

171 TRAINING BUILDINGS

General. Facilities in this basic category are identified according to the nature of instruction provided. The major building types are:

1. Academic Instruction Building (Code 171 10)

This facility provides accommodations for classroom lecture instruction, using chairs with fixed table arms, tables, desks or other similar working surfaces.

2. Reserve Training Building (Code 171 15)

This facility is utilized for training Navy and Marine Corps Reserves.

3. Applied Instruction Building (Code 171 20)

This facility is used to accommodate training through the use of equipment and tools such as drafting tables, workbenches, machinery, equipment or functional systems.

4. Operational Trainer Space (Code 171 35)

This space is required to accommodate highly specialized real-life simulation training that needs specifically designed space within a building or a separate building. The size and configuration of these specialized spaces differ considerably from a typical applied instruction classroom.

TRAINING BUILDINGS

Training Buildings generally consist of three different types of spaces, classrooms, support and circulation, and service areas. The following is a description of the spaces and their components. See Table 171-A for space allowances.

1. CLASSROOM SPACES

a. General Academic Space. These classrooms devoted to lecture space are academic instruction classrooms defined under Code 171 10. Use Table 171 10 for space allowances.

b. Modified Academic Space. This space consists of a lecture-laboratory combination classroom and is used for both lectures and practical exercises involving hands-on disassembly and assembly of small training aids applicable to the subject matter. A class that requires standard office desks is included in this category. Area includes work space, circulation, teaching station and book storage. These classrooms are identified under Code 171-10.

Workbench Lecture Space. This space is for an instructional laboratory, the size of which may be only determined on an individual basis. The facility planners have to take into consideration the student/equipment/instructor ratio which determines the numbers of instructional or test equipment per student station and consequently the space requirements, For example, electronics-related training requires approximately 6 linear feet of workbench resulting in approximately 50 to 55 net SF classroom space per student station, including circulation. Individual justification must accompany EWR submittals.

d. Space for Hands-on Mockups. This space is for a classroom in which instruction is given to individual or groups of students on stationary training devices representing all or part of an operating system. The size of this type classroom is generally determined not by the number of students, but by the physical size of the equipment. Figure 171-20 under code 171-20 provides a formula which may be used to determine the required net floor space. A single line layout drawing indicating major dimensions should accompany BFR submittals.

e. Learning Centers. The learning center is a classroom utilized by students for individual study where training is conducted on a self-paced basis. It is space equipped with study carrels either designed for reading only or equipped with audio-visual training media. Since the self-paced training system has an unstructured time frame (i.e., students may use the facility whenever they have time available), the number of study carrels must be determined individually, the BFR submittal must show these calculations which should be based on the overall number of students requiring such facilities and the estimated number of students which are anticipated to use a learning center at a given time.

f. Modified Academic Classroom. This room is equipped with desks or other working surfaces in lieu of standard chairs with fixed tablet arms. Space requirements are 45 net SF per student station, including circulation. Larger areas require justification. These spaces are identified under code 171-10.

2. SUPPORT SPACES

a. Instructor's Work Space. Facilities should be provided for each instructor to perform his administrative and preparatory duties.

b. Instructor's Lounge. The fixed allowance shown in Table 171 A assumes that no more than 10 instructors will be present at one time. Reduce this area proportionally if smaller use is anticipated. An increase in space above the amount indicated requires specific justification.

c. Student Break Area. This space should accommodate the average number of students scheduled to have a class recess at any given time. It can be provided at one location or dispersed in several locations throughout the school building.

d. Library. Due to the relative complexity of library operations, required space is broken down as follows:

(1) Reading Area. To estimate the number of persons utilizing this facility, use 20% of the average on board student load.

(2) Stack Area. Allowance given in Table 171-A is based on 100 volumes per 3 linear feet section, 7.5 feet high, or 15 volumes per net square feet of floor area.

(3) Film/Videotape Storage. Allowance given in Table 171-A is based on storage of 50 reels in a section of shelving 3 feet long by 7.5 feet high in a space 3 feet wide. The width of this floor space provides for the cabinet depth plus half the width of an access aisle.

(4) Film/Video Viewing Room. This space is provided for viewing both movie film and videotape.

(5) Staff Area. Includes files, administration, reproduction space and material preparation area.

e. Administrative Space. This is space required for functions related to overall administration of the training facility in question and the allowances are governed by the number of administrative personnel. Planning procedures and net space allowances are the same as for category code 610 10 (Administrative Office), planning method 2 (detailed planning factors). The broad planning factor of 150 gross SF per occupant, under category code 610 10, may not be used because it would duplicate some of the support space allowances already provided for under this code (171).

f. Training Aid Storage. The space allowance is shown on Table 171-A.

g. Other Support Spaces not listed above must be identified separately and specific justification should accompany BFR submittals.

3. SERVICE AREAS AND CIRCULATION.

These areas represents all spaces not in direct support of the training function, including walls, rest rooms, mechanical equipment, halls and corridors.

PLANNING PROCEDURES.

Choose one of the following three methods to compute classroom net square feet space requirements.

1. AVERAGE ON BOARD

This method is straight forward. in the calculation of classroom space. requirements. The formula requires a minimum amount of information as follows:

- (a) Total number of students per year for each course.
- (b) Total number of days (duration) to complete the course.
- (c) The proper choice of square feet per student from Table 171-A based on the type of classroom instruction.

2. CLASSROOM SCHEDULING METHOD

This method is preferred sometimes because it's easier to picture classrooms with a set number of students and a drawn schedule. The schedule shows an overall view of the student loading per month and gaps in classroom scheduling. The following minimum information is needed:

- (d) The number of students planned for each classroom.
- (b) The duration of each course and the number of times taught throughout the year.
- (c) A decision on whether or not the classroom can be used for other courses.

3. STUDENT TIME DISTRIBUTION METHOD

This method uses a more involved accounting system to estimate time expenditures for different types of course instruction. The method shows a detail study and breakdown of planned time distribution in labs, lectures and special applications classes. More information is required than in the other two methods

In addition to computing classroom space requirements, develop the requirements for Support Spaces separately. Convert final totals to gross square feet.

SPECIAL NOTES

1. Any construction project, regardless of funding source, submitted for authorization must be accompanied by detailed supporting documentation (broad planning factors cannot be used in lieu of detailed analysis).

2. Facility requirements for Fleet Marine Force Units are contained in P-272, Part IV.

3. Planning for training buildings shall be based on maximum utilization of available classrooms. To this end, the number and sizes of classrooms shall be determined on the basis of a detailed study encompassing curricula, group sizes, schedules, security and proximity requirements, and/or any other pertinent aspects. It is recognized that a number of subjects, especially in the applied instruction field, require extensive training aids or special classroom configurations. Every attempt must be made, however, to minimize the number of such single subject or "dedicated" classrooms, especially in those cases where their use would be relatively infrequent. Cross-scheduling of classroom use must be considered on an installation-wide basis, crossing organizational boundaries if necessary.

4. As a general rule, most training buildings will consist of a mixture of different types of instructional space (normally a combination of academic and applied instruction). For buildings of this type, the specific applicable criteria must be utilized to plan the facility in question even though a resulting project may carry only a single category code (171 10 or 171 20). For example, an applied instruction building (category code 171 20) contains academic classrooms utilized to teach basic or familiarization aspects of an applied instruction curriculum. In such case, academic classrooms are sized using code 171 10 criteria, although on planning documentation, this space will eventually be combined with the figures for the applied instruction (code 171 20) portions of the facility.

COMPUTATION METHODS FOR COMPUTING CLASSROOM SPACE

AVERAGE ON BOARD

1. Use Figure 171-A and list the courses of instruction conducted by the Activity. List the requirements in separate categories (eg. general academic, lab-lecture, etc).
2. Show the Course Data Processing Code (CDPC), course title, and other requested information. The columns of information are defined at the bottom of the table. Information is available in the Master Course Reference File (MCRF) of the Navy Integrated Training Resources and Administrative System (NITRAS) and other sources.
3. Use the AOB formula to calculate the number of students per class.
4. Based on the type of instruction, select the proper square feet per student from Table 171-A.
5. Calculate the Required NSF for each course.
6. Add the Required NSF column to obtain the total requirements.

CLASSROOM SCHEDULING METHOD

1. Use Figure 171-B and list each course
2. Assume the courses meet all day. If a course meets during the AM hours in a room and a different course can meet in the same room during PM hours, assume one room requirement.
3. Draw a line through the number of weeks the course is held each time during the year. Show the week the course begins and ends each time.
4. Show the number of students planned for each course above the course duration line.
5. After the class scheduling is drawn, use Figure 171-C to organize the requirements. List each course, type of class space, number of students for each classroom and the square feet used to calculate requirements obtained from Table 171-A.
6. Determine whether or not the classroom requirement should be dedicated strictly for the course or if other courses can be scheduled in the same room.
7. Use one of the following formulas to calculate space requirements and show the calculation in Figure 171-C Column E or F.
8. Total Classroom requirements is the sum of Columns E and F. Separate the totals into classifications (e.g., total general academic, lab-class, etc., space).

Dedicated Classroom - This classroom has permanently installed demonstrations, mock-ups, laboratory equipment, or special teaching aids. The room is usually not conveniently set-up for teaching other courses.

$$\text{Dedicated Class NSF} = \text{No. Pupils Per Course In Classroom} \times \text{Table 171-A Type Class}$$

Partial Classroom Requirement - This condition applies to courses that can meet in general classroom areas or courses that meet less than 60% of a 250 day school year.

Partial Class = No. Pupils Per	Table 171-A	Tot. Course Days
room Reqmt. Course in Class x	Type Class x	<u>Per Year</u>
NSF room	Sq Ft	250 School Days

School Year = 250 class days per year.

STUDENT TIME DISTRIBUTION METHOD

1. Use Figure 171-D to enter information.
2. Organize the list of planned courses according to the anticipated number of students in each classroom.
3. Group the courses in descending class sizes (e.g. classes with 40, 30, 20, students etc.) in Columns A and B.
4. Show the course duration in number of weeks. Use fractional weeks as necessary.
5. In Columns E, G, I, and K show the estimated percentage of time spent in each type of class (e.g., 50% lecture, 50% lab).
6. In Columns F, H, J, and L, show the equivalent weeks per year for the types of instruction (e.g., Col F = (C) x (D) x (E)
7. Total the weeks in Columns F, H, J, and L.
8. Organize the data according to types of instruction and class sizes as shown in the example Figure 171-D.
9. Calculate the classroom sizes from the square feet allowances per student shown in Table 171-A. For example, to calculate a general academic classroom for 8 students, use 22 sq ft from Table 171-A, which refers user to Table 171-10. Therefore, 8 x 22 = 176 sq ft. Use the same calculation method for labs and the other types of classroom spaces.
9. The totals in the Classroom Computation Schedule show the number of classrooms and net square feet.

FIGURE 171-A
Classroom Space Requirement Computation

COURSE CDP	COURSE SHORT TITLE	DURATION IN DAYS (DD)	ANNUAL FREQUENCY (AF)	PUPILS PER CL (S)	ANNUAL INPUT (AI)	STUDENT AOB*	NSF PER STUDENT (NSF)	REQUIREMENT NET AREA**
TOTAL STUDENT AOB AND TOTAL REQUIREMENT IN NET SQ. FT.								

$\text{Student Average on Board (AOB)} = \frac{\text{Duration (DD)} \times \text{Annual Input (AI)}}{250 \text{ (Classroom Days Per Year)}}$
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$\text{Required NSF Area} = \text{AOB} \times \text{NSF} \times 1.5$
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Round all Fractions to the next highest whole number
School year = 250 class days

- NSF = Select proper square feet per student from Table 171-A according to type of installation
- CDP = Course Data Processing Code
- DD = Duration of course in actual classroom days
- AF = Number of times course is taught per year
- AI = Number of students trained annually AI = (AF) x (S)

1.5 = A utilization factor required to compensate for the inability to completely schedule classes and fully use classroom capacity.

FIGURE 171-B
Classroom Scheduling Method

Type of Training Space: Various

COURSE TITLE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	REMARKS
AN/xyz	15		15		15		15		15		15		
BB Applied	10		10		10		10		10		10		
CD Lab		6		6		6		6		6		6	
Total Student Loading/Month	25	16	25	16	25	16	25	16	25	16	15	6	

Figure 171-C
Calculation Summary - Scheduling Method

(A) Course Desc	(B) Type of Class	(C) No. of Pupils Per Class	(D) Sq Ft Used Table 171-A	(E) Dedicated Room Sq Ft or	(F) Partial or Gen Class Sq Ft
AN/xyz	Lecture	15	22		330
BB Applied	Mod Lec	10	30		300
CD Lab	Lab	6	45	270	
TOTALS				270	630

Grand Total = 900 nsf

FIGURE 171-D
Course Data and Student Time Distribution

COURSE TITLE (ARRANGED BY DECREASING CLASS SIZE) A	CLASS SIZE B	FREQUENCY OF CLASS PER YEAR C	DURATION OF CLASS IN WEEKS D	% TIME IN GENERAL ACADEMIC CLASSROOM OR LECTURE SPACE E	WEEKS PER YEAR (F=CxDxE) F	% TIME IN MODIFIED ACADEMIC CLASSROOM OR MODIFIED LECTURE SPACE G	WEEKS PER YEAR (H=CxDxG) H	% TIME IN WORK- BENCH TYPE SPACE I	WEEKS PER YEAR (J=CxDxI) J	% TIME IN HANDS- ON-MOCKUPS K	WEEKS PER YEAR (L=CxDxK) L	M % TIME ELSEWHERE M

Explanation: Column B - Projected student loading for the designated class
 Column C - Number of times per year course is offered
 Column D - Individual course duration in weeks
 Column E G I K - Percentage of actual student's instructional time spent in the various classroom types
 Column F H J L - Requirements of that particular class room size and type by number of weeks

EXAMPLE FIGURE 171-D
Course Data and Student Time Distribution

COURSE TITLE
 (ARRANGED BY
 DECREASING
 CLASS SIZE)

(NOTE: Same column headings as Figure 171-D)

A	B	C	D	E	F	G	H	I	J	K	L	M
AAA - 0000	40	25	.4	100%	10							
ABC - XXXX	40	10	2	100%	<u>20</u>							
40 PN Totals					30							
DEF - XXXX	20	6	2	50%	6	50%	6					
GHI - YYYY	20	3	10	100%	36							
JKL - 1234	20	5	10	50%	25	20%	10			30%	15	
MNO - 6250	20	2	5	25%	3	50%	5	25%	3			
PQR - 1111	20	50	.6	100%	<u>30</u>							
29 PN Totals					100		<u>21</u>		<u>3</u>		<u>15</u>	
ABD - 0001	10	5	10	100%	50							
" - 0002	10	2	20	50%	20	50%	20					
" - 0003	10	25	1	100%	25							
" - 0004	10	50	.4	100%	<u>20</u>							
10 PN Totals					115		<u>20</u>					

Explanation: Column B - Projected student loading for the designated class
 Column C - Number of times per year course is offered
 Column D - Individual course duration in weeks
 Column E G I K - Percentage of actual student's instructional time spent in the various classroom types
 Column F H J L - Requirements of that particular class room size and type by number of weeks

CLASSROOM COMPUTATIONS

Refer to Figure 171-D

CLASS SIZE	TOTAL WEEKS PER YEAR REQUIRED	÷	50 WEEKS PER YEAR	=	COMPUTED* CLASSROOM REQUIREMENT	ACTUAL** CLASSROOMS REQUIRED	SIZE***	SQUARE FEET	NET
GENERAL ACADEMIC CLASSROOM OR LECTURE SPACE									
40 PN	30	÷	50	=	.6	1 Ea	x	800 NSF	= 800
20 PN	100	÷	50	=	2.0	2 Ea	x	440 NSF	= 880
10 PN	115	÷	50	=	<u>2.3</u>	<u>3 Ea</u>	x	220 NSF	= 660
			Total		4.9	6 Ea			
MODIFIED ACADEMIC CLASSROOM OR MODIFIED LECTURE SPACE									
20 PN	21	÷	50	=	.4	1 Ea	x	20 PN x 45 NSF	= 900
10 PN	20	÷	50	=	<u>.4</u>	<u>0</u>			
			Total		.8	1 Ea			3240 NSF

Workbench type space
 (Use Individual Justification)
 Hands-on-Mock-ups
 (Use Formula in Figure 171-20)

- * Allows for Holiday stand downs and scheduling flexibility.
- ** Actual classrooms required must equal or exceed computed classroom requirement. Number of required classrooms must take into account the excess time available in larger size rooms, i.e., smaller classes can use available excess time in larger rooms.
- *** Size data follows Table 171-A.

TABLE 171-A
Space Allowances for Instruction Facilities

TYPE OF SPACE	MAXIMUM ALLOWANCES
<u>1. CLASSROOM SPACE</u>	
a. General Academic	Use Table 171 10 allowances
b. Modified Academic Space	30 net SF per student station
c. Lecture-Lab Space	45 net SF per student station
d. Modified Academic with office desks	45 net SF per student station
c. Workbench Type Space	Individual justification required
d. Hands-On Mockup Space	Use formula given in Figure 171 20
e. Learning Centers	40 net SF per student station
<u>2. SUPPORT SPACE</u>	
a. Instructor's Work Space	60 net SF per instructor
b. Instructor's Lounge	450 net SF fixed allowance
c. Student Break Area	6 net SF per student
d. Library	
(1) Reading Area	25 net SF per person
(2) Stack Area	6.6 net SF per 100 volumes
(3) Film/Videotape Storage	9 net SF per 50 reels or cassettes
(4) Film/Video Viewing Room	100 net SF fixed allowance
(5) Staff Area	10% of sum of reading stack, film storage and viewing areas
e. Administrative Space	Use category code 610 10 detailed criteria
f. Training Aid Storage	1.5 net SF per student station
g. Other Support Spaces	Individual justification required
<u>3. CIRCULATION AND SERVICE AREAS</u> (Net to Gross Conversion)	Multiply NSF by 1.33
 <u>Note:</u> Student station is defined as a classroom seat or shop workbench area designed to accommodate one student.	