Cabrillo College

FACILITIES AND TECHNOLOGY PRIORITIZATION, TRACK 1 RECOMMENDATIONS

classroom guidelines and standards

Committee: Spring Andrews, Francine Van Meter, Steve Hodges, Anna Zagorska, Calais Ingel, David King, Denise Lim, James Weckler, John Graulty

9/30/16* Conditionally approved by Facilities Planning Committee and Technology Committee (*pending campus-wide accessibility audit recommendations)

TABLE OF CONTENTS

INTENDED AUDIENCES

The primary audiences for this document are:

1. External vendors (contracted to provide goods and/or services for formal learning spaces for Cabrillo)
2. Project teams (those who design, manage and construct formal learning spaces)
3. Internal units
    a. Facilities Planning and Plant Operations (FPPO)
    b. Information Technology (IT)
    c. Instructional Division faculty/staff/administrators

PURPOSE

This document is intended to be the primary source of information to describe formal learning spaces at Cabrillo College (i.e., classrooms); and to provide:

1. Guidelines for room design, construction and/or renovation of formal learning spaces
2. Descriptions of formal learning spaces to aid in room selection for specific teaching and learning needs

All renovations must be integrated with the Cabrillo College Master Planning and Program Plan process. Evidence of alignment and relationship to campus-wide initiatives must be provided. Other Cabrillo standards documents must be consulted for any formal learning space renovation:

- FPPO Project Charter [instructions] [request form]
- Accessibility Standards [*campus-wide accessibility audit, fall 2016— document pending*]
- IT Standards [see examples in Table 1, Recommended Standards]

SCOPE

Teaching and learning space design guidelines should be discussed when designing any formal and informal learning space. Specific standards include physical access, IT services, as well as Code Compliance[1], and apply to all classroom designs.

FORMAL LEARNING SPACES

Formal learning spaces are used for structured, scheduled teaching and learning activities, most commonly known as a classroom or teaching lab. At minimum, a formal learning space should contain:

1. Writable surface for instructor (whiteboard or blackboard)
2. Writable surface for students
3. Chairs for students to sit
4. Location for instructor (e.g. podium)

INFORMAL LEARNING SPACES

Informal learning spaces are multi-purpose spaces where students and instructors can gather to work and socialize together. These spaces, which are often located in libraries, dining areas, and hallways, are designed to be flexible in order to best support a range of individual or group work that may take place within them. Learning outside of the classroom will occur in these informal spaces on campus. This document does not focus on

[1] Each school building constructed, reconstructed, modified, or expanded after July 1, 2006, on a community college campus shall be built according to the Field Act, as defined in Cal. Educ. Code §81130, and in accordance with the California Building Standards Code, as adopted by the California Building Standards Commission.

informal learning spaces however the guidelines and standards included in this document should also be discussed when designing informal learning spaces.

Principles for Designing Teaching and Learning Spaces

The National Survey for Student Engagement (NSSE) is a respected indicator of student engagement used by over 1450 universities across North America. Their five Benchmarks for Effective Educational Practice are based upon extensive educational research.[2] Four of these benchmarks are considered when designing or renovating classroom spaces to support student learning.

Active and collaborative learning:
"Students learn more when they are intensely involved in their education and are asked to think about and apply what they are learning in different settings. Collaborating with others in solving problems or mastering difficult material prepares students to deal with the messy, unscripted problems they will encounter daily during and after college." Learning spaces should provide features that allow students to actively engage with content and to collaborate with one another.

Student-to-faculty interaction
"Students see first-hand how experts think about and solve practical problems by interacting with faculty members inside and outside the classroom." Learning spaces should reduce physical distance and barriers, and facilitate exchanges between students and faculty in the classroom.

Enriching educational experiences
"Complementary learning opportunities inside and outside the classroom augment an academic program." Learning spaces should include a range of technologies that enrich the educational experience by supporting multiple modes of teaching and learning. Such technologies should support instructor as well as student sharing of multiple information sources.

Supportive campus environment
"Students perform better and are more satisfied at colleges that are committed to their success..." Learning spaces should provide a livable environment. Design and materials should be developed with sustainability in mind.

ENCOURAGE ACTIVE & COLLABORATIVE LEARNING

a. Active engagement with content
   - Work surfaces — for notebooks, laptop, textbooks

b. Active collaboration with each other
   - Layout — two rows on a tier, small groupings, sightlines
   - Furniture – fixed chairs that rotate, movable tables and chairs

ENCOURAGE STUDENT-TO-FACULTY INTERACTION

a. Promote interaction
   - Layout — move about easily, multiple aisles, sightlines
   - Furniture — central podium so no 'front' of room; smaller podium to reduce distance

b. Promote communication
   - Acoustics support productive exchange

[2] *National Survey of Student Engagement.* http://nsse.iub.edu/pdf/nsse_benchmarks.pdf. 2008

- Instructor can hear all students, students can hear instructor, students can hear students
- Sound zones should support having multiple conversations

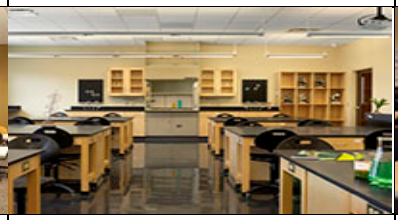
ENRICH EDUCATIONAL EXPERIENCES

a. Technologies support multiple modes of teaching and learning
    - Standard room controls to facilitate ease of use of multiple rooms
    - Two sources (e.g., document camera, computer display), and multiple screens
    - Access to resources (e.g., LMS, internet, interactive whiteboard)
    - Technologies for student sharing (e.g., writable walls, screens for small group work, screen sharing, export work)
    - Appropriate mix of desktop and laptop/mobile devices
    - Power for student devices

PROVIDE A SUPPORTIVE CAMPUS ENVIRONMENT

a. Environmental Quality
    - Ventilation
    - Temperature
    - Comfortable furniture
    - Lighting & Shades
    - Aesthetics
    - Storage
    - Security
b. Promote sustainability
    - Sustainable materials, building practices, and technologies
    - Adaptable to new uses at a reasonable cost (e.g., raised floors for conduits)
    - Re-use and re-cycle
c. Minimize secondary effects that impact use of learning space
    - Noise and movement through and around environment surrounding classroom

TABLE 1 – RECOMMENDED STANDARDS

Classroom types	*Large classroom, 2 or more exits*	*Small classroom 1-2 exits*	*Specialty Classrooms/Labs/ Performance Spaces*	*Active Learning Classrooms*
Classroom floor design	flat /tiered room	flat room with front	flat room, **	flat room**
Image of Classroom type				
Lighting	Standard scenes with/without automation	Manual zones (front, board, room)	Custom scenes with automation	Custom scenes with automation
Window shades	Automated/Manual	Manual	Automated/Manual	Automated/Manual
Acoustics	Amplified audio (instructor mic)	Amplified audio – no mic	Amplified audio (instructor/student mic)	Amplified audio (instructor/student mic)
Floor material	Raised floor - conduit (e.g. auditorium) Soft/Hard/Resilient	Soft/Hard/Resilient	Soft/Hard/Resilient	Soft/Hard/Resilient
HVAC	Re-evaluate for new design	Re-evaluate for new design	Re-evaluate for new design	Re-evaluate for new design
Safety & Security	Re-evaluate (e.g. door lock, alarm panel)	Re-evaluate (e.g. door lock, alarm panel)	Re-evaluate (e.g. door lock, alarm panel)	Re-evaluate (e.g. door lock, alarm panel)

Classroom types continued	*Large classroom, 2 or more exits*	*Small classroom 1-2 exits*	*Specialty Classrooms/Labs/*	*Active Learning Classrooms*
Podium	Front, movable**, motorized	Front, movable**, motorized / mini	Center**, movable** OR none	Center**, movable** OR none
Writable surfaces	Black / White boards, writable walls**	Black / White boards, writable walls**walls**	White boards, writable walls**	White boards, writable walls**
Writable surfaces (digital)	Interactive whiteboard	None OR Interactive whiteboard	Epson OR Interactive whiteboard	Epson OR Interactive whiteboard
Furniture and Layout	Movable tables** and chairs** OR Tablet chairs**	Movable tables** and chairs** OR Tablet chairs**	Fixed tables, movable task chairs**	Round, movable tables**, movable chairs**
IT package	Level I	Level II	Level III or Custom	Custom
Students to computer ratio	None	None	1:1, student:desktop or workspace	2+:1, student:desktop
Power for student laptops	Optional	Optional	Yes	Yes
Video / Web conferencing	Web Conferencing (Webcam) or Videoconferencing	Web Conferencing (Webcam)	Web Conferencing (Webcam)	Web Conferencing (Webcam)

** Note: These features support active and collaborative learning

PURPOSE OF TABLE 1

Table 1 provides an overview of the types of formal learning spaces and the features that ideally should characterize each type of classroom. These should be considered aspirational at this time as current classrooms may not yet conform to all standards. Terminology in Table 1 is for use college-wide to refer to classroom types and features. Using consistent language should increase clarity of communication.

CAPACITY (NOT SEAT COUNT)

The continuum at the top of Table 1 shows that classroom types are generally presented by decreasing capacity. As indicated in the Principles, student faculty interaction and active and collaborative learning are goals for teaching. Interaction is a critical aspect of the learning process and the larger the classroom space the more challenging it can be to generate interaction between students and instructor and students and students.

CLASSROOM TYPE

Because descriptors such as large and small have relative points of reference (and seat count can vary widely), rooms are loosely defined as type to make it easier to differentiate room features required. Room size is determined by Code compliance as well as teaching and learning needs. Initial layouts must attempt to maximize seating capacity, maximize interaction and comply with Code.

1. **Large Classrooms**
    - Auditoriums are the largest spaces available on campus and are often also used for public events. These spaces tend to be sloped and have fixed, theatre-style seating.
    - Lecture halls and forums are larger environments that are primarily designed as teaching and learning spaces (although they may be used for events). They have fixed tiers, but may offer some greater flexibility for student learning including larger surfaces for students, and seating more appropriate for learning that may be movable.
    - Large classrooms can be tiered and look similar to lecture halls but often have fewer students, more movable chairs and less IT.
    - Large flat classrooms are separated into two or more door exits. They generally have movable furniture (tables and chairs or pods depending on capacity requirements), writable walls and movable podiums.
2. **Small Classrooms**
    - Small flat classrooms are separated into one or two door exits. They generally have movable furniture (tables and chairs or pods depending on capacity requirements), writable walls and movable podiums. Layouts can support greater student faculty interaction (including placing the instructor in the center as well as having students oriented in pods) for active and collaborative learning.
3. **Specialty Classrooms**
    - Computer classrooms, wet labs, etc. are designed as places for specific applied learning. They generally have 1:1 student to workspace ratios and are geared towards both group and individual work
4. **Active Learning Classrooms**
    - Active Learning Classrooms are teaching and learning spaces designed to foster students' active engagement in their own learning. Characteristics of these spaces include round tables, podium in the center of the room, writable walls, as well as a number of technologies, such as screen sharing and multiple walls of projection.

CLASSROOM EXAMPLES AND IMAGES

Examples of each classroom type can be found on campus, or through resources like FLEXspace.org and EDUCAUSE. These standards, in addition to standards for physical access and Code Compliance, serve as a guide for future classroom renovation projects.

LIGHTING

Layout of lighting should include multiple zone lighting. Lighting should provide effective illumination for student writing while at the same time, have less direct light shining on projected surfaces. Lighting controls should be located next to the door and not require auxiliary equipment to be controlled, as well as integrated with room automation wherever possible.

Major lighting scenes:

1. Projection (room on, lights on screens off)
2. Multimedia viewing (room off, minimal lighting)
3. Discussion / Board work (room on, lights on screens/boards on)
4. Customized lighting (while scenes would be automatically set, they should **all be customizable by the instructor** and override everything manually from a wall control, for example).

WINDOW SHADES

Shades are necessary if natural light is present. Shades should be standard automated and set with lighting scene control wherever possible. Timed to the program but manually overridden by a wall control. (*Note: maintenance costs high long term)* Blackout shades may be required in specific rooms depending on the type of teaching and learning taking place.

ACOUSTICS

Acoustics encompasses sound travelling in and out of the room.

1. Rooms should have proper acoustic treatment to ensure that hallway noise is not heard inside the classroom and classroom noise does not interfere with nearby classrooms. Rooms should have amplified audio (and wireless audio) where possible.
2. Within the room, acoustic sound zones should be designed to maximize the following types of interactions: instructor-student, student-instructor, student-student and group interaction.

FLOORS

Flooring options vary according to intended use.

HVAC

Re-evaluate new design for heating and ventilation needs.

SAFETY & SECURITY

Re-evaluate safety and security needs for proposed design.

PODIUM

The podium is the main furniture used by an instructor to facilitate a class. The podium should be designed to suit the room and would include all instructor IT-AV related equipment, maintain space for other instructor materials and adhere to accessibility guidelines (including motorized up/down controls). Two types of podiums are possible:

1. **Movable podiums** – Generally smaller, large working surface, powered and movable. Technology should "retract" wherever possible to create a clean work surface. If podiums are movable, adequate length conduits should be used to ensure mobility.
2. **Mini podiums** – These podiums may be used in combination with another type in order to promote instructor-student interaction. They are often small movable tabletops on wheels that may only hold papers, laptop or wireless keyboard and mouse. A mini podium may also be fixed to a wall, providing a location for an instructor laptop or materials in a small room.

WRITABLE SURFACES

Surfaces include writing areas for instructors and students. There are two types of writable surfaces:

1. **Writable surfaces** – Whiteboards or blackboards may be chosen depending on local instructor preferences; however, care should be taken to ensure that only one type should be located in each room. Blackboards should be wall mounted with sliding panels. Whiteboards should be directly mounted on the wall with standard porcelain mounted on steel (non-reflective for projection directly upon their surface). Surfaces for students include writable wall space available for collaboration and should be mounted on all walls possible. If projector screens are used, care should be taken so that they are not mounted over writable surfaces, but rather project onto them, or to the side of them.
2. **Writable surfaces** (digital) – Interactive whiteboards and interactive pen displays are surfaces where instructors can write directly on computer screens. Advantages of these surfaces include the ability to annotate any computer image as well as archive work for distribution.

FURNITURE

Because furniture will often change from year to year, the standards reflect general types of furniture and criteria for their selection. Classroom furniture generally falls into the following categories:

1. Auditorium seating
2. Fixed or moveable tables and moveable chairs
3. Tablet chairs
4. Task chairs
5. Lab stools
6. Instructor stools
7. Lockable storage

Overall criteria for selecting furniture include:

- All furniture should have enough work space to accommodate student papers as well as laptops.
- Consider accommodation for storage of bags and coats.
- Chairs should be height adjustable if used with a table.
- Chairs should have casters to promote flexibility and movement within a classroom
- Tables should be able to be wired for power if required.
- Movable tables should be able to be combined into groups with table legs not interfering with student movement.

ROOM LAYOUTS

Furniture selection can have a great impact on capacity. Layouts should support active and collaborative learning and student-faculty interaction. For rooms with movable furniture, multiple layouts should be made available upon project completion (including layouts for collaboration and group work). Care should be taken when designing layouts to ensure that all seating is used or stored to fit the capacity of the room.

IT PACKAGES

Instructional technology and audiovisual equipment are used in the classroom to enhance communication, interaction, and connectedness to other contexts. This includes projectors, media players (Blu-Ray), writable surfaces (document camera, chalkboard, whiteboard, and writable walls), automated recording systems, sound systems, connectors and cables, screens and automation. It also includes computers at podiums along with their accessories. It would also include any computers or AV used by students in the classroom. All installations should be digital, HD or WXGA projectors along with HDMI and VGA connectors for laptops. Custom packages should be developed only where required (for example, in Active Learning Classrooms).

Proposed categories & packages

The standards are intended to support the broadest range of technologies for teaching and learning given the physical attributes of a classroom. These standards should be applied within a given context and as appropriate.

Tier I: Large Classrooms (Auditorium, Lecture Hall, Tiered and Non-Tiered classroom, typically 100+ students)

Projection	2+ Projectors
Sources	Multiple simultaneous (Document Camera, Desktop computer, Laptop computer input, Aux AV input)
Display	Multiple
Display surface	Screens
Connections	HDMI connection, Auxiliary AV, Analog sound, LAN jack, Wireless
Podium Computer	Desktop with easy access to USB connection
Conferencing	Web Conferencing (Webcam with multiple view camera)
Podium	Fixed or movable, motorized
Sound system	Public Address system with Wireless capability, speakers
Recording system	Optional (Multiple screens + Video), [controlled by instructor]
Automation	Optional
Help Telephone	Yes (with only 2 buttons – emergency, Classroom help)

Tier II: Small Classrooms (Flat Classroom, Active Learning Classroom)

Projection	1 Projector
Sources	Multiple (Laptop computer, Document Camera, Aux AV)
Display	Single
Display surface	Screen or writable wall (Active learning classrooms may require additional display.)
Connections	HDMI connection, Auxiliary AV, sound, LAN jack, Wireless
Podium Computer	Optional
Conferencing	Optional – Web Conferencing (Webcam with multiple view camera)
Podium	Movable, motorized
Sound system	Optional Public Address system with Wireless capability, speakers
Recording system	Optional (Screen only)
Automation	Optional
Help Telephone	Yes

Tier III: Specialty Classrooms (Computer classroom, special labs)

Projection	1 Projector (Normal or Ultra Short Throw) OR 1 LED
Sources	Single (Laptop computer, Aux AV, Document camera)
Display	Single
Display surface	Screen or Writable wall
Connections	HDMI connection, Auxiliary AV, sound, LAN jack, Wireless
Podium Computer	None
Conferencing	None
Podium	Movable OR mini-podium
Sound system	Room speakers or USB speaker/mic
Recording system	No
Automation	No
Help Telephone	Yes

Room control interface

The room control interface is the unit designed to automate, control and interact with the installed AV in the classroom. Interface should be standardized based on 3 standard packages (plus custom interfaces for specialized rooms). AV in complex rooms (such as Active Learning Classrooms) will require custom programming. Previous templates should be used wherever possible. Interface designs should be pre-approved via the FPPO/IT Project Charter and should be designed before construction begins.

REFERENCES

Classroom Design

- 7 Principles for Classroom Design
  http://er.educause.edu/articles/2015/2/seven-principles-for-classroom-design-the-learning-space-rating-system
- 5 Tips for Active Learning Space Design
  https://youtu.be/KXDTxEeLLD8
- Active Learning Spaces — Design Considerations
  http://www.cabrillo.edu/services/ccg/learningspaces.html

Cabrillo Projects Forms

- How to complete a Facilities Planning and Plant Operations Project Request Form (*Appendix A*)
  https://www.cabrillo.edu/internal/facilities/documents/Project%20request%20Form%20Processes.pdf
- Project Request Form (*Appendix B*)
  https://www.cabrillo.edu/internal/facilities/documents/Project%20Request%20Form.pdf

APPROXIMATE LIFE CYCLE OF A PROJECT

✓ A need is identified	
✓ A project request form is filled out and submitted to FP&PO	2 weeks
✓ The project request form gets a rough estimate based upon scope	2–3 weeks

Without an Architect: (small scale project – non-structural work)

✓ Component approves project	2 weeks
✓ Project Manager assigned to project and scope development refined	1 month
✓ Quotes for work are acquired	1 month
✓ Charter developed and funding source assigned w/ signature approvals	1 month
✓ Contracts for vendor/s (w/ DIR approval & bonding over $25k)	6 weeks
✓ Construction / Technology / Furniture & Equipment (depending on size of project)	4–6 Months
✓ Close out / Punch list	2 months
Estimated Total:	16.5–18.75 months

With an Architect: (Structural / design or large scale needed)

✓ Component approves project	2 weeks
✓ Board / Cabinet / CPC / FPC / other approval process	3 months
✓ Project Manager assigned to project and scope development refined	1 month
✓ Architect selected and contracted to design project	3–6 months
✓ DSA approval	3–4 months
✓ Formal/Informal bidding process	3 months
✓ Board approval for formal bids	1 month
✓ Execute contracts	6–12 months
Estimated Total:	21.5–32.75 months