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Space Planning Guidelines

For Academic Spaces

MINNESOTA STATE

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Contents

Introduction

These guidelines describe best practices and recommended standards for Minnesota State facilities, but are not meant to be prescriptive or restrictive.

Instead, the goal of these guidelines is to provide a resource for campuses and their space planning consultants who seek to remodel existing space or create new spaces on campus. The guidelines are not meant to imply entitlement to a specific size, type, or quality of space, or to establish rigid space standards.

Guiding Principles

The following guiding principles shape space within our colleges and universities:

- *Equity*: All campus space is a shared resource that is owned by the institution (and ultimately by the State of Minnesota), not by individual users or departments; each college or university is responsible for allocating space equitably and consistently to all users.
- *Flexibility*: Spaces should be designed to be flexible so that they may be shared and used to accommodate different uses/functions.
- *Efficiency*: To maximize use of existing space, space should be used effectively and efficiently; to maximize efficiency, space that is not being used efficiently may be designated as available for remodeling, reassignment, or reuse.
- *Sustainability*: The design of spaces shall demonstrate financial and environmental sustainability, employing sustainable principles and practices (daylighting, efficient HVAC systems, use of alternative energy sources, etc.)

Given Minnesota State's priority of renovating existing space (instead of constructing new space), we acknowledge that these guidelines must allow the flexibility to accommodate the limits of existing structural, utility, and other infrastructure systems. Many older buildings were designed to serve a purpose quite different from that which they serve today, and these buildings pose challenges in being adapted to fit current program needs. These guidelines are intended to serve as a reference for planning decisions and to describe best practices in an effort to promote efficiency, flexibility, and sustainability of spaces within the Minnesota State system.

These guidelines do not represent or supersede applicable federal, state, or local building codes or civil rights legislation. All current applicable codes, as well as the *Minnesota State Facilities Design Standards*, should be consulted and considered during the design process for any project. If a conflict arises, the Design Standards will supersede these guidelines.

Role of the system office

System office staff are available to assist campus staff and their design/planning consultants with space planning questions, assessment of program needs, space inventories, and assessment of space utilization. The system office also evaluates space use during the campus Comprehensive Facilities Plan update process and whenever a capital project (Capital Bonding, HEAPR, or Revenue Fund) is proposed for design and construction.

Non-academic space

Non-academic space includes space that is part of the Revenue Fund (residence halls, student unions, parking structures, recreation facilities, etc.). Minnesota State does not have explicit guidelines for these spaces; however, the guidelines for non-classroom spaces (office space, study space, etc.) can serve as a resource when planning new or remodeled non-academic space.

01 CLASSROOMS

Classroom utilization and space targets

Making up, on average, 20% of campus space, our classrooms represent a major facilities investment. Classrooms should be sized to best fit academic needs. Most classrooms fit into one of the categories in the matrix below. The Assignable Square Feet (ASF) per Station measurement is a guideline to assist campuses who are remodeling classroom space or creating new classrooms.

Space utilization

Minnesota State's goal for classroom space utilization is a minimum of 85% utilization of a 32-hour week (6.4 hours/day utilization per classroom). Campuses are strongly encouraged to use standardized scheduling policies to maximize space use and streamline scheduling for students. While Minnesota State does not currently have a standard for seat fill (seat use), a seat fill of 70%-85% is desirable from a facilities efficiency viewpoint.

Assignable Square Feet per Station (ASF/Station)

The chart below lists square footage ranges for several sizes of classrooms. Though existing classrooms may not conform to these ranges, use these ranges as a guide to establish expected room capacity for new or remodeled classrooms.

Sample Classroom Layouts

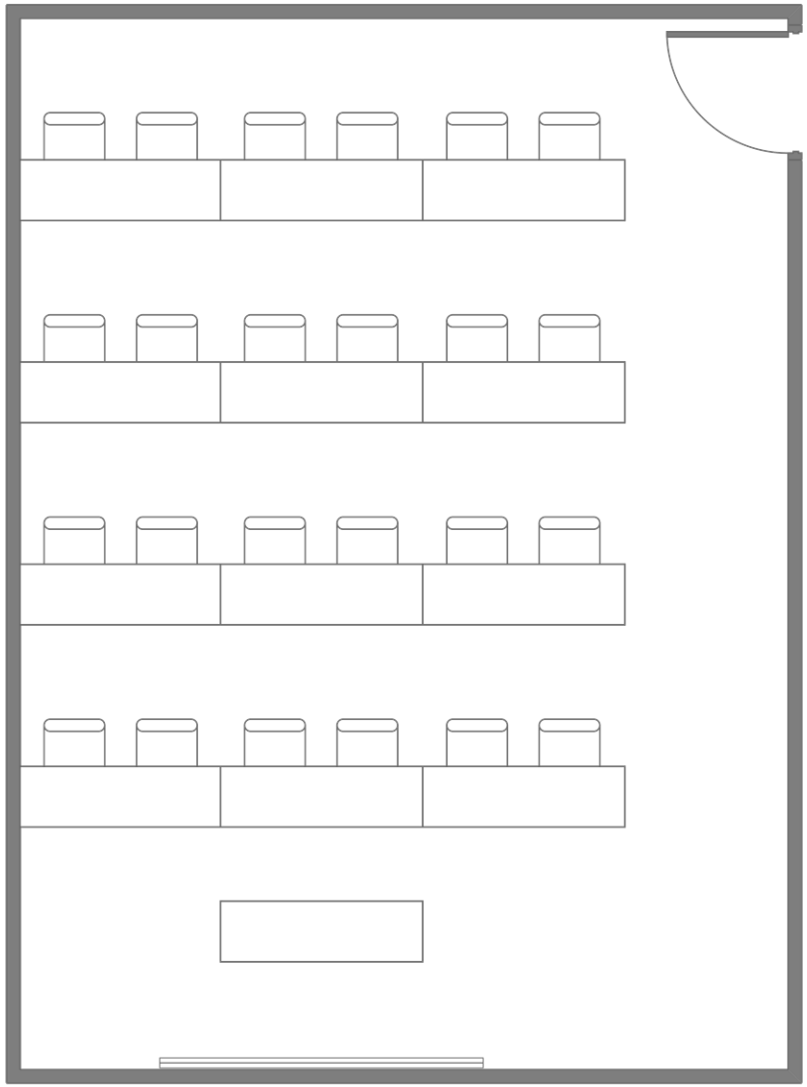
The following pages show sample classroom plans for classroom sizes. These plans demonstrate how different room sizes can accommodate various furniture arrangements.

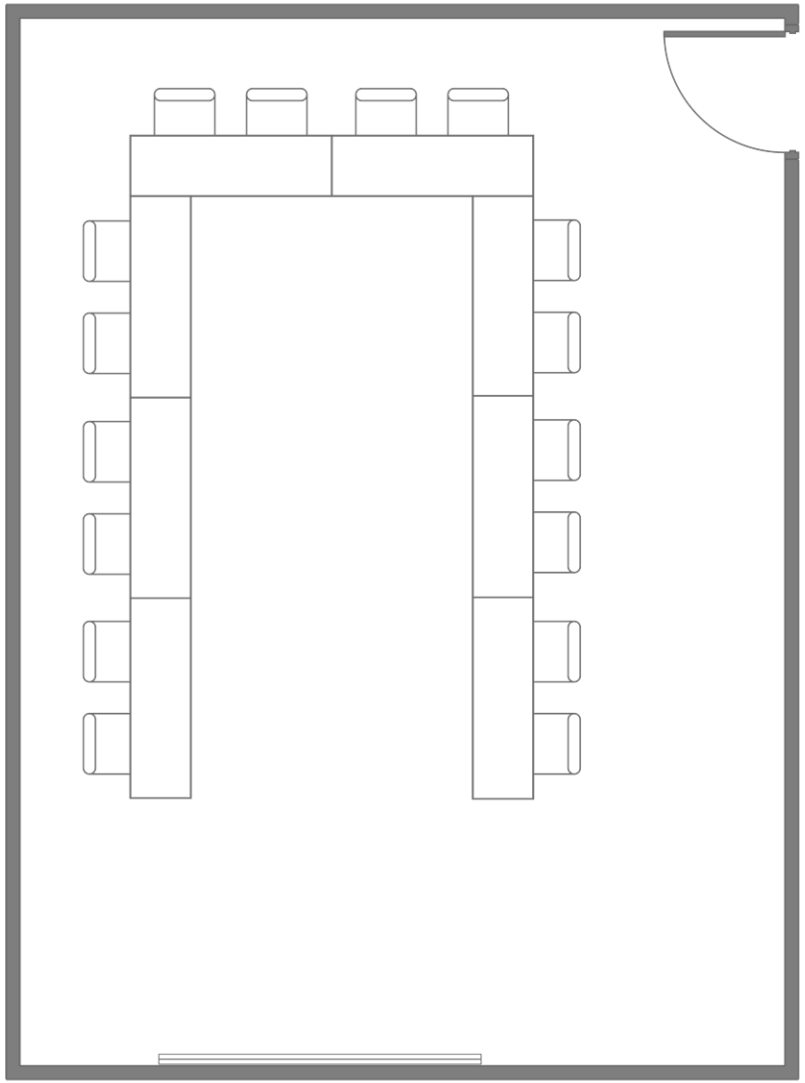
Classroom Type	Room Capacity	ASF/Station			
		Movable chairs w/ tablet arm	Movable tables and chairs	Movable chairs, fixed tables	Fixed auditorium seating
Seminar/small classroom	0-25	17-24	16-26	20-22	--
Medium classroom	26-49	16-18	16-26	18-20	--
Large classroom	50-99	14-16	16-22	18-20	14-17
Auditorium/lecture hall	100-149	--	16-22	18-20	14-17
Auditorium/lecture hall	150-299	--	16-22	17-19	14-16
Auditorium/lecture hall	300+	--	--	16-18	12-15
Active learning classroom*	30-100	25-30	25-35	30-40	--

**For more information about Active Learning Classrooms, see page 14.*

Small classroom example layouts

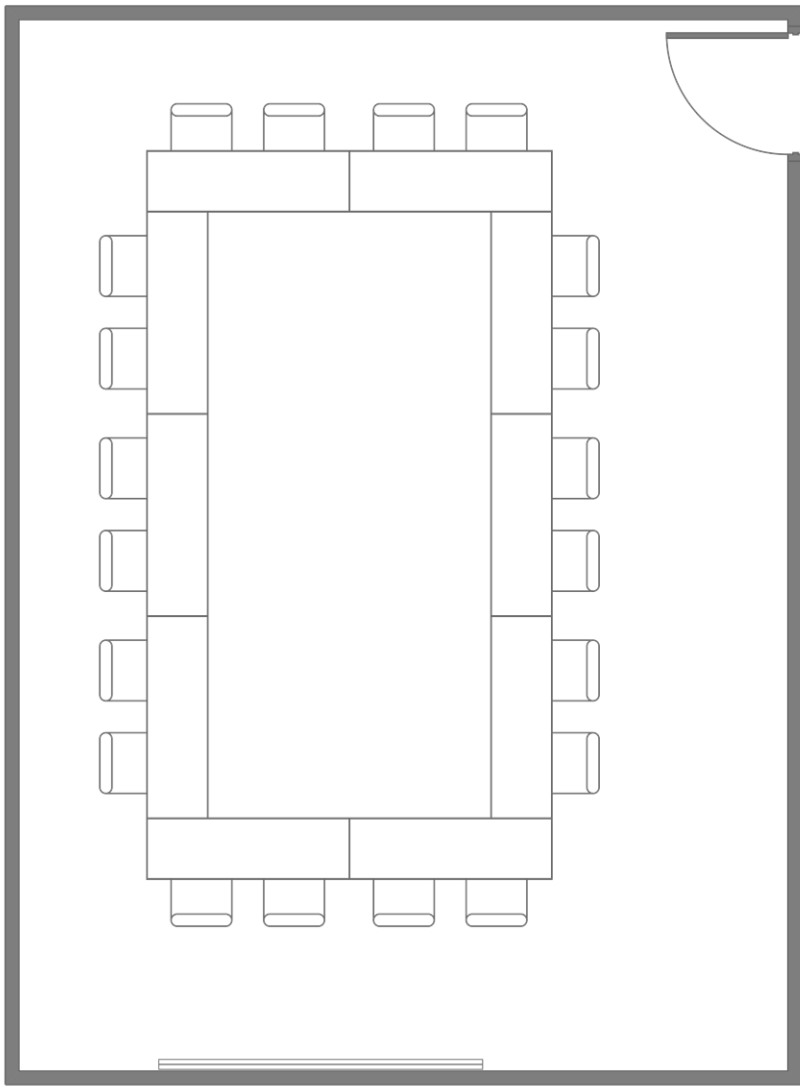
Seating for 16-24 students within approximately 500 sq. ft.

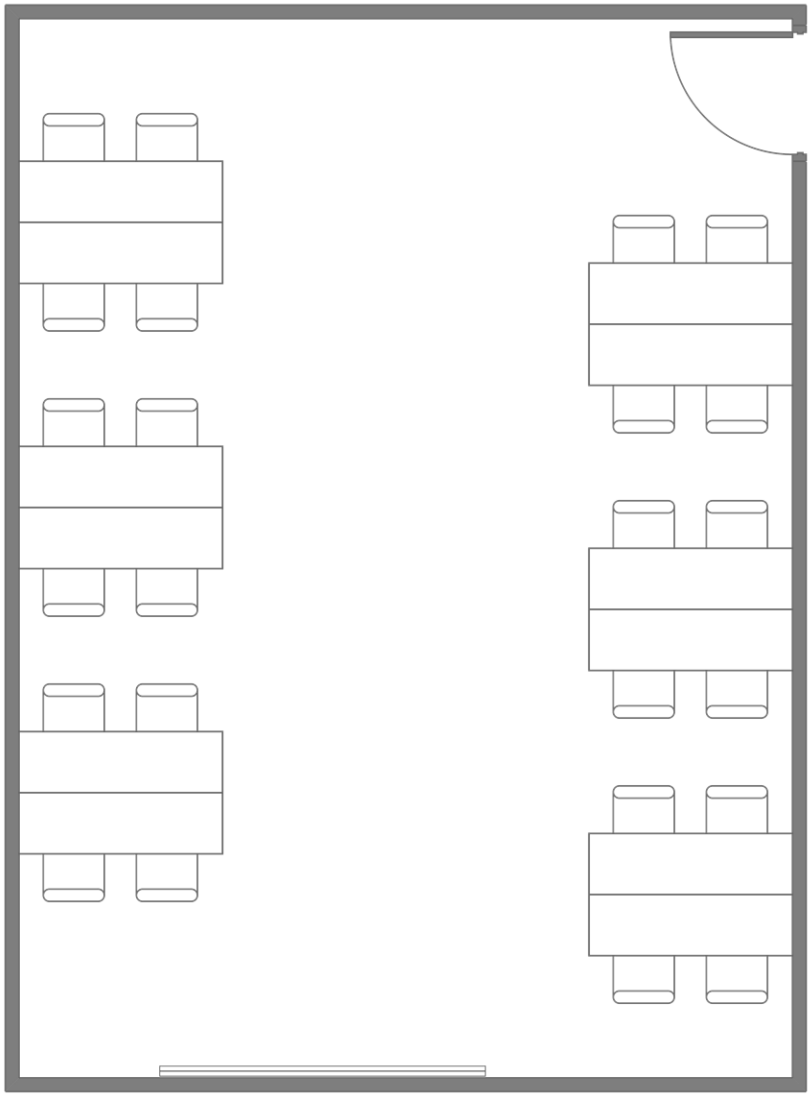




Discussion-based/active learning example layouts

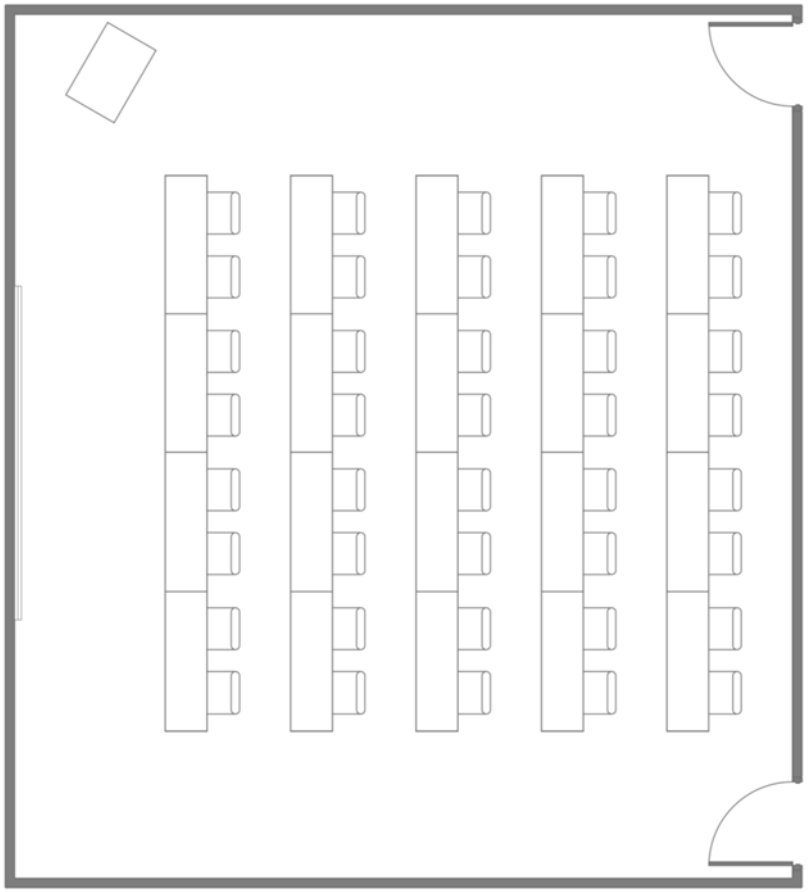
Flexible seating for 20-24 students within approximately 500 sq. ft.

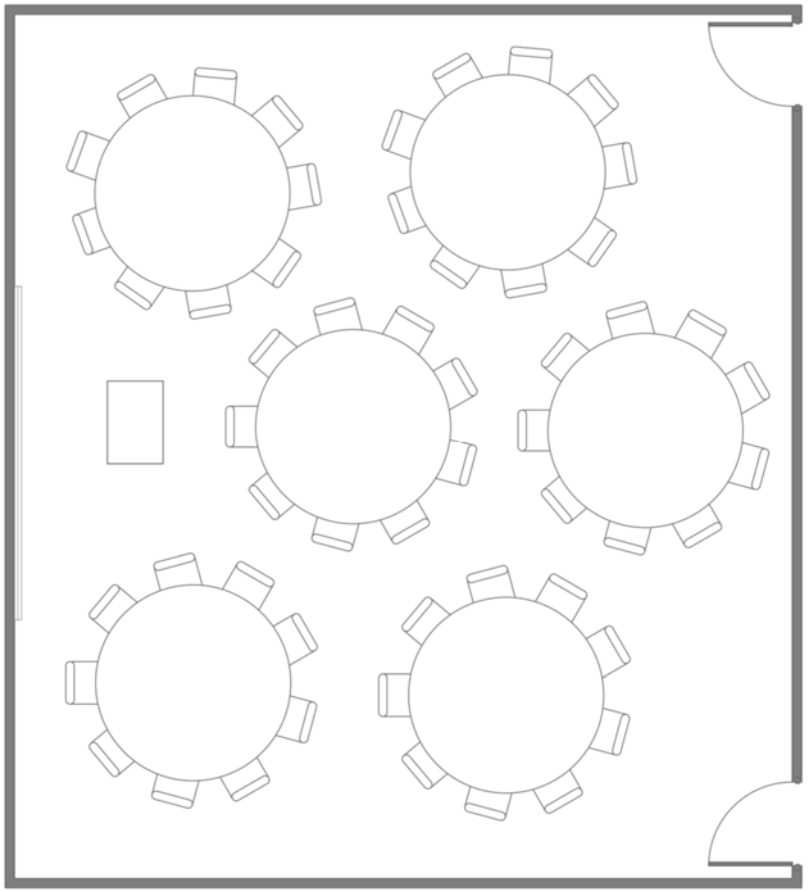




Medium classroom example layouts

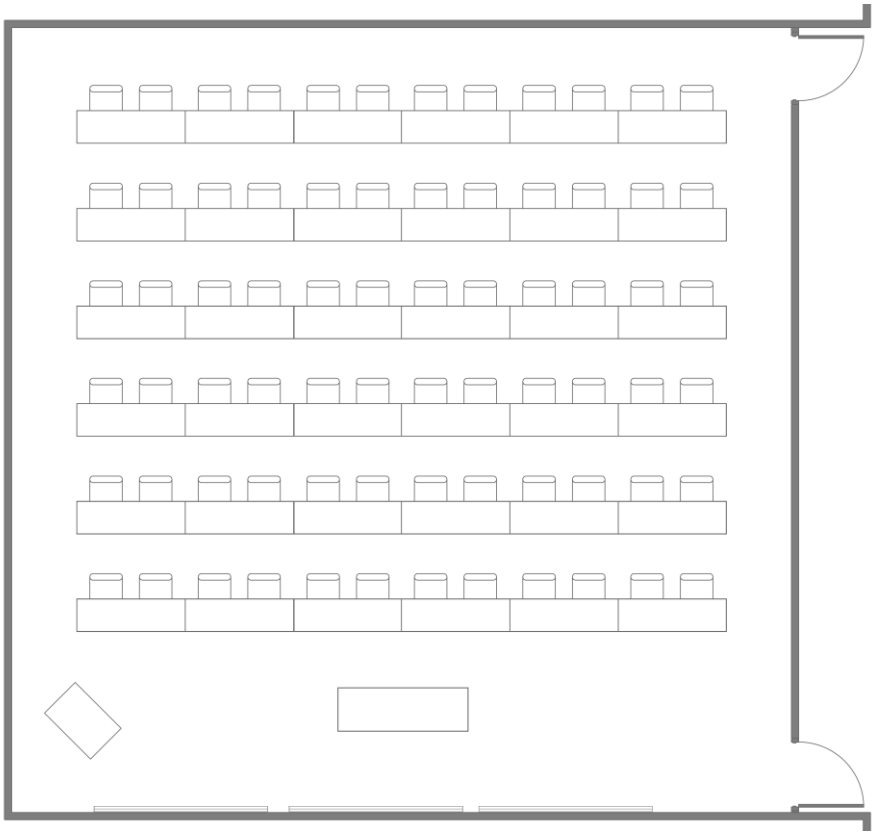
Seating for 40-54 students within 850-900 sq. ft.

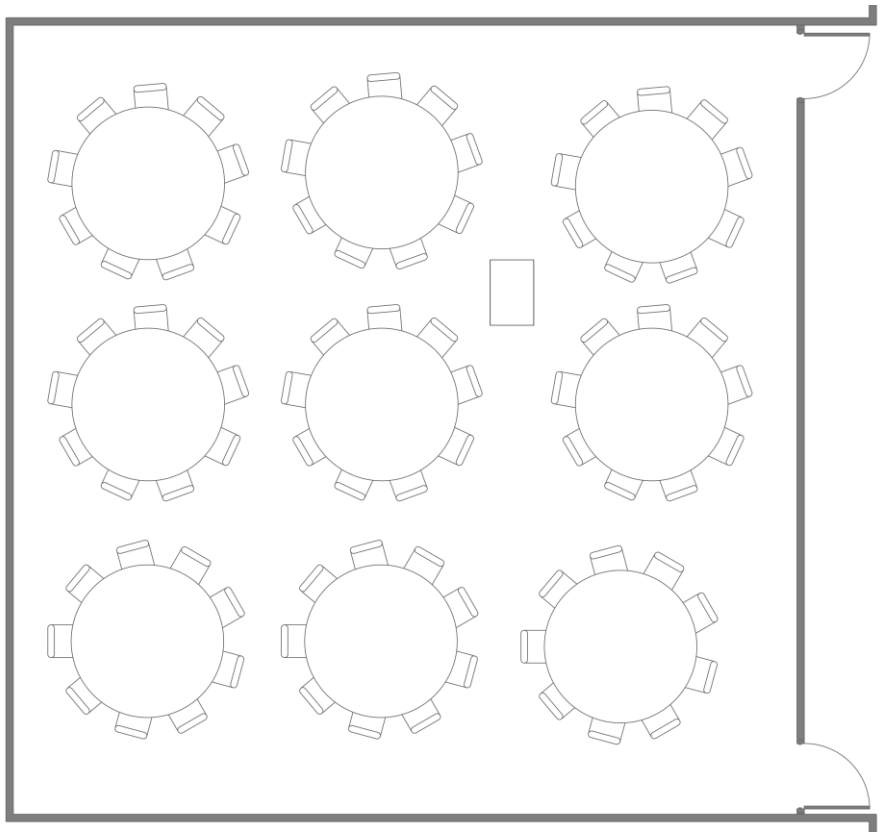




Large classroom example layouts

Seating for 72-81 students within 1200-1400 sq. ft.





Best practices for classrooms

The matrix below outlines best practices and recommended space planning guidelines for classrooms. These are not requirements, but it is strongly recommended that campuses follow these practices when creating new or remodeled classrooms.

Category	Recommendation	Applicable classroom types
Acoustics	Wall, ceiling, and floor surfaces should provide good acoustics.	All
	Mitigate noise from loading docks, driving areas, mechanical/elevator equipment rooms, mechanical systems (especially HVAC), etc.	All
	The design of larger classrooms/lecture halls requires special attention to acoustic attenuation.	Large, auditorium/lecture hall
	In smaller classrooms/class labs, instructors and students should be able to be heard at normal speaking volumes.	Small
	For larger rooms, provide voice amplification.	Medium, large
ADA/Accessibility	All new/remodeled classrooms and class labs shall be designed to be compliant with the most current ADAAG and Minnesota Accessibility Code.	All
	Teaching platforms, teaching equipment, and room controls must be accessible	All
	Provide at least one 36-inch wide aisle providing access to teaching station and accessible seating	All
Ceiling heights (w/ projection)	Projected images are a critical teaching tool in modern classrooms. Accommodating projection requirements is important in designing classrooms.	Medium, large, auditorium/ lecture hall
	Ceiling height shall accommodate a standard ceiling projection system and allow all students to easily see the full height of projected images	Medium, large, auditorium/ lecture hall
	Ceiling heights for room capacity 20-49 stations: Optimum ceiling height = 12’-0” clear; minimum ceiling height = 8’-0” clear	Medium
	Ceiling heights for room capacity 50-75 stations: Optimum ceiling height = 12’-0” clear; minimum ceiling height = 10’-0” clear	Large

Best practices for classrooms

Category	Recommendation	Applicable classroom types
Doors	Should operate quietly and minimize external acoustic disturbance when closed	All
	Located at rear or sides of room	All
	For safety, doors that swing out into the corridor should be recessed such that the door swing is entirely contained within the recessed area.	All
	2 or more exits are required by code	Large, auditorium/lecture hall
	2 separate entrances are recommended, but not required	Medium
Furnishings	Furnishings shall be durable, ergonomic, and flexible in function	All
	All students within a classroom should have access to equal amounts of horizontal work surface (tables or tablet arms)	All
	Where movable or fixed tablet arm chairs are used, a minimum of 10% of the chairs shall be left-handed tablet arms or should be chairs designed for use by right- or left-handed people. In fixed seating arrangements, locate the left-handed chairs along the left side of the row.	All
	Generally, classrooms with fewer than 50 student stations should have movable chairs; tables may be fixed or movable.	Small, seminar, medium
Instructor stations	Must accommodate instructors who are seated, standing, or using a wheelchair/mobility scooter	All
	Work surfaces and audio-visual components should not block students' ability to see projection or vertical writing surfaces.	All
	Should be oriented to allow the instructor to maintain eye contact with students while using technology (laptop, tablet, document camera, etc.)	Medium, large, auditorium/ lecture hall

Best practices for classrooms

Category	Recommendation	Applicable classroom types
Lighting	For general room lighting, provide 50-60 fc at all student stations and at the instructor area; light level may be dimmed to 5-20 fc for note-taking/media presentation.	All
	Special program requirements may dictate more elaborate lighting control systems	All
	Provide at least 2 zones of lighting -- one for the instructor area, one for the student area	Medium, large, auditorium/ lecture hall
	In classrooms with projection systems, provide lighting controls at the instructor station and at every entrance to the room.	Medium, large, auditorium/ lecture hall
Location	If possible, locate classrooms away from large open public areas like dining rooms	All
	If possible, locate classrooms/class labs on the ground floor and as close as possible to main building entrances, to improve access and reduce noise levels in other areas of the building	All
	Corridors outside classrooms should be wide enough to accommodate students waiting for classes	All
	If possible, corridors near/outside classrooms should serve as extensions of the learning environment, providing space for “breakout spaces” and other amenities	All
	Minimize effects of columns or other projections (soffits) on sightlines	All
Storage	Provide open storage for personal items (coats, backpacks); configure this storage to allow unimpeded movement throughout the room	All
	If room contains portable technology (laptops, tablets, other devices), provide secured storage for these items per campus IT policy	All
Technology/ network access	Provide ample wireless (and/or Ethernet, if needed) access with sufficient capacity to serve the full room capacity. Assume all students in a classroom will need network access.	All

Best practices for classrooms

Category	Recommendation	Applicable classroom types
Tiered seating	In general, classrooms with fewer than 75 student stations should have flat floors	Small, seminar, medium
	Raised platforms at the front of the room are discouraged, as they pose ADA and safety issues.	All
Vertical writing surfaces (whiteboards, etc.)	Provide vertical writing surfaces on as many walls as possible	All
	Writing surfaces should be easy to clean and access	All
Windows and sidelights at doors	Per Minnesota State Facilities Design Standards, provide sidelights at all interior doors.	All

Making space for active learning

As Minnesota State colleges and universities look toward the future, they seek to better serve the needs of their students by adapting existing academic spaces—classrooms, libraries, and lab spaces—to new trends in teaching and learning. These new learning spaces are built to encourage collaboration, group learning, and student engagement, leading to greater student success.

Where we are

Currently, a typical classroom on a Minnesota State campus will likely be one of two types:

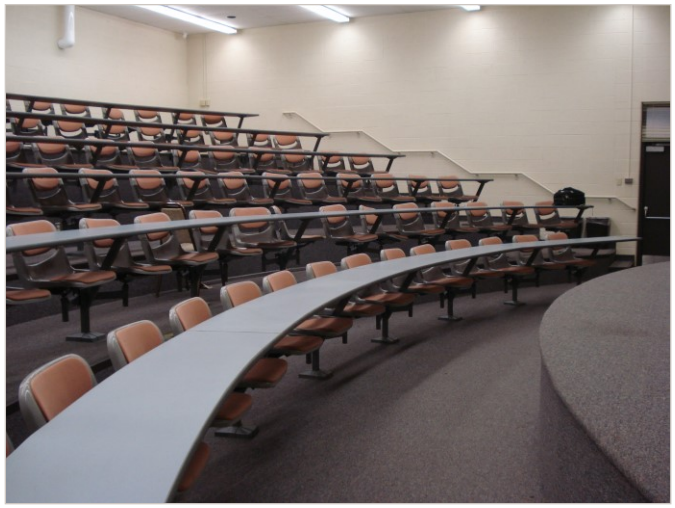
1. A flat-floored classroom with desks/tables (fixed or movable) or tablet-arm chairs, arranged in rows facing the front of the room;

2. A tiered or ramped fixed-seat lecture hall/auditorium.

These types of classrooms best suit a traditional style of teaching where the instructor stands at the front of the room and lectures for most of the class period. While movable furnishings in these classrooms may allow some collaboration among students, the furnishings and equipment do not generally encourage or support alternative teaching methods that use collaborative or hands-on learning.

Until recently, lecture-based teaching was regarded as the optimal method for non-technical classes (especially large-scale undergraduate classes), and typical classrooms reflect that. However, growing pressure to reduce operating costs and increase student success has led colleges and universities across the country to study new methods of teaching as well as new strategies for using classrooms. The end goal of this research is to find ways to maximize the use of existing classroom space while also maximizing student success.

Typical flat-floored classroom



Typical tiered lecture hall

Active learning: What's changing

Recent research has led to the development of a new teaching style known broadly as Active Learning, which encourages learning through hands-on activities, collaborative work, or simulations of real-world activities.

Traditional teaching methods, where the instructor transfers knowledge to students through lectures, are considered "passive" because students are not required to actively engage with the material; instead, the student acts as a "scribe", writing down what the instructor says. Active Learning, by contrast, supports the idea that students acquire a deeper, longer-lasting understanding of the course material when they actively construct knowledge through hands-on activities and real-world problems. An Active Learning environment supports knowledge construction by providing opportunities for rehearsal, feedback, and application of skills and knowledge. Students who have taken classes in Active Learning classrooms have been found to display enhanced conceptual understanding of the course material, moving beyond simply memorizing facts and formulas.

Research about Active Learning has also led educators to realize the importance of community in learning: learning, they have found, is a social process, and students benefit from group learning activities and preparation in working collaboratively with others as they will in the working world. Active Learning classrooms encourage this collaboration by giving students the resources to learn from, and with, one another in technology-rich environments.

University of Lethbridge. Image from FLEXspace.

SUNY Buffalo State. Image from FLEXspace.

Active learning: What's out there

Nationwide, a number of colleges and universities have created their own programs to adapt classrooms and courses to Active Learning. Though the principles behind the programs are similar, each institution's program has its own distinct ideas about how to implement Active Learning.

SCALE-UP: *Student-Centered Active Learning Environment with Upside-Down Pedagogies*; was originally *Student-Centered Activities for Large Enrollment Undergraduate Programs* (North Carolina State University). NCSU's SCALE-UP program was one of the pioneers in exploring Active Learning environments. Classrooms include abundant whiteboard space, round tables, chairs with wheels, laptop computers, projectors and monitors, an audio system designed to allow the students to both hear the instructor and to respond (e.g., by having microphones located at the tables), and lighting that can be adjusted depending on the task. These classrooms have no "front"; a podium at the center of the room allows the instructor to control audio and video components. Instead of lecturing from a fixed position, instructors move around the room, talking with groups of students and checking on their progress.

Nine students typically sit in groups of three around tables that are seven feet in diameter; this size was found to be optimal for encouraging collaboration. Too much classroom density (not enough space between seats) was found to lower student achievement, but too much space between groups prevents students from moving easily from group to group. Two to four feet between seated students was found to be the most effective spacing.

SCALE-UP Classroom, North Carolina State University

NCSU has studied the effects of the SCALE-UP classrooms and found that students benefit from these classrooms in numerous ways:

- Better retention and understanding of concepts
- Better class attendance
- Lower class failure rates
- Higher student satisfaction with the learning process overall.

Active learning: What's out there

ALC: *Active Learning Classrooms* (University of Minnesota, Twin Cities). Based on SCALE-UP, the ALCs were first used for large-scale undergraduate introductory science courses. Campus researchers evaluated the success of ALCs by analyzing student outcomes in ALC classes vs. traditional, lecture-based classes. Students in the ALC classes were significantly more successful than students in the traditional classes, and retained critical concepts longer.

TILE: *Transform, Interact, Learn, Engage* (University of Iowa). Also adapted from SCALE-UP, TILE environments encourage collaborative learning, peer instruction, and activities that benefit from access to computers/technology. Faculty are given training in how to use the TILE classrooms and adapt their courses to active learning. A special unit within the university reviews faculty requests to teach within TILE spaces and ensures that courses within the spaces will make maximum use of the TILE environment.

TEAL: *Technology Enabled Active Learning* (MIT). TEAL uses an Active Learning approach for undergraduate science or engineering courses, encouraging hands-on projects in a collaborative environment. MIT has found that student learning gains in undergraduate physics classes are almost double when Active Learning is involved. The TEAL approach applies state-of-the-art visualization technologies to transform the main topics of introductory science courses from abstract to concrete, increasing student understanding.

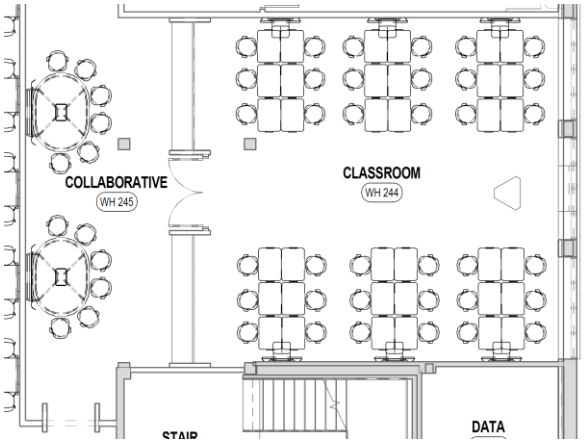
Active Learning Classroom, University of Minnesota—Twin Cities

Remodeled TILE Classroom, University of Iowa

Active learning: Where we're headed

Though most Minnesota State colleges and universities do not currently have Active Learning Classrooms (ALCs), some campuses have implemented ALCs on a small scale. A number of upcoming projects will create these classrooms within new or existing buildings:

- **Bemidji State University, Academic Learning Center** (new building): This new academic building, which will consist primarily of classrooms and a large lecture auditorium, will include two Active Learning classrooms.
- **Rochester Community and Technical College, Endicott Hall Addition:** This addition will contain a new Active Learning classroom and new faculty/ staff offices.
- **Winona State University, Education Village Phase 2** (renovation): This project remodels three existing buildings to create new spaces for the College of Education. It will include Active Learning environments as well as group learning/collaborative study spaces.



Winona State University — Active Learning spaces proposed for Education Village

RCTC, Endicott Hall addition —rendering of future Active Learning Classroom

Bemidji State University — ALC in Memorial Hall (2016 renovation)

Maximizing the benefits of Active Learning Classrooms

Around the country, colleges and universities that have invested heavily in Active Learning Classrooms have found that the greatest benefit in these classrooms comes when a faculty training component is included.

At the University of Iowa, for example, all faculty who wish to use the active learning classrooms must first take classes in how to transform their teaching style and course content to create the best outcomes for the students in these classrooms. Student assistants (Student Instructional Technology Assistants, or SITAs) work one-on-one with instructors to help the instructors develop course content that is appropriate to these technology-enhanced classrooms.

Facilities staff can assess the success of active learning spaces using a free online resource called the *Learning Space Rating System* (LSRS). This tool offers the following recommendations for assisting faculty in adjusting their courses to active learning environments:

- Offer a regularly scheduled user orientation (or user orientation on demand) that introduces the functionality of the furniture, technology, audio, lighting, and other equipment and environmental systems associated with the space.
- Provide online tutorials with suggested room configurations, including explanations of feasible options and activities the room can support.
- Offer educational opportunities for faculty and instructors to learn about new techniques and technologies, take best advantage of affordances to support in-class strategies, and discuss opportunities and challenges with peers and support staff.
- Provide online resources such as articles, FAQs, and support contact information to assist faculty.
- Orientation sessions could include presentations or instructional scenarios to show how technology systems in the room could be utilized to support pedagogical activities.
- Provide incentives for instructors to attend orientation sessions.
- Consider that a default furniture configuration might not indicate a layout at all, but require all chairs and tables to be pulled to the side and stacked or nested after each session, encouraging the next class to consider how it would like to arrange the furnishings to best suit its learning activity.
- Provide space and consultation services to assist faculty and instructors in developing classroom materials and activities.
- Facilitate the observation, evaluation, and coaching of faculty and instructors in reviewing their teaching practices through the use of rehearsal spaces, video capture, or observation in the teaching space itself.
- Offer case studies for use of the space that describe learning objectives, teaching activities used, benefits, and outcomes.
- Facilitate the creation of a faculty and instructors community of practice focused on best uses of learning space affordances.

Assessing classrooms and learning spaces

Though the LSRS is intended to assess active learning spaces, it can be adapted to also assess standard classrooms. The LSRS is described as follows:

> *The LSRS measures formal learning spaces—spaces designed to accommodate [face-to-face instruction]. It provides a set of credits that assess not only the design of individual rooms but also the planning, support, evaluation, and strategic alignment that are crucial to the success of the learning that occurs in a learning space. Recognizing that there is great diversity in teaching and learning, the LSRS does not seek to prescribe specific teaching and learning practices but rather to evaluate a room's ability to support a broad range of those practices.*
>
> —*Learning Space Rating System Version 2*, Educause Learning Initiative, February 2017

Part A of the LSRS measures institutional readiness and development of a planning and operations process. Part B addresses specific features of individual physical spaces. The LSRS includes a checklist (in .xls format) that campuses can use to survey and document existing spaces.

Campus facilities staff may find the greatest benefit in Part B — the final 3 sections of the LSRS:

Section 4: Environmental Quality (EQ)
Section 5: Layout and Furnishings (LF)
Section 6: Technology and Tools (TT)

These sections assess the physical environment of the classroom and its effects on learning.

To download the LSRS, go to:

https://www.educause.edu/eli/initiatives/learning-space-rating-system.

Section	Credit Number	Credit Title	Maximum Points	Earned Points
PART B				
Section 4. Environmental Quality				
EQ	4.1	Daylight	1	
EQ	4.2	Views to Outdoors	1	
EQ	4.3	Interior Visibility	1	
EQ	4.4	Lighting Control	1 or 2	
EQ	4.5	Thermal Comfort	1	
EQ	4.6	Acoustic Quality	1	
EQ	4.7	Environmental and Cultural Inclusiveness	1	
EQ	4.8	Accessibility and Universal Design	1	
			9	**0**
Section 5. Layout and Furnishings				
LF	5.1	Proximities within Space	1	
LF	5.2	Movement Through Space	1	
LF	5.3	Seating Density	1 or 2	
LF	5.4	Furniture Configuration Flexibility	1, 2 or 3	0
LF	5.5	Work Surfaces	1	
LF	5.6	Seating Comfort	1	
LF	5.7	Movable Partitions	1	0
LF	5.8	Transparency	1	
LF	5.9	Access to Adjacent Informal Learning Areas	1	
LF	5.10	Writable Surfaces	1	
LF	5.11	Physical Storage	1	
LF	5.12	Future Proofing	1	
			15	**0**
Section 6. Technology and Tools				
TT	6.1	Electrical Power	1	
TT	6.2	Network Connectivity	1	
TT	6.3	Visual Displays	1, 2 or 3	
TT	6.4	Sound Amplification	1 or 2	
TT	6.5	Audio/Visual Interface and Control	1	
TT	6.6	Distributed Interactivity	1	
TT	6.7	Session Capture and Access	1	
			10	**0**

An excerpt from Part B of the LSRS.

Active learning: Learning space upgrades

For any campus that desires to create an active learning classroom, there are a number of classroom upgrades that provide many of the benefits of active learning classrooms without the expense of creating the full active learning package. The following matrix describes these upgrades and design considerations and indicates their relative costs and benefits.

This matrix is a modified version of Education Advisory Board's (EAB) *Campus Design Toolkit, Tool 4: Learning Space Upgrade Guide*, 2016.

Category	Upgrade	Details	Relative Cost	Fosters student collaboration	Improves learning outcomes	Supports pedagogical needs	Enhances classroom efficiency	Implementation considerations
Space Planning/ Design	Movement space	Leave sufficient space between fixtures to allow students and faculty to circulate comfortably.	**$**	**X**		**X**	**X**	Active learning classrooms usually require 35% more space than typical classrooms.
	Classroom equipment storage	Include lockable cabinet or closet storage for faculty and staff to store expensive technology and specialized equipment only used by certain classes.	**$**			**X**	**X**	Storage space is critical to allow multiple disciplines to use the space and to accommodate diverse pedagogical styles.
	Non-tiered floors	Reduce or eliminate tiered flooring in favor of a flatter layout. Even in larger lecture halls, reducing the number of tiers can improve collaboration.	**$$$$**	**X**				Seating students on the same level facilitates more face-to-face conversations.

Category	Upgrade	Details	Relative Cost	Fosters student collaboration	Improves learning outcomes	Supports pedagogical needs	Enhances classroom efficiency	Implementation considerations
Furniture, Fixtures, and Equipment	Movable tables and chairs	Select easily movable tables and chairs (either lightweight or on wheels) that allow students and faculty to reconfigure the layout to accommodate different teaching and learning methods.	$	X	X	X	X	Establish norms for students and faculty to return furniture to a set location when class ends. Mark these set locations on the floors or post a room layout map.
	Whiteboards	Install dry erase boards around the room. Include multiple boards so that separate student groups can work on projects simultaneously.	$	X	X	X		Install storage for markers and erasers to prevent them from going missing. Custodians should check and replace any missing supplies every few days.
	Personal storage	Students' backpacks and coats can get in the way as students and faculty move about the classroom. Install coat hooks and choose chairs with baskets underneath to allow students to store their belongings during class.	$				X	Personal storage helps prevent trip hazards as students and faculty move around during class.
	Monitors with screen-sharing technology	Install screen-sharing technology that will allow students or faculty to project their laptops onto a screen on the wall or onto a smaller screen situated at collaborative table. This allows students to share their work and for multiple people to view and collaborate on the same document.	$$$	X	X	X		It is important to note that students and faculty may require training to use the equipment. Furthermore, technology can become outdated quickly and is expensive to repair if it breaks.

Category	Upgrade	Details	Relative Cost	Fosters student collaboration	Improves learning outcomes	Supports pedagogical needs	Enhances classroom efficiency	Implementation considerations
Furniture, Fixtures, and Equipment	Large monitor or projector for instructor	A monitor visible to the entire class allows the instructor to present information to the entire room.	$$$		X	X		Because the instructor will likely circulate around the classroom, the monitor should have wireless controls that the instructor can use throughout the room.
	Student table microphones	Table microphones ensure that everyone can hear student voices in large class discussions.	$$$		X	X	X	Microphones are most important in larger active learning classrooms. Note, this technology is expensive and easily broken, and many members report that it often fails.
	Mobile microphone	In larger active learning classrooms, it can be difficult for the instructor to address the entire class. A mobile microphone allows the instructor to address the class from anywhere in the room and helps the instructor recapture the class's attention when students are conducting their own conversations.	$$		X	X	X	Like anything not anchored to the classroom, a floating microphone is more likely to go missing than one installed at a podium.

From Education Advisory Board 's (EAB) *Campus Design Toolkit, Tool 4: Learning Space Upgrade Guide*, 2016.

Category	Upgrade	Details	Relative Cost	Fosters student collaboration	Improves learning outcomes	Supports pedagogical needs	Enhances classroom efficiency	Implementation considerations
Amenities and finishes	Resilient flooring	Students tend to move around more during active learning classes, increasing the risk of food and drink spills. Rubberized flooring makes spills much easier to clean.	$$				X	Because rubberized flooring absorbs less sound than carpeting, institutions installing rubberized floors should consider installing acoustic panels as well (see below).
	Acoustic considerations	Given that active learning inherently involves more conversation, acoustic treatments help ensure that chatter is not distracting. Acoustic analysis should be part of the design process for any active learning classroom.	$-$$$	X	X			Improper acoustics can inhibit collaboration that leads to better learning outcomes.
	Power outlets	Run electricity through the floor to allow for multiple power outlets around the room. Because most students will bring laptops, this prevents students from crowding around a few outlets near the walls and computer cords from creating trip hazards as they stretch from the wall to tables.	$$		X	X	X	Plan to have an outlet within easy reach of every student table.

From Education Advisory Board 's (EAB) *Campus Design Toolkit, Tool 4: Learning Space Upgrade Guide*, 2016.

Minnesota State learning space upgrade examples

An open space houses flexible furniture with shared monitors for group study. (MSU Moorhead)

Monitors on portable stands. (St. Cloud State University — ISELF)

Monitors on the walls combine with movable tables and chairs. (MSU, Mankato—Clinical Sciences Building)

Whiteboards and casual seating provide space for collaboration outside the classroom. (MSU, Mankato—Clinical Sciences Building)

02 CLASS LABORATORIES

Class labs pose space planning challenges

Laboratories can use up a great deal of campus space and utility resources. These resource-intensive spaces should be designed to function as efficiently as possible.

To aid in preliminary space planning, typical station sizes (based on national averages) for various lab types are listed in the matrix on the right. These station sizes include an allowance for internal lab circulation and the instructor's station.

The ASF per station shown in the matrix is a rough estimate of the space needed for various lab types; during project planning for lab spaces, program faculty will need to be consulted to verify program requirements for equipment, safety, storage, and other spaces.

For specific design standards related to class labs, please see the following sections within Division 22 of the Minnesota State Facilities Design Standards:

- Section 9: Laboratories
- Section 11: Medical, Art, Shops, and Industrial Training
- Section 12: Emergency Equipment

Space Utilization

While the system standard is 85% utilization of 32-hour week, we acknowledge that lab utilization will be lower due to necessary setup/prep time and the specialized nature of labs.

Whenever possible, design general science labs to accommodate multiple program types; for example, a shared "wet" lab might accommodate biology, chemistry, and anatomy.

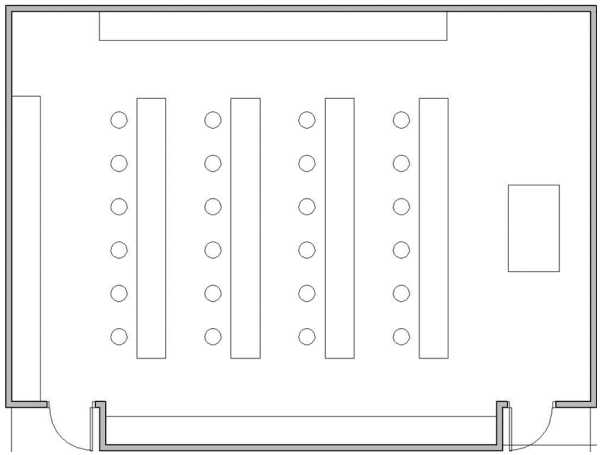
Class Lab Program Type	Avg. ASF/ Station	Range: Min. ASF/Station	Range: Max. ASF/Station
Biological Sciences	57.90	45	75
Health professions	59.50	45	80
Languages	44.00	25	60
Home economics	60.60	45	75
Agricultural sciences	80.60	51	115
Physical sciences	61.50	45	80
Engineering	79.30	45	120
Tool and machine	97.33	60	150
Mechanical technology	140.00	130	150
Diesel/auto tech	172.33	94	240
Construction tech	155.67	94	210
Welding	124.80	90	180
HVAC	136.00	94	200
Automotive	137.50	94	200

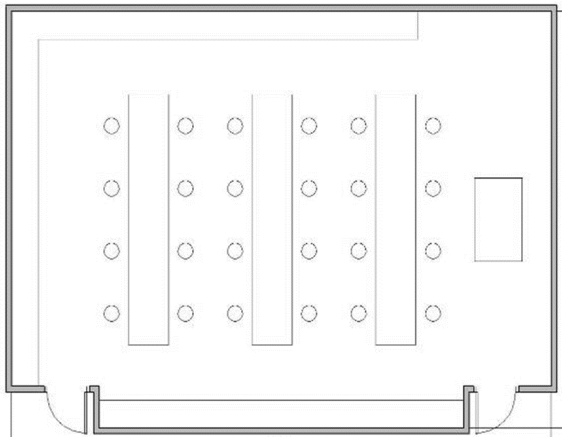
Class laboratories: Best practices

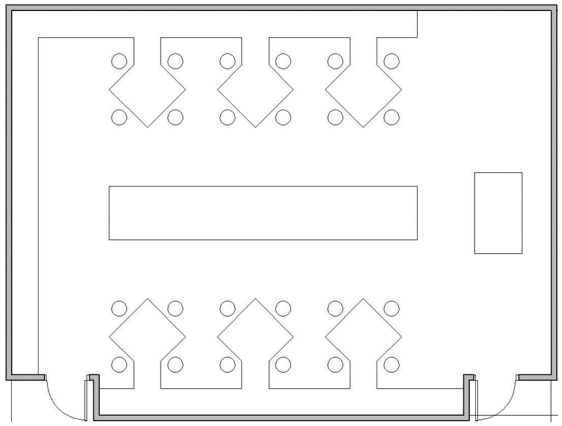
Category	Recommendation	Applicable lab types
Space Planning	Design general science labs to accommodate multiple program types; for example, a lab that accommodates biology, chemistry, and anatomy.	Science
	Science labs should be designed to accommodate 24 students per class.	Science
	If appropriate for the program, design labs with integral lecture/classroom space within (studio concept)	All
	Instructors' offices should be located adjacent or with ease of access to the instructional labs (preferably with windows and doors directly into the lab) for safety considerations and to facilitate instructional supervision.	Applied Tech.
	Laboratory work flow should, when possible, mirror commercial manufacturing/ production facilities' work flow for material delivery and processing.	Applied Tech.
	Cluster labs to allow for shared prep spaces and to minimize HVAC/plumbing inefficiencies.	All
Health/Safety	Safety is of primary importance for all layouts. Care must be taken to consider material flow, work zones, and emergency personnel access.	All
	Work zones are required at each piece of fixed equipment or work bench. (Work zones vary by type and function of equipment and may vary for similar equipment from different manufacturers.)	All
	Acoustical control strategies must be considered for quality instruction, health of students and instructors and safety concerns.	All
	Air quality is a priority due to fumes created by chemicals, solvents, and exhaust. Airborne materials caused by finishing, cutting, grinding and sanding operations must also be considered.	All
	Windows into lab areas from the general circulation corridor promote safety and help to market the program.	Applied tech.
Other Amenities	Vestibules between instructional labs and corridors minimize the transfer of both noise and dirt. A sequence of walk -off mats will help remove moisture, grit, dust, and dirt from shoes.	Applied Tech.
	Flexible overhead power access for small tools, portable saws, and cutting tools increases shop safety.	Applied Tech.

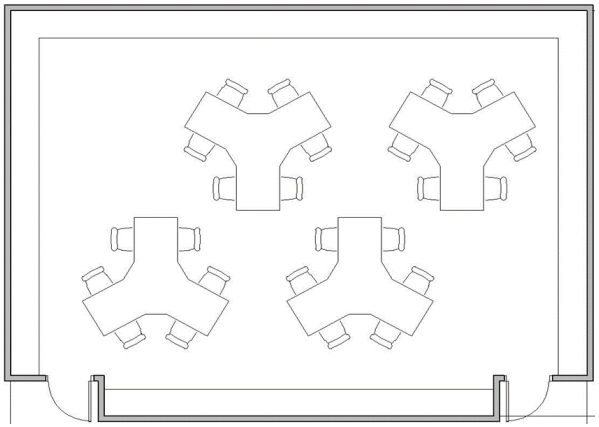
Science lab layouts

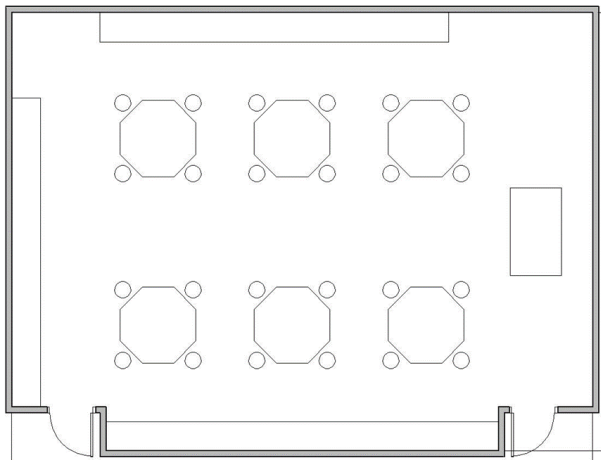
A typical 24-station science lab can accommodate numerous seating/lab bench options.





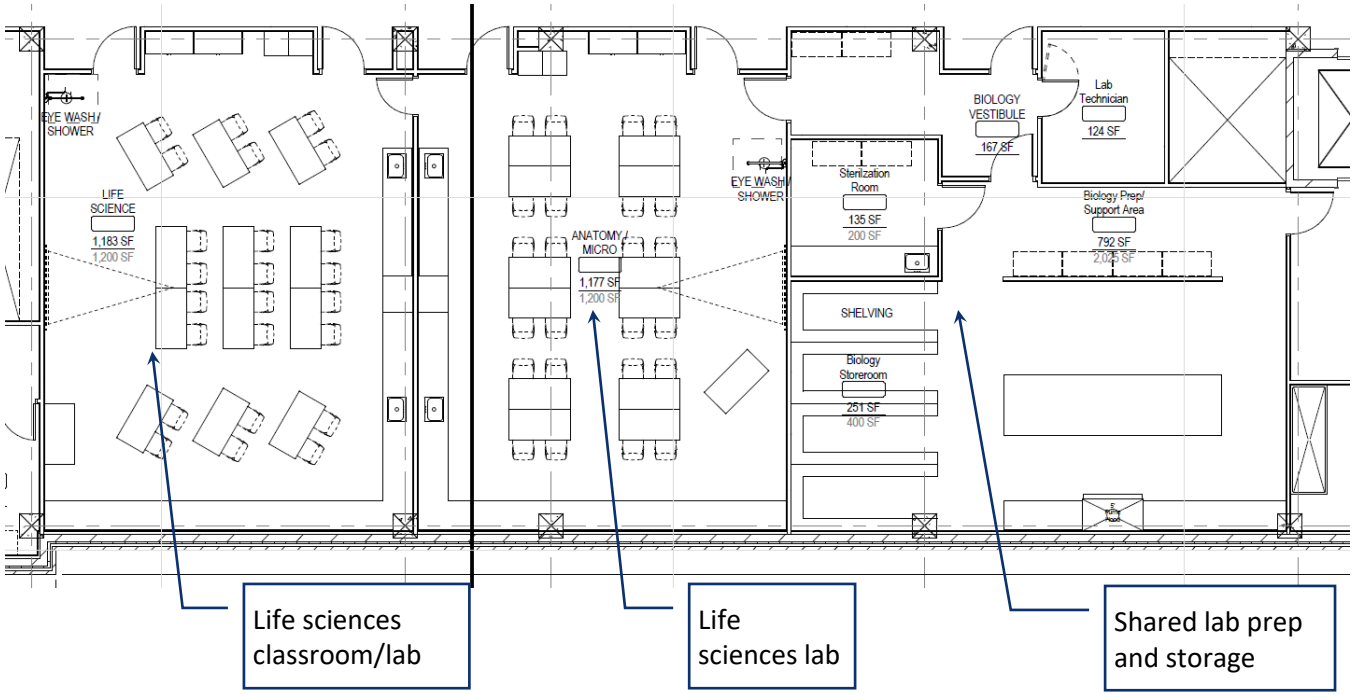




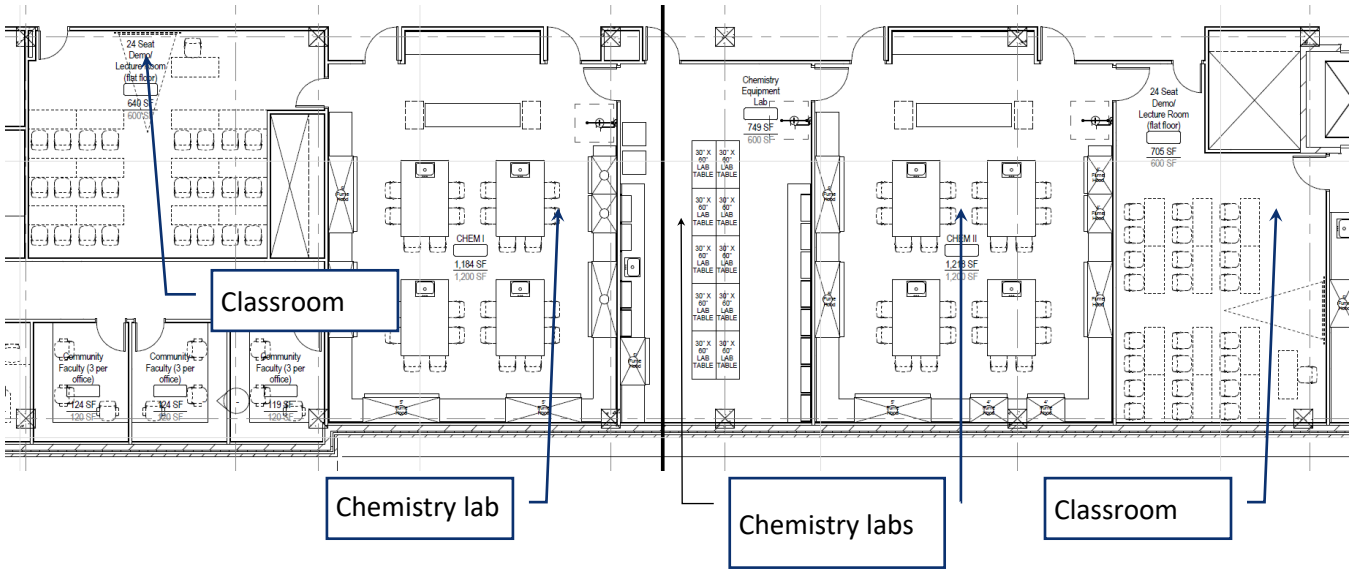


Lab clusters provide shared resources

Clustered science labs located close to classrooms and prep spaces provide space planning efficiency and allow programs to share resources.



Metropolitan State University, Science Education Center (new building): New science labs and classrooms have mobile furnishings, where possible, to provide flexibility and the ability to adapt the rooms to Active Learning methods. Group study areas provide space for students to work collaboratively outside the classroom. Chemistry labs are located adjacent to classrooms.



Studios combine labs and classrooms

Some academic programs are best served by a room that is a combination of lab and classroom all in one — the “studio” lab. Practical lab spaces are provided in the same room as a traditional classroom setting so that classes can move seamlessly from lecture to lab work.

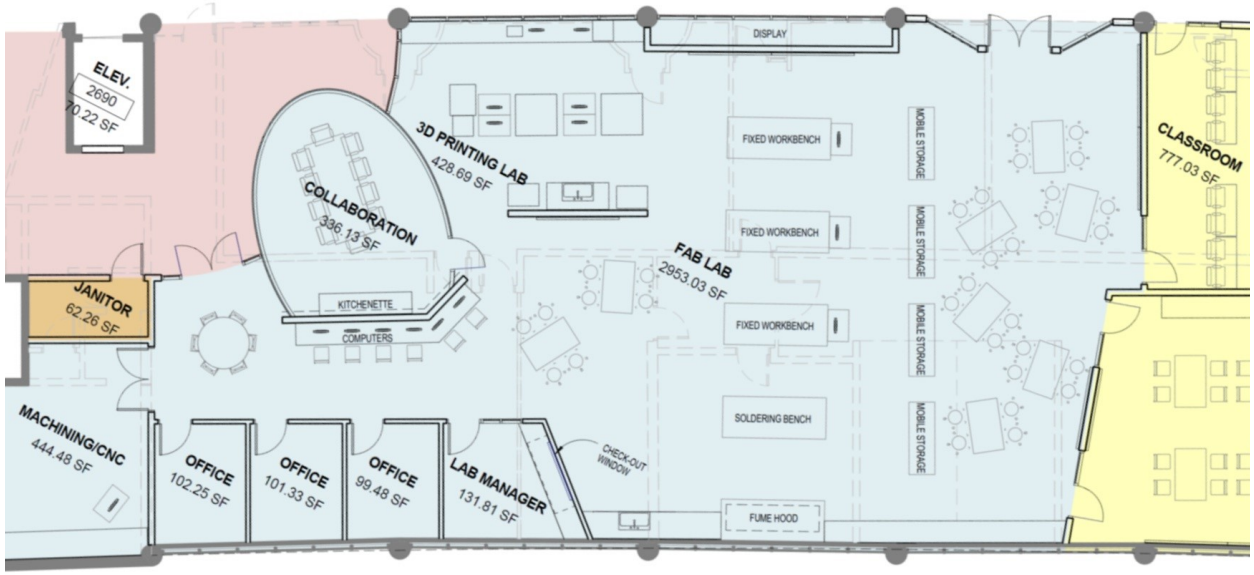
Traditional classroom space is located adjacent to Culinary Arts lab space at Saint Paul College.

Traditional classroom seating and tables are located near lab stations for Allied Health programs.

Maker spaces

Maker Spaces are open lab or studio-like environments that enable multi-disciplinary learning and collaborative work. These types of spaces include a variety of DIY tools and technologies such as 3D printers, software, electronics, craft and hardware supplies and tools, and more. Classes might be taught in the Maker Space, or it could be more of an open-lab type space open to any student.

Century College, Fab Lab (renovation): This new maker space/fabrication lab contains areas for 3D printing, digital fabrication, and hands-on learning. Two nearby classrooms open directly into the lab, allowing students to easily translate classroom concepts into real-world designs.



Applied technology and trades labs

Applied technology labs provide some of the most varied and resource-intensive spaces on campus, and can pose unique challenges to a campus's space utilization strategy. There's no "one size fits all" solution to designing applied technology and trades labs.

Determining space needs for Applied Technology labs can be challenging for a number of reasons:

- *Defining a "station".* Labs for certain programs may contain a well-defined, countable number of student stations. Other programs, such as diesel mechanic, may contain different types of stations within one lab that are difficult to distinguish as separate stations. For these types of labs, assessing ASF per FYE student may be a more effective method of calculating space needs.

- Similarly, *station sizes vary within programs*. For example, students in an autobody program might work individually on projects of many different sizes, causing variations in the station sizes needed.

- *Varied teaching methods.* Students in some programs (such as nursing) work together, collaborating on projects or tasks. Other programs' students work individually at distinct student stations. This distinction may vary by program or by instructor.

When planning or designing new lab spaces, designers and facilities staff should work closely with program faculty to determine the full extent of a lab's space needs — student station sizes, storage needs, networking and power needs for equipment, safety standards, etc.

Lab stations may be easily counted...

...or difficult to distinguish.

General guidelines for applied technology and trades labs

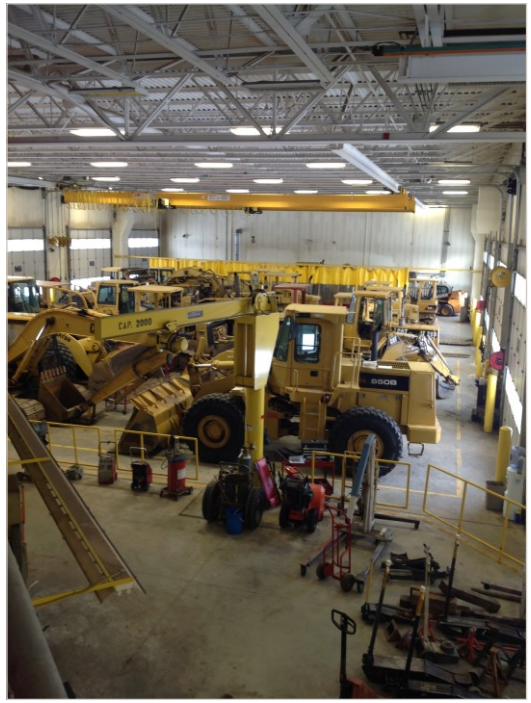
- **Safety** must be a primary consideration for all lab layouts. Carefully consider the lab's materials flow, work zones, and access for emergency personnel.
- **Work zones** are required at each piece of equipment or at each lab bench. Work zones vary by the type of station or equipment; consult the appropriate safety standards or manufacturer's recommendations.
- Consider **acoustical control** strategies in labs with noisy or vibrating equipment.
- Locate **instructors' offices** adjacent to labs to allow supervision of the labs.
- Solvents and exhaust, as well as airborne materials from finishing, cutting, grinding, or sanding, can create air quality issues. Ensure adequate **ventilation and filtration systems** are provided.
- Consider adding **vestibules with walk-off mats** between labs and corridors to minimize the transfer of noise and dirt.
- Where possible, provide **flexible overhead access** to power for small tools, portable saws, and other powered equipment to allow flexibility in the lab layout.
- If multiple programs will use the same lab space during different times of the day, consider providing **lockable storage** for students and faculty.
- Labs should be designed, when possible, in a **flexible** way that allows multiple programs to use the labs during different times of the day or academic year. For example, an "engine/motor lab" could be used by a Diesel Mechanic program during fall semester, then used by an Automotive program in spring semester.

Applied technology lab variations

Certain labs best accommodate group work.

Labs can contain a variety of lab station sizes.

Some individual lab stations are only 15-20 sq. ft.



Other types of stations might be over 200 sq. ft.

03 OFFICE AND SUPPORT SPACE

Reimagining private office space

Office space makes up 40%, on average, of our system's academic space. Though the allocation and assignment of office space can be politically tricky at times, wise stewardship of our space resources—including office space—provides long-term benefits to our campuses.

Traditionally, full-time faculty have been assigned private offices. However, private offices for faculty or staff are not a mandate; many colleges and universities around the country are now reassessing the need for large private offices. Ultimately, the focus should be on creating the right mix of spaces that responds to the needs of the work group or department.

New office environments may include smaller (but still enclosed) individual offices located near open flexible workspaces that accommodate collaborative work among groups of faculty, staff, or students. Additionally, small reservable conference rooms allow private discussions or "head-down" work away from distractions. Open collaboration spaces with "whiteboard walls" or other vertical writing surfaces can provide space for small group impromptu discussions. This approach uses the same amount of square footage per person, but distributes it among spaces that can be used more flexibly.

When planning office space, don't forget to accommodate other environmental needs, such as:

- Acoustics and sound isolation
- Speech privacy
- IT and audiovisual needs
- Department-specific equipment (large format printers, etc.)

RCTC, Endicott Hall Addition: New concepts for faculty office space. Small private offices (90-100 ASF) or shared offices combine with open workstations and small conference rooms to provide spaces for collaborative work and private meetings with students or other staff.

Mobile work can reduce campus space needs

As technology enables more and more people to work from home or other non-office locations ("mobile work"), office space has begun to change in response. The chart below describes recommended station sizes for three work styles.

Flexible workspaces accommodate the workspace needs of various types of employees (such as adjunct faculty or staff who serve multiple campuses) while reducing facilities costs. In place of workspaces based on job title or position description, flexible workspaces include a variety of workstations to be used by any mobile employee. The flexible workspace challenges the notion that one workstation equals one employee. Instead, employees may choose a workspace that allows them to work most efficiently by taking into consideration individual work styles and job tasks.

	work station	recommended size	work style/habit	
deskbound	assigned	48 sf – 64 sf min.	**interactive:** People spend the majority of work hours at their desks while interacting with others or talking on the phone. Because their work involves more noise, their arrangement differs from the style to the right.	**concentrative:** People spend the majority of work hours at their desks and focusing on individual tasks, so they need more space in the office and an arrangement that minimizes disruption.
internally mobile	shared or assigned	36 sf – 54 sf min.	**interactive:** People work in various locations around the office or in the building; they interact with others when at their desks.	**concentrative:** People work in various locations around the office; they need to focus on individual tasks when at their desks.
externally mobile	shared or assigned	30 sf – 48 sf min.	**interactive:** People spend significant amounts of time working away from the office, so they need less space in the office. When in the office, they tend to interact with others and need collaboration space.	**concentrative:** People spend significant amounts of time working away from the office; they need to focus on individual tasks when at their desks and need arrangements that minimize disruption.

From U.S. GSA Public Buildings Service, *Leveraging Mobility, Managing Place: How Changing Work Styles Impact Real Estate and Carbon Footprint,* June 2010. *(Green highlight = potential for space savings.)*

Mobile work brings a number of facilities benefits:

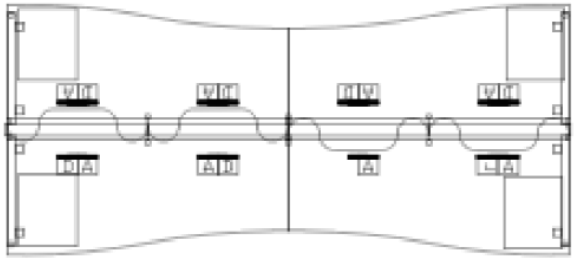
- **Reduced space needs/real estate costs and operating costs:** If the amount of office space on campus can be reduced, this will in turn reduce energy and other infrastructure costs.
- **Higher space utilization:** Technology and mobile work reduce the amount of space needed per employee.
- **Easier adaptation to headcount changes:** If many workers are mobile, the campus will have less need to add workspaces when new employees are added.

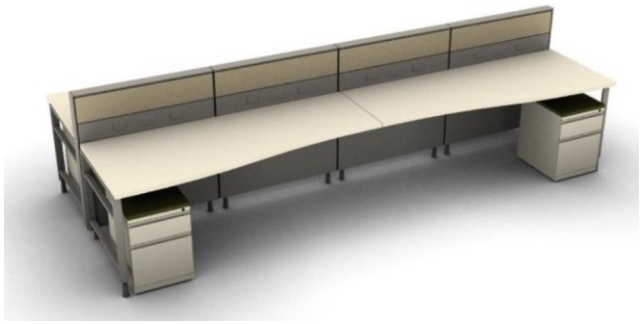
Facilities Considerations

- **Changes in space design:** If an office space uses "hoteling" stations for mobile workers, those stations must be adaptable to different users in terms of ergonomics, file access, and storage of personal belongings. Office spaces that support mobile workers will generally need more investment in infrastructure for access to networks and power (charging stations/plug-ins).
- **Changes in space type proportions:** Offices with more mobile employees will likely need a higher proportion of collaboration spaces and small conference rooms where mobile workers can meet with others while in the office.

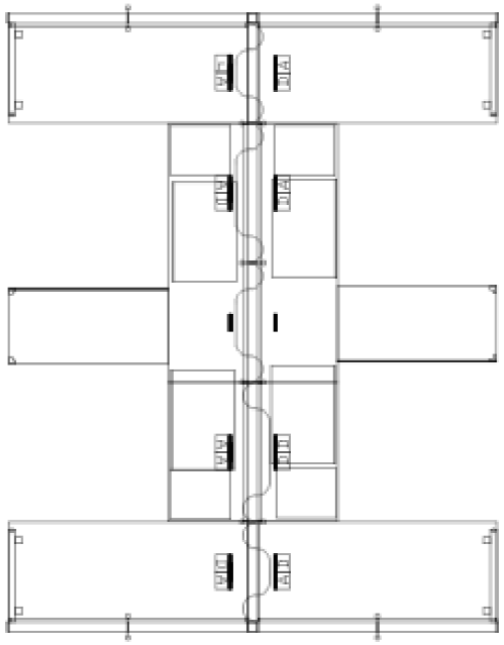
Flexible workspaces for mobile workers

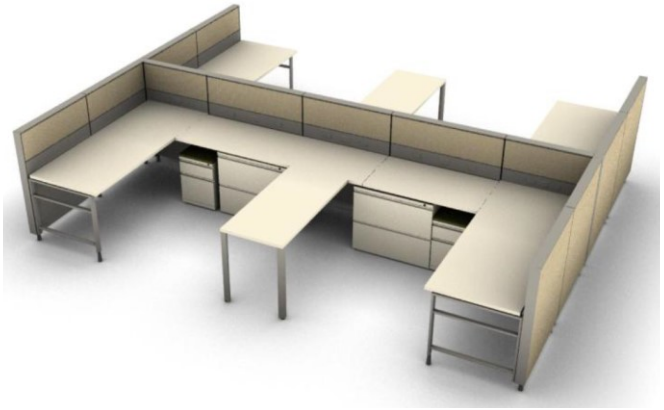
These workstations are designed for “mobile” workers who are not assigned a permanent workstation.





Bench workstations can provide temporary “touchdown” space for mobile workers.





Alternate 6’x8’ workstations provide greater collaboration potential.

Planning for offices and support spaces

Office space and workstation guidelines

Office space created by new construction or remodeling should adhere to the guidelines in this section as much as possible. The limitations of existing buildings may cause some office spaces to fall outside these guidelines, and workstation or private office layouts may vary depending on the needs of the employee or job.

The typical workstation for a *resident* (non-mobile) employee is based on a 6' x 8' workstation. The typical workstation for a *mobile* employee (free address/ flexible workspace) is based on a 6' x 6' workspace. The typical private office is based on a 10' x 12' space.

- Generally, place offices near the building core, not along the perimeter, to provide greater natural light access for all building users
- Campuses are encouraged to develop/create an office space policy and to regularly review office space use to ensure space is allocated equitably and efficiently.
- Use office space policies to respond to the system strategic framework's requirement to optimize space utilization and make the best of what we have.

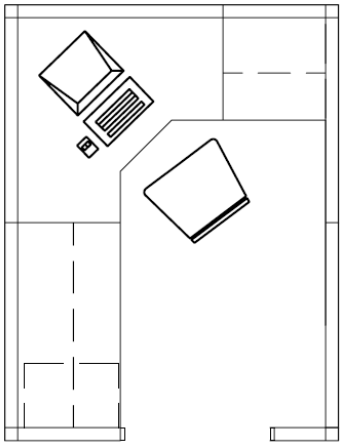
The **Space Needs Assessment** form (.xls format), which you can use to document office and support space needs, can be viewed in the Appendix and downloaded from the link above.

Staff/Faculty Role	Workspace Type	ASF Range*
President	Private Office	250-350
VP	Private Office	200-300
AVP	Private Office	120-150
Dean	Private Office	150-200
Assoc/Assist Dean	Private Office	120-150
Director	Private Office	100-120
Assist/Assoc Director	Private Office	80-100
Dept. Chair	Private Office	100-150
Manager	Private Office	80-100
Staff, Prof Full Time	Shared Office or Cubicle	64-100
Staff, Prof Part Time	Cubicle	48-80
Staff, Admin Support	Shared Office or Cubicle	48-80
Staff, Temp./Grad Student	Cubicle	36-60
Faculty, Tenured	Private Office	100-150
Faculty, Non-Tenured	Shared Office or Cubicle	80-120
Faculty, Emeritus (Active)	Shared Office or Cubicle	64-100
Fellow/Lecturer	Cubicle	64-80

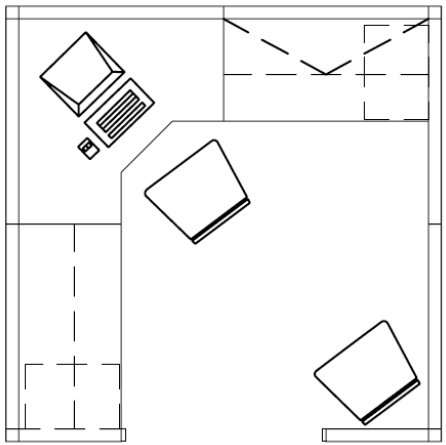
*Workspace types and sizes noted here are only a recommendation (based on national averages) in order to provide planning guidance. Actual sizes may vary depending on program or facilities needs.

Cubicle example layouts

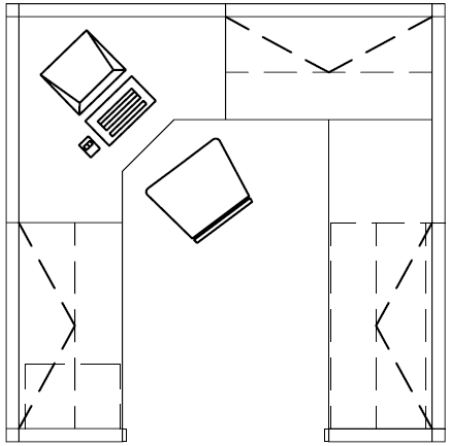
Cubicles (systems furniture) can come in a wide variety of layouts and contain numerous different storage pieces and work surfaces. Cubicles and desking systems should be planned so that they accommodate the work needs of their users.



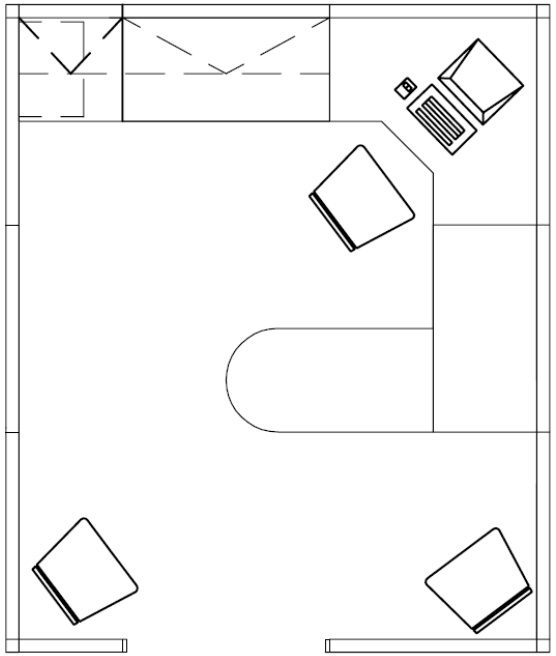
Typical 6'x8' cubicle



Typical 8'x8' cubicle



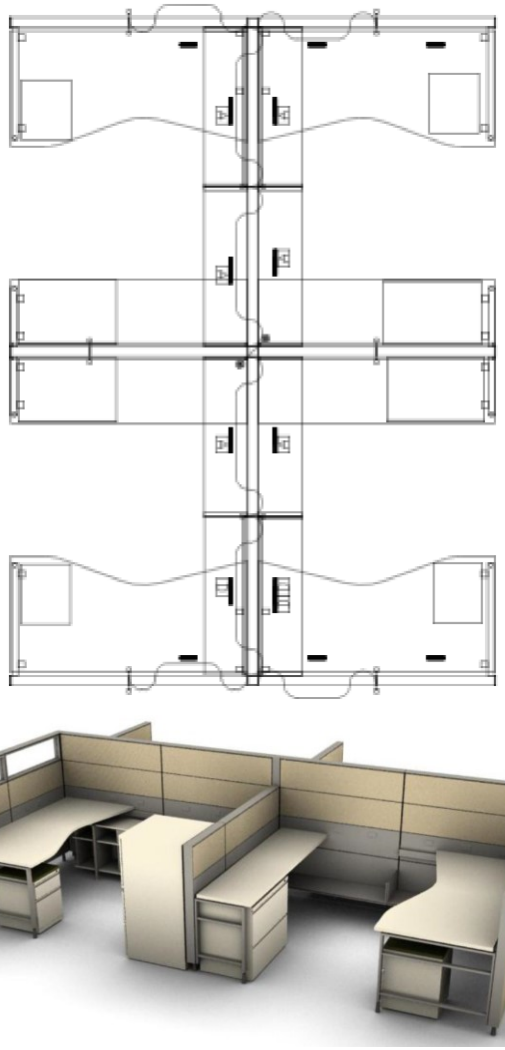
Alternate 8'x8' cubicle



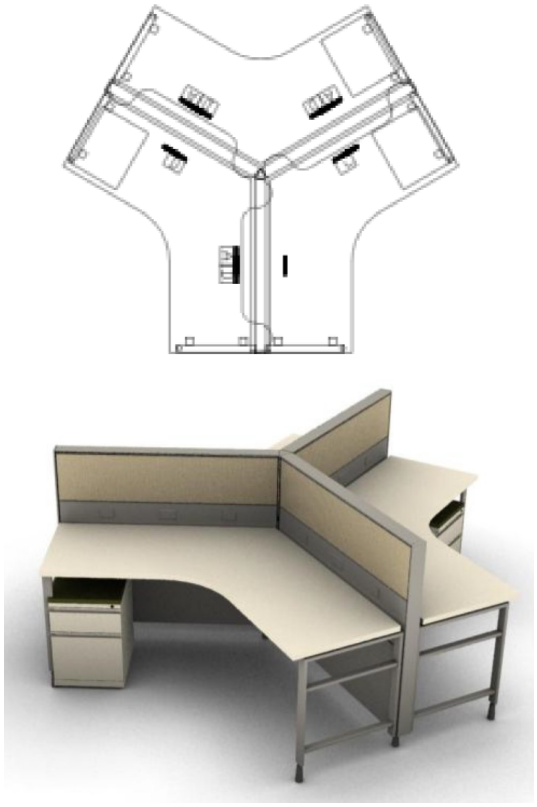
Typical 10'x12' cubicle

Non-mobile workstations

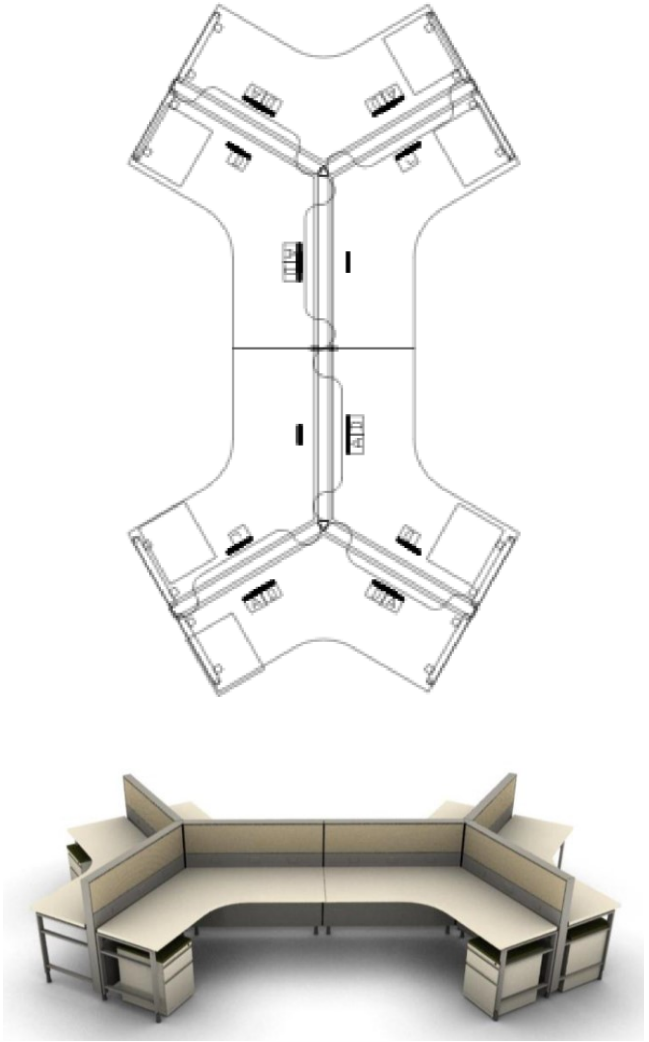
These workstation arrangements best suit “resident” workers who have an assigned permanent workstation.



Standard 6’x8’ resident workstations.

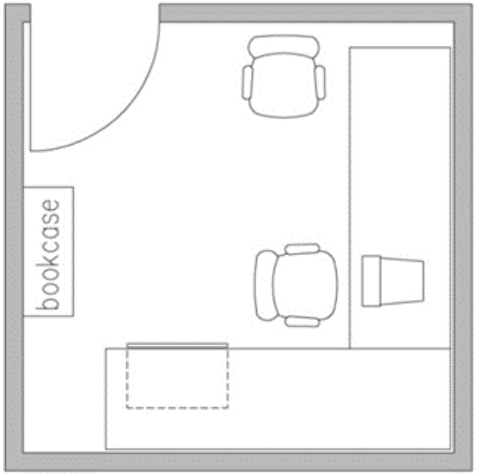


3-workstation grouping.

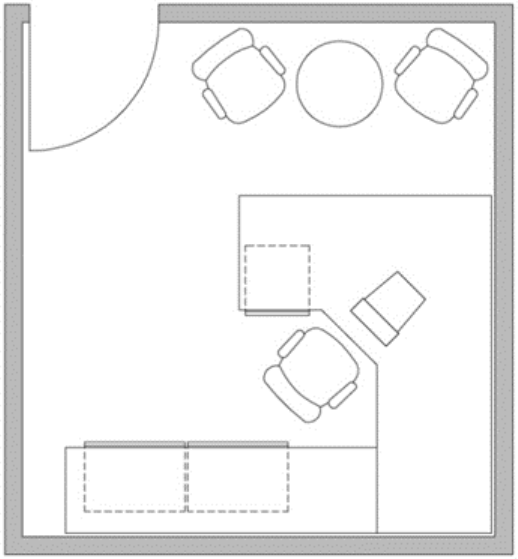


This 6-workstation grouping provides space for collaborative work.

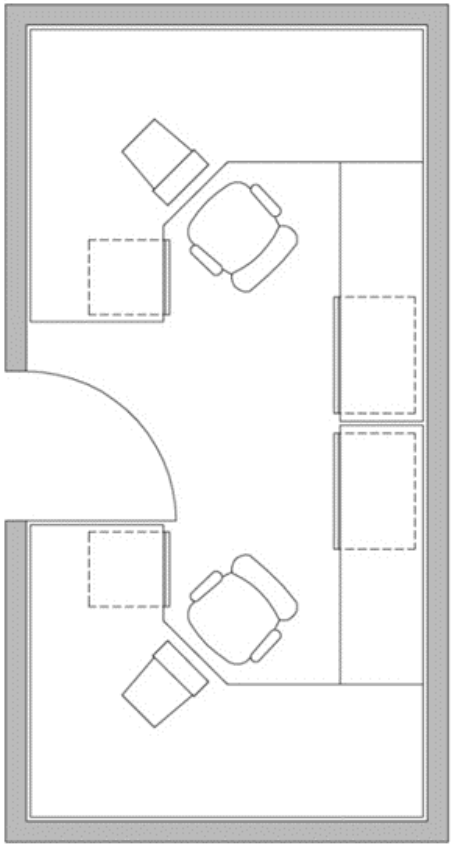
Enclosed office example layouts



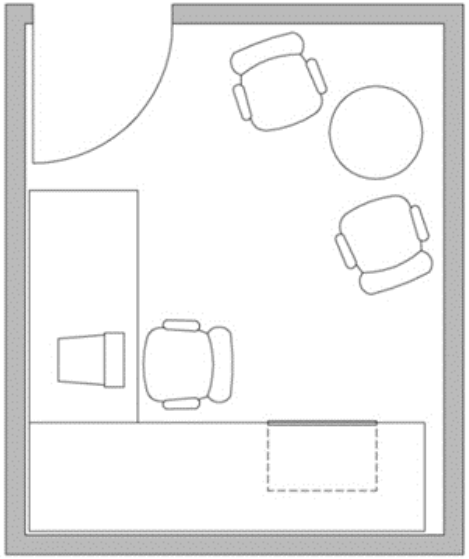
Private office—single occupant



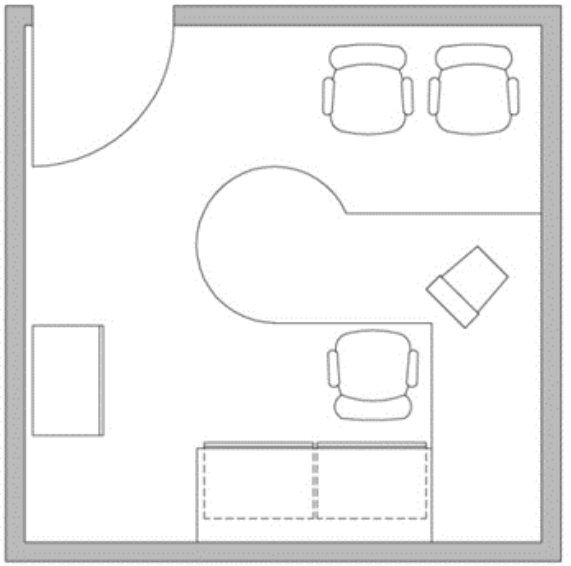
Private office—single occupant



Shared office—two occupants



Private office—single occupant



Private office—single occupant

Planning for support space and conference rooms

Support Space

Office areas normally include support spaces (such as copy rooms, supply rooms, and kitchens) in addition to staff and faculty workspaces. Each office's support space needs will vary depending on the "work styles" of the people in the office; "resident workers" who typically spend their entire day at a desk will need more support space than mobile workers who work remotely.

To calculate the total amount of support space needed (not including circulation space) per FTE, you can use these guidelines:

- An office with a high proportion of mobile workers will need 125-175 sq. ft. of space per FTE
- Offices with an average proportion of mobile workers will need 175-200 sq. ft./ FTE
- Offices composed mainly of resident workers, or containing staff with high support space needs, will need 200-230 sq. ft./FTE.

If an office contains a high number of mobile workers, the office design could include touchdown spaces – small desks or countertop spaces where anyone can work temporarily. These spaces are not "owned" by individuals, but are available for any mobile worker who stops by the office. These spaces reduce the need for dedicated desks or offices on campus for workers who need space only occasionally.

Conference Rooms

If an office will have a high proportion of "collaborative" workers, it will need more conference rooms or small group rooms of various sizes. The number and size of conference rooms required by a department/work group is highly dependent upon the type of work performed by that department and its mix of work styles. Departments are strongly encouraged to share conference rooms and other support spaces whenever possible.

Technology in conference rooms will vary by campus, but it's recommended to include at least one large monitor, a white board, and a conference-capable telephone.

Determining Conference Room Needs

Enclosed-Office Areas:

In areas where there are more private offices than cubicles:

- There should be 1 conference room/meeting space per every 20 people
- 2/3 of conference rooms should hold 8-10 people
- 1/3 should hold 4-6 people

Open Office Areas:

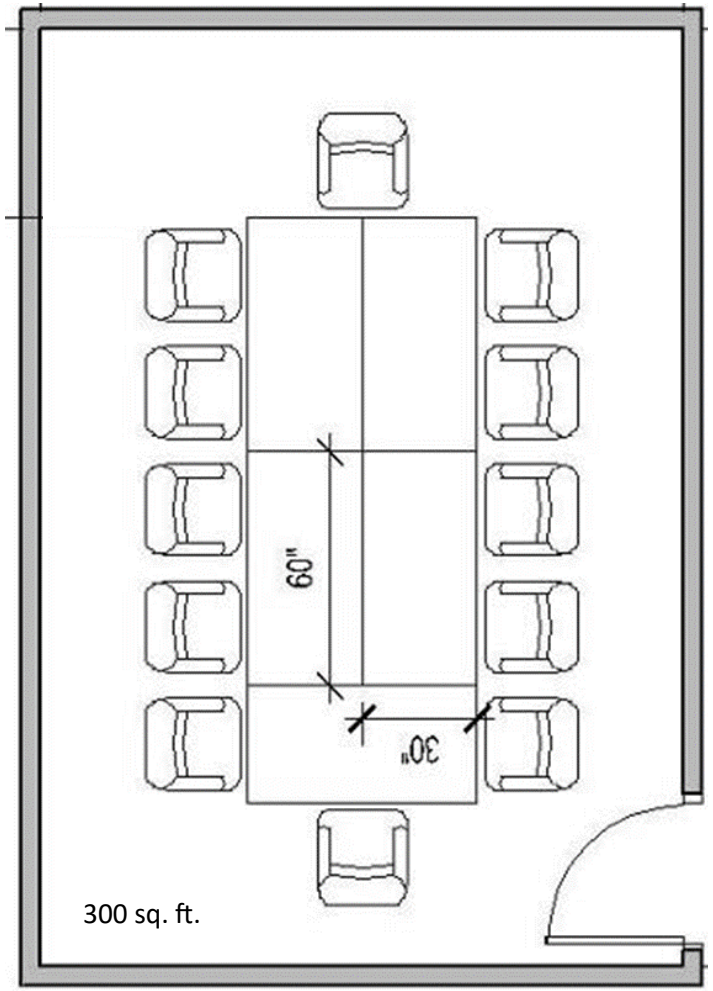
In areas where cubicles outnumber private offices:

- There should be 1 conference room/meeting space for every 10-12 people
- 2/3 of conference rooms should hold 8-10 people
- 1/3 should hold 4-6 people

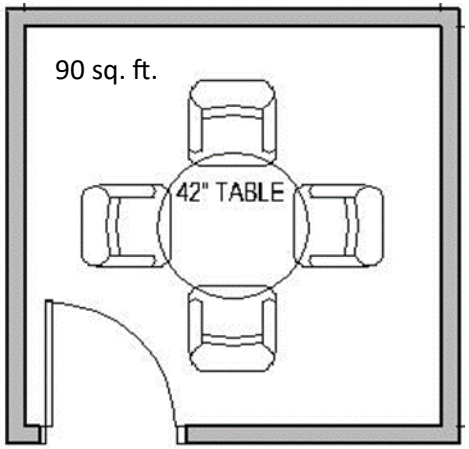
Special department requirements may indicate a need for a different mix of conference rooms that doesn't conform to these guidelines; use the *Space Needs Assessment* form to document these needs.

Conference room example layouts

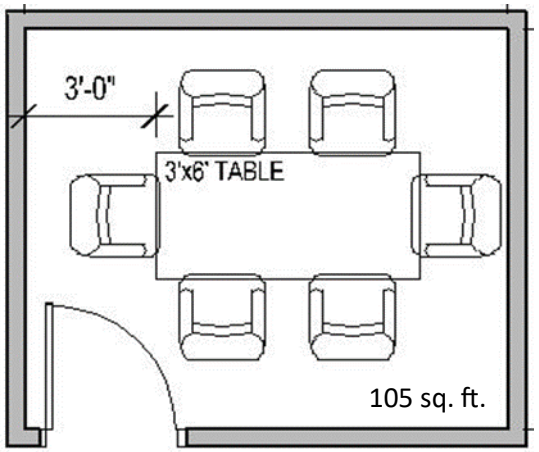
Small to medium conference rooms (80-300 sq. ft.) can seat 2-12 occupants.



Small/medium conference — 250-300 sq. ft.; 8-12 occupants



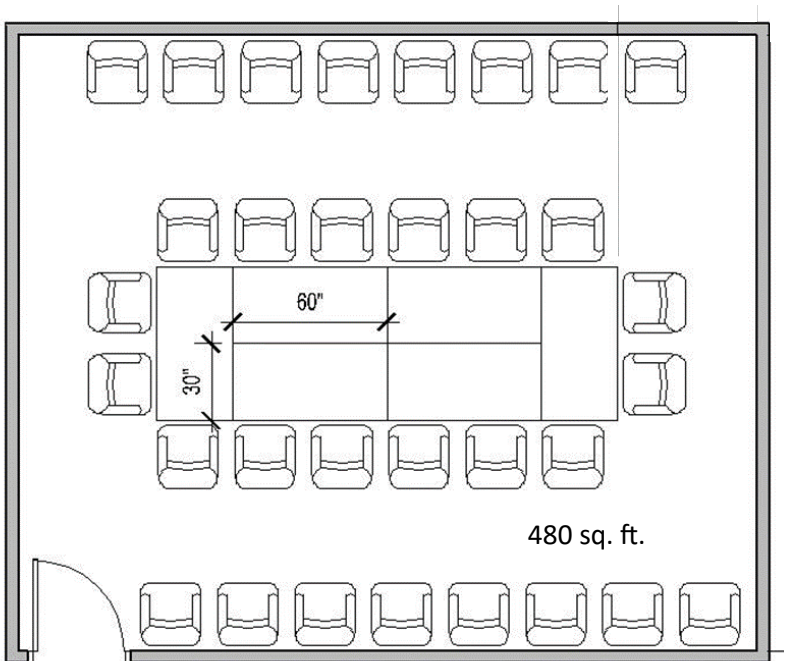
Small conference — 80-100 sq. ft.; 2-4 occupants

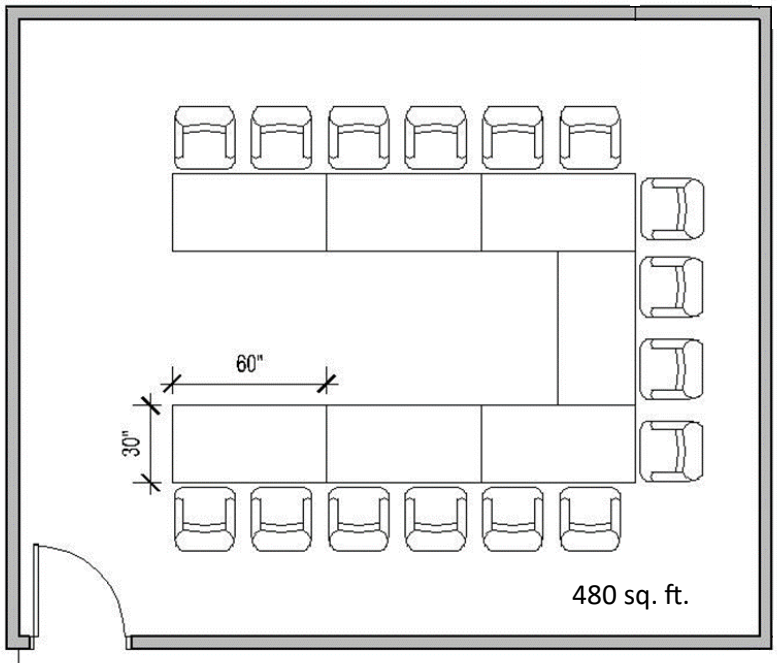


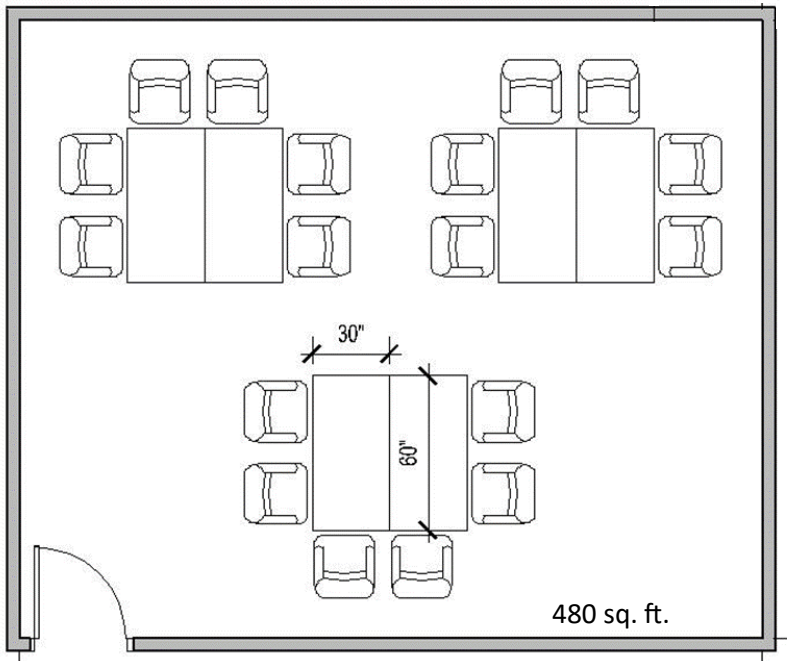
Small conference — 100-120 sq. ft.; 4-6occupants

Conference room example layouts

A large conference room (480-600 sq. ft.) can seat 12-32 occupants.







04 LIBRARIES AND LEARNING COMMONS

The role of libraries is changing

Colleges and universities have begun to reshape their non-classroom spaces — especially libraries — to reflect a more collaborative approach to learning. Academic libraries around the country are encountering a number of changes to their traditional setup:

- Declining use of the library's print collections
- Declining use of reference librarians for research
- Increasing reliance on digital sources and subscriptions
- Increasing demand for student group study areas or technology-enhanced collaboration spaces

These changes have resulted in libraries needing less space for physical collections and reference desks, but more—and increasingly complex—infrastructure for digital access.

A typical traditional library: long rows of book stacks and study carrels.

As a result, the quiet, book-filled library of years past is being replaced with the Learning Commons, where students gather to work in groups and to access a wide range of digital and print resources.

While these commons areas often contain open spaces for small group work, it's important to also provide traditional quiet study spaces—away from more active areas—where students can work individually.

MSU Moorhead's Livingston Lord Library remodel created a Learning Commons space with flexible seating options.

St. Cloud Technical and Community College's renovated library uses a variety of seating options and groupings.

Library space planning trends

Academic libraries, especially those within the Minnesota State system, serve a wide variety of users and needs. For this reason, it's not practical to define a set of prescriptive standards for library space (for example, a certain quantity of shelf space per campus FYE). Instead, libraries are encouraged to develop outcome-based standards to help determine how library space should best be used. (For further information, see the Association of College & Research Libraries' *Standards for Libraries in Higher Education*, http://www.ala.org/acrl/standards/standardslibraries.)

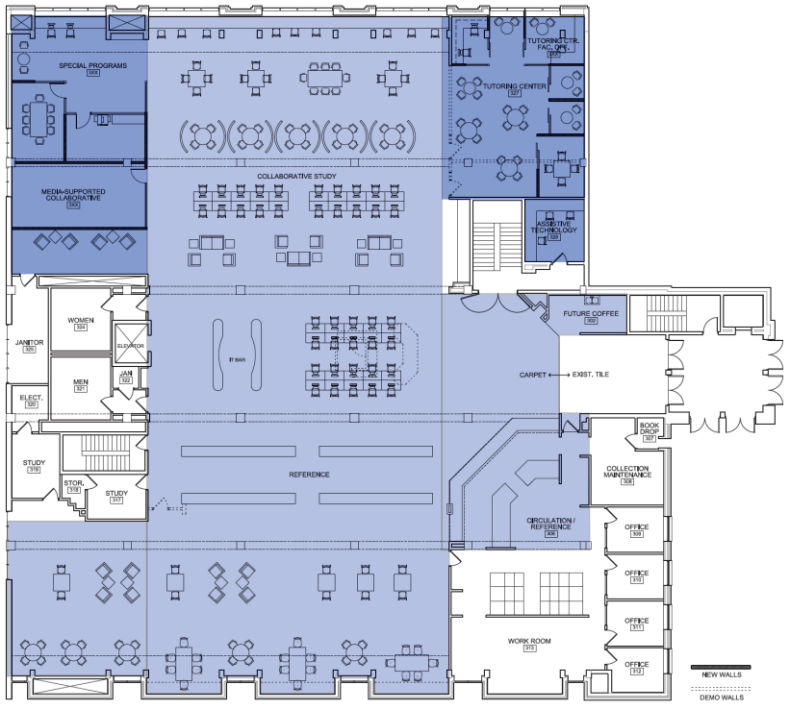
To better accommodate the modern needs of users, libraries are tailoring their design and facility strategy to their students' increasingly social approach to studying, as they opt for large, public tables and couches even when doing private work. Information itself is accessed digitally, either at computer terminals or on mobile devices, and the environment supports not its storage, but its use.

The modern learning commons is flexible, allowing users greater control over its ultimate utilization and configuration, and provides a variety of multimedia tools for students and faculty exploring alternative modes of scholarship. Food and drink restrictions are typically relaxed, creating a comfortable, café-like environment. Finally, related academic support units from advising and centers for teaching and learning to math labs and writing centers are located within the library, presenting students with a "one-stop shop" for almost any academic need. What was once a warehouse for books becomes a vibrant hub of activity, repositioning the library building as the intellectual center of campus.

The top trends in next-generation library space planning include:

- Fewer physical resources
- Comfort and collaboration
- Flexibility and modularity
- Wireless connectivity and power access

Source: University Leadership Council, "Redefining the Academic Library: Managing the Migration to Digital Information Services", 2011.



Bemidji State University: Proposed renovation of A.C. Clark Library. 3rd floor plan.

Library space planning strategies and best practices

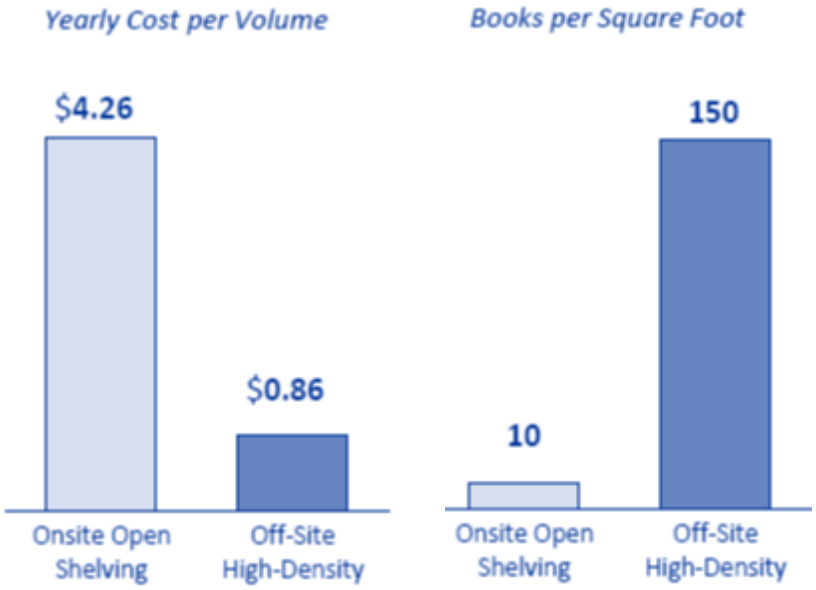
- Locate the library centrally and/or in the context of social spaces such as the cafeteria, student center, commons, bookstore, student services, computer labs, etc.
- Locate the library to maximize connections to other academic support functions (reading and writing support, tutoring, academic computer labs, etc.).
- The entry to the library should be visible and welcoming, and the library should be visible and connected to the campus.
- Provide small group and quiet study locations to allow the remainder of the library to be more active.
- Consider acoustical needs of spaces that change in use.
- Zone for activities: Locate reference materials near seating and staff; provide casual seating near periodicals; strive for easily understandable organization.
- Locate staff for visual supervision of activities and exits.
- Select durable finishes, signage, and furnishings that coordinate with a campus-wide palette.

Century College's library renovation created colorful. active space with a variety of seating and study areas featuring natural light.

Converting library space to better meet student needs

Books and other print media often take up the vast majority of space within a library. But this space is expensive: open shelving typically holds ten times fewer books per square foot compared to high-density storage (see below).

As more library resources become available in electronic forms, libraries can consider reducing the number of physical volumes stored on-site, allowing space to be repurposed to suit new needs.



Source: Courant, Paul and Matthew Nielsen, "On the Cost of Keeping a Book", The Idea of Order: Transforming Research Collections for 21st Century Scholarship. CLIR Pub#147. June 2010; Education Advisory Board interviews and analysis.

Converting library space to meet patron needs	
Current State	Preferred End State
Most library space taken up by physical books and journals in open stacks	E-books and e-journals provide instant access to needed resources
Typically 50% of volumes have never circulated	Physical volumes are removed when possible to free up space for collaborative learning and other activities
	Other academic support services move into library space

Barriers to change:

- E-books and discovery tools not yet an acceptable substitute for browsing open stacks
- It's not yet possible to replace an entire academic collection with electronic resources
- Vocal groups of faculty strongly oppose reducing onsite physical collection
- Patrons may perceive the removal of books from shelves as a retreat from the academic mission of the library
- Deselecting books and journals can be expensive and time consuming
- Often expensive to renovate libraries to accommodate new uses

05 STUDY AND COLLABORATION SPACE

Study space is critical to student success

Study space

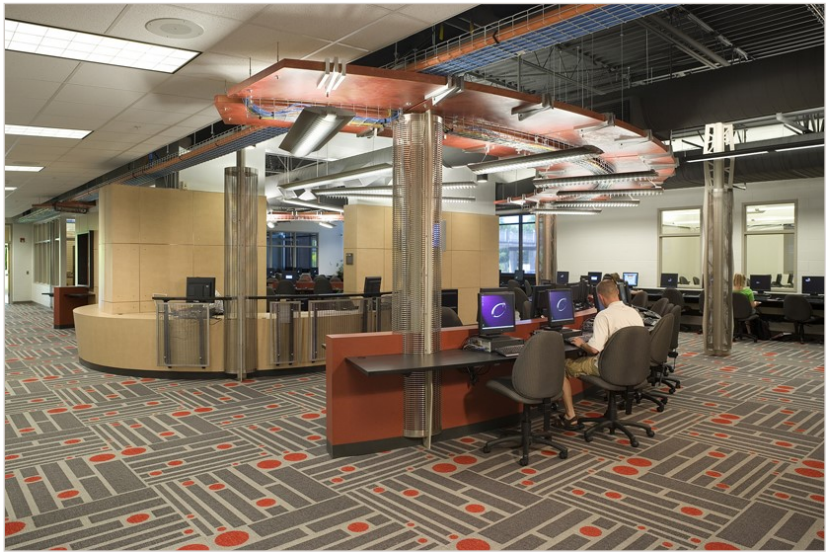
Providing ample flexible study space helps to keep students on campus between classes and promotes a collaborative, collegial atmosphere. A recommended guideline is to create 1 NSF of study space per classroom seat in a building. For example, a classroom building with 500 total seats would need 500 NSF of total study space. The study space should be distributed around the building; when possible, locate study spaces in or near clusters of classrooms, near food/vending areas, or in high-traffic areas.

Collaboration space

The increasing popularity of group projects and group study has created a need for more student collaboration spaces on campus. These spaces often feature semi-enclosed rooms with a table and chairs for 4-6 students. Amenities like whiteboards or wall-mounted monitors may be included. The enclosed space provides greater privacy for the students while reducing noise transmission that might disturb other students nearby.

- When possible, locate study or collaboration spaces in or near clusters of classrooms, near food/vending areas, or in high-traffic areas
- Spaces should be adaptable to different study needs (group or collaborative work, individual study) and should contain abundant power outlets, stain-resistant finishes, and durable furnishings.

Study space comes in many different forms



06 BACCALAUREATE PARTNERSHIP SPACE GUIDELINES

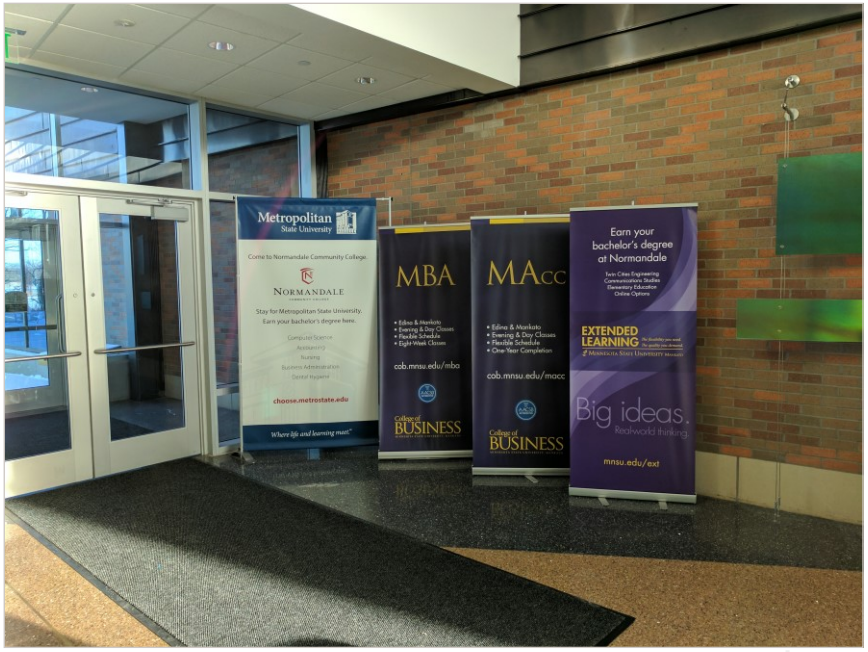
Partnership guidelines

These Partnership Space Guidelines outline the expected facilities and support spaces necessary for programming on college campuses with four-year university partners.

The purpose of these guidelines is to support campuses in developing:

- Dedicated space for partners
- Space and office accommodations that are similar to university-level accommodations
- Spaces that help host campuses start programs
- Consistency among campuses

Designers should also reference Section 3 (Office and Support Space) and Section 7 (Definitions) from the Space Planning Guidelines when planning Partnership Spaces.



Partnership tiers

The following tiers have been identified for host campus/partnership relationships. Space guidelines have been assigned to each tier and will be further defined on the following pages.

- **Tier 1** partnerships offer full baccalaureate degree programs and support services, which are shared with the college. Host campuses may have multiple university partners, each offering complete baccalaureate programs. Certain college facilities may have been purpose-built to support university programs. Examples include Normandale's Academic Partnership Center or North Hennepin's Business and Technology building.
- **Tier 2** partnerships offer a designated location for university partners including baccalaureate programs in selected high demand or unique areas, to include basic branding/signage, integrated faculty offices, and one to two individuals on-site to provide basic student services with more extensive services provided remotely. Examples of Tier 2 campuses include Anoka-Ramsey CC, Saint Paul College, Century College, and Inver Hills CC.
- **Tier 3** facilities retain their college character and baccalaureate programs are very tightly focused and limited. Facility impact limited to temporary program signage and limited/shared space use by baccalaureate program. Services provided on site. Examples of Tier 3 campuses include Dakota County TC, Hennepin TC, and Anoka TC.

Additional considerations when locating a Partnership Center:

- Location/proximity to main entrance(s)
- Location/proximity to student services
- Access to computer labs
- Access to food
- Integration of technology
- Library resources
- Support space
- Info desk
- Standing flags identifying partner universities

Tier 1a

Types of spaces to be included in Tier 1a:

- A dedicated Partnership Center is created on campus to house all the baccalaureate functions including a partnership suite, baccalaureate classrooms, meeting spaces, and administrative/staff/faculty spaces.
- Branding wall occurs in central location and/or main entrance(s) to campus
- Permanent literature display and signage for baccalaureate programs occurs near 2-year department classrooms and also in student services center
- Merchandise for partner universities is sold at campus bookstore

Main lobby/gathering space in Normandale CC Partnership Center

Tier 1a example: Normandale Community College

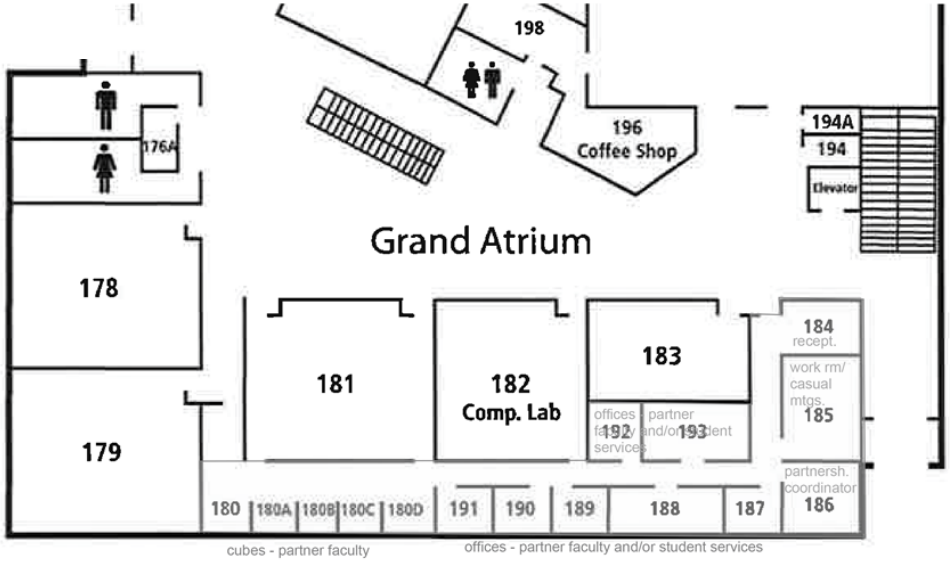
Partnership Center floor plan

Partnership Center office space and shared workstations

Tier 1b

Types of spaces and amenities to be included in Tier 1b:

- Partnership Suite is created to house all the baccalaureate administrative/ staff/faculty and meeting spaces.
- Classrooms may be dedicated to baccalaureate classes or may be shared with 2-year department
- Branding wall occurs in central location and/or main entrance(s) to campus
- Permanent literature display and signage for baccalaureate programs occurs near 2-year department classrooms and also in student services center
- Merchandise for partner universities is sold at campus bookstore

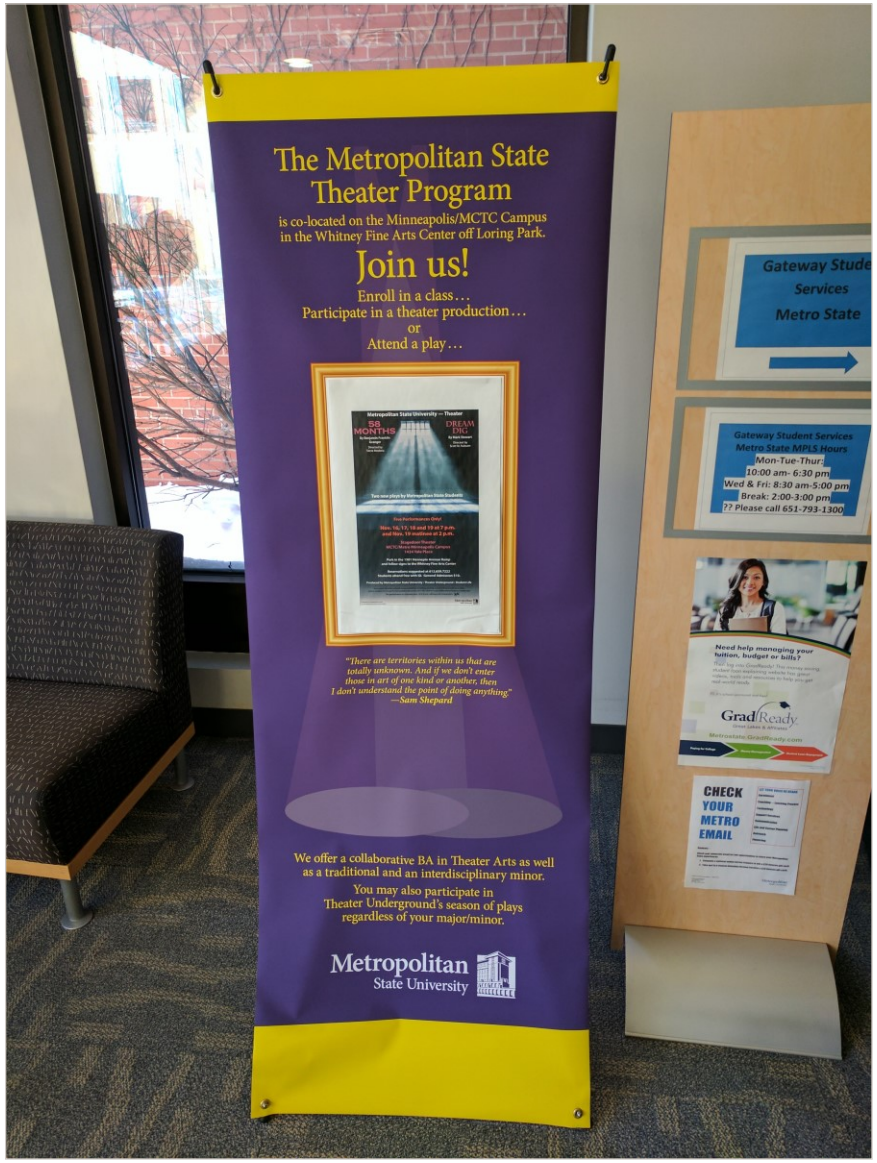


North Hennepin Community College Partnership Suite floor plan

Tier 2

Types of spaces to be included in Tier 2:

- University partner faculty offices are located with 2-year department offices
- Classrooms for baccalaureate classes are shared with 2-year departments
- University partner administrative and support staff is integrated within the college's support staff
- Branding wall occurs in central location and/or main entrance(s) to campus
- Permanent literature display and signage for baccalaureate programs occurs near 2-year department classrooms and also in student services center



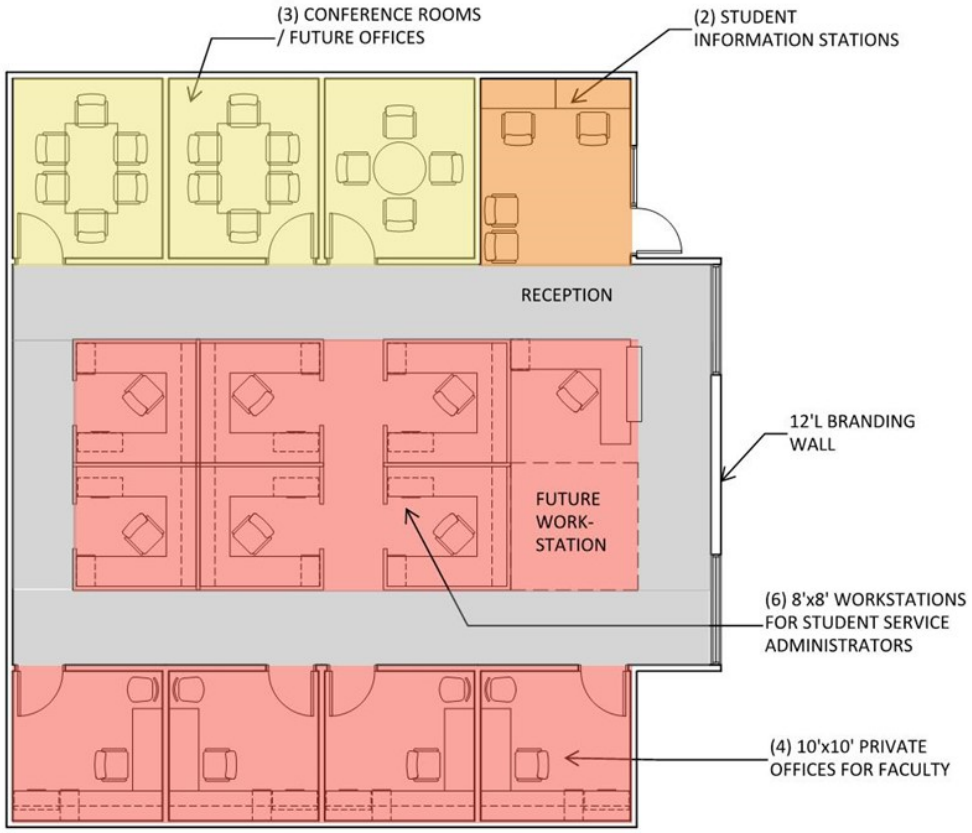
Tier 3

Types of spaces to be included in Tier 3:

- University partner faculty offices are located with 2-year department offices, may be shared
- Classrooms for baccalaureate classes are shared with 2-year department
- Temporary branding wall occurs in central location and/or main entrance(s) to campus
- Temporary literature display and signage occurs near department classrooms

Example space plans and images

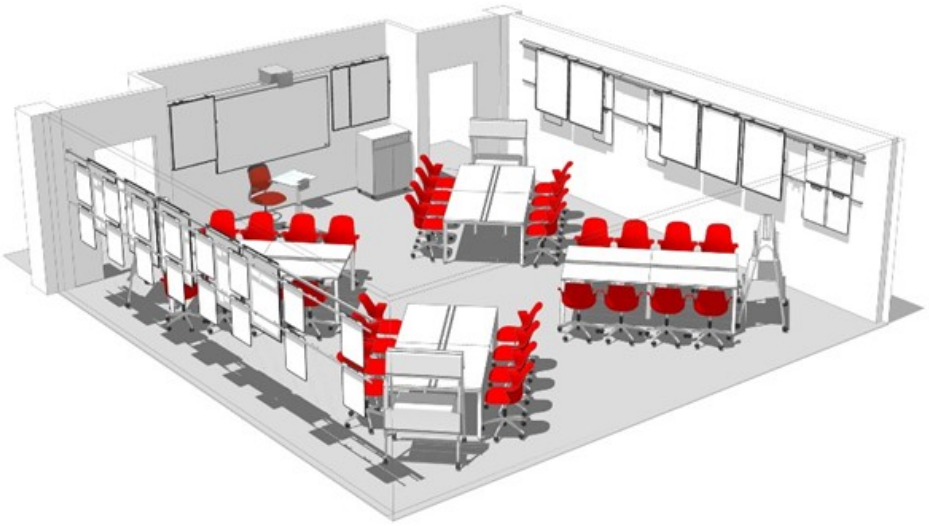
Baccalaureate offices and flexible workspaces



Partnership Suite (generic floor plan)

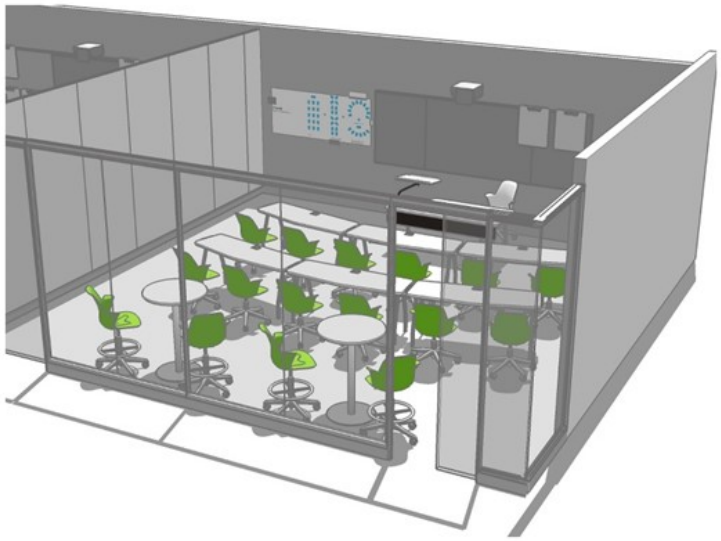
Example space plans and images

Baccalaureate classrooms for collaborative/team work



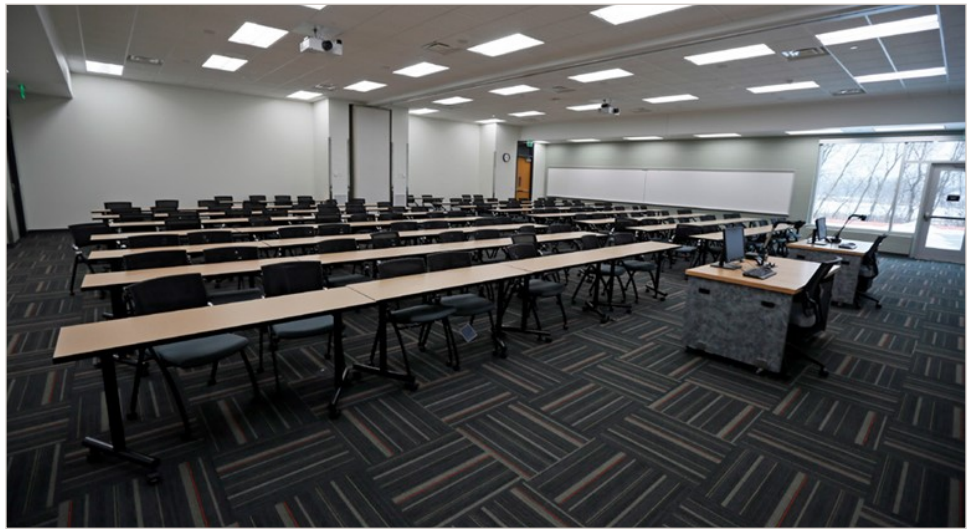
Example space plans and images

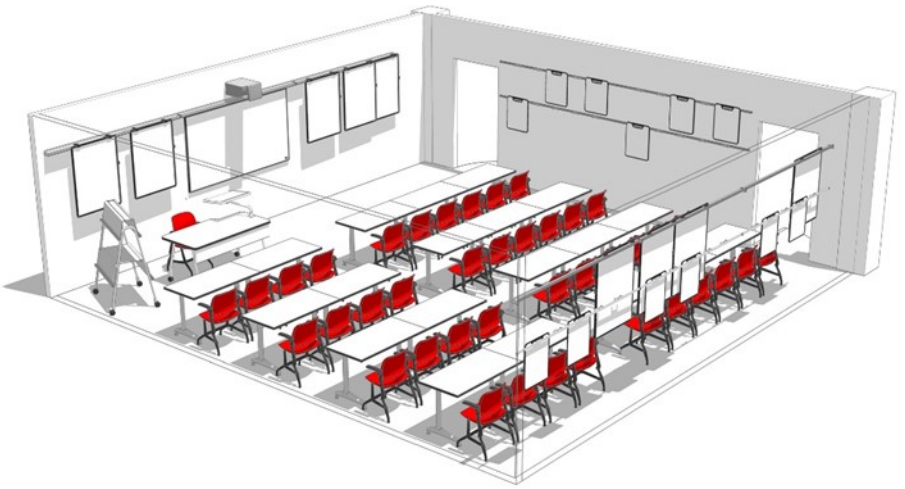
Baccalaureate classroom small group/flexible seating options



Example space plans and images

Baccalaureate classroom, lecture-style. All furniture is on casters for flexibility.





Branding wall examples

Branding wall occurs at a central location and/or adjacent to the student service center.

Partner universities' flags are placed at a central location and/or main entrance(s) to campus

Definitions

Partnership guidelines terms:

Baccalaureate Program: A 4-year postsecondary program that awards a Bachelor's degree. Within the Minnesota State system, baccalaureate programs are administered by universities.

University Partner: A Minnesota State university that partners with a 2-year comprehensive or community college to offer 4-year degrees on the college's campus.

Host Campus or College Partner: The 2-year comprehensive or community college that hosts a baccalaureate program on its campus from a 4-year university.

Space planning terms:

Source of Information: National Center for Education Statistics, Institute of Education Sciences "Postsecondary Education Facilities Inventory and Classification Manual (FICM) 2006 Edition" U.S. Department of Education Sciences, NCES 2006-160

Academic Space: Any building space owned by a college or university that serves academic uses, including (but not limited to) classrooms, class labs, faculty offices, and study spaces.

Gross Square Feet (GSF): The sum of all areas on all floors of a building included within the outside faces of its exterior walls, including all vertical penetration areas, for circulation and shaft areas that connect one floor to another.

In addition to all the internal floored spaces obviously covered above, Gross Area should include the following: excavated basement areas; interstitial space (i.e., mechanical floor or walkways), mezzanines, penthouses, and attics; garages; covered porches, whether walled or not; inner or outer balconies to the extent of a drip line from a roof or balcony immediately above, whether walled or not, if they are utilized for operational functions; and corridors or walkways, whether walled or not, provided they are either within the outside face lines of the building to the extent of the roof drip line or, if covered, to the extent of their cover's drip line. The footprints of stairways, elevator shafts, and vertical duct shafts are to be counted as gross area on each floor through which they pass.

Exclude open areas such as parking lots, playing fields, pools, courts, light wells, and portions of upper floors eliminated by spaces or lobbies that rise above single-floor ceiling height. Exclude unexcavated basement areas.

Net Assignable Square Feet (NASF): The sum of all areas on all floors of a building assigned to, or available for assignment to, an occupant or specific use. (Classrooms, labs, offices, study facilities, special use, general use, support, health care, residential, and unclassified spaces that are used to accomplish the institution's mission.) NASF is calculated by measuring from the inside faces of surfaces that form the boundaries of the designated areas. Minor obstructions such as columns or projections are not deducted from the square footage calculation. ***Assignable square feet*** **(ASF)** is a measurement for individual spaces or student stations.

Space Use Codes: For a detailed description of the FICM Space Use Codes (for example, 110-Classroom), please see the National Center for Education Statistics guide at https://nces.ed.gov/pubs2006/ficm/content.asp?ContentType=Section&chapter=4&section=3&subsection=1.

Appendix: Active Learning Research and Resources

The SCALE-UP Project: A Student-Centered Active Learning Environment for Undergraduate Programs

http://sites.nationalacademies.org/cs/groups/dbassesite/documents/webpage/dbasse_072628.pdf

North Carolina State University, the home of the original SCALE-UP classrooms, studied active learning physics classes at Florida State, Penn State-Erie, and Florida International University. This research looked at students' improvements on the FCI (Force Concept Inventory), a test of basic physics understanding that is given at the beginning and end of physics courses. Though students in introductory physics courses would normally experience a 23% increase in FCI score during their physics course, students in the SCALE-UP classes experienced an average 50% score gain. Female students at Penn State, who typically came into physics courses with lower SAT math and science scores, achieved course grades equal to those of the males.

Florida International found that active learning classes experience a drop/fail/withdraw rate that is only 25% that of traditional classes, and failure rates for the active learning classes are greatly reduced. NCSU researchers also studied Clemson University, where the drop/fail/withdraw rate for introductory calculus classes was 44%, but dropped to 22% with the introduction of active learning classes.

Learning Spaces Research: University of Minnesota

http://www1.umn.edu/ohr//teachlearn/alc/umnresearch/index.html

http://er.educause.edu/articles/2011/12/pedagogy-and-space-empirical-research-on-new-learning-environments

In 2009, the University of Minnesota and Stanford University studied how active learning affected student outcomes in an introductory biology course. Two sections of the course were studied: The first section was taught in a newly-remodeled active learning classroom and was composed of students who had a lower composite ACT score. Because of their lower average score, the students in this section were expected to earn slightly lower grades in the course than their counterparts in the other section. This second section of the course was taught in a traditional classroom but also used active learning teaching methods. The students in this section had a higher average ACT score than those in the first section, and were thus expected to earn higher grades in the course. Both sections of the course were taught by the same instructor. Researchers found that students in the active learning classroom, despite their lower ACT scores, achieved grades that were equal to those of the students in the traditional-classroom section of the course.

Appendix: Active Learning Research and Resources

Using the PAIR-up Model to Evaluate Active Learning Spaces

http://er.educause.edu/articles/2009/3/using-the-pairup-model-to-evaluate-active-learning-spaces

Before studying the effects of active learning on student outcomes, the University of Minnesota had studied students' and instructors' reactions to active learning classrooms. In 2007-2008, researchers surveyed students and instructors who had experienced active learning courses.

- Faculty felt that the active learning environment created a deeper student-instructor relationship, and shifted the instructor's role to that of a "learning coach" or facilitator.
- Instructors appreciated that the active learning classrooms were designed for collaboration, which decreased instructors' class preparation time and allowed them to focus more on the course content.
- Perceptions of the active learning classrooms were favorable overall, with students feeling that the classrooms helped them to feel more active and talkative in class.
- Teamwork and collaborative projects especially benefited from the active learning environment.
- Some instructors even felt that the most important "technology" in the active learning rooms was the round tables, which encouraged student interaction and collaboration.
- One instructor did note an issue with accessibility: Students with physical sensitivities or special needs sometimes found the active learning classrooms too "visually busy" and had difficulty dealing with the increased amount of cognitive load from the many sources of visual stimuli.

Active learning increases student performance in science, engineering, and mathematics

http://www.pnas.org/content/111/23/8410.full.pdf

A 2014 study by researchers at the University of Washington and the University of Maine found that active learning techniques improved average exam scores in STEM courses by about 6%. Students in traditional lecture classes were about 1.5 times more likely to fail a course compared to students in active learning classes. This study found that active learning had the greatest impact on higher-level cognitive skills (deep understanding of course content) versus lower-level skills (solving quantitative problems).

New challenges to active learning initiatives

http://er.educause.edu/articles/2016/1/new-challenges-to-active-learning-initiatives

Researchers at Case Western Reserve University studied active learning courses over two years and surveyed students for their views on active learning environments.

- Students in the active learning courses reported engaging in greater amounts of active group work, group projects, and collaborative learning with peers as compared to traditional classes.
- Greater enthusiasm for the courses and positive effects on learning were also noted by the students.
- However, students in larger classes (more than 50 students) were far less likely to recommend that the course be taught in an active learning classroom again; many indicated that the active learning techniques were

Appendix: Additional Active Learning research

less effective in larger classes because the instructors were not able to be as involved with the students.

- The researchers found that some of the instructors for these larger classes were not well-prepared to teach in an active learning environment; instructors with more experience in active learning tended to see greater student success regardless of class size.
- This suggests that faculty education and preparation is critical to achieving student success with active learning, especially for larger class sections.

Investigating teaching and learning at technology-infused TILE classrooms at the University of Iowa

http://www.educause.edu/sites/default/files/library/presentations/ELI12/SESS14/ELI_PPT_ForWeb.pdf

Can flipped classrooms transform STEM courses?

http://www.academicimpressions.com/news/can-flipped-classrooms-transform-stem-courses?mkt_tok=3RkMMJWWfF9wsRonu6nPdO%2FhmjTEU5z17eguWqC%2BlMI%2F0ER3fOvrPUfGjI4EScprI%2BSLDwEYGJlv6SgFS7jFMaxzzLgLXBM%3D

How does technology-enabled active learning affect undergraduate students' understanding of electromagnetism concepts?

http://web.mit.edu/edtech/casestudies/pdf/teal1.pdf

Technology for active learning

http://web.mit.edu/edtech/casestudies/pdf/teal2.pdf

Appendix: Space needs assessment form

An example of the Space Needs Assessment form is shown on the following pages. Campus staff can download a copy of the Space Needs Assessment from this link:

http://www.minnstate.edu/system/finance/facilities/studies/docs/Sample%20Space%20Needs%20Assessment_Dept.xlsx

You can use this form to estimate a department's office and support space needs.

Minnesota State

Space Needs Assessment: Department/Unit

Instructions: *Please fill out the fields in all worksheets to the best of your knowledge. While every effort will be made to fulfill department/unit space needs, this form is not a guarantee that space requirements will be fully met.*

Background	
Department/Unit Name *List all departments/units to be included in this space analysis.*	**# of Employees**

What is the function of your space? What services do you provide, and to whom?	
Describe your current work environment, work culture, and demographics (i.e., style of work: quiet or conversational? Individual or collaborative spaces?)	
What about your current workspace would you like to change? Why?	
What are your space goals and objectives over the next 2 years (regarding projected staff requirements, functions, and tasks; turnover rate; change in office operations, etc.)?	
What is the image you want your department/unit to portray?	

Flexible Work Spaces	
Is your department/unit interested in incorporating elements of a flexible work space in your office? (For more information on flexible workspaces, please see the Space Planning Guidelines.)	

Primary Department/Unit Contact	
Contact Person and Title	
College/University, Campus	
Phone #	
Email	

Minnesota State
Space Needs Assessment: Department/Unit

Workspace needs by employee/role							
Employee name or role *(add more rows if necessary)*	**Department/Unit**	**Workstation needed (select one)**					**Specific workstation requirements**
		6x6 unassigned workstation	*6x8 assigned workstation*	*Shared workstation*	*10x12 private office*	*% of week spent working outside the office (mobile work)*	*(*Please provide justification for any workstations larger than 6x8 or private offices larger than 10'x12'. These are the State Guidelines for standard workspaces.)*

Support Space: Office equipment, furnishings and other functional spaces are commonly shared areas and typically accessed by more than one staff person. These spaces may be open areas (small meeting areas, central filing locations, printer locations) while others may be enclosed by walls (conference rooms, server rooms, secure storage rooms).
Listed below are typical space types. Please complete the tables below to determine support space required by your department/unit. If additional/special use areas are required, please list them in the Special Use table at the end of this section.

Reception area needs		
# of staff	**# of seats**	**Specific requirements** *(Security, client-dedicated restrooms, conference room, etc.)*

Meeting space needs								
Type of space needed	**# of seats**	**Option to divide**	**Videoconferencing**	**Projector/monitor**	**Dept. use only**	**Shared w/ other depts.**	**Type of storage** (freestanding storage, built-in cabinets, media storage, etc.)	**Specific requirements** (visual or acoustic privacy, work surfaces, equipment, etc.)
Large conference								
Small conference								
Multi-purpose								
Training room								
Collaborative								
One-on-one/small phone room								
Other (specify)								

Support space and computer/server space needs					
Type of space needed	**Quantity**	**Estimated size (l x w)**	**Room contents (equipment, etc.)**	**Electrical power/data requirements**	**Specific requirements (secure room, work surface, adjacency requirements, etc.)**
Copy/print area or room					
Mail area					
Central recycling					
Kitchenette					
Coffee/break area					
Coat closet					
Server room					
IT work area					

Filing/storage needs			
Does your department/unit have a policy about retaining or purging physical (paper/non-digital) files? (Y/N)			
Is your department/unit in the process of purging files that have reached or surpassed their retention date? (Y/N)		**If "No", do you plan to in the near future?**	
Is your department/unit in the process of scanning files to be used electronically? (Y/N)		**If "No", do you plan to in the near future?**	

Storage space needs (does not include individual workstation/office storage)			
Type of storage needed	**Existing Quantity (# or l x w)**	**Add'l quantity (# or l x w)**	**Specific requirements (lockable cabinet, secure room, etc.)**
File - vertical			
File - lateral			
Storage cabinet			
Bookcase			
Cold storage			
Employee locker			

Special use space needs			
Type of space needed	**Quantity**	**Estimated size (l x w)**	**Specific requirements**

Adjacency Requirements: If an individual or group should be located adjacent to one another or in a specific area within the space, please list below.

Adjacency needs -- Employees/work groups		
Employee/role	**Adjacent to/location** (e.g. certain area of office, next to other employee(s), grouped together, etc.)	**Reason for adjacency**

If your department/unit should be located adjacent to another department/unit or in a specific area on campus, please list below.

Adjacency needs -- Department/unit		
Department/unit	**Adjacent to/location** (e.g. certain area of office, next to other employee(s), grouped together, etc.)	**Reason for adjacency**

Security needs -- Department/unit	
Type of requirement (key card access, special locks, etc.)	**Space(s) with this requirement**

Security needs -- Department/unit	
Type of requirement (key card access, special locks, etc.)	**Space(s) with this requirement**

Acoustical privacy needs -- Department/unit	
Type of requirement (hard walls, white noise, acoustic insulation, etc.)	**Space(s) with this requirement**

Visual privacy needs -- Department/unit	
Type of requirement (full height panels, frosted glass, etc.)	**Space(s) with this requirement**

Parking needs -- Department/unit	
Number of stalls for state-owned vehicles:	
Number of stalls for employee vehicles:	
Number of stalls for visitor vehicles:	
Other parking requirements:	

Additional comments/requirements