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The purpose of this document is to describe the base technology configuration in classrooms and labs. Unique academic technology requirements will be individually assessed and designed over and above the base configuration.

Please also refer to the document called Master Guidelines for Communications Infrastructure.

1. **Base Classroom Overview:**

   - Furniture and technology should be reconfigurable and future proof.
   - Each classroom requires a moveable instructor’s podium.
   - Student desks should be lightweight, moveable, and easily reconfigured into different arrangements for group and individual work.
   - Obstructions, viewing distances and viewing angles should not compromise the ability of students to engage with presented materials and activities.
   - There should be adequate writing surfaces on the walls. Currently, whiteboards are dual purposed for both writing and for projector images (instead of pull down screens).
   - Faculty requires comfortable well-ventilated and cooled environments with good control of natural light.
   - Faculty and students also require a quiet learning environment of STC 60.
   - Doors should be located in the rear of room to minimize distractions as people walk in and out.
   - Classrooms should be distributed throughout the building such that all have direct or indirect natural light.
   - All classroom windows should have retractable, 100% blackout coverings suitable for showing videos.
   - “Split classrooms” must be divisible into 2 sections separated by a motorized retractable partition with minimum STC 52.

2. **Accessibility:**

   - All doors require 1066mm clearance.
   - All doors require automatic door openers.
   - All doors require security card access.
   - Classrooms must have a designated percentage of accessible seating.
   - Seating must be provided with optional viewing areas.
   - Room colours and colour contrast should be used in a meaningful but non-distracting way for persons with disabilities.

3. **Base Classroom Technology:**

   3.1. **Overview:**

   - Unless otherwise specified, network connections for students are wireless.
   - In all teaching spaces, students and faculty will bring their own laptops (and other mobile devices).
   - Classrooms are equipped for contemporary teaching methods and utilize the most up to date technological tools.
   - Lights, blinds, sound and projectors should be easily controllable from a podium mounted control system.
   - Classroom technology includes audio/visual (AV), IP phones, IP clocks, network devices, wireless network access devices and door security devices.
Clocks should be installed over the classroom entrance doors.

Ongoing e-Learning initiatives are in progress at Sheridan. Therefore, considerations must be made for future requirements to capture classroom activities for delivery to remote students.

AV, network and other technologies should be concealed as much as possible yet easily accessible for servicing.

3.2. Podiums:

- Podiums must be easily movable by teachers.
- The podium must be lightweight yet durable.
- Much of the classroom’s AV equipment is installed inside the podium.
- The podium must be secured so equipment cannot be easily reconfigured or stolen.
- Each podium supports a PC, a document camera, a Crestron touch panel, microphone, telephone and cables for user provided laptops (HDMI).
- The Crestron touch panel on the podium controls the media devices and projectors. It also controls room functions such as lighting, motorized blinds, sound levels, etc.
- There are five floor monuments to accommodate optional podium locations in the room.
- Electrical outlets and network jacks are required in the floor monuments.
- There is one purple network jack in each floor monument.
- The network cable from the podium is also purple to match the purple jack in the floor. These purple jacks and cables identify designated ports for the podium.

See diagram below for current “standard” podium specifications.
3.3. Display systems:
- Presentation materials should be displayed at multiple locations in each classroom.
- The ability to display more than one image source at a time is required.
- Display systems are always deployed in pairs (A & B).
- Obstructions, viewing distances and viewing angles should not compromise the ability of students to engage with presented materials and activities.
- Currently, short throw projectors are utilized and images are displayed onto whiteboards. For certain academic programs this may not provide adequate quality.
- Display systems require adequate clearances from both physical and viewing obstructions. For example ducts, lights, pipes, air vents, fire alarms, thermostats and other mechanical devices must not be in the way physically nor should they be located in a way that obstructs the image or casts shadows.

3.3.1. Display System Locations, Quantities and Types:
- Determined by the following:
  - Application requirements. (i.e. presentations, video, photography, text, graphics).
  - Viewing distances- both maximum and minimum distance.
  - Viewing angles.
  - Obstructions. (i.e. windows, light levels, desktop monitors, posts, etc)

As part of the room design phase each room must be individually assessed.

See below for examples on how to determine display system quantities, locations and projector types.

Presentations/text Mode:
Video/Gaming Mode:

NEC U310W — $1,282 Street Price, $1,689 MSRP (USD)
1280x800 resolution DLP, 3100 ANSI lumens, 2000:1 contrast, 14.3 lbs

Primary Use:
- Presentations
- Data/Text
- Video/Games

Recommended Seating:
- 8’ - 14’

At Throw Distance:
- 1’11”

Max Room Lighting:
- 1% (7 ft)

NEC U310W Projection Calculator

Lens:
- Throw Ratio: 0.30

Image Brightness: 01 FL

Units:
- Imperial
- Metric

Aspect Ratio:
- 4:3
- 16:9
- 2.35:1

Screen Gain: 1.0

Throw Distance:
- Recommended image brightness for rooms with ambient light

Image Diagonal:
- 350”
- 300”
- 250”
- 200”
- 150”
- 100”
- 50”
3.3.2. **Elevated Wall Specifications:**

- Each display system requires electrical power and network connection(s).
- Exact heights and locations of electrical outlets and network jacks for projectors are specified.
- The standard whiteboard height is also specified. Accuracy is critical when short throw projectors are deployed and projected onto whiteboards.
- See diagram below for specifications.

3.4. **Media Racks:**

- Media racks should not utilize classroom floor space.
- They should be located in safe locations which do not impede pedestrian traffic or in-session classes and meetings. For example, it would not be good practice to locate a ceiling mounted media rack immediately outside a door that could knock a technician off the ladder.
- Media racks should be physically accessible from outside of the classrooms (for servicing) in order to minimize classroom interruptions. One dedicated media rack is required per classroom. For split room designs, each room should have its own rack for a total of two.
- Media racks require adequate physical clearance to allow for airflow and accessibility to the equipment inside.
- Plenum rated racks may be required in certain rooms.
- Hydro should be terminated inside the media rack in accordance to code.
- Network jacks for media rack equipment should terminate outside but adjacent to the rack.
- Currently, media racks reside in the ceiling. The media racks house AV equipment, network switches and lighting controls.
The following is the college’s current media rack solution: http://www.panduit.com/groups/MPM-BR/documents/InstallationInstruction/110317.pdf

<table>
<thead>
<tr>
<th>Part Number</th>
<th>PZICEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>RoHS Compliancy Status</td>
<td>Compliant</td>
</tr>
<tr>
<td>Part Description</td>
<td>Fully assembled in-ceiling active enclosure.</td>
</tr>
<tr>
<td></td>
<td>Accepts up to 2 RU of active network equipment and up to 6 RU of passive product. Includes mounting brackets, integrated horizontal slack manager, AC power provisions, fan assembly, air dam, and electrical junction box.</td>
</tr>
<tr>
<td></td>
<td>External dimensions: 13.50&quot;H x 25.50&quot;W x 27.50&quot;D (342.9mm x 647.7mm x 698.5mm).</td>
</tr>
<tr>
<td></td>
<td>Internal dimensions: 11.49&quot;H x 22.31&quot;W x 22.46&quot;D (291.8mm x 566.7mm x 570.5mm).</td>
</tr>
</tbody>
</table>

| Depth (In.) | 27.5 |
| Depth (mm) | 698.5 |
| Height (In.) | 13.5 |
| Height (mm) | 342.9 |
| Width (In.) | 25.5 |
| Width (mm) | 647.7 |

3.5. Classroom Technology Connectivity:
- The classroom AV solution leverages the data network. Podium equipment such as laptops, PCs and document cameras are effectively streamed over the network to the display systems.
- A network switch is installed in the media rack to accommodate local in-room AV equipment.
- Three Cat 6 cables will be installed between the media rack and the designated wiring closet.
- The AV installer will install Belden Cat 6 patch cables between the display systems and the media rack switch.
- The network cabling on the walls, which is designated for projectors, will be used for monitoring and control. This cabling will terminate in the designated wiring closet.
- Network cabling for all other services such as wireless access points (WAPs), security devices, floor monuments, door locks, IP clocks and convenience jacks will terminate in the designated wiring closet.
- Cabling for podium equipment is contained within the podium except for one purple network cable and one power cable.
Microphone connectivity will be provided via RF or over the data network. Antennas will be installed in the ceiling.

- The AV installer will run wiring for ceiling mounted speakers back to the media rack.
- Each classroom will have cabling pathways between the room and the media rack. Hydro and communications cabling will be kept in separate pathways.
- Each classroom will have cabling pathways from the ceiling to the floor. Hydro and communications cabling will be kept in separate pathways.
- Unless otherwise specified, network connections for students are wireless.

4. **Floor Monuments:**

- Each classroom will have five (5) floor monuments. These are provided for the movable podium and for general use.
- Each monument will have two electrical outlets and two network jacks.
- One network jack per monument is especially configured for podium use only. This jack should be coloured purple for identification purposes.
- The second network jack is for student and/or general use.
- Electrical outlets and network jacks should be contained in the same floor unit.
- Safety- Avoid tripping hazards such as raised monument covers, holes and raised cabling.
- Functionality- Teachers must be able to readily access the plugs without special tools.
- Operational considerations- There must be protection for plugs, cables and jacks from dirt, furniture, pedestrian traffic, etc.
- Monuments must be secured to the floor so they don’t pop out when the user unplugs their devices.
- The under-floor electrical and network cabling which is connected to the floor monuments must have enough slack so that each monument can be moved to any location in the room (including the furthest locations).
- The under-floor electrical cabling should be flexible to minimize future renovation costs. The use of under floor whips and junction boxes should be used.
- Particular attention must be given to the compatibility of the floor monuments with the flooring system.
- The following has been the preferred solution at the college.

**Legrand RFB6E**

5. **Flooring:**

- Flooring must provide flexibility so rooms can be repurposed with minimal renovation costs.
- Raised flooring or some other method, which allows cabling and hydro to be moved to different locations in the room, are preferred.
- Must be quiet, minimizing room echo and the sound of footsteps.
- Must be compatible with selected floor monuments.
- Flooring solution must be ESA or CSA certified.
- Note: Some academic requirements are not compatible with raised flooring.

6. **Lights:**

- Dimmable light fixtures are not required.
- Wall switches will be located at each classroom entrance/exit in accordance to code.
- The podium mounted Crestron touch panel and the standard wall switches will control room lights.
- The Crestron touch panel and the wall switches must work like 3-way switches. One cannot be the master nor can one have a dependency on the other.
- Classrooms do not have a “front.” Teachers can relocate the podium throughout the room. Rooms will be physically different from one another.
  - Yet there must be a “standard” Crestron interface in each classroom. There will be no room specific Crestron customization.
- The Crestron will only turn lights on or off. No dimming.
- Crestron control systems must communicate with centralized building automation systems via the data network to control lighting.
- Split rooms must have independently controlled lighting zones. However, one master must be able to control the lighting zones in both split rooms.
- The Crestron touch panel will control two lighting zones per room.
  1. Perimeter zones- to enhance the viewing quality of the display images.
  2. Internal zones- the remaining lights in the room.
- When two split rooms are combined into one large room, the AV systems will control all four lighting zones to simulate two zones.

See below for examples of classroom lighting zones.
7. Writing Surfaces:

- Currently projector images are displayed onto whiteboards.
  - The projector image size is constrained by the height of the whiteboard.
  - Sunlight greatly diminishes the quality of the projector image. Therefore, 100% blackout window blinds are imperative.
  - Dirty writing surfaces affect image quality. Therefore, the room should be equipped with easily cleanable and non-staining writing surfaces.
- The college is open to alternative and innovative suggestions other than whiteboards such as writable paint and wallpaper.
8. **Room Designs:**

- The following are examples of ideal rooms. In many cases there will be variances to consider.
- As part of the room design phase each room must be individually assessed to deal with issues such as windows, posts, etc.

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**Six-Projector Room (Greater than 1000 sq. ft.)**

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Four-Projector Room (750-1000 sq. ft.)

Two-Projector Room (less than 750 sq. ft.)
9. Sustainability:

- Sustainability strategies are currently being developed.
- In the meantime, we can be “sustainable” in our approach to room technologies.
  - Design solutions that reduce the amount of equipment deployed.
  - Give preference to energy efficient technologies.
  - Automatically configure equipment to turn off or go into sleep mode when not in use.
- Integrate the Crestron control systems with centralized building automation systems and low voltage lighting solutions.
- Deploy digital signage with tangible sustainability metrics in high visibility areas.