EWU Classroom Design Guidelines
Draft 6
August 27, 2009

Purpose of this document:
EWU Classroom Technology, in partnership with the Office of Information Technology, and Construction and Planning Services engages in classroom renovation and presentation equipment upgrades each academic year. This document is designed to be a set of general principles to guide the various renovation projects in building classrooms and teaching spaces that best serve EWU students, faculty, and staff.

Scope of this document:
While these guidelines serve as recommendations for many classroom projects at EWU, they cannot and will not cover all possible design aspects of instruction spaces. The ongoing classroom enhancement project is focused specifically on building general access, generally scheduled, non-departmental FICM (Postsecondary Education Facilities Inventory and Classification Manual)* code 110 classrooms. Completed enhanced classrooms should not be department-controlled or -scheduled and should provide space for instruction by any instructor in any department teaching any course. These guidelines describe generic teaching spaces without specialized equipment that might preclude instructors and students of other classes from using the presentation equipment or the teaching space.

Construction and Planning identifies general use classrooms at EWU as:

Definition: A room or space used primarily for instruction classes and that is not tied to a specific subject or discipline by equipment in the room or the configuration of the space.

Description: Includes rooms or spaces generally used for scheduled instruction that require no special, restrictive equipment or configuration. These spaces may be called lecture rooms, lecture-demonstration rooms, seminar rooms, and general-purpose classrooms. A classroom may be equipped with tablet armchairs (fixed to the floor, joined in groups, or flexible in arrangement), tables and chairs (as in a seminar room), or similar types of seating. These spaces may contain multimedia or telecommunications equipment. A classroom may be furnished with special equipment (e.g., globes, pianos, maps, computers, network connections) appropriate to a specific area of study, if this equipment does not render the space unsuitable for use by classes in other areas of study.

Room Types:

*Enhanced Classrooms* – Classrooms with permanently installed presentation equipment with seating capacities up to 100.

*Enhanced Auditoriums* – Similar to enhanced classrooms, but with capacities over 100 and usually with tiered or sloped floors and fixed seating. These rooms often have additional audio and video capability such as additional microphones and multiple projection screens.

*Computer Classrooms* – Classrooms with a computer workstation for every student. These rooms are to be used only for scheduled, directed classroom instruction, not as open computer labs. The computer workstations are business class models managed by Classroom Technology.

- KGS 331
- SNR 225

*Classrooms with Videoconference Capability* – Classrooms with permanently installed videoconference equipment integrated with the presentation systems. These rooms can be used as general presentation classrooms as well as videoconferences as part of teaching.

- WLM 127
- SNR 101
- SNR 203
- SNR 221
- SCI 173
- CEB 232
- CEB 233

*Patterson Presentation Carts* – Classrooms with presentation equipment installed on a wheeled cart. The cart is assigned to a specific room and has all the capabilities of an enhanced classroom aside from no Lectern PC and no wireless microphone. These carts are only in 20 classrooms in Patterson Hall and will be replaced as part of the scheduled Patterson Hall remodel.

Classroom Data Sheets

During the summer of 2008, Construction and Planning Services, the Office of Information Technology, and the University Registrar developed and deployed Classroom Data Sheets to all classrooms on the Cheney campus. These Classroom Data Sheets identify a classroom’s physical location on campus, preferred room and seating layout, optimum classroom seating capacity, maximum occupancy as determined by fire code, the FICM Classification, and the room area in square feet. The Classroom Data Sheets are posted near the door in each classroom.
**Room Design and Layout:**
When designing a classroom for enhancement, all aspects should be considered. Existing classrooms should be seen as blank canvases with the four walls, windows, and doors as the only limitations (though, these last two can also be modified). New facilities or major construction projects should be seen as having no limitations within the space identified for teaching classrooms.

**Classroom Arrangement**
The classroom should be oriented in such a way so that students do not enter from the “front” of the room. This will minimize classroom disruptions if a student arrives a few minutes late. If the existing classroom orientation is such that students would enter from the front of the classroom, the room should be re-oriented to another direction. Given the choice, wide and shallow classroom arrangements are preferred over long and narrow arrangements.

**Sight Lines**
Classrooms should be arranged in such a way so that there are clear sight lines from all seats to the projection screen. All student seats should be placed within the optimal viewing area for the classroom projection screen(s). This area is identified as fitting within a 45° from the center point of the projection screen. If a classroom has multiple screens or a single offset screen, the student seats should still fit within the optimal viewing area.
**Screen placement**

The projection screen should be placed as close to the center of the teaching wall as possible, barring any existing furnishings, infrastructure, or whiteboard issues. In smaller classrooms, care must be taken to maintain a minimum 8’ of unobstructed whiteboard when the projection screen is down whenever possible.

**Screen Size**

The ideal size of the projection screen for a classroom should be determined using the following formulas:

- Screen Height = 1/5\(^{th}\) the distance from the front wall to the last row of seats
- Screen Width = Twice the distance from the front wall to the first row of seats

\[ A = \frac{x}{5} \quad \text{and} \quad B = 2z \]

- \(x\) = Distance from the front wall to the last row of seats
- \(z\) = Distance from the front wall to the first row of seats
**Seating placement**
The distance from the projection screen to the front row of seats should be eight feet or the same as the screen width; whichever is greater. Seating should also be six feet away from any secondary teaching walls with mounted whiteboards in order to give the instructors and students plenty of room to use the whiteboards. Student seating should never be placed directly against any wall with whiteboards, projection screens, or any other commonly used teaching surface.

**Doors**
Ideally, the doors between a classroom and hallway should have a small window mounted directly in the door or immediately adjacent in order to allow viewing into the classroom without opening the door and possibly disrupting a class.
Room Furnishings:
Classroom furniture-- students should be given appropriate seating and plenty of room. Modular furniture for varying layouts support lectures as well as group work. Modular seating also provides all seats as ADA compliant.

Teaching Table
All classrooms should have a table (approximate dimensions of 48-60” x 20-24”) placed at the front as a staging area for instructor use. Whenever possible, this table should match any tables used for student seating.

Seating
Classrooms should be fitted with tables and chairs for student seating. Student tables should be 60-72” long by 20-24” deep, with each table seating two students. Tables should be light enough to be easily moved by two students, but should not have wheels. Seating should be placed in such a way as to allow each student 20-25 square feet of space.

Chairs should be stackable in order to allow for various classroom layouts. Chairs should not have wheels.

A stool or tall chair should be provided at each lectern for instructor use.

In auditoriums or large classrooms with tiered seating, permanently affixed seating is appropriate.

All tablet-arm chairs should be removed, as they are no longer adequate for the modern university teaching environment and do not promote accessibility.

Lighting
Easy-to-use and full-featured controls for all aspects of the classroom lighting should be mounted near the lectern. When lighting is controlled via a central control panel, physical switches should also be available. Each classroom should also have a light switch for the safety or entry light near the door.

Classroom lighting should be split into at least two zones—one zone directly above the front 1/3rd of the classroom and one above the rear 2/3rd of the classroom. The front lighting zone should be controlled separately from the rest of the classroom to allow for the lights above projection screen to be dimmed while still providing plenty of lights for student work.

Where possible, additional lighting should be provided above any whiteboards, though whiteboard lighting should not bleed onto the projection screen. In larger classrooms and auditoriums, additional lighting zones should be designed to best suit the space.

A small spotlight above the lectern is also recommended in order to give the
instructor plenty of light for preparing materials without affecting the projection display.

Windows and natural lighting
Classrooms should be equipped with two types of window treatments: shades to reduce glare but still allow natural light into the classroom and blackout blinds for full lighting control even in direct sunlight. In larger classrooms or auditoriums, powered shades and blinds are recommended though manually operated treatments are sufficient for most classrooms at EWU.

Paint
The primary teaching wall should be painted with a dark accent color in order to better distinguish the whiteboards and projection screens. Other classroom walls should be painted a lighter color or complimentary shade to the accent color on the primary teaching wall.

Acoustic Wall Panels
Acoustic wall panels colored to match the accent color on the primary teaching wall should be placed on all non-teaching walls in order to mitigate noise and provide for a better learning environment.

Whiteboards
The primary teaching wall and any secondary teaching walls should have whiteboards and dry-erase markers. Each classroom should have a minimum of 16 linear feet of whiteboard. On the primary teaching wall, the whiteboards should span the entire wall (within limits of available pre-cut whiteboards), ideally from edge to edge. This will maximize the available space for instructor use. When the projection screen is down and in use, there should always be at least 8 feet of useable whiteboard available. Whiteboards should be magnetic.

Whiteboards should be mounted 36” above the finished floor. Whiteboards should be 48” tall, and the top of the writing surface should be no higher than 84” above the finished floor.

Whiteboards should also be placed on at least one secondary teaching wall immediately adjacent to the front teaching wall. The whiteboards on secondary walls do not need to extend the distance of the wall, but should provide sufficient working surface (generally 8’-16’ on each secondary wall).

If additional whiteboard space is needed beyond what is available on the teaching wall and any secondary walls, multi-layered sliding whiteboards should be used.

Chalkboards should be prohibited in enhanced classrooms with installed equipment.

Clock
Each classroom should have a large, easy to read clock. When mounted, the clock should be visible by both students and instructors. Refer to SECTION 16680 - CLOCK SYSTEM for more information.

**Lectern**
Each classroom will have a teaching lectern that will serve both as a place from which to teach as well as a location for installed presentation equipment. There are several variations of existing lecterns currently installed in classrooms and future variations will likely need to be considered as more and smaller classrooms are enhanced with presentation technology. Equipment should be rack-mounted inside the lectern.

Lecterns should be placed so that instructors have a clear view of all students and students can easily view the instructor. However, the lectern should never block line of sight from students to the projection screen. Lecterns should also not be placed near an entry doorway or impede student access in any way. Lecterns in which equipment is installed and wired should be permanently affixed to the floor and should not be on casters or wheels in order to minimize equipment damage. When lecterns are placed away from all walls, there should be 36-42” clearance on all sides.

In smaller classrooms, lecterns may be placed directly against walls in order to maximize space for student seating and instructor teaching area. Lecterns installed in such a manner will have to be evaluated on a per room basis to ensure proper placement according to their location on the right or left side of the classroom.

Lectern height should be 39” to the top surface. Height of the keyboard tray should be no higher than 34.”

**Screen controls**
Easy to use projection screen controls should be mounted near the teaching lectern. When the projection screen is controlled via a central control panel, physical switches should also be available.

**Carpet**
All classrooms should be carpeted in order to mitigate classroom noise. Carpet should be rough, tough, and elegant. Carpet colors should compliment the painted accent wall and acoustic panel colors.
Room Equipment:
All classrooms should have a standard package of presentation equipment:
- Ceiling-mounted video projector
- Lectern computer
- Laptop connections for video (VGA), audio, network, and USB
- DVD/VCR
- Document Camera
- Wireless microphone
- Wireless hearing assist

Some classrooms will have additional capabilities such as interactive whiteboards, wireless projection, or videoconference equipment, though these should never be in lieu of the aforementioned display options.

Starting in January 2008, all classrooms should use wide aspect ratio projectors and projection screens as the standard. These displays allow for 25-30% more information in the same vertical space as the equivalent 4:3 projection area and more closely match current computer displays.

![Comparison of a 16:9 image (blue) vs. a 4:3 image (green) with the same height](image)

Exceptions will be made in special cases, such as reusing an existing over-sized screen in a large auditorium.
**Projector**

All general classrooms should have a data projector permanently mounted to the ceiling. Projectors must output at least 3000 lumens in small to medium classrooms and 5000 lumens in large classrooms and auditoriums. Projectors must allow full serial control via RS-232 for integration with classroom control and management systems. Projectors should ideally be filter-less or require minimal routine filter changes.

<table>
<thead>
<tr>
<th>Date Installed</th>
<th>Manufacturer</th>
<th>Model</th>
<th>Lumens</th>
<th>Aspect Ratio</th>
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<td>August 2009</td>
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<td>WD3300U</td>
<td>4000</td>
<td>16:10</td>
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<td>May 2009</td>
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<td>3000</td>
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<td>WL6700U</td>
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<td>WD2000U</td>
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<td>March 2006</td>
<td>Barco</td>
<td>IQ G350</td>
<td>3500</td>
<td>4:3</td>
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</tbody>
</table>

Exceptions currently exist only in Patterson Hall where portable carts are used in lieu of permanent equipment installation so close to the planned building renovation beginning in fall 2009.

**Projection Screen**

All classrooms should use motorized screens rather than manual pull-down screens. Motorized screens present a more professional appearance and will stop in the precise set position every time. Manual screens can be difficult to rise and lower, projected images can be easily distorted, and often have a shorter lifespan than motorized screens. Projection screens should have a black matted border and a flat white, non-beaded surface.

**Interactive Whiteboards**

Classrooms with interactive whiteboards should use SMART Technologies SMART Boards, front projection Series 600, in the largest size possible. Other brands of interactive whiteboards should be considered only if they are compatible with SMART Notebook software. SMART Boards should be connected via USB to the permanently installed Lectern PCs and, when possible, also allow for Guest PC laptop connections via a relay-powered USB switch. In large classrooms or auditoriums, where a SMART Board is simply not large enough, SMART Sympodium interactive displays may be considered.

**Control System**

All classrooms will include a centralized control system capable of controlling the projector, room audio volume, and switching equipment. Additional capability such as lighting control, screen control, window blinds and drapery control, and videoconference system control will be determined on a room-by-room basis. All EWU classroom control systems use equipment from AMX and Extron Electronics. Any equipment installed in classrooms must interface directly with
control systems from AMX or Extron.

Wall mounted controllers should be no higher than 48” for ADA access.

Lectern PC
All classrooms should have a permanently installed lectern computer workstation for instructor use. Computer hardware will closely follow EWU recommended specifications as set by the hardware standards group. Each lectern computer will have an LCD monitor mounted on a moveable arm. As of June 2008, all lectern computers will support dual-booting Mac OS X 10.5 and Windows XP. The only exception to this will be the existing computers in Senior Hall, which are not scheduled for replacement until June 2010.
Guest PC/Laptop connections
All classrooms will include cables for connecting a laptop computer to the classroom presentation system. The cables will support laptop video via VGA, laptop audio via 3.5mm audio, and laptop network connectivity via CAT5e/CAT6. Beginning in summer 2009, USB connections will also be provided for instructor laptops to connect to document cameras and SMART Boards (where applicable).

Document Camera
All classrooms will include a document camera for display of classroom support materials. The document camera will connect to the classroom presentation system via VGA cable. Document cameras will replace overhead projectors in all enhanced classrooms with the exception of auditoriums. Overhead projectors will remain in non-enhanced classrooms.

DVD/VCR
All classrooms will include a DVD/VCR combination player. Classrooms without DVD playback capability should be updated as soon as possible. Classrooms with existing stand alone VHS players and DVD players are acceptable.

In videoconference classrooms, an additional VCR or DVD-R will be installed to record videoconference sessions.

Microphone
All classrooms will include at least one wireless lavaliere microphone for instructor use. The microphone(s) will connect directly to the classroom audio system and will be heard over any classroom content. The microphone(s) will also connect to the classroom hearing assist system. Additional microphones may be included in large classrooms, auditoriums, or videoconference classrooms.

Hearing Assist System
All classrooms will include support for an installed hearing assist system for audio reinforcement of all classroom audio from all sources and the instructor microphone(s). Each system will include a belt-pack receiver and headphones.

Audio Amplifier & Speakers
All classrooms will include amplified audio systems capable of full-range audio playback. Smaller classrooms (40 or fewer seats) will use two wall-mounted speakers and large classrooms and auditoriums will use multi-speaker ceiling-mounted distributed audio speakers. Distributed audio systems are always preferred unless space above the ceiling is inaccessible.
Scheduled Replacement Cycle
Classroom equipment will be replaced and upgraded on a regular basis, specific to the type of equipment.

- DVD/VCR – 2-5 years
- Computer – 5 years
- Projector – 5 years
- Document camera – 5-8 years
- Audio equipment – 10 years
- Switching equipment – 10 years

Items to be addressed in future drafts:
Computer classrooms – KGS 331, SNR 225
Additional detail on the configuration of student workstations
Videoconference classroom configurations – similar to standard enhanced classrooms, but mention codec, camera and mic placement, and local monitor
Information on rack-mounted equipment inside the lectern
Additional info on the proposed lectern design for summer 09
Research into classroom guidelines at other schools and discussions with classroom technology staff, students, and faculty led to this document.

- Western Washington University—WWU (2002)
- Emory University (2007)
  - http://www.college.emory.edu/about/planning/facilities/classrooms.html
- Penn State University—PSU (2007)
- University of California Santa Cruz—UCSC (2003)
- University of Cincinnati—UC (2003)
- University of Washington—UW (2007)
- University of Minnesota—UMN (2006)
- University of Alberta—UAB (2003)
- North Carolina State University
- Middle Tennessee State University
- Purdue University
- Northern Arizona University
  - Items identified as EWU are based on ad hoc discussions held with faculty and staff during the 2007 – 2008 school year

From the research into classroom design, install, and support standards at these schools, I noted a list of ideas to implement or consider implementing at EWU in future projects. Items on this list are wide-ranging and may require more in-depth space renovation, but are worth consideration.

- Labels on all equipment—make, model, location, date installed (WWU)
- Classroom Data Sheets (Emory)
  - Photo of preferred room setup
  - Presentation equipment installed
  - Contact numbers for help—2247 and 2245
  - Posted near door or lectern
  - Room capacity (UMN)
- Sight lines from all seats to projection screen (PSU)
- Square footage per student work area (PSU, Emory, UCSC)
  - 25 sq ft – PSU, Emory
  - 20 sq ft – UCSC
- Tables & chairs (PSU, UW, UAB)
  - No more tablet arm chairs
- Lighting control (Emory)
- Paint/wall colors (Emory, EWU, UAB)
  - Artwork, EWU-themed
- Angled projection screens (PSU)
- Screen to seat distances
  - Screen to closest seat = same as screen width
    - Half the width (UMN)
- Screen to farthest seat ratio is 20% of the distance = height (Emory, UC)
- Document cameras to replace overhead projectors (Emory)
- Doors to the rear or sides of the room (UCSC)
- Doors with small windows (PSU, UCSC, Emory, UMN)
- Motorized screens (PSU, UCSC)
  - Variable screen stops (UW)
- Whiteboards
  - At least 8 feet of useable board when projection screen is down (UCSC)
  - Minimum 16 feet total whiteboard (UW)
- Large, easy to read clock (UCSC)
- Lighting (Emory, EWU, UC, UMN)
  - Multiple zones at the front for separate projection screen and whiteboard
- Rack mounted inside lecterns (EWU)
- Stackable chairs (JISC)
- Detail policies and procedures for lectern computer software (EWU, UW)
- Define classrooms as “scheduled non-laboratory instruction” (UW)
- Instructor area – 8 to 10 feet (UW)
- Separate locks for non-instructor equipment (UW)
- 16:9 screens must have the same minimum projected height as 4:3 (EWU)
- Projection screens now all 16:9 (UMN, EWU)
- Adjustable height lectern (UAB)
- Chalkboards prohibited in classrooms with installed equipment (UAB)
- Chair/stool at all lecterns for instructors (UMN)
Contra Costa Community College
  www.4cd.net/facilities/DesignGuidelines.asp
Dartmouth College
  www.dartmouth.edu/~fpo/Standards/index.html
Emory University
  www.college.emory.edu/about/planning/facilities/classrooms.html
Joint Information Systems Committee, UK
  www.jisc.ac.uk/eli_learningspaces.html
Middle Tennessee State University
  www.mtsu.edu/campusplanning/GuideDocs_CampPlan.shtml
North Carolina State University
  www.ncsu.edu/classtech/standards/index.php
Northern Arizona University
  jan.ucc.nau.edu/lrm22/learning_spaces/
Penn State University
  www.opp.psu.edu/construction/standards/index.cfm
Purdue University
  www.itap.purdue.edu/tlt/tic/index.cfm
University of Alberta
  www.uofaweb.ualberta.ca/pi/standards_guidelines_specifications.cfm
University of California Riverside
  iclassroom.ucr.edu/index.php?content=profiles
University of California Santa Cruz
  media.ucsc.edu/contact/classroomguidelines.html
University of Cincinnati
  www.uc.edu/architect/documents/design/learnenv.pdf
University of Michigan
  www.crlt.umich.edu/learningspaceguidelines/
University of Minnesota
  www.cppm.umn.edu/standards.html
University of North Carolina at Chapel Hill
  www.fpc.unc.edu/DesignGuidelines.asp
University of South Alabama
  www.southalabama.edu/masterplan/standards.html
University of Utah
  www.facilities.utah.edu/cdc/DesignStandards/DesignStandards.html
University of Washington
  depts.washington.edu/fsesweb/fdi/fdi.html
Wake Forest University
  www.wfu.edu/facilities/plan/appendix2.html
Western Washington University—WWU (2002)