitted in fully sprinklered buildings.

3-6.8 **Fire Alarm.** Provide fire alarm system conforming to requirements of NFPA 72 and NFPA 101. Fire alarm system shall consist of pull stations, audiovisual devices, control/annunciation panel and tamper and/or flow connection/supervision to the sprinkler system. Provide supervision of fire pump where fire pump is provided. Fire alarm system shall tie into the base-wide system in accordance with base requirements.

3-7 MECHANICAL.

3-7.1 **Design Standards and Codes.** The mechanical design for all facilities shall be in accordance with the current versions of Army Design Guides, Technical Manuals, Technical Instructions and applicable codes and standards.

3-7.2 **Facility Energy Conservation Requirements.** The entire facility design, inclusive of siting, building envelope, plumbing systems, lighting, electrical systems, and HVAC systems as a complete assembly/structure, must be in compliance with ASHRAE 90.1-2001 and UFC 3-400-01.

3-7.3 Design Calculations.

Heat loss and heat gain calculations. Heating and cooling loads shall be in accordance with the current edition of the ASHRAE Handbook of Fundamentals and TI 810-10_Mechanical Design Heating, Ventilating, and Air Conditioning. Computer-generated load calculations shall be provided, and shall include complete input and output summaries. Equipment may be oversized to no more than 115 percent of the computer-generated load. Design shall be based on weather data from UFC 3-400-02, Engineering Weather Data; from ASHRAE Handbook of Fundamentals; or from other recognized and authoritative sources of weather data. Values for internal cooling loads shall be included in the computerized load calculations in accordance with ASHRAE recommendations. Minimum space heating and ventilation shall be provided in spaces

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normally unoccupied, such as storage and equipment rooms. Any industrial ventilation requirement, other than that required per human occupant, may be considered process load when selecting supplemental heating equipment for the bay area.

3-7.3.1 Load Design Criteria. Internal loads shall be included for each space. Lights shall be included for the actual quantity provided. Any additional equipment furnished or planned under the design shall also be included in the appropriate space.

3-7.3.2 Ventilation Air Calculations. Calculations determining minimum outside ventilation air shall be provided for each building space. Ventilation rates shall be in accordance with the current edition of the International Mechanical Code and the current ASHRAE Standard 62. Outside air quantities will be sufficient to meet ventilation requirements and maintain a positive pressure relative to the outdoors.

3-7.3.3 Exhaust Air Calculations. Calculations determining minimum exhaust shall be provided for each exhaust system. Exhaust rates shall be in accordance with the current edition of the International Mechanical Code.

3-7.3.4 Piping Calculations. Calculations shall be provided for pressure drop calculations for all piping systems, including head loss calculations for all pumps.

3-7.3.5 Duct Calculations. Calculations shall be provided for sizing all duct systems, including static pressure drop calculations for all fans. Ductwork layout drawings shall also be provided to indicate all fittings and devices to substantiate calculations.

3-7.4 Humid Air Design. Where applicable, the special criteria for humid areas in TI 810-10 Mechanical Design Heating, Ventilating, and Air Conditioning shall be used.

3-7.5 Mechanical Systems. Each building core area shall be provided with a central heating and air conditioning system. Systems shall be designed, installed, balanced, and adjusted to distribute heat and cooling in proportion to the calculated load requirements of these spaces. A detailed investigation of the treatment of outdoor ventilation air shall be provided. Classroom spaces, auditoriums, training spaces, conference rooms, and multipurpose spaces are typically occupied by a relatively high number of people. The correspondingly high amount of outdoor air required is often beyond the capability of office or classroom type systems, leading to potential problems with mold, mildew, and high humidity situations. Special problems requiring special solutions occur when the outdoor air is at a high relative humidity condition and/or the spaces are only partially occupied or unoccupied. Systems such as a dedicated VAV outdoor air handling unit and carbon dioxide sensing controls (Demand Ventilation) shall be investigated. Provide means for determining when rooms are partially occupied or unoccupied to modulate outdoor air supply. Each space shall be provided with a separate system with occupancy sensors and/or other override to change status from unoccupied to occupied. The Designer in close coordination with the installation shall determine the allowable system types and fuel options to be used. Also coordinate unit locations with Installation facilities engineering personnel (DPW). All reasonably equivalent fuel options within a range of 10 percent based on life cycle cost analysis shall be allowed. Consider systems utilizing energy efficient equipment, providing additional space in the mechanical room, and other features, which contribute to ease of system operation and maintenance. Consider the high people and computer load that may require cooling in some areas while heat is needed in others at the same time.

Minimum equipment efficiencies shall be in accordance with DOE Buying Energy Efficient Products Recommendations (refer to www.eren.doe.gov/femp/procurement for recommended

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efficiencies), ASHRAE 90.1, or Energy Star.

3-7.5.1 Air Distribution Systems. Provide duct systems conforming to the recommendations of the SMACNA Duct Construction Standards including seal class requirements. Fire dampers shall be provided where required by code. Balancing dampers shall be provided at all branch takeoffs and for all supply outlets. Permanent access to dampers shall be provided. Air intakes shall be placed at least 10 feet above ground to meet the requirements of UFC 4-010-01 – DoD Minimum Antiterrorism Standards for Buildings. Intakes shall be covered with screens to prevent insects and foreign objects from entering.

3-7.5.2 Controls. Control system shall be open protocol DDC. All equipment and systems shall be automatically controlled and monitored by the control system. The controls shall ensure the system will be operational when classes are scheduled. Provide air distribution emergency shutoff switch as required by UFC 4-010-01. The control system shall tie into an existing EMCS system if present.

3-8 ELECTRICAL.

3-8.1 Design Standards and Codes. The electrical design for all facilities shall be in accordance with the current editions of the National Electrical Code, the National Electrical Safety Code, UFC 3 501-03N, UFC 3-520-01 and UFC 3 550-03N. Lighting design shall conform to the Illuminating Engineers Society of North America (IESNA) Lighting Handbook and recommended practices.

3-8.1.1 Facility Energy Conservation Requirements. The entire facility design, including interior and exterior lighting and power systems shall be in compliance with ASHRAE 90.1-2001.

3-8.2 Design Calculations. Provide analysis throughout the design to document selection of equipment and wiring in accordance with UFC 3-520-01. Calculations as a minimum shall include load analysis, voltage drop, fault, device coordination, interior and exterior lighting.

3-8.3 Space Requirements. Provide electrical space for all electrical equipment. Space shall provide clearances and working areas as required by the National Electrical Code. Coordinate location to consider factors such as aesthetics, ease of maintenance, proximity to loads being served, and accessibility.

3-8.4 Materials and Equipment. All materials and equipment shall be the standard catalogued products of manufacturers regularly engaged in the production of such equipment and material, and shall be the manufacturer's latest design. All equipment and material shall conform to the requirements of American National Standards Institute (ANSI), American Society of Testing and Materials (ASTM), National Electrical Manufacturer's Association (NEMA), National Fire Protection Association (NFPA) or other national trade association as applicable. Where standards exist, materials and equipment shall bear the label and be listed by Underwriters Laboratories, Inc. (UL) or other recognized testing organization.

3-8.5 Lighting. Interior and exterior lighting design shall conform to the recommendations of the IESNA Handbook, RP-1-93, Office Lighting and RP-3-00, Guide for Educational Facilities Lighting. Computer friendly lighting systems such as indirect and parabolic systems shall be used in spaces where Video Display Terminals are used extensively. Provide variable/multi-level switching and/or dimming systems in interior spaces as indicated in Chapter 2, Space Design Criteria. Provide occupancy sensors in spaces where use is intermittent such as

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classrooms (not CRXXI or VTT), conference rooms, corridors, restrooms, and storage spaces.

3-8.6 **Power and Grounding.** Power service to the buildings will be fed underground from the base electrical distribution system via a pad-mounted transformer located near the primary building. Power service to buildings will be fed underground from the transformer to building service entrance equipment located in the electrical equipment room.

3-8.6.1 **Special Power Requirements.** Electrical power outlets for special power shall be coordinated with the requirements in Chapter 2, Space Design Criteria.

3-8.6.2 **Grounding.** Each building will have in addition to the grounding requirements of the National Electrical Code a ground grid or counterpoise around the building perimeter for connection to incoming service, building steel, telephone service, piping, and internal grounding requirements.

3-8.6.3 **Lightning Protection.** Facilities shall be protected from lightning in accordance with the National Electric Code.

3-9 **COMMUNICATIONS.**

3-9.1 **Information Systems.** Information systems will consist of a complete end-to-end voice, data, and telemetry cable based functional design accomplished IAW the US Army Installation Information Infrastructure Architecture (I3A) Technical Guide (I3A Guide). Information system equipment provided to satisfy the service requirements of this design will meet the technical specifications and planning guidance found in ANSI/TIA/EIA-568-B and 569-A, as appropriate. Functional requirements will be developed and implemented based upon the I3A Guide to satisfy both the near-term as well as the growth potential of this US Army facility. The I3A standard dual jack voice/data outlet will be used throughout this facility with the following exceptions: wall telephone outlets will be single jack configuration, classroom computer jacks will be data only (dual jacks) to serve the computers planned for each classroom; however, the classroom instructor's administrative telephone outlet will be a standard dual-jack voice/data outlet. System provisions will be compliant with the requirements of the Americans With Disabilities Act (ADA), as directed for the facility.

3-9.1.1 **Voice Systems.** The telephone/voice system provided in this project will meet all US Army I3A objectives using standard state-of-the-art equipment and installation practices. The telephone/voice system provided with this facility will receive dial tone from a US government controlled telephone switching system. Special requirements for telephone circuits receiving dial tone from other sources, i.e., pay-telephone, etc., will be coordinated with installation's local commercial provider -- see DOIM for contact information. The telecommunications cross-connect scheme for this project will utilize a combination of 110-punch down blocks and category rated patch panels as shown in the I3A Guide; this is not a "small facility" for cross-connect purposes. Coordinate minimum essential service requirements with the DOIM; use these requirements in conjunction with the I3A Guide to develop the design based upon planned functional usage of the various spaces. Plan for wall telephone outlets to satisfy an intelligent design based upon safety, courtesy, and convenience: as a minimum, wall telephone outlets will be provided in all equipment rooms (electrical room, HVAC room, telecommunications room, CATV/CCTV/surveillance room, etc.); in all "break" areas and at all entry areas; and along corridors and hallways using a density of four wall telephones per 10,000 square feet of gross building space.

3-9.1.2 **Data System.** Data jacks will be terminated on patch panels located on racks in the

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telecommunications rooms(s). Classroom data jacks will be terminated on patch panels located in classroom equipment rack. Each classroom area, i.e., including those established by folding partitions, will have its own equipment. The classroom data network will be contained in a communication closet, with its own data switch (provided by the Government). Each classroom will be provisioned with twelve strands of fiber optic cable (six single mode and six multimode) to the nearest serving Network Operations Center in the building. Coordinate with the DOIM for special data requirements.

3-9.1.3 Wireless Technology. The use of wireless technology for data transfer must be in accordance with Army Regulation 25-1 Army Information Management found at <http://www.corpsinfo.usace.army.mil/ci/ia/publications> as well as the latest memorandum and letters regarding this quickly evolving issue.

3-9.2 Information System Equipment. All equipment provided for the GIB will meet the functional standards found in the I3A Guide. The building's interior copper cabling will be TIA/EIA 568B Category 6. Installation will be in accordance with (IAW) applicable UFGSs.

3-9.3 Outside Cable Plant Infrastructure. Extend the information system infrastructure from the nearest existing information system node having sufficient capacity to satisfy the facilities requirements -- coordinate with the DOIM on this location. New underground conduits will be multiple concrete encased 100-mm [4-inch] PVC ducts (or equivalent) and will be sized, designed and installed in the underground manhole and duct system IAW the installation's current approved I3A Plan to ensure maximum flexibility for future growth. Place outside plant information systems cabling, both copper cable(s) and fiber optic cable(s), from the servicing nodes into the new facility; extend and terminate the OSP information system cabling on the building's entrance facility per applicable fire and safety code.

3-9.4 Premises Distribution System (PDS) Infrastructure. Design the PDS in accordance with (IAW) the I3A Technical Guide to develop the functional information system features required along with the preferred technical implementation. Ensure that all PDS cable distribution and telecommunications requirements comply with the I3A (for design and allocations) and with the latest versions of TIA/EIA 568B (for technical implementation).

Follow requirements of ANSI/TIA/EIA-569-A for telecommunications paths and equipment room spaces. Provide dedicated PDS raceway space and equipment room space for the purpose of future fiber optic cable installation to each outlet location initially served only by copper cable(s). Provide space for future data and communication cabling. Provide I3A standard dual-jack voice/data outlets throughout core areas, the supply/administration areas, and the classroom's instructor's podiums/desk; use I3A functional area outlet-densities to determine the outlet quantities. Provide data outlets for all planned computer equipped classroom desktops; voice outlets are not appropriate for classroom desktops. Use of multiple-jack outlets to serve classroom desktop locations, (i.e., up to four RJ-45 jacks) is typical. Terminate classroom data outlets on patch panel(s) mounted in a classroom-based cabinet. This cabinet will also contain any LAN networking equipment needed within the classroom. Provide fiber optic cable from this rack (six single mode and six multimode) to the nearest building telecommunications closet.

3-9.4.1 Cables and Jacks. Provide in accordance with the I3A Guide using the latest technical standards in TIA/EIA-568-B. Connect all information system (voice/data) outlets from the equipment room's equipment rack with two 4-pair, Category 6, unshielded twisted pair (UTP) solid copper station cable terminated on 8-position IDC type connectors and extended to the servicing equipment room's equipment rack. Connect all single 8-position type wall, special

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purpose, and pay telephone outlets with one 4-pair, Category 6, unshielded twisted pair (UTP) solid copper station cable terminated on 8-position IDC type connectors and extended to the servicing equipment room's equipment rack. For specialized circuits, such as pay phones, coordinate with the local telephone company for electrical requirements and Americans with Disabilities Act (ADA) design features. When systems furniture is installed as part of the construction contract, insure that systems furniture specifications include ANSI/TIA/EIA-568-B and ANSI/TIA/EIA-569-A cabling and raceway standards. Use a combination of multimode and single mode fiber optic cable (12 strands of each) for backbone data service, unless expanding an existing site where other backbone cable types are required or requested by user. Refer to the "Installation Information Infrastructure Architecture (I3A) Design and Implementation Guide".

3-9.5 Paging Systems. A paging system will be provided for the entire building with the microphone located in the Building Manager's Office. Provide a system that allows paging individually or grouped in classrooms, administration and public areas. Outdoor spaces such as break areas shall be on the public area system.

3-9.6 Cathodic Protection. Cathodic Protection (CP) is mandatory on buried ferrous metallic structures. Design of cathodic protection systems shall be in accordance with UFC-3-570-02N.

3-9.7 Electronic Security System (ESS). Coordinate the requirement for any security system including provisions for the CCTV system with the User and the Installation local security authority. Design of security systems shall also be coordinated with the Mandatory Center of Expertise (MCX) Electronic Security Center, US Army Installation Support Center, Huntsville, Alabama.

3-9.7.1 For large facilities, an alarm and CCTV system shall be provided. Alarm monitoring will be performed in the Building Manager's Office at a console where the public cannot view the alarm and CCTV monitors. Every exterior door shall have at a door position switch. CCTV camera shall be installed in corridors, public spaces, and the loading dock. Facilities shall have their alarms reported to the Installation security office.

3-9.8 Clock System. Clocks shall be provided in classrooms and public spaces. When requested by the Activity, this requirement may be met by providing an integrated clock system that provides adjustment of all clocks from one central point.

3-9.9 Mass Notification System. Provide a mass notification system conforming to UFC 4-010-01 and UFC 4-021-01 for the purpose of providing real-time announcements in the immediate vicinity of the building during emergency situations. Coordinate specific system requirements with the User and Installation.

3-10 COST

3-10.1 Criteria. Programming and cost estimate shall be done in accordance with UFC 3-701-03 DoD Facilities Pricing Guide. Consider the cost of furniture and equipment such as computers, which is currently projected at approximately 15% of construction cost.

3-10.2 Life Cycle Cost. During design, consideration must be given to not only the initial cost of construction, but also the cost of operation, maintenance, and custodial care during the intended life of the building. Both initial and life costs must be analyzed, especially in the selection of utility systems, interior and exterior finishes.

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APPENDIX A

REFERENCES

GOVERNMENT PUBLICATIONS:

Department of The Army
ATTN: DAIM-MD; Assistant Chief of Staff
for Installation Management
2511 Jeff Davis Highway
Arlington, Virginia 22202

Army Regulation 415-28, and DA
Pamphlet 415-28, Guide to Army Real
Property Category Codes

US Army Corps of Engineers

Relevant Technical Instructions for facility
design.

Technical Instructions for facility design
may be found at
<http://www.hnd.usace.army.mil/techinfo/ti.htm>

Relevant Army Technical Manuals

TI 810-10 Mechanical Design – Heating,
Ventilating, And Air Conditioning

Army Technical Manuals may be found at
<http://www.usace.army.mil/inet/usace-docs/armytm/>

TI 800-01 Design Criteria

TM 5-810-5 Plumbing

Department of Defense
Unified Facilities Criteria (UFC) documents
may be found at
http://65.204.17.188/report/doc_ufc.html

Refer to the Unified Facilities Criteria
(UFC) documents for the latest relevant
DOD requirements

UFC 1-200-01 Design: General Building
Requirements

UFC 3-400-01 Design & Energy
Conservation

UFC 3-501-03N Electrical Engineering
preliminary Considerations

UFC 3-520-01 Interior Electrical Systems

UFC 3-550-03N Design: Power
Distribution Systems

UFC 3-600-01 Design: Fire Protection
Engineering for Facilities

UFC 4-010-01 Design: Minimum

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Antiterrorism Standards for Buildings

UFC 4-010-02 Design (FOUO): DOD
Minimum Standoff Distances for Buildings

UFC 4-021-01 Mass Notification Systems

U.S. GOVERNMENT PRINTING OFFICE

Superintendent of Documents
U.S. Government Printing Office
Washington, DC 20402

U.S. Government Printing Office (GPO)
Style Manual

Standard for Use of the International
System of Units (SI): the Modern Metric
System

NON-GOVERNMENT PUBLICATIONS:

Electronic Industries Association (EIA)
2500 Wilson Blvd
Arlington, VA 22201-3834

EIA/TIA 568-B (2001) Commercial
Building Telecommunications Cabling
Standards

EIA/TIA 569-A (2001, amendment 5)
Commercial Building Standard for
Telecommunications Pathways and
Spaces

U.S. Government Printing Office (GPO)
Style Manual

Illuminating Engineering Society of North
America
120 Wall Street, 17th Floor
New York, NY 10005-4001

IESNA RP-8 (1983; R 1993) Roadway
Lighting

IES LHBK (1993) Lighting Handbook,
Reference and Application

International Code Council, Inc.
5203 Leesburg Pike, Suite 708
Falls Church, VA 22041-3401

ICC (2000) International Building Code

ICC (2000) International Plumbing Code

ICC (2000) International Mechanical Code

National Fire Protection Association
One Batterymarch Park
Quincy, MA 02269-9101

NFPA 10 (1998) Standard for Portable
Fire Extinguishers

NFPA 13 (1999) Installation of Sprinkler
Systems

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NFPA 70 (2002) National Electrical Code

NFPA 72 (1999) National Fire Alarm
Code

NFPA 101 (2000) Life Safety Code

Institute of Electrical and Electronics
Engineers Inc. (IEEE)
445 Hoes Lane, P.O. Box 1331
Piscataway, NJ 08855-1331

Standard for Use of the International
System of Units (SI): the Modern Metric
System IESNA RP-8 (1983; R 1993)
Roadway Lighting

IES LHBK (1993) Lighting Handbook,
Reference and Application