UNM

Learning Environments Design Guidelines

LEDG

VERSION **1.0**

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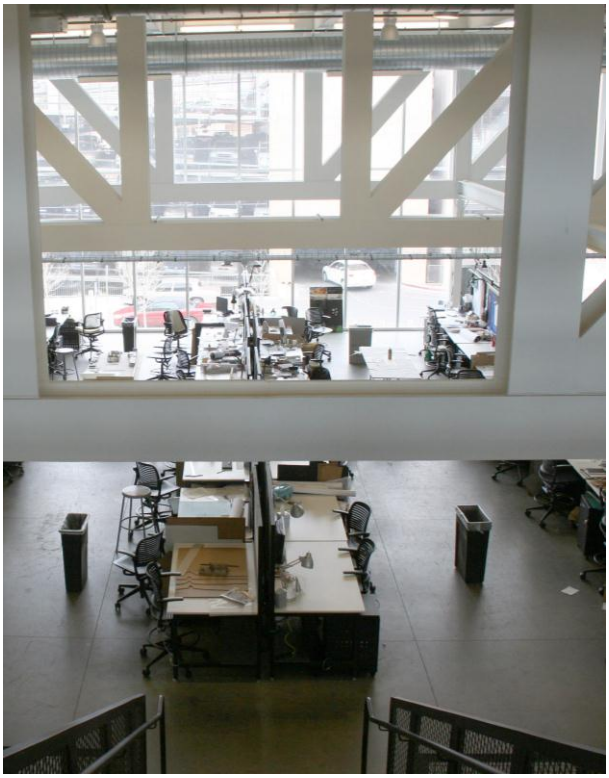

Architecture Studio, George Pearl Hall.

Learning Commons, Mitchell Hall.

1 Introduction

The Learning Environments Design Guideline (LEDG) of the University of New Mexico was developed to assist the design professional to meet the increasingly complex needs of UNM learning environments. The LEDG is intended to provide guidance for negotiation between the increased parameters of current educational models and the efficiency/sustainability goals of all UNM facilities. UNM President David Schmidly signed, in June of 2007, the American College and University Presidents' Climate Commitment (ACUPCC). Under President Schmidly's leadership, the University of New Mexico is dedicated to a plan for achieving carbon-neutrality on each of its campuses. As the university implements this important commitment, it is certain to positively impact UNM learning environments in significant and unforeseen ways. It is of supreme importance that each person involved in the creation of UNM learning environments participates in this goal critically within a process intended as both systemic and imaginative.

The LEDG should be comprehensively applied in the design of all learning environments either owned or leased, on all UNM campuses and properties. However, emphasis must be made that the LEDG is a guideline and not a specification standard, contractual obligation, regulatory policy, nor enforceable code. The LEDG functions as a collective set of recommendations intended to advise and to assist the design professional to achieve a timely and qualitative solution to the design task at hand. The LEDG is to be used in conjunction with current editions of all other UNM facility guidelines and standards. The LEDG is a "living document" and as such reflects UNM's best current practices and expectations, communicates the principles these practices are built upon, and establishes a context to resolve the

occasional exception or unanticipated condition. The LEDG is updated on an annual basis. In the case if critical developments, the guidelines do dictate certain product specifications and designers should adhere to the essential dimensional or technical tolerances where so indicated. The LEDG possesses and projects a voice of inclusion in order to support and to sustain qualitative learning environments for current and future generations.

The principles and objectives herein are the guidelines to contribute a tradition of excellence. The design professional should hold these guidelines foremost during the development of all UNM learning environments. The LEDG upholds the following principles as vital to the design and improvement of UNM learning environments:

- Encourage individual, collaborative, and interactive learning.
- Provide comfortable, durable, and stimulating surroundings.
- Integrate advanced instruction and information technologies.
- Facilitate varied pedagogical approaches and instructional techniques.
- Improve access for all to participate inclusively and without discrimination.
- Establish spatial relationships that are efficient and functional.
- Incorporate modularity and flexibility for future requirements.
- Maintain high standards of safety and security at all times.
- Specify healthy, sustainable materials and equipment.
- Promote efficient utilization through scheduling and occupancy.
- Follow Building Information Modeling (BIM) processes and guidelines.
- Offer cost-efficient, up-to-date, user-friendly technology platforms and software.
- Provide hosted, cloud-based services.
- Embrace Web 2.0 and emerging social networking technologies.
- Support smooth transitions to future technologies and learning activities.

Computer Commons, Zimmerman Library.

2 Acknowledgements

The contents of the Learning Environments Design Guidelines involves the efforts of many individuals at UNM, past and present, including professionals in planning, architecture, engineering, information technology, media technology, and facility maintenance, as well as UNM faculty, staff, students, and administrators. All have contributed to build a strong tradition of excellence for UNM learning environments which is modestly formalized in a document of this magnitude. This rich tradition makes

the current document a smooth and unproblematic commission. May future contributors to this document sustain a high level of awareness and inventiveness when the time comes for annual review.

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Study Space, Dane Smith Hall.

3 Update and Approval Process

Changes in technologies, teaching approaches, building systems, and available furnishings frequently influence the already dynamic process of design for learning environments. Every effort is made to update and to maintain the present guidelines. However the LEDG may at times become out of step with current best practices. Innovative design solutions that are not anticipated by the guidelines may be considered as part of the design review process during specific projects. Despite these historical dynamics, departure from the current guidelines must be fully justified by the design professional and approved by the University Architect. It is the responsibility of the Project Manager to highlight guideline deviations in a given project and to bring them to the attention of the University Architect.

The University Architect is responsible to approve or to deny a requested variance from the guidelines by weighing the request and its supporting information with the status quo. This will expedite the decision making process for instances possessing nominal departures from the guideline. The University Architect reserves the right to require that any variance request is reviewed by the Chair of the LEC, who may commission a subcommittee of the Learning Environments Committee, (LEC) membership and any LEDG contributors who have expertise pertaining to the effected guidelines.

The University Architect is responsible for updates to the LEDG by accumulating all relevant variances and by coordinating this through the LEC. For purposes of updating the guidelines, all questions, comments, and suggestions regarding the current guidelines may be directed to the University Architect. The Learning Environments Committee is responsible to maintain and uphold the existing guidelines on all remodels and new construction that occurs throughout campus.

The University makes every effort to ensure that the guidelines are consistent both internally and with other UNM design guidelines and standards. Conflicting information should be brought to the attention of the University Architect or the Chair of the UNM Learning Environments Committee so that consistency may be maintained.

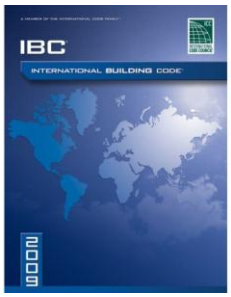
See Appendix 1 for the LEDG variance request form to the University Architect.

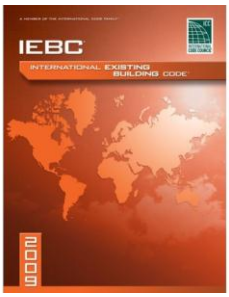
4 Compliance Issues and Special Requirements

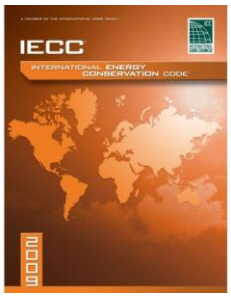
4.01 CODE COMPLIANCE AND EMERGING TRENDS

All UNM facilities must attain full compliance to all applicable codes established by the New Mexico Construction Industries Division (CID) of the New Mexico Regulation and Licensing Department. The changing nature of design models for learning environments suggests that a greater reliance on flexible space and intensive Information Technologies (IT) will continue to impact design. This trend influences the size and density of learning environments as they accommodate a growing number of supplemental requirements for space and technology. Traditional spaces may no longer hold the capacities for which they were originally designed or modified. In some instances, meeting the minimum requirements of code may not support the greater mission of UNM learning environments. The current guidelines are intended to establish criteria for the design of learning environments that negotiate between increased accommodations of current models and efficiency/sustainability goals of all UNM facilities.

Departure from the current guidelines must be fully justified by the design professional and approved by the University Architect. Although every effort is made to update and maintain the current guidelines, subsequent changes to code compliance must be incorporated by the design professional. The codes currently listed below currently apply. Updates may also be found here: http://www.rld.state.nm.us/cid/rules-and-law.htm.







- Building Codes General
  - NMAC 14.7.2 2009 NM Commercial Building Code
  - NMAC 14.7.3 2009 NM Residential Building Code
  - NMAC 14.7.4 2009 NM Earthen Building Materials Construction Code (Phase III)
  - NMAC 14.7.5 2009 NM Non-Load Bearing Baled Straw Constr. Bldg. Code (Phase III)
  - NMAC 14.7.6 2009 NM Energy Conservation Code
  - NMAC 14.7.7 2009 NM Existing Building Code
  - NMAC 14.7.8 2009 NM Historic Earthen Buildings
- Plumbing Codes
  - NMAC 14.8.2 2009 NM Plumbing Code
  - NMAC 14.8.3 2006 NM Swimming Pool, Spa and Hot Tub Code (Phase III)
- Mechanical Codes
  - NMAC 14.9.2 2009 NM Mechanical Code
  - NMAC 14.9.4 Boilers
  - NMAC 14.9.5 Medical Gas Installation and Certification
  - NMAC 14.9.6 2006 NM Solar Energy Code (Phase III)
- Electrical Codes
  - NMAC 14.10.4 2008 NM Electrical Code
  - NMAC 14.10.5 2008 NM Electrical Safety Code

4.02 ACCESSIBILITY STANDARDS

UNM is actively involved in the transition of its facilities toward full compliance with the Americans with Disabilities Act (ADA) and places high priority on accessible learning environments. The UNM Facility Access Committee (FAC) oversees the prioritization of projects (sites, facilities, buildings, and elements) for this transition. The following rating system is currently utilized by the FAC to prioritize the projects that will advance UNM's accessibility compliance:

Priority A: Urgent Non-Compliance – Life Safety Issue
Priority B: Important Non-Compliance – Program or Workplace Issue / Special Accommodation Request / Disruption of Primary Accessible Route / Many Complaints
Priority C: Negligible Non-Compliance – Routine Maintenance Issue / Disruption of Secondary Accessible Route / Few to No Complaints
Priority D: Compliance – Desired Accommodation

In some instances, meeting the minimum requirements of the current accessibility standards may not support the greater mission of UNM learning environments. It is important that learning environments

accommodate individuals with physical disabilities and eliminate any impediments to participation in learning activities. Current guidelines encourage accessibility to sites, facilities, buildings, and elements by individuals with physical disabilities so they may participate inclusively and without discrimination. The design professional is directed to offer solutions that keep accessibility at the forefront of concern.

The following accessibility standards currently apply.

- ICC/ANSI A117.1-2003 – Accessible and Usable Buildings and Facilities
  - 2010 ADA Standards for Accessible Design (U.S. Department of Justice) (http://www.ada.gov/2010ADAstandards_index.htm) (mandatory starting March 15, 2012)

UNM has a number of facility standards that go beyond minimum compliance to current national accessibility standards and are uniquely suited to flexible, IT-intensive learning environments. Upon their approval, they may be found at the Planning & Campus Development (PCD) website. The UNM accessibility standards do not absolve design professionals of their responsibility for compliance to accessibility standards designated by the ADA. Though every effort will be made to update and maintain the current guidelines herein, subsequent changes in the accessibility standards must be incorporated by the design professional.

Please note: Accessibility efforts with reference to instruction or program may be found at the **UNM Accessibility Resource Center (ARC)** and/or the **UNM Office of Equal Opportunity (OEO)**. Likewise, accessibility efforts with reference to information technologies may be found at **UNM Office of the Chief Information Officer** website: http://cio.unm.edu/standards.

- All UNM learning environments must assure compliance to the appropriate number of wheelchair spaces in rooms.

Number of Total Seats in Room	Number of Required Wheelchair Spaces (min.)
4 – 25	1
26 – 50	2
51 – 150	4
151 – 300	5
301 – 500	6
501 – 5,000	6 plus 1 for ea. 150 or fraction thereof
5,001	36 plus 1 for ea. 200 or fraction thereof

From ADA-ABA Accessibility Guidelines, p.46.

4.03 SPECIAL REQUIREMENTS FOR DESIGN SUBMISSIONS

All projects are to follow the requirements and protocols for design submission and review, as established in the UNM Design Standards. A Pre-Design or Programming document, with appropriate sign-offs by the user representatives, is required prior to all design phase submittals. This document must at minimum specify the scope of work, the design intent, and the specific goals of the project with respect to the learning environments included in the project. Compliance to the LEDG will be under review beginning in the Pre-Design phase and extending through all subsequent phases of each project. In order to make an appropriate evaluation of the design and an accurate assessment of its components, the following items will be required of each design submission in the design phases indicated:

Submittal	Phase	Requirement
Preliminary Budget	P SD	To include funding amount allocated to FF&E (furniture, fixtures and equipment).
Furnishings Plan	SD DD CD	To include for each learning environment all FF&E elements such as: chairs, tables, lecterns, equipment carts, portable media carts, instructor workstations, marker boards, chalkboards, projectors, projection screens, lights, controls, switches, data outlets, wireless access points, power receptacles, floor junction boxes, etc., as well as projection paths to seats, sight lines to instructor & media surfaces, egress paths, accessibility door clearances, wheelchair turning & clear floor spaces, etc. *Final approval by the UNM Fire Marshall is required.*
Typical Section	SD DD CD	To include items as mentioned above, with indications of pertinent height dimensions.
3D Digital Model	DD CD	To include all elements within the learning environment. Model format: Autodesk Revit (v.11). *This requirement is not an additional service in the A/E contract.*
Acoustical Engineer's Report	DD CD	To include calculations of sound transmission, noise level, and reverberation time, as well as recommendations to improve acoustic performance in existing situations.
Cost Estimate	DD CD	To include the FF&E budget (established in pre-design) and line tabulations for each item. *It is unacceptable to reduce the FF&E budget in order to pay for cost increases in other areas of the project.*
Security Intent Narrative	PD	To include overview of the intentions and elements of the security strategy.
Security Plan	PD SD DD CD	To include initial risk assessment, access control, CCTV, and other security enhancements as well as recurring costs. The final Security Plan will be filed with the departments and with the UNM Police Department.

P = Planning PD = PreDesign SD = Schematic Design DD = Design Development CD = Construction Documents

4.04 SUSTAINABILITY

The challenge of sustainability in higher education is generated by the desire to maintain sensitivity to institutional histories and curricular traditions, which are influenced by local cultures. Effective teaching and effective learning rely upon many intangible factors that require sensitive, cooperative, and confident reconciliation. Sustainability is now a direct and legitimate tenet of any UNM curriculum, and is communicated regularly in the learning environment as a holistic model of outcomes and incentives, expenditures and benefits, environmental and social impacts, and transparent and participatory practices.

Within this framework, the design of any learning environment must fully consider established needs in context. Enthusiasm for technologically advanced learning environments must be tempered with seeking a reasonable balance that is both critical and sensitive to context in order to mitigate unwarranted space and energy consumption. When we build extravagantly, we unwittingly reproduce extravagance within the academic and support cultures. But when we build sustainably, we physically embed the best values of education within our learning environments. It is the responsibility of all involved to assess the ramifications of design requirements upon the sustainability of the learning environment as an educational, cultural, and ecological artifact.

The LEDG is intended to help the designer to negotiate the competing interests that may influence UNM learning environments. Current models, upon which the design of most UNM learning environments are based, have developed increased spatial accommodations and power requirements over previous models in order to provide for robust instructional technologies, a variety of instructional methods, and parameters for greater comfort. These objectives can entail a greater use of space and energy and are in some measure at cross-purposes with sustainability goals regarding efficiency of use/operation of UNM facilities. Each power outlet, data port, projection system, speaker, light fixture, and cubic foot of conditioned space ultimately results in a measurable increase in load upon the energy systems of the campus.

It is important to view all increased parameters cited within the LEDG document as negotiable rather than unconditional. Approval procedures for such negotiations may be found in section 3 of this document. However, the conditional terms of the LEDG do not warrant approaches that are relaxed and/or opportunistic. Rather they demands vital and thoroughgoing methods to achieve design criteria for effective learning environments.

The following sustainability measures should be given consideration:

Topic	Recommendation
Utility Usage	Optimize energy performance and provide commissioning per LEED EA credits. Provide water reduction and efficiency per LEED WE credits. UNM monitors the utility usage of its learning environments at the level of the building to ensure that its facilities meet sustainability measurement and verification standards. Monitoring may require an IP connection.
Lighting Controls	Provide per LEED IEQ credit.

Acoustics	Provide enhanced acoustical performance per LEED IEQ credit.
Furniture	Provide furniture per LEED IEQ credit with GREENGUARD certification.
Raised Floors	Raised (or access) floors can offer many substantive features for flexible space use and planning. Consult with University Architect for latest advisory.
Flexible Environments	Provide for retrofit of IT where practicable. Provide flexibility in all UNM learning environments to the greatest degree practicable. As this may be a cultural shift for many UNM departments, clear communication of the flexibility measures must be made to the building committee for approval.
Power Outlets & Power Stations	Provide areas (at or near reference counters, if provided) where laptop batteries may be recharged. Number of receptacles should be based upon room occupancy. Since many current and future computing devices achieve 10-12 hours of battery life, additional power outlets are *typically* not required (with the exception of computer-intensive labs with dedicated power). Students are requiring increased access to power outlets so attention needs to be paid to balancing numbers of outlets versus available funds and priorities. Creating a flexible environment that prepares a facility for technology enhancements that may not be identified today is prudent.
Ceiling Height	Provide 11'-0" minimum ceiling height in seminar and discussion rooms.
Floor Boxes	Unless intensive graphics or other computing cycles will be prevalent, provide floor boxes without data, as wireless access is preferred.
Clustered or Learning Studio Arrangements	Pursue either the clustered arrangement of student seating (with movable 2-person tables) or the Learning Studio arrangement (with multi-person round tables) for seminar and lecture rooms. As this may be a cultural shift for many UNM departments, clear communication of the seating arrangement in relation to the teaching style must be made to the building committee for approval. In such arrangements, ceiling-mounted flat panel screens will generally replace the projector and screen setup.
Low-Emitting Materials	Provide low-emitting materials per LEED IEQ credits.
Instructor Station Remote-Controls	Provide remote-controls for lighting and projection system at the instructor station.
Energy Star Equipment	Provide Energy Star rated CPUs and related equipment for the learning environment.

Important Sustainability Links

- Executive Order 2006-001 State of New Mexico Energy Efficient Green Building Standards for State Buildings.
  http://www.emnrd.state.nm.us/ECMD/documents/EO_2006_001.pdf

- Executive Order 2007-053 State of New Mexico Increasing Energy Efficiency in State Government by 2015 and Statewide by 2012 and 2020.
  http://www.emnrd.state.nm.us/ecmd/GovernmentLeadByExample/documents/EO_2007_053.pdf

- American College & University Presidents Climate Commitment.
  http://www.presidentsclimatecommitment.org/

- UNM Office of Sustainability.
  http://sustainability.unm.edu/

- UNM Climate Action Plan.
  http://acupcc.aashe.org/site_media/uploads/cap/78-cap.pdf

- UNM Policy 2100: Sustainability.
  http://www.unm.edu/~ubppm/ubppmanual/2100.htm

- UNM Policy 5100: Energy Management.
  http://www.unm.edu/~ubppm/ubppmanual/5100.htm

- UNM Policy 5200: Allocation and Assignment of Space.
  http://www.unm.edu/~ubppm/ubppmanual/5200.htm

- UNM Policy 6350: Recycling Materials.
  http://www.unm.edu/~ubppm/ubppmanual/6350.htm

5 Space Type Definitions

Space is one of the primary resources of any educational institution. UNM is responsible for conducting, reporting, and maintaining an institutional space inventory that provides basic information regarding space categorization and coding, space utilization and availability, space allocation and assignment, and space efficiency and maintenance. This information permits UNM to assess the adequacy of its current space, to determine the operation costs of its facilities, and to plan for its future space needs. The types of UNM learning environments are defined below and coded according to the Postsecondary Educational Facilities Inventory and Classification Manual (FICM). They are defined primarily by the following parameters:

Space Type & #	Floor Type	Seating Type	Room Size
Lecture, Seminar, Auditorium, Studio	Flat, Tiered, or Sloped	Fixed or Movable	Small, Medium, Large or Extra-Large

Please note: UNM also identifies seven different tiers of instructional technology for deployment in a wide variety of learning environments. Descriptions of each technology tier and a matrix relating them to space types is located in LEDG section 6, entitled **Technology Tiers**.

Capacity

It is important to understand the relationship between UNM space types and the seating capacities they hold. UNM space types are not defined by strict boundaries between seating capacities, as may be the case with conventional guidelines from other post-secondary institutions. This is because there may be "overlaps" in capacity when comparing space types. For example, it is possible to have a 126-person learning studio and a 126-person auditorium, but it is not possible to equate these space types formally or functionally. The same may hold true for the comparison between larger seminar rooms and smaller lecture rooms, or between larger lecture rooms and smaller auditoriums. Overlaps in capacity should

remain flexible and therefore capacity should not drive the formal and functional definition of the space types.

Design professionals should reference the table below to guide the accommodation of furnishings and equipment in relation to projected seating capacities. The table offers capacity ranges for each space type, while guiding the negotiation between room size, seating type, and occupancy density (NASF/ Station) toward the goals of efficiency and sustainability. **Planning and Campus Development** (PCD) should be included in any discussions that arise in the programming and design stages that impact functional needs or seating capacities. The Space Type Criteria table below may be used as a guide for estimating the net assignable floor area (NASF) of various learning environments.

	Space Type	# Stations			Writing Surface	Seat Type	Occupancy Density NASF / Station			Classroom NASF
							Low	Medium	High	
1	Seminar Room	5	-	30	(M)Table	(M)Chair	25	28	31	840
2	Lecture Room	20	-	35	(F)Table	(F)Chair	21	23	25	805
3	Lecture Room	20	-	35	(M)Table	(M)Chair	23	25	28	875
4	Lecture Room	30	-	40	(F)Table	(F)Chair	23	26	29	1,040
5	Lecture Room	25	-	60	(F)Tablet Arm	(F)Chair	16	18	20	1,080
6	Lecture Room	25	-	60	(M)Tablet Arm	(M)Chair	18	20	22	1,200
7	Auditorium	60	-	150	(F)Tablet Arm	(F)Chair	16	18	20	2,700
8	Auditorium	60	-	150	(F)Table	(M)Chair	22	24	26	3,600
9	Auditorium	150	-	250	(F)Tablet Arm	(F)Chair	15	17	19	4,250
10	Auditorium	250	-	300	(F)Tablet Arm	(F)Chair	14	16	18	4,800
11	Auditorium	300	-	500	(F)Tablet Arm	(F)Chair	14	15	17	7,500
12	Learning Studio (SCALEUP)	45	-	153	(M) Table	(M)Chair	32	35	39	5,355

M = Movable F = Fixed

5.01 SEMINAR ROOM [11001]

Seminar Room, Science & Math Learning Center (SMLC).

Space Type & #	Floor Type	Seating Type	Room Size
Seminar [11001]	Flat	Movable	Small

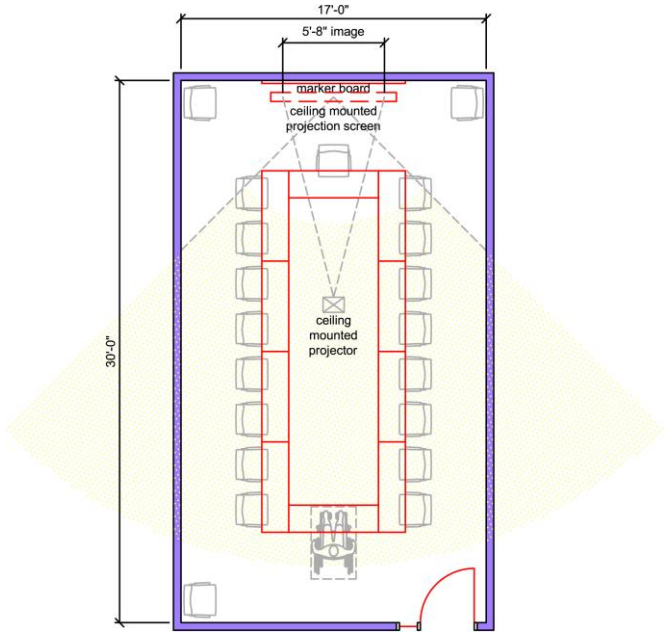
The Seminar Room primarily serves the needs of conversation and discussion, and secondarily allows for presentation. These rooms and are ideally arranged so students can see and hear each participant equally well. Typically this is accomplished with a single large table or with a series of modular tables arranged in an island or doughnut configuration. Larger seminar rooms intended for frontal arrangement should be designed to function equally well for presentation or for collaborative learning and other interactive learning formats. Such rooms should be planned with a primary presentation wall where whiteboards and screens are located. However, the inclusion of whiteboards on perpendicular walls will enable the room to be used in alternate configurations. Accommodation for mobile computing must be considered for seminar rooms. Ceiling-mounted projection toward a manual or motorized screen is preferred to tabletop projection on a blank wall.

Though many consider a smaller seminar room to be equivalent to a conference room, there are important differences in size and activity range. Smaller seminar rooms intended for centralized arrangement should incorporate additional perimeter seating to allow greater flexibility in classroom size. Rather than providing a single, monolithic table, it is preferable to arrange the seminar room with movable tables and chairs, so that students can be clustered into small groups when needed and tables can be easily returned to a traditional layout.

If a smaller seminar room is needed, or an existing seminar room cannot be enlarged to accommodate 30 students, a boat-shaped table configuration that is designed to improve eye contact may be sufficient.

Regardless of table style, provide:

- An unobstructed view of the projection screen from all seats.
- A ceiling-mounted data projector with a wiring pathway to a floor junction box located under the table near where the instructor will sit.
- Outlets for power, data, and audio-visual system wiring in the junction box.
- A document camera and other audio-visual components on a movable cart located near the instructor.



Typical Room Layout for Seminar Rooms. (See Section 8 for alternate seating arrangements)

5.02 LECTURE ROOM [11002]

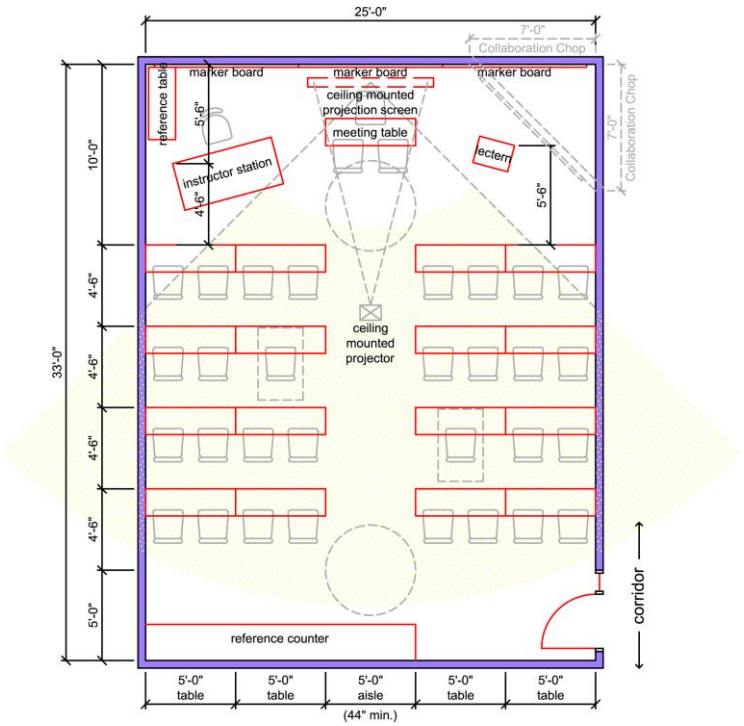
Lecture Room, Science & Math Learning Center (SMLC).

Lecture Room, College of Education.

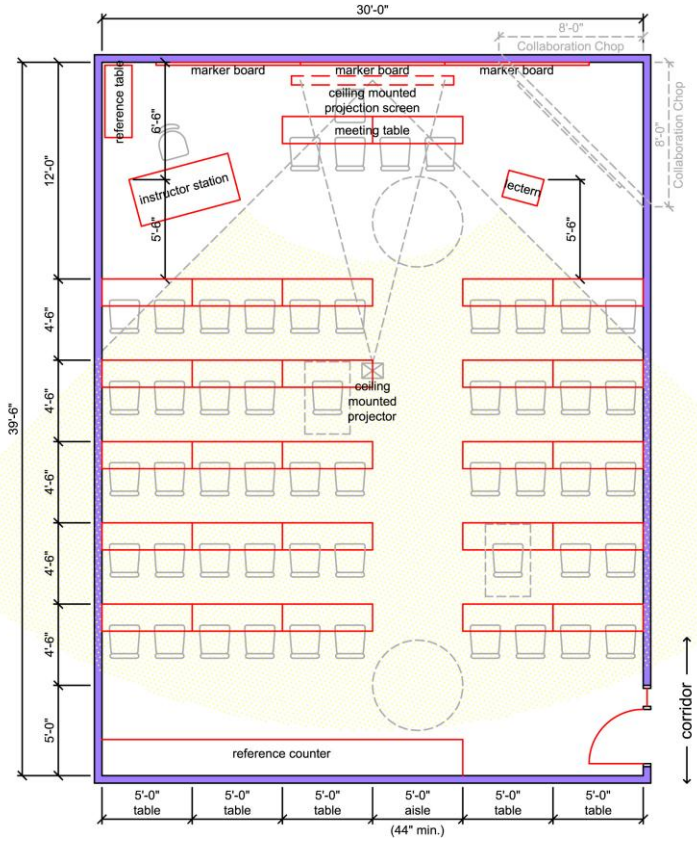
Space Type & #	Floor Type	Seating Type	Room Size
Lecture [11002]	Flat	Movable	Medium & Large

The Lecture Room should be designed to function equally well for presentation or for collaborative learning and other interactive learning formats. Choices and combinations of available space, classroom furniture, and proper installation of multimedia technology determine the level of performance for any particular room. All furnishings in lecture rooms with flat floors should be movable. In those rooms with sophisticated technology profiles, the instructor's podium or other A/V equipment should have limited mobility. However items such as remote controls, wireless microphones, and wireless keyboards must be mobile and afford flexibility for the user's location in the classroom.

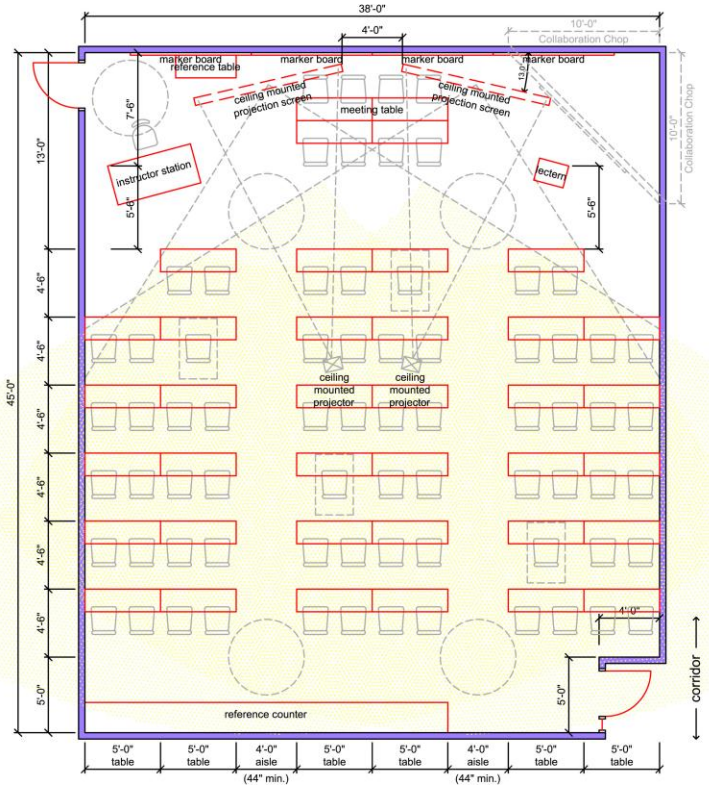
Technology design should include appropriate IT outlets for podiums, wireless, networking for AV, and power. Plans should offer a primary presentation wall that includes whiteboards and motorized screens. The inclusion of whiteboards on adjacent walls facilitate collaborative configurations. Tables on casters and sled-based chairs are the preferred furniture for lecture rooms. Universal design is best met by using 60" wide height-adjustable tables serving two students who are abreast in regular chairs. Tablet arm chairs are not recommended for lecture rooms, as they are poorly designed for laptop use and accessibility requirements.



Typical Room Layout for 30-Student Lecture Rooms. (See Section 8 for alternate seating arrangements)



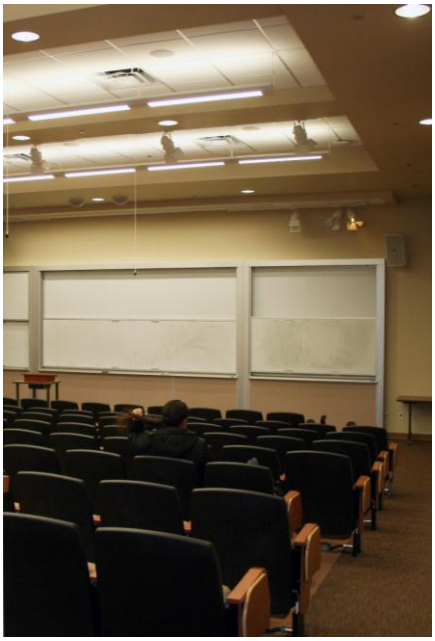
Typical Room Layout for 48-Student Lecture Rooms. (See Section 8 for alternate seating arrangements)



Typical Room Layout for 64-Student Lecture Rooms. (See Section 8 for alternate seating arrangements)

5.03 Auditorium [11003]

Auditorium, George Pearl Hall.

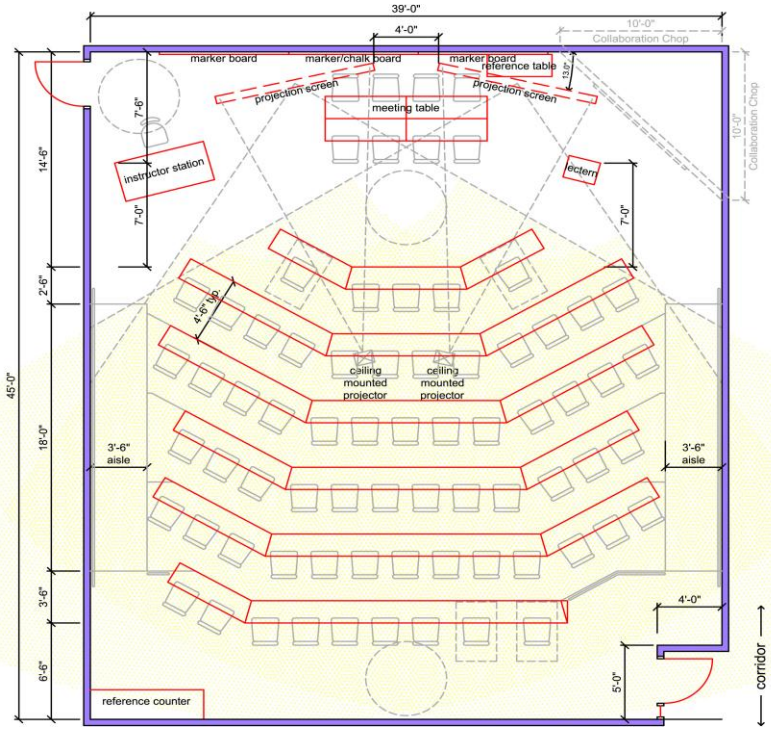


Auditorium, SMLC.

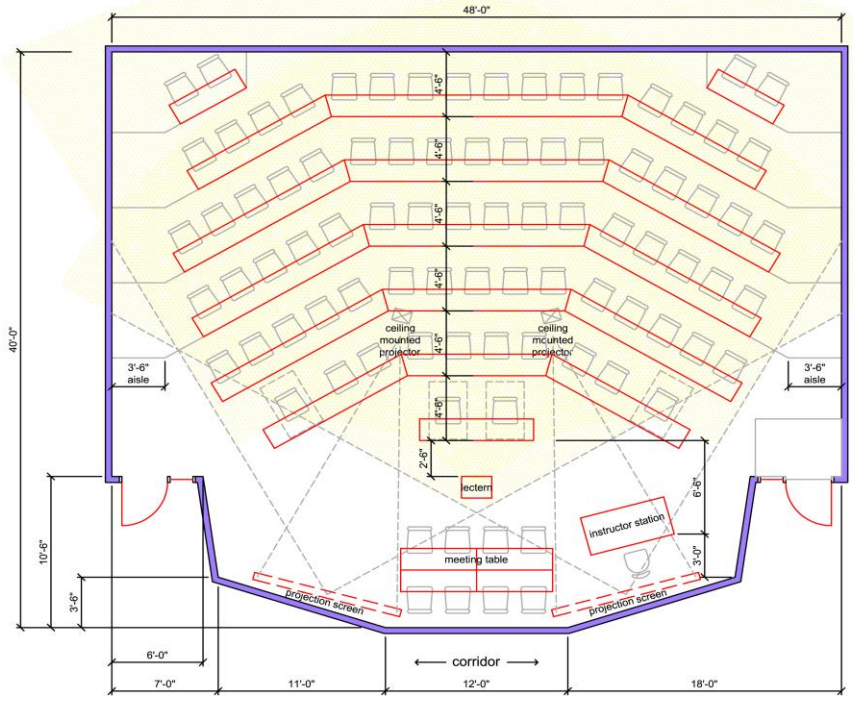
Space Type & #	Floor Type	Seating Type	Room Size
Auditorium [11003]	Tiered or Sloped	Fixed	Extra-Large

The Auditorium is an extra-large learning room primarily used for presentation-style teaching. Its defining feature is the use of fixed seats mounted on tiered or sloped floor so that each seat has a clear, unobstructed view of the primary wall where the instructor and instructional media are located. In the Auditorium, adequate aisle widths and sufficient instructor space are required. The primary instructional wall should include vertical or horizontal sliding whiteboards and a large motorized projection screen. All auditoriums should be designed with infrastructure to support multimedia equipment that meets with the current LEDG guidelines.

Front rows may be configured to encourage interactive discussion when the room is not full. Remaining seats are normally arranged in a gentle arc within the viewing angles of all projection screens. If a collaborative learning style is desired in the auditorium, swivel seats may be provided to allow individuals to face the row behind them. To minimize room depth in large auditoriums (400 or more seats), consider use of balconies or auditorium-style seats with tablet arms, instead of task chairs and tables.



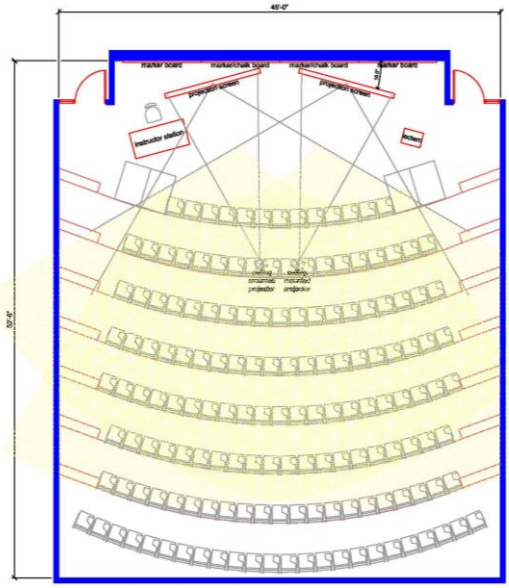
Typical Room Layout for 64-Student Auditorium.



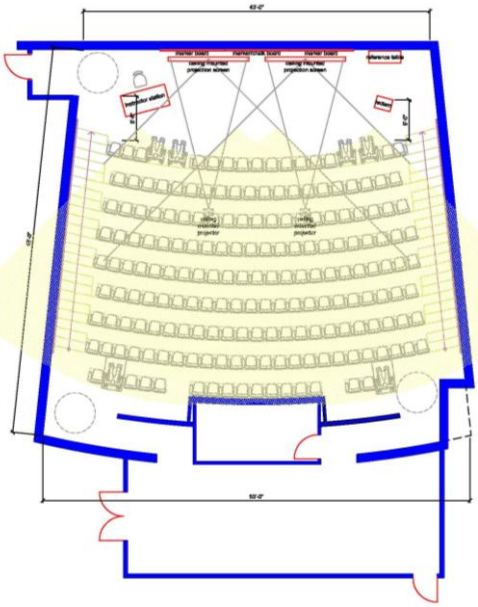
Typical Room Layout for 80-Student Auditorium.

Typical 150-Student Auditorium.
Science and Math Learning Center Auditorium

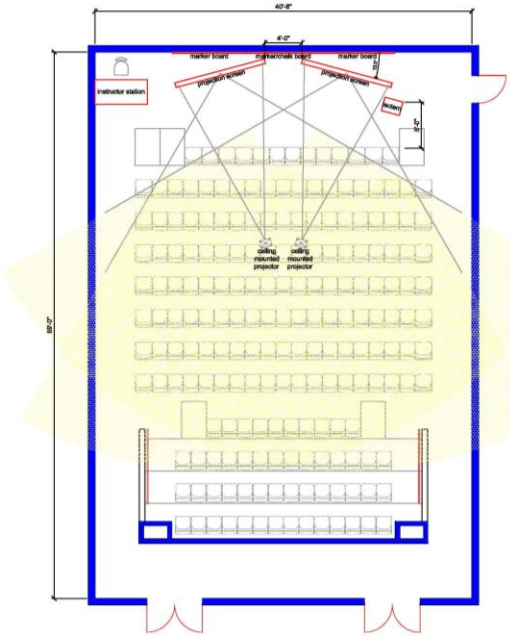
Typical 300-Student Auditorium.
Domenici Center for Health Sciences Education Auditorium



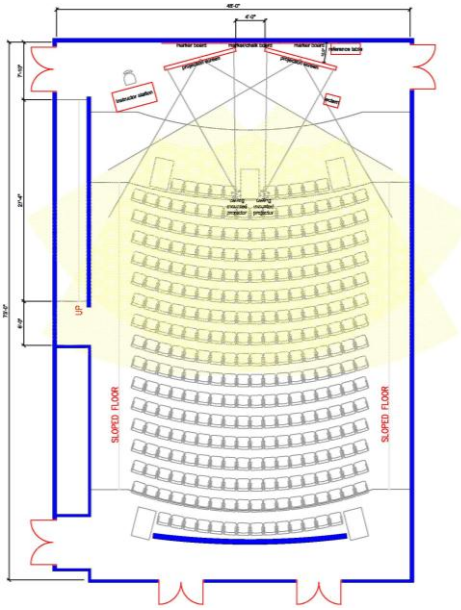
DANE SMITH 150 SEAT AUDITORIUM



PEARL HALL 190 SEAT AUDITORIUM



SCIENCE AND MATH 200 SEAT AUDITORIUM



DOMENICI CENTER 300 SEAT AUD.

5.04 LEARNING STUDIO [11005]

Learning Studio, Anderson School of Management.

Space Type & #	Floor Type	Seating Type	Room Size
Studio [11005]	Flat	Movable	Large

Learning studios are designed to emphasize collaborative learning among students and minimal lecture by the instructor. Students are seated at large, round tables to facilitate team work and the walls are covered with working surfaces and projection screens/video monitors to present student work. There is a teacher station with controls located in the center of the room to diminish the perception of a "front of the room". Students use portable computing at the tables, typically with a notebook computer provided for each team (typically three students per team and three teams per table). Please provide power for the use of additional computers, pads, and other mobile devices that may be used during class. Learning studios follow a recent trend toward team-based performance and interactive learning that depends directly upon internet and wireless technologies. These spaces accommodate the following learning methods:

- Simulation modeling
- Collaborative problem-solving
- Hands-on activity sharing
- Hypothesis-driven researching
- Internet probing
- Real-time information access
- Socratic dialog

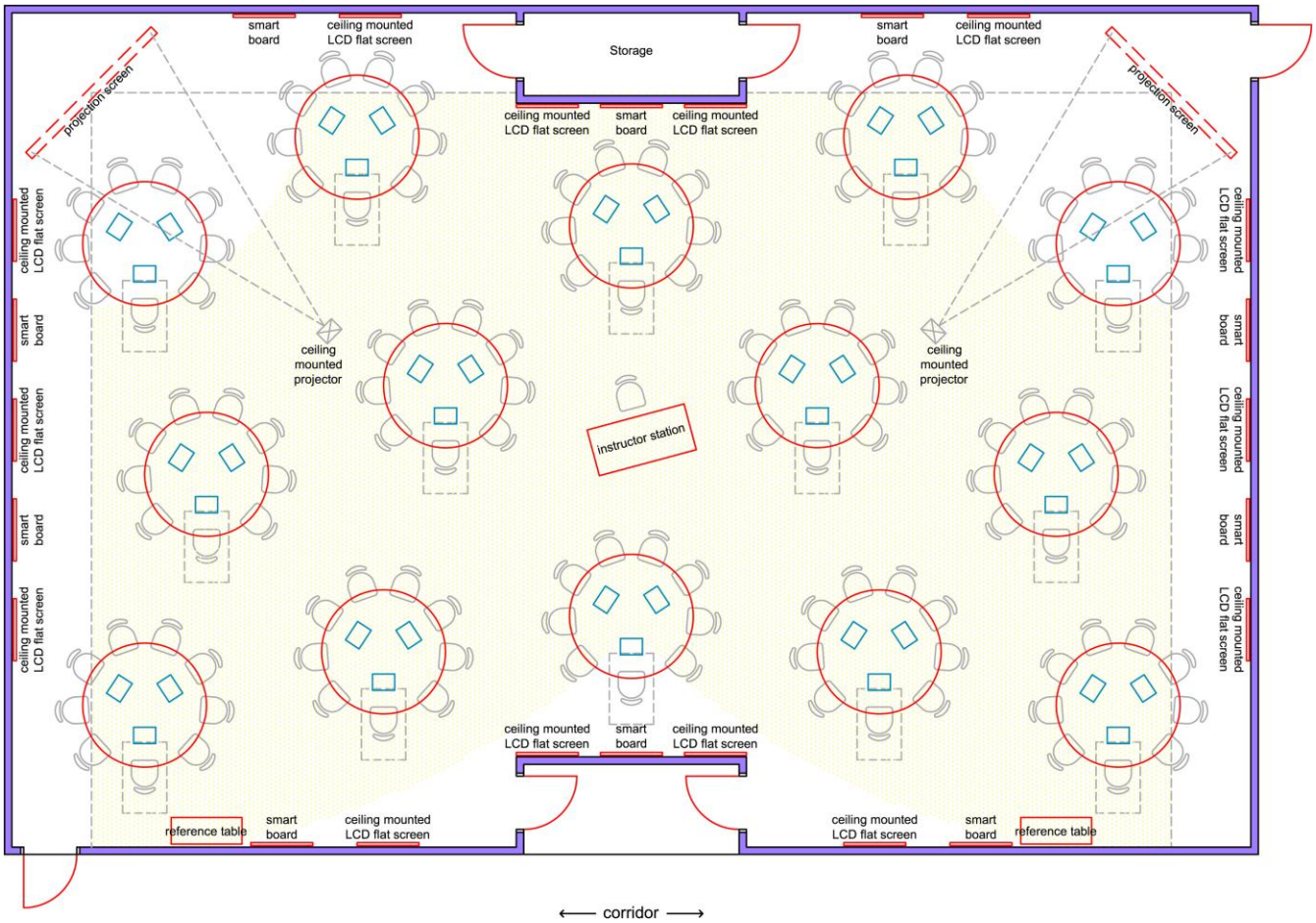
The room resembles a banquet hall. Students are seated in small groups at round tables (approximately 7 feet in diameter). Instructors move about the room while working with teams and individuals. Each table should accommodate at least three networked laptops, around which students may form teams. AC power and data may be supplied from floor boxes through the center of the table or may come from

above on a coiled feeder line. Wireless data connections should also be provided. Whiteboards and large screen monitors should surround the perimeter in support of multi-directional instruction. The setting should support lively interactions, informal discussions, and a variety of methods to share information and to observe activity.

In general, some of the recommended requirements for these rooms are:

- Round tables 7 feet in diameter (smaller tables feel cramped; larger ones force shouting across the table).
- Round table seating capacity of 9 students: 3 groups of 3 students each.
- 3 laptops per table.
- Instructor stations located near the center of the room to discourage unidirectional lecturing.
- Large LCD displays mounted above 7 feet at perimeter of room. The number of displays are to be determined by sight lines and room coverage.
- Whiteboards throughout the room to facilitate real-time transcription of teaming. Provide magnetic pushpins.
- Zoned parameter lighting to provide a darkened background to displays and projection screens.
- Carpet for acoustic attenuation during multiple activities and noisy discussions.
- Occupancy sensors to shut off lights, and power strips to shut off equipment when not in use.
- Laptops rather than desktop computers for smaller footprints and lower screen heights.
- Raised floor for flexible table locations, cable runs, and to allow retrofitting of IT.
- In larger rooms, a microphone connected to a perimeter speaker system for each instructor station and student table.
- Data connectivity, both wired and wireless, is essential and locations of outlets and WAPS based upon the room design.

For further discussion of Learning Studio requirements see the white paper entitled “Scale-Up Room Design Study” October, 2009 – Revision 1. Other sources can easily be found on the web.



*Typical Room Layout for **126-Student** Learning Studio.*

5.05 CLASS LABORATORY [21000]

A class laboratory is a room used primarily for regularly scheduled classes with university course numbers. Class laboratories require special-purpose equipment for student participation, experimentation, observation, or practice in a field of study. The class laboratory is specially equipped to serve the needs of a particular discipline for group instruction in regularly scheduled classes. The design of these rooms and/or the equipment in them normally limits or precludes its use by other disciplines. Examples are rooms in which lab sections of a course are held.

Included in this category are the following room types:

- Class Lab – Wet [21001]
- Class Lab – Dry [21002]
- Class Lab – Computer [21003]
- Class Lab – Art [21004]
- Class Lab – Music [21005]
- Class Lab – Clinical/Observation [21006]
- Class Lab – Production [21007]
- Class Lab – Design [21008]
- Class Lab – Language [21009]
- Class Lab – Performance [21010]

Design features (such as size and shape) vary widely in class laboratories. During the programming phase of a project, the design capacity, furnishings, and equipment planned for these room types must be clearly identified. If a Class Lab requires a multimedia audio-visual system, the guidance for design of these systems may require modification to be compatible with specialized lab equipment or custom-designed furnishings. However, basic concepts such as providing good sight lines for all students will still apply. Similar judgment must be used to adapt other applicable guidance to the lab design.

Class Lab – Wet [21001]

Chemestry Lab, Science & Math Learning Center (SMLC).

A Wet Class Lab is a room used for formally or regularly scheduled classes that require special purpose equipment or a specific room configuration for student participation, experimentation, observation, or practice in academic discipline methods that requires water or utility services. It is a room used primarily for scheduled instruction in one of the physical sciences (e.g., biology or chemistry).

Specialized equipment and furniture such as lab benches, fume hoods, and gas valves may be present in these rooms. Access to water is required.

Class Lab – Dry [21002]

A Dry Class Lab is a room used for formally or regularly scheduled classes that require special purpose equipment or a specific room configuration for student participation, experimentation, observation, or practice in academic discipline methods that *does not* require water or utility services.

Class Lab – Computer [21003]

Computer Lab, Mitchell Hall.

The Computer Class Lab is a room used for formally or regularly scheduled classes that require special-purpose computer equipment or a specific room configuration for student participation, experimentation, observation, or practice in an academic discipline that uses computers.

Computer Class Labs are designed with at least an A/V Tier 1 or Tier 2 (depending on room size), and includes a CPU in the instructors' lectern. Typically there is one computer per student, but in some group collaboration environments there may be one computer for every 2, 3 or 4 students. The main characteristic of a Computer Class Lab is hands-on computing by students during class time. Student computers should be oriented appropriately to maintain optimum lines of sight between faculty and student.

There should be at least one adjustable-height table to accommodate a wheelchair as well as a variety of student accessibility profiles. Floor boxes should have one (1) data port for each permanent computer work station, plus two (2) more to accommodate the use of student laptop computers. Table work surfaces should be comfortable and ample enough to accommodate laptop and/or desktop computers.

Floor boxes should also have two (2) power sources per workstation plus two (2) more power sources to accommodate the use of student laptop computers. To support group collaboration floor boxes should be installed so as to allow for flexibility and multiple configurations.

Furniture should accommodate LEC pedagogical standards. LEC standard chairs should be provided.

Class Lab – Art [21004]

Art Lab, Art Building.

An Art Class Lab is a room used primarily for scheduled instruction in art. Specialized equipment such as easels, pottery wheels, kilns, worktables, benches, or elevated platforms for models or subjects may be required.

Class Lab – Music [21005]

Kurt Frederick Hall, Popejoy Hall.

A Music Class Lab is a room used for formally or regularly scheduled band room classes that require special purpose equipment or a specific room configuration for student musical participation, experimentation, observation, or practice in an academic discipline. These rooms require acoustic attenuation.

Class Lab – Clinical/Observation [21006]

A Clinical/Observation Class Lab is a room used for formally or regularly scheduled clinical/observational classes that require special purpose equipment or a specific room configuration for student participation, experimentation, observation, or practice in an academic discipline.

Class Lab – Production [21007]

A Production Class Lab is a room used for manipulating video and film images.

Class Lab – Design [21008]

Design Lab, George Pearl Hall.

A Design Class Lab is a room used primarily for scheduled instruction in various kinds of design. Disciplines such as architecture, graphic arts, and mechanical design may use this type of room. Specialized equipment and furniture such as layout tables and tack boards are present in these rooms.

Class Lab – Language [21009]

A Language Class Lab is a room used for formally or regularly scheduled language classes that require special purpose equipment or a specific room configuration for student participation, experimentation, observation, or practice in an academic discipline. Specialized equipment such as recording and playback devices, microphones, and headphones are present in these rooms.

Class Lab – Performance [21010]

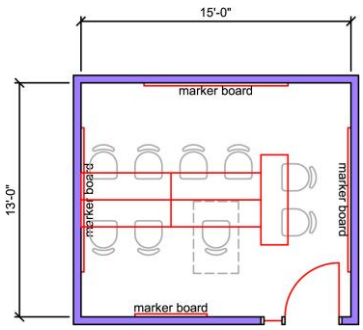
Dance Hall, Carlisle Gym.

A room used primarily for scheduled instruction in one of the performance arts such as dance, music, or drama. Specialized equipment such as audio equipment, special lighting or acoustic equipment or specialized flooring may be required in these rooms.

5.06 STUDY SPACE [41000]

Study Space, Zimmerman Library.

Study Space may be either a room or an area used by individuals to study. It is not restricted to a particular subject or discipline, and contains no specialized equipment. Study Spaces vary in size to accommodate groups of two to twelve students often within a private/semi-private room that can be acoustically isolated for a variety of study situations, but can also be located within open areas. The rooms are typically, but not always, adjacent to other types of open, informal, and collaborative learning spaces. These spaces should have ample means of visual surveillance to and from the area. There should be ample work surface, power and data outlets, and at least one large white board.



Typical Seating Layout for 10-Student Study Rooms.

Collaboration Space

Collaboration Space, Mitchell Hall.

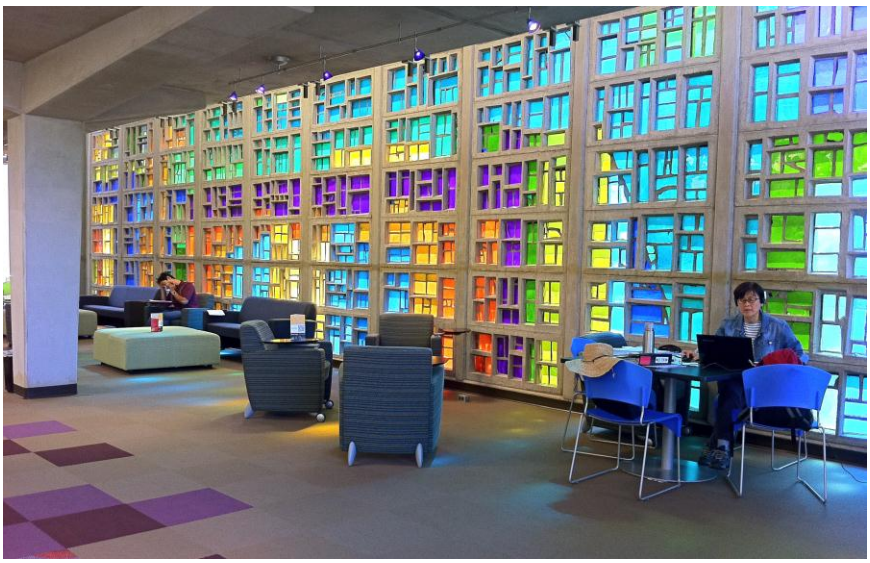
Collaboration Spaces are informal study spaces that are not isolated within a room. They are located within the interior of a building and offer a variety of study arrangements. The primary features which distinguish them from the Learning Commons (see the following section), are the ad hoc and varied nature of the spaces, as well as their lack of dedicated support and technology for library reference. Such areas are created merely to provide students with places to informally interact, study, and gather between classes and during extended breaks.

Collaboration Space, Jackson Student Center.

In renovations, Collaboration Spaces are typically created from the under-utilized areas within buildings and transformed into comfortable and supportive learning environments. These spaces are renovated with an emphasis on improving lighting, acoustics, and ergonomics for informal learning. In addition to

providing new, contemporary furniture and finishes, each gathering and collaboration space is typically fitted with artwork from the UNM Art in Public Places Committee. As Collaboration Spaces are adjacent to, or within, corridors and exits, it is important that projects which create such spaces carefully address code issues regarding these elements. The minimum required clear dimensions of egress routes and exits should never be compromised by the presence of furniture in these spaces.

Campus spaces that are leftover, marginal, or peripheral to primary usage, and which are often under the responsibility of no particular department for its care and maintenance, can be improved in this manner to support the academic mission of the university.



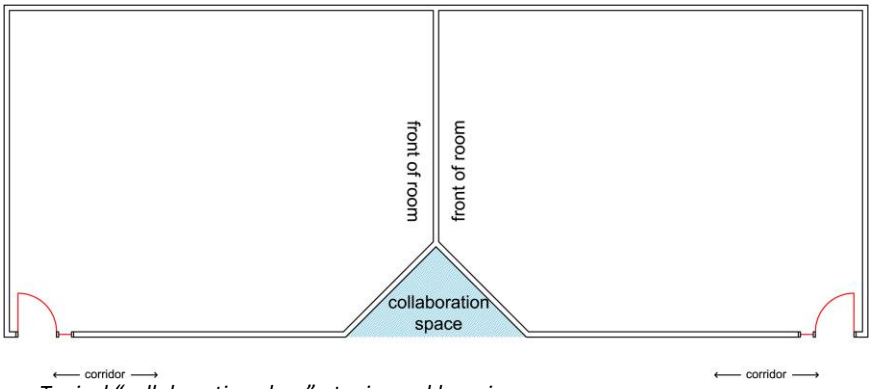
Collaboration Space, Travelsted Hall.

Collaboration Space, Science & Math Learning Center.

Collaboration Spaces can be designed in a variety of ways, but they should always be located within or directly adjacent to corridors and foyers. Such spaces range from smaller alcoves containing a few seats to larger atria containing many seating types and arrangements. They should foster continuity with the

formal learning environment, providing places for students to continue discussions and share information before and after scheduled class-time. These types of spaces also offer students a place to wait for class, read, use laptops, and generally interact and informally collaborate with each other. Collaboration Spaces within a building should vary in type, size, and location as much as practically possible. Because their specification is somewhat indeterminate, the design of these spaces should be carefully negotiated with applicable building efficiency standards. If not designed properly, these spaces can negatively impact the overall sustainability of a building by lowering the building's efficiency ratio.

Collaboration Chop



Typical "collaboration chop" at mirrored learning rooms.

Room layouts within this document illustrate corridor collaboration space (shown a dashed line within the room) which may be carved from the front of the learning room at 45 degrees and devoted to the corridor. This "collaboration chop" should be pursued in areas only where mirrored plans occur within buildings. The "collaboration chop" creates a more efficient learning room by reducing the area of the room that is used the least (the front of the room opposite the instructor's station). Outside the room it returns approximately 5-10% of the learning room to the adjacent corridor for student gathering and collaboration. Under the mirrored plan, the "collaboration chop" effectively creates free collaboration space. Space is merely repurposed, without creating additional space. In instances where a corridor does not exist adjacent to this corner of the room, the strategy may still be applied to create a "storage chop" to be utilized within the room.

5.07 LEARNING COMMONS [41002]

Learning Commons, Zimmerman Library.

As University Libraries transform their information capacities and incorporate additional learning functions, the Learning Commons represents a key academic trend to re-conceptualizing library reference and study space as essentially collaborative as well as to reinvigorated them with computing-intensive capabilities. The learning commons is a multi-functional resource and service environment that is grounded in the use of digital technologies. The Learning Commons typically features large-scale student computing facilities with technical support, state of the art computers and peripherals, attractive new or refurbished space associated with traditional library collections and services, teaching rooms for computer and information literacy, integrated service desk, and cybernet café. This is the result of a long-standing collaborative effort between library services and information technology services. Students have access to library and internet resources, productivity software, capture and output peripherals, individual and group study spaces, reference assistance, and technical support – all in one location.

The Learning Commons not only integrates technologies, references, and services but also facilitates learning in which students engage critically with information and actively participate in the acquisition of knowledge. The Learning Commons represents a greater functional integration of learning support and in some cases may extend to support academic staff. Its foundation is a student culture that is centered on collaborative and computing-intensive learning.

Wireless connectivity is preferred with strategic location of wall and floor ports for power and data..

- Power and data locations within the Learning Commons must coordinate with their associated furniture arrangements.

6 Technology Tiers

Study Space, Zimmerman Library.

Learning Studio, Science & Math Learning Center (SMLC).

The University of New Mexico provides a tiered structure to identify the base minimum for technology in classrooms. All design instances that are identified for any of the tier technology categories must provide the **baseline technologies** (See details in Appendix 1). These are wireless connectivity, internet access, an overhead projector, and AC power to accommodate all electrical devices, including instructor and students laptops or other computing devices.

Currently, not all environments will provide printing stations, however plans for at least one printing station should be considered an element for all baseline designs. At a later time, rooms without printing

services should be easily modified for that purpose without depreciating the original environmental design and its intended use. Furthermore, as technology develops, additional computing-enabled learning technologies will undoubtedly emerge and could be integrated as baseline elements for all learning environments. For these reasons, the design professional should inquire if any additional baseline technologies have been added which are not listed here.

6.01 TIER ONE TECHNOLOGY

Tier One Technology is located within the majority of classrooms. At a minimum, it consists of a single projector, DVD/VCR, audio speakers, teacher station, laptop connectivity, desktop computer, motorized screen, and a simple control touch panel to operate, adjust, and switch equipment sources.

6.02 TIER TWO TECHNOLOGY

Tier Two Technology is located generally within in larger classrooms or classrooms that, due to classroom layout and instructional needs, require additional instructional technology. Tier Two technology includes all Tier One technology as a base (See Tier One above), and additionally includes two projectors, two motorized screens, a document camera, and a Smart Podium. The control system must allow the instructor to be able to send any source to either projector.

6.03 TIER THREE TECHNOLOGY

Tier Three Technology is located within very large lecture halls and auditoriums. At a minimum Tier Three technology consists of two or more projectors, motorized screens, document camera, DVD/VCR, Blu-Ray player, 7.1 audio surround sound system, multimedia teacher lectern, laptop and desktop computer connections, wired and wireless microphones, cameras with mounts, control system with custom programming, equipment rack and UPS battery backup with surge protection. The control system should be customized to allow instructor to easily switch video sources, and display multiple sources at the same time. Additionally, a lecture capture system should also be installed in order to record courses for students to review at a later date.

6.04 TIER FOUR TECHNOLOGY

Tier Four Technology is located within Computer Class Labs/Pods. For the AV, designers may employ either a Tier One or Tier Two technology for the base system. Each student should have a computer with monitor. Please visit the UNM-IT website for the current desktop computer standards: http://it.unm.edu/wsm/desktop.html.

6.05 TIER FIVE TECHNOLOGY

Tier Five Technology is located within distance education rooms that support Interactive Television (ITV) courses. This technology varies slightly, based upon the room's configuration. It is mandatory to consult with Media Technology Services prior to the design phase when working on academic facilities on main campus. Technology for this tier must allow for the sending and receiving of live content to remote locations in real time. Tier Five technology must consist of a minimum of four flat-panel displays (and/or projectors), two high resolution PTZ cameras, and microphones for the instructor and the audience, a desktop computer, laptop connectivity, DVD/VCR player, a document camera, and controls.

In addition, video conferencing and class capture technologies are required for content delivery and recording.

6.06 TIER SIX TECHNOLOGY

Tier Six technology is located within conference rooms or small seminar classrooms. This technology should have the capability to display a computer and video source, either by projector or by flat-panel screen (depending on room layout and dimensions). Camera(s) and microphones are also desired to facilitate web-conferencing and/or video-conferencing.

6.07 TIER SEVEN TECHNOLOGY

Tier Seven technology is located within learning studios that are designed to maximize collaborative learning by utilizing furnishings that turn students toward one another rather than toward a focal-point presenter. Although configured in various ways, these classrooms will always employ technology to facilitate collaboration. Multiple projection screens or flat-panel screens may be required in larger rooms in order to assure line of sight from all seats. Power and data and/or wireless to support individual laptop or tablet/pad computers at each seat is expected, although the actual number of provided portable computers varies with each project. An interactive whiteboard or equivalent projection technology should be provided. A standard multimedia teacher lectern with CPU, monitor (or Smart Podium), DVD/Blu-Ray player, and document camera is provided in each room.

For a detailed list of tier requirements, see **Appendix 1: Technology Tier Specifications** of this document.

Technology Tiers are to be utilized with space types according to the following table:

	Tier 1	Tier 2	Tier 3	Tier 4	Tier 5	Tier 6	Tier 7
Seminar Room	X	X			X	X	
Lecture Room		X	X		X		
Auditorium			X		X		
Learning Studio					X		X
Class Laboratory	X	X		X	X		
Study Space	X						
Collaboration Space	X						
Learning Commons							

X *indicates the tier option available for a particular learning environment.*

7 Room Design

7.01 ROOM LOCATION

Learning rooms should be located near building entrances to improve access and reduce noise levels in other areas of the building. Large learning rooms should be located in close proximity to primary building entrances and large circulation corridors. Such corridors should be large enough to accommodate students waiting for their classes to begin. The strategic location of rooms for access to natural light should be considered a fundamental requirement for all learning environments. Rooms with windows facing north can be more easily designed to provide adequate blackout capability and energy efficiency than rooms with windows facing other directions. Passive solar design features should be considered for rooms having the capacity for direct solar gain. Where existing learning spaces do not meet these conditions, subsequent renovation/remodel projects should discover opportunities to adequately resolve them.

7.02 CORRIDORS, DOORWAYS AND ACCESS AISLES

Multi-Functional Corridor, Student Union Building (SUB).

The configuration of corridors, doorways, and access aisles is critical to the success of the learning environments. Movement of students within and between learning environments significantly impacts the way learning environments function and the way students learn within them. All circulation elements should be designed as extensions of the learning environments that they serve, and should offer the same basic criteria for comfort, functionality, and access. Corridors, doorways, and access aisles are often referred to as "break-out" spaces when they incorporate some dimension of informal learning.

Multi-Functional Corridor, Mitchell Hall.

Where practical, corridors should be comfortable places for sitting, socializing, reading, using laptops, and waiting for class whenever practicable. Such vestibules can function as an informal learning environment before and after scheduled class times.

Learning Room Entry, Dane Smith Hall.

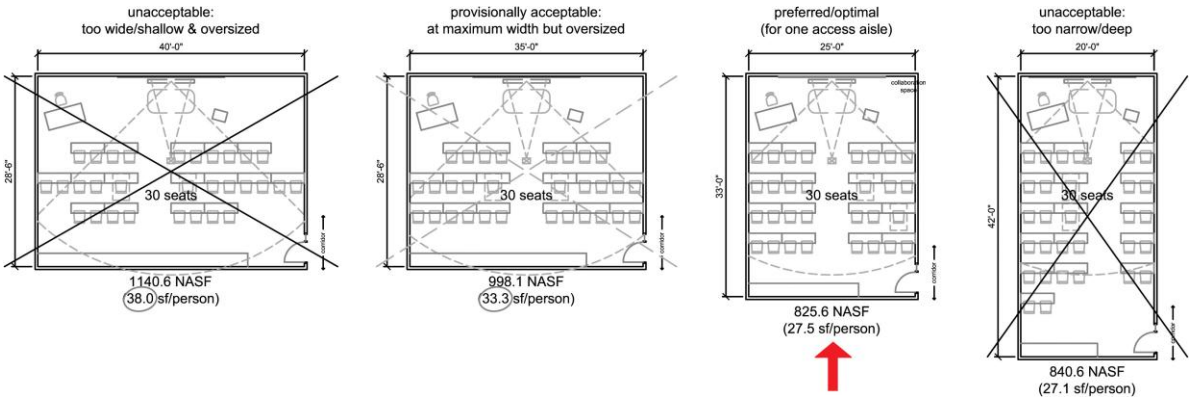
Learning Room, Dane Smith Hall.

Doorways must always provide ample clearance. Doorways that swing outward from the room should be recessed so that doors do not swing into the corridor. Doorways to larger learning environments must provide ample space to relieve the congestion that occurs during class transitions, and should integrate with corridor alcoves whenever practicable. Vision panels should be installed in or near doors to allow students to check whether the classroom is in use. Panels should be narrow to reduce transmission of light from the hallway.

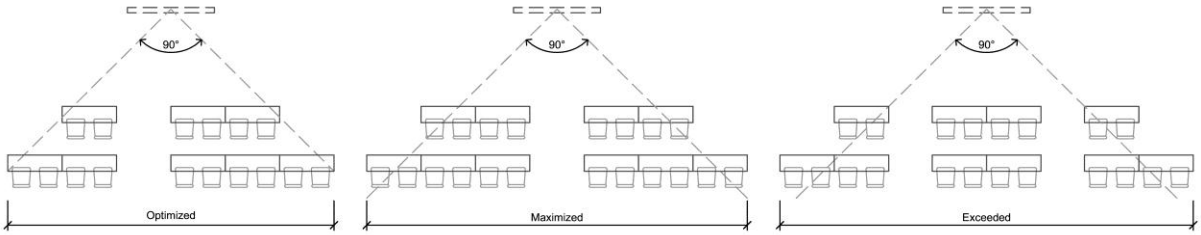
Access aisles within the rooms should allow ample flow through the learning environment while also complying with accessibility standards and fire codes. Because learning environments with movable chairs and tables may be configured in many different ways on an ad hoc basis, it is important that reference diagrams be provided for each room to depict acceptable configurations and clearances. Primary access aisles should be minimally 36 inches wide minimum. Secondary access aisle should be minimally 32 inches wide minimum.

7.03 ROOM PROPORTION

Room proportion significantly influences the way instruction takes place in the learning environment. Rooms that are too wide inhibit the instructor's ability to maintain eye contact, provide more instructor space than is needed, and typically have poor sightlines, especially from seats in front corners. Rooms that are too deep make it hard for students seated in the back to hear the instructor, to interact with the entire group, and to see whiteboards and projection screens. They also force a narrow instructor space, causing instructor stations to interfere with views to the front.



Relationship between Room Proportion, Viewing Angle, and Throw Distance.

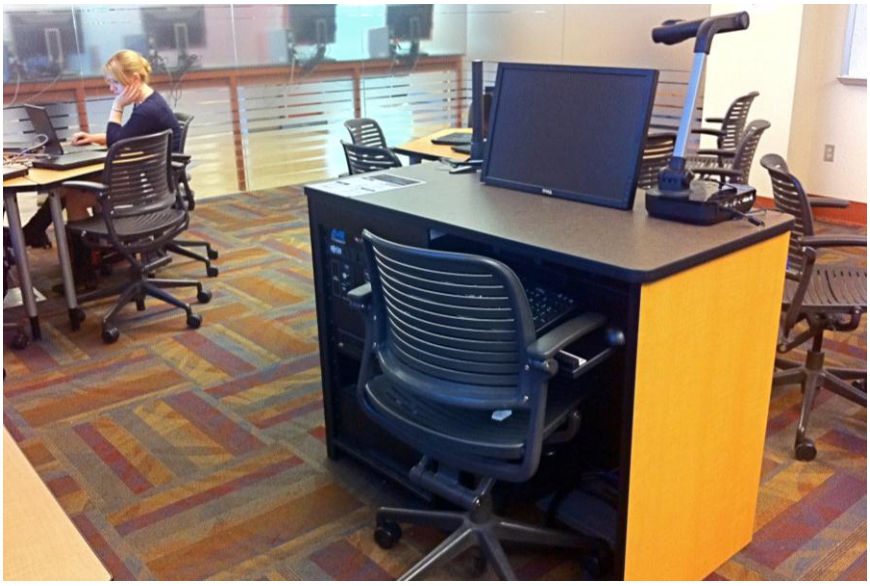


Relationship between Room Width and Viewing Angle (based upon a standard 45 to 60 degree view angle from center of screen).

NOTE: DRAWINGS CAN BE CHANGED TO REFLECT A 60 DEGREE VIEWING ANGLE.

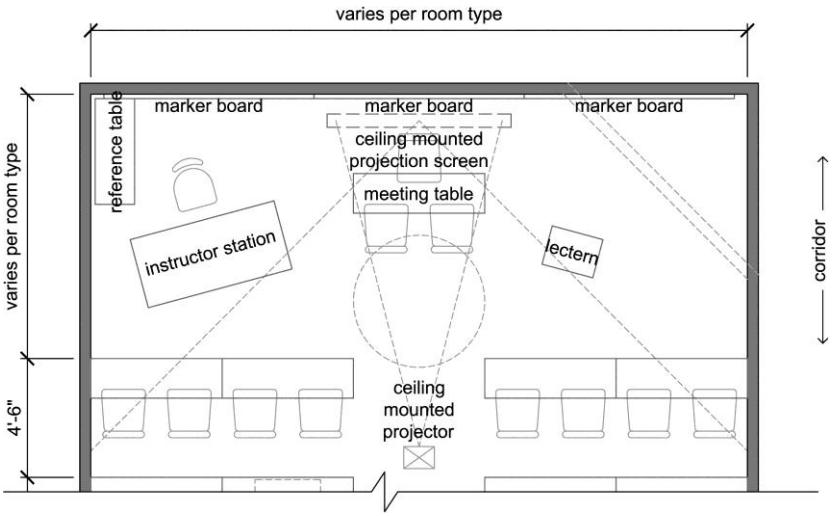
7.04 FRONT OF ROOM

Front of Learning Room, Mitchell Hall



Instructor Station, Mitchell Hall

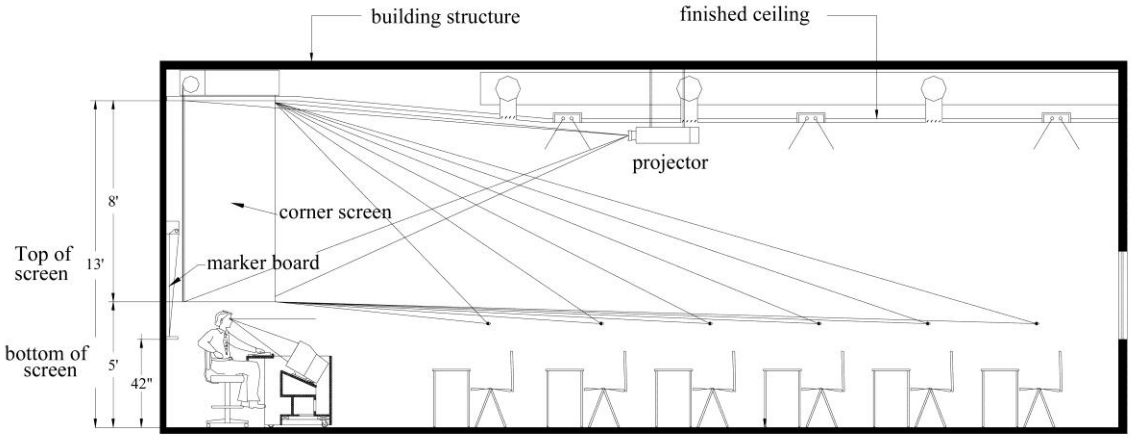
The front of the room is an important design feature for those learning environments which support forward-facing instruction. Forward-facing seating should be set back to a minimum depth of 9 feet at the front of the room to accommodate a multimedia instructor station, a reference table, portable equipment, and circulation space. Rooms that are intended for alternative and flexible seating arrangements and that allow students to face multiple directions should be supplemented by flat-screen monitors that are mounted in strategically accessible locations. The instructor station should also have an alternate location to the center of the room. The width and height of the front of the room should be based on criteria for room proportions and sight lines discussed below.



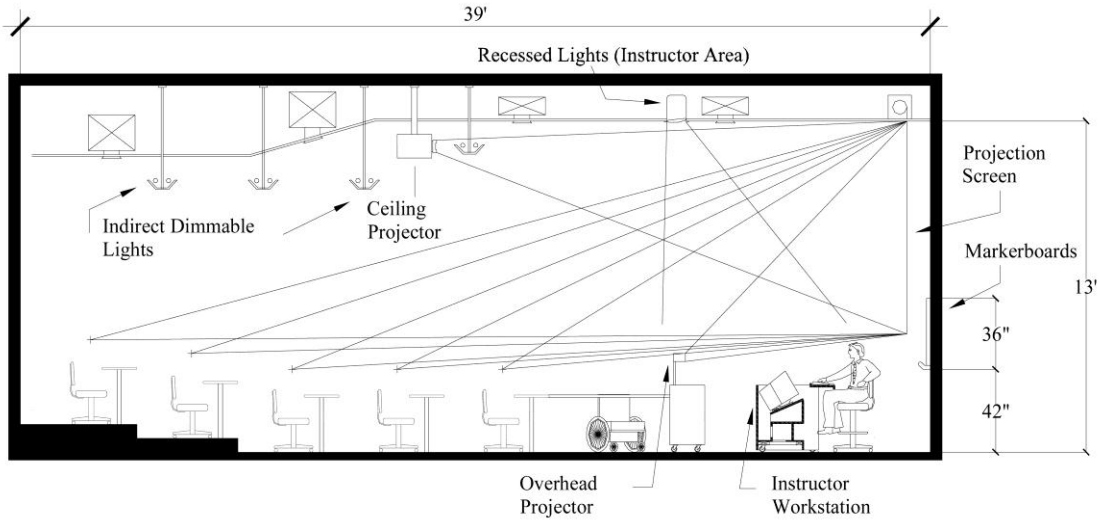
Layout of Front of Room.

7.05 SIGHT LINES

Fixed seating arrangements should be vertically tiered and horizontally staggered to insure proper sight lines to the front of the room. Ceiling heights at the front of the room should be minimally 12 feet to provide ample projection height.



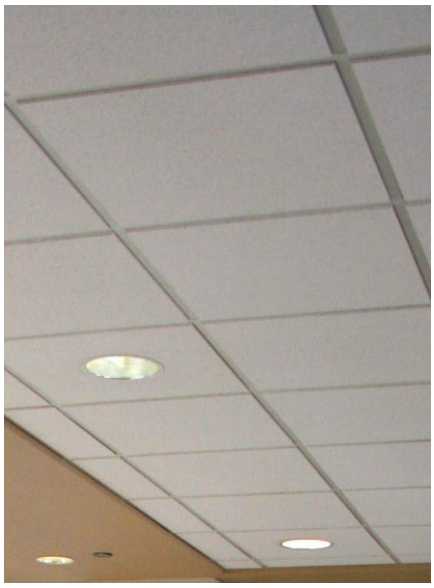
Sightlines to Projection Screen in Flat-Floor Room. (from Univ. of Cincinnati).



Sightlines to Projection Screen in Tiered-Floor Room. (from Univ. of Cincinnati).

7.06 ACOUSTICS

Corridor, Mitchell Hall.



Learning Room, Student Union Building.

Learning rooms should be located an appropriate distance away from high-noise sources such as mechanical equipment, heavy vehicular traffic routes, music practice rooms, stadiums, food courts, or outdoor spaces that are frequently used for noisy activities. Spaces that generate noise and are adjacent to learning rooms should be acoustically modified for minimum disruption. Learning rooms should be designed to provide adequate acoustical separation from all other interior and exterior noise sources and should meet the following minimum sound transmission class (STC) requirements:

- 50 STC – at walls, ceilings, floors. Movable or folding partitions are discouraged, as substantial costs are associated with bringing them to compliance. Partition walls that do not extend to the deck of the floor above should extend sound-attenuating materials to the deck.

- 40 STC – at doors and windows near high-noise areas.
- 28 STC – at doors and windows near low-noise areas.

Regardless of room size, location, or construction type, an overall noise criterion (NC) rating in empty rooms should be at or below NC-35, and should be met with the heating and air-conditioning system in operation.

Wall, ceiling, and floor surfaces shall provide good acoustics. The design of large learning rooms (over 50 seats), auditoriums, and distance-learning rooms requires special acoustic attenuation and should obtain the services of an acoustical engineer. The following should be provided:

- High-reflectance materials near the instructor that project sound to the back of the room.
- Sound-absorbing materials on ceilings and on the upper levels of walls in the rear.
- Target 0.6 seconds reverberation time for unoccupied furnished learning rooms. Core learning spaces ≤ 283 m3 (≤ 10 000 ft3) shall be readily adaptable to allow reduction in reverberation time to 0.3 seconds. (See *ANSI/ASA S12.60-2010/Part 1 American National Standard Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools, Part 1: Permanent Schools* at http://asastore.aip.org/shop.do?pID=594)
- Special design features such as angled walls and ceilings may be required to insure sounds can be clearly heard without distortion in all parts of the room.

The acoustical engineer's report should be included in the design development and construction document submittals. The report will include sound-transmission, noise level, and reverberation time calculations and recommendations to improve acoustic performance.

7.07 FINISHES AND COLORS

Learning Room, Mitchell Hall.

Soft flooring materials such as carpeting should be avoided in most learning rooms. Soft flooring is usually more difficult and costly to keep clean than hard-surface finishes. Exceptions can be made in rooms where:

- Food and drinks are not allowed, especially in computer instruction labs.
- Sound absorption is very important, particularly in distance-learning rooms.
- Special use requires a softer, more luxurious floor finish than resilient flooring.
- Operating budgets are sufficient to insure proper maintenance.
- Raised floor systems are proposed to improve energy efficiency and reduce costs.

Colors of finishes, furnishings, and audio-visual components shall be fully coordinated. A color board illustrating the colors, materials, and products proposed for all of these elements shall be included in the Design Development submission. Colors for finishes should be selected from palettes that are compatible with successful color schemes used in recent renovation projects in the same building. Colors in the front of rooms behind marker boards and projection screens should be darker than in other areas to reduce light reflections when media projectors are in use. Colors for furnishings and audio-visual components should be coordinated with finish colors used in the same building or on the same campus. Neutral colors are preferred so these items can be moved from room to room. Avoid use of “cool” colors in rooms with “warm” finishes, and vice-versa.

All learning environments with movable furnishings should include chair rails wide enough for the specified tables and chairs. Mounting height should typically be 28-33 inches above floor finish. Wall corners in high-traffic areas should be protected from damage. Low-maintenance finishes are strongly preferred. Typical solutions include:

- Hard-surface or resilient flooring with durable surface coatings.
- Gypsum wallboard on steel studs.
- Epoxy coatings or other durable materials on wall areas within reach of people.

- Sound-absorbing materials located beyond arm reach.

Only low-VOC architectural coatings should be used. All interior finish materials must comply with NFPA 101 and be of Class A or B only.

7.08 RAISED FLOORS

Modular raised floors provide an intelligent design solution to learning environments that require flexibility in space and/or infrastructural systems. Raised floors are industrially prefabricated floor panels and pedestals that are installed by a dry construction method. Any of the panels freely supported on the pedestals can be taken up in order to access the floor cavity. The reliability and simplicity of raised floor construction makes it invaluable for areas with exclusive equipment standards. Not only can electrical and mechanical installations be accommodated in the floor cavity, but also water, waste water, pneumatic tube conveyors, compressed air, central vacuum cleaning systems, IT infrastructure, etc.

Raised floors offer the following advantages to facilities in which learning environment are located:

- Flexible space and movable partitions.
- Versatile plenum access.
- Modular, universal cabling.
- Adjustable voice/power/data locations.
- Adjustable air distribution.
- Cost-effective IT retrofitting for technology upgrades.

8 Room Furnishings

Stimulating and successful learning environments require careful study of the type, size, and location of furnishings planned for each type of room. Furnishings should be selected for durability, ease of maintenance, quality, warranty, comfort, ergonomics, durability, flexibility, accessibility, reasonable economy, design options/compatibility, and favorable previous product experiences at UNM. In learning environments where video- or audio-recording will take place, furniture should not squeak or make intermittent noises that will disturb the recording. The selection of seating types and their arrangement should accommodate people with different body types and those with specialized needs. They should also accommodate computers and audio-visual components as needed. Impact on aisle width and seat spacing should be evaluated early in the design process, especially in remodel projects where room sizes may be fixed.

The type, size, and arrangement of furnishings greatly determine the size of each learning room and the location of lights, diffusers, and power/data outlets within them. For each learning environment, the seating capacities developed in pre-design must be met and ensured by the subsequent design. Furnishing layouts drawn to scale must be included in the schematic design submission and for each subsequent design review. Reduction of the programmed seating capacities is unacceptable unless otherwise approved by the University Planning Officer or University Architect.

8.01 STUDENT SEATING AND WORK SURFACES

Auditorium, School of Law.

Lecture Room, Mitchell Hall.

Learning environments that seat **less than 100 students** should be designed as flat-floor Seminar Rooms / Lecture Rooms (with two-person tables and movable chairs), or as tiered-floor Lecture Rooms (with continuous fixed work surfaces and movable chairs with adjustable-height seats and backs), or as sloped-floor Lecture Rooms (with continuous fixed work surfaces and fixed chairs), or as flat-floor Learning Studios (with 6- or 8-person tables and increased area). Movable tables and chairs give flexibility to the learning environment so that students can be either be oriented to the front for traditional instruction or clustered into small groups for alternative instructional requirements.

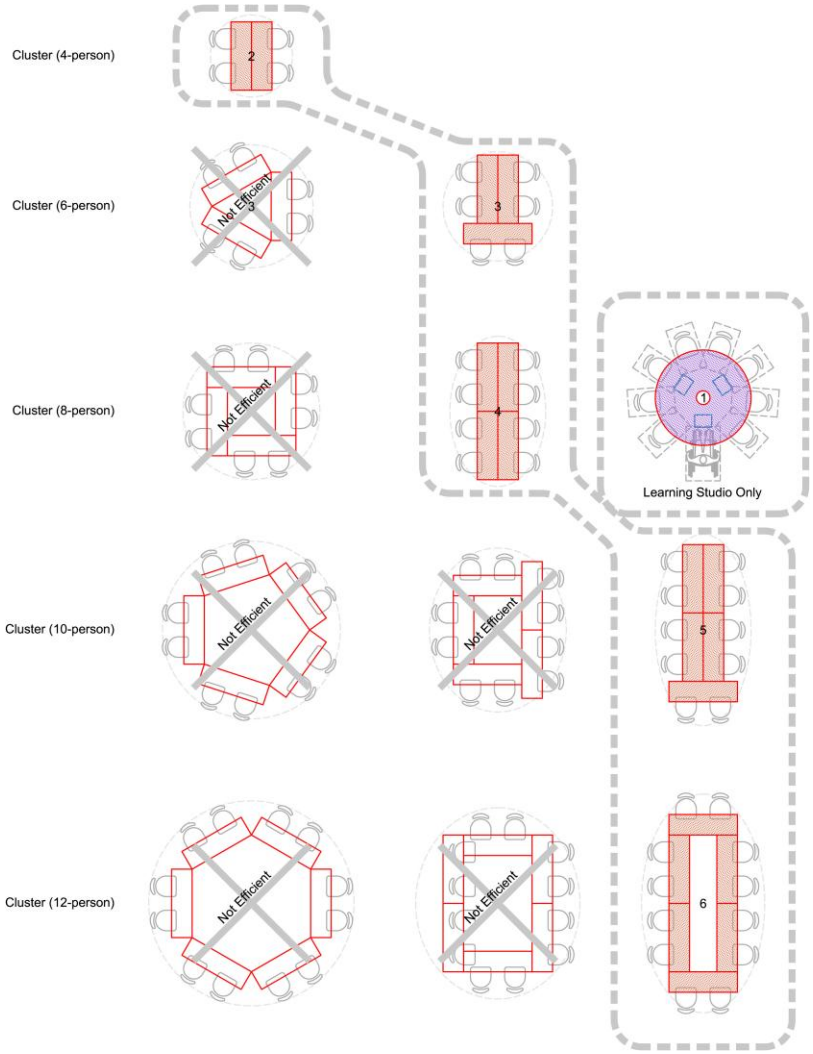
Learning environments that seat **100 or more students** should be designed as Auditoriums. The Auditorium may have tiered floors with continuous fixed work surfaces and movable chairs with

adjustable-height seats and backs; or they may have sloped floors with continuous fixed work surfaces and fixed chairs; or larger auditoriums may have sloped floors with fixed chairs with tablet arms to reduce room depth and cost.

To enhance the long term life of learning environment seating, upholstered seating is discouraged. However, if padded upholstered seating is desired, vinyl or faux leathers are recommended for their durability and ease of cleaning. If standard upholstery fabric is chosen, only fabrics especially treated for stain resistance should be chosen.

Clustered Arrangements

Each flat-floor Seminar Room, Lecture Room, and Learning Studio may accommodate certain clustered seating arrangements. Some seating clusters are more efficient than others, and should be given priority in the clustered arrangement of learning environments. It is imperative that an egress route be maintained to each exit in clustered arrangements. Some cluster types and their room arrangements are shown below. It is desirable to implement those cluster types which consume less floor space.



Typical seating clusters for 2-person movable tables or 9-person round tables.

Remodel Projects

Projects that remodel or renovate existing learning rooms typically encounter increased design constraints over those in new construction. In such cases, the designer may inherit difficult room shapes, room orientations, or entrance locations and must negotiate the location of the front-of-room, whiteboards, and projection screens to the best possible configuration. Remodels typically result in **reduced seating capacities and efficiency ratios**. This must always be considered beforehand in the establishment of overall occupancy and utilization objectives for the project, so that final counts do not fall short of anticipated needs. Remodel projects also encounter a variety of code issues which must not be compromised. Sound research and innovative solution to these challenges are encouraged and expected from the design and remodel professional.

Work Surface & Seating Selection

Student Work Surface, College of Education.

Work surfaces should provide about four square feet of usable space for each student in one unobstructed area, excluding space used for computer monitors, keyboards, mouse pads, microphones, or other types of equipment. Larger work surfaces will only be considered based on academic needs, such as the use of large drawings or maps. Smaller work surfaces should be considered only for large auditoriums (over 300 seats) with auditorium-style seats with tablet arms.

When furnishing learning rooms, the dimensions of the room and the desired occupancy of the room should be an integral component of the seat and table type determination. Individual tablet arm chairs are highly discouraged and are used only under circumstances of retrofit where the necessary occupancy can only be achieved by the use of tablet arm chairs.

Student Work Surface, Mitchell Hall.

Student desks, continuous work surfaces, seminar tables, and computer workstations must accommodate right- and left-handed students, as well as students in wheelchairs. This requires careful consideration of the work surface height and location within the room. Minimum unobstructed knee clearance space underneath work surfaces should be provided as follows:

- Width: 23 inches (30 inches for accessible work stations)
- Depth: 18 inches typical
- Height: 27 inches

Movable task chairs should be comfortable and provide good ergonomics (with proper lumbar support) through a range of adjustable features, while accommodating a wide range of body types and sizes. Armrests are not desired in most learning rooms because they make access more difficult, are often hard or impossible to adjust to student size variations, and increase costs. However, they are preferred in rooms used by professional-level or non-traditional students.

Seating and work surfaces should be selected for quality, comfort, ergonomics, durability, flexibility, accessibility, reasonable economy, harmonious appearance, ease of maintenance, replacement availability, design options/compatibility, and favorable previous product experiences at UNM. High quality seating should be specified to minimize life-cycle costs. The appearance of the seating and work surfaces must be coordinated with the interior of the classroom and help meet the acoustical requirements for the space. Soft coverings should be used in large auditoriums or lecture halls where reverberation of sound may become a problem. In rooms where class time exceeds 2 hours, cushioned seats and backs should be selected. Materials and colors should be selected for consistency with the overall décor of the learning environment. Solid and light colors are discouraged. Fabrics must be easily cleaned and provides good abrasion resistance (minimum 200,000 double rubs).

In order to reduce both the initial and long-term maintenance costs, seating and work surfaces should be selected for consistency with previous selections on each campus, to the maximum extent feasible. This will also allow better furnishing interchange between rooms and buildings. These items should be procured from trusted manufacturers with proven track records in the marketplace, with maintained stock levels to ensure replacement can be made without timely backorder delays. Additional criteria to select these items are that they facilitate clean floor surfaces and require minimum maintenance of seat coverings.

In classrooms and instruction labs where chemicals or art supplies are used, movable chairs or stools should be provided which do not have foam pads and upholstery. However, such chairs should still be adjustable.

The following seating types do not meet this guidance and should not be considered:

- Movable chairs with tablet-arms.
- Pivot-arm seats without adjustable-height seats and backs.
- Pivot-arm seats that do not comfortably accommodate large/small students.
- Pedestal seats bolted to the floor.
- Movable student desks with seats attached.
- Custom-designs that cannot be used by all students, such as:
  - Oversize tables and chairs
  - Adjustable-height tables

8.02 FURNITURE TYPES

Student Work Surface, Fine Arts and Design Library, George Pearl Hall

The learning environments furniture shown in this document has gone through a rigorous vetting process with the UNM Classroom Furniture Standardization Committee. The committee invited local commercial furniture dealers to present their best classroom manufacturer's tables and chairs for consideration by the committee. Detailed specifications were reviewed and compared. In addition,

UNM students were provided product samples to review. They voted on the basis of comfort, durability and appearance. Those items receiving the most votes appear in this document.

The balance of the furniture, including soft seating, occasional tables, casual seating, auditorium seating, conference tables, and lecterns have been selected based on quality, comfort, ergonomics, durability, flexibility, accessibility, reasonable economy, design options/compatibility, warranty, and favorable previous product experiences at UNM. The furniture listed in this document has been carefully reviewed for its intended purpose.

There are many options available for other furnishings needs. If you do not find a product that suits the requirements of your department within this document, please contact the Associate Project Manager of Interiors with the **UNM Office of Capital Projects** for direction to quality manufacturers and products that will best serve your department and the University. You may also use the above contact should your department experience any issues requiring repair of furniture purchased. Please be prepared with manufacturer label information (usually found underneath tables and seating). You can be put in touch with the local dealer that services that product to review the feasibility of manufacturer warranty repair or outside of warranty repair or replacement.

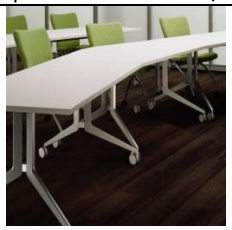
The following chart specifies current chair and table types for the various UNM learning environments:

Furniture	Classroom Type	Image	Key Functions
Stack Chair (with or without arms)	• Seminar Classroom • Scheduled Instruction Lab • Group Study Room • Student Gathering/Collaboration • Learning Commons	 Example: Steelcase Cachet	- Stacking - Flexible webbed seat/back for comfort - Flip up arm With or without padded seat (vinyl recommended)
		 Example: KI Dorsal	- Stacking - Flex back - With or without padded seat (vinyl recommended) Budget minded pricing

Tablet-Arm Chair (prohibited unless proven to be necessary)	• Discussion Classroom	 *(tablet arm not shown)Example: Herman Miller Caper*	- Perforated poly shell with handle - Left or right tablet arm available
		 Example: KI Dorsal	- Flex back - With or without padded seat (vinyl recommended) - Budget minded pricing Left or right tablet arm
Rolling Task Chair	• Seminar Classroom • Computer Classroom • Learning Studio/SCALE-UP Classroom	 Example: Steelcase Cachet	- Flexible webbed seat/back for comfort - Flip up arm - With or without padded seat (vinyl recommended) - 5 star castered base Height adjustable
			- Flexible intuitive movement - With or without short fixed arm - With or without padded seat (vinyl recommended) - 5 star castered base Height adjustable

		 Example: Izzy Wing	- Poly formed perforated seat/back - With or without padded seat (vinyl recommended) - 5 star castered base - Height adjustable
Auditorium Seat – Tablet-Arm (Fixed)	• Discussion Classroom (Tiered Floor) • Lecture Hall/Auditorium	 Example: KI or American Stg.	- Left or right tablet arm - Data/electrical available in some models - Available all fabric or poly but fabric is a preference for sound absorbtion
Lounge Seat (with or without tablet arm)	• Student Gathering/Collaboration • Learning Commons	 Example: Arcadia Belamonde	- Compact size - Large right or left tablet arm
		 Example: National Reno	- Casters/handle available - Large wood or poly tablet arm available
cont.		 Example: Carolina Retrospect	- Compact size - Large right or left tablet arm Small round table avail on modular pieces only

Café Seat (tall & standard height)	• Student Gathering/Collaboration • Learning Commons	 Example: Leland Parfait	- Formed wood seat and back - Multiple colors available - Steel frame
		 Example: Paoli Artisan	- Formed wood seat and back, design cutouts - Multiple colors available - Steel frame
		 Example: Fixtures Jazz	- Formed thermoplastic seat/back - Available in translucent and opaque colors - Steel frame

2-Person Table	• Seminar Classroom	 Example: Steelcase Vecta/Akira	-Multiple sizes available -Fixed, flip, mobile and height adjustable options Power/data available
		 Example: Haworth Planes	-Multiple sizes available -Fixed, flip, mobile and height adjustable options Power/data available
		 Example: KI Synthesis	-Multiple sizes available -Fixed, flip, mobile and height adjustable options Power/data available
Reference Table	• Discussion Classroom • Lecture Hall/Auditorium	 Example: Steelcase Vecta/Akira	-Multiple sizes available -Fixed, flip, mobile and height adjustable options Power/data available
		 Example: Haworth Planes	-Multiple sizes available -Fixed, flip, mobile and height adjustable options Power/data available

		 Example: KI Synthesis	-Multiple sizes available -Fixed, flip, mobile and height adjustable options Power/data available
Computer Table	• Computer Classroom	 Example: Steelcase Vecta/Akira	-Multiple sizes available -Fixed, flip, mobile and height adjustable options Power/data available
		 Example: Haworth Planes	-Multiple sizes available -Fixed, flip, mobile and height adjustable options Power/data available
cont.		 Example: KI Synthesis	-Multiple sizes available -Fixed, flip, mobile and height adjustable options Power/data available
Conference Table	• Seminar Classroom • Group Study Room	 Example: Steelcase Vecta/Akira	Modular or std. conference table shapes/sizes avail. - Wood or laminate

		 Example: Haworth Planes	Modular or std. conference table shapes/sizes avail. - Wood or laminate
Cluster/Modular Table	• Learning Studio Classroom	 Example: Steelcase Vecta/Akira	Modular or std. conference table shapes/sizes avail. - Wood or laminate
		 Example: Steelcase Vecta/Akira	Modular or std. conference table shapes/sizes avail. - Wood or laminate
		 Example: KI Synthesis	- Modular or std. conference table shapes/sizes avail. - Wood or laminate
Lounge Table	• Student Gathering/Collaboration • Learning Commons	 Example: Aracia Jigsaw	Multiple Styles Available Wood or laminate
cont.		 Example: Carolina Talos	Multiple Styles Available Modular or std. conference table shapes/sizes avail. - Wood or laminate

		 Example: National Excalade	Modular or std. conference table shapes/sizes avail. - Wood or laminate
Café Table	• Student Gathering/Collaboration • Learning Commons	 Example: Leland Parfait	- Unusual base styles available Laminate or wood tops
		 Example: Fixtures Pick A Top/Base	Multiple sizes mix/match tops/bases
Lectern	• Lecture Hall/Auditorium	 Example: Bretford PE	- Height adjustable - Oversized paper platform Laminate or wood
		 Example: Egan OVO series	- Angled surfaces with lip at front Document holder is height adjustable

8.03 SEAT SPACING

Lecture Hall, Mitchell Hall.

Adequate seat spacing is required to accommodate comfort and flexibility in all learning environments. Space planning should account for the side-to-side spacing and front-to-back clearances of differing seat types, configurations, and functions, as well as spacing requirements for the disabled and oversized. Seat spacing for seminar rooms, lecture rooms, and auditoriums is as follows:

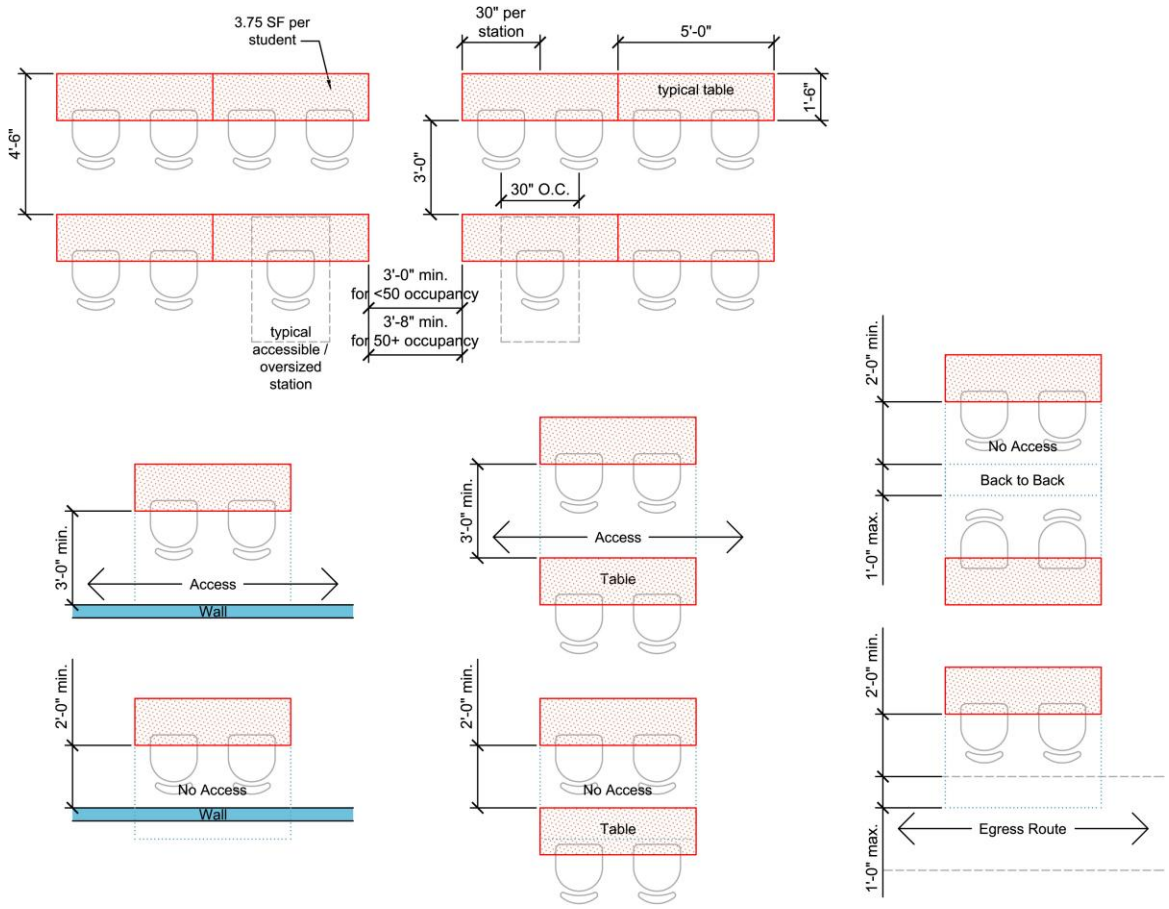
Seat Type	**Table Type**	**Side-to-Side Distance (on center)**	**Front-to-Back Distance (clear space)**
Movable	Movable	26”-30”	36” between tables
Movable (≤20 seats)	Fixed	26”-30”	36” between tables
Movable (>20 seats)	Fixed	26”-30”	38” between tables
Tablet-arm (fixed or movable)	NA	24”-30”	12” (w/open tablet-arm)

Access aisles should comply with applicable fire codes. In addition, furniture layouts for each room must be approved by UNM’s Fire Marshall to insure that egress requirements within the room and between room furnishings and equipment are met. Provide access aisles as follows:

- 36” min. aisle width, leading to front of room.
- 28” min. aisle width, in other locations of room.

Spacing between workstations in computer instruction labs, science labs, and design studios varies based on workstation design and teaching method. Provide access aisles as follows:

- 36” min. aisle width, in rooms where students work primarily in small groups or where bulky equipment must be moved frequently from one workstation to another.
- 28” min. internal aisle width, in computer instruction and study labs where students usually work independently or with only one other student.



Typical Seating Layout for Seminar and Lecture Rooms.

8.04 INSTRUCTOR WORK STATIONS

Instructor Station, George Pearl Hall.

Instructor Station, Mitchell Hall.

Learning rooms will include instructor workstations designed to accommodate:

- Computer-based audio-visual systems and other commonly-used audio-visual components
- Instructors who are standing, seated, or using a wheelchair

Key workstation design features and location considerations are as follows:

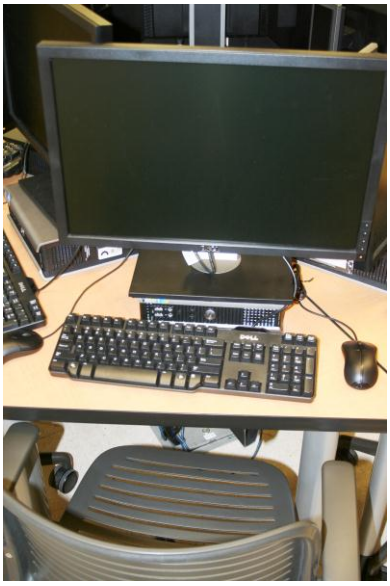
- Workstations shall be oriented to allow instructors to maintain eye contact with students while using keyboards and allow students to see projected media:
  - In rooms with one screen, an instructor workstation on the left side of the instructor area, whiteboards in the center, and a screen in the right corner usually works well.
  - In large rooms with multiple screens, a workstation located on the left side of the instructor area, near the whiteboard and overhead projectors, usually works well, but a more central location may be preferable in some rooms. Tables used for panel discussions or references are also needed.
- Work surfaces and audio-visual components shall not block views of screens and marker boards:
  - 34 inches above floor–maximum height of work surfaces
  - 41 inches above floor–maximum height of monitors/task lights/other components
- Work stations shall accommodate instructors who stand, sit, or use a wheelchair:
  - Provide accessible route to workstations (flat floor or ramps < 30 feet and 8% slope)
  - Minimum knee clearance: 27 inches high, 18 inches wide
  - Control panel for A/V system in easy reach of instructors
  - Height of instructor's seat easily adjusted - 19 to 27 inches above floor

Instructor workstations shall provide space for the following:

- Instructor's references and materials
- Personal computer/monitor and power/data outlets for laptops
- Audio-visual components installed
- Lockable access to computer and audio-visual components for maintenance

- Electronic security system to prevent theft of components (not currently in the bulk of our rooms)

8.05 COMPUTER STATIONS



Computer Station, Mitchell Hall.

Anderson School of Management

In order to provide the greatest possible flexibility in any computing-intensive learning environment, wireless components, and raised floor systems should always be considered in the design of areas that incorporate computer stations. It is important to evaluate whether the area will benefit greatly from minimized cabling, quick disconnects, and movable floor outlets and air diffusers.

The following elements should be avoided:

- Power poles or other features that block views of instructors, marker boards, & screens.
- Plastic floor outlets/covers that break easily.
- Flat floor outlets that will collect dirt or floor wax from janitorial cleaning.
- Raised floor outlets that present a trip hazard.
- Plastic raised floor systems that present fire/smoke hazards.
- Lighting systems that cause glare or reflection on computer monitors.

Furnishings for Computer Classroom (11020) should be selected with the following considerations:

- Accommodation of large monitors (19 to 22 inch, thin-profile).
- Minimization of table space devoted to CPU.
- Accommodation of both linear and clustered arrangements.
- Unobstructed visual access between students, instructors, and visual presentation surfaces.
- Ease of instructor mobility throughout the room.
- Visual access between students in group clusters, and ease of monitor sharing.
- Adequate table space (4 square feet minimum) for student reference materials.
- Equal accommodation for right- and left-handed students and disabled students.
- Possible integral storage compartment for backpacks and other student accessories.

- Cost-effectiveness for the given situation.

8.06 INSTRUCTOR REFERENCE TABLES

In classrooms and instruction labs seating up to 48 students, a table near the instructor workstation should be provided for the instructor's references or handouts. The work surface should be 18 inches deep and 36 inches wide. Color and style should be compatible with other classroom furnishings.

In larger classrooms and auditoriums, tables should be provided for the instructor's references or handouts and comfortable chairs should be provided for guest speakers. These learning environments are often used for panel discussions or other events where more than one person makes a presentation. Provide tables and chairs as follows:

Room Capacity	No. of Reference Tables	No. of Chairs	Table Dimensions
50-79 seats	1	2	24" deep, 60" wide
80-119 seats	2	4	24" deep, 60" wide
120 seats or more	3	6	24" deep, 60" wide

8.07 PODIUMS/ LECTERNS

Lectern. (Lectern to be set on casters)

In larger rooms a stand-up podium may be desirable to compliment the teacher workstation. Many UNM faculty prefer to give a traditional, standing lecture. The use of a stand-up podium or lectern can be more conducive to this type of instruction. A stool may also be provided for the podium.

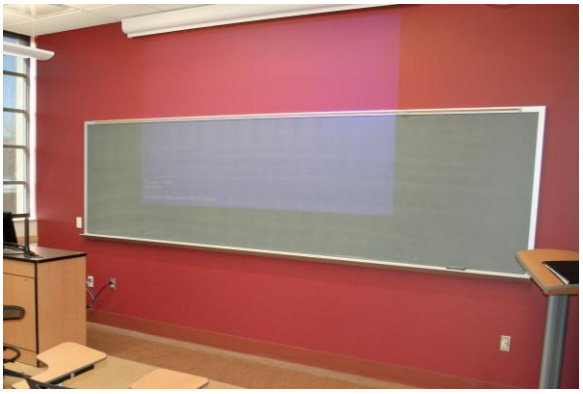
8.08 EQUIPMENT CARTS

While equipment carts are not desired, as they usually require hazardous and unattractive cables across the floor, the reality is that they are needed in rooms that do not have any built-in A/V equipment. The following requirements apply for equipment carts:

- Carts should include a power strip with a long cord.
- Short carts should be 34" tall with 4 wheels.
- Tall carts should be 42" tall with 4 wheels.

9 Instructional Technologies and Equipment

9.01 CHALK BOARDS



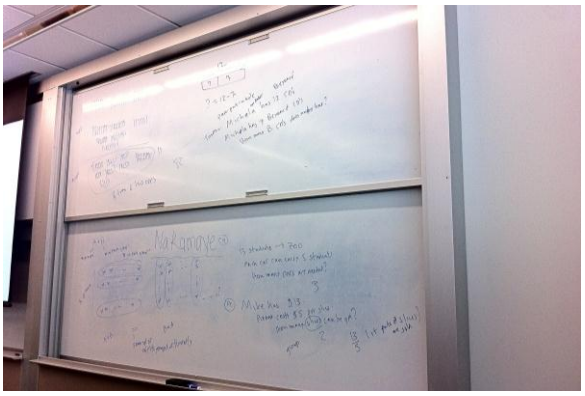
Chalk Board, Mitchell Hall

Chalk boards are in the process of being phased out at UNM in favor of marker boards. Chalk boards are currently allowed in general purpose learning environments.

Chalk Dust

The health issues surrounding chalk dust relate to inhalation not ingestion. The ingredients of chalk dust are considered to be non-toxic. But when regularly inhaled, chalk particulates accumulate in the respiratory system potentially causing long-term health problems. (Source: MSDS 510-11WHC). Students and instructors unavoidably inhale a portion of the chalk dust generated during a classroom session. For those with chronic breathing issues such as asthma, exposure to chalk dust can trigger a reaction. Chalkboards, trays, and erasers should be cleaned regularly. "Dustless chalk" still generates a form of chalk dust, but the particles are much heavier and tend to fall directly to the floor, thus reducing airborne exposure. Nevertheless, accumulation of chalk dust on and within sensitive instructional equipment is still problematic. Devices such as computers and VHS/DVD/BluRay players stored inside classrooms can suffer severe damage from accumulated chalk dust.

9.02 WHITE BOARDS/ MARKER BOARDS



Whiteboard, Science & Math Learning Center

Whiteboard, Science & Math Learning Center

Provide whiteboards in learning rooms as follows:

Room Type	Room Depth	Fixed-Height	Adjustable-Height
Seminar	Under 30 ft	Min 36 SF (3 x 12 ft)	None
Classroom Computer Instruction	Under 50 ft	Min 36 SF (3 x 12 ft)	Min 24 SF (3 x 8 ft)
Larger rooms Distance Learning	Over 50 ft Any depth	Min 24 SF (3 x 8 ft) With electronic capability	None

Fixed-height marker boards shall be mounted with the bottom edge 42-inches above the floor to allow students in the rear rows of seats to see more of the boards. They shall:

- Have a low-gloss white porcelain-enameled steel surface that is easy to clean.
- Be illuminated by lights on a separate switch that do not spill over onto screens, other marker boards, or the wall behind them.
- Have a continuous marker tray below the whiteboard surface and a wall-mounted holder nearby that is large enough for six markers and an eraser.
- Have electronic projection capability in distance-learning rooms and other rooms that are too deep for students in the rear rows to see writing on conventional whiteboards. This can be economically provided by adding an overlay screen on the whiteboard that is linked to the computer in the instructor workstation.

The adjustable-height whiteboard shall be near the instructor workstation in a location that can be easily seen from all seats when the panel is raised. It shall:

- Have a low-gloss white porcelain-enamel steel surface that is easy to clean.
- Have a panel that can be raised and lowered easily by instructors in seats or wheelchairs. The bottom of the panel should be adjustable from 30 to 42 inches above the floor.
- Be illuminated by lights on a separate switch that do not spill over onto screens, other boards, or the wall behind the board.

9.03 INTERACTIVE WHITEBOARDS

Interactive Whiteboard, College of Education

Interactive White Boards (IWB's) from Smart Technologies, Promethean, and other vendors are proving their worth in classrooms and boardrooms everywhere. The term "SmartBoard" is actually a trademarked brand of device generically referred to as an Interactive White Board (IWB). In the US, the term SmartBoard has become the common name used to refer to IWB's even though there are many different companies that currently manufacture and distribute similar IWB technologies. But what exactly is a SmartBoard or an IWB?

An Interactive White Board is a broad name for a device that, when used with a computer and some type of large video display, makes the surface of the display become touch sensitive in some manner and allows it to be used to control the computer. In the United States SmartBoards (sold by Smart Technologies Inc.) are the most well-known manufacturers of IWB's. Another company, Promethean Technologies, is equally popular in Europe, but is only recently making a push in the American market. Both the Promethean and the SmartBoard products are compatible with both Windows and Macintosh computers and both come with numerous tools for creating SmartBoard and IWB resources.

Other companies also make IWB products, with some such as Mimio, EBeam, and Eno, which make portable devices that attach by suction cups to existing traditional white boards, turning them into interactive devices when coupled with a video projector and computer. The portable units are more appropriate for traveling business people and those who do not have the room or budget to retrofit a room to use the permanently mounted devices mentioned previously.

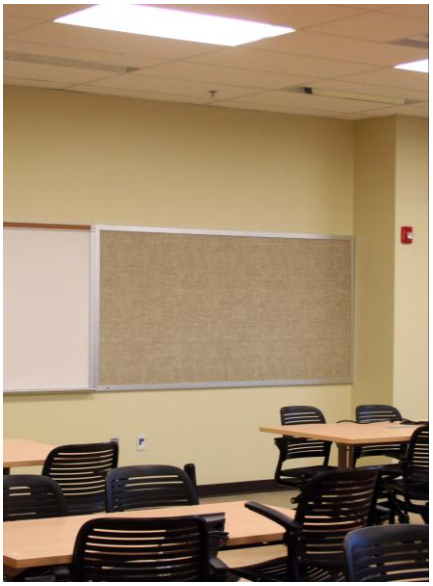
IWB's are fast becoming a popular addition to school classrooms as well as to office meeting spaces. The interactivity that an IWB provides allows teachers or professional presenters to let their audience collaborate, draw, and interact with information on the screen. Lessons and activities in a classroom setting are more engrossing for students and increase overall retention of the lesson content. Research done by Smart as well as by **the British Economic and Social Research Council** shows clearly that teachers using IWB's see greater improvement from their students compared to classrooms that do not use IWB enriched classroom content.

In business situations SmartBoards and Interactive White Boards increase productivity by allowing collaborative work sessions to be shared digitally, saved, and reused without having a physical hard

copy. Anything drawn on the SmartBoard can be saved as an image and recalled days, months, or years later. Visual copies of written data can be sent via email quickly and easily without the need for cameras or retyping.

An alternative to an IWB is the tablet factor such as a Smart Podium.

9.04 TACK BOARDS



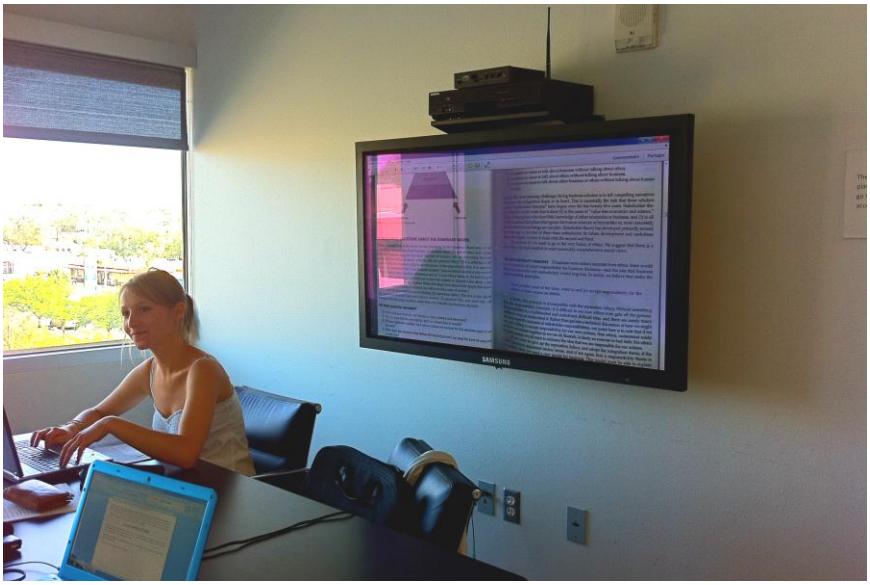
Tack Board, College of Education

Movable Tack Board, George Pearl Hall

In learning rooms with conventional fixed-height marker boards, tack board strips and clips should be provided along the top of the boards to easily display materials. Tack boards of a modest size may be mounted outside the learning room near the door. In rooms or corridors where display of student projects is common, full-height display boards of a low-maintenance material should be provided. Large display boards are not desired in other areas because they attract personal notices and advertisements that detract from room and building purpose.

9.05 FLAT-PANEL SCREENS

Flat-Panel Screens, Anderson School of Management



Flat-Panel Screen, Fine Arts and Design Library, George Pearl Hall

Flat panel display utilization is rapidly increasing in both consumer- and business-use cases. Screen clarity and display size are increasing, while prices are dropping. Although there still exists a cost premium (as of late 2011) for flat panel displays/mounts compared to a typical projector/mount and screen/mount, users are becoming increasingly comfortable with viewing large displays versus projectors in a number of use cases where space types position viewers approximately 25' or less from the display.

Displays should be deployed in UNM learning environments for those cases where

- an environmentally "green" solution with bright, highly-readable video images is required. This supports display of video content and communication outside of the space via web conferencing.

- excessive power is consumed;
- dimming of the interior room lights is required, and/or outside-facing windows require light-blocking coverings;
- relatively narrow image viewing angles are experienced;
- having participants and possible recording equipment compete with projector fan noise and screen glare/motion and image shadowing are considered undesirable.

Displays can be optionally specified in either an 60", 70" or 80" diagonal with or without an optional touch-screen to provide a virtual whiteboard capability.

Displays should provide:

- at least 1080P resolution with 1920 x 1080 pixel groupings and where each pixel grouping containing at least one red, one green, and one blue pixel.
- a vertical refresh rate at least 120 Hz;
- at least four HDMI audio/video inputs;
- at least one Component (Y, Pb, Pr, left audio, right audio) input and one VGA video input;
- at least one RCA audio output, one 802.3 Ethernet input, and one 802.11 wireless Ethernet input.

In addition they should:

- consume less than 250 W in operational mode;
- consume less that 1 W in standby mode; and
- possess a matte black housing.

In summary: flat panel or digital displays can be used in classrooms in lieu of a projector and screen, if the image size will be sufficient for students to view the material presented. They are preferred over a projector and screen in conference, rooms as well as student collaborative spaces. As the prices of flat panel displays continue to drop and screen size increases, UNM may consider replacing projectors and screens in classrooms. Flat panel displays should meet the following specifications:

- Be commercial grade
- Have 120 Hz or better refresh rate
- Be LCD or LED
- Have VGA as well as HDMI inputs
- Have a 1080P native resolution (HD)
- Use secure mounting hardware for theft prevention

If using a flat panel as the display device, follow the same mounting, sight line and viewing cones guidelines as you would for a projector and screen.

9.06 PROJECTION SCREENS

Projection Screen, George Pearl Hall

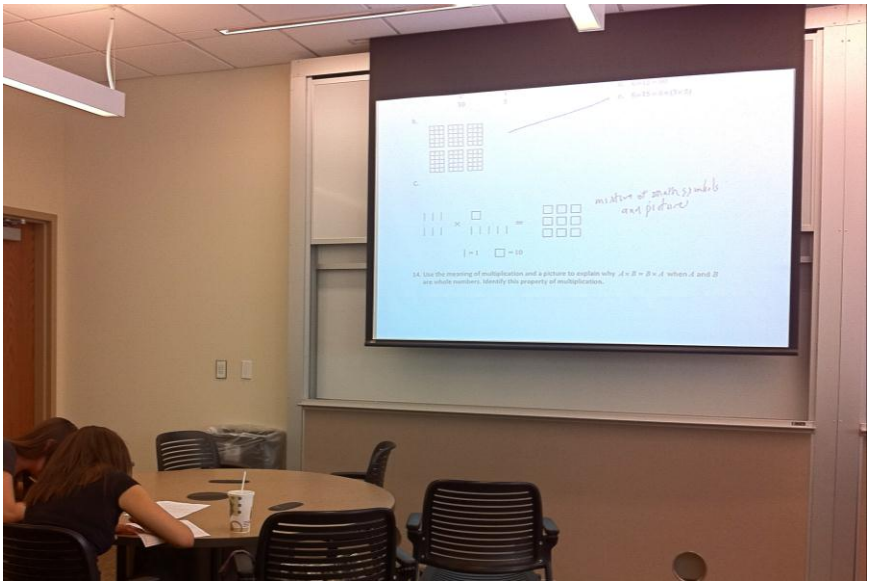
Projection screens should be designed for front projection in all learning rooms. Screens should be located and sized so students in all seats can easily see the entire projected image without discomfort or image distortion. Provide the following number of screens and projectors in each room:

Room Type	Capacity	# Screens	Ceiling-Mounted Data Projectors	Overhead Projectors (For Transparencies)
Seminar	10 to 22	One	One	One
Classrooms	21 to 48	One	One	One
Classrooms	49 to 74	Two	Two	One
Classrooms	75-199	Three	Two	One
Auditoriums	200+	Two or Three	Two or Three *	One

* Provide wiring pathway, power, and A/V wiring for third projector. Projector is optional (provide if funds permit).

Determine the optimum screen size based on room dimensions, planned audience seating occupancy and arrangement. The rule of thumb is to fit the screen to the audience - not to the projector.

- Screen height should be approximately equal to 1/6 the distance from the screen to the last row of seats, allowing text to be read and detail to be seen in the projected image. Ideally, the first row of seats should be approximately two screen heights away.
- The bottom of the screen should be a minimum of 4 feet above the audience floor, allowing those seated toward the rear of the audience to see the screen. This may require additional screen "drop" for ceiling hung screens.



Projection Screen, Science & Math Learning Center

How to Calculate a Custom Screen Size

Use the following formulas to calculate a custom size. The formulas will assist you in finding the viewing area only.

NTSC (1.33) Video Format	**HDTV (1.78) Video Format**	**Letterbox (1.85) Video Format**
Diagonal/1.667 = Height Height x 1.33 = Width Width/1.33 = Height Height x 1.667 = Diagonal	Diagonal x 0.49091 = Height Diagonal x 0.87247 = Width Height x 2.0395 = Diagonal Width x 1.14585 = Diagonal Height x 1.78 = Width Width x 0.561837 = Height	Diagonal x 0.4762 = Height Diagonal x 0.88 = Width Height x 2.10 = Diagonal Width x 1.135 = Diagonal Height x 1.85 = Width Width x 0.5405 = Height
Cinemascope (2.35) Video Format	**16:10 Wide (1.60) Video Format**	**SXGA (1.25) Video Format**
Diagonal x 0.3916 = Height Diagonal x 0.9209 = Width Height x 2.554 = Diagonal Width x 1.0868 = Diagonal Height x 2.35 = Width Width x 0.4255 = Height	Diagonal x 0.530 = Height Diagonal x 0.848 = Width Height x 1.887 = Diagonal Width x 1.1.79 = Diagonal Height x 1.6 = Width Width x 0.625 = Height	Diagonal x 0.625 = Height Diagonal x 0.78125 = Width Height x 1.60 = Diagonal Width x 1.28 = Diagonal Height x 1.25 = Width Width x 0.80 = Height

Note: Current UNM Standard: 16:10 Aspect Ratio (Screen width to screen height).

Screen Location and Orientation

Screens should be oriented towards the “center of gravity” of the seating area so students in all seats can easily see projected images and the marker board.

- In classrooms with only one screen, locate screen on right or left side of instructor area.
- Minimum distance between screen and closest seat.

Viewing Angles
Provide an unobstructed view of the entire image on all screens from all seats within the viewing angles (cones of vision) described below:

- Maximum 60-degree horizontal angle from the perpendicular at center of screen.
- Maximum 35-degree vertical angle from the perpendicular at top of screen.

Show horizontal and vertical viewing angles on schematic and design development floor plans and sections/interior elevations for "typical" learning rooms of each type, size, and depth. Do not show viewing angles on construction floor plans & sections.

Screen Surface

- Matte white with gain of about 1.0 (30 Lamberts per square foot of screen area).
- Black border.

Screen Type

- Electrically-operated with edge stiffeners.
- Ideally will be mounted above the suspended ceiling with opening in ceiling.
- Stop point five feet above the floor.

Manual screens will be considered only in rooms designed primarily for interactive discussion and the project budget precludes the use of ceiling-mounted data projectors and other audiovisual components that are installed permanently.

- Manual screens should be recess-mounted above the suspended ceiling.
- Screens operated by electric motors represent less than 10% of the cost of an electronic audio-visual system. Installing them after rooms are built can be very costly if ductwork or lights must be moved and new wiring circuits added.
- Most manual screens are not very flat, distort projected images, are hard to raise and lower, and can be easily damaged.
- Students in rear rows cannot see the bottom half of projected images if manual screens are mounted just above the marker board.

Manual screens should therefore be considered only as a last resort in rooms where projected images are only needed occasionally.

9.07 PROJECTORS

A variety of projection technologies are available for use in UNM learning environments. Each projector type has specific projection/mounting location and performance criteria.

Ceiling-Mounted Projectors

Overhead Projector, Mitchell Hall

All learning rooms should have ceiling-mounted projectors regardless of room size (Large screen LCD panels may be acceptable. Check with Academic Technology Services (ATS) for exceptions). Since the technology changes rapidly, check with ATS on current specifications that meet the current criteria. At this time, ATS has selected 3 Chip LCD, WXGA projectors with a minimum of 3000 lumens and 16:10 native resolution as the standard classroom projector. The newer bulb technology that many manufacturers are implementing is desired as they allow for 4000-5000 hours of bulb life which will help keep maintenance costs down. Some academic units prefer projectors with DLP technology because it displays high speed video (i.e. feature films) without pixilation.

Projectors must meet the following:

- Low noise level.
- Uniformly bright, clear images with good resolution and color accuracy (3000 Lumens is minimum).
- Compatibility with other AV components.
- Reliability; availability and cost of replacement parts (i.e. lamps, filters).
- RS232 or Ethernet port for communication with the video server, ie., equal to Crestron RoomView server.

3D technology is now being offered in projectors; and ATS will approve these on an as-needed basis. This technology is changing rapidly and costs are starting to come down.

Overhead Projectors

Overhead Projector, Dane Smith Hall

The venerable overhead (transparency) projectors are the most widely used technology on campus. Media Technology Services will provide an overhead projector for any classroom on campus regardless if it is centrally scheduled or departmentally controlled. The preferred manufacturer of overhead projectors is Eiki because their products are made of all-metal construction are extremely durable.

Projectors should be located:

- Minimum 6 feet from the screen (seminar rooms/classrooms seating 21-48-students).
- Minimum 10 feet from the screen (larger classrooms and auditoriums).

Provide a power outlet nearby (in the floor, on a riser, or in a built-in work surface). If projectors will be located on seminar tables, provide a floor power outlet under the table.

- Include a power strip with a long cord.
- Be 34" tall with 4 wheels (short cart).

Table Projectors

Table projectors should only be used when it is not practicable to install ceiling-mounted projectors.

Slide Projectors

Slide projectors are no longer required in learning environments, as the media is slowly being converted into digital formats. Slide projectors are available for checkout from Academic Technology Services.

9.08 AUDIO SYSTEMS

All classrooms that offer amplified sound should contain an audio amplification system and speakers. The instructor workstation should be designed to accommodate an amplifier in a standard component rack. Many AV controllers include a 20W, 2 speaker amplifier built into the unit.

Some targets and requirements for speaker selection:

- Dispersion angle of 130 degrees or greater.
- Average Sensitivity of 88 dB 1W/1M or greater. Most are in the range of 86 dB 1W/1M.
- Rated for plenum airspace. Speakers must meet the UL 2043 standard for heat and visible smoke release to be acceptable for this application.
- A single model with 70V or 8-ohm operation allowing for uniformity of speaker choice and flexible installations. One speaker model can be used everywhere.

Quantity of speakers based on Room size

Square Feet	No. of Speakers	Total Amp Power When all Speakers Tapped at: (Watts)		
		4	8	16
less than 800	2	10	20	40
800-1300	4	20	40	80
1300-2000	8	45	90	180
2000+	12	60	120	240

Number of Speaker and Amp Required

Since each room is different, square footage alone is not always enough to determine the appropriate speaker configuration. The figure above should be used as a guideline and there should be expectations for slightly more or fewer speakers required during implementation. Contact: **Media Technology Services** for additional specifications.

9.09 A/V CONTROL SYSTEMS

Crestron A/V Touch Pad System

The University of New Mexico has standardized on Crestron for its AV control systems at this time. These systems should have the capability of controlling all of the AV components installed in learning

environments. These control systems must tie into the Crestron RoomView™ software system for remote management and control of the room and equipment.

Systems must:

- Be programmable and capable of being reprogrammed.
- Interface properly with controls for screens, projectors and audio equipment as well as lights and shades.
- Have a button or touch panel on the instructor workstation with easy-to-read, simple menu choices.

Contact **Media Technology Services** before specifying systems.

All source codes, compiled codes, and access passwords shall be provided to the University at acceptance and become University property.

9.10 SECURITY FOR A/V COMPONENTS

Security for A/V equipment is a very big concern for the University of New Mexico, and all equipment in learning environments must be locked down securely. Equipment located in the teacher stations must be secured in the equipment rack with security cables, as well as faceplates that utilize security screws. Contact Academic Technology Services (ATS), a service under **Media Technology Services**, to see examples.

Projectors must also be secured with a lockable mount. In addition to the secured mount, security cables should also be installed on the projector mount and secured to the ceiling structure where possible. Ideally, security tabs connected to the UNM Security alarm system should be installed. However, this requires a phone line which may be cost prohibitive. All A/V control systems also must be tied into the Crestron RoomView system which will send alerts to ATS staff if equipment is unplugged from the system.

UNM is continuing to develop security systems, including monitoring systems. It continues to engage the larger campus community in the discussion to keep the instruction technology safe.

9.11 TELEPHONES AND DATA CONNECTIONS

Typical Phone Connection

Typical Table-Mounted Power/Data Port

An analog telephone or a “ring-down” may be desired near the instructor workstation in all learning rooms. Ring-down phones are essentially intercoms and are used to obtain technical support and enhance security. Ensure the phone cord is long enough to reach all areas of the instructor workstation. Contact **IT** for specifications. Project Administrators shall make arrangements to activate phone and data service.

9.12 DOCUMENT CAMERAS

Typical Document Camera

Document cameras provide the same functionality as the overhead transparency projector but they project the image through a digital projector. This provides for a larger and easier-to-read image. There are several models available but should include the following features:

- A VGA out connection and/or
- A Digital out connection

Optional:

- A light bed

Contact: **Media Technology Services** for recommendations.

9.13 VCR/DVD & BLU-RAY PLAYERS

Typical Blu-Ray Player

Learning rooms should contain a combination videocassette recorder (VCR) and DVD player configuration. The VCR is designed primarily for playing VHS tapes; features such as recording capability are not required. If possible, a region-free DVD player is desired in order to play content that is used by the various foreign language programs. In rooms with a teacher station, the VCR/DVD player should be mounted in its component rack. In rooms without teacher stations, the VCR/DVD player should be mounted on either a movable cart or a shelf mounted to the wall.

Playback of the VCR/DVD player should project through the ceiling-mounted projector onto the projection screen. In rooms without a ceiling-mounted projector, Media Technology Services will provide a movable cart with the VCR/DVD player, as well as a TV.

Blu-Ray content is now gaining popularity and Media Technology Services is deploying this emerging technology into the larger lecture halls. The players should be mounted into the teacher station's component rack, or the equipment rack in the projection booth. Blu-Ray players should also include region-free DVD playback.

Media Technology Services also has Blu-Ray players available for checkout by faculty for rooms that are not equipped with a dedicated Blu-Ray player.

Contact: **Media Technology Services** for specifications.

9.14 CABLE TV

Cable TV is no longer required due to expense.

9.15 MUSIC EQUIPMENT

Contact the Music Department at 505.277.2126 for requirements.

9.16 ASSISTIVE LISTENING SYSTEMS

Typical FM Assistive Listening Device

FM Assistive Listening Systems are available through UNM's Accessibility Resource Center for use in classrooms by those students who are hard of hearing. The system provides improved listening clarity for those who experience difficulty and fatigue when trying to understand speech because of distance, reverberation, or distracting background noise. Operating over an FM carrier signal, the system allows amplification of the lecturer's voice or the audio portion of videotape, and it also filters out any extraneous noises. The system is portable and contained within a very practical carrying case. It is battery powered and can be taken anywhere on campus. The user simply gives the wireless transmitter to any presenter, teacher, classmate, or anyone else they to whom wish to listen. The system is versatile and can be used to listen to other sound sources such as TV or audio, from a facility's soundboard. Presentations can be simultaneously monitored, recorded for later review and archived.

9.17 STUDENT RESPONSE SYSTEM (CLICKERS)

Typical Student Response System

I-clicker

Clickers, or student response systems, are used to promote active learning whereby students become more engaged in class time by providing real-time response within an active learning environment. Clickers integrate a gaming approach which promotes greater student engagement, increased student interest, heightened discussion, and interactivity over traditional classroom lectures and discussions. With clickers, students have an input device that allows them express their views in complete anonymity, and the cumulative view of the class appears on a public screen. A moderator can pose a question and within seconds the respondents' answers are anonymously logged on a laptop at the front of the room. Each input device is numbered so the instructor can download responses for recordkeeping after the class session ends. Clickers enable the instructor to determine if students understand the topic while the topic is discussed.

9.18 CLASSROOM CAPTURE

Typical Classroom Capture Camera

Typical Classroom Capture Station

Example of a lecture capture recorder

Classroom capture technology is implemented in several main, north, and branch campus classrooms. Sonic foundry's Mediasite is currently used to capture class content and broadcast as on-demand or live-webcast venues. There are many different solutions on the market today and new installations of class capture into classrooms needs to be coordinated with Media Technology Services.

9.19 WIRELESS CONNECTIVITY

The wireless coverage standard is one 801.11n access point (AP) per 20 devices for a classroom.

Use a 50% occupancy ratio for large auditoriums. For example, there may be an auditorium with 800 seats, so plan for 400 seats or 20 APs in that area. At events with anticipated high attendance and thus higher density of attendees per unit area in various learning environments around UNM's campus (such as SUB Ballrooms A, B, and/or C), the wireless load could be higher. Such cases should be supplemented with wireless coverage and should be engineered on a case-by-case basis. Typically, this can include supplementing normal AP placement with Wireless on Wheels (WOWs).

Typical Wireless AP at Ceiling.

9.20 PRINTING & SCANNING

Printer Station, Mitchell Hall.

UNM IT has implemented student printing stations throughout the campus. These have been placed in high-traffic areas and students can now print wirelessly from their laptops to these stations. Students

use the UNM Lobo card utilizing card swipe technology release the job from the printer cue. A desktop computer and high-volume printer is not required. Contact **UNM IT** for more information.

10 Other Concerns

10.01 ELECTRICAL POWER

Typical floor box, Fine Arts and Design Library, George Pearl Hall

With regard to electrical power, these guidelines defer to the UNM Physical Plant Department (PPD) electrical specifications located at:
http://iss.unm.edu/ppd/webpdfs/designstandardscsiformatrevision2dated03262011.pdf
and
http://iss.unm.edu/ppd/webpdfs/electricalspecifications.pdf

Please contact **UNM PPD** at (505)277.2421 for additional specifications not indicated here or not found in the PPD Guidelines.

To meet students' request for easily accessible power, it is mandated that the ratio of power outlets is to be determined based upon room occupancy. These ratios will range between 1-quad outlet per eight students, or 1-quad per six students, depending upon how heavily the room is to be scheduled. For example, in auditoriums a lower ratio is acceptable, while in a classroom, in which Freshman English is scheduled a few times a week, will require a higher ratio. Because it is usually the case that power is an ongoing need, and it is simultaneously subject to continual deliberation concerning cost, the following rule of thumb should apply: Power circuit boxes should always anticipate future demands for more power outlets, even if a particular room is initially designed to contain a low ratio because of low occupancy. This will enable flexibility in the future, at lower future cost, should additional quad outlets be required because of unanticipated power demands.

Wall-Mounted Electrical Power

A quad grounded AC power outlet shall be placed at the front of the classroom primarily for instructor use. In addition, to accommodate student devices that require occasional charging, similar quad outlets or in-line outlet strips shall be placed around the perimeter of the classroom to provide coverage of a single quad outlet per 8 students so that two students may have access to 1 plug. In a 40-person classroom, this would translate to 5 quad outlets.

Floor-Mounted Electrical Power

Floor outlets are called for if power cords that lay across aisles to wall-mounted quad outlets could jeopardize emergency exiting, or could cause tripping in low-lit scenarios, such as when projectors are being used during classroom instruction. In this case, floor outlets shall be distributed around the floor, located under or accessed on tabletops, and ideally in a manner to support reconfiguration of classroom furniture. Floor-mounted power must also accommodate regular janitorial cleaning (e.g. to prevent damage due to water rinse-down and adequate cover access to avoid wax buildup).

Raised floors are not considered cost effective for power unless HVAC and data are included. Further investigation for this solution is underway. Raised floors are only a design consideration for new building projects and not for remodels, unless building modifications, such as ramps were a part of the redesign. Please confer with PPD regarding raised floor options, at this time.

Ceiling-Mounted Electrical Power

Where wall or floor outlets are not feasible, ceiling-mounted outlets may be employed. Ceiling power should be dropped to easily reachable heights through "tele-power" poles equipped with surge protection. Outlet-to-student ratios should be based upon room occupancy as above.

Peripheral Electrical Power

Ceiling projectors and electrical projector screens will require special-case ceiling power outlets. These outlets should be recessed, above drop ceilings, so that the cord for the device is hidden, if possible.

Power for printers should be designed into the electrical floor plan by default. Even if a printer is not to be installed at the outset, outlets should be provided near printer data outlets, for a future installation of a printer, possibly for two printers if it is for a very large room or computer lab.

For special room use requiring power for other kinds of devices, such as plotters, coffee machines, refrigerators, or other miscellaneous electrical appliances, please verify that accommodations will be made to suit power demands.

10.02 LIGHTING

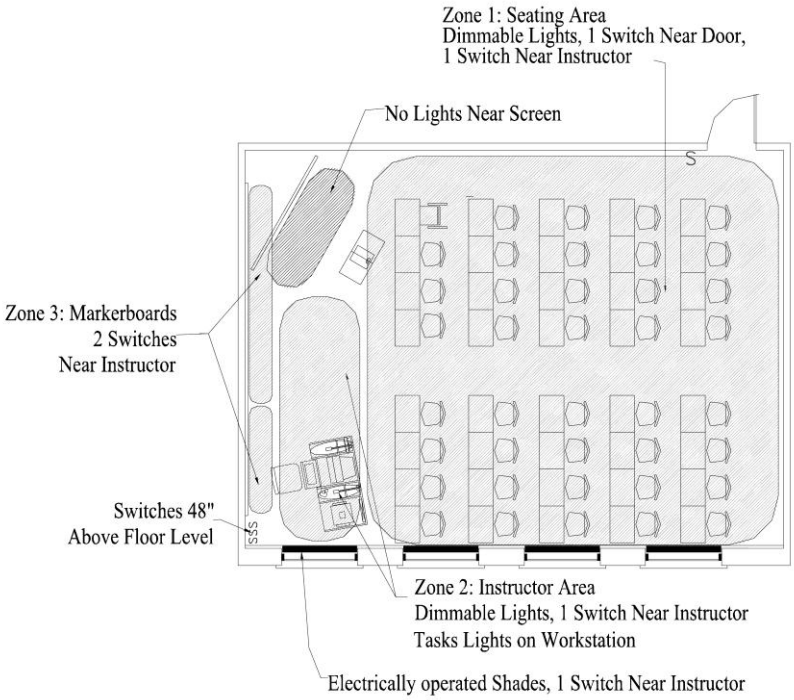
Typical Learning Room Light Fixtures

In general, lighting systems should:

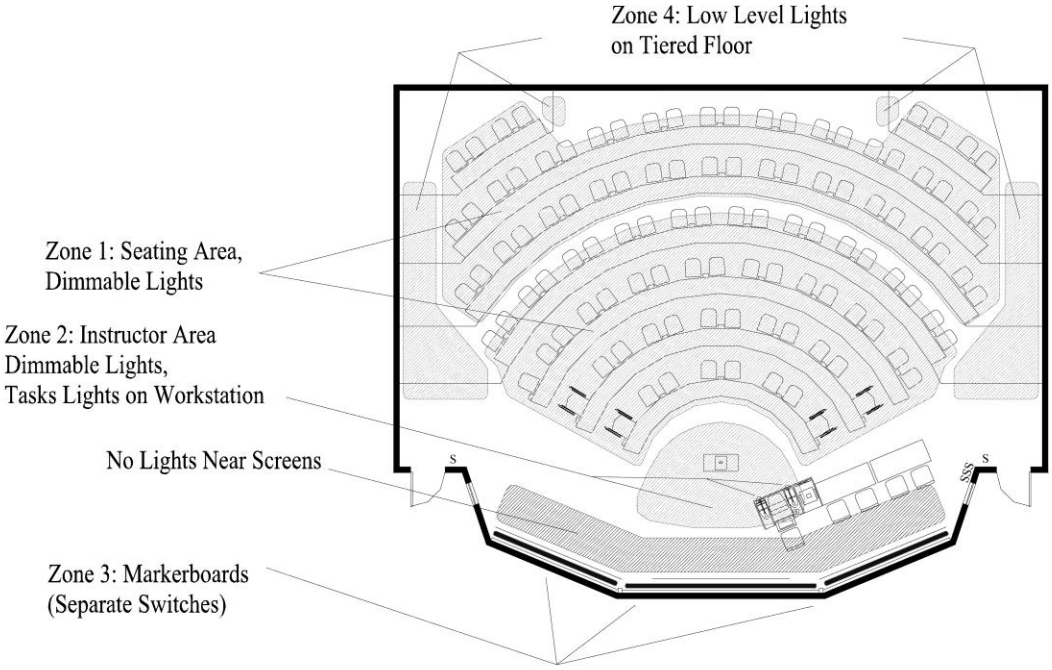
- Be energy-efficient.
- Be easy to use, maintain, and modify.
- Emit appropriate lighting levels for all room activities.
- Cause no glare or reflections on computer and projection screens.
- Be indirect to eyes and surfaces.
- Be located out of important view paths.

Lighting Zones and Levels

- Seating areas: Provide 30-40 foot-candles, dimmable to 5 to 10 foot-candles.
- For those rooms where very dark images such as x-rays are projected: Provide lights dimmable to 2 foot-candles and full blackout capability.
- At projection screen locations: No lights.
- Corridors, instructor areas, ramps, & tiered floors: Provide lights with lower light levels.
- Instructor workstations: Provide task lights that do not spill to screens and monitors.
- Whiteboards: Provide lights that do not wash out screen projections.
- Throughout: Provide safety lights per code, to remain on when other lights are off, but do not illuminate screens.

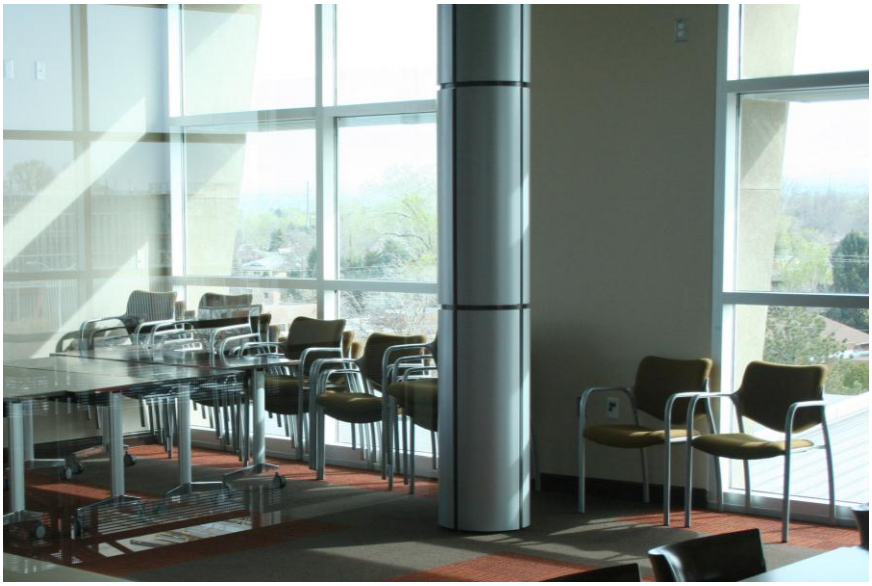


Typical lighting zones for regular classroom. (from Univ. of Cincinnati).



Typical lighting zones for lecture hall. (from Univ. of Cincinnati).

Natural Light



Natural Light in Learning Room, Domenici Center

Natural light should be provided, though not excessively, in all learning rooms, except distance learning rooms. Windows should be located in order not to disrupt projection technologies. Skylights and clerestory windows must have an easily accessible mechanism for darkening. Opaque window coverings should reduce light levels to 2 foot-candles. Window coverings in rooms that do not require full darkening should nevertheless be capable of reducing light intensity and glare. Window coverings should be easy to open/close and should not jam. When budgets permit, electrically operated shades should be provided. Manually operated shades should be used only in rooms with few windows. Avoid use of mini-blinds, as they are difficult to clean and maintain, frequently jam, and allow too much light into rooms. Exterior glazed openings should open directly onto a public way, yard, or court in accordance with applicable building codes. Glazing systems should meet or exceed UNM energy standards.

Lighting Control Devices

- Dual switching and switching of small areas to reduce energy usage shall be considered.
- Occupancy sensors shall be used to control lighting in appropriate rooms. Room lighting shall be controlled by motion sensors and should turn off 5 minutes after the last occupant leaves. Occupancy sensors shall not be used in electrical, mechanical or IT rooms/closets.

Interior Lighting Fixtures, Lamps and Ballasts

Typical Learning Room Light Fixture

- All fluorescent light fixtures installed must be provided with high frequency, instant start, high p.f., low-THD, electronic ballasts and applicable (i.e. T-8 or compact fluorescent) lamps. Where lamps will be frequently switched or controlled by occupancy sensors, ballasts shall be high-frequency, program rapid-start type. All fluorescent light fixtures must be provided with a full coverage lens, or clear "tube protectors".
- All fluorescent light fixtures must be provided with a full coverage lens, or clear "tube protectors". Open lamp strip fixtures will be accepted only after specific approval.
- All multi-lamp ballasts must be of the "parallel circuit" type. Lamp color shall be as approved by UNM.
- "U-lamp" light fixtures shall NOT be installed.
- Special areas (conference rooms, etc.) shall have suitable lighting for presentations.
- Lamp CRI and CCT shall be specified/scheduled for each luminaire type.
- Ceiling types, grid layout and luminaire layout shall be coordinated with Architectural drawings. Base sheet shall match.
- 24 x 7 "night" lighting shall be minimized for energy conservation.
- Lighting shall comply with the most recent recommendations of the Illuminating Society of America.

Exit Signs

- All Exit lighting will be standardized. The standardization will apply to the EXIT sign housing, lettering and color. All EXIT signs will meet the size criteria of NFPA 101. Exit signs shall be LED type.
- Exit signs and egress lighting shall be shown in appropriate locations.
- All exit lighting will be internally lit with battery back-up power or shall be connected to an emergency source of power, which will provide not less than 1-1/2hrs of continuous power in the event of main building power failure.
- Exit signs with attached emergency lighting heads will not be acceptable unless specifically approved.
- Battery packs shall be provided with RCT (remote control test) feature.
- No radioluminescent EXIT signs shall be installed.

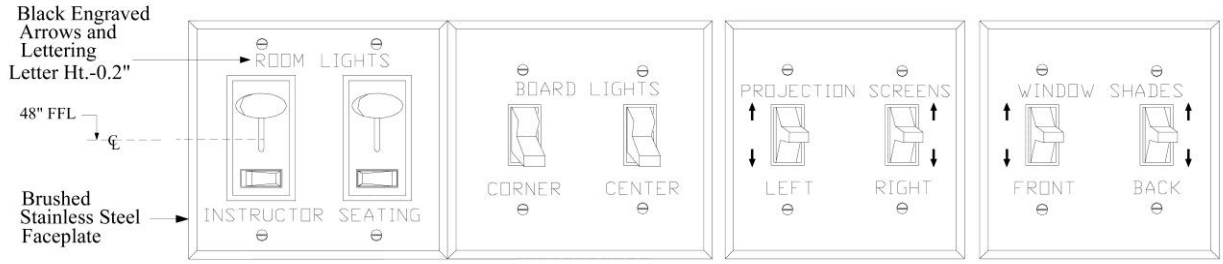
For further specification see the UNM PPD – Engineering and Energy Services Design Standards at (**http://iss.unm.edu/ppd/webpdfs/designstandardscsiformatrevision2dated11052007.pdf**).

Switches

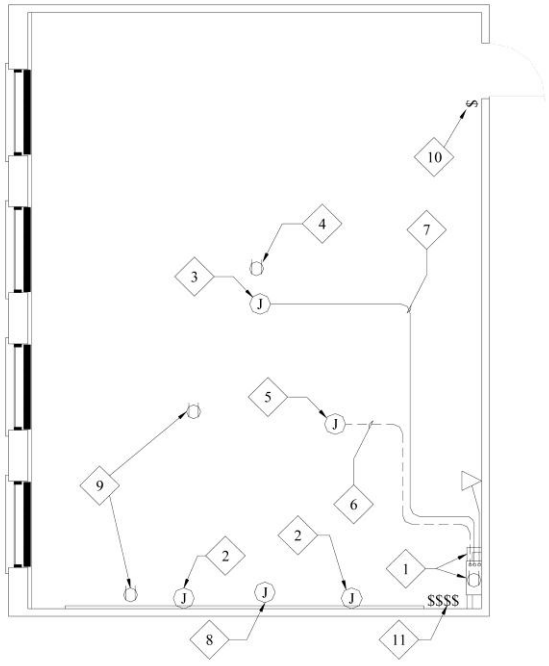
- Provide a wall-mounted switch for seating area lights near each entrance door.
- Provide wall switches in one area near the instructor workstation, mounted 48” above the floor:
    - Dimmer switches that allow lights to be turned fully on, dimmed, or off.
    - On-off switches for marker board lights.
- Specify brushed, stainless steel faceplates with engraved black letters to identify functions.
- Avoid wall-mounted signs or faceplates that vary in color, style, size, and mounting height.
- Arrange switches as illustrated in the diagram below.

Switches must not require holding in position to activate screens or shades. The wall-mounted switch set and audio-visual “smart” control system must be coordinated during design so that they remain operable at all times. Leaving either one in any position or condition must not prevent the other from functioning normally and fully.

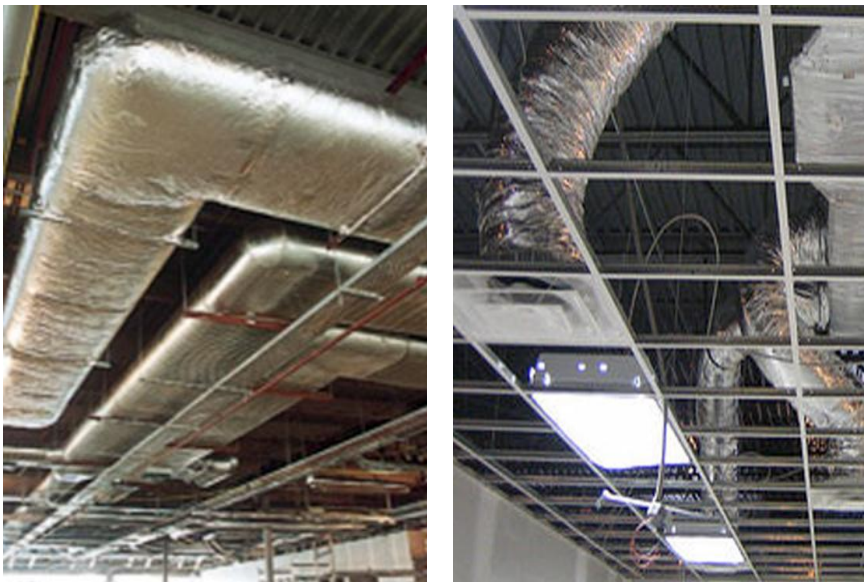
The diagram below illustrates how switches should be arranged and functions identified:



The diagram below illustrates typical locations and sizes of conduit and wiring for electronic classrooms with a full complement of audio-visual components. In large classrooms and auditoriums, provide floor junction boxes, wiring pathways, and wiring to serve all potential locations of the instructor workstation.



10.03 HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)



Typical HVAC Duct Work

HVAC systems should be designed to provide a comfortably conditioned learning environment without disruptive noise, wasted energy, or compromised air quality. Good indoor air quality (IAQ) should be achieved in every instance. An inadequately designed, improperly adjusted, or incorrectly operated and maintained HVAC system may lead to a shortage of properly conditioned air in the classroom. Indoor air temperature, air filtration, air flow and air exchange rates, and outdoor air content, and should be controlled to support attentive and comfortable learning. Sources of pollution near air intakes should be identified for mitigation early in the classroom design phase. The following criteria apply in addition to the ASHRAE Standards:

- Adequate space above the ceiling should be provided for a ductwork, piping systems, electrical conduits, cable tray, special plumbing systems, etc. as necessary to provide accessible and maintainable components.
- Selection of the building HVAC system, in consultation with UNM-PPD engineers, must be made at the schematic design phase.
- Variable flow systems with variable frequency drives should be used wherever possible. The base system design for typical variable air systems for classroom spaces, administrative spaces, and common spaces is a single-duct, VAV system with hot water reheat coils in terminal units. Electric reheat is not allowed.
- A Direct Digital Control (DDC) system is required and should integrate occupancy sensors with lighting and HVAC. Operable windows should also integrate with the DDC system. Unoccupied areas should always activate the HVAC system to unoccupied mode.
- Thermostat set-points should be established in accordance with UNM Energy Management Policy 5100.
    - During the heating season, room temperatures should be maintained between 68-72°F when occupied. Whenever it is economically and technically feasible, temperatures should be allowed to drop to 55°F during unoccupied periods.

- During the cooling season, room temperatures should be maintained between 74-78°F when occupied. Ceiling fans should be operated in all areas that have them. Air conditioning should not be used in classrooms during the summer sessions unless the classrooms are being used for instruction or extracurricular activities. Whenever it is economically and technically feasible, temperatures should be allowed to rise to 85°F during unoccupied periods.

- Return air design velocity through ceiling grilles should not exceed 300 fpm of free open area. Return air design velocity through wall transfer openings should not exceed 450 fpm of free open area. Design velocity for general exhaust ducts should not exceed 1500 fpm except as required for special systems.
- The maximum velocity for medium pressure supply duct should not exceed 2500 fpm.
- The maximum pressure drop for low pressure supply duct should not exceed 0.07"w.c./100 ft.
- Fans should be selected to minimize noise. A room coefficient value of 35 should be the design maximum unless specified by the Owner's Project Requirements (OPR). An overall noise criterion (NC) rating in empty rooms should be at or below NC-35, and should be met with the HVAC system in operation.
- All supply ductwork to diffusers should be provided with balancing dampers located as far away from diffusers as possible in order to provide uniform airflow to the diffuser.
- Ductwork and diffusers should be located away from projection screens and instructor workstations, as this brings noise into the instructor area and causes screens to undulate, distorting projected images.

For further specification see the UNM PPD – Engineering and Energy Services Design Standards at (**http://iss.unm.edu/ppd/webpdfs/designstandardscsiformatrevision2dated11052007.pdf**).

10.04 SECURITY



Teacher station, laptop and printer use has dramatically increased. How should they be secured? While it is impossible to eliminate all risk, the University of New Mexico is committed to providing a safe environment for students, faculty, staff, visitors, and patients. We will use available resources to provide the safest campus possible, while supporting the University's mission of education, research, and patient care.

Protecting *people*, *information* and *property* are primary concerns when designing new space or remodeling existing facilities. Currently, a basic security survey at the preliminary stages of planning is required. In the future, any measures taken are based on a Risk Based Assessment (see Security Survey in appendix). Security Surveys will be completed by personnel trained in environmental Crime Prevention. Each project shall submit a preliminary Security Survey that identifies potential vulnerabilities and opportunities based on hours of operation, crime statistics, value of equipment, who has access, purpose of each room, chemical or bio-hazardous considerations, etc.

Ultimately, a full Security Plan (SP) will be developed for each new building and a modified Security Plan will be developed whenever significant changes are made in design, landscaping, equipment investment or entries/exits in large remodels. Protocols, training and an operating budget are included in the final SC based on any proposed CCTV and access controls. Specific design considerations for classrooms and classroom buildings are a subset within the larger context of environmental design and must be a part of every project. UNM strongly encourages using the concepts espoused by Crime Prevention Through Environmental Design (CPTED).

CPTED is based on the idea that the proper design and effective use of the built environment can lead to a reduction in the incidence and fear of crime, and an improvement in the quality of life. Safety and crime prevention can be enhanced through architectural design and layout, site planning & landscaping, signage, and circulation control. It can also be enhanced by the use of access control, locks, alarms, monitoring and other devices. And finally, safety can also be advanced through organizational methods, such as police, security guards, and observant faculty, staff and students.

Outdoor Patio, Mitchell Hall

Student Gathering, Mitchell Hall

Environment Perimeters:

- Designing the classroom environment begins with an assessment of risk at the perimeter of buildings. Exterior lighting is essential to creating a sense of safety. Halogen lights and bollards are not effective solutions. Provide lighting systems that minimize glare, shadow, light pollution and light trespass. Refer to the *UNM Lighting Guidelines* which suggest standardized fixtures that are energy efficient and provides the proper foot-candles. Identify the pathways that will be used by pedestrians and ensure that they are properly lit and included as a part of the site improvement of a new facility.
- Landscaping is designed in such a way as to avoid the opportunity to screen or hide someone, with adequate set backs from the building. The exterior architecture should facilitate easy visibility of the entrance and areas on the perimeter of the building. Designing low walls,

landscape and paving patterns to clearly define the space around a building entry as belonging to (and the responsibility of) the building occupant provides a "territorial reinforcement" of a public area. Keep shrubbery under three feet in height for visibility. Lower branches of trees should be trimmed to at least seven feet off the ground. Landscaping should not obstruct views from windows.

- Eliminate or design covered walkways to restrict access to the roof and avoid other structural (such as door overhangs and fences or landscaping features) that provide roof access.
- Designate a main area to secure bike racks that is easily observed from a normally occupied area of the building.
- Locate the main entrance so it is easily identified when approaching the building.
- Keep dumpsters visible at the designated service area and place in a secured, locked area or consider an internal trash room. Dumpsters can create blind spots or hiding places.
- Emergency Blue Phones are used to summon police assistance. When the activation button on the station is pressed, a two-way audio link with the 911 communications center is opened.

Internal Design Considerations:

- Locate common areas as centrally as possible or near major circulation paths within the project. Avoid remote locations for common areas.
- Design hallways to be easily observed with very few offsets.
- Locate visual panels (small windows in doors or adjacent to doors) in all classrooms to allow instructors to observe the hallway with minimal visual distractions to the seated students.
- Design an open access to the rest rooms with no need for a hallway door. Position rest rooms adjacent to entries when at all possible.
- Construct stairwells to be open and visible, without solid walls, wherever possible. Place elevators close to the main entrance, with the entire interior in view when the doors are open. Do not install permanent stop buttons in elevators but ensure that elevators can be turned off.
- Glass break systems or motion detection systems are installed on a case-by-case basis, with consideration for assessing what is to be protected. UNM PD will review, advise, and modify the design as needed prior to completion of design development drawings. Motion detection is preferred over glass break systems. (Note: over 3,000 hours were spent in one year to false alarms).
- Reactors, Level III labs, etc. have special considerations and are connected directly to the UNM Police Department.
- Freezers, incubators, etc. frequently have alarm requirements that are routed through UNM PD dispatch, who then contacts the effected lab's researcher. Contact IT for information.

Small Study Area at Zimmerman

Hallway computers at Mitchell Hall

Classrooms:

- Each classroom with ceiling mounted projection is connected to an alarm system monitored and managed by Media Tech Services. Media Technology Services will respond to any apparent interruption in service and notify UNM PD as needed. See technology section.
- All classroom doors will be equipped with locks. Occupants should be able to lock rooms from the inside in the event of an active shooter. Access control is generally not recommended for general classrooms. Trilogy locks are prohibited.
- For class labs, each college-allocated lab space will establish policies and procedures for controlling entry during the handling of any bio-hazardous, radioactive, or chemical materials. All microbiological cultures, bio-hazardous, radioactive, or chemical materials will have secure storage areas provided. Based on the **Security Survey**, departments should consider risks and determine whether access control is appropriate. Older facilities are generally not able to be retrofitted due to concrete or plaster walls and obsolete infrastructure.
- Freezers, incubators and other storage cabinets will be contained within each class lab and locked to prevent access by unauthorized personnel.

Students study in groups, Mitchell Hall

Access Control:

- In new construction, the building perimeter doors will be controlled by the University access control system.

- On central and south campus, the standard is C-Cure. In the Health Sciences Center, it is Maxxus. Emergency exit alarms will not be responded to as a general rule.
- Access controlled doors will have master keyed entry available to UNM Police only. During evening hours, only one door should be used as the primary entrance/exit, with others used for emergency egress only. Funneling students out of one door promotes the buddy system and enhances safety.
- Access control systems should have an IP address with redundancy. Hard wired is preferred.
- If access control cannot be funded on all perimeter doors by the project, building infrastructure will be provided for future installations.
- C-Cure is centrally controlled by Physical Plant Lock Shop for installation, maintenance and repair. Recurring charges for each door with an installed access control device will be funded by each department on a monthly basis. UNM IT will administer the C-Cure access control software.
- To review the door standard, please visit PPD's web site.

Video Surveillance:

- Video surveillance should be evaluated for every classroom project that goes beyond the equipment that they normally contain, with determination made based upon a risk assessment from UNM PD.
- UNM PD will review any recommendations for surveillance. At this time, a centralized system is not in place.
- Cameras should be specified with pan-tilt-zoom features, with night/day capabilities and the ability to alarm in unusual conditions, depending upon the situation.
- Local CCTV systems may comprise one or more cameras, with a digital recording device to allow documentation of activity at the site. Local systems are not monitored at a remote location. Selection of the correct system depends on the amount of video storage needed. The number and location of the cameras used should be designed to ensure coverage of the area to be recorded. The final recorded facial image should be no less than one-fifth the total screen height. Recordings should be secured and stored for a minimum of 90 days.
    - A standard for cameras can be obtained from UNMH Director of Security, Randy Talley. Should funds not be available, preparing the facility with conduits and appropriate infrastructure is acceptable.
    - Do not use "dummy" cameras.

Alarms:

- Fire Alarms always come into the UNM Police Department, as do burglar and panic alarms. Panic and burglar alarms are installed on a case-by-case basis.
- Emergency (Blue) Phones dial directly to UNM PD dispatch. Emergency phones should be included in new construction and major remodel budgets. Collaboration with Safety and Risk Services, Office of Capital Projects, IT, and PD is essential for placement. The main UNM PD # 277-2241.

Reviews:

- UNM Police Department will review the initial Security Plan based upon information from the Risk Based Assessment. A narrative should be provided in each Pre-Design document outlining the security intent. UNM PD will review Schematic Design documents and again at 50% Design Development drawings for compliance with initial risk assessments and provide final decision-making regarding access control, CCTV and other security enhancements.

- UNM PPD will review department business plans that address recurring costs and may recommend reductions based on a solution's cost-effectiveness and/or a test of reasonableness of proposed measures.
- Final Security Plans will be filed with the departments and with UNM PD.

10.05 ROOM SIGNAGE

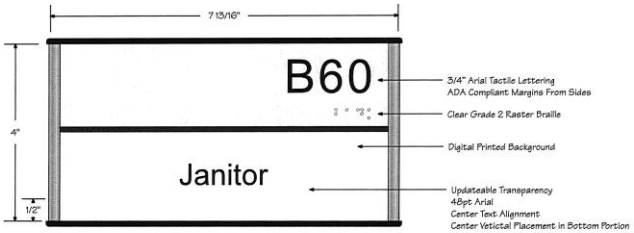
Typical Room Sign at Entry, with Scheduling Matrix Panel

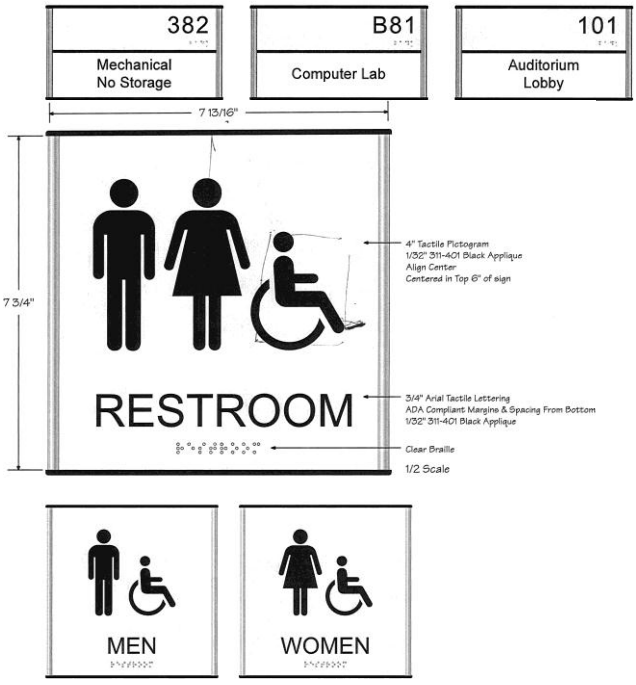
Signage is important in the effort to maintain safety and security while providing information allowing those with physical disabilities to engage successfully with the learning environment. The intent of the current guidelines for signage is to provide the highest standard available from the ADA and the American National Standards Institute (ANSI) as well as the latest International Building Code (IBC) and National Environmental Policy Act (NFPA) standards. Whenever there is a discrepancy with these standards, life safety issues will be the priority. As these national standards evolve over time, UNM will mandate that the most stringent requirement apply to signage.

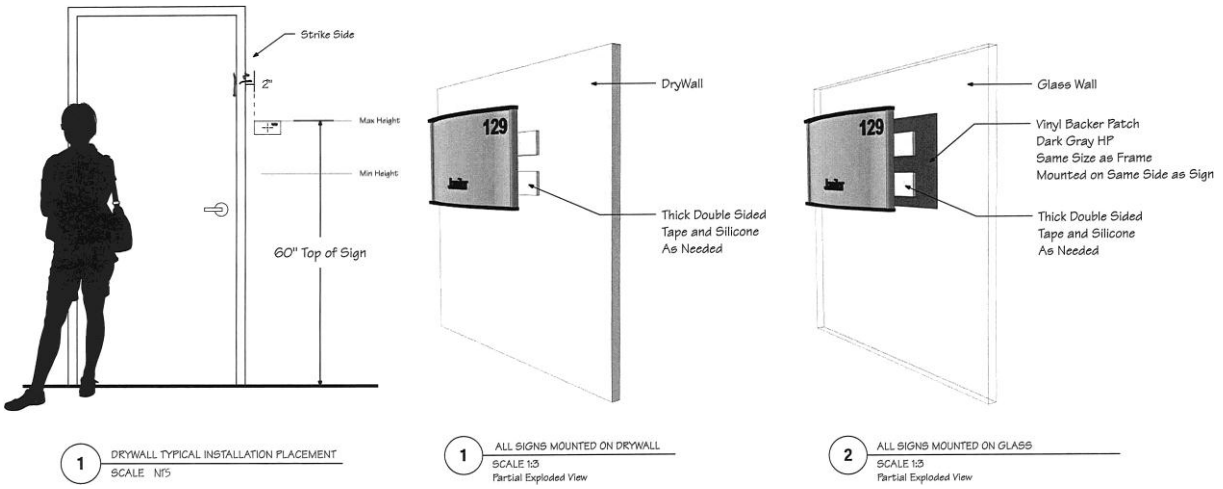
Signage types will vary accordingly to the specific functions and accommodations within the learning environment. ADA requirements, fire safety and other code compliance are paramount. Essential signs for all facilities include exits, room numbers, restroom facilities, stairwell and elevator locations, emergency and fire safety information, and the description of rooms with specific functions. An example list of required signage may include but are not limited by the following:

- Area of Refuge
- Auditorium
- Auditorium Lobby
- Classroom Number Room Signs
- Electrical Room, No Storage
- Exit

- Fire Riser
- In Case of Fire with ICON
- Janitor
- Maximum Occupancy Sign
- Mechanical Room, No Storage
- Restroom- Men, Women, Disability
- Roof Access
- Stairwell Identification/ Floor Identification Sign
- Stair Identification Sign (Stair) – Used when the stairs are not part of the egress.
- Stair Identification/Exit Sign (Stair/Exit) - Used when the stairs are part of the exit egress.
- Telecom Room
- Trash







Interior Sign Design Considerations

- Signs shall have the capacity to be easily updated in a timely, economical manner. The Diversity updateable sign system or equal may be used.
- All signs shall have a uniform appearance and style of font. Arial Roman font is recommended for compatibility with end user's print machines. Templates for updateable inserts should be provided to all end users.
- All signs shall have an ADA compliant sign lens with both raised characters and corresponding domed Grade ll Braille. Some instructional signage within rooms may not require raised characters or Braille.
- The printed background insert shall be of a tear-resistant material and water-fast coating such as PVC media or equal.
- All symbols shall be those developed for the USDOT, the SEGD standard accessibility symbol, or custom icons as approved by the University Architect.
- A furniture layout placard shall be placed prominently in each room by the primary exit showing the approved furniture layouts. Each placard shall include the statement "All furniture and egress patterns must be maintained for safe emergency evacuation per code."

Reviews

- UNM Planning and Campus Development will review the initial signage plans with final approval by the University Architect.

10.06 TRASH AND RECYCLING CONTAINERS

Typical Trash/Recycling Combination Container

Trash receptacles are to be attractive and to be neutral in color. They are to be located near exit doors while not interfering with circulation and other room functions. As recycling is strongly encouraged throughout UNM as part of a coordinated sustainability effort, recycling containers should be conveniently located to serve building occupants on each floor in locations where recyclable items are predominantly generated.

Recycling containers should not be located within learning rooms, but should be located within lobbies, lunch rooms, informal gathering areas, or along corridor walls near learning room doors while in close proximity to trash receptacles so as to discourage contamination of recycling containers with trash. Trash and recycling containers must not impede required egress and accessibility areas. It is recommended that a 2-bin recycling unit (typically one for paper & one for bottles/cans) be specified in conjunction with a trash receptacle. Recycling containers should always have restricted openings (a slot for paper & a circular opening for bottles/cans) to distinguish them from trash receptacles and to prevent contamination by trash. Recycling containers must be placed on a solid, sealed floor surface (not carpet) to permit spill cleanup. Further, recycling containers should be backed by a wall surface that is easily cleaned.

10.07 CLOCK SYSTEMS

Faculty request that the standard in each classroom include a clock. This simple request has generated significant discussion among planners, architects, physical plant personnel and information technology. The solution vetted by Physical Plant and Information Technology recommends a network oriented solution that will improve operational efficiencies. While basic battery powered clocks appear to be the least expensive option, manual processes of resetting thousands of clocks twice per year, let alone changing out batteries and troubleshooting, can be very costly and inefficient. UNM is moving towards a cost effective, synchronous timekeeping solution that allows remote, automatic updating and resetting clocks.

Power over Ethernet (PoE), IP clocks are preferred (vs GPS wireless clocks), so ensure that an internet connection be specified in design drawings in the proper location. Dual-facing clock assemblies require two PoE connections. GPS wireless clocks are strongly discouraged. Clocks will need to tie into SNS Time Server at UNM for synchronizing time via NTP, 2-way communication between SNS Time Server and clocks, reporting and archiving clock information and configuration clocks remotely. The transmitter shall include a battery back-up. The system shall be Primex Wireless, Inova, or approved equal.

Coordinate clock types (analog vs digital) and display type (6 digit vs 4 digit) with building users and their needs. The clock should be positioned so that the lecturer and students can easily see the clock at a glance. For assistance in specifying and installation, contact Physical Plant Engineering.

11 Conclusion

The Learning Environments Design Guideline (LEDG) of the University of New Mexico is a performance-based document rather than a strictly prescriptive one. It puts to test the underlying principles used to formulate its many components and is designed to engage feedback for their ongoing improvements. The LEDG is therefore under continual modification based upon current research, user feedback, and shifting trends. It is subject to detailed modifications of content as well as fundamental shifts in perspective.

Overall, the LEDG manifests from an inclusive approach that supports and sustains qualitative learning environments for current and future generations at UNM. This document should be used critically and imaginatively toward the creation and improvement of all UNM learning environments.

LEDG
APPENDICES

Appendix 1: LEDG Variance Form

Page 1 of 2

UNM LEDG

Variance request Form

Please complete Section I of this form and deliver or email the request to Robert Doran, UNM Architect. The form must be signed by the UNM Project Manager assigned to the project.

rdoran@unm.edu
Robert Doran, UNM Architect
Planning and Campus Development
The University of New Mexico
1841 Lomas Boulevard NE
Room 206
MSC 07-4212
Albuquerque, NM 87131-0001

Section I

Date Click here to enter a date. Project Name Click here to enter text.

Requestor Name, Email, Telephone No. Click here to enter text.

Deviation from Standard section number and name: Click here to enter text.

1. Request description: Click here to enter text.
2. Justification for request: Click here to enter text.
3. Proposed solution: Click here to enter text.

UNM Project Manager Name and contact information: Click here to enter text.

X _____

UNM Project Manager (signature)

Page 2 of 2

UNM LEDG
Variance request Form

UNM Architect recommendation and variance approval:

UNM Architect ☐ Approve ☐ Disapprove Reason Click here to enter text.
Suggested Solution: If you deny the variance and want to suggest an alternative solution describe it here

---

The University Architect can request that the Learning Environments Committee review the request for Variance.
LEDG Committee Meeting Date Click here to enter a date

LEDG Committee Meeting ☐ Approve ☐ Disapprove Reason Click here to enter text.
Suggested Solution: If you deny the variance and want to suggest an alternative solution describe it here

---

Final decision date: Click here to enter a date.

X _____

UNM Architect

X _____

Project Manager Signature

UNM Architect must send a copy of approved or rejected form to the UNM Project Manager, The LEDG Committee Chair and the Variance Requestor.

Appendix 2: Technology Tier Specifications

Based upon increased investment in media technology, UNM identifies herein seven separate tiers for its learning environments. A tier captures requirements for different levels and combinations of instructional technologies in order to accommodate a variety of instructional approaches and media involvement. A tier's definition is subject to extreme shifts and rapid changes as instructional technologies and learning modes evolve within contemporary technological milieus. Though every effort is made to keep current the guidelines herein, the design professional must verify that they are up-to date, or identify if there are outstanding changes, which may not be included.

Current definitions may be found at the following websites:

- UNM Media Technology Services (MTS) http://mts.unm.edu/;
- UNM Office of the Chief Information Officer (Office of the CIO) http://cio.unm.edu/;
- UNM Information Technology (IT), and http://it.unm.edu/;
- UNM Purchasing http://www.unm.edu/~purch/.

Learning environment technology tiers are defined below. The tier guidelines describe the intended functional use of information and/or instructional technologies. In some special cases, a particular brand, company or standard may be specified to enable interface with our current learning environment infrastructure. Because technology profiles are always evolving, the designer should verify that technology interfaces, such as vendors, standards, or device specifications, are current and up to date. See the *2011 UNM Approved Technology Vendor List* in *Appendix.*

Study Room, Zimmerman Library

Learning Studio, Science & Math Learning Center (SMLC).

A2.01 BASE GUIDELINE

All design instances that are identified as a candidate for any of the technology tier-level guidelines must provide the baseline technologies listed below. Essentially, these are wireless connectivity, Internet access, an overhead projector, and AC power to accommodate all electrical devices, including instructor and students laptops or other computing devices.

Currently, not all environments will provide printing stations, however *plans* for at least one printing station should be considered an element of all baseline designs. Consequently at a later time, rooms without printing services can be easily modified for that purpose without depreciating the original environmental design and its intended use.

Furthermore, as technology develops additional computing-enabled learning technologies will undoubtedly emerge and could be integrated as baseline elements for all learning environments. Therefore, the design professional should inquire if any additional baseline technologies have been added which are not listed here.

- Wired Access per 802.03 for Teacher Station
- Wireless Access per 802.11.x
- Internet Access
- Overhead Projector
- Electrical Power
    - To accommodate all devices
    - Basic 4-plug power outlet at front of room
    - Charging stations for mobile computing
        - As appropriate for use-density
        - Minimally 1 power plug for each student
- Planned accommodation for networked printing
    - Space for 1 networked printer

    - AC and network cabling for printer
- Optional: Computing-enabled Learning Technologies and Interfaces

A2.02 TIER ONE TECHNOLOGY

Basic Description
Tier One Technology is installed within the majority of classrooms on campus. At a minimum, it consists of a single projector, DVD/VCR, audio speakers, a teacher station, laptop connectivity, networked desktop computers, an electric projection screen, and a simple control touch panel to operate and to adjust equipment sources.

Intended Use
Tier One Technology supports traditional teaching activities. These are lectures to small- to medium-sized class; pedagogical discourse between instructor and students; and small group activities. However there may be media related pedagogical activities, such as viewing films or Internet content on the screen. Presentation technology should be situated so as minimize obstruction to whiteboards or chalkboards.

Basic Teaching Classroom
- Baseline infrastructure
- Instructor height-adjustable stool
- Installation and Theft Deterrence
- Resource Management Software

Instructor Technology
- Teacher Station
- Optional: Smart Podium
- Document Camera
- Control System and Control Software

Student Technology
- Baseline for AC power and wireless connectivity

Presentation Technology
- ***Two Computers and One Video Source (Desktop + Laptop + DVD or Blu-Ray player)***
    - Desktop Computer with appropriate Disk Image
    - Control Wall Plate for one computer and one video source
    - Cabling
        - Compatible with Control System
        - Plenum rated (RGB, VGA, DisplayPort, HDMI, etc.)
        - Breakout (A/V) from wall plate to source (12')
    - DVD/VCR combo player or Blu-Ray player
        - Region-free DVD playback
    - 1 (one) Projector: 2500+ lumens WXGA
        - Closed-captioning

- RS232
- Ethernet
- 3-year replacement, next business day warranty (NO CHARGE)
- Lockable/secure projector mount

- 1 (one) Projection Screen: 5x8 *(l13"on* the diagonal)
  - Low-voltage controller (check room size)
- Ceiling speaker set
  - Additional speakers may be required (check room size).

A2.03 TIER TWO TECHNOLOGY

Basic Description
Tier Two Technology is generally installed within larger learning environments or within those that, because of the demands of layout and instruction, require additional instructional technology. Tier Two technology includes all Tier One technology (see above 5.2 *Tier One),* however Tier Two includes two projectors, two electric projection screens, a document camera, and a podium with interactive pen display. The control system must allow the instructor to be able to send any source to either one of the projectors.

Intended Use
Tier Two Technology, like Tier One, supports traditional teaching activities (see 5.2 Tier One Room). The classes are larger; therefore instructors may use two projectors to accommodate a higher number of viewers. Smart Podiums engage and involve the audience as the instructor writes over any applications with digital ink, accesses websites or multimedia content, and saves the digital ink notes for future access. Document cameras project images from a book, or allow instructor to draw, calculate, or demonstrate below the document camera, which can be viewed on the screen in real time. As with Tier One, presentation technology should be situated so as minimize obstruction to whiteboards or chalkboards.

Basic Teaching Classroom

- Baseline infrastructure, see 5.1 *Baseline Learning Environment Technologies*
- Instructor height-adjustable stool
- Installation and Theft Deterrence
- Resource Management Software

Instructor Technology

- Teacher Station
- Optional: Smart Podium or Interactive Whiteboard
- Document Camera
- Control System and Control Software

Student Technology

- Baseline for AC power and wireless connectivity

Presentation Technology

- ***Two Projectors* to *Multiple Sources (Desktop + Laptop + DVD or Blu-Ray player)***
    - Desktop Computer with appropriate Disk Image
    - Control Wall Plate for one computer and one video source
    - Cabling
        - Compatible with Control System
        - Plenum rated (RGB, VGA, DisplayPort, HDMI, etc.)
        - Breakout (A/V) from wall plate to source (12')
    - DVD/VCR combo player or Blu-Ray player
        - Region-free DVD playback
    - 2 (two) Projector: 2500+ lumens WXGA
        - Closed-captioning
        - RS232
        - Ethernet
        - 3-year replacement, next business day warranty (NO CHARGE)
    - Lockable/secure projector mount
    - 2 (two) Projection Screen: 5x8 (l13"on the diagonal)
        - Low-voltage controller (check room size)
    - Ceiling speaker set
        - Additional speakers may be required (check room size).

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A2.04 TIER THREE TECHNOLOGY

Basic Description

Tier Three Technology is installed within very large lecture halls and auditoriums. At a minimum Tier Three consist of two or more projectors, electric projection screens, a document camera, a DVD/VCR, a Blu-Ray player, a 7.1 audio surround sound system, a multimedia teacher lectern, connectivity for laptop and desktop computers, wired and wireless microphones, cameras with mounts, a control system with custom programming, an equipment rack, and UPS battery backup with surge protection. The control

system will be customized to allow instructor to easily switch video sources, display multiple sources at the same time. Additionally, a lecture-capture records courses for students to review at a later time.

Intended Use

Tier three is primarily used in large lecture halls and auditoriums.

Large Lecture Hall

- Baseline infrastructure, see *5.1 Baseline Learning Environment Technologies*
- Instructor height-adjustable stool
- Installation and Theft Deterrence
- Resource Management Software

Instructor Technology

- Wired microphone
    - For voice amplification and/or lecture capture
- Wireless microphone system with battery eliminator
    - For voice amplification and/or lecture capture
- Smart Podium or Interactive White Board
- Control touch panel
- Control Programming
- Multimedia lectern [Is this a Smart Podium?]

Student Technology

- Baseline AC power (charging stations) and wireless connectivity
- Optional: i-Clicker technology

Presentation Technology

- ***Multiple Projectors* to *Multiple Sources (Desktop + Laptop + DVD or Blu-Ray player)***
    - Desktop Computer with appropriate Disk Image
    - Control Wall Plate for one computer and one video source
    - Cabling
        - Compatible with Control System
        - Plenum rated (RGB, VGA, DisplayPort, HDMI, etc.)
        - Breakout (A/V) from wall plate to source (12')
    - 2+ (two or more) Projector: 2500+ lumens WXGA
        - Closed-captioning
        - RS232
        - Ethernet
        - 3-year replacement, next business day warranty (NO CHARGE)
    - 2+ (two or more) Lockable/secure projector mounts
    - 2+ (two or more) Motorized Projection Screens: verify dimensions with room size
        - Low-voltage controller (check room size)
    - Low-voltage controller (check room size)
    - Ceiling speaker set
        - Additional speakers may be needed (check room size)
    - Surround-sound audio system
    - DVD/VCR combo player
        - Region-free DVD playback

- Blu-Ray player
- Equipment rack
- Surge protectors and UPS battery backup for equipment

Class Capture Recording Technology

- Pan-tilt-zoom (PLT) camera for lecture capture
- Camera Mount
- Class-capture recorder
- Backup DVD/VCR recorder
  - Region-free DVD playback

Auditorium, George Pearl Hall.

A2.05 TIER FOUR TECHNOLOGY

Basic Description

Tier Four technology is installed within computer classrooms/pods. For AV setups refer to Tier One or Two for the base system. Each student is provided with a computer with monitor. Please visit the UNM Office of the CIO website (http://cio.unm.edu/standards/) for the current desktop computer standards.

Intended Use

[insert pedagogical intent here]

Computer Classroom

- Baseline infrastructure see 5.1 *Baseline Learning Environment Technologies*
- Instructor height-adjustable stool
- Installation and Theft Deterrence
- Resource Management Software
- Tier One or Two Audio-Video set-up

Instructor Technology

- Networked Desktop computer with appropriate Disk Image
- Teacher Station
    - Optional: Smart Podium or Interactive Whiteboard
- Document Camera
- Control System and Control Software

Student Technology

- Baseline AC power (charging stations) and wireless connectivity
- Networked desktop computer with appropriate Disk Image per student
    - Count is determined by room capacity

Printing and Scanning

- High-volume networked printer
- Print-spool release station
    - Designated CPU
    - Spool software
    - ID-swipe keyboard
- Document scanner
- See *Section* 9.19 *Printers and Scanners*

Miscellaneous

- Phone/alarm and intrusion detection
    - *Optional:* security cameras
- Carpet (no tile)
- Whiteboards - oriented to lectern
- Digital clock

Optional

- Smartboards or Smart Podiums
- Web Conferencing

Computer Classroom, Mitchell Hall.

A2.06 TIER FIVE TECHNOLOGY

Basic Description

Tier Five Technology is installed within distance education rooms that support Interactive Television courses (ITV) courses. These rooms can vary slightly based on room configuration. Consultation with Media Technology Services prior to design is imperative. These rooms must allow for the sending and receiving of live content to remote locations in real time. They shall consist of a minimum of 4 (four) flat panel displays (and/or projectors), 2 (two) high-resolution PTZ cameras, and microphones for the instructor and the audience, a desktop computer, laptop connectivity, a DVD/VCR player, a document camera and a control system. In addition, video conferencing and class-capture technologies are required for content delivery and recording.

Intended Use

[pedagogical activities listed here]

[

Distance Education Interactive Television Classrooms

- Baseline infrastructure, see *5.1 Baseline Learning Environment Technologies*
- Instructor height-adjustable stool
- Installation and Theft Deterrence
- Resource Management Software

Instructor Technology

- Networked Desktop computer with appropriate Disk Image
- A/V hookup for laptop
    - Optional: Hookup for additional external A/V equipment on instructor desk
- Instructor microphones

    - One wired microphone
    - One wireless microphone
- 2 (two) *g/l* monitors for instructor (preview and program) desk
    - Monitor One:
        - Instructor view remote-site broadcast preview
    - Monitor Two:
        - Instructor view remote-site broadcast
        - Instructor view of real-time remote-student views
- 1 (one) remote control to route equipment
    - Route different sources to different destinations

Student Technology

- Baseline AC power (charging stations) and wireless connectivity
    - Capacity depends upon room size and layout
- Student microphones
    - Automatic gated ceiling microphone
    - Count depends on room size and layout

Presentation Technology

- Minimum 4 (four) LCD TV monitors, at least 42"
- DVD/VCR player
    - Region-free DVD playback

Webcast/Broadcast Technology

- *ITV classroom equipment (classroom)*
    - Computer-to-composite scan converter
        - To allow computer-to-broadcast signal conversion
    - 1 (one) video projector
    - Videoconferencing unit
    - Room Audio/Video output for Web Conferencing
    - Speakers
        - To distribute audio from different sources around the room
        - Count depends upon room size and layout

ITV room equipment (operator's equipment)

- 1 (one) touch-screen equipment controller
    - To route A/V sources to different or multiple destinations.
- 2 (two) gil monitors
    - Monitor One: for preview
    - Monitor Two: for program
- Automatic audio mixer
- Audio monitor
- Camera controller
- Backup DVD/VCR recorder
    - Region-free DVD playback
- Classroom titling/notification system
    - To display information for next class (for remote students)

Class Capture Recording Technology

- 2 (two) Pan-tilt-zoom (PLT) hi-resolution camera for lecture capture
- 2 (two) Camera Mounts
- Class-capture recorder
- DVD/VCR backup recorder
    - Region-free DVD playback

[Place photo here of a different Distance Educ **ITV** classroom, please identify location if new photo required.]
[Place photo here of a different **ITV** equipment room, please identify location if new photo required.]

A2.07 TIER SIX TECHNOLOGY

Basic Description

Tier Six rooms are conference rooms or small seminar classrooms. These rooms should have the capability to show a computer and video source, either by projector or flat panel display (depending on room layout and dimensions). Camera{s) and microphones are also desired so the room will be able to facilitate web conferencing and/or videoconferencing.

Intended Use

[pedagogical activities listed here]
[Refer to examples of room types here?]

Conference Room

- Baseline infrastructure, see 5.1 *Baseline Learning Environment Technologies*
- Installation and Theft Deterrence
- Resource Management Software

Instructor Technology

- Baseline AC power (charging station) and wireless connectivity
- Control System
    - Wall plate for one computer and one video source

    OR
    - Control table top mount built into conference room table
- Instructor microphones [please verify these]
    - One wired microphone
    - One wireless microphone

Student Technology

- Baseline AC power (charging stations) and wireless connectivity
    - Capacity depends upon room size and layout
- Student microphones
    - Automatic gated ceiling microphone
    - Count depends on room size and layout

Presentation Technology

- 1 (one) Projector: 2500+ lumens WXGA
  - Closed captioning
  - RS232
  - Ethernet
  - 3-year replacement next business day warranty on projector (NO CHARGE)
- 1 (one) Lockable/secure projector mount
- 1 (one) Projection Screen: 5x8 *(113"on* the diagonal)
  - Low-voltage controller (check room size)
- Ceiling speaker set
  - Additional speakers may be needed (check room size)
- DVD/VCR combo player
  - Region-free DVD playback
- Blu-Ray player

Conference room additions

- Video Conferencing unit:
  - Includes camera, and flat-panel display
- Web Conferencing software:
  - Includes camera, and software licensing

A2.08 TIER SEVEN TECHNOLOGY

Basic Description

Tier SevenTechnology rooms are studio classrooms that are designed to maximize collaborative learning through furnishings that turn students toward one another rather than toward a focal-point presenter. Although configurations vary, these classrooms will always be supported with technology that facilitates collaboration. Multiple projection screens or flat-panel screens may be required in larger rooms in order to assure line of sight from all seats. AC power, data, and wireless connectivity to support individual laptop or tablet/pad computers at each seat is required, although the actual number of provided portable computers will vary with each project. Interactive whiteboard or equivalent projection technology should be provided. A standard multimedia teacher lectern with CPU, monitor (or Smart Podium), a DVD/Blu-Ray player, and a document camera included.

Intended Use

[pedagogical activities listed here]
[Refer to examples of room types here?]

Learning Studio

- Baseline infrastructure, see 5.1 *Baseline Learning Environment Technologies*

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- Wired Access for Teacher Station
- Wireless Access
- Internet Access
- Overhead Projector